

PROFILE

Ecotourism, Sustainable Development, and Conservation Education: Development of a Tour Guide Training Program in Tortuguero, Costa Rica

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ABSTRACT / A tour guide training program was developed for rural communities near Costa Rica's Tortuguero National Park to respond to the impacts of the 24-fold increase in park visitation in the past decade, to involve local communities in resource management, and to provide regional environmental education. The development of the training course involved a survey of scientists and park managers to ascertain resource management needs, priorities for information to be

disseminated, and impacts of tourism on the resource base. Current and potential tour guides were surveyed to identify their information needs, solicit their input in the training program, and to determine their knowledge and skills. Written questionnaires were developed and given to 400 tourists to determine their activities and environmental information needs, and hotel owners were censused to examine the economic feasibility of a local guide program. A pilot training course and guide program involving 12 Tortuguero residents demonstrated that a tour guide program: (1) helped mitigate negative tourism impacts on Tortuguero National Park's natural resources, particularly by regulating tourists on the park's 35-km beach used for nesting by endangered sea turtles; (2) provided environmental education to an important segment of the local community not traditionally reached through school or government development projects; (3) provided environmental information to tourists, thus enhancing their visit; and (4) provided local economic benefits through lucrative part-time employment, thereby allowing local people to participate more fully in the tourism system. An extended training course is being planned to provide further environmental education programming and to increase year-round employment opportunities for the tour guides.

Ecotourism, or natural history oriented tourism, is a growing industry in developing countries (e.g., Laarman and Durst 1987, Boo 1990) and has been identified as an important and sustainable development initiative in Costa Rica (Hill 1990). Ceballos-Lascurain (1987) defined ecotourism as "traveling to relatively undisturbed or uncontaminated natural areas with the specific objectives of studying, admiring, and enjoying the scenery and its wild plants and animals, as well as any existing cultural manifestations

(both past and present) found in these areas. . . ." Dependent on using natural resources in a relatively undeveloped state, ecotourism is based on natural features like scenic vistas, wild rivers, pristine forests, and abundant wildlife and necessitates the high-quality maintenance of these resources. Ecotourism represents a potentially low-consumption use of natural resources that may generate substantial economic return, thus playing a role in the sustainable management of resources, from rainforests to coral reefs, in Costa Rica and other developing countries.

The positive and negative impacts of ecotourism—economic, social, and ecological—vary considerably. In Costa Rica, the benefits of ecotourism have ranged from economic inputs into rural communities, to the preservation of a cloud forest (Healy 1988, Hill 1990).

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Other benefits of the tourism industry include: (1) its growth potential (tourism is predicted to become the largest world industry by the year 2000 (Beekhuis 1981), (2) the fact that the tourism market comes to the producer, (3) its potential to help diversify economies and employ a large work force relative to other industries (Pearce 1981), and (4) its ability to stimulate economic activity and growth in isolated rural areas (e.g., Jacobson 1991).

Negative impacts of the ecotourism industry also are plentiful. For example, tourism often provides an unstable source of income—weather, politics, and exchange rates can cause great fluctuations in tourist numbers; substantial leakages of income out of the host countries often occur; investments for infrastructure may be high; and success, in the form of too many tourists, can destroy the industry. Furthermore, environmental impacts from pollution and habitat modification, social impacts resulting in cultural deterioration, and so on, have been frequently noted (see Mathieson and Wall 1982, for review). In spite of the potential negative impacts, many countries, such as Costa Rica, are eager to embrace ecotourism for the expected foreign exchange earnings (Hill 1990). Additionally, ecotourism may provide benefits by promoting the preservation of natural areas and providing opportunities for environmental education, the focus of this study in Tortuguero, Costa Rica.

Boo (1990) found that 30% of the tourists surveyed in Costa Rica reported that natural history was an important factor in deciding to visit. Over half of those surveyed had been to a protected area, and many had visited several during their trip. Increased tourism to parks and protected areas potentially could result in increased revenues, better protection, expanded interpretive facilities, or even the establishment of new reserves. Expanded interpretive programs in protected areas, in turn, could help foster more favorable attitudes towards protected areas, promote natural resource conservation, educate school children, train resource managers, and increase a park system's flow of benefits to the public by serving as an educational resource (e.g., Dietz 1986, Fitter 1986, Jacobson 1987, Olson and others 1984, Sharpe 1982).

Although Costa Rica is world-renowned for its extensive and spectacular park system, many of the parks lack the basic infrastructure, such as trained guides, environmental and interpretive information, and visitor centers needed to support tourism. Opportunities to absorb tourist dollars, to promote environmental education, or to provide employment for local communities are missed. For example, Tortu-

guero National Park (TNP), on Costa Rica's northeast coast, has experienced a rapid increase in visitors. Attracted by sport fishing, sea turtle nesting, and the area's wild expanse of rivers, forests, and beaches, visitors have increased by 24-fold in the past decade; tourism was the primary industry in the town of Tortuguero in the 1980s. Place (1988, 1991) found that more than half the residents of Tortuguero worked at least part-time in the tourist industry or with the Turtle Research Station located near the park and operated by the Caribbean Conservation Corporation (CCC). In 1989, 39% of the residents surveyed were employed in tourism occupations, and 51% of their family members worked in the tourism industry, for the CCC, or for the park (Brown 1991). Based on sociological research in 1986, Place (1988) emphasized the potential benefits that might accrue from a local tour guide program, noting that local infrastructure development had not kept pace with rising tourist numbers.

In 1990, the CCC expanded its role in Tortuguero beyond the Turtle Research Station, where it had been supporting a 35-yr turtle tagging research and conservation project, to work in cooperation with the TNP and the University of Florida on the development of a training program for tour guides. The goals of the program were to: (1) mitigate negative impacts of visitors on Tortuguero's natural resources, particularly the endangered sea turtles that nest on the beach each year; (2) provide conservation education to local residents, especially a group that was not reached through the school system or through other government development activities; (3) provide environmental information to foreign and domestic visitors to Tortuguero, thus enhancing their visits; and (4) provide an additional source of income for a sector of the local community.

