SIMAVIS
System of Managing Visitors of the Galapagos National Park

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Galapagos tourism was conceived as nature-based tourism that is selective, educational, and designed for individuals whose primary interest was to enjoy the wildlife of the islands (Reck et al., 2008). This focus was reiterated in the Special Law for Galapagos (LOREG), the Galapagos Regional Plan, and the Special Regulation for Tourism in Protected Natural Areas (RETANP). Everyone recognized the economic and social importance of tourism development and the need to minimize negative impacts and threats to the fragile insular biodiversity. The current Management Plan of the Galapagos National Park (PNG, 2005) reflects this same view.

The tourism management practices used in Galapagos have included the designation of specific visitor sites, the use of trails, tour boat itineraries, naturalist guides, and a permit and concession system. These practices have contributed to keeping ecological impacts in the visitor sites within acceptable and/or manageable levels. From the beginning, visitor management and interpretation have focused on providing travelers with the opportunity to experience nature close up. Interpretation techniques have sought to foster appreciation and understanding of Galapagos wildlife and landscapes.

Currently, an array of tourism management tools, such as Carrying Capacity (Cayot et al., 1996), tourism monitoring (PNG, 2000), and the Network of Visitor Sites for Ecotourism (PNG, 2005), are being adapted and integrated based on current needs and realities.
The result of this process is the System of Managing Visitors (SIMAVIS) (Reck et al., 2008).

**SIMAVIS**

SIMAVIS is an adaptive management tool that integrates and addresses five key elements: zoning, acceptable visitor load, itineraries, tourism monitoring, and visitor site management strategies (Figure 1). It draws on various methodologies and management tools that have been adapted to Galapagos realities, including Visitor Experience and Resource Protection (VERP; United States National Park Service, 1993), which was derived from the concept of Limits of Acceptable Change (LAC; Stankey et al., 1985), and zoning principles based on visitor activities and expectations, originally proposed in the Recreational Opportunity Spectrum (ROS; Clark and Stankey, 1979).

**Figure 1.** Principal components of SIMAVIS: Public Use Zoning (PUZ), Acceptable Visitor Load (AVL) measured as the number of Groups at any One Time (GAOT), regulation of itineraries, tourism monitoring, and management strategies to respond to negative impacts detected that result from tourism activities.

SIMAVIS establishes guidelines to optimize the management of visitor sites and the natural and social resources that attract visitors to Galapagos (Figure 2). SIMAVIS should not be seen as a tool that will solve the complex problems of tourism in the archipelago. Rather, it is a methodology designed to systematize and implement technical planning and management tools related to the public use areas of the park.

**Figure 2.** Results of the survey on GNP visitor satisfaction, “Motive for your visit to Galapagos,” carried out in the following visitor sites: Punta Suárez, Punta Espinoza, Bartolomé, North Seymour, Punta Cormorant, El Barranco, Sombrero Chino and Cerro Dragón (GNP data).
Zoning: Public Use Zones within the Network of Ecotourism Visitor Sites of the GNP

The 2005 Management Plan of the GNP redefined categories within the visitor site zoning system, based on a study of biophysical, social, and management considerations in each terrestrial visitor site. This resulted in the designation of six Public Use Zones (PUZ) encompassing 70 GNP visitor sites (Table 1).

Table 1. Comparison between the visitor site zoning in the Management Plan of 2005 and the proposed zoning according to SIMAVIS.

<table>
<thead>
<tr>
<th>Public Use Categories in the Management Plan of 2005</th>
<th>Zoning SIMAVIS</th>
<th>Examples of Visitor Sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restricted</td>
<td>Restricted</td>
<td>Alcedo, Punta Tortuga Negra, Daphne Major</td>
</tr>
<tr>
<td>Intensive</td>
<td>Intensive - Natural</td>
<td>Punta Suárez, Gardner Bay, Punta Espinoza, Punta Moreno, Playa Espumilla, etc.</td>
</tr>
<tr>
<td>Did not exist</td>
<td>Intensive – Managed</td>
<td>Cerro Dragón, Bartolomé, North Seymour, Punta Pitt, Punta Cormorant, etc.</td>
</tr>
<tr>
<td></td>
<td>Intensive – NearTown</td>
<td>Asilo de la Paz, Media Luna, Gemelos, El Junco, Sierra Negra, Tintoreras, etc.</td>
</tr>
<tr>
<td>Recreational</td>
<td>Recreational</td>
<td>Tortuga Bay, Garrapatero, Las Grietas, Carola, Lobería, Concha de Perla, etc.</td>
</tr>
<tr>
<td>Did not exist</td>
<td>Cultural - Educational</td>
<td>Interpretation Center and Breeding and Rearing Centers</td>
</tr>
</tbody>
</table>

The new visitor site zoning system adapts the management approach defined in the GNP Management Plan (PNG, 2005) to the current reality of each visitor site, based on biophysical elements (natural state, uniqueness, fragility), social elements (number of visitors, frequency of visits), and management elements (current, necessary, and acceptable levels of direct management intervention and/or infrastructure).

