

MODIFY THE VISITOR EXPECTATIONS

- **Inform visitors of the conditions they may encounter (susceptible resources, conflicting uses, etc.)**
- **Inform the visitors of the area's mission, management objectives and desired future conditions**
- **Involve visitors as participants in the planning process**



IMPROVE, MAINTAIN AND REHABILITATE THE USE SITES

- **Locate use in areas that are resistant or able to recuperate**
- **Toughen/reinforce sites – build infrastructure that reduces impacts**
- **Use natural barriers and curtains**
- **Eliminate indications of use or impact**
- **Maintain paths and use sites – avoid accelerated deterioration**
- **Rehabilitate the deteriorated sites**

RATIONING TECHNIQUES (WHEN NECESSARY AND APPROPRIATE)

- **Reservations**
- **Lotteries**
- **First come, first served (make a line)**
- **Entrance price/quota**
- **Preferences based on merit, skills or knowledge**
- **Require fixed itineraries**





FACTORS IN THE SELECTION OF A PREFERRED ALTERNATIVE (EXAMPLES)

- **Which alternative is most compatible with the area's mission?**
- **What percentage of the concerns and opportunities are addressed by each alternative?**
- **How does each alternative face irreversible environmental changes?**
- **Which one best distributes the costs and benefits?**
- **Which alternative has the most public support?**
- **Which is most feasible given the current management capacity of the area?**



Visitor Impact Monitoring and Management

(from *Ecotourism Development: A Manual for Conservation Planners and Managers*, Volume II; The Nature Conservancy: Drumm and Moore, 2003)

Introduction

Every time a visitor sets foot in an ecotourism site, he/she causes a negative impact. This is an unavoidable fact of life. An ecotourism program will initiate many public use activities that will have impacts, both positive and negative. An Ecotourism Management Plan enables the minimization of the negative impacts and ensures that they are outweighed by the positive ones. The monitoring and managing of visitor impacts are fundamental ecotourism management strategies but ones that are most frequently left unattended. If you do not know what effects your ecotourism activities are having upon the site's natural environment and the surrounding communities, then you cannot say that you are being successful.

Careful monitoring of impacts, both positive and negative, needs to be a primary activity of the site's overall management activities. Monitoring costs money and requires trained personnel and the assistance of interested stakeholders.

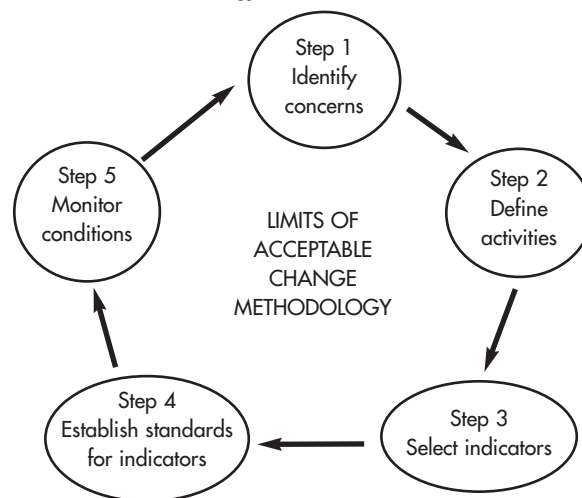
The first methods developed to address tourism impacts evolved from the concept of carrying capacity, which originated in the field of range management. Several definitions of carrying capacity have been offered depending on how and where the concept was applied (Ceballos-Lascuráin, 1996). Initially, it was used only to indicate **how much** tourism activity was too much. Researchers began to realize that looking only at numbers of visitors was not sufficient. They demonstrated that **what** visitors did, **when** they did it and a number of other circumstances were frequently more important in determining visitor impacts than simply the number of visitors. In other words, there is no direct correlation between numbers of visitors and negative impacts that affect soil, vegetation, wildlife or other people's experience at the site.

The degree of impact depends upon on many variables in addition to the amount of use: the degree of

site hardening (making site trails, landings, overlooks resistant to erosion); the motivations and behaviors of visitors; the mode of visitor transport and lodging; the effectiveness of guides; and the season(s) in which most use occurs. Therefore, when managers use the term "carrying capacity" they usually are referring to this more broadly-defined meaning: "the amount and type of use that an area can sustain before impacts become unacceptable." The more simple and straightforward concept of carrying capacity — limiting numbers of visitors — can sometimes be used as a solution for mitigating impacts in restricted, small-scale situations, but not usually on a protected area basis or large ecotourism site situation.

There are two very good methodologies that can be used to monitor visitor impacts: "Measures of Success" and "Limits of Acceptable Change." Limits of Acceptable Change (LAC) has evolved specifically to allow tourism to address the shortcomings of the carrying capacity concept, although it has been applied to more general management situations. Measures of Success can be applied to any management planning

Figure 6.1 Steps to Implementing Limits of Acceptable Change Methodology



adapted from Stankey et al., 1985

situation, not just ecotourism, and relies primarily upon the setting of objectives that can be easily monitored.

Limits of Acceptable Change Methodology

LAC is a process developed by the United States Forest Service to address visitor impacts, primarily in wilderness situations. It accepts that change is inevitable but sets limits on what degree of change is acceptable. The basic concept involves determining a common vision of what a site's conditions should be like, setting indicators and standards related to the amount of change stakeholders deem to be unacceptable in those sites, and then monitoring to continually assess where you are in terms of visitor impacts upon the previously-determined standards. When standards are not met, then management must adapt to mitigate negative impacts. Figure 6.1 shows a five-step process adapted from Stankey et al. (1985).

The LAC approach forces managers to come to grips with the details of management in a way that goes far beyond any figure for overall carrying capacity. By setting limits of acceptable change that involve as many stakeholders as possible, managers acquire much more

credibility when they request or require management changes that affect other people, such as tour operators, guides and community people.

These are the basic steps in determining the LAC (adapted from Wallace, 1993):

1. Identification of Area Issues and Concerns: Involving all stakeholders, identify the ecotourism site's unique values, attractions, opportunities, threats and problems.

2. Define and Describe the Types of Desirable Activities: This step should be done in the abstract, not thinking of any specific location. Consider all of the different types of activities that ecotourism might involve. The desirable activities should then be applied to specific sites/zones.

3. Select Indicators: These indicators should be selected for the management parameters that most concern you at a given site in a given zone. They should be indicators directly related to the activities of visitors that can be controlled (see Box 6.1).

Box 6.1 Types and Examples of Indicators

There are five general types of indicators that must be monitored in some way by an ecotourism project:

- Environmental (Biophysical)
- Socio-cultural Aspects
- Experiential
- Economic
- Managerial

Environmental (Biophysical) indicators:

- soil erosion at a particular site
- site spreading (vegetation loss in campgrounds or along trails)
- sea floor litter at mooring sites
- stress on a particular wildlife species (nesting success, animal aggression against visitors, etc.)
- illegal fires or campfires
- landslides along a road
- coliform bacteria count in river X, site X
- visibility from point X
- number of damaged trees in picnic area

Experiential (on visitors) indicators:

- number of encounters with other groups per day
- number of safety violations per month
- number of complaints about noisy visitors
- number of students using area for environmental education
- number of illegal hunters encountered in X location

- percent of visitors pleased with their visit to the area/site
- evidence of human waste
- number of return visitors
- visitor perception of naturalist guides

Economic indicators:

- number of ecotourism entrepreneurs in neighboring communities
- amount of entrance fees collected in a month
- average length of stay in the site/community
- overall contribution of ecotourism to site's budget (percentage)
- level of tourism employment
- level of investment in local public services and facilities

Socio-cultural (on communities) indicators:

- maintenance of traditional practices
- change in population
- reports of negative behavior by visitors towards residents
- change in crime rate
- number of visitors at local cultural events/sites
- perception of guides to ecotourism activity
- general perception of residents to ecotourism activity(ies)

Managerial (infrastructure) indicators:

- number and length of trails
- amount of time spent on infrastructure maintenance
- number of graffiti found in campgrounds

The following questions should be asked when identifying indicators:

- i. Does the indicator tell us what we want to know? What question are we trying to answer?
- ii. Does the indicator relate directly to an important resource, social or economic condition?
- iii. Can the indicator be measured easily and relatively inexpensively?
- iv. Can the indicator alert managers to a deteriorating condition before it reaches an unacceptable level?
- v. Can the indicator be measured without affecting the quality of the visitors' experience?
- vi. Will the indicator provide information which is worth the time and cost needed to obtain it?
- vii. Who will carry out the necessary monitoring?

4. Establish Standards for Each Indicator: The standards should set some limit of acceptable change. Some impacts are inevitable, but managers must be willing to say how much impact they will tolerate before changing the way they are managing. If trails are eroding faster than it is feasible to maintain them, if viewing areas are getting too big, if some animals are changing their behavior in an unacceptable way, then management actions must be taken (e.g., group sizes reduced, hardening of some sites, fences put up, patrolling increased).

Establishing standards requires taking the indicators from the previous step and placing a quantitative value on them: e.g., two landslides per year; 90% of visitors who characterize their visit as "very enjoyable"; two new ecotourism entrepreneurs per year in community X; 25 individual monarch butterflies sighted along trail X between 10 and 11 a.m. on July 20th. Remember that these quantitative values represent limits of some sort that are acceptable; fewer than 90% of visitors who are "very satisfied," or fewer than 25 butterflies sighted along a given trail at a given time means that managers must determine what is wrong and work to fix it. Establishing indicator standards should involve as many stakeholders as possible so that the standards agreed upon represent everyone's best faith effort and so that they will commit to trying to achieve these limits.

Some standards and indicators should be chosen from each general type of indicator mentioned above. They should also be chosen for each type of visitor environ-

ment, usually by using the zoning system set up in your Ecotourism Management Plan (see Volume I, part 2, Chapter 3). The types of visitor environment range from intensive use sites where lots of visitors will be found (and there will be high impacts) to primitive and perhaps even wilderness zones, where a high degree of isolation may be desired and managed for (and visitor impact is generally lower).

Another major consideration in choosing standards and indicators is the availability of baseline information. If there is little or no information which you can base your standards on, then you will be making only a very subjective guess about what a realistic standard would be. At first, it may be appropriate to set provisional standards and later adjust them if need be. Bringing in relevant specialists, say a biologist who is familiar with a particularly pertinent species of plant or animal, may help in your decision making.

5. Monitor conditions and implement actions: If acceptable limits have been exceeded, make management changes that will bring resource, social or economic conditions back within acceptable limits.

The Measures of Success Methodology

The Measure of Success methodology applies the concept of adaptive management and sees monitoring as an essential element of project planning and management. The monitoring program Margoluis and Salafsky (1998) describe is integrated into the project cycle and is developed as part of the conceptual model and management plan. Once project goals, objectives and activities are selected, a clear and precise monitoring plan is drawn up. The steps involved in this process are:

1. Determining the audiences for monitoring information.
2. Determining the information needed based on project objectives (which are prepared so that monitoring can determine whether or not they are being met).
3. Designing a monitoring strategy for each information need.
4. Developing one or more indicators for each information.
5. Applying and modifying the indicators as needed.
6. Determining methods of measuring indicators by using four selection criteria: accuracy/reliability, cost-effectiveness, feasibility and appropriateness.
7. Developing an operational plan for applying the methods: listing the tasks, people responsible for carrying out those tasks, monitoring sites and timeline.

Box 6.2 Examples of Standards for Indicators

Biophysical (environmental):

- 30% bare ground at campground X
- minimum of five nesting robins along the Riveridge Trail
- three illegal campfires in the Blue Spring area during the calendar year
- two landslides along five kilometer stretch of entrance road from January-March
- ten mile visibility from summit of Green Mountain on a clear day in November
- three new damaged trees in picnic area during period June-September

Experiential (on visitors):

- one encounter with other groups during 1 day period in the primitive zone
- five visitor complaints per month about noisy visitors
- 100 students receiving environmental education classes at the visitor center
- 90% of visitors who indicate that they were "very satisfied" or "satisfied" with their visit to the area/site
- three visitors who indicate that they were disturbed by evidence of human waste in inappropriate locations

Economic:

- two new ecotourism entrepreneurs in the Machalilla community in the next year
- \$50,000 dollars collected in entrance fees during the year
- three day average length of stay in the site/community
- ecotourism revenue contributes 25% of site's overall budget

Socio-cultural (on communities):

- typical local food served in 50% of local restaurants
- three negative reports of visitor behavior in the Machalilla community per year
- two robberies per year in the Machalilla community
- 25% of site visitors who also visit local cultural events/sites

Managerial (infrastructure):

- total length of available trails increase 10% yearly for six years
- site personnel spend 50% of their time on infrastructure maintenance
- three examples of graffiti found in campground during three-month period

Margoluis and Salafsky provide very detailed information on the types of monitoring designs, the censusing and sampling techniques, the quantitative methods, applying the methods, collecting and handling data, analyzing data and communicating results to various types of audiences.

In addition, they have developed another approach for determining project success that can be useful in some ecotourism circumstances. Entitled "Threat Reduction Assessment," this approach identifies and monitors threats in order to assess the degree to which project activities are reducing the threats and achieving success. The process contains the following steps:

1. Define the project area spatially and temporally.
2. Develop a list of all direct threats to the biodiversity at the project site present at the start date. In the case of an ecotourism project, use the Site Conservation Planning (SCP) results obtained at the beginning of the planning process (see Volume I, part 2, Chapter 2) that identify the major threats to the ecotourism site, and determine strategies for mitigating them.
3. Rank each threat based on three criteria: area, intensity and urgency.

4. Add up the score for each threat across the three criteria.
5. Determine the degree to which each threat has been reduced by management activities.
6. Calculate the raw score for each threat.
7. Calculate the threat reduction index score.

While natural science methods can be used, less precise social science approaches are often easier to apply, particularly by or about community members/projects. Community members become active participants in future mitigation activities by being involved in this assessment.