Thus, the development of a tour guide training program addressed four primary areas: (1) resource management needs of the nesting turtles and other wildlife of TNP; (2) information needs of local tour guides based on their interests, knowledge, and skills; (3) information needs of foreign and domestic tourists, as well as the duration of their visits, group size, and activity patterns [as Boo (1990) notes, this type of basic information is "non-existent in most cases," for visitors to Latin American parks]; and (4) information on the economic feasibility of a tour guide program, based on seasonality and hotel capacity for tourists in Tortuguero.

Input into development of the tour guide program was obtained from the groups affecting, and being affected by, ecotourism and the potential tour guide

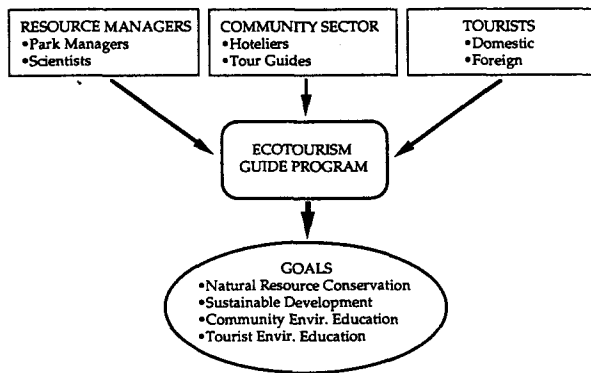


Figure 1. Model of target audiences and goals related to Tortuguero's ecotourism guide program.

program in Tortuguero (Figure 1). Participation by these groups—residents, hotel owners, resource managers, and the tourists themselves—is essential for the long-term sustainability of the industry and the natural resource base, in order to integrate economic development with the conservation of Tortuguero's natural resources. An understanding of the needs and interests of each of these groups provided the foundation for the tour guide program.

Information was solicited from each group through the use of written and oral questionnaires (Table 1). These background surveys helped to identify priority subjects to be included in the tour guide training course, local and international priorities, technical feasibility, impacts of tourism and potential mitigation, ecological and economic sustainability, and cost effectiveness. An evaluation of a pilot guide program targeting tourists visiting the turtle nesting beaches was conducted in August 1990. This helped determine to what extent the objectives of the tour guide program could be achieved and identified further training needs for Tortuguero guides.

Methods

Study Area

Tortuguero National Park. Located in northeast Costa Rica, Tortuguero, the Turtle Region, was first chronicled as a traditional nesting ground for sea turtles by the Dutch in 1592 (Boza and Mendoza 1981). During this century, the exploitation of the turtles for their meat, calipee (used in making turtle soup), eggs, oil, and in one species, shell, led to their decline or disappearance in other regions. In 1954, A. Carr began a study of the green turtles (*Chelonia mydas*) nesting in Tortuguero using a tagging program to determine "where the turtles came from and where they

were going" (Carr and Carr 1972). In 1959, The Brotherhood of the Green Turtle was founded, which led to the establishment of the CCC, a nonprofit organization, dedicated to the study and conservation of sea turtles. The CCC helped initiate protection of the nesting turtles at Tortuguero, by promoting a national decree in 1970 to establish Tortuguero National Park for the protection of the 35-km beach, the largest nesting site for green turtles in the western hemisphere, where between 5700 and 23,000 turtles nest each year. In 1975, the park was expanded to 18,946 ha, to include surrounding forests (classified as tropical wet forest, Holdridge 1967), encompassing most of the Tortuguero basin watershed. In addition to the four species of marine turtles that nest on its beaches, the park protects a variety of threatened and endangered species, as well as over 55 species of fish in the lagoons, over 350 species of birds, and some 140 species of mammals (Boza and Mendoza 1981). Much of the park is inundated seasonally; the area receives an average of 5.8 m of rain annually (Myers 1981). An elaborate network of canals and rivers crosses the park. The verdant swamp forests, blue waterways, and rich wildlife are a natural tourist attraction.

Tortuguero village. Tortuguero is a small, coastal village with a current population of approximately 300 people of Hispanic, Afro-Caribbean, and West Indian descent, and is located near the mouth of the Tortuguero River and the Caribbean Sea (lat. 10°37'N, long. 83°33'W). Since the establishment of Tortuguero, the economy has been based on the exploitation of natural resources. Originally the products of the green turtles were exploited, becoming a large-scale industry in 1912 when an 18-ton cargo boat came regularly from Limon to catch turtles. The current decrease in demand for turtles and more stringent regulations have rendered turtling an insignificant part of the economy. Between 1940 and the 1960s, lumber became the primary industry. Tortuguero's population quadrupled when a sawmill was built in town, and the first school and stores opened. By 1972, the sawmill was no longer economical. Its closure left the town overpopulated and poor. Many people emigrated from Tortuguero and the population declined by 2.2% between 1973 and 1984 (Place 1988). Tortuguero remains extremely isolated, accessible only by boat or small plane.

The establishment of Tortuguero National Park in 1975 removed some natural resources, such as wildlife for hunting and land for farming, from local access and exploitation. Several recent studies have examined the relationship of the park to Tortuguero

Table 1. Needs assessment for a tour guide program: Information solicited from four groups involved in ecotourism in Tortuguero

Resource managers	Tour guides	Tourists	Hotel owners
Tourism impacts	Background	Background	Use of guides
Opportunities for mitigation	Interests	Interests	Seasonality of tourism
Conservation goals	Skills	Activities	Economics of tourism
	Finances	Finances	

residents. For example, Place (1988) asked heads of households she interviewed to compare their lives with their situation a decade before. Eight families felt their diet was worse, nine reported it was the same or better, and ten deferred answering. Ten of 21 families reported their quality of life was worse, primarily because of inflation and unemployment, and 11 felt it was the same or better. However, since there were no control subjects, such as another community away from the park, the overall impact of the park on the local community's attitudes and lifestyle was unsubstantiated. In 1989, Brown (1991) again surveyed Tortuguero's residents and found that 100% of the respondents agreed with the statement, "It is good that the park is protected." The majority of respondents in this survey recognized the value of the park in providing direct employment, opportunities for tourism development, and the conservation of nature.