The Restricted Zone, the area of greatest protection, includes those visitor sites whose biophysical elements are more intact, unique, fragile, and/or vulnerable. They are areas for specialized research, interpretation, and observation; visitors are required to justify their visit and must obtain authorization prior to visiting the site. Management guidelines restrict the number of groups and the number of individuals per group, and require visitors to pass through a quarantine process to avoid the introduction of species. In terms of management in situ, physical interventions are limited to the minimum needed to ensure the safety of visitors. This category includes Alcedo (Figure 3), Punta Tortuga Negra, and Daphne.

Figure 3. Volcán Alcedo, Isabela is designated as a Restricted visitor site due to its fragility. This site is undergoing recovery following the elimination of introduced species that caused major degradation of the environment. Photo: GNP, 2008.
**Intensive - Natural** visitor sites have highly attractive biophysical characteristics. They are not as fragile as Restricted sites and are generally not vulnerable to guided tourism activities (Figure 4). The social aspects of visits should be geared to nature tourism, creating a sense of isolation and solitude for visitors. Management interventions should seek only to ensure the safety of visitors and the delineation of trails with boundary markers.

Visitor sites in the **Intensive - Managed Zone** usually provide the same level of attraction and importance in terms of biophysical elements as those in the Intensive - Natural zone. The difference is that in these areas the current or potential accumulated impact of visitors (usually erosion) justifies more direct management interventions, such as wooden retention barriers, the relocation of rocks, construction of scenic viewing areas, handrails, etc. (Figure 5). The management of impacts allows for a broader profile of potential visitors, and decreases the need for specialized visits. Infrastructure for safety and orientation is acceptable.

Visitor sites in the **Intensive - Near Town Zone** are easily accessible to the local population and have natural and/or historical-cultural resources of significant interest (Figure 6). These sites and their biophysical resources can have a moderate to high level...
of alteration from tourism and local traditional use. The social expectations associated with the visit are generally lower, allowing for greater numbers and interaction of visitors, without losing the necessary conditions for observation, contemplation, and interpretation. A wider range of management interventions are allowed at these sites, including infrastructure to increase access and safety for a broader range of visitors (steps, hardened trail surfaces, gates, scenic viewing areas, etc.) and to protect and recover degraded resources.

**Recreational** visitor sites have the same level of accessibility as Intensive - Near Town sites and offer interesting opportunities for interpretation (Figure 7). However, these sites have conditions that are appropriate for the development of more varied recreational activities, provided they do not jeopardize the sites’ biophysical resources. Given the different types of activities permitted, larger numbers of visitors are possible and more infrastructure is acceptable, as long as it makes use of local and/or environmentally friendly resources and blends in with the surrounding area.

Finally, the **Cultural - Educational Zone** includes visitor sites that are artificial or semi-natural, whose main function is to provide environmental education.
for tourists and the local population (Figure 8). Accessibility, the absence of fragile resources, and the physical capacity of these sites make them appropriate for larger groups of tourists.

The definition of these six Public Use Zones provides a framework for the management of each visitor site and a starting point for using SIMAVIS to determine other necessary measures and actions.

**Acceptable Visitor Load (AVL)**

Beginning in 1996, Carrying Capacity (CC) was the method used to define the maximum number of visitors above which a visitor site's ecosystem would begin to degrade (Cayot et al, 1996). CC is estimated using a formula that has been proven to be unsuccessful at correctly estimating the optimum number of visitors for each visitor site:

1. CC of some visitor sites was overestimated (e.g., Sombrero Chino or Playa de las Bachas), while CC of others was underestimated (e.g., Puerto Grande or Punta Carola).

2. CC calculations did not consider acceptable social conditions during visits. Some sites that were not considered overused according to their calculated CC are subject to complaints from tourists regarding the excessive number of visitors (e.g., Sombrero Chino).

3. CC determines the maximum number of groups per day at each visitor site, without considering an optimum distribution of those groups throughout the day.