Public Participation

While both LAC and Measures of Success require high levels of participation in the planning and operational phases of a monitoring program, Rome (1999) recommends the development of a monitoring plan according to a multi-step process which strongly emphasizes public participation at practically all levels. According to Rome, the process should be guided by a steering committee composed of protected area/ecotourism site managers, tourism industry representatives and community leaders. It would include the following steps:

1. Community meeting to discuss concerns and potential impacts of ecotourism.
2. Steering committee meeting to determine indicators and measures and to assign monitoring responsibilities.
3. Community meeting to present monitoring program and to discuss limits or ranges of acceptable change.
4. Training of monitoring and analysis team.
5. Implementation of monitoring.
6. Analysis of results, evaluation of management needs and small-scale management adjustments made.
7. Community meeting to discuss monitoring results and management recommendations.
8. Continued implementation of monitoring and management.

Obtaining the Information

Using management objectives, indicators and standards to assess overall progress requires the ecotourism site's management to have a specific monitoring program that has been incorporated into the site's routine management scheme. Monitoring requires that certain kinds of information be collected on a systematic, routine basis. Baseline information is needed to compare with subsequent data and assess the direction management is taking.

The collection of baseline data and subsequent data should involve procedures that are relatively simple to implement and do not require large investments of time or cost to the site's administration. To the extent possible, the cost of the monitoring program should be financed from ecotourism revenues.

Table 6.1 Visitor Management Methods

Indirect Methods

- Environmental education/interpretation
- Information/diffusion
- Site manipulation
- Zoning
- Infrastructure and facility design
- Type and degree of maintenance
- Ease or difficulty of access

Box 6.3 Monitoring the Great Currasow in El Imposible National Park

El Imposible National Park in western El Salvador is one of the country's few natural areas. It is small, only about 5,000 hectares in area, yet contains a rich diversity of plants and wildlife. As part of its monitoring program, the park organizes an annual "Dia del Pajuil" (Pajuil Day). The pajuil is a Great Currasow (*Crax rubra*), a large bird which is relatively easy to observe. The park is the only place in El Salvador where it is found, so keeping track of its well-being provides an indicator not only of its overall numbers in the country and the park but also of the general state of the park's environment. On Pajuil Day, park staff, naturalist guides and other community members join together, form teams and cover almost all of the park to complete an inventory of the pajuil's numbers. In this manner, the park not only keeps track of the pajuil's population, but provides an opportunity for others to contribute to the park and creates a public relations opportunity.

Most of the data should be collected by the site's staff, but strategic use of third parties such as university biologists, naturalist guides, concessionaires and community members should also be considered. Naturalist guides may also be recruited to carry out certain observations on a routine basis. Cooperative agreements can be signed with local universities which permit scientists (e.g., biologists, ecologists) to carry out research in return for providing information which will supply baseline data, or to provide data on an ongoing basis which will allow the site to monitor a particular management concern. Site staff may need special training to collect certain data. University scientists can train rangers to identify certain

Direct Methods

- Fees and costs
- Restrictions
- Patrolling/human presence
- Requirements to participate in certain skilled activities
- Permits and licenses
- Designated sites (camping, picnics, etc.)
- Trained guides
- Rules and regulations

insects, bird songs and plants that may be the object of monitoring activity. They can also be trained to take water samples and even do some basic water sample testing.

Some types of data that need to be collected on a daily, systematic basis (which requires a very good recordkeeping system) include: visitor numbers and other visitor characteristics (e.g., age, nationality), fee collection amounts, and visitor observations and complaints.

In addition, ecotourism management requires frequent evaluation of visitor characteristics and levels of satisfaction with different aspects of the site: facilities, staff, interaction with other visitors, etc. This is usually done using surveys and questionnaires, which can be carried out by site staff or third parties. Ideally, a standard survey addressing the management objectives and indicators of concern should be prepared and presented to a random sample of visitors on a regular basis (for

example, every quarter); alternatively, a select group could be targeted on a more frequent basis, depending upon what is being measured.

Visitor comment registers can be placed in strategic places to obtain visitors' opinions. While this is not a scientific method for obtaining visitor input, it can give a sense of what visitors are thinking.

Visitor Management Strategies and Alternatives

If you have determined that you are not reaching management objectives or that you have exceeded a limit of acceptable change, you must adapt your management strategies to this new situation. Table 6.1 is a framework for considering visitor management strategies.

Box 6.4 provides some guidance regarding specific tactics and strategies to employ when faced with a visitor impact issue.

Box 6.4 Some Strategies and Tactics for Managing Resource Impacts or Visitor Crowding and Conflicts

I. REDUCE USE OF THE ENTIRE AREA

- Limit the number of visitors to the entire area.
- Limit the length of stay in the entire area.
- Encourage use of other areas/sites.
- Require certain skills and/or equipment.
- Charge a higher visitor fee.
- Make access more difficult.

II. REDUCE USE OF PROBLEM AREAS

- Inform potential visitors of the disadvantages of problem areas/sites and/or advantages of alternative areas/sites.
- Discourage or prohibit use of problem areas.
- Limit number of visitors in problem areas.
- Encourage or require a length of stay limit in problem areas.
- Make access to problem areas more difficult and/or improve access to alternative areas.
- Eliminate facilities/attractions in problem areas and/or improve facilities/attractions in alternative areas.
- Establish differential skill and/or equipment requirements.
- Charge differential visitor fees.

III. MODIFY THE LOCATION OF USE WITHIN PROBLEM AREAS

- Discourage or prohibit camping and/or stock use on certain campsites or other locations.
- Encourage or permit camping and/or stock use only on certain campsites or other locations
- Locate facilities on durable sites.
- Concentrate use on sites through facility design and/or information.
- Discourage or prohibit off-trail travel.
- Segregate different types of visitors.

IV. MODIFY THE TIMING OF USE

- Encourage use outside of peak periods.
- Discourage or prohibit use when impact potential is high.
- Charge fees during periods of high use and/or high impact potential.

V. MODIFY THE TYPE OF USE AND VISITOR BEHAVIOR

- Discourage and/or prohibit particularly damaging practices or equipment
- Encourage or require certain behaviors, skills, and/or equipment.
- Teach correct ecotourism ethics.
- Encourage or require a group size.
- Require or encourage use of guide.
- Discourage or prohibit horses, mules, donkeys.
- Discourage or prohibit pets.
- Discourage or prohibit use of radios, cassette players, etc.
- Discourage or prohibit overnight use.

VI. MODIFY VISITOR EXPECTATIONS

- Inform visitors about appropriate uses.
- Inform visitors about conditions they may expect.

VII. INCREASE THE RESISTANCE OF THE RESOURCE

- Shield the site from impact (fences, natural barriers, etc.).
- Strengthen the site (tent platforms, drainage pipes, paved trails, etc.).

adapted from Marion and Farrell, 1993

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**ECOTOURISM IMPACTS MONITORING:
A Review of Methodologies and Recommendations
for
Developing Monitoring Programs in Latin America**



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EXECUTIVE SUMMARY

Ecotourism is one strategy for supporting conservation and providing income for communities in and around protected areas. While envisioned as a positive approach towards sustainable development, unplanned or poorly planned and implemented tourism can have serious negative effects on the environment and on communities, offsetting the benefits it was designed to provide. In order to anticipate negative impacts and to prevent or mitigate them, ecotourism impacts monitoring is required. While visitor impacts management methodologies have been developed and applied in the United States and other developed countries, little such work has been done in the developing world. And, few monitoring programs have assessed socio-cultural impacts on nearby communities. A methodology which is easy to implement on limited budgets and with limited technical expertise is needed for Latin America.

This report offers a summary of some existing visitor impacts measurement methodologies for protected areas and provides recommendations for how to establish ecotourism monitoring programs in Latin America. It is designed for use by The Nature Conservancy partner organizations but is also applicable for others involved in ecotourism throughout the world.

Initiatives to reduce the negative impacts of visitors to natural areas originated with determinations of carrying capacity and the imposition of limits to numbers of tourists. While a useful first step, this methodology proved to be overly simplistic, and better methods have since been developed. Limits of Acceptable Change (LAC) is one of the most widely accepted because it is flexible, can encompass a wide variety of impacts, and calls for stakeholder participation. Other methodologies and models for impact monitoring of conservation and development projects utilize the LAC system of identifying impacts, indicators and limits or ranges of allowable change, and are useful in developing characteristics for effective monitoring programs for Latin America. Recommended attributes include the incorporation of monitoring into protected area and ecotourism management plans; participation of all stakeholders, including the local community; the need for monitoring programs to be user-friendly; and the importance that monitoring results be closely tied to management actions and outreach.

To be wholly effective, monitoring of ecotourism operations must encompass impacts of the following types: environmental, experiential (or psychological), economic, socio-cultural and managerial (or infrastructural). A recommended process for developing and implementing ecotourism monitoring has the following steps:

- 1) Formation of a steering committee composed of protected area managers, ecotourism managers, local NGOs and community representatives
- 2) Holding a community meeting to educate residents about ecotourism impacts and monitoring and to involve them
- 3) Identifying impacts and indicators to be monitored
- 4) Selecting methods of measurement
- 5) Identifying limits or ranges of acceptable change with stakeholder input
- 6) Developing an operational monitoring plan
- 7) Training of staff, managers and community representatives in monitoring techniques, analysis of data and effecting management changes
- 8) Carrying out monitoring and examining data
- 9) Presenting monitoring results to all stakeholders
- 10) Evaluating the monitoring program and conducting outreach

Training needs for conservation NGOs cover general monitoring concepts, participatory planning and community outreach, sampling and measurement techniques, analysis and storage of data, impact management alternatives, and identifying support for establishing monitoring programs. Funding for monitoring must be incorporated into protected areas budgets. Income might be provided through a levy on visitor entrance fees or on tourism operators working in the area.

Introduction

Ecotourism is one strategy being used in and around protected areas in developing countries for supporting conservation and providing income-generating opportunities for local peoples in rural areas. Envisioned as a positive approach towards sustainable development, ecotourism programs and destinations are springing up in natural areas around the world. However, unplanned or poorly planned and implemented tourism, erroneously called “ecotourism,” can have serious negative effects on the environment and on communities, offsetting the benefits it was designed to provide. While there is abundant literature describing the negative impacts of tourism (one example which provides excellent analysis is Mathieson and Wall, 1982), there is much less information on how to measure, predict and forestall deleterious impacts.

Definitions of Ecotourism

Since the term was coined in the early 1980s, there has been much discussion about what it is and how it should be defined. The Ecotourism Society’s definition (Lindberg and Hawkins, 1993) is now one of the most widely accepted:

responsible travel to natural areas that conserves the environment and improves the well-being of local people

It is distinguished from nature-based tourism, which refers only generally to tourism activity in a natural setting, and from adventure tourism, which involves physically exerting activities in a natural setting (Ceballos-Lascurain, 1998).

Several other definitions of ecotourism are worth mentioning in order to demonstrate and emphasize the potential benefits that may be realized. One is given by Ceballos-Lascurain (1996) of the World Conservation Union (IUCN):

Ecotourism is environmentally responsible travel and visitation to relatively undisturbed natural areas, in order to enjoy and appreciate nature (and any accompanying cultural features – both past and present) that promotes conservation, has low visitor negative impact and provides for beneficially active socio-economic involvement of local populations.

Another useful definition is provided by Martha Honey (1999):

Ecotourism is travel to fragile, pristine, and usually protected areas that strives to be low impact and (usually) small scale. It helps educate the traveler; provides funds for conservation; directly benefits the economic development and political empowerment of local communities; and fosters respect for different cultures and for human rights.

Impact monitoring, or the periodic collection and evaluation of data relative to stated goals, objectives and activities (Salafsky and Margoluis, 1998), is a way to measure progress and change stimulated by conservation and development projects. When it is complemented by an evaluation and consistent modifications in management, monitoring can help to allay negative impacts (Marion and Farrell, 1998). It can measure the scale of both positive and negative effects of interventions and can be used to predict future conditions. Therefore, it can be used to measure success as well as serving as a warning signal of possible dangers or problems. This report will focus on the use of monitoring for the latter, to predict and alleviate negative impacts of tourism so that the potential of ecotourism is realized without the pitfalls, as described by Boo (1990) and others who approach ecotourism with necessary caution.

The concept and practice of visitor management in protected areas has been utilized in the United States for at least 25 years. In Latin America however, the advent of nature-based tourism is relatively recent and up until recently there has been little need or incentive for developing methodologies to limit tourism impacts. Now, however, the popularity of “eco”-tourism in these countries is becoming manifest, and strategies are needed to mitigate negative impacts. Application of existing methodologies, mostly developed for national parks and forests in the U.S., where budgetary and technical resources are substantial compared to their developing country counterparts, is difficult. New methodologies, which are simple, yet comprehensive enough to address the multidisciplinary features of conservation and development initiatives in developing countries, are needed.

This report is intended for The Nature Conservancy partner organizations, many of which are conservation NGOs (non-governmental organizations) to facilitate and advance responsible ecotourism. It provides background and recommendations for developing monitoring and evaluation programs which can be used locally in Latin America by a variety of stakeholders involved in ecotourism in and around protected areas. These programs are needed to periodically measure a range of environmental, socio-cultural and economic conditions which may be affected by ecotourism, and to incorporate findings into management programs in order to forestall negative impacts.

It begins with a brief justification for monitoring tourism impacts and highlights three characteristics of conservation and development programs in Latin America which address the need for reevaluating and adapting existing monitoring methodologies for successful implementation in these countries. Next is a short discussion of some existing methodologies used in developed countries, with references to more detailed treatments. Following this, several newer impact assessment methodologies are presented. They were selected because of their relevance for use or adaptation to developing countries. Several conceptualizations of socio-cultural analysis are also offered to orient this oft-neglected aspect of ecotourism impacts monitoring.

The most practical aspects of this report are the penultimate sections providing key characteristics of effective monitoring and adaptive management, and suggesting a process for involving a variety of local stakeholders to initiate and implement a monitoring and evaluation program. Finally, there is an outline of training needs for protected area and ecotourism managers, as well as some ideas on possible funding mechanisms for monitoring programs.

Biological Monitoring

While ecotourism impacts monitoring is not widespread, the field of monitoring for conservation purposes is active. Biological monitoring is the most common and can be classified into two types:

- 1) biodiversity monitoring, which can serve to test hypotheses about ecosystem structure, function and composition (Noss, 1990);
- 2) impact monitoring, which is designed to address management issues and can assess impacts of integrated conservation and development projects (ICDPs) (Sisk, 1993; Kremen et al., 1994).