Surveys

Surveys were developed to address each of the four goals for the development of a tour guide program and its attendant audiences:

1. Resource management needs of the nesting turtles and other wildlife in the region. Questionnaires were developed and conducted orally with the TNP director, park manager, regional park director, and three CCC Turtle Research Station scientists. The resource managers and/or scientists were asked open-ended questions about the impacts of tourism, their opinions of the pilot tour guide program, and their suggestions about the content of a future extensive training course. For the latter, they also were asked to rank the importance of various subjects from a list of 15 topics (wild animals, plants, geology, tropical ecology, sea turtle natural history, human use of plants and animals, rain forest conservation, local cultural history, marine life, first aid and safety, communication techniques, financial management, foreign language training, park regulations, and boat maintenance).

2. Information needs of tour guides. Questionnaires for tour guides were developed and conducted

orally for all 18 current and pilot (participants in the pilot tour guide program) Tortuguero guides: nine employed by hotels and nine self-employed community guides. They were asked to rank (using a 5-point Likert-type scale) their relative interest in nine natural and cultural history topics and to rank the relative importance of 15 general topics for inclusion in a tour guide training program. Additional suggestions for subjects to be encompassed in a training program also were solicited, as well as general information about scheduling, sociodemographic backgrounds, and education levels. To determine their knowledge and skills, observations of the information transferred to tourists by community guides that had completed the pilot training program were made during each of their tours, as part of an evaluation conducted one month after the implementation of the pilot program. Observations also were made of tour group activities on the beach.

3. Information needs of foreign and domestic tourists. A survey of tourists was developed as a written questionnaire based on a format used by the US National Park Service (e.g., Dolsen and Machlis 1989). It was pretested by a dozen former tourists to parks in Costa Rica, with additional input from CCC staff. Four hundred questionnaires, in English and Spanish, were distributed to the six hotels, with numbers varying according to the hotel capacity. Questionnaires were placed in prominent areas with a box for their return, and hotel owners and/or managers were asked to encourage tourists to fill out a questionnaire upon their departure. The questionnaires employed multiple choice, fill-in-the-blank, ranking, and open-ended questions in order to record tourists' activities in Tortuguero, their interests and information needs, their mode of transportation, ages, origin, reasons for visiting, expenses, size of groups, and opinions of tourism impacts. As Boo (1990) noted, basic information concerning visitors to Latin American parks is unknown.

4. Economic opportunities based on tourism. An oral census was conducted of all six hotel owners (or managers, depending on availability) in Tortuguero

to determine the seasonality, hotel capacity, and financial output from tourism. Their input in the development of a tour guide training program also was solicited. Like the resource managers, the hotel owners were asked to rank 15 subjects for inclusion in a guide training program, as well as to provide other suggestions relevant to tourist management in Tortuguero.

Pilot Program

A pilot tour guide training program was developed by the CCC and TNP in July 1990 to address the immediate problem of unregulated tourists and the disruption of nesting turtles. This also provided an opportunity to ascertain the economic feasibility of a guide program. A 10-h training course encompassing sea turtle natural history, park regulations, and communication techniques was advertised locally and provided to any interested individuals in Tortuguero over the age of 17. Upon completion of the course, a guide cooperative was established by the newly trained guides, and the TNP helped enforce the evening use of tour guides by tourists on the nesting beach. An assessment of the tour guides' knowledge and skills was conducted at the end of their first month of guiding. Direct observations of each of their guided tours were made to assess: (1) information transferred, (2) group effects on turtle nesting behavior, and (3) financial feasibility of a tour guide program.

Results

Survey of Resource Managers

Oral interviews with the area's resource managers and scientists indicated concern about the negative effects of tourism. All reported that the tourists' lights, flash photography, and movements on the beach at night frightened the turtles and kept them from nesting. The scientists also complained that the tourists interrupted their nightly turtle tagging work by asking questions or shining flashlights. Additionally, the problem of littering, particularly by domestic tourists, was noted, as well as other pollution—sewage waste, fuel leaks from boats, etc.—linked directly to tourism.

The resource managers' comments on the benefits of tourism commended the industry for bringing in park fees, even though small (US \$1.10 for foreigners, \$0.60 for Costa Ricans), and adding an additional cadre of people on the beach to potentially report suspicious activities. Concerned tourists even re-

ported the activities of researchers on the beach several times.

The resource managers were unanimous in assessing the results of the pilot tour guide program as a significant help in regulating the tourists on the beach and monitoring their activities (E. Chamorro, personal communication). As one result of the program, they were able to collect more park fees. The resource managers were supportive of the development of an extensive guide training program. They ranked sea turtles and other wild animals, plants, ecology, rain forest conservation, and communication techniques as the most important subjects to include in a tour guide training program (Figure 2a). The topics of marine ecology, geology, local culture, and boat maintenance were considered among the least important. Additional topics suggested for the training course included: group leadership, human activities impacting the Tortuguero watershed, sea turtles (international laws, conservation, exploitation in neighboring countries), the history of the CCC turtle research project, general wildlife laws in Costa Rica, human relations, and aquatic ecology.

We also collected data to quantify human activity on the nesting beach. Tourists were not the only people active on the beach at night; groups of CCC turtle researchers walked the beach, covering 2-mi transects six to eight times per night, and park guards also regularly patrolled the beach. A week of nightly observations from 23 to 30 July, at the busiest area of the beach, quantified human activity patterns during early evening hours when tourist numbers were greatest. The maximum number of people passing the observer during a 90-min interval included 90 tourists, one guard, and ten researchers during a weekend night; the minimum number during the same time period, but during the week, was no tourists, five researchers, and two park guards.

