

Tour Operators' Contributions to Sustainable Tourism in Protected Areas

Tourism in protected areas: Friend or foe?

Tourism activities in and around protected areas can have both positive and negative impacts on local people and the environment.

Tourism can benefit a national park or other protected area by serving as a financing mechanism, with direct revenues from user fees and taxes used to protect biological resources and maintain natural areas. Intangible benefits can include increased awareness of and support for the purpose and role of protected areas, by both local communities and tourists. If tourism is important to the local or national economy, it may encourage authorities to manage and maintain protected areas more effectively, benefiting tourists, local communities and the environment.

The negative environmental impacts of tourism can include water and soil contamination from construction or improper disposal of solid waste and wastewater, air pollution from transportation, wildlife habitat destruction, and land degradation. Tourism can also lead to the exclusion of local people from certain areas, particularly in protected areas that were created to conserve wildlife. Although, in most cases, the protected area designation will have preceded the development of tourism, exclusion of local people from these areas usually occurs after tourism becomes established and profitable, and thus more economically important to governments or landowners than traditional activities.

Co-operation is success

Successfully addressing the challenges of tourism in protected areas requires strong co-operation among all parties, including those operating within and outside protected area boundaries, as well as those that can promote effective management of protected areas by ensuring that the appropriate planning and management tools are adopted. Although the goals of different stakeholders can be quite varied, tourism activities can only be sustainable if implemented with a common understanding and consensus-based approach to development.

Tour operators play a central role in the tourism industry. As intermediaries between tourists and tourism service suppliers, tour operators can influence the choices of consumers, the practices of

suppliers and the development patterns of destinations. This unique role means that tour operators can make an important contribution to furthering the goals of sustainable tourism development and protecting the environmental and cultural resources on which the tourism industry depends for its survival and growth.

The members of the Tour Operators' Initiative believe that tourism in protected areas should be:

- Developed and implemented with the consensus of, and in close co-operation with, relevant stakeholders;
- Supported by effective policies, guidelines, management strategies and technical tools; and
- Focused on conserving the environment while ensuring economically, socially and culturally sound development.

Tour operators' contributions to sustainable tourism development in protected areas

The members of the Tour Operators' Initiative also believe that tour operators can contribute to the sustainable development of tourism in protected areas in many different ways, such as:

- Including protected areas in their itineraries and giving customers information about the natural and cultural features of visited sites and their roles in the conservation of local ecosystems;
- Limiting the size of their groups, or dividing large groups into smaller ones when visiting protected areas;
- Informing protected area managers of visits ahead of time and discussing ways to reduce visitor impacts;
- Integrating sustainability principles into the selection criteria and service agreements of their suppliers, and choosing locally owned and operated suppliers;
- Making financial contributions to conservation and development projects;
- Providing customers with opportunities to proactively support protected areas; and
- Providing customers with guidelines on how to avoid negative impacts while visiting sensitive areas, for example by maintaining appropriate distances from wildlife, staying on trails to avoid trampling plants or causing erosion, and keeping water and energy use down to avoid related impacts on the environment.

Examples of good practice by TOI members

Discovery Initiatives (UK) offers Discoverer Holidays, which allow customers to get involved as field assistants in specific research projects. For example, a tour in Kalimantan, Indonesia, on the island of Borneo, allows travellers to work with the world's leading orang-utan study programme and contributes US\$1,000 per client to the Orang-utan Foundation in Tanjung Putung National Park.

Dynamic Tours (Morocco) has developed a Mountain and Desert Guide's Charter for its guides, as a means to build awareness on their roles as liaisons to travellers on:

- Environmental problems;
- Economic impacts of groups in a given area;
- Financial resources generated by tourism and their role in preserving local species and heritage;
- Local social and economic development; and
- Appropriate and sustainable environmental and social practices.

Exodus (UK) has a Responsible Tourism policy that includes:

- Hiring more local guides to provide better experiences and support to local communities;
- Purchasing local products and services, where appropriate, for all trips;
- Working with local operators to implement the policy; and
- Limiting group size based on local situations.

Hapag-Lloyd Kreuzfahrten (Germany) specialises in expedition and luxury river and ocean cruises, particularly in the Arctic, Antarctica, the South Pacific Islands and the Amazon basin. To minimise the environmental impacts of its tours and improve the experience of its customers, the company has developed a handbook for travellers to Antarctica, which provides:

- Guidelines and practical information for appropriate behaviour in Antarctica;
- Historical, geological and scientific facts to accompany lectures offered on cruises; and
- Supplementary reading on Antarctica, covering topics such as the region's history, the Antarctic Treaty, native plants and animals, and environmental issues in the region.

Hotelplan (Switzerland) established an Eco-Fund in January 2001. Funds are raised through a contribution of five Swiss Francs (about US\$3) per customer on any of Hotelplan's 'Holidays at the Seaside' packages, which represent 20-25 percent of sales. In 2002, the fund raised about US\$750,000. The money is used for internal and

external sustainable tourism projects, environmental efforts by partners at Hotelplan destinations, and emergency help in case of natural disasters or one-off projects.

Premier Tours (US), which specialises in safari tours to Southern and East Africa, selects tented camps and lodges in national parks and private game reserves that are committed to sustainable practices and apply a sensible approach to tourism, conservation and local community involvement. Premier Tours favours camps that:

- Employ full-time ecologists to ensure sustainable environmental practices in camps;
- Provide electricity through solar panels;
- Do not allow hunting, but support photographic safaris;
- Provide for direct or indirect benefits to local communities and/or conservation projects;
- Have garbage removed to appropriate places for safe disposal; and
- Have lined tanks for safe sewage processing.

TUI Nederland (the Netherlands) launched the Environmentally Aware Tourism project in Bonaire and Curaçao in 1999, to provide customers with information on responsible travel and sustainable products. Initial information is provided in the brochures of TUI Nederland's brands Arke and Holland International. Once a client has chosen a holiday to Bonaire or Curaçao:

- TUI Nederland provides tips for environmentally sound practices in the voucher booklet that includes their air tickets;
- KLM, a project partner, shows an on-board video about the sustainable excursions and activities that are part of the project;
- Upon arrival, trained TUI Nederland hostesses introduce guests to the sustainable excursions and activities that are available; and
- The TUI Nederland resource book, available in hotel lobbies, further directs guests to sustainable excursions, activities and attractions.

Viaggi del Ventaglio (Italy) decided in 1998 to grant US\$1 per bed/night to the Ministry of Tourism of the Dominican Republic, to help repair damage from Hurricane George. Contributions lasted for one year and generated about US\$150,000. Part of the funds were invested in the conservation and development of Saona Island, inside the Parque Nacional del Este. The island represents a unique and beautiful, but delicate, ecosystem, and is a favourite excursion for hotels located in the area. Funds were also used to reconstruct 63 houses in the village of Manojuan, which was badly damaged by the hurricane, and to promote and develop local handicrafts, through grants to local enterprises.



Case Study: Peru Treks & Adventure

Peru's tourism has expanded dramatically in the last two decades, due to increased safety, cultural, historical, and natural attractions, and major advertising in international marketing campaigns. Virtually all tourists who come to Peru travel to Machu Picchu in the Andes, and many hike all or part of the "Inca Trail" from Cuzco to Machu Picchu. In the late 1990's, **increasing numbers of tourists hiking the Inca Trail began to cause numerous environmental and social problems**, including a large amount of litter and human waste at unregulated campsites, damage to ruins and to the ancient stone steps of the trail, and negative impacts on the lives of local residents.

Poor treatment of porters and cooks became a particular problem. The majority of the porters on the Inca Trail are Quechua farmers from the surrounding countryside, who supplement their income by working on the Inca Trail. Their first language is Quechua, the language of the Incas, although many now speak Spanish as well. Many of their traditions and beliefs have remained unchanged since well before the Spanish arrived. The growth of mass tourism in and around Cuzco has been a powerful, and often disruptive, force for this native community. Exploitive porter treatment has included extremely low wages, excessive loads (often 50kg or more), and poor provisions on the trail, which passes through cold and rugged passes over 13,000 feet in altitude. Porters may not be able to afford appropriate footwear, clothing, food, or sleeping bags for these cold, high-altitude hikes.

The Peruvian government has taken strong measures to restore and maintain environmental quality along the Inca Trail, recognizing that the Trail is a major source of tourist revenue to Peru. **Tourist numbers on the Inca Trail are now strictly limited** by permits (now US \$73), which must be reserved well in advance in coordination with a local guiding company. Other measures include:

- Tourist hikers are now required to travel with licensed guides
- All hikers must sleep in certain designated camping sites
- Campfires have been banned
- Trail closure one month per year, or as necessary, for maintenance and litter removal
- Regular trail checkpoints to inspect permits, passport numbers, and porter burdens

The requirement that tourists travel with guides has led to an exponential increase in the number of companies offering guided tours, many of whom do not use sustainable tourism practices, particularly regarding treatment of local staff. The Peruvian government passed a "Porters' Law" in 2002 to limit porter burdens to 20kg and set minimum wages, but this law has been widely ignored. However, a few local tour operators have taken steps to improve the environmental and social aspects of tourism along the Inca Trail. One such company, **Peru Treks & Adventure**, has implemented several environmentally and socially responsible policies, including:

1. Fair treatment of local staff

Peru Treks & Adventure is locally owned and operated. The company takes particular care in the treatment of its trail staff. The owners state: "Providing good porter welfare is a complicated issue. It is not just a simple issue of paying higher wages; in our opinion **it is more about treating porters as human beings rather than beasts of burden.**" Their practices include:

- Porter wages are ~20% above the average of local Inca Trail tour operators. Their daily income is comparable to that of a skilled tradesperson (such as a master carpenter) and is approximately four times higher than that of a local farmer.
- Porters are paid an additional 5% if they complete a first-aid course offered by a local NGO. In 2006, the company began offering another additional 5% to porters who complete an environmental awareness course. This not only helps the porters financially, but gives them valuable skills, helps disseminate those skills to the local community, and contributes to the porters' sense of professionalism and self-esteem.
- Porters carry a maximum of 20kg. (Required by law, but Peru Treks & Adventure enforces this limit strictly, weighing all porter burdens at the trailhead and insisting that tourists with excessively heavy bags either discard gear or hire an additional porter).



- Porters are provided with a large tent with a waterproof floor for sleeping on the trail.
- Every porter is provided with good-quality walking shoes (porters pay 25% of the shoe cost), sleeping bags (free), and specially designed backpacks for porter loads (free)
- Full life/accident insurance for all porters (applicable year-round, not just while on the tour).

In several cases, the company has found ways to make **double use of supplies by giving them to porters after they have been used by tourists**. For example, a large waterproof tent is set up for tourist meals; at the end of dinner, the meal tent is swept, lined with a waterproof floor, and used as a porter sleeping tent. Similarly, high-quality sleeping bags are purchased regularly and rented to tourists who do not have their own bag. After a bag has been rented ten times, at which point the company has made a profit on the bag, it is donated to a porter.