For the purposes of improving management of protected areas, the second type is preferred. And, to make monitoring most applicable, monitoring should be directed towards identified threats, as opposed to biological targets. Such data collection and analysis provides information which can guide specific management decisions (Reiger, 1999a).

In Latin America, TNC's Parks in Peril Program has developed an ecological monitoring strategy (Shopland, 1993; TNC, 1994) and a number of Parks in Peril partners, especially in Mexico, have quite a bit of experience in development and implementation of monitoring plans (See Shopland, 1994; Reiger, 1999a). In most cases, this monitoring has been biological and ecological in nature and has not addressed socio-cultural or economic concerns. However, many of the concepts and processes used are the same.

Another, new monitoring initiative of The Nature Conservancy, which will eventually be applied in virtually all TNC sites worldwide, is described in Measures of Conservation Success (Reiger, 1999b). The objective is to assess conservation impact by measuring biodiversity health (the health of selected conservation targets) and threat status and abatement. While this methodology examines threats posed by specific actions (such as tourism), it may be difficult to directly relate the findings or scores of biodiversity health with a particular activity. The results will rather provide a more general measurement of success, critical for assessing the ultimate goal of biodiversity conservation.

The Need for Ecotourism Impacts Monitoring

Ecotourism is often one component of conservation and development programs. At the initiation of any such program or activity, project impacts are rare or minimal. Initial symptoms of negative impacts may be difficult to perceive, especially when there is little or no data on baseline conditions to compare to. In developing countries, comprehensive baseline surveys are rarely conducted at the outset because time, budgets and technical resources are limited and the needs are not perceived. Often, it is only when severe impacts are manifested that questions are asked and management actions are deemed necessary.

As Buckley (1999) points out, once negative impacts are readily apparent, options for managing them easily are reduced. It becomes politically difficult to reduce numbers of visitors and/or limit their activities. Another alternative, "hardening" the environment, or making it more resistant to impacts, requires increased budgets for infrastructure and subsequent maintenance. In some cases, management cannot compensate for the losses realized. Had impacts been measured progressively from the start and actions taken early on to reduce them, less or no harm might have occurred. The establishment of a monitoring program at the outset of project development and the gathering of baseline information allows for early warning of impending changes, enabling timely management programs to be put into place.

Characteristics of Protected Areas Management in Latin America

Before examining the range of visitor impact and management methodologies, most of which were developed in the United States and other developed countries, it is important to recognize several characteristics which distinguish protected areas planning and management in Latin America from that in developed countries. The practical consequences of these differences as they relate to monitoring are also discussed.

- 1) Economic and technical resources for protected areas in Latin America and the Caribbean are limited. Management budgets are small, staff time is limited, and data collection, such as is required by monitoring, is a low priority when more urgent concerns such as invasions, poaching or forest fires are present. Park managers often do not see impact monitoring as being useful to them and therefore may be reluctant to spend the time or resources necessary. In addition, while park staff available to carry out routine monitoring activities may possess keen observational skills, advanced technical analysis of data may not be an option. Therefore, monitoring methodologies must be simple, easy to apply by few staff with limited training, and must provide results which indicate specific management actions.

- 2) In developing countries there is often a lack of baseline data and/or information on the impacts of tourism (Courrau, 1995). Research on natural systems and human societies and cultures has not been sufficient to provide accurate guidance for management activities. However, even in situations where baseline data is difficult to obtain and/or natural and human systems are not fully understood, it is possible to monitor changes based on data that has been collected in an objective, consistent manner. Adaptive management, defined as a process developed to manage natural resources by deliberate experimentation and systematic monitoring of the results (Margoluis and Salafsky, 1998), can be applied. For instance, even if the population size of a particular bird species is unknown, consistent measurement of it in the same place using the same techniques over time can serve as a relative measure of change. Correlations between tourist visitation and population fluctuations can be made, and if the relationship appears strong, measures to lessen human influence can be taken and resultant effects analyzed.
- 3) Traditionally, protected areas management in the U.S. has been an inwardly looking discipline. Parks administrators have jurisdiction and responsibility for only what lies within or enters the park's boundaries. Physical and biological resources and visitor well-being have been the priority, while people and resources outside have been of little concern. Now, in contrast, park staff in Latin America and worldwide are realizing that the future of their parks depend on the people who live around them. (Borrie et al., 1998), At the same time, local communities are demanding an increasingly larger role in the establishment, planning and management of protected areas. As they seek to incorporate cultural, spiritual and economic values and practices into protected areas conservation and management, they become active players. Park visitation programs and ecotourism, in particular, involve the community and affect it. Therefore, impacts monitoring must go beyond what happens in the protected area itself, and must examine a myriad of characteristics of community life. Methods for assessing impacts on local cultures and socio-economic systems are necessary.

The Evolution of Visitor Management Methodologies

The first methods developed to address tourism impacts emerged from the concept of carrying capacity, which originated in the field of range management. Several definitions of carrying capacity have been offered, depending on how and where the concept is applied (see Ceballos-Lascrain, 1996 or Boo, 1995). Broadly defined, however, it is a measure of the amount and type of use which an area and its surrounding community can sustain before impacts become unacceptable. Methods for measuring it are provided by

Boullon, 1985; Ceballos-Lascurain, 1996; Cifuentes, 1992, among others, and examples of its application are seen in the Galapagos Islands and the Carara Reserve in Costa Rica (Harroun & Boo, 1996). The use of strict numerical limits on visitation is seen as a simple and straightforward solution for mitigating tourism impacts.

However, researchers and managers familiar with visitor impact dynamics (Stankey and McCool, 1972; Lindberg et al., 1997; Borrie et al., 1998) recognized that there is no clear and precise relationship between numbers of tourists and impacts, and that there are many factors which affect where and how much impact will occur. In addition, a variety of mitigation strategies and tactics (Marion and Farrell, 1998) can be applied, effectively allowing increases in numbers while reducing negative impacts. Therefore, simple quantitative restrictions applied under carrying capacity analyses are no longer considered appropriate or accurate. New, more sensitive and specific methods have been developed. That said, it is important to note that the phrase, carrying capacity, is still commonly used and remains helpful for referring to the concept of placing limitations on tourism to reduce negative impacts. In fact, because the term is universally understood, it has raised awareness to the importance of impacts monitoring (Lindberg, McCool and Stankey, 1997).

In response to the inadequacies of earlier, strictly numerical methods for limiting visitor impacts, Stankey and his colleagues developed more qualitative methodologies. The earliest of these utilizes the Limits of Acceptable Change (LAC) concept, which recognizes that change will occur as a result of tourism and that the key goal of visitor management is to limit impacts to predetermined amounts. It and other similar methods set standards or ranges of acceptable change and describe a methodology for determining these standards, measuring impacts and identifying management strategies for controlling negative impacts. They include:

- Recreation Opportunity Spectrum (ROS) (Clark and Stankey, 1979);
- Limits of Acceptable Change (LAC) (Stankey and McCool, 1972; Stankey et al., 1985, McCool and Stankey, 1992);
- Visitor Impact Management (VIM) (Graefe et al, 1990; Loomis and Graefe, 1992);
- Visitor Experience and Resource Protection (VERP) (Hof et al, 1993; NPS, 1995);
- Tourism Optimisation Management Model (TOMM) (Manidis, 1997),

These methodologies have been well reviewed by a variety of researchers (Boo, 1995; Harroun and Boo, 1996; Ceballos-Lascurain, 1996; Borrie et al., 1998; Harroun, 1994; Marrison and Farrell, 1998; TES, 1998; etc.) with the key differences identified. Particularly useful are reviews provided by Courrau (1995) and Harroun and Boo (1996) because they examine these methodologies for application in a developing country context. The former also suggests some site

specific monitoring techniques for measuring physical and biological change. The latter reviews how tourism impacts were measured in the Maasai Mara Reserve in Kenya and in St. Paul Subterranean National Park in the Philippines and the subsequent management actions taken. However, in these cases, as well as at four protected areas in Costa Rica where carrying capacities were identified, ongoing monitoring does not seem to have taken place. Reasons include insufficient political will and funding, and the limitations of the strict carrying capacity approach which does not incorporate the use of management techniques for reducing impacts. Harroun and Boo review management strategies and tactics to reduce visitor impacts and then conclude that no visitor management framework can be recommended for all sites. Each program must develop its own methodology, maybe a composite of LAC, VIM and others, to suit its specific needs. Finally, they acknowledge that little attention has been placed on assessing the impacts of tourism on communities.

The consensus of these authors and others (e.g., McCool, S.F., 1989; Lindberg et al., 1998) is that the concepts behind the Limits of Acceptable Change methodology make it a more powerful and accurate framework for assessing and managing impacts than strict carrying capacity determinations. LAC is participatory in nature, addresses the variability of impacts, depending on use characteristics, and acknowledges the diversity of resources and conditions. It focuses on management strategies, and allows for subjectivity in making management decisions. The flexibility of LAC and its ability to incorporate value judgements from a wide variety of stakeholders renders it an appropriate and effective method of measuring impacts and developing management strategies to overcome or prevent degradation of a variety of natural, social and cultural systems. Most importantly, it incorporates protected area objectives into the monitoring scheme.

While the application of LAC and related methodologies in the United States has predominantly been for monitoring physical and biological characteristics of protected areas and assessing visitor experience, these methods are equally suitable for measuring other dimensions of carrying capacity (now using the term in its broader sense, as discussed above). The dimensions or types of carrying capacity are variously described. FNNPE (1993) identifies three:

- environmental
- cultural and social
- psychological

WTO/UNEP (1992) adds a fourth, managerial, which Ceballos-Lascurain (1996) also incorporates. He lists four components:

- biophysical
- psychological
- socio-cultural
- managerial.

Methods for Reducing Negative Impacts of Tourism: Guidelines and Certification

Related to, but distinct from impacts monitoring, are several other methods of addressing negative impacts caused by tourism. Two voluntary initiatives, which have largely been applied to environmental and, to a lesser extent, socio-cultural concerns, are guidelines for sustainable tourism and certification.

The establishment of guidelines for responsible and sustainable tourism guidelines is a popular and simple way to educate tourists and suppliers about potential negative impacts. They have been developed for a number of different audiences including visitors, tour operators, protected area managers and government agencies by such organizations as The Ecotourism Society (TES, 1993), the American Society of Travel Agents, and the National Audubon Society. Guidelines promote increased vigilance of tourism impacts on the parts of both tourism suppliers and consumers. Although they are not evaluative tools, their effectiveness can be measured by conducting surveys which use the guidelines as standards by which to compare activities and impacts generated (Ceballos-Lascurain, 1996; Norman et al, 1997).

Another way of encouraging tourism suppliers to minimize deleterious impacts is through the establishment of certification or accreditation programs or "ecolabelling" (UNEP, 1998). These initiatives are voluntary pledges by suppliers, such as accommodation facilities, tour operators, transportation providers or destinations, that their practices are "eco-friendly." The certification sponsors, which can be public or private entities, develop criteria for measuring environmental responsibility and issue an application form for interested parties to fill out and submit with a fee. Depending on the program, there may be several levels of certification available. In any case, monitoring of applicants is necessary to assure the validity of their statements and continuing beneficial practices.

Certification programs can improve environmental management of tourism suppliers by identifying negative impacts and solutions for overcoming them, encouraging responsible practices, educating suppliers and consumers about environmental management practices, and serving as a marketing tool. However, they are often costly to establish, administer and monitor, and require that suppliers pay to become certified (often difficult for small ecotourism operations). As a result, most certification programs have been carried out in developed countries, especially in Europe, with virtually none in Latin America, Africa or Asia. The development of criteria and establishing standards for tourism suppliers in different countries and of different types of operations is extremely difficult. These challenges are major obstacles to the implementation of internationally credible and effective certification systems.

In any case, there is clear recognition that in the worldwide context, tourism impacts on cultures and societies, in addition to those on the natural environment and visitors, must be considered. In fact, for some authors (e.g. McLaren, 1998), negative impacts of tourism on local cultures is more pernicious than impacts on the physical or biological environment.

Because LAC calls for participatory input, it is especially useful for incorporating the community into the planning and implementation of monitoring. For instance, the first step in the LAC process is identifying area concerns and issues. Since ecotourism involves and affects surrounding communities in Latin America, the “area” includes buffer zones and their inhabitants. Socio-cultural concerns, as well as economic issues, can be examined and incorporated into planning and management programs.

Monitoring and Impact Management Methodologies of Special Interest

There are few examples of ecotourism impacts monitoring being conducted in developing countries. However, there is some literature about recommended methodologies which are being tested in Asia, Latin America and Australia. These are described below. In addition, examples are given of biological and socio-cultural monitoring at sites where ecotourism is part of conservation and development projects. All of these methodologies and experiences are of interest in developing a more comprehensive and effective monitoring program.

Elizabeth Boo – “The Ecotourism Boom”

Boo (1992) emphasizes the importance of incorporating levels of tourism and limits for visitors into ecotourism diagnosis and planning. She describes a process for creating an ecotourism strategy which defines how to plan for and manage ecotourism so that negative impacts do not occur and so that positive results will be realized. Her methodology includes the following phases:

- 1) Assessing the current situation
- 2) Determining a desirable level of tourism
- 3) Strategizing about how to reach this level
- 4) Writing and disseminating an ecotourism strategy document

Phase 2 focuses on numbers and activities of tourists, utilizing concepts similar to carrying capacity. Although this may be overly simplistic, Boo’s methodology examines stakeholder group objectives for implementing ecotourism and bases all tourism planning on these objectives. She suggests creating scenarios for different levels of tourism (outlining tourist numbers and profiles, types of activities and services provided, community interaction, marketing, etc.) and then examining the related impacts. She does not specify

how to link quantifiable measures with objectives by establishing standards or acceptable ranges for impacts, but does refer to LAC and other methodologies.

In phase 3, Boo recommends setting up mechanisms for examining and, in some cases monitoring, natural resources, visitation, park infrastructure, human resources, interaction with local communities and regional and national level institutions. Finally, she stresses the importance of working closely with all stakeholders including the community, government, private sector and conservation groups.