Survey of Tour Guides

All 18 pilot and hotel tour guides operating in Tortuguero during this study were interviewed using oral questionnaires. Subject matter they considered of most interest for an extensive training program dealt with the natural history of sea turtles, other wildlife, and plants (Figure 2b). Foreign language training, particularly English, also ranked high. Subjects viewed as least important included the human use of plants and animals and local cultural history. Financial management and communication techniques also ranked poorly. Several other topics were suggested for inclusion in the course, consisting of: ecology of the nearby river; fisheries; geography and cultures of

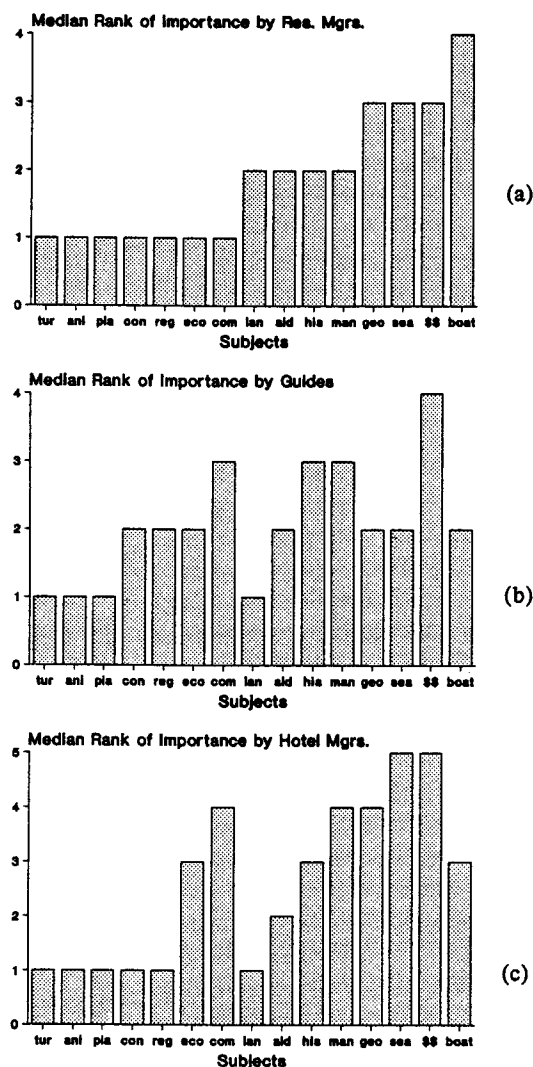


Figure 2. Importance of subjects for inclusion in a guide training program, ranked on a scale from 1 (extremely important) to 4 (not important), by (a) resource managers, (b) guides, and from 1 (extremely important) to 5 (not important) by (c) Hotel Managers. Subjects = sea turtle natural history (tur); wild animals (ani); plants (pla); rainforest conservation (con); park regulations (reg); tropical ecology (eco); communication techniques (com); foreign language training (lan); first-aid (aid); local cultural history (his); human use of plants and animals (man); geology (geo); marine life (sea); financial management (\$\$); boat maintenance (boat).

the world; climate, weather, and rainfall patterns; the national parks of Costa Rica; and availability of financial aid.

The respondents provided guidance for the logistics of a training program. A course of several months in duration, meeting on Mondays and Tuesdays (days

that fewer tourists are in Tortuguero), was suggested. Fourteen of the 18 men felt a certificate program for Tortuguero guides should be established to regulate the local industry. Three of the four guides in opposition to certification were already employed as hotel guides and did not want to restrict guiding opportunities. All 18 men indicated they would be interested in taking an extensive training course if it were offered.

When asked what obstacles prevented them from earning a good salary from tour guiding, one quarter of the guides said there were no obstacles; four guides cited a need for English language training; and four complained of the lack of tourists, seasonality, and lack of tourism promotion. The need for their own boats and their lack of experience and contact with hotels also were mentioned as obstacles. Several guides were more specific about the lack of tourists and complained that even during peak seasons, "if it is rainy, tourists don't go out." The short duration of the average tourists' visits, the lack of control over prices (tourists generally chose the cheapest guide or boat to rent), and the lack of a tourism organization also were mentioned.

In spite of these obstacles, all of the respondents were very interested in tourism development in Tortuguero. Given several development options to choose among, all of the guides felt that they and their families would benefit mainly from increased tourism development and wildlife conservation. Increased agricultural development, increased timber production, and increased use of wild animal products were not favored.

The socioeconomic background of the participants was important to consider in the development of a guide program. Almost all of the people participating in the pilot training course had attended several years of primary school; many of the hotel guides had completed some secondary schooling. All of the guides were male and ranged in age between 17 and 40 yr old. Many of the guides, particularly those working in the community, had been in Tortuguero for under ten years. Several of those participating in the pilot program had moved to Tortuguero from neighboring countries in just the past three or four years.

Survey of Tourists

A total of 245 of 400 visitor questionnaires were returned; 16 questionnaires were incomplete and were excluded from the analysis. Of the remaining 229, 174 were completed in English and 55 in Spanish. A total of about 2500 tourists visited Tortuguero

during the course of this study. Some of the 155 surveys not returned were kept by tourists as souvenirs, according to hotel operators. Comparisons of responses between male and female tourists were made from completed questionnaires. The low number of Costa Rican tourists (7%) completing the surveys made it difficult to compare domestic versus foreign tourism needs for all but a few questions.

Tortuguero is inaccessible by road; 83% of the tourists completing surveys arrived by boat and 17% by plane. The mean number of days spent in Tortuguero was 2.5 (SD = 0.9) and, in fact, 94% of all visitors spent either two or three days in Tortuguero. Its poor accessibility renders one-day visits virtually impossible. For 90% of the tourists, it was their first visit to Tortuguero; the second visit for 5%, the third to tenth visit for 4%, and more than the tenth visit for 1%.

At least half the tourists surveyed came to Tortuguero with an organized tour. In addition, many of the tourists that recorded traveling with family or friends were also with an organized tour, so the total number of those surveyed who were with a tour was approximately 75% of the visitors. The size of the groups ranged from one to 55; the majority of the tour groups staying in the three major hotels had between 20 and 55 people.

Only 7% of the tourists surveyed were Costa Rican; 60% were North American, 29% were European; 2% were South American; and 1% were Asian. According to records of TNP, 56% of visitors to Tortuguero were Costa Rican in 1981. Domestic tourism represented only 13% of visitation in 1989 (R. Jimenez, personal communication), as a result of a great increase in foreign tourism.

