

Local perceptions of the turtle conservation project in Gandoca-Manzanillo Wildlife Refuge, Costa Rica

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Abstract

Global biodiversity is rapidly declining due to a variety of factors related to anthropogenic activities. Of the six or seven species of marine turtles, all are listed endangered or at risk. Turtles have very long maturation rates making it difficult for populations to recover from activities affecting hatchlings, juveniles and adults. Direct harvest is historically one of the most important threats to turtles, but activities at sea and on shore also have serious impacts. Habitat loss is one of the leading causes of species extinction; this is true for nesting turtles whose nesting beaches have been altered by human activities.

Approaches to turtles conservation should occur at national and international levels through a variety and combination of techniques. One method incorporates the use of "community-based conservation". Community involvement is critical to the long term success of conservation projects, and is most effective when stakeholders can realise economic benefits.

Field research using household questionnaires was undertaken in Gandoca-Manzanillo Wildlife Refuge in March 2002, to investigate local perceptions of the turtle conservation project, including positive and negative perceptions. Involvement and perceptions of benefits were key factors influencing respondent's perceptions. It was difficult to correlate demographic attributes to perceptions due to the small sample size (n=26). Despite this, other authors have found that personal attributes are important to consider in these types of studies.

Key findings in this study were that: active involvement of the community is important for success in conservation projects, Community-based conservation initiatives cannot be oversimplified and romanticized, and there is a need for some level of centralized management in conjunction with local management.

Introduction

The biodiversity crisis

Biodiversity can be defined as “the total number of species occupying a region, continent, or the entire planet”... and “the variety and variability among these species and the ecological complexes in which they occur” (Kramer and Von Shaik 1997). The concept of “species” is important to biodiversity because species are the units of evolution and will go extinct; whereas populations, varieties, ecosystems and other subdivisions of nature are not at risk of extinction. The loss of species means the loss of genetic material and biodiversity (as potential resources to humans) (Kramer and Von Shaik 1997).

According to Kramer and Von Shaik (1997) the leading causes of species extinction include habitat loss, fragmentation, overkill, secondary extinction, and the introduction of exotic species. Estimates regarding biodiversity loss are crude due to the scientific ignorance of the current status of the majority of Earth’s species. Rates of extinction are 100 to 1000 times above natural expected rates (Dearden 2002) and in tropical ecosystems it was estimated that the rate at which species were becoming extinct were 1 species per day to 1 species per hour between the 1970’s and 2000 or 50 % of species by 2000 (Jordan 1995). These predictions are complicated due to difficulties proving losses which are only evident in regions with repeated surveys, and the consideration of organisms that are not yet extinct if they are not detected in surveys. Despite the lack of knowledge of the extent of the biodiversity crisis it can never be used as an excuse to do nothing (Kramer and Von Shaik 1997).

Turtles

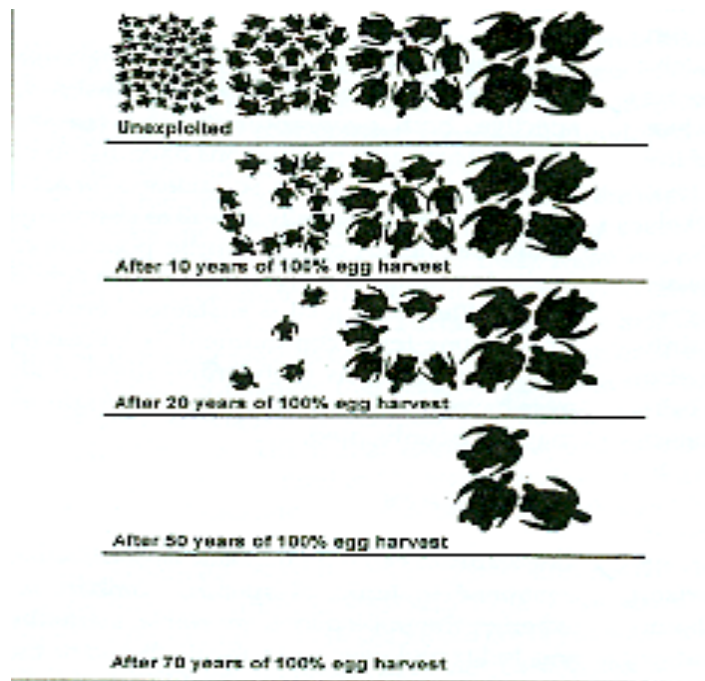
Sea turtles spend their entire lives in marine or estuarine habitats and in the world today there are seven or eight species. Only females will emerge from the sea, mainly to lay eggs on warm sandy beaches of tropical or sub-tropical latitudes. Multiple clutches can be laid per year over cycles of one to nine years. After laying an average of 65-180 eggs in a nest excavated by the hind flippers of the female, the nest is covered with sand and the female returns to the sea. Eggs hatch after about eight weeks of incubation depending on temperature. Once hatchlings reach the beach surface above the nest chamber they will immediately crawl towards the sea using visual cues, such as the brightest point on the horizon. Large numbers of eggs, hatchlings, juveniles and sub-adults must be maintained in the population to sustain even a small number of reproductively active adults because immature sea turtles grow slowly and maturity is delayed. Studies using mark-recapture methods have demonstrated that sea turtles have very slow growth rates under natural conditions. Species such as the green or hawksbill turtles can take 30 to 50 years to reach adulthood (Mortimer et al. 2000).

Why turtles are declining

According to Mortimer et al. (2000) sea turtle populations thrived until recent times. Human interference has become the main cause of recent declines; anthropogenic activities impact every stage of their life cycle. Historical and modern threats to species survival include direct harvest, mortality associated with fisheries and other factors, and damage to nesting and foraging habitats. The inclusion of all sea turtles on endangered species lists reflects past over-exploitation and the need for better management (Mortimer et al. 2000).

Figure 1 **The destruction of a nesting population from overharvesting of eggs**

Source: Mortimer et al. 2000



Direct harvest is historically the most important threat because impacts do not become evident until the population of the nesting beach has become dangerously close to extinction (Mortimer et al. 2000). Figure 1 shows that the population is destroyed from the bottom up because hatchling turtles are not able to enter the population and for most species it can take many years for turtles to reach adulthood. At least 20 to 40 years can pass after harvesting begins before the number of females nesting on a beach annually starts to decline. It can appear that a population is stable and abundant when there is a large aggregation of nesting turtles, but this does not reflect reality. In theory, small harvests could be sustainable, but in practice nesting

ground harvests are difficult to control and interfere with reproduction (Mortimer et al. 2000).

Hundreds of thousands of turtles are believed to die annually in fisheries activities; either by accidental or intentional capture, incidental drowning, or injury (Mortimer et al. 2000). Different age classes will be affected by fisheries activities in different ways. Nets set off of nesting beaches can impact breeding adults, while turtles caught in shrimp fisheries are often juveniles and sub-adults (Mortimer et al. 2000).

Feral or wild animals (pigs, dogs, cats, fox and raccoons) will also contribute to sea turtle mortalities. The presence of these animals increases when they have year round access to human garbage with clutch mortalities up to 100% on some nesting beaches. Other factors of direct turtle mortality include boat strikes, dredging operations and underwater explosions. Misguided management efforts, such as poorly run hatcheries, can often be overlooked but must also be considered.

According to Kramer and Von Shaik (1995) habitat loss is one of the leading causes of species extinction and this is also true for sea turtles. Turtle habitat is being eliminated by human environmental modification. On nesting beaches habitat is lost through unregulated coastal development, structures have caused erosion to be exacerbated and access of turtles to beaches to be impeded, and nesting and nocturnal sea finding abilities are disrupted by artificial lighting. Pollution such as oil, plastics and non-biodegradable debris and industrial, urban wastes and agricultural run-off all degrade turtle habitats. Climate change and global warming will also intensify the decline in turtle populations. Sex ratios of populations will be disrupted from rising temperatures and the likelihood of greater numbers of feminine offspring due to environmental sex determination (temperature of incubating eggs determines the sex of the hatchlings). Coral reef die offs due to global warming will result in loss of food sources.

Possible solutions

Approaches to turtle conservation should occur at both the national and international scales. High success at the international level comes from the use of treaties, collaboration between resource managers and governments, and sea turtles as flagship species for awareness campaigns. At the national level solutions involve: the use of multi-faceted programmes of broad perspective, integrated regional and national priorities for action, the identification of critical habitats, evaluation of nesting and feeding populations, and increased awareness and education.

Treaties such as the Convention on International Trade of Endangered Species (CITES) and the Convention on Migratory Species have been instrumental to increased protection of endangered turtle species. The huge, unregulated trade in turtle products was greatly reduced after the creation of CITES in 1975. Marine turtle workshops and training sessions have resulted from the collaboration of resource managers and governments. As well, sea turtles are charismatic species with intriguing life cycles and identifying and using them as flagship species is important for education and research activities.

At the national scale priorities for action should be set in conjunction with those at the international scale because sea turtle populations range through many jurisdictions. Status of populations should be evaluated in terms of species, numbers of turtles, and the stability of populations. Sources of turtle mortalities need to be identified and critical habitats set aside in protected areas to minimize impacts from both existing and anticipated threats. Awareness and education campaigns using the flagship species approach, will increase support from the general public, policy-makers, fishermen, coastal residents, enforcement personnel, educators and children (Mortimer *et. al.* 2000).

Community involvement is critical to long-term support and is most effective when stakeholders can realise economic benefits (Mortimer *et al.* 2000). This is especially true for communities residing in and living off of the resources of protected areas set aside for species conservation. Community-based conservation activities are important because strictly centralized protected area systems are inadequate to adequately manage these areas. It is usually impossible for the protection of the area set aside to be implemented, problems of corrupt officials occur and very often there are excessive tourist developments (Dearden 2002). These initiatives are being implemented all over the world throughout the United States, Sri Lanka, Mexico, Central America, the Caribbean and Africa among others (Campbell 1998; Tambiah 1998; Nichols *et al.* 2000; Kapurusinghe 2001).

Statement of Problem

It is widely accepted that success with conservation projects in developing nations will be jeopardized if needs, aspirations, and attitudes of local people are not accounted for. Case studies from around the world, such as presented here, can convey a sense of what community-based conservation entails. This paper intends to present the social and economic aspects of the turtle conservation project that may or may not be enhanced through local involvement in the turtle conservation project. This study sought information regarding the community's perceptions of the project and its impacts.