Measures of Success

Margoluis and Salafsky (1998) have developed a methodology for monitoring of conservation and development projects which is very useful and relevant to ecotourism programming. Their book, Measures of Success, is a guide for designing, managing and monitoring impacts of projects and is to be used by a variety of stakeholders. It applies the concept of adaptive management and sees monitoring as an essential element of project planning and management, providing useful feedback on both positive and negative impacts. The monitoring program they describe is integrated into the project cycle (see Figure 1), and is developed as part of the conceptual model and management plan. Once project goals, objectives and activities are selected, a clear and concise monitoring plan is drawn up. The steps are:

- 1) Determining the audiences for monitoring information
- 2) Determining the information needed, based on project objectives
- 3) Designing a monitoring strategy for each information need
- 4) Developing one or more indicators for each information
- 5) Applying and modifying the indicators, as needed
- 6) Determining methods of measuring indicators – using four criteria for selecting methods: accuracy and reliability, cost-effectiveness, feasibility and appropriate
- 7) Developing an operational plan for applying methods – listing the tasks, people responsible, monitoring sites and timeline

Margoluis and Salafsky provide very detailed information on types of monitoring designs, censusing and sampling techniques, quantitative and qualitative methods, applying the methods, collecting and handling data, analyzing data, and communicating results to various types of audiences. Finally, and importantly, they explain how to use the information gathered to carry out adaptive management.

Unlike LAC, VIM and other methodologies, they do not recommend establishing standards of acceptable change or limits for impacts. Instead, they suggest that the monitoring results be used for testing assumptions, adapting the project to overcome problems, and documenting and sharing lessons learned.

There are no specific directions for selecting alternative management strategies. However, the authors recommend a process of iteration, or revisiting of the various steps in the project cycle. This involves rethinking and refining the assumptions made for implementing management activities, and adjusting activities or developing new ones for fulfilling project objectives.

In addition, and as a complement for the methodology described above, Margoluis and Salafsky (1999) have developed another approach for determining project success. This method does not rely on biological measures since these are often difficult to obtain, analyze and use by stakeholders in developing country situations. Entitled Threat Reduction Assessment, this approach identifies and monitors threats in order to assess the degree to which project activities are reducing them and achieving success. The process contains the following steps:

- 1) Define the project area spatially and temporally.
- 2) Develop a list of all direct threats to the biodiversity at the project site present at the start date.
- 3) Rank each threat based on three criteria: area, intensity, and urgency.
- 4) Add up the score across the three criteria.
- 5) Determine the degree to which each threat has been met.
- 6) Calculate the raw score for each threat.
- 7) Calculate the final threat reduction index score.

The evaluation of threats reduction can be done using qualitative or quantitative measures and can utilize the results of monitoring. Its authors claim that it has several advantages including its increased sensitivity to short term changes and small scale impacts, its ease of application using social science research methods which are often simpler than natural science methods, and its ability to be easily applied by community members and project staff. While this method may not provide specific measures of ecotourism impacts, it could serve to measure the degree to which predicted threats are reduced or aggravated by ecotourism. Ultimately, it serves as an alternative method of measuring project impacts, and can support more traditional monitoring.

In summary, the planning and management methodology described in Measures of Success is compelling. It guides users through a complete process of project design, planning, management and assessment for conservation and development projects, incorporating monitoring as one of the key ongoing steps. It considers monitoring essential not only for recognizing the negative impacts which a particular action or program may have, but also to measure its degree of success in relation to fulfillment of project objectives. This positive use of monitoring is one which is often neglected in many of the impact monitoring methodologies but which is critical for stimulating project support. Recognition of progress towards identified goals provides powerful incentives on the local level for increased data collection, analysis and adaptive management. It also

serves to gain support more broadly from international donors and other collaborators.

Biodiversity Conservation Network Monitoring

The methodology described in Measures of Success was drawn from the authors' experience in conservation and development projects, including those of the Biodiversity Conservation Network (BCN) program, which supports and evaluates the effectiveness of enterprise-oriented approaches to biodiversity conservation. Monitoring of the projects within BCN was initiated near project start-up through the measurement of a variety of biological and physical indicators and socio-economic surveys. In the projects which implemented ecotourism, the environmental indicators were selected as dependent variables affected by ecotourism as well as other income generation activities (nut gathering in the Solomon Islands). Monitoring is carried out by tourists, guides, local NGO staff and community members, and is analyzed by international NGOs. Several examples follow.

In Makira, Solomon Islands, the indicators are fruit dove frequency, as measured anecdotally by tourists and guides and through ornithological research, and results of socio-economic surveys conducted annually. At the same time, the community is involved in examining threats using the Threat Reduction Assessment process. In Irian Jaya, biological conditions of the coral reef are measured using indicators such as numbers of butterfly fish, live coral and fish caught in designated sites. Beach trash is also monitored. Within the community, a wide range of socio-economic indicators were measured and are being re-measured (Parks and Hochman, 1999).

The impacts of both of these programs are already being seen in management actions. For example, in two different sites, monitoring results have provoked seasonal restrictions on pigeon hunting, bans on pesticides, experimental transplanting of coral, and pressure on governmental agencies to discontinue practices which have caused damage to coral reefs. Although the causes for some of the impacts were not necessarily related to tourism, these examples demonstrate the value of monitoring results to stimulate concern among the community and to implement actions to overcome negative impacts.

In another BCN project in Gunung Halimun National Park in Indonesia, environmental monitoring is being carried out on river water quality, key indicator species, rattan extraction and trash. Some socio-economic data is also collected, but the success of the monitoring program has been limited. Reasons include the fact that most of the data gathering was carried out by NGO staff members without involving the community and was treated as a research activity rather than as a means for planning and adaptive management. (Cordes, 1999; See Appendix 3.)

Some of the Measures of Success concepts and methodologies are being applied for biological monitoring at sites where BCN is promoting ecotourism at Royal Chitwan National Park in Nepal and in Sikkim, India. With the exception of assessments of wood resources, which does involve community members, there is little community participation in monitoring activities. Most is done by scientists and graduate students. The only socio-economic studies have been to examine the extent of dependence of residents on the projects. While it appears that the results of monitoring can be used to guide management, it is too early to tell since not enough data has been collected and assessed. (Balachander, 1999; See Appendix 4.)

The Nature Conservancy

While TNC encourages ecotourism impacts monitoring with its partner organizations, very little is being conducted yet. However, TNC is actively developing methodologies and is promoting biological monitoring (see box on biological monitoring above). One example of simple biological monitoring being applied by a TNC partner in an ecotourism site is in Noel Kempff Mercado National Park in Bolivia.

TNC partner, Fundacion Amigos de la Naturaleza (FAN) and the Bolivian national park system have been conducting biological monitoring of megafauna and endangered species for the past three years. Park guards and FAN staff are responsible, and use data collection procedures recommended by visiting scientists. For the past year, nature guides have also collected information on bird and animal sightings; however, because the level of ecotourism in the park is low their data is not very complete. There is no monitoring of cultural and socio-economic impacts because there are no communities in the park and the ecotourism that exists does not affect communities.

There has been little need to implement a more rigorous or comprehensive monitoring program yet because ecotourism has not grown to a point of having significant impacts. However, the monitoring that has been done has helped protected areas staff to more effectively plan their work. For example, they now have a better idea of when river turtles are nesting, when they hatch, when they are in most demand by locals, when fish are migrating, etc. In addition, it provides baseline data from which to assess future impacts. FAN will be interested in additional ecotourism monitoring if funds are available and when they succeed in attracting more ecotourists. (See Appendix 5.)

Biological monitoring, assessments and research are also being conducted in two other TNC partner reserves where there are ecotourism programs: the Rio Bravo Conservation and Management Area in Belize and Parque del Este in the Dominican Republic. These activities were not specifically designed to assess ecotourism impacts.

Tourism Optimisation Management Model (TOMM)

The Tourism Optimisation Management Model, or TOMM (Manidis Roberts, 1997), is a sophisticated and comprehensive framework for monitoring tourism activities, as well as for helping people make better decisions about tourism. It was developed for Kangaroo Island in southern Australia and is to be used by all of the stakeholders involved in and/or affected by tourism. In fact, it was created specifically as an alternative to LAC and VIM because these were found lacking in several ways, especially in the involvement of all parties. The tourism industry found the terminology of these methods, which identify impacts and limits, unpalatable, wanting to focus more on growth and forward movement from a business perspective. At the same time, many of the traditional methods examined environmental impacts and visitor experience, but ignored the local community. TOMM combines the concepts and practices of regional planning, social and biological monitoring, and business management. Even the terminology used to describe the steps of the model manifest its multi-disciplinary origins. (See Figure 2)

There are several unique features of TOMM which make it useful as a model from which to base a monitoring system for developing countries. One of these is the inclusion of socio-cultural conditions as a dimension which stands on equal footing with four others: economic, market opportunities, environmental and experiential. Another is the incorporation of a market approach in addition to a strictly economic one. There is a distinct business bias to the model, which makes it useful for examining emerging issues and alternative management strategies to be promoted by the business sector.

The steps for implementation of TOMM resemble those of LAC and similar frameworks. First, it identifies the context within which tourism functions. Then TOMM selects the optimal conditions desired within the five dimensions (mentioned above). This is done by developing alternative scenarios of tourism, in which the scale of tourism is increased or decreased and/or other factors come into play. Benefits and costs of each scenario are predicted, and the types of information needed to measure them is determined. From the list of information needs, indicators are determined. Once optimal conditions are specified, acceptable ranges for each indicator are selected. When monitoring demonstrates that these ranges are exceeded, causes are identified and their potential effects are analyzed. If the effects are due to tourism activities, the industry assesses management options and tests them with its predictive models. When models indicate that these management responses can bring the indicators back into the acceptable range, management actions are implemented.

The methodology uniquely and importantly assesses the costs of implementing the program and human resources required. Unfortunately, the results indicate that TOMM is extremely expensive to apply, making it impractical

for adoption in Latin America. In addition, its industrial perspective may be a bit overwhelming for rural communities. Most importantly, it assumes strong government direction and support, unavailable in much of the developing world.

Nevertheless, TOMM surpasses many other impact monitoring methodologies in a number of ways. First, its holistic approach, giving equal emphasis to multiple dimensions (socio-cultural and economic, as well as environmental) and stakeholders in tourism, is fundamentally correct. Second, the process of determining optimal conditions is recommendable because it requires multi-stakeholder planning and visioning, useful exercises for determining the diverse values of many players. Third, in selecting ranges of acceptance, rather than specific limits which are sometimes arbitrarily chosen, it provokes discussion and analysis. While these ranges are chosen based on value judgements, the performance of indicators is measured objectively. Finally, the model's focus on assessing progress, as well as using the data for predicting the future, is useful and forward thinking.

Conservation International (CI)

Conservation International is currently assessing and developing methods for monitoring its field projects, some with ecotourism and others without. Using the Chalalan Lodge in Bolivia as a pilot, CI staff are first determining the information which is most important to gather and monitor. They are looking at project management structure and resources, examining aspects such as leadership development, hiring practices, distribution of resources, magnitude and distributions of impacts, etc. In addition, they are considering conducting periodic Rapid Assessment Programs (RAPs) using both environmental and socio-economic indicators. Community members would be involved in collecting data, which would then be analyzed in a central office in Washington and sent back to the field for local use. Indicators have not yet been selected. Another possible monitoring tool will be an assessment of community attitudes towards the environment and conservation. Finally, visitor survey are already being conducted in several sites, including Madidi, Bolivia and the Peten in Guatemala, and the results will be incorporated into the monitoring program.

CI's overall approach is to ensure that its programming is having the desired impacts. While some of the analysis is on the level of project management, other components will be examining results and impacts on the ground. CI plans to incorporate the approaches of Measures of Success, as well as LAC, in its monitoring program. It will develop a hypothesis, which it will test with the information gathered. After analyzing results in Washington, DC, CI will make any necessary adjustments to its programming (Finsidore, 1999).

Frameworks for Looking at Cultures and Change

Although Brandon's (1996) review of key issues ecotourism and conservation does not outline monitoring methodologies, the author provides a useful framework for identifying cultural changes which can result from tourism. In developing indicators to assess socio-cultural impacts, the following four types of changes should be considered and measured:

- Commodification of culture – can cause peoples to “stage authenticity” and thereby impede or arrest natural cultural evolution
- Change in social structure – can include increases in crime and alcoholism, fracturing of relationships, and changes in individual roles and responsibilities
- Cultural knowledge – can include a loss of traditional knowledge, skills and religious practices
- Use of cultural property – can affect historical and archaeological property, religious sites and significant natural features.

Another framework relating to community characteristics and values which might be useful to consider for determining indicators for evaluating socio-cultural impacts of tourism is that provided by Bruner (1993). She lists eight factors which villagers perceive as contributing to the protection of nature reserves. They are:

- 1) Management issues - legitimacy, who and how
- 2) Amount of input of villagers in the development of the sanctuary
- 3) Level of communication between local people and the NGO(s) involved
- 4) Level of compensation from economic, aesthetic and service sources
- 5) Attitudes towards tourism development
- 6) International recognition/pride
- 7) Conservation attitudes/knowledge
- 8) Economic status/land use

Characteristics of Effective Monitoring Programs

As a result of this review of various monitoring and impact analysis methodologies, a number of recommendations for developing effective ecotourism monitoring programs can be made. They are:

- Monitoring must be incorporated into general planning and management
Monitoring provides a measure of project impacts – both positive and negative – and its results guide management. As a management tool, it must relate back to project goals and activities outlined in area management plans. Therefore, in order to develop effective monitoring programs, it is essential that they are developed as part of overall protected area and community management and development planning. In the case of ecotourism impacts, a monitoring program

may be integrated into an initial ecotourism plan, which deals with both site related issues as well as community concerns.