2. Environmental responsibility

Peru Treks trains all its trekking staff on Machu Picchu Sanctuary regulations and environmental awareness, takes care to remove all litter and trash, and uses clean-burning fuel to cook meals while on the Inca Trail. As mentioned above, staff are paid 5% more if they complete an environmental awareness course. Guides educate tourists in environmentally sound practices.

3. Tourist education

Peru Treks offers an enormous amount of information on local culture, sustainability, environmental impacts, etc. to its clients, via its website, brochures, pre-tour information packets, and via the guides when along the trail. Tourists are encouraged to contribute to community projects (see below). The company also provides tourists with information on other hotels, tours, etc. elsewhere in Peru that meet the standards of sustainable tourism.

4. Community donations & projects

Peru Treks & Adventure follows a dual strategy of both **donating some of its own funds to the community, and also encouraging its tourist clients to donate as well**. Projects include:

- **School construction.** The company's most ambitious community project has been construction of two local schools. In 2005, they donated all of the construction materials (US\$6000) and paid for skilled labor for construction of a school for 60 children. The local community provided the general labor. In 2006, Peru Treks & Adventure donated \$5000 for construction of a second school. The company hopes to build one school per year.
- **Clothing donations.** The company encourages tourists to bring extra clothing on their trip, to donate to the community. Peru Treks & Adventure collects the clothing at their main offices when tourists come to get final information before departure for the trail.
- **Donations of school materials** such as book, paper, paints, etc. The company donates some of its own profits to this project, and also encourages tourists to donate.
- **Other good-will gestures** to the community, including Christmas presents donated by tourists and distributed to community children, and sponsorship of community parties and soccer games.

5. Finding clients who are willing to pay more for sustainability

Peru Treks & Adventure's operating expenses are slightly higher than other tour companies because of these practices. Yet the company is profitable. It charges a slightly higher fee to tourists for the Inca Trail hike, but at the same time it attracts clients who are willing to pay the higher fee for environmental and social responsibility.

Peru Treks & Adventure markets itself heavily as a socially and environmentally responsible company. For example, it includes an large amount of information on its website, which is updated regularly to include detailed articles about porter welfare and labor practices, updates on the school construction projects, and so on. The obvious care and attention that this tour operator gives to community welfare and sound environmental practices attracts those hiking clients who care about sustainability, and who are willing to pay a little more for it.



Tour Operators Products and Main Suppliers

Elements of Tourism Products	Suppliers
Accommodation	Hotels, bed & breakfasts, self-catering, (serviced) apartments, campsites, cruise ships
Transport to and from destinations	Public transport (e.g., trains), airports, scheduled air carriers, air charters, scheduled sea passages, chartered sea passages, coaches, cruises
Catering and food and beverage	Restaurants and bars, grocery stores, farmers, fishermen, local commerce/markets, bakers, butchers, food wholesalers
Ground transport	Car rentals, boat rentals, fuel providers, gas stations, taxis
Ground services	Agents, handlers, or inbound operators in the destination
Cultural and social events	Excursion and tour providers, sports and recreation facilities, shops and factories
Environmental, cultural and heritage resources of destinations	Public authorities, protected site managers, private concessionaires and owners

Source: Supply Chain Engagement for Tour Operators – Three Steps Toward Sustainability. 2004. The Tour Operators' Initiative for Sustainable Tourism Development.



Sustainable Supply Chains - Case Studies

Case study 1: Aurinkomatkat

Aurinkomatkat, a Finnish outbound tour operator, began integrating sustainability measures into its supply chain system in early 2000. The company developed sustainability criteria for partner hotels, with priority given to good **water management** and **energy saving**.

Minimum criteria were established for partner hotels, including connection to a wastewater treatment system and water- and energy-saving measures. The sustainability program has been implemented in phases, to give existing contract partners a **several-year transition period** to meet the requirements of the program and understand what will be expected in the future.

The first phase of the program included **monitoring** of environmental performance, but did not actually require accommodation providers to meet all the requirements. The initial monitoring takes place through a checklist completed by a representative of the facility, which is then checked by Aurinkomatkat personnel at the destinations and verified annually. All Aurinkomatkat staff have been trained in sustainable tourism through lectures and round-table discussions. Training continues through discussions, an internet site, a newsletter on sustainable tourism and an information package. Responses to the program have been positive, and some hotel managers have provided information on their environmental performance before being asked to do so. Aurinkomatkat informs its suppliers about the program and how to fulfill the sustainability criteria through letters and personal visits, depending on the destination. Because many of the accommodations are family-owned enterprises, the environmental program and the criteria are translated into the language of the destination.

To provide incentives for its partners to improve their environmental performance, Aurinkomatkat has created a **sustainability classification system**. The classification system will soon appear beside the traditional quality classification in Aurinkomatkat brochures, web pages and marketing materials. The classification system is based on a 100-point scale. By meeting the minimum criteria of connection to a wastewater treatment system, and water- and energy-saving measures, a facility can achieve the 30-point minimum required for inclusion in the sustainability program. Additional points are awarded for having an environmental or sustainability policy, developing an effective waste management system, using renewable energy sources, implementing a sustainable purchasing policy and having a community relations program. Hotels can receive up to three stars for environmental performance. If there is negative feedback from customers or if issues arise that compromise the criteria, a hotel may have its environmental classification downgraded.

Concerned that integrating of environmental criteria into hotel contracts might increase the risk of losing touch with the socio-cultural and economic sides of sustainability, Aurinkomatkat has also integrated indicators for **social, cultural and economic sustainability** into the program. These criteria recognize that an 800-room hotel has a different scale of impact than a six-room holiday apartment hotel, and their resources are not comparable. A five-star multinational resort with eco-certificates is not always a “better” choice than a family-owned apartment building that has no environmental program but which employs the family next door and helps the local economy by encouraging tourists to buy food and other goods from local stores. Thus, the company has made it easier for **small family-owned properties** that cannot invest in environmental technology to the same extent as large hotels by giving an additional five points to small-scale locally owned accommodations. This will mean that a small family-owned hotel that uses water- and energy-saving measures and treats its sewage appropriately will meet the minimum requirements for inclusion in the sustainability program. Achieving a higher environmental classification will require more investment.

**Case Study 2: LTU Touristik**

In summer 2000, **LTU Touristik**, a German tour operator that specializes in package tours to all continents, launched a campaign to help contracted hotels improve their environmental performance. The campaign was based on the company's experience with contracted hotels that showed that most hoteliers felt a general sense of responsibility for the environment, but needed suggestions for how they could implement good environmental practices. To determine where assistance was most needed, LTU Touristik's Environmental Department worked with a consultant to distribute a questionnaire to contracted hotels. The department also held personal meetings with hotel managers in a number of destinations, allowing them to learn firsthand about the hotels' environmental practices and environmental impacts.

As the centerpiece of the campaign, the company developed a small manual, *Das Umwelt freundliche Ferienhotel* (The Environmentally Friendly Holiday Hotel) to give technical assistance to contracted hotels (those that are not directly operated by LTU Touristik). Topics addressed in the manual include drinking water, outside areas, energy, purchasing, waste and communication. Each section includes a general description of the problem and concise suggestions about how to solve it, presented in simple language and a user-friendly layout, showing how much time an action will take, the investment required, and the likely cost savings.

The manual, which targets hotel managers and other staff members responsible for hotel operation, was launched in all destinations worldwide where LTU Touristik does business. Now in its 3rd edition, the 20-page manual is published in German, Greek, English, French, Italian and Spanish. In 2002, about 15,000 manuals were distributed, and several large hotel companies ordered the manual to use for staff training or reprinted it on their own.

Where possible, the manual was distributed personally to hotel managers. Tour guides, buyers and the head of the destination agency delivered the manuals during routine visits, explained LTU Touristik's objectives and offered initial suggestions for environmental practices. These representatives then reported back on the first reactions of the hotel managers to LTU Touristik's Environmental Manager. Along with the manual, hotel managers received a personally addressed letter and a one-page questionnaire about whether they were able to use some of the practices in the manual, whether they needed further information and which environmental protection measures they already implemented. Nearly 20 percent of all contracted hoteliers have offered feedback to the company.

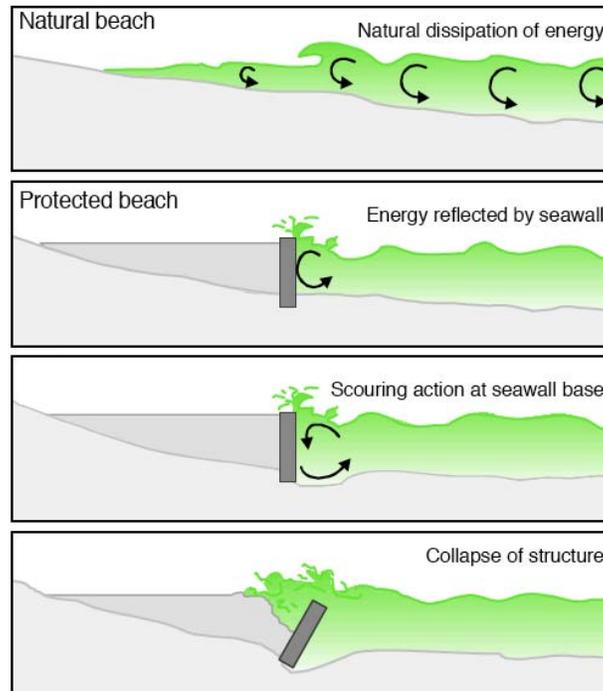
If hoteliers need further assistance beyond these first contacts, LTU Touristik provides it through its Environmental Department's two-person technical assistance team, thus guaranteeing a continuous dialogue with hotels that want to improve their environmental performance. Training is offered to buyers, heads of destination agencies and tour guides, and the Environmental Manager personally updates them on the campaign. Information is also provided on what type of technical assistance is expected from them and how to make an informal evaluation of the visited facilities. The company's web site provides all interested employees with more detailed information.

LTU Touristik has recognized that relying solely on manuals has its limitations, principally that there are no mechanisms for enforcement of the voluntary practices nor incentive for their implementation. The company's long-term goal is to be able to demonstrate the benefits of environmental action and to establish environmental standards for holiday hotels. As a next step, LTU Touristik plans to collect all information about environmental action introduced by the hotels and report its findings to other hotels and eventually to its clients.



Hard Engineering Approaches to Coastal Construction

Seawalls, bulkheads and sheet piling are solid vertical walls constructed of concrete, masonry, or metal which all serve the same purpose. These methods are used to combat erosion because they require less material and space. However, due to their vertical nature, reflective wave energy is maximized, creating the potential for undermining and destruction of the beach or other land form being protected, as indicated in the following figure.



Undermining of a seawall built on a high-energy coastline.