The surveys were completed in equal numbers by males and females. The total number of people represented in the survey responses was 409: 203 males and 206 females. The average age of respondents was 38 yr old (SD = 12.7, N = 209); the ages of all tourists represented in the surveys were: 2% between 1 and 9 yr old, 14% between 10 and 19 yr old, 22% between 20 and 29 yr old, 24% between 30 and 39 yr old, 23% between 40 and 49 yr old, and 15% over 50 yr old.

The amount of money spent on a visit to Tortuguero ranged from US \$29 to \$650 per person. The average cost was \$154 (SD = 87.5, N = 159); over half the tourists spent \$100–199. Itemized costs (Table 2) of lodging, travel, food, local activities, and gifts were provided by only a quarter of the respondents. Many of the others indicated that they paid one price for a package deal that included everything. The costs for local activities and gifts averaged \$18, and miscella-

Table 2. Expense of a visit to Tortuguero

	Range (US \$)	Mean (US \$)
Total costs (N = 159)	29–650	154 (SD = 87.5)
Lodging (N = 45)	3–250	40 (SD = 45.9)
Travel (N = 40)	10–500	75 (SD = 95.6)
Food (N = 39)	2–171	33 (SD = 42.4)
Local Activities (N = 67)	2–100	18 (SD = 19.5)
Gifts, misc. (N = 36)	2–100	16 (SD = 20.4)

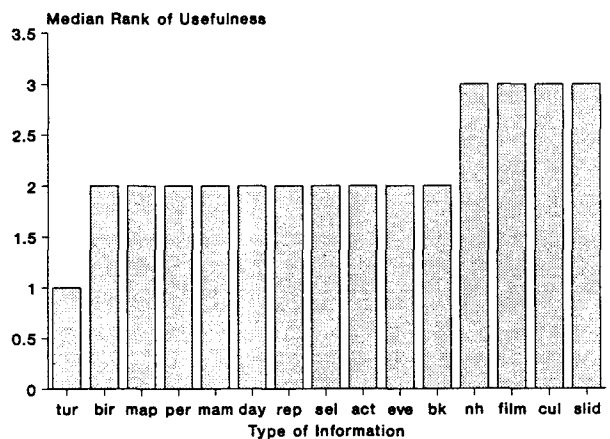


Figure 3. Tourist information needs ranked by tourists on a scale from 1 (extremely useful) to 5 (not useful). Type of information = evening turtle viewing walks (tur); regional bird list (bir); park map (map); information personnel and guide service (per); regional mammal list (mam); daytime natural history guided walks (day); regional reptile list (rep); self-guided tours (sel); park activity guide (act); evening natural history guided walks (eve); regional guidebook (bk); natural history exhibits (nh); natural history film or slideshow (film); cultural lifestyle exhibits (cul); cultural film or slideshow (slid).

neous items averaged \$16. A number of respondents indicated that they also included their bar bill in one of these categories, the only expense not covered by their package tour.

The tourists ranked 15 types of potential environmental information sources according to their usefulness (Figure 3). The highest-scoring sources included evening guided turtle walks, regional bird lists, information personnel and guide services, and a Tortuguero park map. Among the least popular were natural history or cultural exhibits, films, and slide shows ($\chi^2 = 174.4$, $P < 0.0001$). There were no differences in responses between males and females for all 15 activities (χ^2 tests, all $P > 0.05$).

Ninety-one percent of the tourists reported viewing sea turtles during their visit, and 56% stated that

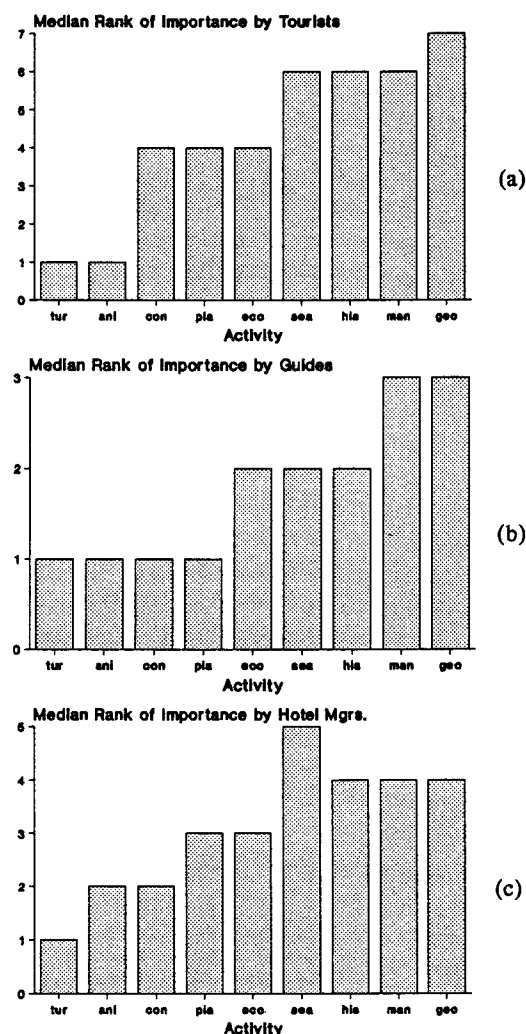


Figure 4. Subjects of interest, ranked in order of interest from 1 (most interesting) to 7 (least interesting) by (a) tourists, from 1 (most interesting) to 5 (least interesting) by (b) guides, and from 1 (most interesting) to 5 (least interesting) by (c) hotel managers. Subjects = sea turtle natural history (tur); wild animals (ani); rainforest conservation (con); plants (pla); tropical ecology (eco); marine life (sea); local cultural history (his); human use of plants and animals (man); geology (geo).

this was their primary reason for visiting Tortuguero. Tortuguero's pristine environment and local wildlife and forests were the next most prevalent reasons for visiting. Fishing, the beach, local culture, or desire for an adventure were selected less than 6% of the time. Additionally, the tourists were asked to rank nine subjects by interest. Sea turtles and other wildlife were ranked of most interest, while geology, cultural history, and human uses of plants and animals were ranked among the least interesting (Figure 4a). Domestic tourists ranked rain forest conservation as a

less interesting subject than foreign tourists ($\chi^2 = 20.5$, $P < 0.01$). No differences were evident between sexes (χ^2 tests, $P > 0.05$).