- Monitoring must be grounded in protected area management and community development objectives

When land-use and development objectives are used as the basis for monitoring and analyzing changes due to ecotourism, the monitoring process and its resultant recommendations become part of the overall planning and management strategy for a protected area and its buffer zone. Like management planning, which identifies goals, objectives and actions for park protection, a monitoring program must begin by articulating objectives and desired resource conditions. This explicit link between results and outcomes of monitoring and attaining the basic management objectives is a critical element for demonstrating the importance of impacts monitoring. When community concerns are incorporated, the argument for monitoring is even clearer. The welfare of the community depends on ensuring that visitor impacts do not exceed defined limits of acceptability. These limits are determined by a representative body whose priorities are in the best interests of the environment and the society that depends upon it.

- The complex causes of impacts must be recognized and analyzed

Although it is clear that tourism can have clear-cut negative impacts on the environment and on communities, it is important to realize that changes that occur in areas where there are conservation and development programs may be a result of numerous factors outside of tourism. Therefore, when analyzing impacts measured in ecotourism monitoring programs it is important to differentiate between changes caused by tourism and those caused by other factors from both within and outside of the project.

- Indicators and methods for measuring them must be selected carefully

Care must be taken when selecting indicators to ensure that impacts being measured are directly and uniquely related to ecotourism activities. Salafsky and Margoluis (1998) recommend four criteria for selecting good indicators:

- Measurability
- Precision
- Consistency
- Sensitivity

TOMM (Manidis, 1997) offers five, even more basic criteria for selecting indicators:

- Degree of relationship with actual tourism activity
- Accuracy
- Utility
- Availability of data
- Cost to collect and analyze

Margoluis and Salafsky (1998) offer a list of criteria similar to TOMM's for choosing appropriate and effective methods of measuring indicators. In any case, it will usually be necessary to measure several indicators for each impact that is to be monitored. At first, it may be helpful to select and measure a series of indicators for each potential impact so that there is room to experiment, later refining or discarding those which do not fulfill the criteria sufficiently.

- When selecting standards or acceptable ranges for measuring indicators, several factors must be considered.

For biological indicators, it is important to ensure that minimum levels are sufficient to maintain population numbers and genetic diversity (Brandon, 1996). When biological research has not been carried out and there is insufficient information regarding minimal population sizes, the best available information should be used. Researchers in other sites as well as people with longtime experience at the site in question may be helpful. In any case, standards should err on the conservative side.

When considering visitor reactions, it is important to realize that visitors generally recognize physical and experiential (or psychological) impacts more accurately than biologic ones (Harroun and Boo, 1996). That is, they are more apt to recognize impacts such as trail erosion, litter or crowding than reduced nesting or altered behaviors of animals. Also, visitors' pre-trip expectations about what they will see may be unrealistic, especially in rainforests where animals are often difficult to see. Therefore, analysis of visitor reactions must be treated with care.

It is important to identify the management changes which will be needed once standards or acceptable ranges of indicators are exceeded. That is to say, the range or standard must be defined such that once the measure of an indicator is unacceptable, a management change is triggered.

- Local stakeholder participation is critical

The participation of community members and other local stakeholders in developing and implementing monitoring programs provides many benefits which can further project goals. First, the degree of acceptable change in community-related impacts (socio-economic and cultural factors) can best be decided by those involved. Therefore, representative community members must be included in the determination of likely impacts to be anticipated, indicators and standards or ranges of acceptability which will be tolerated. Second, community members are often those who, because of their familiarity with the environment and community, can most easily perceive impacts and changes in indicators. Therefore, they should be the ones to collect data. Third, when the community is intimately involved in monitoring, methods and findings are made more accessible to the public, generating additional community participation and acceptance of management activities. The scientific rigor found in many monitoring programs can carry much weight for community members who may

be more used to basing their actions on more personal, sometimes unspecific criteria.

- Monitoring methodology and analysis of findings must be user-friendly and minimally demanding in time or budget

Guides, park rangers and community members are those people most apt to implement monitoring. They generally have an intimate knowledge of the resources and issues and have a clear and ongoing stake in the results since it is they who predominantly deal with the consequences of impacts. Because time, budget and technical abilities are often limited, the selection, measurement and evaluation of indicators and making of management decisions should be as straight forward as possible. In addition, the entire process of planning monitoring programs, implementing them and applying results should be carried out on the local level by those most involved. This helps them to understand the value of monitoring and to reap educational benefits. Guidance by specialists may be provided during the development of monitoring programs but ultimate success will depend on the local incorporation of the process into daily or monthly routines.

- Monitoring results must be carefully analyzed to determine appropriate management options

Findings from monitoring exercises may indicate any number of impacts which may or may not be directly related to ecotourism. It is important to explore all possible causes for the results found and determine which impacts can be influenced by changes in management. Management strategies, or approaches, must be developed and then specific tactics, or actions, selected. Cole (1987) offers eight strategies and 37 tactics for reducing visitor impacts and discusses the advantages and disadvantages of each. Ultimately, management actions must be selected based on assessments of their costs, effectiveness in modifying impacts, and palatability to all of the various stakeholders (ecotourism and protected area managers, local community, tourists and others). Marion and Farrell (1998) emphasize the selection of appropriate responses, while conceding that protected area managers in developing countries may face budgetary and technical constraints which make careful analysis difficult. They recommend recruiting researchers and other specialists who are readily available and/or periodically hiring a group of experts to analyze monitoring results and management strategies and to provide recommendations.

- Monitoring must lead to specific management and awareness-building actions

Because monitoring is a long-term activity which does not always produce immediate and recognizable benefits, managers may not fully realize its value. When faced with other priorities, they may neglect to carry it out. To overcome this, monitoring programs must demonstrate their relevance to project goals and objectives and their usefulness for guiding management activities. One way of ensuring this is through selective choice of impacts and indicators which are easily recognizable and clearly affected. Once standards are exceeded and

causes are identified, management actions must be selected and implemented immediately. The results of continued monitoring should then be disseminated to generate further support both from within management as well as from other stakeholders.

Implementing an Ecotourism Impacts Monitoring Program

It becomes evident from the characteristics outlined above that ecotourism impacts monitoring is a process. Since the objective of this report is to offer a methodology for establishing comprehensive monitoring systems, it is therefore important to outline the steps for initiating and implementing a monitoring program. However, prior to this it is important to clarify the types of impacts which must be measured and to understand how to select useful indicators.

Identification of Impacts and Indicators

The indicators selected for measuring ecotourism impacts will depend on the specific characteristics of each site. It would be impossible to select appropriate indicators without first examining the natural and physical resources, the community, the infrastructure and the type of visitorship in the area. However, it is clear that any monitoring program must assess the critical impacts within each impact area and affecting all types of stakeholders. That is, it should cover the following categories of impacts on the following broadly defined groups:

- 1) Environmental impacts – on protected area and surrounding lands
 - Physical impacts
 - Biological impacts
- 2) Experiential or psychological impacts - on visitors
- 3) Economic impacts – on communities and protected area
- 4) Socio-cultural impacts – on communities
- 5) Managerial or infrastructural impacts – in protected areas and surrounding lands

There are numerous methods for measuring these impacts (see Margoluis and Salafsky, 1998). At this point, suffice it to say that environmental and economic impacts are generally measured using quantitative methods, while experiential and socio-cultural impacts are often examined qualitatively. In the case of the latter two impact types, surveys of visitors and local community members are common. A wide range of questions may be asked, including those which deal with visitors' attitudes towards the community and community attitudes of visitors.

Economic impacts are often treated separately from protected areas management and monitoring analyses. However, in the case of income-generating enterprises, economic gain and distribution are important. Financial success for protected areas management as well as community development are

desired and progress towards these objectives should be constantly measured. A related point is that while this categorization is offered as an overall framework for examining types of ecotourism impacts, the actual impacts experienced may cross over category lines. For example, changes in local consumption patterns or in use of medicinal plants may be stimulated by a combination of economic, social and cultural factors. What is most important, however, is that the most serious impacts are measured and managed, and that the goals and objectives of the various stakeholders are realized.

It is important to remember when selecting specific impacts and indicators to measure that these be directly related to identified threats due to ecotourism. While there is a range of impacts for which monitoring would provide useful information, limited time and budgets make it difficult to be as comprehensive as would be ideal. It is better to begin with a few, carefully selected impacts and to implement monitoring of them than to develop long and detailed plans which might become so overwhelming that they are not applied.

In addition to gathering data such as that listed above, careful records of tourist visitation should be kept. Important statistics include numbers of tourists, places of origin, ages, dates of visit, length of stay, number in party, and income received. More in-depth analysis might examine activities conducted, evaluations of the tourist experience and attitudes towards the protected area, the ecotourism program and the community.

Appendices 1 and 2 provide examples of potential monitoring indicators.

Process for Developing a Monitoring Program

Ideally, an ecotourism monitoring program is established during the planning stages of ecotourism. However, if an operation is up and running and no monitoring is taking place, it is not too late to begin. The following process can be applied with only minor differences, and if negative impacts are already being experienced, the need for monitoring will be more apparent. Stakeholders should be more interested in being involved and in planning for and carrying out monitoring to improve management practices and mitigate undesirable impacts.

The development of a monitoring program is a multi-step process which requires involvement of protected areas managers, conservation NGOs, ecotourism managers, community members and tourists. All of these groups have a stake in ensuring that the monitoring achieves certain objectives; however the exact objectives of each group may vary. Therefore, it is important that goals and objectives are identified and discussed at the outset, and that consensus is reached early on as to why monitoring is being implemented and how it will be done. Conservation NGOs, particularly, have an important role to play in ensuring that all necessary stakeholders are involved and that there is a clear understanding of why and how monitoring is implemented.

The following steps are recommended for initiating and implementing an ecotourism impacts monitoring program. Discussion of each step follows below.

- A) Planning for Monitoring
 - 1) Formation of a steering committee
 - 2) Holding a community meeting
- B) Developing a Monitoring Program
 - 3) Identifying impacts and indicators to be monitored
 - 4) Selecting methods of measurement
 - 5) Identifying limits or ranges of acceptable change
 - 6) Developing an operational monitoring plan
- C) Conducting Monitoring and Applying Results
 - 7) Training staff, managers and community representatives
 - 8) Carrying out monitoring and examining data
 - 9) Presenting monitoring results
- D) Evaluating and Advancing Monitoring
 - 10) Evaluating the monitoring program and conducting outreach

A) Planning for Monitoring

- 1) Formation of a steering committee

The first step is to form a steering committee of individuals representing the various stakeholder groups mentioned above (with tourists potentially represented by tour operators). A conservation NGO member or protected area manager might be selected as the coordinator of the monitoring initiative. The first task for all members of the steering committee is to recognize the need for establishing a monitoring program and to determine what the program's goals and objectives are.

- 2) Holding a community meeting

Once the committee is clear on the need for monitoring ecotourism programs, activities and impacts, it is critical to seek public support at this early stage. Therefore, a community meeting, or a series of meetings, is held, with representatives from all stakeholder groups present. The first task is to educate everyone about ecotourism and monitoring, and to discuss ecotourism objectives and management. A second and important reason for convening a large group of stakeholders is to list potential concerns about and impacts of tourism. These can be identified and examined through a participatory planning appraisal or other similar methodology which encourages local input and idea generation. Components of ecotourism and related issues to be identified and discussed include:

- Visitor attractions and sites or resources frequented by visitors
- Sensitive species and areas
- Infrastructure, both within the protected area and the buffer zone
- Threats of tourism
- Opportunities of tourism
- Perceived differences between community members and tourists
- Scope and scale of tourist presence in the protected area and in the community.

It may be useful to examine impacts of ecotourism in the context of the five impact categories: environmental, experiential, economic, socio-cultural and managerial.

B) Developing a monitoring program

3) Identifying impacts and indicators to be monitored

Once the steering committee, with community support, has defined its goals and objectives for ecotourism monitoring and identified salient concerns, it is time to list the potential and actual impacts and to identify those most important to monitor. The decision will be based on management interests and capabilities, since monitoring must be linked to management planning and implementation. The number of impacts selected should be kept small (maybe 2-3) at first, in order not to become too overwhelming. However, it is important to ensure that the program is comprehensive, addressing impacts of all five of the previously discussed types (that is, environmental, experiential, economic, socio-cultural and managerial).

Next, the committee should select indicators utilizing the criteria provided earlier in this document and discussed by Salafsky and Margoluis (1998). See also Appendices 1 and 2. Although several indicators may be necessary to examine each impact, it is useful to start with the simplest measures and to develop a system which can be expanded once it has proven itself feasible and useful.

4) Selecting methods of measurement

Salafsky and Margoluis (1998) emphasize the importance of selecting appropriate methods for measuring indicators. While biological and economic indicators are often quantifiable and therefore easily measured with standard techniques, many of the impacts on visitor experience and local society or cultural are qualitative in nature, and more difficult to measure. These may be best assessed utilizing some of the research methods generally used by anthropologists and sociologists (see Bernard, 1995; Patton, 1990). Surveys of visitors and community members are usually recommended for assessing many of the indicators of experiential and socio-cultural impacts and should be

developed with input from both of these types of stakeholders. Other indicators (e.g., measures of crowding at certain attractions or number of new businesses in local villages) may be measured through observational surveys, and can be conducted by protected areas staff and/or community members.

5) Identifying limits or ranges of acceptable change

The steering committee should initiate the identification of limits or ranges of acceptable change for each of the indicators to be measured. An understanding of biology, ecology, sociology and economics, as well as ecotourism practice, are important for determining such standards, and a diverse steering committee can provide the necessary expertise. However, it is also important to involve the community and other stakeholders in order to ensure that all are comfortable with decisions made about monitoring and application of results. Therefore, a second community meeting should be held to present, seek input, and discuss the limits or ranges of change identified. Other related concerns and plans are also addressed.

6) Developing an operational monitoring plan

As discussed previously, monitoring is most likely to be carried out and to be effective when it is incorporated into general management plans for protected areas management and ecotourism. An operational plan which indicates scheduling, persons responsible and equipment needed for monitoring activities is necessary and should be developed by the steering committee. The coordinator of the committee or one of the protected area or ecotourism managers should be appointed to be responsible for ensuring that thorough and timely monitoring is taking place in all of the impact areas.