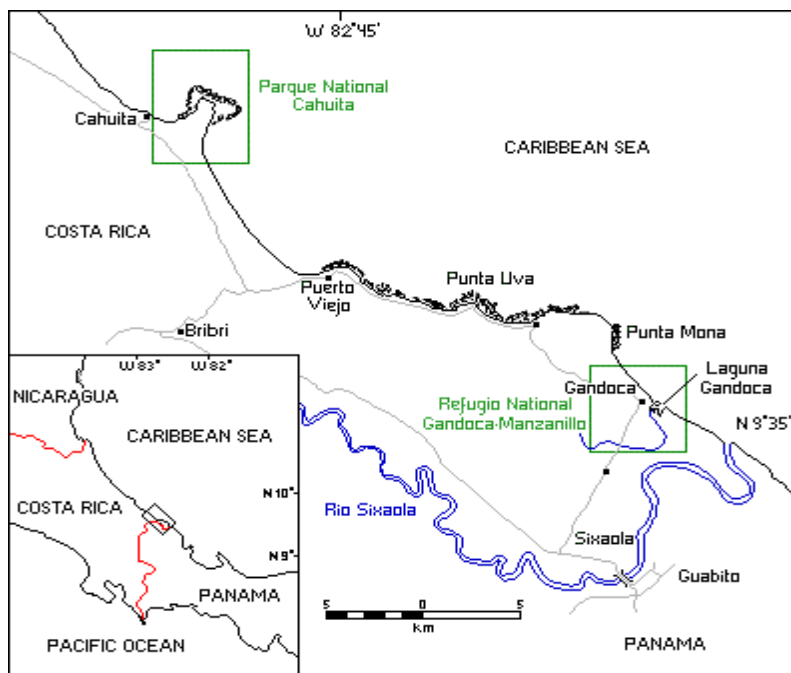
Background on the Project

The study site

Gandoca-Manzanillo National Wildlife Refuge (hereafter the Refuge), or REGAMA (see Appendix II) is located on the southern Caribbean coast, in the province of Limon, Costa Rica (09°37'N 082°40'W) (Ramsar Info Sheet 1995). The Refuge (see Figure 2) is bordered by the Sixaola River to the east (as the Panamanian border), a row of mountains from the Talamanca range to the south, and the beaches of the Caribbean Sea to the north (Ministry of Environment and Energy & Amistad-Caribe Conservation Area no date).

Figure 2 **Gandoca-Manzanillo Wildlife Refuge**

source: Unesco, 1999



The Refuge is included in the Talamanca-Caribe Biological Corridor (Ramsar Info Sheet, 1995) and as a part of this corridor Gandoca-Manzanillo is one of a few protected areas and indigenous reservations containing five of the country's twelve life zones. This region contains some of the last remaining stands of the Atlantic Moist Forest zone of Costa Rica and connects the highlands of the Talamanca Mountain Range (3,820 meters or 12,533 feet above sea level) to the protected coastal and marine areas. This portion of the Biological Corridor was declared a biosphere reserve in 1982 and later a World Heritage Site by UNESCO.

The Refuge was created in July 1985 to protect species in danger of extinction and to maintain them in their natural state. Within the refuge there are several examples of ecosystems unique to Costa Rica. To accomplish species protection and maintenance of their natural state active participation of local communities is encouraged. The communities of Cocles, Punta Uva, Manzanillo, Punta Mona and Gandoca are included in this conservation area (Asociacion ANAI no date).

The Refuge is a small reserve consisting of 4436 hectares (ha) of marine area and 5013 ha of land area (Ramsar Info Sheet 1995; Asociación ANAI 2002; Ministry of Environment and Energy & Amistad-Caribe Conservation Area no date). The area has a rich diversity of fauna including endangered plant species, threatened jaguar (*Panthera onca*), crocodile (*Crocodilus acutus*), anteater (*Cyclopes dydactylus*), tapir, and primates. It includes the only coastal lagoon of the Caribbean coast of Costa Rica with manatee species being permanently open to the sea and is an important ecosystem for the growth of fish fry (Ramsar Info Sheet 1995; Ministry of Environment and Energy & Amistad-Caribe Conservation Area no date).

Gandoca beach extends 8.85 km from Punta Mona to the southeastern corner of the country where the Sixaola River forms the border to Panama. The sand beaches of the Refuge are one of three important nesting sites in Costa Rica. Four of the five sea turtles of the Caribbean nest in Gandoca including the loggerhead (*Caretta caretta*), green (*Chelonia mydas*), leatherback (*Dermochelys coriacea*) and hawksbill turtles (*Eretmochelys imbricata*) (Chacon et al. 1994; Ramsar Info Sheet 1995; Ministry of Environment and Energy & Amistad-Caribe Conservation Area no date).

Most of the land surrounding Gandoca-Manzanillo is privately or state owned, or in Keköldi aboriginal reserves (Bribri group). Human uses in the area include traditional, low-scale agriculture growing cereals, cacao, plantains, yucca and other tuberous plants; forestry; and marine and freshwater fishing (Ramsar Info Sheet, 1995). Banana farming also occurs in the area adjacent to the reserve. According to the Ramsar Info Sheet (1995) tourism has become the most important activity of the area.

The marine turtles

The turtle species of principle concern in Gandoca-Manzanillo Refuge is the leatherback (*Dermochelys coriacea*). This species is declining worldwide due to: hunting in some parts of the world for its meat and oil, the over-harvesting of eggs, the accidental capture of turtles in commercial fishing nets, and the over-development of sites (Asociacion ANAI no date). The leatherback turtle is listed as critically endangered and included in Appendix 1 of CITES and the Red Data Book of the IUCN (International Union for the Conservation of Nature) (Chacon et al. 1994; Asociacion ANAI no date). It is estimated that the female population at the Refuge is between 350 and 400 animals. Worldwide estimates of the number of leatherback turtles range are 26 000 - 43 000 animals. In Gandoca the biggest threats include poaching, debris, and extensive beach erosion (Chacon *et al.* 1994).

The impact of over-harvesting the eggs by people in the Gandoca region became serious with the re-establishment of banana plantations in the Sixaola River valley and the gradual extension of Costa Rica's highway network. Before these developments, the residents of Gandoca customarily harvested a few turtle eggs for domestic use, and this pressure on the population was probably sustainable (Chacon *et al.* 1994). The amount of log debris in Gandoca has increased in recent years as a result of the deforestation of nearby watersheds. Other debris on the beach includes: coconut husks and a wide variety and amount of plastics, mostly originating from banana farms. During beach garbage collection activities the researcher observed the great amount of all of these types of debris. Human induced changes to the country's Atlantic lowlands, including agricultural and tourist development have resulted in the increasing and extensive erosion of Gandoca beach (Chacon et al. 1994).

Other anthropogenic factors contributing to increased stress to the leatherback turtles of the Refuge include: the occasional practice of sand mining for the purpose of highway maintenance, the temporary drainage of small coastal swamps, artificial lighting (which in Gandoca is limited to beach fires), and pesticides from adjacent banana farms reaching the beach via rivers such as the Sixaola (Chacon et al. 1994). In perfect conditions a natural nest will have a hatch rate of about 60-80% (Chacon et al. 1994; Mortimer et al. 2000). Natural factors affecting the success of hatchlings include: the failure to hatch due to heavy rain or seawater flooding the nest, high

tides washing away and destroying whole nests, or disruption from ants, crabs, coatis, raccoons, dogs and pigs (Asociacion ANAI no date).

Other species of turtles that will come to nest in Gandoca include hawksbill (*Eretmochelys imbricata*), green (*Chelonia mydas*), and loggerhead turtles (*Caretta caretta*) (Asociación ANAI no date). All three of these species are classified endangered in the IUCN "Red Data Book". Globally, hawksbill turtles have been harvested for the "tortoise-shell" material from the carapace, and despite its status illegal international and domestic trade continues. Green turtles are considered relatively abundant compared to most other species but populations are much reduced with some nesting populations now extinct. Despite these declines, the species is still in great demand for its meat. Loggerhead turtles appear to have some stable populations while others are decreasing. This species has been depleted from incidental captures in commercial fisheries (Mortimer et al. 2000).

The human community at Gandoca

During the nineteenth century Afro-Caribbean people of the bordering Nicaraguan and Panamanian coasts colonized this region. The original village of Gandoca was a coastal community of houses along the main road and a row of farms extending into the north from the road. The majority of communities in this region, including Puerto Viejo, Rio Cocles, Punta Uva, and Manzanillo were based on agricultural activities of these first settlers (McLarney 2002).

The second settlement phase of Gandoca was related to activities of a lumber company in the thirties. A number of families from those times are still around. Later, another set of families, most of them former banana workers, squatted along the road in an area about 5 kilometers inland from the beach. This settlement of squatters resulted in unplanted banana company land now known as Mata de Limon, being given to squatters. Gradually the gap between Mata de Limon and coastal Gandoca filled in and by 1970 it was necessary to know the area's history to know which town you were in. For most practical purposes "Gandoca" now encompasses both towns and they became more connected as the road improved (McLarney personal communication, January 15, 2002).

The village proper of Gandoca has no real centre and consists principally of a collection of farms, many of which have been more or less abandoned since collapse of the area's principal cash crop of cocoa due to disease in the early eighties (Asociacion ANAI no date). Most of the people now living in the community of Gandoca are immigrants or the children of immigrants, from Panama, Honduras, El Salvador, and other regions of Costa Rica. At present, the community of Gandoca is dominated by mainly Hispanic immigrants with a mix of some people of Afro-Caribbean ancestry (Asociacion ANAI no date). According to the last national census 355 people are considered residents of Gandoca (Chacon 2002) in about 50 houses (McLarney, personal communication, January 15, 2002) mostly built along the road leading into and through the Refuge.

Evidence exists that indigenous people inhabited this region in the past, but these groups have predominantly remained on the Talamanca hill slopes adjacent to Gandoca. There was a period of time they were attracted to the lowland regions by agricultural activities but the majority have moved back into the hillslope regions. The Cabécar and Bribri indigenous peoples are two of the largest indigenous groups in Costa Rica with a collective population of approximately 17 000 people. Colonization that occurred in the area resulted in the loss of much

land to peasant farmers and cattle ranchers by both the Cabécar and Bribri groups (Herlihy 1997). La Amistad Biosphere Reserve in which Gandoca lies, contains land of both indigenous groups with some of the private land in the Refuge belonging to the Keköldi (a Bribri group). There is one reserve located near the Refuge having the largest concentration of Bribri people in Costa Rica (Ramsar 1995).

Creation of the Refuge

Until around 1980, the sea turtle nesting in Gandoca was largely unknown to the world. At that time, the harvesting of turtle eggs done by the small local population was probably sustainable (Asociación ANAI, 2002). With the re-emergence of the banana companies in the Sixaola River basin and the improved road system to the area, poaching of eggs became a serious threat. It is estimated that annually, in the early eighties, more than 99% of the turtle eggs on Gandoca's nesting beach were being taken from nests. There was no immediate effect at the time, but it is estimated that the population would have collapsed in 20 years (as discussed in Figure 1) when no new females returned to nest (Asociación ANAI, 2002).

The non-governmental organization, ANAI (Appendix III), was instrumental in the creation of the Gandoca-Manzanillo Wildlife Refuge. This organization has been running the turtle conservation project since 1985, the same year the refuge was founded. In the early years of the Project ANAI staff, wildlife authorities through the Ministry of Environment and Energy, and members of the community patrolled the beach to keep poachers away. By 1990, poaching in Gandoca seemed to be under control and a volunteer program and research activities were started. The volunteers with ANAI help patrol the beach, collect research information and release newborn turtles. The volunteer program now works with over 400 volunteers per year and in 2001 over 90% of the nests were protected (Asociación ANAI, 2002). The Biosphere Reserve which Gandoca-Manzanillo is part of was created (1982) to protect natural habitats while acknowledging the needs and traditions of the resident indigenous populations (Herlihy 1997).