Source: *Sustainable Coastal Tourism Handbook for the Philippines, 2002*

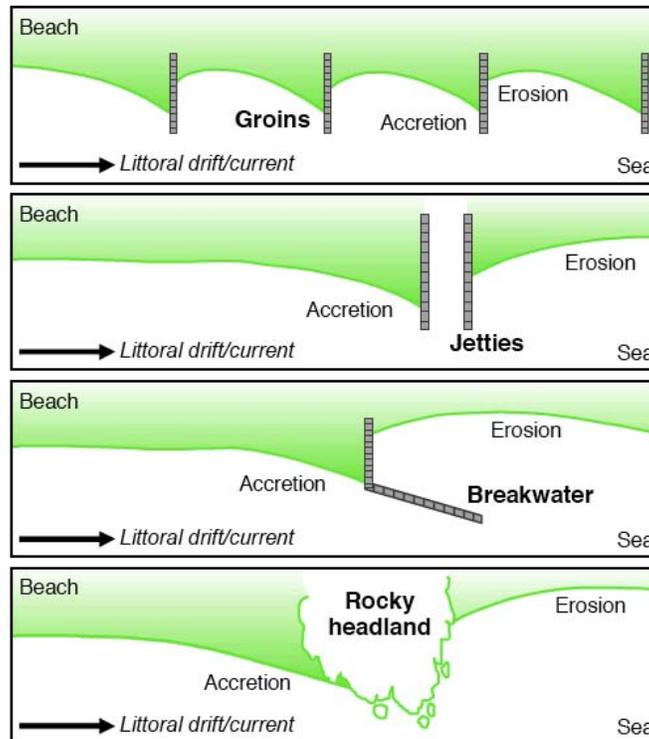
Due to the increased scouring action of waves at the base of seawalls, seawalls inevitably lead to loss of beach sand at the base of the seawall. Thus, though a seawall will temporarily protect the land behind the seawall, it is also virtually certain to accelerate loss of the beach in front of the seawall. And eventually, when the seawall falls, the land behind the seawall will be at greater risk than before, due to greater water depth due to loss of the beach.

Seawalls are a short-term solution only, and will usually accelerate loss of the beach over the long term.

Groins, breakwaters and jetties are structures predominantly built with rocks or concrete. Groins or their variations are placed perpendicular to the shoreline to trap sand on the up-drift side by extending out into the water and interrupting the littoral drift, causing deposition of sand. However, after the water column loses its suspended sand load, its velocity increases, causing it to wrap around the groin and pull more sand away from the down-drift side, resulting in beach loss and erosion. (These processes occur naturally around rocky headlands.) Such structures



tend to cause more problems than they solve unless they are very carefully designed and placed appropriately in relation to the shoreline features, drift and wave patterns of the water.



Source: *Sustainable Coastal Tourism Handbook for the Philippines, 2002*

Revetments (see handout) are sloping rock walls and similar protective structures that are used along the coast to prevent undermining and erosion of coastal lands. The slope of the wall and the spaces between the rocks act to dissipate wave energy and minimize reflective waves. They are often more affordable than more costly bulkheads, breakwaters, seawalls and groins.

Beach nourishment is another form of erosion control in which sand is brought onto an eroding beach to replace lost sand. Nourishment must be done periodically if beach erosion continues. Nourishment is costly and since it is usually prohibited to mine sand, the source of sand may be limited or not available. An eroding beach needs to be analyzed for what is causing the erosion and the most appropriate solution sought considering nature, cost and legal restrictions.

When planning a coastal tourist establishment, the hazards of beach erosion may be avoided by following several “golden rules” for combating beach erosion:

- Understand the natural beach system before it is altered. Site-specific studies may be required.
- Develop a setback line *before* construction begins
- Never mine the sand from the dune, beach, or nearshore sandbars
- Where a major obstruction to longshore water transport is built, such as a harbor, use soft solutions, such as sand nourishment or diversion of channels, rather than hard solutions, such as revetments or seawalls
- Do not panic after a storm has drastically altered the beach. Wherever possible, let the normal beach cycle return the sand.



Coastal Tourism Development Criteria for Maldives

- Limit the maximum built-up area to 20% of total land area.
- Preserve the aesthetic integrity of resort islands by restricting the height of buildings to the height of the vegetation profile of the island. The maximum height of any building is limited to two stories provided that there is vegetation on the island to conceal these buildings.
- Allocate space for each tourist such that each tourist room should face the beach with 5 linear meters of beach line provided to each tourist in front of their room. Only 68% of the beach length can be allocated to guestrooms. 20% has to be allocated to public use and 12% left as open space.
- Preserve native vegetation through mandatory replacement of each tree that is cut down. Certain rare and large trees have to be avoided when constructing buildings.
- Ensure setbacks from the beach such that all buildings have to be located well away from the peripheral vegetation. A minimum setback distance is 5 meters from the shoreline to ensure that the peripheral vegetation, most important to coastal protection, is preserved.
- Allocate space for vegetation between buildings to ensure that substantial areas of indigenous vegetation are left untouched.
- Prevent construction of rock-filled jetties, groins, seawalls and detached and submerged breakwaters. Rather, promotion of greater coral colonization on the peripheral reefs and other natural methods to protect shorelines is encouraged.



Water Conservation for Hotels

Benefits from implementing water conservation measures:

1. Save money – reduced utility costs, and reduced costs of heating, pumping & maintenance
2. Protect the environment - reduce strain on local water resources & infrastructure
3. Improve guest comfort - reduce likelihood of water shortages, equipment failures, and fluctuations in water pressure & temperature

Step 1

- Evaluate hotel's water use patterns (daily and monthly) to identify times/places of high water use, and identify ways to conserve
- Common high-water-use areas to check: Guest room plumbing, Grounds and irrigation, Laundry, Pools and Jacuzzis, Kitchen, Bars and Ice Machines.

Step 2

- Set priorities and take action
- Good solutions to consider: Aerators, low-flush/water dams, watering strategies, maintenance, leaks, reusing greywater

Step 3

- Continue to monitor consumption
- Identify problems quickly, track progress

Short Term Practices

- Install faucet aerators
- Install water-efficient showerheads
- Reduce pressure carried by the property's water distribution system
- Install foot pedal valves in kitchen sinks

Long Term Practices

- Harvest rainwater to use for laundry, etc.
- Irrigate lawns with graywater (from sinks, showers, laundry, etc.)
- Install low-flush toilets over time

Example: An assessment of a 30-room hotel revealed 67% of its guestroom faucet aerators were faulty and leaked at flows of up to 5.5 US gallons/minute. Installing 1.5 US gal/min aerators could have reduced water consumption by more than 225,000 US gal/year and saved 2,400 US \$/year. This measure required a US \$200 investment and offered a payback period of 5 weeks.



Wastewater Treatment

What is “wastewater”?

Wastewater is any water that has been used and is no longer pure. It includes:

1. Greywater – water that has been used in cooking, bathing, laundry
2. Sewage from toilets - containing human waste
3. Irrigation water - containing fertilizers and pesticides
4. Water from swimming pools and hot tubs - often containing harsh chemicals like chlorine and bromine
5. Industrial water from factories, businesses, etc.
6. Water from the environment - surface water, storm water, and groundwater.

Without adequate treatment, wastewater can pollute coastal waters, damage fragile ecosystems like coral reefs, and spread diseases. Toxins such as pesticides and chlorine can stress or kill organisms outright. Excessive nutrients (from raw sewage or agricultural fertilizers) can cause a syndrome called eutrophication - excessive growth of plants (usually algae), with resultant clouding of water, lowered oxygen levels, foul odors, and death of fish. Raw sewage can also carry pathogens that endanger the health and safety of people as well as of wildlife. Coral reefs are particularly susceptible to smothering from excessive seaweed and algae growth caused by improperly treated wastewater.

Basic Wastewater Treatment:

1. **Preliminary treatment** removes trash and coarse sand and grit. This is commonly accomplished with bar screens and grit chambers. Grease traps are also part of pre-treatment. Kitchen outflow pipes, for example, must have grease traps.
2. **Primary treatment** removes most of the settleable solids, and floating material, including much of the oil and grease. This results in a “sludge” that must be disposed of periodically. Typically, primary treatment removes 50% of the suspended solids and about 30% of the biodegradable components.
3. **Secondary treatment** removes most of the remaining solids and further breaks down the biodegradable components.

Primary and secondary treatment are often combined in a single septic tank with two chambers. Within a septic tank, grease floats to the top, solids settle to the bottom, and anaerobic bacteria slowly process the biodegradable components. Water from the first tank flows to the second tank for further processing. Outflow from the second tank is finally sent out of the septic tank to a leaching field (also called drain field or seepage field), where it is further filtered naturally and taken up by plants. If the system is working well, this outflow should be quite clean, and can be captured and re-used for irrigation – though the water should be tested to be sure it is indeed clean enough for this purpose.

Sources: Caribbean Alliance for Sustainable Tourism (CAST), San Juan, Puerto Rico. URL: www.caribbeanhotels.org

**Key Considerations for Wastewater Treatment:**

- Most coastal hotels will need to install their own septic systems.
- Once installed, septic systems should not be forgotten or assumed to run trouble-free. They need regular inspection and maintenance to work properly. Otherwise, treated water emerging from the septic system can become progressively more contaminated as the system becomes clogged with grease and sludge and its cleaning efficiency declines. Septic tanks must be cleaned of sludge periodically (leaving 10% of the sludge to re-populate the bacterial population), and the preliminary treatment components, particularly grease traps, must also be cleaned (see below).
- Grease traps must be cleaned once per week, particularly in kitchens. Otherwise, the grease will ultimately clog the pipes of the septic system. The common practice of dissolving grease with sulfuric acid is not recommended. The grease merely re-hardens downstream (often in the outflow pipe to the leaching field), and the acid kills helpful bacteria. Instead, manually scoop out small grease traps, hire professionals to clean large grease traps, and use bioaugmentation – additional of helpful bacteria that can break down grease.
- Sludge from the septic system or treatment plant must be disposed of carefully; it can be environmentally hazardous. In some cases, properly treated sludge can be used on the grounds as fertilizer.
- Properly treated wastewater can then be re-used for irrigation, but it must be monitored to be sure it truly is clean and will not spread disease.
- Laundry greywater should not be sent through the wastewater treatment process. Hot laundry water restricts growth of helpful bacteria, the surges of large volume can overload the system, and greywater does not require full treatment in any case (since it usually contains only soap and dirt). Laundry water is best sent to a laundry water re-use system, or can be sent to a soakage pit.
- Harsh chemicals like bleaches and chemical cleaners can make wastewater unsuitable for any environmental use. The best course of action is to limit the use of these chemicals in the first place. In most cases, other cleaners can be used.
- Proper training is critical for employees who perform system maintenance (e.g., grease trap cleaning) or treatment plant operation. Wastewater treatment should not be viewed as a menial or unimportant job; it is a complex process with great importance for the environment and the community.