Monitoring responsibility might be divided up among various stakeholders in the following way:

- Environmental monitoring – protected area managers, rangers and guides
- Experiential monitoring – guides and ecotourism managers
- Economic monitoring – protected area managers, ecotourism managers, and community representatives
- Socio-cultural monitoring – community representatives and others (possibly a sociologist or anthropologist)
- Managerial monitoring – protected areas managers, ecotourism managers, and community representatives

Included in monitoring activities of socio-cultural impacts, might be community members who are not currently employed by the protected area or ecotourism program. They may be able to provide feedback which is unnoticed by protected area or ecotourism staff or visitors.

C) Conducting monitoring and analyzing and applying results

7) Training staff, managers and community representatives

Prior to beginning monitoring activities, it will be necessary to train all those who will be directed involved in implementing monitoring and using the results. This may include protected areas and ecotourism staff and managers as well as community representatives. Conservation NGOs may also be involved, especially in data analysis and provision of other technical support. The specific nature of the training program will depend on the types of impacts and indicators to be analyzed and who will be involved. Local and international NGOs, as well as government or private educational institutes, may be called upon for instruction. An outline of some training needs is presented in the next section.

8) Carrying out monitoring and examining data

Monitoring is conducted by assigned stakeholders, according to the operational plan, and data is recorded using pre-determined formats. Information is collected and stored in a central location and analyzed periodically by trained analysts. The steering committee should meet at least every six months in order to review the monitoring results and discuss whether they warrant changes in management. As needed, small scale management adjustments are made. When monitoring indicates large scale management changes and/or modification or adoption of policies which will affect the community, local input should be elicited.

9) Presenting monitoring results

Communities meetings should be held on an annual basis in order to present monitoring results and conclusions to all stakeholders. Progress in achieving the ecotourism goals and objectives are presented and difficulties encountered are discussed. Input is sought from the community regarding the monitoring program, impacts experienced and general management of the process. It is also recommended that media be contacted to share findings and experiences with other communities and organizations (local, regional, national and international) interested in ecotourism management.

When monitoring results indicate the need to conduct management changes which affect the community or others outside of the protected area and ecotourism management, additional meetings and publicity should be implemented. It is important to keep all stakeholders informed and involved so that they will fully understand why monitoring is important and how results may impact them. In the case of socio-cultural impacts, there may be a variety of management alternatives. Public input regarding the form, scale and timing of related management activities can be useful.

D) Evaluating and advancing monitoring

10) Evaluating the monitoring program and conducting outreach

Finally, as with any objective-oriented program or activity, the monitoring program should be documented and assessed. Annual reports on the progress, successes and weaknesses of the monitoring initiative should be presented to the steering committee and other associated organizations or supporters. Evaluations should be carried out when necessary and adjustments made to ensure that monitoring and management objectives are being met.

Presenting talks about the monitoring program at conferences and workshops is an excellent way to share experiences with others and to gain feedback for making improvements. In addition, the publication of findings and experiences nationally and internationally is recommended to further advance the concepts of ecotourism impacts monitoring and responsible tourism management on a larger scale.

Training Needs for Conservation NGOs and Protected Areas and Ecotourism Managers

To implement a comprehensive monitoring program, many of the key players will need to be trained in management and in specific techniques for data collection and analysis. To begin with, training might be directed at protected areas managers, ecotourism managers and conservation NGOs. An outline of training components follows.

- 1) Overview of monitoring examining concepts such as
 - definition
 - objectives
 - impact categories – environmental, experiential, socio-cultural, economic, managerial
 - indicators
 - standards or limits of acceptable change
 - management responses
- 2) Techniques of participatory planning and community outreach
- 3) Threats analysis and identification
- 4) Determination of impacts and indicators
- 5) Methods of measuring environmental, psychological, sociologic, cultural, economic and management factors
 - Sampling techniques – biological, sociological, economic

- Survey methods – developing and implementing interviews, focus groups, observation techniques, mapping, ranking techniques, etc.

6) Collecting, organizing and storing data

7) Data analysis techniques for

- Quantitative measures
- qualitative measures

8) Management alternatives for reducing negative impacts

9) Gaining support for monitoring

- funding options
- developing partnerships
- monitoring resources

Financing Monitoring Programs

It is essential that monitoring activities be incorporated into protected area and ecotourism program budgets. Aside from providing compensation for time spent and necessary materials, it legitimizes the work involved and demonstrates a degree of seriousness to financial supporters that the prevention of negative impacts due to ecotourism is taken seriously. Funds may be incorporated into operational budgets under any number of categories, but one suggestion might be to add a small amount to visitor entrance fees specifically for monitoring and visitor management. This could be publicized to all visitors in order to build awareness that tourism can have negative impacts and that managers are serious about minimizing these impacts through education, monitoring and adaptive management. Alternatively, a sliding scale fee could be levied on tour operators, with the charge per year depending on the number of tourists they bring and the timing of their visits.

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People Contacted for Information on Ecotourism Impacts Monitoring

(* - indicates that response was received)

*John Parks, Biodiversity Support Program
*Cheryl Hochman, BSP
*Nick Salafsky, BSP
*Richard Margoluis, BSP
*Ganesan Balachander, BSP
Seema Bhatt, BSP
*Chiranjeev Bedi, BSP
*Bernd Cordes, BSP
Roger James, Conservation International
Sarah Wilson, CI
*John Finsidore, CI
Dr Eklabya Sharma, GB Pant Institute of Himalayan Ecology and Development
Ms Nandita Jain, The Mountain Institute
*Gabriel Campbell, The Mountain Institute
Arun Rijal, King Mahendra Trust for Nature Conservation
*Ralf Buckley, Griffith University, Australia
Terry de Lacy, Griffith University, Australia
David Weaver, Griffith University, Australia
*Michael Kaye, Costa Rica Adventures
*Tracy Farrell, Virginia Tech University
*Costas Christ, Peace Corps, Kenya
*Megan Epler Wood, The Ecotourism Society
*Michelle Libby, The Nature Conservancy
*Jose Courrau, TNC
*Paige MacLeod, TNC
*Roger Sayre, TNC
*Jim Reiger, TNC
*Tammy Newmark, TNC
Connie Campbell, TNC
Susan Anderson, TNC
Christina Lasch, TNC
*Tim Miller, Fundacion Amigos de la Naturaleza
*Seleni Matus, Programme for Belize
Maria Andrade, ProNatura
Eduardo Herman, Ecoparque
Will Mehia, TIDES
*Carlos De Paco, Monteverde
Maricela Munoz, Monteverde
Bruce Moffat, Monteverde
Mel Baker, ATEC
Andres Baquero, Fundacion Natura
*Alan Moore, University of Tennessee
*Gail Lash, University of Georgia
Bill McLaughlin, University of Idaho
Ed Krumpke, University of Idaho
*Nick Sanyal, University of Idaho
Chuck Harris, University of Idaho
*Ron Mader, Ecotravels in Latin America website

Figure 1: The Project Cycle (from Salafsky and Margoluis, 1998)

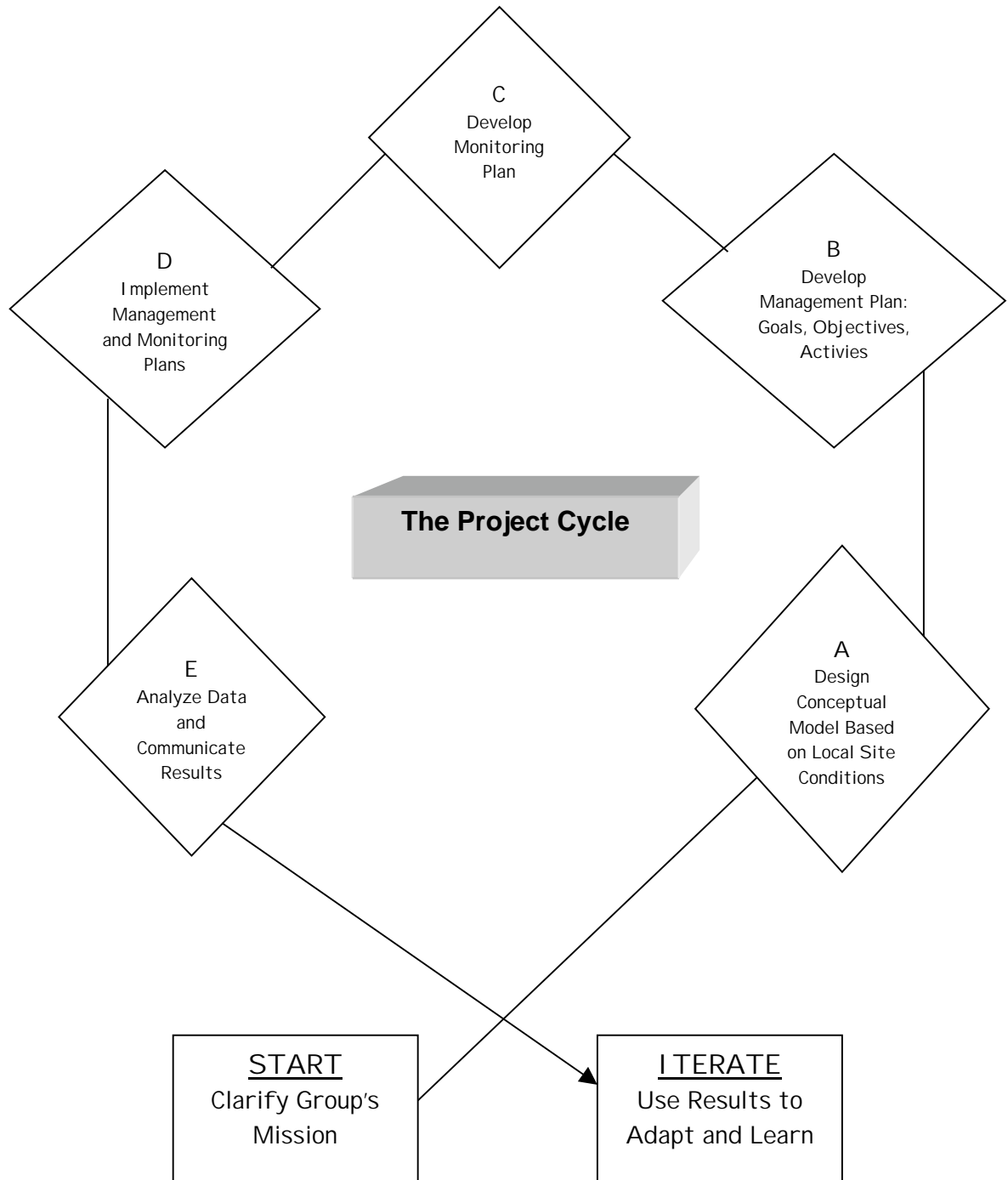
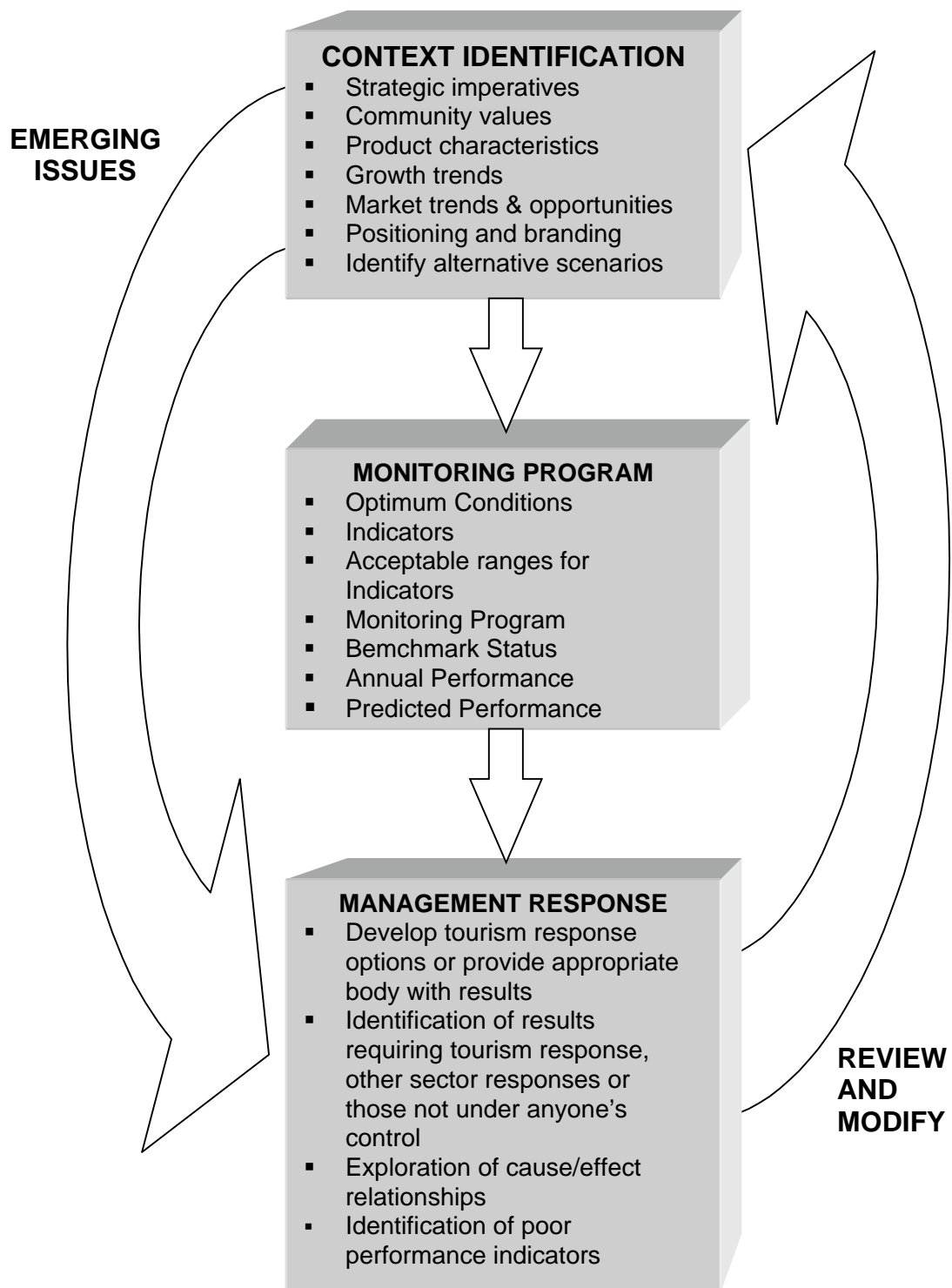