Legal, administrative and membership structure of the project

In July 1985 the government in Executive Decree number 25595-MINAE officially declared the management plan for the Refuge. This plan was drafted to best manage the resources and environment of REGAMA under the strictest principles of sustainable development (Ministry of Environment and Energy & Amistad-Caribe Conservation Area 1999). The leatherback sea turtles of the Gandoca-Manzanillo Wildlife Refuge are protected and regulated by the Wildlife Law (N°7317, 1992), the Gandoca-Manzanillo National Wildlife Refuge regulations and the Gandoca-Manzanillo Sea Turtles Protection Decree (N°230069, 4/05/94). Laws relating to marine turtle protection in Costa Rica are summarized in Table 1.

Table 1 Legal framework for marine turtle protection in Costa Rica.

| <i>Laws pertaining to marine turtle protection in Costa Rica</i> | <i>Function and attributes</i> |
|--|--|
| 'Fish and Maritimes' Law 190, Article 28 28 September 1948 | Prohibits commercial capture and sale of marine turtles and their eggs, and the destruction of nests |
| 'Wildlife Conservation' Law 4551 1966 | Prohibits non-commercial collection of marine turtles and their eggs |
| Laws pertaining to the project | |
| 'Wildlife' Law 7317 7 December 1992 | Allows Costa Rican or foreign citizens to practice scientific and cultural collecting activities, and to carry out research of the wild flora and fauna throughout the national territory. |
| Decree 230069 5 May 1994 | Protects marine turtles within the Gandoca-Manzanillo Wildlife Refuge |

Sources: Campbell 1998; Chacon et al., 1994; Ministry of Environment and Energy & Amistad-Caribe Conservation Area 1999; Instituto Nacional De Biodiversidad. 2002

The national institute responsible for the administration of all national refuges in Costa Rica is the Wildlife Directorate of the Ministry of Environment and Energy (MINAE). MINAE was created as a response to a series of social demands to develop an institutional framework for the protection of the country's natural resources (Instituto Nacional Biodiversidad 2003). A major objective for MINAE is the creation of the National System of Conservation Areas aimed at developing an integrated institutional effort to carry out biodiversity-related activities. MINAE's administrative activities for the Refuge occur from the administration house located in the Refuge (Ministry of Environment and Energy & Amistad-Caribe Conservation Area no date).

Other groups involved in the running of the Project include: ANAI, ADESGAMA, Comité de Salud (Health Committee), DINADECO and the Grupo de Guías (Group of Guides) (see Appendix II). ANAI is the non-profit organization involved in running the research activities of the project. ADESGAMA is a non-governmental organization and all of its members are from Gandoca. They handle grants received from the United Nations Development Program Global Environment Facility (GEF-UNDP) for turtles and other conservation work and tourism. During the present season only one member is involved in the Project, while the rest are employed elsewhere (Chacon, personal communication, March 3, 2003). The Grupo de Guías consists mainly of younger people who are trained for guiding work. Three of the group's twenty members are local assistants with ANAI while the others are from local families who don't live near the coast (making it difficult for them to work on the Project). Guides will also work in the forest, lagoon and coral reef areas when it is not the nesting season (Chacon 2003). The Comité de Salud proposed to be part of the project to provide medical services to the volunteers and involves members that don't receive direct profits or who are not employed through the Project (Chacon 2003).

Participation and distribution of benefits

Up until the 2002 season residents of the community who took in volunteers on the Project were part of what was called the Cabin Owners Group. Most recently (2003) this organization was replaced with the Cabin Owners Association. All members of the group pay a membership, have a representative, follow rules set by the group, and attend a meeting once a week during the nesting season and once a month during the off season (Chacon 2003).

Due to geography and economics not all families in the community can be involved in the Project. The main reason relates to the distance from their homes to the beach because volunteers cannot walk long distances to work, especially after late night shifts patrolling on the beach. As well, if every family were to offer accommodation, the number of volunteers staying with each household would be reduced and would not be worthwhile for any of the families. If this were to happen it is expected that people would return to poaching eggs and turtles (Chacon 2003) to compensate for economic losses. During the 2002 season, volunteers were distributed to member houses by the volunteer coordinator who tried to balance the number of volunteers each family received.

This conservation project was designed to discourage residents, especially those living near the beach, from poaching eggs. Prior to the Project the level of poaching was nearly 100% with poachers receiving \$0.13 USD per egg sold on the black market. Based on an average of 600 nests per year and 82 eggs per nest, the collective earnings of poachers could be \$6 396 USD if all the eggs were sold. This situation would be unsustainable, the distribution of benefits would not likely be even, and under the Fish and Maritimes Law 190 (see Table 1) illegal. On the other hand the Project has an average of 20 volunteers staying per week, each paying \$14 USD per day, over a season of 20 weeks. Therefore, the potential income from volunteers staying in the community could be \$56000 USD, which does not include additional income generated by other volunteer spending in the community (i.e. from the store and tourism related activities).

Summary of the turtle project

ANAI's core beliefs in the turtle conservation project are that no contradiction exists between economic development and environmental conservation and that development and conservation work together to create thriving communities (Asociacion ANAI 2002). MINAE is involved in the Project to meet its goals of protecting those species in danger of extinction and maintaining the natural state of the ecosystems in the Refuge that are unique to Costa Rica. MINAE also aims to accomplish their goals with the active participation of local communities (Asociacion ANAI no date).

Methods

The general hypothesis of this study is that involvement in the project leads to positive perceptions and attitudes by the residents of Gandoca. This study compares the characteristics of respondents who are in favour of the project with those respondents opposed. The data collection for this project was done in Gandoca during March of 2002. The results presented in this paper are based on household questionnaires and observations made during the researcher's involvement in the Project.

Household questionnaire

The community of Gandoca is made up of approximately 50 houses, 38 of which lie along the main road in either direction into the Refuge and outlying banana farms. Households were defined by physical dwelling with an average household size of 4.0 people per dwelling (mode = 4). Questionnaires were conducted with either the female or male household head, when possible. Of the 38 houses adjacent to the road, 26 responded to questionnaires (69%). Households were missed due to the unavailability of occupants during the times of surveying, or the refusal to respond. The lack of data from those residents who did not want to respond or were not contacted is a potential source of measurement error resulting in a skew towards positive perceptions because individuals with negative perceptions chose not to participate in the survey. Seven of the homes did not want to respond stating simply that they didn't want to, had no answers, or that they just stay home (implying that they are not involved in the project). Another respondent said that both them and the researcher could not understand each other so there was no point in responding. Due to the researcher's limited knowledge of Spanish, the language barrier was one limiting factor to the success of this project.

The survey instrument (appendix I) was a questionnaire distributed to the households of Gandoca. It contained 23 questions to acquire general household socio-economic data and to measure perceptions of sea turtle conservation activities based on ranked questions covering the social and environmental impacts of the project. The questionnaire included close-ended questions regarding gender, education, and perceptions using ordinal ranking scales and open ended questions about age, family, birthplace, time in the community, and the economy of Gandoca. Qualitative questions provided an opportunity for respondents to expand on their ranked perceptions of the turtle conservation project. The questionnaire was distributed in Spanish or was conducted as an interview with the assistance of a bilingual assistant when necessary i.e. when the respondent was unable to read.

Data was processed in SPSS with analysis limited to the calculation of response percentages in cross tabulation form. This procedure provided an overall impression of the community's perceptions of the project.

Results: Profile of the community of Gandoca

A total of 26 people responded to the questionnaire with a ratio of 1: 1.7 males (37.5%) to females (62.5%). The respondents ranged from 16 to 83 years in age with an average age of 41 years. The proportion of respondents in age classes was: 25 % young (up to 25 years), 42 % adult (26-45 years), 25 % mature adult (46-65 years), and 8 % senior (66 years and up). The majority of respondents had primary education (43.5%) and in Costa Rica this consists of six grade levels (Infocostarica staff 2002). Secondary education (up to an additional five years) was the second most common education level (35%). Those respondents who had attended university made up 13% of the population while 9% had no education at all.

The majority of the respondents (61 %) originate from within the province of Limón in which Gandoca lies. The rest (39 %) were not from Limón province, but many of these respondents were still from within Costa Rica (5 out of 9). The remaining respondents originated from Honduras, Nicaragua, and Panama. The average residence time of respondents was 28 years

within a range of 3 to 58 years. More than half of the respondents (58%) stated that they or somebody in their household was involved in the Project. The rest of the respondents and the residents of their household (42%) were not involved in the Project in any way.

Results: Perceptions of the turtle conservation project

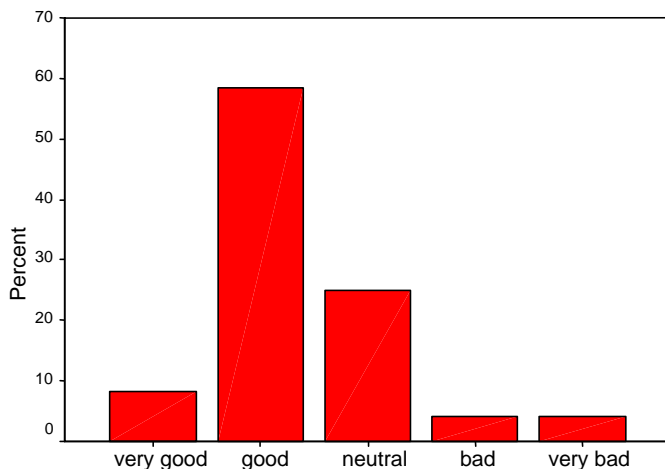
Due to the small sample size and for the analysis of data in cross-tabulation, the categories of responses 'good' and 'very good', and 'bad' and 'very bad' were collapsed into new categories of 'good' and 'bad' respectively. These tables can be seen in Appendix III. In the following discussion the categories of perceptions assume these groupings unless otherwise stated. The rate of response for each factor was approximately 92% (n=24); with item non-response of two respondents (8%) for all questions.

Overall support of the project

Just under two-thirds (58%) of respondents had positive overall support of the project, six respondents (25%) chose to remain 'neutral' and two (8 %) felt it was 'bad' (Figure 3). Positive support for the project was based mainly on the need and recognition of continued protection of the turtles. Many respondents stated that they supported the Project because they were involved in it. It was identified that the future of the project was closely linked to the community's involvement. The Project was seen as a factor uniting the community through the strength and support it provides for those involved. Tourism is an important industry to Gandoca and respondents recognized that they will benefit now and in the future by helping tourists learn about the turtles . Two respondents had negative attitudes. One felt that they

were not being taken into account while the other did not give a reason.