Solid Waste Management

Solid waste consists of any sort of physical waste that is not dissolved in water – “trash and garbage” along with all sorts of other items such as food scraps, broken furniture, construction debris, old clothing, bottles, cans, papers, etc. Hotels concentrate large numbers of people who generate huge amounts of solid waste. Most tourists generate more solid waste per day than local residents.

Benefits from effective waste management:

- Reduced utility costs, e.g. hauling and tipping fees (for example, the Half Moon Hotel in Jamaica reduced its garbage hauling costs from US \$1,700 to US \$620/month).
- Increased revenue from recyclables
- Reduced insect and rodent problems, fire hazards, and odors
- Improved community relations,
- Improved sanitation
- Improved aesthetics, e.g. reduced litter on beaches
- Improved guest satisfaction, due to all of the above

Tips for solid waste reduction:

- Recycle all possible items – glass, aluminum, papers and plastics. Make available containers for separating waste, and encourage development of recycling programs.
- Collect waste in tight-fitting containers to avoid rodent and mosquito problems (see below).
- Certain types of solid waste tend to collect rainwater and can spread mosquito-borne diseases, particularly rubber tires, bottles, cans, etc. In areas where this is a concern (e.g., malaria and dengue fever zones), encourage people to store cans, bottles, etc. upside-down on peg racks, or in a covered location where they will not collect rain.
- Re-use all items when possible – e.g. old furniture or clothing can be re-used on property, or given to staff or charity.
- Provide guests with a place to leave unwanted items that can be donated to charity.
- Unused food may sometimes be suitable for donation to charity.
- Compost all organic garden and kitchen waste (food scraps, etc.) and use for fertilizer for gardens.
- Minimize use of individually packaged guestroom amenities (e.g. bottles, cans) and plastic bags.
- Minimize use of disposable items (e.g. plastic bags, plastic tableware, disposable cups, cook caps and aprons, paper napkins, etc.) and single-serving food packages (butter, sugar, cream, jams, condiments, milk, juices, cereals, etc.).
- Collect and/or recycle used cooking oil.
- Clean grease traps frequently and without harsh chemicals (See Wastewater section).
- Purchase commonly used items in bulk containers when possible.
- Ask chemical suppliers to take back empty chemical containers.
- Use environmentally friendly chemicals and minimize use of hazardous chemicals (e.g. drain cleaners, descaling acid, solvents.)



Energy Conservation

Energy, in the form of electricity and fuels, are a substantial part of hotels' operating costs, and commonly add up to 70% of utility costs. The major of this usually is air-conditioning in guest rooms. Energy conservation is a quick way to reduce operating costs with little capital investment. It can also reduce the harmful effects of fossil fuels on air quality, the ozone layer, global warming, and sea levels.

Best “No-Cost” Energy Savings Measures

- Assign one staff member to spearhead the energy conservation program. Responsibilities should include reading of meters (at least on a monthly basis), and monitoring progress.
- Emphasize staff awareness, training, and checklists or other clear instructions to meet energy conservation targets.
- Adjust settings and illumination levels to ensure minimum energy used for desired comfort levels. Hot water can usually be set to 122°F, and room air temperature to 72-74°F.
- Establish a preventive maintenance schedule for all major equipment, paying particular attention to:
 - Adjusting and replacing belt drives
 - Insulating and repairing pipes and ducts (10-20% is typically lost)
 - Frequent servicing of air-conditioning equipment (usually results in 20% energy savings)
 - Repairing seals on doors, windows, coolers, freezers, etc.
 - Abnormal equipment vibration or sounds
- Assign rooms so that unoccupied areas can be shut down.
- Have staff turn off pool pumps and exhaust fans overnight.
- Run only full loads through dishwashers and washing machines.
- Consider using natural sunlight to totally or partially dry laundry.
- Wherever possible, use natural ventilation, and shading from trees and other vegetation to cool guest rooms, patios, etc.



Hotel Planning Principles & Checklists

Planners should consider the following principles when developing Land Use Plans or zoning schemes for coastal areas.

Protect Sensitive Areas: Development should be avoided in coastal areas that have been identified as being ecologically sensitive, culturally or socially important or potentially hazardous for development. When development in and around sensitive areas cannot be avoided, it is imperative that activities that could threaten the environmental or cultural resource be regulated, or even prohibited, by local ordinance, or, if in an established park or reserve, relevant legislation.

Locate Development Inland When Possible: When developing a plan for a coastal area, a critical question to consider is whether or not the proposed activity requires a coastal location. If not, alternative sites inland should be considered. For example, a fish processing plant would not necessarily need to be located on the seashore as long as adequate systems could be developed to transport fish from landing sites to the plant, and from the plant to the shipping (road, rail, or sea) point. In this way, the prime beach areas could be utilized for other purposes that absolutely require a coastal location.

Concentrate Development in Nodes: The natural preference for coastal hotel developers is to spread the development along the beach, thereby maximizing seafront property. Careful planning is required in order to avoid “ribbon” or “strip” development parallel to the shoreline that is inefficient as far as provision of basic infrastructure services are concerned (water supply, electricity, and roads); and also to ensure that the scenic beauty that attracted development and tourists in the first place is not eroded. Planners should attempt to ensure that the coast does not become one long line of fenced-off beach resorts.



Project Review Checklist for Site Selection

Does the project proposal

- Adhere to the Land Use Plan and its development conditions?
- Show that local authorities and local communities have been consulted about whether the proposed development is appropriate to the site?
- Show that local knowledge is being sought, and received, about the environmental characteristics and social or cultural importance of the proposed site?
- Take into account any ecologically sensitive areas within or adjacent to the proposed site?
- Consider the feasibility of providing infrastructure services to the proposed site?
- Take into consideration existing, and planned, land uses in the area and include plans to ensure that those uses will not be adversely affected by the hotel during construction and operation?
- Take into consideration the amount of land that may be needed for future expansion of the hotel?
- Consider alternative sites for the project and provide adequate reasons for choosing the proposed site?
- Justify the need for a coastal location?
- Take into consideration whether or not the development of a hotel on the proposed site will result in ribbon development now or in the foreseeable future?

Source: Tanzania Ministry of Natural Resources & Tourism. 2003. *Guidelines for Coastal Tourism Development in Tanzania*. Tanzania Coastal Management Partnership.



Project Review Checklist

Siting and Design of Tourist Facilities

Does the project proposal

- Identify sensitive habitats or hazardous lands and incorporate protection measures such as buffer zones or setbacks?
- Incorporate a reasonable setback from the high water mark to ensure free access along the beach and protect structures from wave action and beach erosion?
- Ensure that the buildings and structures blend into the local environment, creating an aesthetically pleasing atmosphere?
- Adhere to the development conditions as stated in the Land Use Plan, particularly with regard to maximum allowable height of buildings?
- Maximize open space by clustering rooms and locating service areas away from common areas?
- Maximize the use of local materials and products from sustainable sources for construction and decoration?
- Take into account international standards for resort or hotel density?
- Take into account materials and costs for future maintenance of facilities?



Project Review Checklist Vegetation Management

Does the project proposal

- Identify the major features of existing vegetation and incorporate them into the site plan?
- Identify and show an understanding of the ecological services existing vegetation provides and include plans for protecting it during construction and operation?
- Consider the option of creating a temporary nursery for those plants and trees cleared for construction to be replaced once construction is complete?
- Show commitment to avoiding the introduction of non-native species onto the site?
- Show commitment to planting plants and trees that require minimal amounts of watering?
- Include plans to utilize plants and trees for shading and privacy barriers?



Project Review Checklist Water and Sewage

Does the project proposal

- Identify adequate sources of water to meet expected demand?
- Provide results of, or call for studies, on groundwater levels during dry and rainy seasons?
- Provide assurance that other water users will not be affected by construction and operation of hotel?
- Include a comprehensive plan for the siting of water wells and septic systems to eliminate possibility of on-and off-site contamination?
- Provide assurance that septic systems will not allow leachate fluids to enter into ground water or the sea before being treated?
- Consider the option of using constructed wetlands in the design of septic systems?
- Include plans for water conservation that could include low-flow toilets and shower heads, composting toilets, rainwater harvesting, or reduced daily laundry services?
- Show commitment to implementing a staff and guest water conservation awareness program?
- Minimize hard surface areas to reduce run-off?

Hotel owners and managers can take a proactive role in educating their staff and guests in the values of water conservation. Training staff on the conservation measures that have been incorporated into the hotel design will encourage them to use water efficiently. If a monitoring system can be put in place, staff could receive small bonuses if actual water consumption is less than a pre-determined target level over a period of time.

More and more tourists want to understand the local context when they travel. Providing them with basic information on water scarcity and the hotel's active role in water conservation will make them more prone to watch their own consumption carefully. Small signs placed at strategic locations (bathrooms, outdoor rinsing showers, etc.) can be an effective way to get the message across without 'forcing' guests to comply.

Source: Tanzania Ministry of Natural Resources & Tourism. 2003. *Guidelines for Coastal Tourism Development in Tanzania*. Tanzania Coastal Management Partnership.



Project Review Checklist Solid Waste Management

Does the project proposal

- Assess the potential to use local waste collection and delivery services?
- Identify specific areas to be used as a landfill and show evidence that local approval has been obtained? Include plans to minimize and dispose of wastes during construction?
- Include plans to reduce the amount of waste generated by the hotel, through buying in bulk and using refillable dispensers?
- Show that suppliers and manufactures have been consulted for information on re-usable or recyclable materials?
- Include plans to reuse certain materials or products?
- Show that the local community has been consulted about what types of materials they could reuse?
- Include plans to recycle materials and products?
- Include plans to develop a composting scheme for organic wastes?
- Include plans for secure storage of wastes to keep flies and scavenger animals away?
- Suppliers and contractors have been consulted for materials to be reused or recycled.



Project Review Checklist Energy

Does the project proposal

- Estimate energy needs during construction and operation, taking into account seasonal fluctuations in tourist arrivals?
- Identify adequate sources of power, whether from the grid, generator, or other source?
- Provide plans to include a back-up power supply system in case of grid failure?
- Incorporate natural cooling features in landscaping and building design, such as open floor plans to maximize air flow, orientation of rooms with respect to sunlight, use of shade trees, etc.?
- Include plans to conserve energy by utilizing energy-saving appliances, regulating use of electrical appliances or cutting power off during certain times of the day?
- Include the development of staff and guest awareness schemes on energy conservation measures?
- Consider options for alternative energy sources, such as solar or wind power?
- Ensure that windmills, if planned, will not negatively affect avian flyways?



