Visitor Impact Monitoring and Management

(from Ecotourism Development: A Manual for Conservation Planners and Managers, Volume 2; 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.
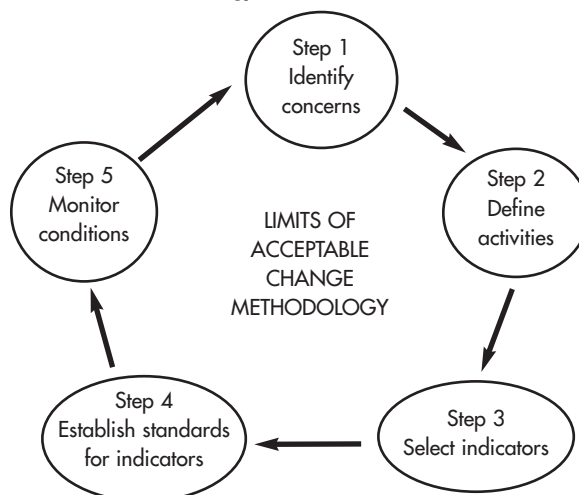
The first methods developed to address tourism impacts evolved from the concept of carrying capacity, which originated in the field of range management. Several definitions of carrying capacity have been offered depending on how and where the concept was applied (Ceballos-Lascuráin, 1996). Initially, 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

Step 1 Identify concerns

Step 2 Define activities

Step 3 Select indicators

Step 4 Establish standards for indicators

Step 5 Monitor conditions

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

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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.

> **Box 6.3 Monitoring the Great Currasow in El Imposible National Park**
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> 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 insects, bird songs and plants that may be the object of

Table 6.1 Visitor Management Methods

Indirect Methods	Direct Methods
• Environmental education/interpretation	• Fees and costs
• Information/diffusion	• Restrictions
• Site manipulation	• Patrolling/human presence
• Zoning	• Requirements to participate in certain skilled activities
• Infrastructure and facility design	• Permits and licenses
• Type and degree of maintenance	• Designated sites (camping, picnics, etc.)
• Ease or difficulty of access	• Trained guides
	• Rules and regulations

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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