Figure 3 Overall support of project



Involvement in the project was important to respondents overall support of the project. As can be seen in Table 1, the respondents with more positive overall support of the Project were those involved (93% involved versus 33% not involved). The majority of respondents who did not have positive support of the project chose to remain neutral (56%) and only one respondent not involved in the project had negative support for the Project.

Table 1 Overall Support of the project and involvement

| Table 24 | Question #18 | | |
|-----------------------|-----------------------|------------------|----------------------|
| n = 23 missing = 3 | Good (1.0 and 2.0) | Neutral (3.0) | Bad (4.0 and 5.0) |
| Question #10 | % (n) | % (n) | % (n) |
| Total | 70 (16) | 26 (6) | 4 (1) |
| Involved | 93 (13) | 7 (1) | 0 (0) |
| Not involved | 33 (3) | 56 (5) | 11 (1) |

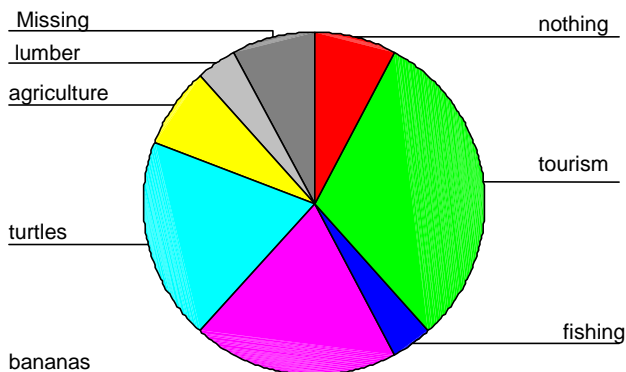
The socio-economic factors of gender, age, origin, residence time, and level of education were analyzed. Table 1 shows which classes within each of these attributes had the highest proportion of respondents. This gives a general impression of which attributes may have influenced respondent's perceptions. Gender and age did not appear to influence attitudes of overall support of the project; there was a majority of positive perceptions in all classes. Respondents originating from Limón Province had higher overall support of the project (71%) compared to those who were not (62.5%), but the difference was small. Respondents who had lived in the community between 31-40 years had the highest level of negative perceptions (60% 'bad', 40% 'good'). There was little difference between education level classes and all classes had mainly positive responses very near the average of 71%. The only negative response came from one respondent (11%) with primary education. Tables showing the entire cross-tabulation of the results can be found in Appendix #3.

Table 2: Relationship between personal attribute and attitudes of overall support

| | Class with most positive support | Class with most neutral support | Class with most negative support |
|------------------------|----------------------------------|-----------------------------------|----------------------------------|
| | Class (% , n) | Class (% , n) | Class (% , n) |
| Gender | Female (73, 11) | Female (27, 4) | Male (12.5, 1) |
| Age | 66 and up (100, 2) | Under 25 (33, 2) 25-45 (33, 3) | 46-65 (20, 1) |
| Education | None (100, 1) | University (33, 1) | Primary (11, 1) |
| Origin | Limon (71, 10) | Not Limon (37.5, 3) | From Limon (7, 1) |
| Residence time (years) | 16-30 (75, 6) | Up to 15 (50, 2) | 31-40 (40, 2) |

Perception of the economic benefits of the project to the community

Figure 4
Most important economic activity



According to respondents the most important economic activities in Gandoca were tourism (31%), and turtles and bananas (both 19 %) (Figure 4). More than half of the respondents ranked impacts as 'good' (58 %), five (21%) chose 'neutral' and five (21%) felt they were 'bad' (Figure 5). Of the 26 respondents two (8%) did not respond to this question (n=24).

The project was seen as a major source of income for the community and many of its families. These sources of income come from volunteers who stay with families, jobs created for guides and

research assistants, and business for taxis. One respondent (4%) stated that there would be economic benefits in the future from "an abundance of turtles and eggs" and that the community will be able to export the eggs. Eight respondents (33%) had negative perceptions and felt that only the organizations and few families involved benefited. One respondent (4%) felt that economic benefits were good, but was still concerned that there weren't enough volunteers and tourists coming. It was also perceived that a resource was lost for some people because residents were not able to sell or eat eggs.

On the basis of gender there was a difference in attitudes of economic benefits; male respondents had a lower proportion of positive perceptions (37.5%) than females (73%) and higher negative perceptions (37.5%) than females (7%). Adults and seniors had the highest proportion of positive perceptions (78% and 100% respectively). University educated respondents had the lowest level of positive perceptions (33%) and the only other class with a negative response was one primary (33.3%). Respondents originating from Limon province had lower positive perceptions (50%) than those not from Limón province (75% positive). Residents who had lived in Gandoca for 31-40 years had a greater proportion of negative perceptions (40%) while the 16-30 year class had the highest proportion of positive perceptions (75%).

Figure 5 **Perceptions of economic benefits**

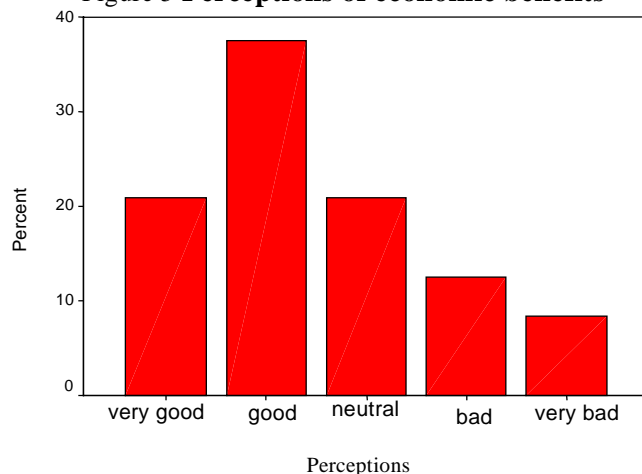
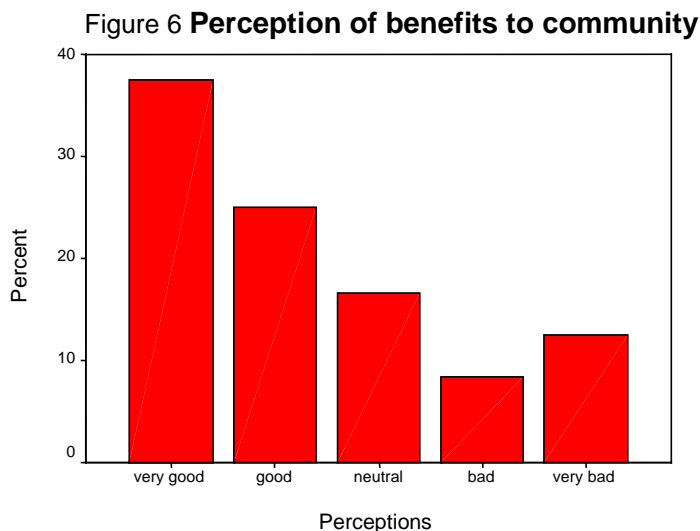


Table 3 Relationship between personal attribute and attitudes of economic benefits

| | Class with most positive support Class (% , n) | Class with most neutral support Class (% , n) | Class with most negative support Class (% , n) |
|------------------------|---|--|---|
| Gender | Female (73, 11) | Male (25, 2) | Male (37.5, 3) |
| Age | 66 and up (100, 2) | Under 25 (33, 2) | 46-65 (40, 2) |
| Education | None (100, 1) | University (33, 1) | University (33, 1) Primary (33, 1) |
| Origin | Not Limon (75, 6) | Limon (29, 4) | Limon (21, 3) |
| Residence time (years) | 16-30 (75, 6) | Up to 15 (25, 1) 16-30 (25, 2) | 31-40 (40, 2) |

Perception of the benefits of the project to the community

More than two thirds of respondents ranked impacts to the community to be 'good' (62.5%) and many of these respondents felt very strongly and ranked impacts as 'very good' (37.5%). Two respondents (8%) did not answer this question (n=24).



Respondents with positive perceptions stated that community-related benefits came from increased community development and an improved economy; benefits and treatment of everybody was considered to be equal for everybody. It was also felt that increased international recognition of the community would lead to more tourism and cultural understanding. The community also benefits from the conservation of its natural resources. The five respondents (21.5%) with 'bad' perceptions felt the community was not making management decisions and the distribution of benefits was uneven. It was also cited by one respondent that the Project displaces

local tourism to other coastal areas (due to restrictions on the beach and in the Refuge).

Fewer males (37.5%) than females (80%) had positive perceptions of the community's benefits and more negative perceptions (37.5% versus 7%). Mature adults perceived negative community benefits (40% positive and 40% negative) while youth and seniors had the most positive attitudes (83% and 100% respectively). The only other class with negative perceptions were the adults (22%). A greater proportion of respondents not born in Limón province felt community impacts were 'good' (75%) than those who were (57%). Respondents from Limón also had higher negative perceptions (21% compared to 12.5%). Respondents who had lived in Gandoca for 31-40 years had the lowest proportion of positive attitudes (20%) and the highest in negative attitudes (40%). One hundred percent of the 16-30 year class had positive attitudes.

Table 4: Relationship between personal attribute and attitudes of community benefits

| | Class with most positive support Class (% , n) | Class with most neutral support Class (% , n) | Class with most negative support Class (% , n) |
|------------------------|---|--|---|
| Gender | Female (80, 12) | Male (25, 2) | Male (37.5, 3) |
| Age | 66 and up (100, 2) | 46-65 (20, 1) | 46-65 (40, 2) |
| Education | None (100, 1) | University (33, 1) | Primary (33, 3) University (33, 1) |
| Origin | Not Limon (75, 6) | Limon (21, 3) | Limon (21, 3) |
| Residence time (years) | 16-30 (100, 8) | 31-40 (40, 2) | 31-40 (40, 2) |

Perception of the benefits of the project to the turtles

The project's activities as identified by respondents are outlined in Table 5. The knowledge level of the Project was good and the majority of respondents (63.5%, n=24) were able to name activities directly or indirectly related to the Project.

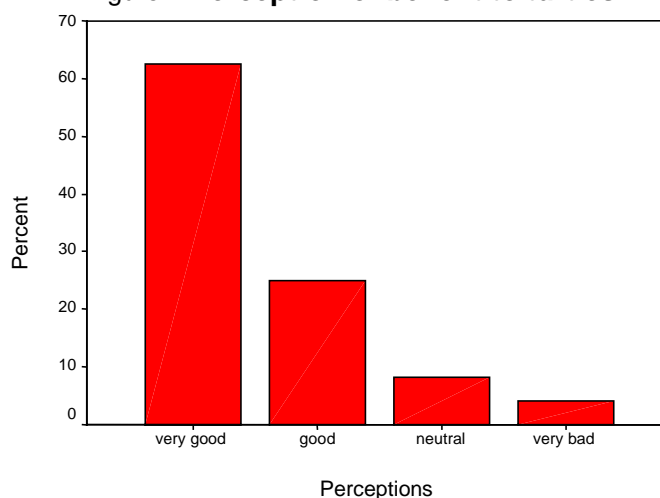
Table 5: Activities of the turtle project as identified by respondents

| <i>Directly related to turtle conservation</i> | <i>Indirectly related to turtle conservation</i> |
|--|---|
| Hatcheries Night patrols Education Beach clean-ups Tagging and Measuring Egg collection | guides accommodation restaurants maintenance handicrafts and other workshops horses |

Four respondents (16%) stated that the Project's activities were "none", three (12.5%) made comments that did not answer the question and two respondents (8%) did not reply. One unrelated responses was that "none of the activities can be fulfilled if they don't take the community into account". The respondent is referring to community issues and not the Project's activities.