Project Review Checklist Strong Community Relations

Does the project proposal

- Show that the local people have been consulted extensively about the proposed project?
- Take all comments or objections from community members into consideration?
- Show that the local people have been informed about what benefits they may receive as a result of the development? Are these perceived benefits reasonable?
- Show commitment to hiring local people during construction and operation?
- Are there any plans for training or mentoring local staff?
- Show that opportunities for the use of locally produced supplies, such as artwork, furniture, fruits and vegetables, etc. have been identified in collaboration with community members?
- Show that opportunities for cultural, or village, tourism have been explored in collaboration with local communities?
- Show commitment to maintaining a system of open communication between the hotel management and local communities?
- Consider working with community leaders to set up a village development fund and offer to make small contributions?

Other points to consider:

- Do the local people have a good understanding of what their roles and responsibilities are in terms of the development of tourism in their area?
- Do they understand the importance of maintaining a clean and secure environment for guests to enjoy?
- Do the local people understand and accept the changes that will occur as more and more tourists start visiting the area?

Source: Tanzania Ministry of Natural Resources & Tourism. 2003. *Guidelines for Coastal Tourism Development in Tanzania*. Tanzania Coastal Management Partnership.



Sample Code of Conduct

Welcome to _____!!

Please remember that you are a welcome guest. Please enjoy our natural environment, culture and warm hospitality. To make your visit more pleasurable, make sure you do the following:

Do ask us if we would like to have our pictures taken - and remember to send us a copy!

Do buy our goods and handicrafts - and remember to bargain with a smile.

DO help us preserve our natural environment by:

- putting trash into proper bins
- Looking at our beautiful plants and flowers without taking them
- Enjoying our wildlife without feeding them
- Enjoying our coral reefs and marine life without touching or taking anything

DO help us preserve our historical and cultural heritage by:

- resisting temptation to remove objects or alter monuments or ruins
- refusing to buy historical artifacts, such as coins and pottery.

DO bask in the sun on our beautiful beaches and remember to cover up when venturing into the village or town.

DO ask us if you may enter our homes or gardens.

DO resist giving money or gifts to individuals unless it is a tip for excellent service.

DO contribute, if you desire, to our community development fund. Boxes for contributions can be found at _____.

DO feel safe when walking around but remember to leave your valuables at the hotel or guesthouse.

DO ask to see our schools and dispensary and give us advice on how to improve them.

DO sign our guest book and make suggestions on how we can be better hosts.

And one thing you must never do:

DON'T forget to tell your family and friends about your wonderful visit to _____!



Septic Systems

All sewage should be treated to at least secondary, preferably, tertiary levels before being discharged into the ground. The following simple septic system design can effectively treat sewage wastes and even be a source of water for irrigation of hotel gardens. The important feature is the addition of a final treatment step through the use of constructed, or artificial, wetlands as part of a “drain field” on top of the second tank.

Traditional septic systems consist of 3 components:

- **Receiving tank** – typically an impermeable concrete underground holding chamber which retains the solid wastes and where the process of biological decomposition of the solid waste occurs. Towards the top of the chamber is an opening that allows the liquid portion of the sewage to “overflow” into a second tank. Excessive grease (such as from kitchens) can clog this opening.
- **Second tank with drain field** (also called leach field) - a second concrete tank with two compartments containing gravel. **Wetlands plants** are planted over the “drain field”. These plants’ root systems serve as filters of the wastewater that is exiting from the tank, and remove the nutrients and undesirable components from the wastewater.
- **Garden** – native plants are planted around the perimeter of the drain field to take up more of the remaining wastewater nutrients. This minimizes the growth of algae, seaweed, and other undesirable plants that the excess nutrients might otherwise encourage.

One of the major advantages of this system is that it does not require chemicals, pumps or other mechanical devices. The only maintenance required is the occasional de-sludging of the first septic tank, and pruning of the wetland plants on the two tanks to stimulate their growth. This cut vegetation can then be used for animal fodder or supplies for artisanal baskets or weavings (it is not recommended for human consumption).



Siting of Septic Systems

Poorly located, poorly designed, or poorly maintained septic systems can have serious negative impacts by polluting surface water bodies and ground water stores. Taking the following steps into consideration can greatly minimize these potential impacts.

1. Consider the location of existing water wells and buildings, both on-site and in adjacent areas. To minimize the risks of contamination, septic systems must be located at least:

- 30 meters away from any water wells;
- 7 meters from any stream, cuts or embankments;
- 1.5 meters from any paths, walls, buildings or property boundaries; and
- 3 meters from swimming pools or large trees.

Situations where contours or steep slopes exist, particularly where soils are porous, may warrant an even greater distance between septic systems and water wells.

2. Evaluate depth of water table after rainy season to avoid contamination.

Leachate liquids (the waste after solids have been separated out) should not flow towards wells or into the water table. Establishing the highest level of the water table after the rains and locating the septic system above this level will help to eliminate any chance of water contamination from wastewater.

3. Consider the soil type and contour of bedrock. Septic systems should be located at least one meter above the underground rock ledge to minimize possibility of leachate liquids flowing along the top of the rock ledge and into the groundwater or directly into the sea.



Water Wells - Planning and Design

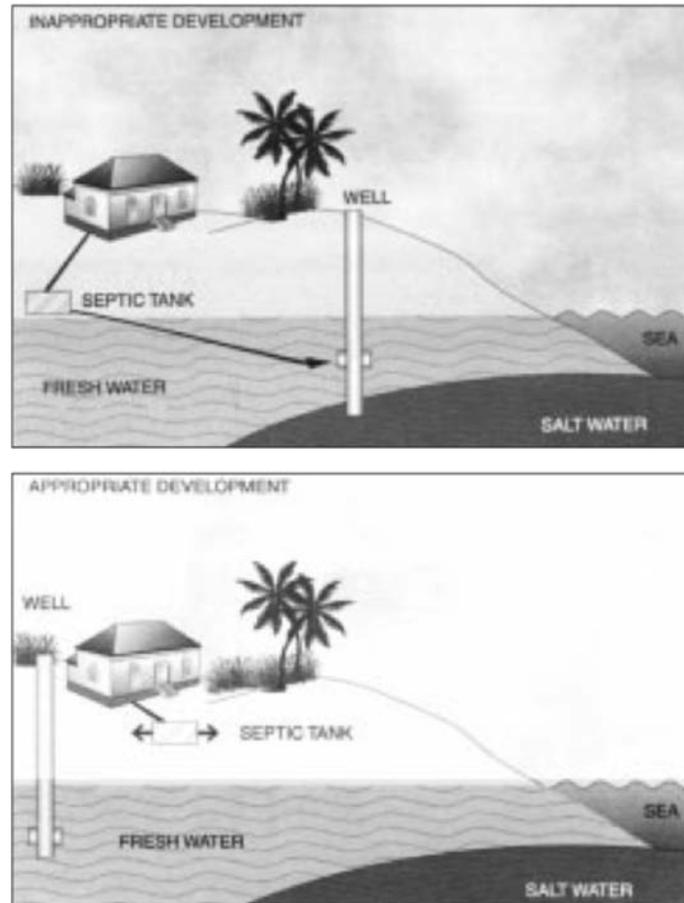
Guiding Principles

- All relevant factors should be considered in siting and design of wells and septic systems
- Consider natural or alternative sewage treatment systems in order to reduce costs and potential for contamination.
- Use closed cycle systems whereby water initially used for human consumption is recycled for use in landscaping.
- Institute water conservation techniques to decrease water use and reduce operational costs.
- Minimize hard surfaces to reduce run-off and allow for sufficient water absorption.
- Carry out a hydrological survey of water resources along the coast to establish a scientific base for planning of tourism facilities.

Technical guidance in siting and design of water wells

Knowledge of the site and careful siting and design of water delivery systems can ensure a consistent supply of fresh water and minimize potential for contamination. The following steps should be used in the planning stage:

1. Locate water sources and determine water needs. Identify sources of fresh water on-site or nearby and estimate demand for water during construction and operation at full capacity, taking into account seasonal fluctuations in rainfall and tourist arrivals.
2. Identify and locate potential sources of contamination. Possible sources include pit latrines, industrial wastewater, septic tanks, run-off during heavy rains, or fertilizers from agricultural activities.
3. Conduct a hydrological survey prior to drilling. This study will help determine the optimal location and depth of well or borehole. It is recommended that studies be conducted in the dry season to establish the lower limits of water availability.
4. Design wells to eliminate intrusion of contaminants and salt water. One inexpensive and effective method is to install a horizontal tube at the bottom of the vertical pipe. This ensures that fresh water flows horizontally into the wellhead.



*Fig. 5 Diagram of water well with horizontal tube
Siting and Design of Septic Systems*

Source: Tanzania Ministry of Natural Resources & Tourism. 2003. *Guidelines for Coastal Tourism Development in Tanzania*. Tanzania Coastal Management Partnership.



13 Core Questions for all Marine Recreation Providers

1. Does your company abide by all local, regional, national and international environmental laws and regulations?

Please list actions taken to support and educate customers about local, regional, national and international environmental laws and regulations:

Social Dilemma:

- Fishing provides income, but removal of key biological species can destroy the ecosystem and the reasons for tourists coming to fish.
- Disposing wastes at sea saves money, but improper disposal of wastes in coral reef waters can destroy the reef's ecosystem.
- Selling reef fish, urchins, shells and other reef animals as ornamental objects or food makes money, but is leading to worldwide coral reef destruction.
- Pelagic fishing is lucrative, but over harvest of pelagic species leads to ecosystem decline and diminishes food resources for local communities.

Good Practice:

- Marine recreation providers can support healthy reefs by abiding by all environmental laws pertaining to toxic and human waste disposal
- Not harvesting resources to sell as ornamental objects
- Not serving threatened or endangered species as cuisine.
- Boat crews can educate tourists about relevant laws governing fish harvesting and consumption in a given region and ensure that all recreational excursions and fishing trips comply with these laws.

2. Does your company provide trainings, briefings or literature for employees and tourists regarding good environmental practices for snorkeling, diving, kayaking, various types of boat tours and other marine recreation activities?

Please list actions taken to provide environmental education for employees and tourists:

Social Dilemma:

- Many impacts to coral reefs and other marine environments are caused by a lack of knowledge and understanding of the marine environment by marine recreation providers and tourists.

Good Practice:

- Marine recreation providers can supply training manuals for employees and onboard literature and briefings for tourists that address relevant environmental issues and highlight marine recreation practices that minimize impacts to coral reefs and other marine environments.



3. Does your company provide information for employees and tourists regarding the potential impacts of motorized vessels and poor boating practices on coral reefs and other marine environments?

Please list actions taken to provide information on the potential impacts of motorized vessels and poor boating practices to employees and tourists:

Social Dilemma:

- Being a tourist boat operator provides a living, but poorly conducted or irresponsible boating practices, such as operating in shallow water environments, can increase sedimentation as a result of propeller wash and wave creation. This disruption can cause severe damage to coral reefs, sea grasses, mangroves and other marine environments.

Good Practice:

- In order to minimize boating impacts to coral reefs and other marine environments, operators should follow proper navigation and mooring principles,
- avoid fast motoring in shallow reef areas, and
- educate tourists who rent boats about relevant environmental issues and good boating practices.