Figure 2: Three-tiered structure of the Tourism Optimisation Management Model (TOMM) (from Manidis Roberts Consultants, 1997)



APPENDIX 1

A Sample of Potential Ecotourism Monitoring Indicators (developed by Abigail Rome)

Environmental

- Species of special tourism interest – numbers recorded per time or area, breeding sites
- Endangered species – numbers recorded per time or area, breeding sites
- Keystone species – numbers recorded per time or area, breeding sites
- Trail width
- Trail maintenance required
- Water quality
- Vegetation trampled near trails and infrastructure

Experiential

- Number of other people or groups encountered on trails
- Number and size of vehicles in parking areas
- Degree of solitude experienced by visitors
- Number of repeat visitors
- Tourist ratings of guides
- Ratings of food and accommodations

Socio-cultural

- Quality of historical, cultural sites
- Knowledge of traditional uses of flora and fauna and rituals
- Changes in land use near protected areas
- Quality and quantity of consumption
- Changes in dress and language
- Use of free time
- Community attitudes about tourists and tourism

Economic

- Income levels of
- Residents working directly in ecotourism
- Residents providing ecotourism services indirectly
- Residents not involved with ecotourism
- Amount of protected area budget spent on ecotourism-related management
- Revenue generated by ecotourism for protected area
- Amount of money spent on community improvements
- Changes in costs of local goods and services
- Rate of new construction in the area
- Population changes
- Number and volume of new businesses

Infrastructure (or managerial)

- Number and length of trails
- Amount of infrastructure development within protected area
- Amount of time spent in maintenance of infrastructure
- Lodging capacity in and around the protected area
- Degree of road maintenance required
- Methods of communication and transport

APPENDIX 2

Potential Indicators of Sustainable Tourism on Kangaroo Island

from: Manidis Roberts, 1997

ECONOMIC INDICATORS
Annual total profit of tourism operators on the island.
Total tourism expenditure on Kangaroo Island.
Change in the number of visits levels.
Level of direct tourism employment.
Per capita visitor yield from tourism.
Annual investment in tourism development.
Number of products and services consumed by tourists which are supplied by businesses operating on the island.
Number of tourism development proposals approved in past two years.
Change in tourism target market.
Number of tourism operators.
Number of operators who have Quality Assurance.
Participation rate of cooperative marketing campaigns.
Level of investment in tourism infrastructure and services.
Number of operators with international accreditation.
Number of new products developed by local suppliers in response to tourist demand.
Proportion of skilled versus non-skilled direct tourism related employment.
Change in rate revenue from tourism businesses.
Profitability of tourism businesses.
Proportion of overnight to day visitors.
Level of use of Kangaroo Island logo.
Change in costs of products and services on island.
Level of investment in public services and facilities.
Degree to which Kangaroo Island businesses abide to their code of business ethics.
Number of operators that have accreditation.
ENVIRONMENTAL INDICATORS
Number of rare and endangered species or habitats at sites impacted by tourists.
Population of wildlife colonies.
Change in conservation measure for water.
Change in tourism industry methods of wasted disposal.
Change in volume of waste per capita.
Change in water quality.
Change in visitors' perceptions of crowding on the island.
Net coverage of natural vegetation on Kangaroo Island.
Change in biodiversity.

The number of visitors to the island's reserves and national parks within areas designated service zones/core areas.
The number of visitors to the island's reserves and national parks outside of areas designated service centre/core areas.
Proportion of native roadside vegetation remaining.
Proportion of roadside vegetation without disease.
Number of threatened plant communities.
Number of threatened animal communities.
Breeding rate of a particular species.
Number of hectares of vegetation removed for tourist related infrastructure.
Number of animal roadkills.
Number of animal roadkills on tourism roads.
Proportion of trackside disturbance.
Change in resources being expended on environmental regeneration.
Change in water usage by tourism developments.
Membership level of environmental groups by tourism operators.
Degree of erosion.
EXPERIENTIAL INDICATORS
Proportion of visitors who perceive that they are in a wild environment.
Number of businesses which abide by the code of ethics.
Perceived quality of interpretation. Perception of range of interpretation.
Proportion of tourist time spent on being a nature based tourist.
Degree to which marketing driven expectations are met.
Proportion of natural vista occupied by tourism related infrastructure.
Satisfaction level of visitors departing Kangaroo Island.
Proportion of visitors who leave Kangaroo Island having had a significant learning experience.
Number of visitors returning to Kangaroo Island.
Proportion of visitors who experienced a feeling of remoteness and/or space on Kangaroo Island.
Proportion of visitors who experienced a feeling of cleanliness and/or health on Kangaroo Island.
Proportion of visitors who had a wildlife/nature/cultural experience.
Change to the integrity of the cultural site.
Change in the amount of litter.
Change in the number of tourists.
Change in the number of developments.
Change in the level of crime.
Change to the existing land clearance and conservation laws.
Change in the number of visits.
Proportion of time spent observing wildlife.
Perceived change in quality of service.

Change in the number of dirt roads.
Degree to which expectations to visit certain places are met.
Degree to which photographic expectations are met.
Number of contacts with other visitors at natural sites.
Change to visitor's perception of crowding.
Proportion of visitors who perceive their experience on Kangaroo Island could only have been experienced on Kangaroo Island.
Proportion of visitors who consider that new infrastructure improves the quality of the tourist experience.
Change in the number of opportunities to experience interpretation at sites.
Change in degree of ease in booking into tourist services.
SOCIO-CULTURAL INDICATORS
Proportion of tourists versus locals at major events.
Change in population level.
Change in population demographics.
Range of public services available.
Difference in the number of visits across months.
Proportion of residents to tourists at recognised local recreation sites.
Proportion of residents to tourists at recognised local tourist sites.
Reports of degenerative behaviour by tourists.
Reports of degenerative behaviour by residents towards tourists.
Change in perception of ease of parking in main street.
Number of traffic accidents involving tourists.
Proportion of members of local tourism association who are not operators.
Level of involvement in tourism related consultations.
Membership level of voluntary community service groups by tourism operators.
Change in crime rate.
The number of councillors who derive their primary income from tourism.
The number of approvals to modify cultural sites for tourism activity.
Number of cultural heritage listings.
Membership level of local historical society.
Number of reports of damage to cultural sites.
Number of tours visiting recognised cultural sites.
Level of funding contributions from tourism operations accessing cultural sites.
Proportion of tourism employees employed with cultural training.
Number of community initiatives to present culture.
Number of residents attending a cultural special event developed by tourism industry and residents.
Number of tourists attending a cultural special event developed by tourism industry and residents.
Number of incidents of Aboriginal involvement in cultural interpretation.
Change in community perception of interactions with tourists.
Number of tourists visiting significant local historic sites.

APPENDIX 3

Report on Monitoring in Indonesia

Subj: Re: Ecotourism impacts monitoring methodologies
Date: 2/17/99 4:29:27 AM Eastern Standard Time
From: bcordes@cbn.net.id (bernd cordes)
To: Abirome@aol.com

Hi Abi:

I'll try to respond succinctly without leaving too much out. BCN supports two projects in Indonesia that have ecotourism as its core enterprise. I will answer your questions for both. Their two stories are in total contrast to each other.

(1) Gunung Halimun National Park-- terrestrial; implemented by the Gunung Halimun Consortium

What: At GHNP, the plan was to monitor (a) river water quality along paths where trekkers and campers would be; (b) key indicator species, such as endemic primates and bird species, along set transects and paths in the forest whether or not increases in tourist numbers resulted in wildlife receding further into the forest and reducing their normal "range"; (c) rattan extraction (handicrafts are made for visitors); and (d) trash along commonly used paths. Some of this monitoring was done in all categories, but only the rattan really had an analysis component. In many ways, the monitoring program wasn't monitoring at all. It was more like traditional research, which is very unfortunate. The people doing the data collection couldn't get out of the mind set that the data should be useful for project design, implementation and community knowledge and environmental education.

Who: The GHNP Consortium members themselves and other University of Indonesia researchers did the monitoring. There was almost no community involvement, in spite of efforts by BCN to get them involved. GHNP Consortium members were, generally, of the opinion that locals couldn't add value because they are not smart enough and it would take too long to train them in basic methods.

Design: The original monitoring plan was not designed using a Measures-type approach. Over time, BCN staff tried to work with the project staff to make it more in line with Measures (i.e., get it away from research and toward monitoring and adaptive management), but the process was slow and frustrating—more so than on almost any other project we support here in Indonesia.

Community involvement: The community was, as mentioned not involved at all in design or, for the most part, monitoring/data collection.

Success?: By the end of BCN's support for the project (it ended in November 1998), some useful data was finally coming in. So, it was successful in that they now have data that can be used for further strategic design, as

baseline information, for marketing the enterprise (e.g., bird species lists), etc. Unfortunately, the Consortium as a management entity imploded and the project is very much on the rocks because of their internal problems. The information has, as far as I know, not been translated into "management actions" to date, and there is little chance that the data gathered will actually be used to make future decisions or to work with community members because of this project management breakdown.

Threat coverage: No, not all of the threats to the Park were being covered by their monitoring. One of the major threats is local agricultural expansion. This is not an explicit target for their monitoring. The same is true of local, small-scale gold mining and timber harvesting. BCN tried to work with the project staff to get these threats recognized, but it didn't work. They are VERY resistant to changing their methods.

Socio-economic: Some socio-economic monitoring was done, but it is extremely poor. It wasn't until the end of 1998 that some useful information came in, and that's because BCN insisted that on-site staff members be included in the data gathering (they had been excluded by outside consultants brought into the project who didn't have a clue). Until early 1998, the BCN was largely unsuccessful in getting the socioeconomic monitoring on this project to include Measures-type processes. In short, much of the so-called socio-economic monitoring, until the end, was totally useless.

TRA: We did do a TRA with part of the project staff. It worked in the sense that they realized the project was not really designed to address some of the major threats to the area/Park. Unfortunately, these staff members were neither involved in the project's original design, nor in the monitoring itself. This is difficult to explain, but, in essence, the most important individuals in terms of project implementation on site were kept from assisting with monitoring and management decisions. The TRA results were not used to take action-- at least, not yet.

(2) Biak and Padaido Islands; marine-based; implemented by Yayasan's Rumsram and Hualopu

What: Their plan monitors (a) numbers, size and types of fish caught at designated monitoring sites (both reefs and Fish Aggregating Devices); (b) live coral cover along designated transects; (c) trash along transects on one of the main islands where tourists go; and (d) general reef health through key indicator species (butterfly fish) and photo quadrats.

Who: The monitoring is led primarily by two staff members from Hualopu-- one is a Canadian marine scientist. They lead and guide the monitoring and analysis, but the actual implementation is done by village members. In other words, community members do the fish counts, assist with the underwater transects and quadrats and get down there themselves, and do the butterfly fish species counts.

Design: The original design did not include Measures-type processes (Measures didn't exist yet-- we were in the process of developing the method). But,

BCN staff worked with the project staff early on by going through a Measures-type design and implementation schedule that would include community training and involvement. It worked. They, of course, made modifications over time, but that was completely in line with the Measures approach.

Community involvement: As mentioned, they are involved. This project is one of the few in all of Indonesia that can honestly say community members are doing monitoring. It's not rhetoric.

Success?: The monitoring has been successful. The project staff and community members have gathered data that is extremely useful at several different levels. It has already been used by the community members and staff to make decisions on project re-design, future strategies for addressing threats, etc. The data is working for conservation at this site. They have used it to declare local bans on the use of small-mesh gill nets, bombs, cyanide and crowbars (for shell-fishing on the reefs). These are all destructive-fishing-related threats and not tourist-related, I realize. But that's because the project has a strong emphasis on trying to make the local fisheries industry more sustainable, and because the number of tourists to the area has been so small that they are not worried for the near future about exceeding carrying capacity.

Threat coverage: The current monitoring plan does have as specific targets the main threats to the reefs in the area-- small-mesh gill nets, cyanide, bombing, local over-fishing, anchor damage (from tourist boats) etc. The one main threat that is not covered is large commercial fishing, but this is tough to do. I'm also a little concerned because they do not have in their current monitoring plans efforts to look at whether or not tourist visits to the islands are resulting in loss of certain trees used for fuel-wood/cooking. But again, the project staff intend to include this in their future strategy.

Socio-economic: These impacts are being monitored, but not nearly as well as the biological impacts. This is in part due to fewer skills and resources in this type of monitoring. The project staff know the communities very well-- so well that it is probably one reason they felt they didn't need to focus on socioeconomic monitoring as much. At any rate, they have good baseline data and a plan to improve this monitoring, but it hasn't happened yet.

TRA: It has been done with project staff at a couple of different levels, and it works. The Project Coordinator is particularly interested in the methodology and wants to use it with the community for future strategic design.

Hualopu and Rumsram say they will be doing a marine monitoring manual, but I'm not sure what their time-line is.

There is so much more to these stories, of course. BCN is in the process of getting all of this out. In the meantime, I hope this helps, Abi.

Regards,

Bernd Cordes

APPENDIX 4

Report on Monitoring in Nepal and India

Subj: Re: Questions on ecotourism monitoring -Reply
Date: 3/1/99 1:05:42 AM Eastern Standard Time
From: gbala@mozcom.com (Ganesan Balachander)
To: Abirome@aol.com
CC: John.Parks@WWFUS.ORG

Abirome,

My responses in **bold** embedded in the text, following your questions:

From: Abirome@aol.com
Date: Thu, 11 Feb 1999 11:32:41 EST
To: gbala@mozcom.com
Subject: Questions on ecotourism monitoring

Dear Bala,

Hello, I don't know if you remember me, but I worked for a short time With BSP. I was in the DC office a year ago, working with Richard Margoluis And the Latin American Program. I am now working as an independent Consultant and have a contract with The Nature Conservancy to do a literature review of ecotourism impacts monitoring methodologies. I am reviewing some of the standard ones (carrying capacity, LAC, VIM, etc.) and others, including Measures of Success, and am trying to identify and/or modify one which can be successfully applied in Latin America (under conditions which are different than in the US, where many of the standard methodologies have been used) and which also measure community-related impacts (which, again, most of the standard methodologies do not). Yesterday I met with John Parks and Cheryl Hochman to discuss some of the monitoring programs which are being Implemented in BCN projects. They told me about the work being done in Makira and Paidado, and suggested that I contact you for info on some of the other sites (e.g. Sikkim).