The majority of respondents felt that impacts to the turtles were 'good' (87.5%) while one respondent (4%) felt they were 'bad'. Two (8%) did not respond to this question (n=24). To justify positive perceptions of the Project's impacts to the turtles, respondents stated that the project was contributing to the prevention of turtle extinction. This is being done by preventing exploitation of turtle meat and eggs, increasing populations, and excellent research work and monitoring which has increased the knowledge of turtle species.

Figure 7 Perception of benefit to turtles



One respondent (4%) cited that by protecting the turtles there would be potential for selling them in the future. Another respondent (4%) felt the turtle's benefits were 'bad' but simply stated "only six people benefit from the project". This comment was not related to the turtles' benefits from the Project. It was felt by one of the two respondents who remained neutral that the best was not being done for the turtles. The other 'neutral' respondent stated that "...these turtles are like a gold mine for some organizations because only at the time of turtle [nesting] do you see people, organizations and interest in the protection of this unique animal and not for others [animals]".

Although there were mostly positive attitudes from both genders, female respondents had a higher proportion of positive attitudes (100% versus 75%). The mature adult class had the most negative attitudes (60% positive and 20% negative perceptions). All other age classes felt the turtle's benefits were 'good'. It was perceived by 100% of almost classes of education, except primary (78%), that the turtles had 'good' benefits from the Project. Two people from Limón did not feel the turtle's benefits were positive; one remained neutral while the other was felt they were negative. Residents who had spent the least time in the community had the most positive attitudes.

Table 6 Relationship between personal attribute and attitudes of turtle benefits

| | Class with most positive support | Class with most neutral support | Class with most negative support |
|-----------|---|---------------------------------|----------------------------------|
| | Class (% , n) | Class (% , n) | Class (% , n) |
| Gender | Female (100, 15) | Male (12.5, 1) | Male (12.5, 1) |
| Age | Under 25 (100, 6) 26-45 (100, 9) 66 and up (100, 2) | 46-65 (20, 1) | 46-65 (20, 1) |
| Education | None (100, 1) | Primary (22, 2) | None of the classes |

| | | | |
|------------------------|---|---------------|---------------|
| | Secondary (100, 8) University (100, 3) | | |
| Origin | Not Limon (100, 8) | Limon (7, 1) | Limon (7, 1) |
| Residence time (years) | Up to 15 (100, 8) | 31-40 (20, 1) | 31-40 (20, 1) |

Despite the fact that the majority of the respondents felt the turtles were impacted in a 'good' way from the project, many (65%) did not feel that these activities were sufficient for the protection of the turtles. Issues arose included the need for more financing from the government and volunteers, the need for the community to be more informed about the nesting before the season begins, and the concern that the Project ends too soon in the nesting season. One respondent felt that there was need to protect other turtle species and not just the leatherback turtles (these are the most common species to nest at Gandoca but the Project's activities are carried out for any turtle nesting on the beach). Another concern was the need for better training as some respondents felt that turtle eggs have been lost from mishandling (or stolen as was suggested by one respondent).

Discussion

It was encouraging to see that the majority of the respondents had positive attitudes and a good understanding of the project's activities. On average, 70% of respondents had favourable attitudes of all aspects of the project, only 5-8% of respondents had negative attitudes, and 24 - 27% chose to remain neutral. There were a variety of negative and positive attitudes toward the Project and many respondents, whether they were involved or not, expressed issues and concerns. As was expected, involvement in the Project was the most important factor influencing respondent's attitudes as this factor had a very large difference in attitudes toward the Project. This was commented on many times by respondents involved and not involved.

Community involvement in the Project

Community involvement is one of the main objectives of the Project and this factor directly influenced attitudes of respondents. Respondents involved in the project had more positive perceptions (93% overall support) than those not involved (33 % overall support). Many respondents felt that not all of the community could be involved. People who felt they did not benefit personally (mostly as a result of not being involved) from the project had more negative attitudes than those who did. These respondents felt that only a few families along with ANAI and MINAE gained any of these benefits. One respondent stated that, "...if we talk about the community it is only that it is not taken into account and I don't want to say this to put somebody down, but this has been happening for many years. This is the worst year."

Respondents involved in the project also had a better understanding of the Project's purpose and activities; although many respondents not involved were able list some of the Project's activities. Table 7 shows the activities identified by each respondent and whether their overall support of the Project was positive or negative. It can be seen that the majority of respondents who could identify directly related activities had positive support. On the other hand those respondents who felt that the Project had no activities or made unrelated comments had negative perceptions of the Project. These respondents might have been able to identify activities, but because of their negative perceptions chose not to list any. Mortimer et al. (2000) identified that knowledge of conservation activities is an important factor to perceptions because turtle's have slow growth rates and delayed maturation which results in delays in the decline of turtle populations. Many people only become strong advocates of turtle conservation after they are aware of the vulnerability of populations.

Table 7 Knowledge level and overall support of project

| Table 25 | Support | |
|------------------------------|-------------------|-------------------|
| n = 24 missing = 2 | <i>Positive</i> | <i>Negative</i> |
| <i>Activities identified</i> | % (<i>n</i>) | % (<i>n</i>) |
| Directly related | 58 (14) | 8 (2) |
| Indirectly related | 4 (1) | 0 (0) |
| Unrelated response or none | 8 (2) | 21 (5) |

The lack of involvement by some members of the community is directly linked to political problems in the community. It was reported that, in the previous season the volunteer coordinator, a member from one of the families, used their position to send more volunteers and those staying longer to their home, resulting in greater profits for that family. Due to this unfair behaviour, the family was banned from having volunteers, by the director of MINAE and the association. A non-local volunteer coordinator took over the job to evenly distribute volunteers to all the families. These types of problems hinder the ability of the Project to include the entire community in its activities and will remain a source of conflict in the future. An example of the conflict that occurred in the community was a confrontation that occurred on the beach during the final weekend of research, the Semana Santa (Easter) holiday. These sorts of conflicts make absolute community involvement an even more difficult task to accomplish.

The first night of the Semana Santa weekend the director of ANAI was seen on the beach with a large group of people (around 30) and a nesting turtle. This was reported as either one of two situations. A research assistant who was on the beach at the time thought that it was a larger than usual "turtle tour"; it was also reported by one of the rangers that this gathering was a confrontation between community members who were not involved in the Project and those who were. The following night, at the scene of another nesting turtle, another large group (15-20 people) was crowded around and yelling at each other. Concerned about the turtle, one of the research assistants (a foreigner) tried to clear people away but ended up getting punched in the face. The incident was quickly dissipated when armed police and rangers arrived. Within the days following several volunteers left and the director of MINAE was removed from the community as he was considered the source of conflict for banning the one family from the Project.

The complexities of the community's politics were later revealed to the research assistant by one of the founders of the Project (from the United States). Apparently, the directors of the Project had known an incident was going to occur on the beach but did not act in a way to maintain the

volunteers' safety. Essentially this incident was a political battle among some of the families of the community and between some of the families and the organizations involved (ANAI and MINAE). The details of these political issues are beyond the scope of this paper. The research assistant felt that what ensued was the "the assault of foreigners so that [certain parties] could get what they want in the future". One of these parties was the family banned from having volunteers and shortly after the director of MINAE left, they began taking in volunteers again.

In the past decade community-based conservation efforts have been heralded for bringing back management forms reminiscent of those used before the centralised approach took over. These forms of management arose in situations where there were strong personal and societal commitments to maintaining non-utilitarian values in the environment. The temptation or ability to inflict wide-scale environmental damage was probably minimal and there was probably no real conflict between livelihood and maintaining the environment. Anybody who tried to abuse their privileges of the community commons was justified by the community authorities. Unfortunately, there is some debate as to how widespread such an ideal ever was and whether communities can and will protect environmental values (Dearden 2002).

The problems in Gandoca reflect just how difficult it can be to maintain the idealised situation of community-based management. Enthusiasm about community-based conservation initiatives must not mean that everything associated with government intervention is opposed (Dearden 2002). The experience of Gandoca shows that even with the intervention of the government authorities equitable distribution of benefits is not easily maintained. Many respondents felt that because of the Project, management control was lost to outside organizations, specifically ANAI and MINAE. This was expressed by respondents with comments such as "... the people of the community should be making decisions, not people from outside the town" and that "...MINAE tries to be or play the role of the communal government". The confrontation that occurred in Gandoca shows that if the community had complete control of the Project there would be more problems and the distribution of benefits would be less equitable than at the present. The political problems within the community prove that management of such a project needs to occur under the cooperation of outside organizations and the community.

According to (Dearden 2002) community-based conservation initiatives are "challenged with the ability to provide legislative framework and centralized management that will meet the needs of a nation while allowing sufficient flexibility for the community to build their own strengths relative to their locality". The situation in Gandoca shows that centralized and community management initiatives must adapt to the particular situations of the communities of the protected area involved. This community is in need of management that takes into account the political issues, these problems must be addressed or the turtles and other species of the Refuge will end up losing as political battles continue at the sacrifice of good conservation activities. Centralized control in the form of governmental management has a legitimate role in community-based conservation activities, and conflicts must be minimized for better overall management of the Project.

Other factors affecting attitudes towards the Project

This study sought to identify the characteristics of respondents and their attitudes on the basis of their personal attributes. Due to the small sample size it was difficult to directly correlate these factors. Classes within each of the categories of gender, age, origin, residence time and education were composed of only a small portion of the respondents. For example, most of the

negative responses had only one respondent in each class; there were not enough respondents to recognize patterns related to the specific demographic factor. As a result, qualitative responses were assessed to see if any responses could be related to these attributes. Strong differentiation in the community was not evident on the basis of any of these attributes.

Male respondents, mature adults, and respondents who had lived in Gandoca for 31 - 40 years had more negative perceptions. Interestingly, respondents who originated from Limon were more supportive of the Project overall, but had more negative perceptions of the economic, community and turtle benefits than respondents who were not from Limon. Respondents were also asked why they came to Gandoca to find out if new residents were attracted to the community by the Project's activities. This was not found to have been an influence to anybody. A comparison of the general results of this study to other studies is outlined below.