Over 90% of the respondents recommended a visit to Tortuguero. Of the remaining respondents, many wrote that they were concerned about the negative impacts of tourism on the nesting sea turtles and suggested it would be better not to promote tourism to this area because of ecological costs. Quantitatively, 71% of the respondents believed that tourism helped promote conservation of the natural systems (plants, animals, marine life, etc.) of Tortuguero. Twelve percent believed it did not, and 16% did not know. Of note, tourists at the two hotels that hosted the largest tour groups had fewer positive responses than other hotel guests ($\chi^2 = 15.3$, $P = 0.05$).

Survey of Hotel Owners or Managers

The owners or managers (depending on availability) of all six hotels were interviewed to ascertain their ideas concerning tourist information needs, a tour guide program, and the economics of local tourism. The hotel operators' ranking of their relative interest in nine presented subjects were similar to the rankings by tourists and guides (Figure 4c). They scored the subjects of geology, human uses of plants and animals, local cultural history, and marine life as being of the least interest. Sea turtles and other wildlife again scored among the highest.

Their ranking of the importance of subjects to be included in a tour guide training course was similar to the opinions expressed by the tour guides (Figure 2c). Financial management, marine life, and human uses of plants and animals again scored among the lowest subjects. Sea turtles, wildlife, plants, and rain forest conservation were ranked highly, as were foreign language training and park regulations. Additional subjects to include in a course encompassed: group leadership, tropical agriculture, fishing, timber production, economics of Tortuguero, and observation time with turtle researchers.

Opinions about the development of a tour guide program in Tortuguero varied. Only one of the hotel operators felt community guides would directly compete with his hotel's programs. The others felt a training program would be useful but were against the establishment of a certification program in Tortuguero to regulate the guides. Only one operator said he would be willing to help pay for the expenses of a tour guide training program or felt that it was important that the tour guides were residents of Tortuguero.

Economics and seasonality of tourism. Among the six hotels operating in Tortuguero, a night's stay runs the

gamut from US \$2.00 for a bed to \$135.00 for a double room, private bath, and meals. The hotels have a total of 106 rooms and a total capacity of 287 people per night. However, capacity is severely limited by transportation. Two of the hotels depend on a weekly government boat from Limon to bring tourists, three hotels have their own private boats, and one hotel primarily relies on chartered boats and planes to bring people to Tortuguero. For the hotels with private boats, usually only two boat trips are made weekly, limiting the number of nights people visit. Two private homes also board tourists and, additionally, camping is permitted in the park; however, tourists choosing these options were few and were not included in computations. The CCC Turtle Research Station has long-term tourists, volunteers, and researchers that spend from a week to several months during the turtle nesting season at Tortuguero. From June to September, a total of 75 people stayed at the research station.

Although the total capacity for tourists at Tortuguero is potentially over 8000 person-nights per month, even at peak months for 1989–1990, each hotel was only 10%–75% filled (Figure 5). This drops to 4%–20% in the lowest tourist months. Green turtle nesting season, July through September, was considered a relatively good tourist season and during July of 1990 the hotels housed about 1300 tourists. The visitors were not spread evenly through the week, but visited primarily on weekends. Thus, Friday or Saturday night may receive as many as half the week's tourists. This, in turn, affects overall tourism impacts and the number of tour guides needed.

Pilot Tour Guide Program

Before the 1990 turtle nesting season, few regulations governed human activity on the nesting beach.

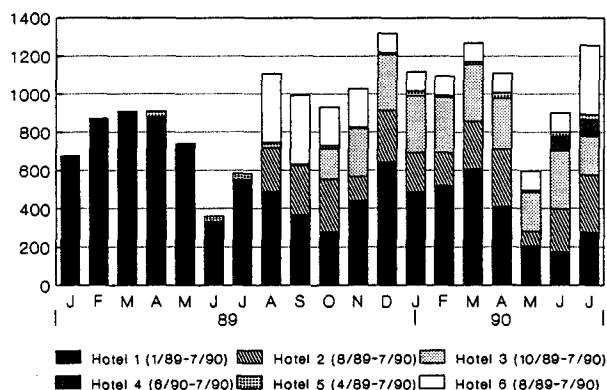


Figure 5. Number of tourists by month at Tortuguero hotels. (Data reported by hotel owners and available for varying time periods.)

Park managers and CCC scientists reported frequent disturbances of turtles coming to shore by tourists walking up and down the beach, shining flashlights, and taking flash pictures of turtles. This affected the first 7 km of the 35-km beach, where historically about 10% of the turtles nest (C. Luthin, personal communication). The pilot guide program was developed to help regulate tourist activity on the beach.

Twelve Tortuguero residents began the 10-h pilot guide training program implemented in July 1990, and eight completed it. A cooperative was established by the eight new tour guides with CCC assistance, for the purpose of organizing the guide program and rotating guide duties. A fee of US \$2.00 per tourist was charged for each tour and all proceeds were pooled and split by the guides at the end of the week. TNP staff helped enforce the use of tour guides by tourists walking on the nesting beach at night. An assessment of the tour guides' knowledge and skills was conducted at the end of their first month of guiding. Direct observations of each of their guided tours were made to assess: (1) group effects on turtle nesting behavior, (2) information transferred, and (3) financial feasibility of a tour guide program.

The pilot guide program limited the number of tourists roaming the beach by confining tourists to being out with a guide in groups of ten or less. Additionally, only the guides were allowed to use flashlights. Although ten people per group was selected as an arbitrary cutoff number, observations of four guides with 12–15 people indicated a group of this size was difficult to keep under surveillance by one guide. Several people disappeared from one group, and in the three other groups, tourists straggled up to 300 m behind the guide.