My questions are: what sorts of monitoring are being conducted at other BCN sites which have ecotourism?

I will classify the types of monitoring into one of three classes:

- 1) Scientific (predominant use of scientists and trained personnel from outside the area)**
- 2) Participatory resource monitoring (greater involvement of community members [in comparison to 1] in specific resource assessments - stock, incremental growth, extraction rates or levels etc.)**
- 3) Community monitoring**

Some projects have started off with 1) or 2) and progressed to 3) in the final phase of the project.

Who is doing it? Was the monitoring program developed as outlined in Measures of Success?

Yes and no. In the early phase of the program (in 1995), BCN merely suggested guidelines for monitoring (the kinds of questions to address) which then evolved into site specific monitoring, and with greater involvement of community members. The monitoring

protocols were also simplified, taking into consideration cost, time available and capacity at sites.

With the community? Who is actually conducting the various monitoring activities? How is it working out?

Egs. of Ecotourism projects (other than Padaido and Makira)

Chitwan, Nepal: Scientific (little involvement of community)

Sikkim: Scientific (little involvement of community) Lately, a local NGO is beginning to participate in some aspects of the monitoring. Most of the data gathering is being done by students for their doctoral degrees.

There is very good info. being collected.

Are the findings translated into management actions? Do you feel that all the major impacts are being covered?

To some extent, yes. But the time frames are too short for data collection, assessment, mgmt. plans and action. But there is movement. The trends are hopeful.

Are cultural and socio-economic impacts to the communities being assessed?

There have been s-e surveys to gauge the extent of dependence etc. A case study on the role of stake holders in conservation across all projects (4 detailed and the rest, a rapid assessment) has been done.

How does the Threats Reduction Assessment methodology and implementation fit into this?

In my opinion, TRAs are useful to get the communities thinking about these issues, and to complement what is being collected by the biologically based methods (but is not a substitute). Also threats are not static, and the role of the institutions and leadership become key to the mgmt. of conflict and reduction of threats.

I realize that these are a lot of questions and that it may actually be too early to provide good answers to some of them. Given that, I'd appreciate your best responses. Also, Jon mentioned that you are writing a paper on ecotourism impacts? How far along is it? Do you think I could see a copy of your draft? It might be very helpful to me, given the experience that you have.

Thanks very much for your assistance.

Abi Rome

Will be interested in seeing your framework and the report when completed. Will send you a copy of the Ecotourism impacts when completed (prob. a month's time).

Cheers,

Bala

APPENDIX 5

Additional Responses about Ecotourism Impacts Monitoring Initiatives

Noel Kempff Mercado National Park, Bolivia

Subj: Re: Para Tim - Ecotourism Impacts Monitoring
Date: 3/10/99 5:43:44 PM Eastern Standard Time
From: tmiller@fan.scbbs-bo.com
To: Abirome@aol.com

Abi,

Following up on my last message to you, I would like to take a few minutes of my time to answer the questions you posed to me - I think it is something important and would like to give you all of the support that I can. So anyway, here goes:

(1) What sorts of monitoring is being conducted at the site(s) you work?

The ecotourism program of Noel Kempff Mercado National Park currently carries out biological monitoring with the aid of parkguards and the coordination of the Departamento de Ciencias de la Fundacion Amigos de la Naturaleza (FAN). As FAN has a management agreement with the Government of Bolivia, they are the group responsible for conducting this activity.

(2) Who is doing it?

As I mentioned, FAN and the parkguards that work in Noel Kempff are responsible for the monitoring work. The focus is mainly on charismatic megafauna and endangered species. As a sidenote, I would like to add that the naturalist guide of every group that visits Noel Kempff is responsible for filling out a trip report which includes animal (and important bird) sightings, place, time, date, habitat, trail, etc... That information has proven to be very useful in determining migration patterns, differences between wet and dry seasons (thus increasing the possibilities of wildlife viewing by our visitors), and many other indirect benefits.

(3) Are cultural and socio-economic impacts to the communities being assessed?

There are no local communities that live in the park and we do not offer trips to "remote indian villages" - therefore the direct impacts on local communities are pretty much non-existent. However, we are very interested (and actively working on) an ecotourism project that will be based on local participation in a community found on the border of Noel Kempff. What would be interesting is to look at a feasibility study to get a better idea of what things we should monitor as that project is implemented. Have any ideas???

(4) What kind of methodology (or methodologies) are you using?

We use a standard form that allows easy identification and indication of the various sightings. The form was developed with the assistance of various scientists that have

worked in the park and is collected and processed by the Departamento de Ciencias de FAN. They enter all of the data into a computer and then are responsible for its analysis.

(5) How long has the monitoring system been in place?

The system has been in place for about three years. It is also important to note that as this work is not directly funded and does not create any source of income for the park or the Sciences Dept. - it is not a very high priority. With regards to the trip reports by tour guides - the idea was implemented 1 year ago and unfortunately is not as indicative or useful as it could be due to the lack of a constant flow of visitors to the park.

(6) What kinds of results do you find?

I think I have answered this question already.

(7) Are the findings being used to guide management?

I think I have answered this question already. Due to the immense size of Noel Kempff and the lack of people living in it or around it... there is really no immediate threat on the long term survival of the diverse populations of plants and animals found in the park. The monitoring, however, focuses on areas that park guards travel to - areas with a high risk - and I would have to admit that the monitoring has helped the protection more effectively plan their work. For example, they have a better idea of when river turtles are nesting, when they hatch, when they are in most demand by locals, when fish are migrating, etc... and can use this knowledge to more effectively plan their work. As I mentioned - tourism numbers are VERY low and there has not been a need up until this point to implement an intense monitoring program. Furthermore, I think that the one that we are currently using (with a few modifications) would prove to be sufficient once numbers increase - so I feel prepared to meet the challenges that would be associated with an increase in numbers.

(8) Do you feel that all the impacts are being covered?

Yes

(9) What are some of the challenges/problems?

Unfortunately, we are actually LOOKING for more visitors whom may create more impacts and problems. That is probably not the answer that you wanted to hear - an ecotourism program wanting to create more impacts. Actually that is not what we want to do and due to our interest in conservation - those impacts would never become a reality. Furthermore, due to the size of the park and the relatively small amount of areas that tourists are allowed to visit - I really don't think that we will ever become an unsustainable operation threatening the natural resources that we depend upon for our success. Another important challenge, problem, limitation that you are bound to find will be the lack of funding available for this kind of activity. Lack of funding is the limitation to all good ideas I have found and will probably turn out to be the biggest challenge in monitoring efforts. An interesting sub-question may be to ask how people have tried to overcome these challenges!

(10) What sorts of recommendations would you have for your site and/or others?

Never give up in your effort to meet your goals!

OK, that is all I have to say for now. Please feel free to contact me at any time with any further questions or comments that you may have.

Sincerely, Tim Miller

New South Wales, Australia

Subj: ecotourism impacts

Date: 2/2/99 3:42:07 AM Eastern Standard Time

From: info@npws.nsw.gov.au (Information Centre - HO)

To: abirome@aol.com ('abirome')

The nature tourism strategy is not on the website. It is currently being substantially rewritten and the new strategy (when adopted by the Minister) will probably be on the website.

The New South Wales (NSW) National Park and Wildlife System does not undertake any systematic monitoring of ecotourism impacts. Small studies are done at specific sites, such as of walking trails in the Blue Mountains, and this is available as a saleable item. The only large monitoring program in NSW currently underway is at Jenolan Caves, where they are almost 3 years into a program monitoring everything from water quality, air quality and carbon dioxide levels to invertebrates and lint deposited by visitors. This is using a modified "VIM" methodology. Again the details are not available on the web but a publication on the project can be purchased from the Jenolan Caves Reserve Trust, which does have its own web site.

Anya Wort

The Planning Process “Limits of Acceptable Change”

From: Stankey, G.H., Cole, D.N., Lucas, R.C., Petersen, M.E. and Frissell, S.S., 1985. The Limits of Acceptable Change (LAC) System for Wilderness Planning. Forest Service, U.S. Department of Agriculture, Ogden, UT.



(4 corners outside of circle starting in upper left and going clockwise)

Analyzing the relationship between real and desired conditions
Identifying the actions necessary to achieve the desired conditions
Monitoring and evaluation
Establishing the desired future conditions

(center of circle)

The LAC Planning System

(in orange circle, starting with step 1 [paso 1] in lower left and continuing clockwise)

Step 1: Identifying uncertainties and opportunities
Step 2: Defining and describing types of opportunities (or zones)
Step 3: Selecting biophysical and social indicators
Step 4: Making an inventory of biophysical and social conditions
Step 5: Specifying standards for the indicators
Step 6: Identifying alternatives for the assigning of classes of opportunities
Step 7: Identifying management actions for each alternative
Step 8: Evaluating and selecting the preferred alternative(s)
Step 9: Implementation and monitoring

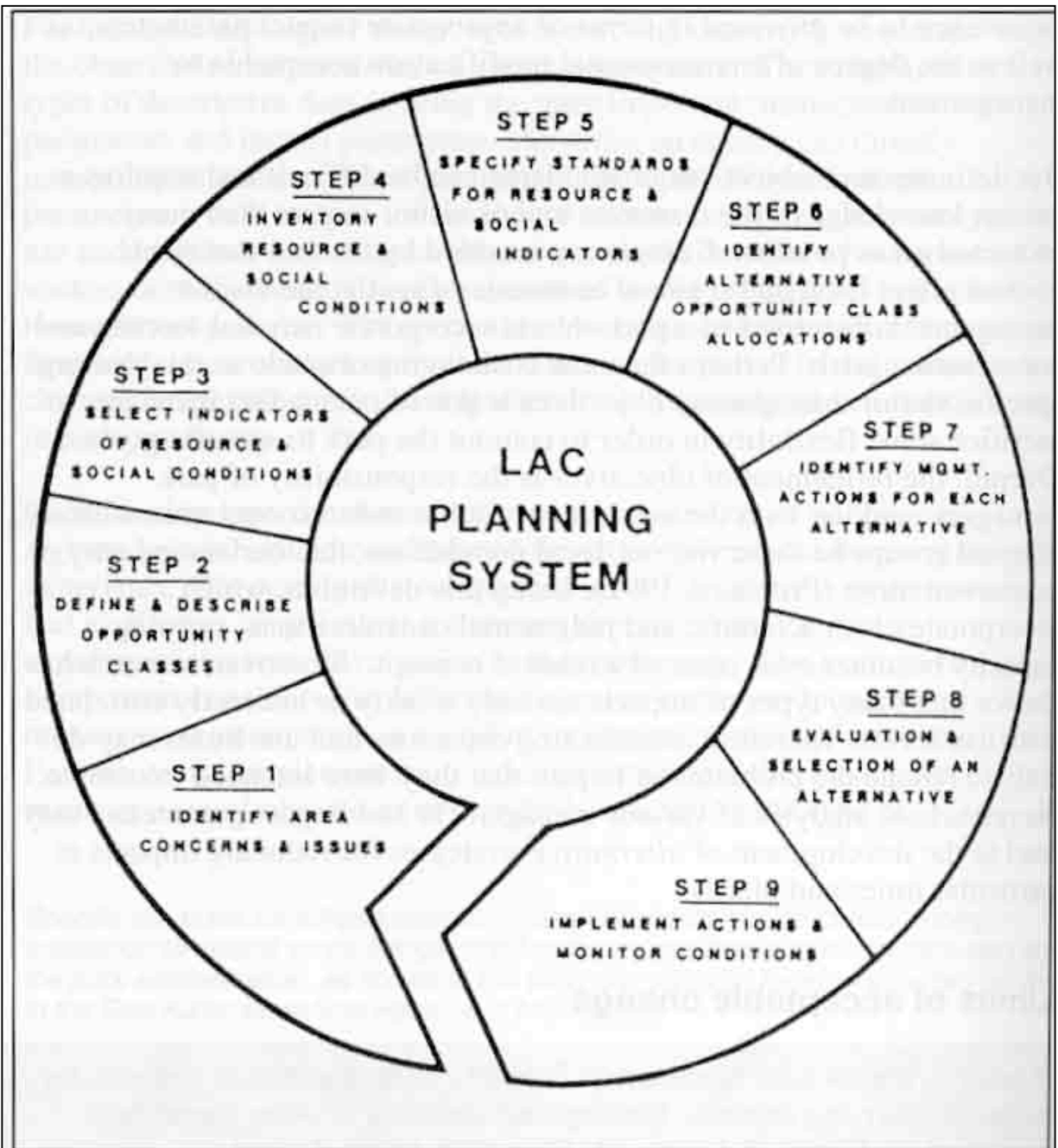


Fig. 8: The LAC Planning System. *Source: Stankey et al., 1985*

Notes for Discussing Visitor Management

Note 1

National Park: There are two seasons each year with a lot of visitors and low numbers the rest of the year. There is one very popular trail that runs through the area. During the high use times there are many backpackers (mostly foreigners) on the trail. Two or three places along the trail there are informal camp sites that have been considerably widened with a lot of damage to the vegetation. Sometimes there appear to be little settlements of up to 50 people camped together. The path is in good condition.

Note 2

Archeological Site: There is a parking lot inside the protected area. Visitors park and get to the site by a 2.5 km long trail. Along the trail there is a lot of human debris. There is evidence of vandalism (grafitti) at the archeological site. There are visitor complaints about the sense of crowdedness.

Note 3

National Park: There is a species of charismatic animal that is a visitor attraction during mating season. Many visitors get very close to the animals to take pictures, and there is evidence that the animals' behavior has changed and that the reproductive success rate has gone down. Since this activity occurs during the rainy season, there is also a lot of trail erosion.