A study in Ecuador found differences on the basis of demographic attributes of respondents. An analysis of protected areas in Ecuador (Fiallo and Jacobson 1995) found that older residents (which can be associated with longer residence times) were less likely to support protected area activities because they felt adversely affected by new restrictions (i.e. lost use of resources that were previously accessible). Research in Tanzania had similar results with long-term residents more likely to support the abolition of protected areas (Fiallo and Jacobson 1995). The situation in Gandoca was different than these examples. One of the oldest members of the community had full support of all aspects of the Project. In fact, this individual felt that his contributions to the Project were instrumental to the Project's success and was recognized with a gift from the community at the Project's inauguration ceremony. There was some opposition from residents who had lived in Gandoca for a long time (31-40 years) but none of these respondents made comments that relate to increased restrictions as mentioned in Fiallo and Jacobson (1995). The only comment that may be related to resident time referred to the fact that the community has been dealing with political problems for a long time. These residents may have been more aware and affected by these issues than residents who had not spent as much time in the community.

In the protected areas of Ecuador and Nepal it was found that the level of acceptance increased with education and literacy. Five of six studies analyzed by Fiallo and Jacobson (1995) found that education had a stronger relationship to attitudes than all other attributes. This relationship may be somewhat true for Gandoca; respondents with secondary education tended to have more positive attitudes than those with primary education. One of the three university educated respondents had a negative attitude and felt that the Project displaced local tourism and took away the community's rights to eat turtle eggs.

According to Astolfi (1995) documentation of women's interactions with protected areas and related conservation activities is scarce. The different, but interdependent roles of men and women and how these roles have a direct impact on their relationships with resources are slowly being understood. Differences in attitudes on the basis of gender were analyzed to identify any gender-related issues. Women's role in decision making and carrying out tasks has frequently been unrecognized or undervalued in conservation projects (Jordan 1995). Meanwhile, men may be affected differently than women if their activities are restricted by conservation regulations. According to a turtle conservationist on the Pacific Coast, Costa Rican society highly values larger families and turtle eggs have traditionally been collected by men for their aphrodisiac qualities (AL J. personal interview, January 30, 2002). One male respondent with negative perceptions of the Project was displeased about the loss of turtle eggs as food source.

Conclusions

Despite the fact there were many complaints about ongoing problems within the community it must be seen in the context of the Project's achievements. There was high overall support of the project and only two respondents felt negatively, of which only one provided a reason for feeling this way (lack of participation). The majority of all respondents felt that the Project's benefits to the turtles were good. Even though some respondents felt they were not receiving benefits the Project has provided a source of income for many families, and is doing this in a way that is preventing or greatly minimizing the poaching of turtles. The community is also better educated about the turtles and other flora and fauna that live in the Refuge.

Community-based conservation initiatives are just one of the many possible approaches to turtle conservation; in most cases these programs should proceed alongside rather than as an alternative to other approaches. As was stated in the discussion, these initiatives must be considered on a case by case basis, accounting for the socio-economic, political, and cultural features of the communities most affected by conservation activities. Three general conclusions can be made based on the experience in Gandoca:

A high level of community involvement is necessary for continued and improved success with the Project. Individual families have received economic benefits from the Project with the reinvestment of some profits into community development having allowed for benefits to the entire community. Through community developments (i.e. improved school, health committee building) there can be some level of equitable distribution of benefits, even for residents not directly involved in the Project. The Project should continue to strive for the highest level of community involvement possible, with the minimum amount of conflict.

Community-based conservation initiatives have been by oversimplified and romanticized by many authors (see Wells & Brandon 1992; Little 1994; Western & Wright 1994). Much like Campbell's (1998) analysis of community-based conservation activities of turtles in Ostional, the situation in Gandoca cannot simply be seen as whether it is successful or not, but rather how well it is being managed within the complex issues of the community.

Some level of centralized management is needed in conjunction with local management. Within communities there are many political issues and if conservation programs run without any form of centralized management, these political problems can seriously impair the ability of these initiatives to function with some level of success.

The results of this study indicate that community-based management approaches are important for managing protected areas and conservation activities as they tend to improve people's attitudes and support. Management needs to continue with open communication between the community and organizations involved and ongoing assessments are important for understanding the issues affecting people in conjunction with conservation activities. Although demographic attributes were not significant factors to the results of this study these need to be considered.

**Appendix I: Questionnaires
English (one per household)**

Gender: female male

Age

What level of education do you have?

None primary secondary university

How many people live in this house?

Are all the people that live in this house family?

yes no

If not, what type of relationship do they have with the family?

Extended family friends other

Where were you born?

Where were the other people that live in this house born?

How long have you lived in Gandoca? Years

How long have the other people in this house lived here?

If you or anybody else in this house was not born here, then why did you or they move here?

In your opinion, what is the most important economic activity in Gandoca?

Are you, or is anybody in this home, involved in any way with the turtle conservation project?

yes no

If so how?

What do you believe to be the positive or negative aspects of the turtle conservation project?

What are the benefits (beneficiaries-translation error) of the project?

What do you believe are the best aspects of the turtle conservation project in Gandoca?

What do you believe are the worst aspects of the turtle conservation project in Gandoca?

How do you rank the turtle conservation project in terms of its impacts on the economy of Gandoca?

very good good neutral bad very bad
Why do you feel this way?

Now, could you tell me, how do you rank the turtle conservation project in terms of its impact on the community of Gandoca?

very good good neutral bad very bad
Why do you feel this way?

How do you rank the turtle project in terms of its impact on the turtles?

very good good neutral bad very bad
Why do you feel this way?

How do you rank your support for the turtle conservation project?

very good good neutral bad very bad
Why do you feel this way?

What activities are being carried out in Gandoca in regards to the turtle conservation project?

Do you believe these activities are sufficient for the protection of the turtles in Gandoca?

yes no
Why do you feel this way?

What do you think are the positive or negative aspects of the Gandoca-Manzanillo Refuge?

How do you rank regulations and rules for the control of the lagoon?

very good good neutral bad very bad
Why do you feel this way?

What do you do when there are no turtles?

Participant Form

You are invited to participate in this study because you are a part of the community of Gandoca and your opinion is very important to the Turtle Conservation Project. If you accept to participate in this study your participation will include responding to a questionnaire.

There are no known or anticipated risks to you by participating in this research, it is totally confidential and your participation is totally voluntary. If you withdraw from this study, your data will be used for analysis and in the results of this study, if you are in agreement.

In terms of protecting your anonymity none of the responses will be made public, your data will be used only by the principal researcher. The results of this study will be shared with other students or in a presentation for a class.

In addition, you may contact the researcher at the address given, or if you would like to verify, contact the Associate Vice-President, Research at the University of Victoria Association (250-472-4362)

Your signature below indicates that you understand the above conditions of participation in this study and that you have had the opportunity to have your questions answered by the researcher.

Name of Participant

Signature

Date

Cuestionario-español (uno por casa)

sexo: femenino masculino

Edad

Que nivel de educación tiene usted?

ninguno primaria secundaria universidad

Cuántas personas viven en esta casa?

Todas las personas que viven en esta casa son familia? si no

Si no lo son, ¿qué tipo de relación tienen con la familia?

Familiares lejanos amigos otro

¿Dónde nació usted?

¿Dónde nacieron las personas que viven en esta casa?

¿Cuánto tiempo ha vivido en Gandoca? años

¿Cuánto tiempo ha vivido en Gandoca las personas que viven en esta casa?

Si alguna de las personas que habitan la casa, no es originaria de Gandoca, ¿podría decirme por qué se vinieron a vivir a este pueblo?

En su opinión, ¿cuál es la más importante actividad económica en Gandoca?

¿Esta usted, o alguien más de esta familia (casa) involucrado con el Proyecto de Conservación de Tortugas en Gandoca? si no

Si es así, ¿cómo?

¿Cuáles cree usted que son los principales aspectos negativos y positivos de el Proyecto de Tortugas en Gandoca?

¿Cuáles cree usted que son los beneficios (beneficiarios) del Proyecto?

¿Cuáles cree usted que son los mejores aspectos del Proyecto de Conservación de Tortugas en Gandoca?

¿Cuáles cree usted que son los peores aspectos del Proyecto de Conservación de Tortugas en Gandoca?

¿Cómo usted califica el Proyecto de Conservación de Tortugas desde el punto de vista económico?

muy bien bien neutral malo muy malo
Porque cree usted que es?

Ahora podria decirme, como usted califica el Proyecto de Conservacion de Tortugas desde el punto de vista beneficiario a la comunidad de Gandoca:
muy bien bien neutral malo muy malo

Porque cree usted que es asi?

Como califica usted el Proyecto de Tortugas en beneficio a las tortugas?
muy bien bien neutral malo muy malo
Porque cree usted que es asi?

Como califica usted el apoyo que usted le da al Proyecto de Conservacion de Tortugas en Gandoca?
muy bien bien neutral malo muy malo
Porque cree usted que es asi?

Que actividades cree usted que se realizan en Gandoca referente al Proyecto de Conservacion de Tortugas?

Usted cree que estas actividades son suficientes para proteger las tortugas en Gandoca?
si no
Porque or porque no?

Cuales cree usted que son los principales aspectos negativos y positivos de el Refugio Gandoca-Manzanillo?

Como califica usted las normas y reglas impuestas para el control de la laguno?
muy bien bien neutral malo muy malo
Porque cree que es asi?

Que hacen ustedes cuando no hay tortugas?

Formulario Del Participante

Usted esta siendo invitado a participar en este estudio porque usted es parte de la comunidad de Gandoca y su opinion es muy importante para el Proyecto de Conservacion de Tortugas. Si usted acepta coraborar en esta investigacion su participacion sedara contestando un cuestionario.

Usted no corre ningun riesqo al participar en esta investigacion, esta es totalmente confidencial y su participacion es totalmente voluntario. Si usted decide participar no debe dar ninguna explicacion de sus repuestas, su informacion va hacer utilizado para el analisis y resultacio de este estudio, si usted esta de acuerdo.

En terminos de proteger su anonimidad, ninguna de las repuestas sera puesta en publico, la condificalidad de la informacion que usted de sera protegida por el investigador principal pero los resultados de la investagacion servan compartidos con otros estudiantes o en una presentacion a la clase.

En adicion, usted puede contactor al investigador en la direccion de correo que se le dio anteriormente, o si tiene dudas puede verificar todo, contactando a la Asociacion Vice-Presidente de Investigacion de la Universidad de Victoria 00-1-250-472-4362.

Su firma incica que usted entiendo lo que se dijo anterrormente, las condiciones de participar en este estudio y la oportunidad de ser parte de una investigacion.