4. Does your company actively use, and support the use of, mooring buoys as an alternative to anchoring around coral reef ecosystems?

Please list actions taken to actively use, and support the use of, mooring buoys:

Social Dilemma:

- Anchors are convenient, but if used improperly, anchors and the long chains associated with them can cause severe damage to coral reef ecosystems.

Good Practice:

- Marine recreation providers can significantly reduce anchor damage through the use and support of a mooring buoy program at popular coral reef sites.
- Companies that rent boats can provide information to tourists on basic seamanship, navigation and location of mooring buoys in coastal regions (information about the damage that anchors can cause to coral reefs) and a waterproof map of the location of mooring buoys at popular snorkel and dive sites.
- Rent boats can encourage drift dives, where no anchor is dropped, when a mooring buoy is not available at a particular site.



5. Does your company have an environmental code of conduct to guide the actions of motorized and non- motorized boat operators and tour guides when they come into contact with, or viewing distance of, marine wildlife such as turtles, manatees, dolphins and whales?

Please list actions taken to abide by the environmental code of conduct:

Social Dilemma:

- Tourists will pay to see marine wildlife, such as turtles, dolphins and whales, but their life cycles can be easily disturbed if not viewed properly. These disturbances can affect mother/calf pairs, resting periods and use of feeding and breeding grounds.

Good Practice:

- The most appropriate way to view marine mammals is at a slow speed from a distance that does not change or alter the animals' behavior. Avoid approaching animals head-on and never chase the animals. One-hundred meters is a commonly agreed upon minimum distance for watching large whales.

6. Does your company take actions to prevent accidental discharge of toxic substances or other waste into the environment?

Please list actions taken and methods and procedures used to prevent accidental discharge of toxic substances or other waste into the environment:

Social Dilemma:

- Hazardous materials such as fuels and oils can threaten the health of coral reefs and other marine environments, but are inherent in boat operations.
- It is expensive, and if not urgent, doing maintenance yourself, or putting it off as long as possible, can save money, but, that can lead to accidental or unintentional discharge of toxic chemicals into the marine environment.

Good Practice:

- Regular boat maintenance and record keeping, particularly regarding engines, fuel tanks and other potential leakage areas, can significantly reduce the amount of pollutants a boat discharges into the marine environment.



7. Has your company taken actions to reduce use and ensure proper disposal of toxic antifouling bottom paints, fuels, cleaning agents and other hazardous materials?

Please list actions taken and methods used to reduce the use of toxic paints and chemicals and ensure the proper disposal of wastes while operating at sea or during drydock operations:

Social Dilemma:

- Antifouling bottom paints are useful, but contain known carcinogens and heavy metals and threaten the health of both coral reefs and people who eat seafood.
- Operating boats involve many hazardous materials that are time-consuming and expensive to properly contain and disposed of, but if released deliberately or unintentionally, can really harm the marine plants and animals.

Good Practice:

- Use antifouling bottom paints that are produced from biodegradable products and significantly less toxic than paints of the past.
- Replace other onboard chemicals with alternative environmentally friendly and biodegradable products
- Ensure that all hazardous materials associated with at-sea operations or drydock repairs are disposed of in a proper manner.

8. If applicable, does your company use alternative, clean-burning technology such as four-stroke outboards for smaller boats or biodiesel fuel for larger vessels with in-board propulsion systems?

Please list actions taken or future plans to use alternative, clean-burning technology:

Social Dilemma:

- It is not always practical to replace older gasoline boat engines that are inefficient and pollute, releasing as much as 30 percent of consumed fuel unburned into the marine environment.

Good Practice:

- Replacement of older, less fuel-efficient models with new designs significantly reduces pollution in the marine environment.
- For inboard engines, retrofitting for use of biodiesel as an alternative fuel source can significantly reduce toxic discharge into the marine environment.

**9. Does your company take steps to minimize discharge of untreated sewage and wastewater from boats?**

Please list actions taken and methods used to minimize discharge of untreated sewage and wastewater:

Social Dilemma:

- It is expensive to build effective septic systems or repair old ones, but raw or partially treated sewage in coastal waters poses a health threat to coral reefs, marine animals, and people.

Good Practice:

- Disposal of sewage at pump-out facilities on land is the best way to minimize impacts to the marine environment.
- If pump-out facilities are not available, boats should treat sewage mechanically and with nontoxic, biodegradable chemicals to reduce solids and pathogens.
- Boats should proceed as far as possible offshore before pumping out to prevent the pollution of bottom sediments, coral reefs and coastal waters.
- Alternatively, boats can use self-contained toilets, which can be removed from vessels and dumped at onshore facilities.

10. Does your company take actions to prevent the introduction of garbage or solid waste into the marine environment?

Please list actions taken to prevent the introduction of garbage or solid waste into the marine environment:

Social Dilemma:

- It's expedient, but when individuals throw garbage into the environment, it creates a mess.
- It is convenient to just throw plastic, fishing line, cigarette butts, and Styrofoam into the ocean, which seems so big, and like it won't matter, but they cause the death of millions of turtles, seabirds, fish, and marine mammals that eat or get caught in them every year.

Good Practice:

- Garbage bins on tour boats can be contained or kept inside to minimize the chance of debris blowing overboard.
- Replace plastic and Styrofoam by more biodegradable material, such as paper.

**11. Does your company support good environmental practices to avoid catching and serving rare, threatened or endangered marine species for seafood consumption?**

Please list the actions taken to avoid catching and serving rare, threatened or endangered species:

Social Dilemma:

- It is very lucrative to help tourists catch popular game fish, but their populations are plummeting and have been listed as endangered or threatened (groupers, jewfish, jacks, marlin, tuna, snappers, lobsters and crabs, etc.).
- It does not seem like one person can make a difference, but over fishing is removing key predators and herbivores from the marine environment.
- Everyone has the right to make a living, but over fishing directly threatens the health of coral reefs and other marine environments worldwide.

Good Practice:

- Not harvesting rare, threatened or endangered marine species to serve as seafood.
- Practicing catch-and-release programs.
- Educating tourists about which species in a given region are rare, threatened or endangered, and thus should be avoided.

12. Does your company support good environmental practices and educate customers about the negative environmental impacts of harvesting marine species from coral reefs and other marine environments to sell as ornamental souvenirs?

Please list actions taken to support good environmental practices and educate customers about the potential negative impacts of ornamental souvenir collection:

Social Dilemma:

- Selling souvenirs provides income, but removal of key biological components in reefs and marine environments damages ecosystem health.
- Over harvesting of reef fish, urchins, shells, etc., for souvenirs is contributing to the decline of coral reefs and other marine environments around the world.

Good Practice:

- Marine recreation providers can support healthy coral reefs and other marine environments by not harvesting marine species to sell as ornamental objects.
- Boat crews can educate tourists about the damaging effects of collecting marine species as souvenirs.



13. Does your company contribute to biodiversity protection and conservation projects in the local region of its operations?

Please list the actions taken to protect and conserve biodiversity in your local region:

Social Dilemma:

- They are not problems that one individual can solve, but environmental degradation and loss of biodiversity are affecting all regions of the world.
- You do not have to contribute, but local, regional and international conservation projects are working to protect terrestrial (land) and marine ecosystems, and regularly need support through funding, volunteers and other resources.

Good Practice:

- Contribute financial, in-kind or material support to local and regional projects.
- Contribute to local coral and other marine parks in which marine recreation providers operate.
- Lobby government agencies to support environmental legislation, participate in local or regional environmental planning, and encourage tourists to make financial contributions to local conservation projects.

Source: *Managing Environmental Impacts in the Marine Recreation Sector: Self-Assessment Checklist*. Available from the Center for Environmental Leadership in Business at www.celb.org, www.toinitiative.org and www.coral.org.



Visiting Mangroves

Many MPA visitors have never experienced a mangrove forest and have no knowledge of this unique, generally muddy, environment. Walks at low tide, snorkeling and boat trips at high tide, and best of all an elevated boardwalk are good ways to experience the forest. This sheet provides advice on how to visit mangroves, whether for educational or recreational purposes, and on how to build and manage a boardwalk.

WALKS, SNORKELLING AND BOAT TRIPS

Fiddler crabs, mud skippers, wading birds and other foraging birds are just some of the inhabitants that can be encountered in most mangrove forests at low tide. In many countries, local fishers and villagers make footpaths through mangroves to allow access, and these can often be incorporated into a low tide shore walk. Alternatively, new paths can be designed, perhaps with the addition of gravel or stone to consolidate the mud. Loops in paths can be included to route users through interesting areas (e.g. into a *Rhizophora* part of the forest), returning the walker to the main path further along. Damage to trees, interference with natural drainage patterns, and disturbance of the fauna should be avoided when making paths.

Snorkeling can be a rewarding experience preferably during slack high tide when the water is clear, and activities of fish and invertebrates can be observed. Clear water is usually found only in a few areas, e.g. in small inlets or on offshore islands, away from large sediment-rich rivers. Care should be taken to avoid damaging branches and pneumatophores (aerial roots), as well as personal injury from attached oysters and barnacles.

Irrespective of water clarity, boat trips through mangrove forests at high tide are an enjoyable and comfortable way of viewing trees, birds and often fish. Paddle canoes are best; motorized vessels should try to keep noise levels down and minimize pollution from fuel.

MANGROVE BOARDWALKS

Walking through the mangroves along a purpose-built platform or boardwalk is the simplest, safest and most accessible for visitors. Walkways (usually made of wooden boards) provide footpaths over water and mud allowing easy access at high or low tide. The deck provides access for pedestrian, as well as cyclists, wheelchairs and children's pushchairs.



Visiting Coral Reefs

SCUBA DIVING AND SNORKELLING

Divers and snorkelers can cause damage by breaking corals, stirring up sediment, and disturbing animal life. Coral breakage is the main problem, caused by poor buoyancy control, careless kicking with fins, and standing on the reef. Underwater photographers and novice divers may have greater impact but experienced divers may also break corals as they tend to swim closer to the reef. However, research suggests that most divers and snorkelers have little negative impact and there is no evidence that they cause declines in coral diversity or abundance.

Many MPAs have codes of practice or guidelines for divers and snorkelers. For example, in Brazil, guidelines were produced through a national workshop. Dive boat operators using an MPA should be required to implement best practices. These include: securing trailing equipment, such as gauges, and making buoyancy checks at the beginning of a dive; discouraging use of gloves to deter divers from touching marine life; and carrying out practice activities (e.g. mastering buoyancy control, snorkeling for beginners) away from coral. Novices should always be with someone experienced. Good briefings before visitors enter the water have been shown to reduce damage to coral reefs and should be made obligatory. If a beach entry is necessary, provide an access point away from corals. Monitor the impact of divers and snorkelers and limit numbers, if coral breakage or other disturbances increases (see sheet J2).