4. Degradation at sites cannot always be directly attributed to overuse. Some sites do suffer resource degradation that is not caused by excessive numbers of visitors (e.g., Punta Cormorant or Caleta Tagus).

SIMAVIS defines the Acceptable Visitor Load (AVL) at each visitor site, replacing the concept of CC. This management tool was introduced by Reck et al. (2008) and is being used by the GNP to determine itineraries beginning in 2010.

The parameter used to determine the AVL in each visitor site is Groups at Any One Time (GAOT). National parks in the United States use a similar parameter, known as PAOT (People at Any One Time). This new approach assumes that the quality of the visit and the environmental conditions at each visitor site do not depend on the total number of visitors in one day or the next, but rather on the number of people at the site at any one moment.

To estimate the AVL, a series of social and management factors are considered, including previously unanalyzed variables such as the quality of visit and the organization/management planning related to visits (Table 2).

When applying this concept, it is assumed that the goal is to achieve the fewest possible visitors in a site at any one time, in order to foster greater satisfaction among the visitors. Given the high levels of demand, this is not possible in many sites and park managers must look for the best options to reduce interference among groups.
### Tourism monitoring

Monitoring is an ongoing management tool aimed at detecting changes over the long term and making necessary decisions regarding actions needed to maintain and restore the desired conditions at each site.

SIMAVIS provides a systematic and ongoing monitoring protocol, using a group of quantifiable ecological, physical, social, and management-related indicators. It also establishes the desirable conditions and the limit for acceptable changes for each zone and site.

The new monitoring process was structured to integrate different management tools. Modifications have been made to the system for defining system elements, updating information, analyzing data, and making management and policy decisions.

Dynamic variables reflecting tourism-related changes occurring in each visitor site (impacts on the natural resources and the social quality of the visit) were used to define indicators (Table 3). Measurement units were established for each indicator, as was frequency of data collection, those responsible for data collection, and standards and limits of change associated with the zones and visitor sites.

Once problems are analyzed and causes of unacceptable situations are determined, all available management responses are discussed by the appropriate authorities. All possible alternatives for resolving a problem or conflict are considered, including the possibility of no intervention (acceptance of the impact).

### Management strategies

Monitoring is the foundation for adaptive and participatory management of visitor sites and optimizing capacity for corrective response. This includes the identification of causes of impacts, which is fundamental in determining response alternatives.

Management alternatives can include both direct methods that regulate and control tourism activity *in situ* and indirect methods that influence the behavior of visitors. The level of direct intervention depends upon the zone to which a specific visitor site has been assigned.

A proposal for management interventions designed to improve the quality of visits and minimize the impacts of visitors was developed based on the evaluation of the sites and a search for diversified tourism activities in and around the sites. Examples of interventions already implemented include the conversion of dead-end trails to circular trails to avoid encounters between groups and to create more opportunities for interpretive activities on new trails, hardening the surface of some trails to limit erosion, and the construction of infrastructure to facilitate access and/or increase visitor safety. These kinds of changes have been made at a number of sites including Tintoreras (Figure 10), Cerro Dragón, Punta Espinoza, and Los Gemelos.

### Itineraries

One of the most important uses of SIMAVIS is the optimization of visitor flows at visitor sites through the organization and coordination of itineraries. Currently, many tourist boats visit certain visitor sites at the same time, while other sites remain underutilized. The congestion of groups of tourists beyond the Acceptable Visitor Load at some sites reduces the quality of the visitor experience. An example of such overcrowding is found at Punta Suarez (Figure 11), one of the most emblematic visitor sites in Galapagos. All boats offering multi-day tours (691)

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1 As of 31 December 2009, 69 tourist boats offering multi-day tours were in operation.
visit this site, and as many as 10 groups can be present at the same time.

Various alternative proposals for adjusting the itinerary system to current realities of Galapagos tourism are being developed. These proposals integrate all of the available management tools. Some of the new measures will be implemented starting in 2010.