Nombre de participante

Firma

Fecha

Appendix II: Acronyms related to the project

| | | |
|---|--|---|
| ACLAC <i>Area de Conservación la Amistad Caribe</i> | Amistad Caribbean Conservation Area | One of SINAC's observation areas. A territorial unit where private and government activities interrelate in fields such as the use and conservation of natural resources. Aimed at achieving sustainable management of resources. |
| ANAI <i>Asociación de los Nuevos Alquemistas</i> | National Association of New Alchemists | American founded Costa Rican run non-profit organization formed in 1978. Pursues sustainable development in Costa Rica's Talamanca region. Programs include: organic agroforestry, marine turtle conservation, and regional federation for forested corridor development. |
| ASACODE <i>Asociación San Megueleña Para la Conservación y el Desarrollo</i> | San Megueleña Association For Conservation and Development | Guesthouse for tourists |
| DINADECO <i>Dirección Nacional para el Desarrollo de la Comunidad</i> | National Direction of Community Development | National organization consolidating institutional management and community development to obtain integrated and sustainable community management. |
| MINAE <i>Ministerio de Ambiente y Energía</i> | Ministry of Environment and Energy | Government ministry which develops institutional framework for the protection of the country's natural resources |
| REGAMA <i>Refugio <u>Gandoca-Manzanillo</u></i> | Gandoca-Manzanillo Wildlife Refuge | Refuge administered and protected with the active participation of civil society, the resident stakeholders and the authorities of MINAE and the police. |
| SINAC <i>Sistema Nacional de Areas de Conservación</i> | National System of Conservation Areas | Decentralized and participatory institutional system which puts together MINAE's responsibilities regarding protected wildlands, wildlife and forested areas. |

Appendix III

Qualitative Responses

* response based on misinterpretations of the question

8. a) If you or anybody else in this house was not born here, then why did you or they move here?

To work on a wood operation
The war from 1979 to 1990 (in Nicaragua and Honduras)
Work on banana farms
Family (x4)
We bought a farm
To work and look for a new home
Marriage
We have Costa Rican papers
To work on the farm
Cattle farming and agriculture

10. a) Are you, or is anybody in this home, involved in any way with the turtle conservation project?

yes no

If so how?

Naturalist guides (x2)
**Supporting natural resources (conservation?)*
Food service
Guides
Cleaning the beach
Cabineros (accommodation) (x3)
Project management committee
Working with ANAI (x5)
Volunteers
Courses
Patrolling (x2)

11. What do you believe to be the positive or negative aspects of the turtle conservation project?

Positive

Maintaining turtle populations (x4)
Taking care of the turtles (x5) went 10 years without seeing the birth of the turtles.
Generates economic resources for the community (i.e. attracts tourism, provides work for some people). (x5)
On the basis of protection that has been given we think that in the future there will be more production.
So that in the future we will know what a turtle is.
Scientific development.

They have helped us and given us conscientiousness about the value of the species that it is in danger of extinction.

Protection (x4) of: beach, fauna

The effort of a few that are involved in the project.

Negative

To the descendants of native people because they lived off of natural resources.

It used to be a custom to eat turtle eggs, but now we cannot. (x2)

It has limited a product that in a way used to sustain us.

It displaces local tourism. (x2)

(Too) few volunteers.

That the community does not participate (x2), that MINAE tries to be or play the role of communal government.

Lack of consciousness (of some people).

Lack of union in the village.

A community project should try to distinguish itself justly. Also, in the agreement with the community and the people of the community should be making decisions, not people from outside the town.

Restrictions in going to the beach at night during nesting (x3)

There are many problems with the people of the community with the turtle project.

Many volunteers that consume drugs and injure the community.

Bad planning.

Elimination of the turtles by some people.

People coming from other places (locals practice conservation, non-locals do not)

**Eggs that are lost*

**comments which may/probably do not answer the question re: the project as opposed to the turtle situation*

12. What are the benefits (should be "beneficiaries"-translation error) of the project?

**** beneficiaries**

Tourism

**Endangered species conservation (x4) (turtles)

Economic benefits

**MINAE

**ANAI

**Not the community

Money, volunteers, turtles (implies that volunteers** and turtles** are beneficiaries)

**Some people are benefitting

All the community: cabineros, guides and everybody** (3)

From my point of view the only beneficiary of the project is ANAI**. Because during the time of the project they are the only people reaping the benefits of this project. And if the turtle conservation project were managed by the association as it should be maybe there will be more shared benefits.

**Income for the families that work with cabinas and for some young people that work in the project.

**We don't benefit from the project

Conservation of natural resources, opportunity of training for the community**, economic assistance

Nothing (nobody?**)

It makes a tourist zone in the community** of Gandoca and thus we have more tourists and we protect the turtles** of Gandoca-Manzanillo beach more.

The people that live on the beach**

Many**, but not all the community benefits from it. Rather there are some that they (from the project) hurt, not from the protection of the turtles but from the sector that it protects.

The cabina owners**

Those who** kill the turtles and take the eggs

13. What do you believe are the best aspects of the turtle conservation project in Gandoca?

Looking after what we have to teach and educate the community and attract the goodwill of people from other countries to help us conserve that which they don't have.

Culture of other countries (exchange).

It educated the inhabitants of the community (x2) and its neighbours in the vicinity for the protection of the turtle.

Due to the protection of the turtles by many people we had greater income and the town is starting to develop.

The rearing of turtles.

Turtle protection (x4)

Getting to know different cultures and some very good people come here and we can share some interesting ideas.

Creates consciousness.

Recognition of the community at the international level.

That it is a joint job for ANAI and MINAE and the people of the community are striving for the same goal. We also counted on the contribution of the commando of Sixaola.

By caring. It prevents people that kill turtles and steal the eggs, what was happening some years ago.

Protecting the turtles so that they are not completely lost.

For some youth it is an experience because they learn to protect their community.

It conserves the animals.

From the help it gives to the community, brings tourism, protects the species in danger of extinction, conscientiousness of the people that see the positive side of this project, those who cooperate and help.

Brings many people to get them involved in the project.

Teach us to conserve and the importance of their (the turtles') lives.

Patrolling and taking care (of the turtles).

Hatcheries.

14. What do you believe are the worst aspects of the turtle conservation project in Gandoca?

With regard to the worst aspects: that all the people must walk around dressed and not in bikinis or dental floss. Try to put the garbage in its place. And others.

Restriction of people on the beach.

There are no worst aspects.

There is not sufficient public transport, we don't have an adequate place to satisfy basic needs, we don't have an info office, there is no public phone and many other things.

The stealing of eggs by caretakers.

The majority of the people aren't taken into account. This project should be managed by members of the community or at least we should be able to make decisions about things that pertain to us as local people and owners.

What happened yesterday at the beach- confrontations, lack of conscience.

If it is said that it is a community project, that is because the community is the only thing not taken into account, except for the few people who take control of the community.

It is managed mostly by one non-governmental organization and the community doesn't participate in the management.

Nothing.

Because it is managed by one non-governmental organization which is known as ANAI and they never take the community into account.

Those that want to kill the turtles.

They are the guys on the beach that don't follow the rules, like not smoking, no liquor, no drugs. It only benefits some people, some volunteers consume drugs and this has made the youth of the community do the same thing.

The project doesn't have anything negative only that there are certain restrictions that the community won't accept.

That people not part of the project try to boycott it.

In our opinion nothing.

Destruction.

People that come from the Panamanian side and take the turtle eggs.

15. a) How do you rank the turtle conservation project in terms of its impacts on the economy of Gandoca?

1. very good 2. good 3. neutral 4. bad 5. very bad

b) Why do you feel this way?

(#) value corresponding with rating scale

(1) The benefits to the community.

(3) For me there are no benefits.

(1) There needs to be more volunteers and tourists during the season of egg laying and throughout the year.

(2) Because of the project many families have opportunities for new sources of income.

(4) Because we are not able to sell or eat the eggs.

(2) Because of the volunteers.

(1) It brings money from the volunteers.

(4) Because the management is by one non-governmental organization that tries to deceive and develop their own interests and certain people are their puppets, along with MINAE they are harming members of the community.

(2) ANAI receives the majority of the economic benefits. ANAI has never donated anything directly to the community. The cabin owners and guides receive part of the money.

(5) This project would be able to benefit more people if it were open and communitarian as it claims to be and not as has been up until now.

(3) It is not the majority of the community that benefits from the project, only some families.

(4) Only six families benefit from the project. (x2)

(3) All the people that work with the project gain in a similar way.

(2) It gives income to some people that work there.

- (3) I don't say neither bad or good because I don't obtain any benefits from the project.
- (2) Conserving them (the turtles) so that they don't die.
- (2) You can see that they know how to work on the project.
- (2) There are many families that don't benefit, only a certain few.
- (2) During the project the people of the community make more money.
- (2) because thanks to the project some people have a good income.
- (1) We will see plenty of animals in the future, an abundance of turtles and eggs and then we can export them.
- (1) Benefits people with cabinas, taxi drivers, family involved (as guard and camping)

16. a) Now, could you tell me, how do you rank the turtle conservation project in terms of its impact on the community of Gandoca?

1. very good 2. good 3. neutral 4. bad 5. very bad

b) Why do you feel this way?

- (1) Ten years ago ecotourism was ignored because we did not know anything about the value of the project.
- (3) We do not benefit directly from the project
- (1) It helps in many ways in development of the community, such as economic aid from international institutions.
- (4) Runs out local tourism.
- (3) It is equitable for all.
- (1) everybody benefits.
- (4) The decisions should be made by the association for development and not as is the actual case, the decisions are made by ANAI and MINAE without bringing benefits to Gandoca.
- (1) Everybody is being treated equally, there is no guidance about why the project is the way it is.
- (5) I don't know, but if we talk about the community it is only that it is not taken into account and I don't want to say this to put somebody down but because this has been happening for many years, this is the worst year. They don't take the community into account but rather the two organizations are taking the decision making power.
- (2) It gives better knowledge of the community at the international level and attracts the attention of more tourists to come to Gandoca.
- (1) They are helping us to conserve our natural resources and understand that a turtle is worth more alive than dead.
- (2) Protection and conservation.
- (5) It doesn't bring anything for the community.
- (3) In this community the people who benefit are close to ANAI because otherwise they don't give any volunteers to the other cabin owners and this is very negative.
- (2) they conserve them.
- (1) It is creating a more touristy zone in our community.
- (1) Because it protects the turtles and protecting them brings tourists, the working tourists and some of them are doing good research about the lagoon and the turtles.
- (2) Maybe, by tourists coming through and later the community will be known throughout the world.
- (2) They leave behind benefits when the cabinas are rented or loaned or others.
- (1) For the future.
- (2) Not everybody benefits, for example those that have farms or are very farm from the beach.

17. a) How do you rank the turtle project in terms of its impact on the turtles?

1. very good 2. good 3. neutral 4. bad 5. very bad

b) Why do you feel this way?

(1) There is no exploitation of their meat and eggs.

(1) Helps increase the population. Here it's not like in Panama. Three turtles have been found dead in Panama now.

(1) It increases the numbers of turtles in the sea and their population.

(1) By protecting them there are more each and this way their extinction will be avoided.

(1) They reproduce.

(1) The turtles are protected.

(2) Protection and no killing of stealing of eggs.

(3) It is not the best, the best is not being done.

(1) 96% protection.

(3) My point of view is that these turtles are like a gold mine for some organizations because only at the time of the turtles do you see people, organizations and interest in the protection of this unique animal and not for others (animals).

(2) It tries to protect the turtles, but there are many occasions that the people that work don't know how to handle the eggs and damage them when they move them to the hatcheries and this a loss to the species.