Several of the hotels in Tortuguero brought 20–40 tourists per group to the beach with one or more guides. Although these guides were better trained in controlling their groups, frequent cases of excessive use of flashlights, for up to 30 min duration, and wandering tourists, were reported by CCC staff. Tourists from one hotel, known for taking out large groups, complained in the written surveys and to CCC staff on more than half the tours under consideration that their group, ranging from 20 to 45, was too large for comfortable viewing and that the lights and activity of so many people had caused turtles to retreat to the ocean without laying eggs. Several tourists in each of these groups felt they were such a disturbance that they suggested tourists should be prohibited from the beach. In contrast, groups of ten or smaller did not engender these complaints.

Direct observations were made of each of the guided tours conducted by the eight pilot guides one

month after completion of the pilot tour guide course. All of the guides provided general facts about sea turtle natural history during their tours and were able to correctly answer tourist's questions about 75% of the time. However, only one guide out of eight articulated the significance of Tortuguero's nesting beach in global conservation efforts for green turtles, or was able to describe other aspects of Tortuguero's marine or coastal resources. This suggested that much specific information provided in the pilot course was not retained. Qualitatively, the guides showed great concern and interest in the sea turtles. They were eager to meet with researchers to learn more about the turtles. They also sent a letter to the CCC Turtle Research Station expressing concern about isolated research activities that were disturbing nesting turtles and were contemplating writing to the Costa Rican government to advocate complete protection for the turtles.

The communication skills of the eight pilot guides varied considerably. All but one of the guides complained that their lack of foreign language skills hampered the transfer of information. None of the guides demonstrated group leadership skills, e.g., few provided an introduction for the evening's activities, developed rapport with their groups, maintained them cohesively, or ensured that all participants were able to hear their commentary.

Each guide conducted tours two or three nights per week. During the first month, each guide earned US \$131 for working about nine hours per week.

Discussion

Ecotourism was not environmentally benign and requires careful management in Tortuguero. Education and training was an important prerequisite for allowing local people to more fully participate in the economic benefits of the tourism system. Input from resource managers, current and potential tour guides, hotel owners and/or managers, and the tourists themselves was necessary to ensure that the objectives of the tour guide program could be achieved. The pilot program demonstrated varying degrees of success in achieving each of the four goals, namely to: (1) conserve natural resources and mitigate negative impacts of visitors on Tortuguero's nesting sea turtles, (2) provide conservation education to local residents, (3) provide environmental information to foreign and domestic tourists to Tortuguero, and (4) provide an additional source of income for members of the local community. This study also highlighted the need for and feasibility of an extensive training program for tour guides.

Mitigation of Tourism Impacts on Natural Resources

The disturbance of the nesting sea turtles was identified by resource managers and scientists as the most pronounced negative impact of visitors on Tortuguero's natural resources. Reports by the tourists themselves of tourist disturbance of nesting turtles supported managers' concerns. The pilot tour guide program was successful in helping to mitigate the impact of tourists by controlling the number of people on the nesting beach at night. A number of tourists in large tour groups (>20 people) complained of the negative effects of their groups on the beach and reported frightening turtles back into the sea before nesting occurred. By forcing tourists to be accompanied by a tour guide in small groups, disturbance on the beach was minimized. Flashlights were prohibited except for use by the guides, and flash photography was allowed only after the turtles had begun laying eggs, a time when they were less susceptible to disturbance. These regulations have been suggested for controlling human activity on other turtle nesting beaches (e.g., Florida Department of Natural Resources, unpublished recommendations).

Hypothetically, if it takes one person 3 min to traverse a segment of beach, then 90 people (the maximum number of tourists observed in one area during this study), all walking individually, will cross the same segment in 4.5 h, but groups of ten will traverse the area in less than 3 min; thus the segment of beach will be occupied for one-tenth the amount of time when people are grouped. From the viewpoint of a turtle attempting to nest, this decreased activity on the beach may be significant. Although preliminary comparisons between sections of the beach subjected to different amounts of human disturbance did not demonstrate different levels of nesting behaviors (Figuro, personal communication), this may have been an artifact of the short duration of the study. Furthermore, tourist activity was skewed heavily towards weekends, thus the low tourist numbers during the rest of the week may have been insufficient to result in a significant change in turtle nesting behavior. Increased tourism may result in quantifiable changes.

Of note, the part of the beach easily accessible to tourists represents only one-fifth of the total nesting beach and historically less than 10% of the turtles nest in this area. This may become more significant with time as the relatively recent establishment of the park and new regulation of human activity may affect nesting in this section in the future. The park managers and CCC scientists were unanimous in their agree-

ment that the guide program helped minimize the activity of tourists on the beach. In turn, this should help mitigate negative impacts as tourist numbers increase. The guide program additionally helped maximize the number of park entrance fees TNP was able to collect.

Traditionally, as tourism increases, many researchers have noted an increase in its negative impacts on the resource base (Mathieson and Wall 1982). Careful management is necessary to ensure that TNP, as a tourist attraction, does not become the "nonrenewable" resource that Butler (1980) described as the fate of so many tourist areas where environmental and social costs eventually exceeded benefits. In response to CCC and TNP concerns, the Costa Rican government in March 1991 decreed a 6-km tourist zone along the Tortuguero beach where tourists will be prohibited from using lights and will have to be accompanied by guides during the green turtle nesting season.

Environmental Education for Tortuguero Residents

An important objective of the tour guide training program was to provide environmental education for the Tortuguero community, particularly for a segment of the population not reached through formal school programs or development projects. Because no pretest was conducted due to the timing of the course, baseline data were not available for comparison with the results of the course. However, an evaluation of the tour guides' knowledge and skills was conducted at the end of their first month of guiding. Direct observations of each of their guided tours revealed that, although the guides were fairly knowledgeable about general sea turtle natural history, much specific information was not retained from the course. An extensive course should ameliorate this problem, as the pilot course was only 10 h in duration and many of the guides had limited formal education.

Of significance, however, was the concern for and interest in the sea turtles shown by the guides. After a month of guiding, all of the community guides were eager to meet with researchers to learn more about the sea turtles. As a group, they also wrote letters to promulgate better protection for the turtles. This demonstrates not only a concern for the natural resource, but the development of the motivation and skills to help conserve the turtles in perpetuity.