UNDERWATER TRAILS

Underwater trails, whether guided or not, provide added value for visitors. These must be designed so that they do not concentrate people at fixed points, thus causing damage. On the Great Barrier Reef marine Park, rest stations (e.g. poles and floating inner tubes that snorkelers can hold on to) have been installed. If underwater signs are used, they should be placed in areas of sparse coral cover or on sandy bottoms. They are often difficult to read, particularly for those who cannot duck dive, and need regular cleaning of algae and other fouling organisms; numbered markers, with portable waterproof information sheets explaining each point, may be a better means of providing information. Visitors should be briefed in advance about the trail, and visitor numbers and group size may need to be limited occasionally or the trail periodically closed to aid recovery. Trails should be sited away from waves and strong currents for safety reasons, and in water sufficiently deep to avoid fin damage but shallow enough to provide good viewing; a minimum depth of 2.2m is recommended.

REEF WALKING

If an environmentally sound trail can be established over a reef flat, it can provide an enjoyable and educational activity, particularly for visitors who may not wish to snorkel or dive. However reef walking should be discouraged if it will cause damage by trampling. The impact can be minimized if the trail is sited on existing routes (e.g. those used by fishers), sand channels, and areas without living coral. It should be marked and visitors should be required to walk in single file and not stray. They should have suitable footwear, and use a pole for balance (but this must not be used to poke animals). If an organism is picked up for interpretation, it should be returned to the same place; organisms attached to the reef surface should not be removed.



FISH WATCHING AND FEEDING

Colorful reef fish and large 'charismatic' open water fish are always popular with visitors, and some can be observed underwater or from glass bottom boats. Identification guides add to a visitor's enjoyment, and many divers like to participate in monitoring programs (see sheet D3). Fish feeding, to increase numbers and activity, should be discouraged as it disrupts normal behavior,, sometimes making fish aggressive and altering their diets. If considered necessary, it should take place away from areas used for fishing or research and not when people are in the water. It should be done only by trained personnel, the food should be thrown rather than fed directly by hand, and only raw fish or fish pellets in limited amounts (max. 1 kg/day/site) should be used.

GLASS BOTTOM BOATS

The greatest risk from glass bottom boats is physical damage to corals from anchoring or operating in shallow water. Boatmen should be trained and must understand the importance of avoiding corals, boats must be well maintained (see sheet F5), and mooring buoys should be installed near popular reef viewing areas (see sheet F9).

Source: Managing Marine Protected Areas: A Toolkit for the Western Indian Ocean

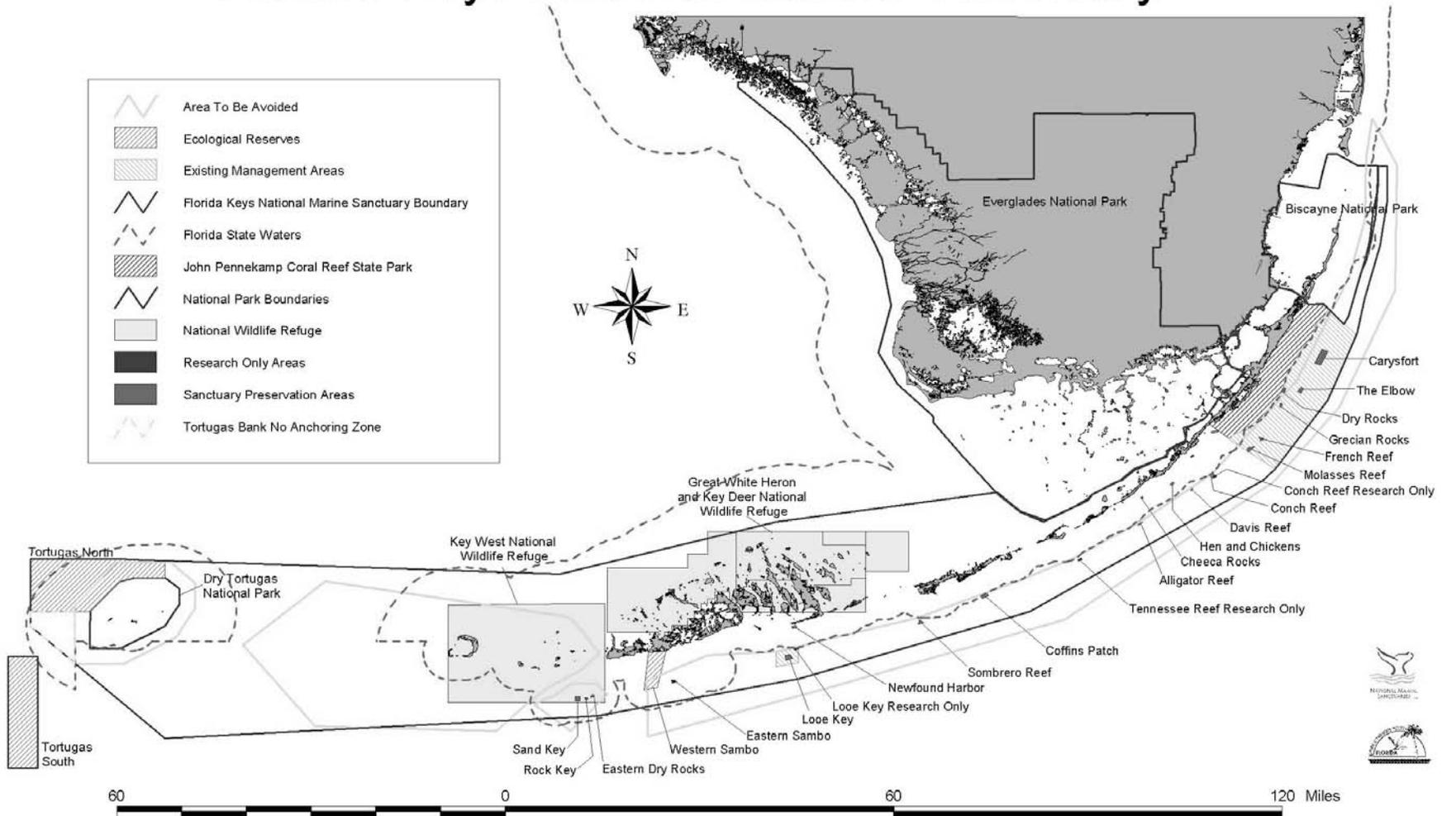


Pointers for Developing Zones for MPAs

- Management zoning is a *prescriptive* process that specifies **future conditions**. Unless existing conditions *are* the desired future, **the zoning should not describe existing conditions**. (Zoning the existing conditions, rather than the future conditions, will maintain the status quo, which usually will not help managers resolve current or future visitor use impacts.)
- Zoning should not be an arbitrary process or be based solely on planners' or park staff's opinions. There should be a philosophy or vision for the future that guides the zoning scheme. Without a unifying concept, zoning decisions cannot be explained or justified. The reasons for placing zones in different locations should be documented as part of the process.
- Management zones should have boundaries that are distinguishable in the field. Drainages, rivers, streams, topographic features, landforms, roads, and other identifiable features should be used as zone boundaries.
- There is no minimum area a zone can cover; however, in general, new zones for tiny portions of a park or for a single feature should not be created. When needed, specific management strategies for a small area in a larger zone should be identified.
- The shape of zones on a map may vary considerably depending on the resources, visitor experiences, and management strategies. Some zones may be narrow or linear, such as zones that follow vehicle corridors or rivers; other zones may be large polygons.
- When applying zones, the planning team should consider the land uses outside of the park. To the extent possible, the park zoning scheme should be compatible with land uses in areas adjacent to the park.



Florida Keys National Marine Sanctuary





Name of Zone	General objective (visitor experience, resident use, etc.)	Zone description (biophysical, social, & administrative attributes)	Zone location & boundaries	Management rules, regulations & policies



Zoning Proposal for Galapagos National Park, Ecuador

Rural. Might include all areas adjacent to the park where the park is working with private landowners to develop activities such as lava tubes tours on Santa Cruz or equestrian and hiking trails that occur on a combination of contiguous park and private lands.

Intensive/Recreational. Might include developed recreation areas in the park near local communities or park-related sites within communities. This could include guard stations and visitor centers, port or transportation facilities, and other sites that include park personnel and activities and are designed for large numbers of visitors.

Intensive/Natural. Would include visitation sites with outstanding wildlife, ecosystem, natural, or cultural history value but with only moderate resource constraints. Higher use levels would be permitted (group size would still be site specific but tend toward larger groups) at sites of varying distances from port towns.

Extensive/Natural. Would include sites with outstanding wildlife, ecosystem, natural or cultural value, with more severe resource constraints (again, site specific) limiting group size to smaller groups, or, conditions permitting, where a more leisurely experience with fewer encounters is desired.

Semi-primitive. Backcountry areas or remote beaches, usually on larger inhabited islands, more than one mile from any road or motorized beach landing area. Areas where foot, animal or non-motorized boat transport are required. Risk, challenge and required skills are greater. Resource constraints are low to moderate. Encounters with other visitors are kept low and both permits and park service orientation or special guides are required. (This zone would be new for Galapagos National Park.)

Pristine/Scientific. Islands or parts of islands where ecosystem value is at its highest with no or very few exotic species introductions. Usually remote and uninhabited with severe resource constraints. Visits are very limited, usually but not always confined to scientists. Requires permits in advance and guides specially trained in low impact techniques. There would be many strict regulations.

Complete description of the proposed new semi-primitive zone:

Management Objectives: To allow those visitors who seek a more self-directed or individualized experience (using outdoor skills in a natural setting) to have access to portions of the park where many natural features and values exist but where concerns about species introduction are pressing and can be controlled more easily due to the proximity of ranger stations. To also reduce the pressure on intensive/natural zone visitation sites by dispersing opportunities for visitors wishing alternatives to traditional guided tours.

Experience Opportunities and Setting Attributes/Activities: Hiking, camping, sea kayaking, volcano climbing, wildlife viewing and nature study. There is the opportunity to use outdoor skills; moderate levels of risk and challenge and physical stamina are required.

Physical Setting: Remote, generally several miles away from traditional visitor sites or transportation corridors, in natural terrain that may have some mixture of endemic and exotic species but very little other evidence of human activity. Rugged mountains, scrub forest lava fields or remote beaches may all be found in such a zone.

Social Setting: Groups will be no larger than five persons and all trails and campsites will have site quotas so that encounters should not exceed two other parties in a two-day period.

Managerial Setting: Permits are required and given on a first-come first-serve basis. Itineraries are prepared and campsites assigned. Length of stay is from one to two days at any one site. Ranger patrols are regular, but their contact with visitors is optional and brief. Prior to entry, visitors will watch a fifteen-minute videotape on low-impact techniques and backcountry regulations as well as undergo a check for exotic plant material and proper equipment.