(4) Only six people benefit from the project.

(1) It is all about giving them maximum protection and therefore giving them greater and better living opportunities.

(1) They protect them so that they don't disappear and the eggs are not commercialized.

(1) If they didn't take care of them they would be exterminated, this is the only good thing about the project, although some local cabina owners get benefits but not all of them, only those that ANAI wants.

(2) So that they don't disappear.

(1) We protect them (turtles) from the human beings.

(2) It allows the conservation of marine turtles.

(1) Clearly it is very good because they are doing excellent research work and monitoring and protection of this beautiful animal.

(1) because of the conservation.

(1) Because the project is here many turtles have been saved.

(2) If we destroy the few there are there won't be anything in the future, further in the future we can eat and sell them.

(1) Before there was no turtle protection and now there is.

18. a) How do you rank your support for the turtle conservation project?

1. very good 2. good 3. neutral 4. bad 5. very bad

b) Why do you feel this way?

(2) This refuge came to Gandoca because of me, I can call myself the founder of this turtle project and the refuge Gandoca-Manzanillo

(3) We have nothing to do with the project.

(2) We need to participate more, manual labour like cleaning the beach, constructing hatcheries, markers etc.

(2) Because we are involved in various aspects.

(3) I am against the project.

- (2) *By not doing anything to hurt the turtles.
- (2) We don't have any problems, we cooperate with the project.
- (2) *We don't kill them, eat their eggs and don't teach our children to destroy them.
- (1) Somebody has to teach the other people. I am conscientious that if we don't help with maintaining the project it is going to disappear.
- (4) In no way because they don't take us into account.
- (3) It is not all about harming the species if I could help with the patrols I would do it to give support. (If he can help he does when the opportunity is there).
- (2) I have tried to support them in a way that I have personally tried to support them on the beach.
- (2) *We don't bother them because if we do they will die.
- (3) Not everybody is taken into account because they think we are different from them.
- (3) the people in charge of the project don't take me into account.
- (2) So that they don't disappear.
- (2) It is a big help to the project.
- (2) With the people being united comes the strength and the support from other people.
- (1) Almost always I go to patrol with ANAI, and any other things that they need and I am able to help and assist with.
- (3) I am not involved in the project.
- (2) I help lot of tourists learn more about the turtles.
- (2) For the future.
- (2) If there was no project we wouldn't benefit from the tourists etc.

***misinterpreted question: explains what they do to support the project, not why they do or don't support the project.**

What activities are being carried out in Gandoca in regards to the turtle conservation project?

Hatcheries, night patrolling, keepwatching by the police and MINAE, and the technical part brought by ANAI and biologists from other countries and our own.

None. (x4)

There are guides, housing and restaurant service, educating the schoolchildren.

Cleaning the beach, constructing hatcheries, collecting the eggs.

Harvesting and taking care of the eggs.

Hatcheries, collecting garbage, patrols.

Hatcheries, patrols.

Beach patrol, collecting eggs and taking care of them until they hatch.

Teaching the children in the school so that they know what is going to happen in the nesting season, guides take course to prepare starting in January to be ready in April, repairing houses for the tourists, the cabina owners are going to take course on handicrafts in order to offer to the tourists.

None of the activities can be fulfilled if they don't take the community into account.

Tries to give conscientiousness to the people about the importance of respecting the life of these animals.

Artisan, teaching.

Work in the banana company the agriculture and breeding of pigs and other animals.

Take care of them (the turtles).

They give workshops, train people.

Take the school students to see the birth of the turtles.

Patrolling, monitoring, building hatcheries, digging up nests, relocation, taking care of hatchlings, tagging and measuring them.

Patrolling to take care of the turtles.

They hold many workshops relating to the marine turtles, crafts and others.

The community itself has to support it. Foreign people help us, we all have the right to look after the turtles. In the future we can build a factory to capitalize on the turtles and their eggs.

Guides, taxis, horses (horseback-riding), cabinas, camping.

20. a) Do you believe these activities are sufficient for the protection of the turtles in Gandoca?

yes no

b) Why do you feel this way?

(no) There needs to be more personal financing by the government and volunteers from other countries.

(no) There are no activities.

(no) profit for this very project exists on the part of those who take care.

(yes) Because of the eggs and the protection.

(no) Because the eggs are always taken and the turtles killed and it is very easy to do bad things.

(no) better cabina service, it is necessary that there is discussion before the nesting, need to talk to the community, the people do not know anything about the refuge/lagoon. It is necessary to prepare them, to tell them why we cannot go to the beach, eat the eggs, etc. Many people don't ask for information, only wait until it arrives at their house (recommendation: information booklets to ALL members of the community explaining global turtle issues and importance of protection –holistic explanation).

(no) Because it does nothing for the consciousness of the town and if the town is not conscious there is no protection that is of worth.

*(no) *There are no activities that relate to the project, only the project itself.*

(no response-no?) I thing that the project must extend to try to protect other species like the Carey and Green turtles.

(no) Need a little more protection.

(no) When the project ends they leave without caring that there are other baby turtles yet to come.

(no) They always steal the eggs (osta-translation?) some of the people who work on the project.

(yes) It is good for taking care of them.

(no) There needs to be better training for the people of the community who have collaborated with the project.

(no) We need support from all the inhabitants of the region and their neighbours.

(no) Maybe needs a more strategic plan.

(no) There needs to be more taught about how to protect them.

(yes) For the future, benefits for the community.

(yes, but not very) It is lacking vigilance.

21. What do you think are the positive or negative aspects of the Gandoca-Manzanillo Refuge?

Positive

The care that is being given, although there are deficient rangers who don't do their job as they should.

More animals, more turtles.

There are only positive.

Protection.

Protection of flora and fauna. (x3)

The natural potential of flora and fauna and its biodiversity in total and some groups that are trying to protect it.

Clear and concise eco-tourist information.

Maintaining and cleaning the beach.

It is good for conserving animals.

It is a project that helps conserve the flora and fauna of the refuge.

It benefits the community and protects the existing resources.

The refuge itself, for conservation.

*The pipe, coconut, sweet limes.

Nothing at the moment.

Taking care of it.

Everything is good.

Negative

Customs such as walking on the beach or in the mountains have been lost.

Prohibits cutting trees or (*apiar charrales*-Translation? Charra = horsewomen) in order to sow corn, rice, beans etc. or selling trees. These are sources of income for daily survival.

Bad administration which impacts very badly on the community.

The people of Gandoca are denied the chance to do the things they used to do in the past. The town was forgotten.

There is little way to stop the destruction towards the refuge. The laws of Costa Rica are very flexible.

When one does not wake up to the eco-tourism. It brings strangers that construct big hotels on the beach and the wealth only goes to one place.

Because they are created from groups without taking account of the town.

Bad management on the part of some rangers and members of the community.

They never complete their administrative work hours and it is not their life. In other words there problem- community has to deal with it).

That they don't kill them, the people.

Destruction of nature (when it occurs)

Not being able to use natural resources of necessity.

They don't try to take care of it.

The people that destroy it.

22. a) How do you rank the and rules for the control of the lagoon?

1. very good 2. good 3. neutral 4. bad 5. very bad

b) Why do you feel this way?

(1) By taking care, but I think that in the future it will be better because there are projects for the lagoon.

(3) I don't know what the rules are there is no documentation.

(1) It protects the fauna and flora and the rainforest.

- (2) Because it does not permit many activities that used to happen in the past like fishing with nets and outboard motors which used to contaminate the lagoon and this allows for the protection of many species.
- (5) It must be more flexible with local tourism.
- (3) Because some rules are good but others are bad. Like for fishing, I agree with those rules.
- (4) The majority of people of Gandoca don't even know them and we need to know them.
- (2) Good but it has failed i.e. banana workers in the lagoon- stricter (with people in the lagoon).
- (5) They must let the town know and communicate government bylaws and new laws that are approved.
- (2) If it were not this way perhaps the lagoon would be more contaminated and the vegetation destroyed.
- (5) Nobody ever takes us into account.
- (2) It helps us to avoid too much contamination therefore we protect more life forms that are in this place.
- (2) To avoid the destruction of the fish.
- (5) They don't take the town into account about what they do.
- (1) People from other communities come to do things against the conservation of the species of the lagoon.
- (1) We can better preserve our flora and fauna.
- (2) It is a place where there are very many species and thus they help with their conservation.
- (1) There are many people that come and they think that they can make rules and then break them, and it's with those rules not just anybody can enter the lagoon alone, only with the guides.
- (2) Everything about conservation is good.
- Not familiar.
- (2) The lagoon is a place of conservation and the rules are to be followed.
- (1) To protect everything for the future.
- (1) The rules are good, norms are good because they are protecting the fish.

What do you do when there are no turtles?

We sell pork and beef, coconuts, chickens, bananas and practice agriculture.

It's the same everyday- I live by fishing.

In Gandoca there is no other activity, the only (activity) is the turtle project from February to June. We dedicate ourselves to maintaining buildings and domestic chores.

Fishing with net and ticket (license).

Head of the house, public safety (police), quiet life, tourist publicity.

Suffer, there is no money.

We are like ANAI and MINAE and they left us out of their group at their own will. We do not depend on the turtles nor on the project. We do other activities and never depended solely on the turtles.

Sometimes people arrive, if they don't arrive my spouse works in other places. This year there are going to be mini-buses: people every weekend and perhaps it will be different.

I don't depend on the turtle project. *(For me outside better that this project is takes care to the ?mian? because he corresponds to do it?)* Note that: The problems whose solutions effect an entire community are affected because people are not taken into account. (The problem lies in the fact that the people aren't being taken into account).

The turtles don't change what I do.

Try to look for work somewhere else because the situation gets more difficult. I think that the community in general needs to become conscientious that if such a valuable project ends we the

inhabitants of this community will be the only ones harmed. On my part, I thank you for taking us into account in this study and I hope you are successful.

The same (x2), I work at the banana farm. (x1)

Same as always because we don't depend or count on any kind of help because the people who come don't leave anything for us.

The same, my sons help me because I don't have work.

Only hoping that the project returns so that we can have volunteers. When there is no project the community isn't worth anything. Because many more that benefit from the turtles, such as: guides, cabina owners, stores and bars.

The same, "Live the life".

Since we don't fully depend on the project, I don't know, look for work or wait for the next project.

I don't depend on the turtle project, I work for the government.

The same, I chop wood for ...

We dedicate ourselves to other things such as cultivating, buying or raising pigs, hens and others.

We don't live off fishing but those that do, do not support the project. It's better to respect the laws so that there will be turtles in the future.

The same, I have a farm.

Additional comments

Years ago this was a smaller community and people took only what they needed and covered up leaving the rest of the eggs.

More people from other areas came in destroying nests and killing turtles for their shells and meat.

Fights between people living here because of those that came from outside to settle, new economic resource: sold shells, meat, eggs, etc. in Bocas Del Toro, Panama.

One incident: people couldn't wait for the turtle to lay eggs so cut into its side to get the eggs before the turtle laid them.

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