**Conclusions and recommendations**

The GNP is currently in the final phase of implementing SIMAVIS. The participation of experts in tourism management, naturalist guides, and tourism operators is important at this stage. Tourism demand is what is creating pressure on visitor sites, and tourism operators are in a unique position to help modify demand and to adjust it to what the GNP offers. The GNP and tourism operators are both interested in ensuring the quality of the visitor experience and preserving the park’s natural resources. Working together, they need to redefine tourism opportunities within the Network of Public Use Sites, and consider an array of adjustments such as changes in itineraries and visiting hours at tourist sites. Other alternatives include:

- Review and create micro-zones for ancillary tourism activities (snorkeling, panga rides, kayaking). Ancillary activities can help disperse groups at visitor sites. However, some activities (snorkeling and panga rides, for example) are incompatible if carried out in the same area and must be

**Table 3. Summary of indicators for tourism management in the visitor sites.**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Indicator</th>
<th>Persons Responsible</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erosion</td>
<td>% (Depth/width) or % (Trail width/length of the chain)</td>
<td>Field technicians, park rangers</td>
<td>6 months</td>
</tr>
<tr>
<td>Trail width</td>
<td>% (Increase/predefined width)</td>
<td>Field technicians, park rangers</td>
<td>6 months</td>
</tr>
<tr>
<td>Compaction: canals and cracks</td>
<td>Yes/No (Nº occurrences)</td>
<td>Field technicians, park rangers</td>
<td>6 months</td>
</tr>
<tr>
<td>Vegetative cover</td>
<td>Yes/No (Nº occurrences)</td>
<td>Field technicians, park rangers</td>
<td>6 months</td>
</tr>
<tr>
<td>Alternative trails</td>
<td>Yes/No (Nº occurrences, sp.)</td>
<td>Field technicians, park rangers, volunteers</td>
<td>6 months</td>
</tr>
<tr>
<td>Garbage</td>
<td>Yes/No (Nº occurrences)</td>
<td>Field technicians, park rangers, volunteers, guides</td>
<td>6 months weekly</td>
</tr>
<tr>
<td>Fires</td>
<td>Yes/No (Nº occurrences)</td>
<td>Field technicians, park rangers, volunteers</td>
<td>6 months weekly</td>
</tr>
<tr>
<td>Graffiti</td>
<td>Yes/No (Nº occurrences)</td>
<td>Field technicians, park rangers, volunteers</td>
<td>6 months weekly</td>
</tr>
<tr>
<td>Introduced species</td>
<td>Yes/No (Nº occurrences, sp.)</td>
<td>Field technicians, occasionally volunteers</td>
<td>6 months weekly</td>
</tr>
<tr>
<td>Diversity of biological attractions</td>
<td>N/C</td>
<td>Field technicians, occasionally volunteers, guides</td>
<td>6 months</td>
</tr>
<tr>
<td>Dynamics of the visit</td>
<td>Nº encounters</td>
<td>Guides, volunteers</td>
<td>Weekly</td>
</tr>
<tr>
<td>On-site behavior</td>
<td>Nº complaints</td>
<td>Guides, volunteers, field technicians</td>
<td>Weekly</td>
</tr>
<tr>
<td>Accidents</td>
<td>Nº complaints</td>
<td>Guides, volunteers, field technicians</td>
<td>Weekly</td>
</tr>
<tr>
<td>Visitor satisfaction</td>
<td>% satisfaction</td>
<td>Guides, park rangers, volunteers</td>
<td>-</td>
</tr>
<tr>
<td>State of the infrastructure</td>
<td>Qualitative, state of conservation</td>
<td>Field technicians, park rangers, volunteers, guides</td>
<td>6 months weekly</td>
</tr>
</tbody>
</table>
Micro-zoning will allow guides to engage their visitors in ancillary activities based on the visitor saturation of the site at any given time, and time their visit on land to achieve the greatest level of exclusivity.

- Identify alternatives to the most congested sites to distribute tourist groups among sites that offer the same or similar attractions.

- Shift to 14-day itineraries, with the goal of reducing pressure on the most critical sites by 50%. In order to implement 14-day itineraries, it will be necessary to first identify additional alternative visitor sites.

- Open new trails within current visitor sites to reduce congestion and bottlenecks; open new visitor sites in cases where there is no potential for new trails.
Through the application of GAOT, establish a more effective system of rotating and timing visits, especially in the towns.

- Require boats carrying the largest number of visitors to function according to the continental time zone (visiting sites one hour earlier than others). Some boats already function in this manner.

- Optimize the distribution of arrivals and departures of tourists, utilizing both major airports and adjacent visitor sites for the first and last days of cruises.

All of these elements should be considered and discussed among the relevant stakeholders in order to reach consensus and achieve the management objective of SIMAVIS, which is to organize tourism activity within the protected areas of the archipelago.

This process is supported by the Management Plan of the GNP where it mentions that “management of the protected areas of Galapagos should be governed by adaptive and precautionary principals, to achieve the objectives of protection and conservation, as well as ensure quality and safety.”