Zoning Scheme for El Imposible National Park, El Salvador

Intensive Use Zone

General Objective: Provide recreational and educational opportunities within a semi-natural environment but with high concentrations of visitors; provide economic opportunities for local people.

Description: This zone consists of natural or altered sites that have natural or cultural attractions and outstanding scenic beauty. Its topography allows limited vehicle access and support facilities. Although this zone should be maintained in as natural a state as possible, high concentrations of visitors and facilities are acceptable, including toilets, interpretive trails, vehicular access routes for park vehicles only, visitor centers, and camping and picnic areas. Management presence at this zone will be a high priority in order to maintain impacts at acceptable levels.

Rules and Regulations:

1. Visitor use of this zone will have few restrictions other than paying the park entrance fee.
2. Campfires will be permitted only in those sites with designated fireplaces.
3. Firewood collection is prohibited in this zone.
4. Use of soap is prohibited in the rivers.

Moderate Use Zone

General Objective: Offer educational and recreational opportunities within a relatively natural environment, with medium concentrations of visitors.

Description: Consists primarily of natural sites but with some sectors that have some degree of human intervention; contains representation of significant natural and cultural features. Serves as a transitional zone between high densities of visitors and those zones with a minimum of public use. Facilities will not have the same level of development as those in the Intensive Use Zone. Topography will limit public use, and therefore the zone will require less attention on the part of park personnel.

Rules and Regulations:

1. Campsites with minimum facilities are permitted.
2. Los Enganches, Mirador La Algodonera-Rio Mixtepe are accessible only with a guide and a permit.
3. All trash must be removed by the visitor.
4. Campfires are prohibited except in exceptional situations.

Primitive Use Zone

General Objective: Protect the most natural park environments and offer recreational opportunities characterized by a minimum of environmental impact and very few group encounters.

Description: Consists of a natural site with a minimum of human intervention. Contains unique ecosystems, scientifically-valuable species of fauna and flora that can tolerate limited use by small groups. Roads, improved trails and permanent visitor infrastructure are excluded from this zone.

Rules and Regulations:

1. Public use is limited to special groups that have requested a permit in advance and that are accompanied by a park ranger.
2. Camping is permitted only in sites designated by the park administration.
3. Visitor groups are limited to a maximum of six people.
4. Campfires are not permitted.



Activities Allowed or Restricted in the Turtle Islands Heritage Protected Areas

Activities	RZ	HMZ	SPZ
Access			
Paddle boats	Yes	Yes	Yes
Motorized boats	Yes	Yes	No
Cruise boats	Restricted	Restricted	No
Anchoring/mooring buoys	Restricted	Restricted	No
Tourism Activities			
Turtle nesting watching	Yes	No	No
Bird watching	Yes	Yes	No
Nature appreciation	Yes	Yes	No
Volcano exploration	Yes	Yes	N/A
Daytime photography	Yes	Yes	No
Nighttime photography	Restricted	No	No
Picnicking	Yes	Restricted	No
Island hopping	Yes	Restricted	No
SCUBA diving	Yes	Restricted	No
Snorkeling	Yes	Yes	No
Swimming	Yes	Yes	No
Rowing/kayaking	Yes	Yes	No
Wind surfing/hobiecat	Yes	No	No
Infrastructure Development			
Restaurant	Yes	Restricted	No
Single-level cottages	Yes	No	No
Souvenir shops	Yes	Restricted	No
Comfort stations/restrooms	Yes	Restricted	No
Visitor information center	Yes	Yes	No
Improvement of airstrip	Yes	No	No
Solid waste disposal system	Yes	Restricted	No
Sewage treatment facilities	Yes	Yes	No
Jetties	Restricted	Restricted	No
Observation decks	Yes	Restricted	No
Trails	Yes	Restricted	No
Interpretive signs	Yes	Restricted	No

RZ - Recreation Zone; HMZ - Habitat Management Zone; SPZ - Strict Management Zone

Source:

Hüttche, Carsten M., Alan T. White, Ma. Monina M. Flores. 2002. *Sustainable Coastal Tourism Handbook for the Philippines*. Coastal Resource Management Project of the Department of Environment and Natural Resources and the Department of Tourism, Cebu City, Philippines.



Case Study: Bunaken National Park: Participatory Management in Zoning

Bunaken National Park, in North Sulawesi, is a 89,000 hectare reserve covering 6 islands and mainland coastline. It has diverse coastal and marine habitats, including extensive coral reefs and mangroves, supporting such species as dugong, sea turtles, giant clams, and a species of coelacanth. It offers some of the best scuba diving in Southeast Asia, and provides livelihood to a population of 20,000 people in local communities.

The main section of the park was declared a provincial park in 1980, and was combined with a southern section in 1991. The early process of planning the park was a process of sparring between the provincial government, local dive operators, and the central government (represented by the Ministry of Forestry). The local communities, an important stakeholder, were not included in the process.

The provincial government's primary interest was tourism development, supported by a long-held misconception that the tourism value of the park greatly outweighed its value to local fisher people. Further, there was a belief that the park was suitable for mass beach tourism such as at Bali, though the beaches in the park were small and not suitable for this. The local dive operators were based outside the park, and had long lobbied for a ban on tourism facilities inside the park, due to fears that whoever gained concessions inside the park would gain an unfair advantage. The national government's primary goal was conservation. Thus all three players had incompatible goals. In addition, all three of these players viewed the local community as an obstacle that had contributed to damaging the coral reefs since the reefs' "discovery" in the mid-1970's.

In 1991 the northern and southern sections were combined into a single park, and a new management planning process began in collaboration with USAID, which actively encouraged community participation. It was quickly realized that because local communities had long-established use practices, it was imperative that they become involved in planning and management. It was considered unfair that they be relocated out of the park (as proposed by both local and national government) when, after more than 100 years of use, the coral reefs of the park were found to still be in good condition. In fact, there was strong evidence that the reef damage since the 1970's was due to tourism, not to local community use.

After a participatory planning process involving all of these stakeholders, four types of marine zones were established:

- (1) Core (or sanctuary) zones. There was strong pressure from communities to place these relatively close to villages, which has not been the usual practice. The reasoning was that local communities could more effectively monitor and prevent violations of zone regulations.
- (2) Dive zones. An informal equilibrium had already been established between dive areas and fishing areas before formal zoning; this served as the basis for development of these zones.
- (3) Traditional use zones for limited use by local communities; this was the majority of reef flat areas.
- (4) Use zones for small and medium scale industrial fishing. This covers open sea areas within the park that are at least 200m from coral reefs.

The resultant zoning plan was spatially more complex than that originally envisaged, with more zones that were individually smaller in size. However, outreach and enforcement costs were reduced because all users had "bought into" the plan. Local communities now assist in sharing rights and responsibilities for sustainable management of the park, through Community



Conservation Agreements (CCAs) that cover the extent and type of activities in buffer zones.

Dive operator support has also increased. In 1991, rivalries between dive operators thwarted attempts to establish good management practices. A mooring buoy program begun in 1993 failed because of these rivalries. However, since 1996 several new 4-star hotels with professional dive operations have opened. These hotels and diving companies rely on a healthy national park to ensure their financial success, and are now working together to support conservation management of the park. Park management and dive operators are developing a partnership to support a wide range of conservation activities. This partnership includes development and dissemination of park information materials, as well as a new mooring buoy program. A formal user-fee system is being designed. In the meantime, the dive operators have started to collect monthly membership fees, which are then donated to the national park to cover costs of patrolling and outreach.

However, the need for active and adaptive management continues as new changes occur. First, the rapid spread of seaweed farming has led to dramatic changes in local resource management. This has resulted in reduced pressure on fishing resources within the park, as local people switch to seaweed farming, but an increased pressure on mangrove habitats. It is essential for the park to support the economic aspirations of poor local communities, and to ensure their support for broader economic goals. Therefore, park staff are trying to reduce negative impacts of seaweed farming, while encouraging positive ones. A second development is the arrival of major new tourism operators who were not involved in the initial planning process. A third is the economic crisis in Indonesia, which has reduced government funding for parks, and has led to a greater occurrence of destructive fishing practices by outsiders. A fourth is a move toward decentralization in Indonesian government, which may affect the legal status of the park.



Suggested Process for Establishing a Tourism Zoning System

STEP 1: Refer to the General Management Plan (GMP) for the zoning, special areas and locations where tourism could be an appropriate strategy. In general, the GMP should be the most important guideline for developing any activity in a protected area.

STEP 2: Obtain a base map of the protected area/ecotourism site. While the map should be large enough to cover the entire area, it must also contain sufficient detail to allow you to locate specific ecotourism attractions and infrastructure in relation to significant physical features, such as rivers and streams, mountains and hills, primary forest vs. altered vegetation and agricultural lands, etc. If a zoning system already exists, the map should include those zones and their boundaries. Locate sensitive or environmentally fragile sites

STEP 3: Locate on the map particularly sensitive or environmentally fragile sites.

STEP 4: Indicate where proposed new infrastructure would be located, such as trails, overlooks, campgrounds, visitor centers, guard stations and ecolodges. Consider what sorts of experiences and/or situations visitors wish to have while at the site (e.g., small groups, large groups, few encounters with other visitors, etc.).

STEP 5: Compare the proposed location of visitor attractions and infrastructure with the location of environmentally sensitive sites as well as with the present zoning system. Are there real or potential conflicts? If visitor sites are located at or near fragile sites, can management activities ensure that visitor impacts will not occur, or will be within acceptable limits? Is the present zoning system compatible with what you are proposing for visitor use?

STEP 6: Determine the final location of visitor infrastructure and attractions, after evaluating the relationship of visitor attractions with other potentially conflicting situations. These locations should be verified by site visits.

STEP 7: Prepare a preliminary zoning system that incorporates recommendations for visitor use zones. Intensive use zones might be designated at those places where high visitor concentrations occur, e.g., visitor centers, campgrounds, etc.; extensive use zones could be designated to cover the sites where visitor use is more dispersed. If possible, have two teams prepare a zoning system and then compare results to come up with the best one.

STEP 8: Compare your proposed zoning system with the preexisting system. Do changes need to be made in one or the other in order to come up with a definitive zoning system? Consider how visitor access and flow will work under your proposed system. Propose your system to the site's managers and staff. Do they agree?

STEP 9: Develop a final zoning system. Describe each zone following the format described under "Zoning Attributes." Include biophysical, social and management attributes for each zone; these will guide you in determining management guidelines for each zone.

STEP 10: Define the rules and regulations that will apply to the specific visitor sites and zones. What is the management capacity of the administrative authority? Is it capable, or will it be capable within a few years, of effectively managing a complex ecotourism program, or should it be kept simple?

From: Drumm, Andy. Alan Moore, Andrew Sales, Carol Patterson, and John E. Terborgh. Ecotourism Development: A Manual for Conservation Planners and Managers. Volume II. The Business of Ecotourism Development and Management. The Nature Conservancy, Arlington, Virginia, USA, 2004.