The communication skills of the eight community guides that had completed the pilot course varied considerably. Although most of the guides lacked foreign language skills, all of the tours observed had at least one bilingual tourist participating in the walk who was

willing to serve as an interpreter. This worked adequately for communicating basic information. With additional training in group leadership offered in an extensive guide course, the guides should be able to develop an approach that helps minimize communication problems. An English language course also has been proposed for Tortuguero village.

The extensive training program will incorporate into the course the suggestions and interests of the experienced and pilot guides. Topics such as aquatic ecology and natural history should provide the guides, a group with limited education but much indigenous knowledge, with greater understanding and skills to participate more directly in the management of Tortuguero's natural resources. The background data collected from the resource managers, pilot and hotel guides, and tourists provides valuable input for the design of the training course. The sociodemographic background of the guides makes hands-on, participatory training approaches, such as simulations, role-playing, and most importantly, actual experiences in the field, of more value than typical didactic approaches. The logistics of course meetings and the emphasis of the materials presented also will be dictated by the input from the groups involved. It is expected that as the range of tours is increased to include daytime activities, other members of the community, particularly women, may be attracted to participate in the program.

Provision of Environmental Information to Tourists

During the month following the pilot tour guide training program, 475 tourists participated in a turtle walk led by community guides. As discussed in the previous section, the language barrier and range of knowledge levels and communication skills of the tour guides resulted in varying amounts of information being successfully transmitted to, received, and understood by tourists. The presence of bilingual tourists on the guided walks helped mitigate the foreign language problem. Basic natural history facts about the sea turtle were provided to the tourists by all the tour guides. Almost all of the tourists participating in the observed guided walks indicated that they were satisfied with their experience watching the turtles. Fortunately, the sight of a 130+ kg reptile heaving itself up the beach to lay eggs is spectacular regardless of the interpretation that accompanies it.

Better trained tour guides certainly can increase both the knowledge and enjoyment of the tourists engaged in a turtle walk. In the future, the structure of the turtle walk will be changed to accommodate the constraints noted above, such as implementing a uni-

form bilingual introduction to the walk for all general tour groups. Based on the results of our tourist questionnaires, the type and delivery of information can be directly targeted to the audience, identified primarily as North American and European adults, with strong interests in wildlife and less interest in local culture or history. The latter lack of interest is contrary to Boo's (1990) speculation that ecotourists would naturally be interested in and concerned about resident cultures. This information is useful as the tour guide program expands to include other types of tours. Any focus on cultural history will need to be marketed specifically or must remain just a component of the natural history tours.

The surveys of tourists also provided additional data about their information needs and interests that will help guide the future development of park interpretation and education materials in Tortuguero. Although better information should enhance visitor experiences, only one of six hotel operators indicated a willingness to defray the expenses of developing a guide training program. Closer scrutiny of who absorbs the costs and benefits of ecotourism in Tortuguero is needed. During the first part of the decade, half the visitors to TNP, as to other Costa Rican parks, were Costa Rican nationals. In the past several years, however, foreign tourism has dominated TNP visitation. Thus, the environmental education programs are of benefit mainly to foreigners. It is of concern that the development of materials and activities for these tourists does not overshadow the need to develop materials for domestic tourists and local community members.

Provision of Sustainable Income for Local Residents

Place (1988) reported that primarily four families in Tortuguero benefited economically from tourism in 1986. However, many others also were affected. Brown (1991) found that about half of the Tortuguero residents were employed in tourism-related jobs through hotels, the TNP, or the CCC turtle research station, although, as frequently reported for tourist developments in developing countries (e.g., Mathieson and Wall 1982), a number of the administrative or other high paying positions were held by people living outside Tortuguero. For many of the community tour guides, few alternative sources of income were available in Tortuguero, where tourism is the main industry.

The guide cooperative allowed each of the eight guides to work two or three nights per week and share in all profits, regardless of the number of tourists on

their particular nights. This was instituted because of the skewed numbers of tourists on the weekends. During the first month, each guide earned US \$131 for working approximately nine hours a week at night (K. Broadlieb, personal communication). This salary for part-time work in Tortuguero is excellent. In contrast, full-time cleaners or assistant cooks make only about US \$170/month in Tortuguero, and full-time boat drivers and cooks make US \$200–\$300+. All of the community guides were extremely pleased with their earnings.

A key element in the economic success of the tour guide program was the endorsement by the TNP staff. All tourists were required by TNP to be with a tour guide upon entering the park at night. Checks at a guard station near the entrance ensured that tourists had paid their park fees, and errant tourists were denied access. It is unlikely that many tourists would voluntarily choose to go with a community tour guide, rather than on their own, without the cooperation of the TNP. In a similar situation, the success of a tour guide program for visitors to La Selva, a private biological station in Costa Rica, operated by the Organization for Tropical Studies (OTS), likewise was dependent on the enforcement of a new OTS regulation requiring all tourists to be accompanied by guides (P. Paaby, personal communication). This also is the case in the Galapagos Islands, Ecuador, where the national park has been enforcing tourism regulations concomitant with a guide program and an extensive guide training course for almost two decades.

Tourists to Tortuguero spent an average of \$18 on local activities, less than 10% of the total expenses of their trip to Tortuguero (not including the costs of reaching Costa Rica). The \$2.00 fee for a guided tour was minimal for foreign tourists, and high-quality tours could certainly command a better price in the future. Data from hotel owners indicated that tourist numbers are fairly stable for most of the year (with the exception of a low season in May and June) (Figure 5). However, the green turtle nesting season lasts only from July to October. Other types of guide services need to be created if guiding is to become a stable source of employment. Currently, over a half dozen individuals rent boats to tourists who wish to explore the waterways of TNP. This enterprise could be greatly expanded. Other tours, such as a night-time canal trip or interpretive hikes in TNP could be developed and promoted. An extended training program to develop these guiding skills is now being designed by the CCC. It is expected that the information conveyed in the course will not only provide a greater understanding of Tortuguero's natural resources, but

also will enhance participation by the tour guides in the development of their community and the potentially sustainable economy generated through ecotourism. Only through careful management and local participation will the potential economic benefits of ecotourism outweigh the environmental costs.

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