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INTERNATIONAL ECOLOGGE GUIDELINES

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Burlington, Vermont USA

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The International Ecotourism Society (formerly The Ecotourism Society) is an international, non-profit membership organization founded in 1990 to make ecotourism a tool for conservation and sustainable development. The Society provides professionals with the information and educational materials they need to plan and manage ecotourism in destinations worldwide. TIES publishes a quarterly newsletter, books, information packages, guidelines and fact sheets; develops standards and monitoring programs for the ecotourism industry; performs research; and offers workshops, seminars, training programs and international forums on key topics within the field.



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FOREWORD

By William McDonough



Travelling often means visiting a place that is foreign and new. Imagine, instead, leaving home to find yourself in a dwelling where every element of your surroundings is imbued with the local; with the cultural, natural, material and energetic qualities of that new place, in a dwelling where your ecological “footprint” is gentle rather than harsh. In that case, you would have come home in a much larger sense to the planet itself. You would also have entered an ecolodge, one of this century’s most delightful prospects.

The word “ecology” is rooted in understanding the “logic” of our home. It comes from the ancient Greek “oikos,” which meant household, and “logos,” which evolved into logic. Information about the nature of our earth home has exploded in the last few decades with galactic and nanoscale images, complex computer modeling, scientific research, and global communication. Even as these developments unfold, humans, like the early explorers, continue to explore the natural world and enjoy its diversity. We celebrate nature’s abundance, and we have even begun to recognize its fragility. But we have only scratched the surface of honoring this larger home with our designs. The important questions for designers today at the local and global levels are, How can we become native to this place? How can we all become indigenous people?

This will not mean to go backward in time, but to move forward; to see the earth, and our place upon it, as gently and prosperously intertwined. It will also mean an encompassing approach across many disciplines. Right now, the human dimension of life on the planet is dramatic, it is dynamic, it is everywhere, and, with its current trajectory, it can be terrifying. The conventional global “development” process is clearly a strategy of tragedy — though an unintended one. Mindless design can be seen as a kind of intergenerational remote tyranny: the tyrannizing of future generations by our poor design choices today. In order to offer future generations of all species a strategy of hope, we must move to an intentional strategy of change. The concepts in this book offer a profoundly hopeful strategy, one that moves humans from a timeful mindlessness in our relationship to the earth, toward a timeless mindfulness that celebrates that relationship.

A famous statement of 20th century design was that of the modern architect Le Corbusier, who said “a house is a machine for living in.” This has been translated in the last century to putting the same “machines for living” everywhere and powering them with petrochemicals.

As the technological world expands with asphalt hegemony, and architects engage in the construction of more steel, aluminum, and silica structures, those of us who lead must remember to ask the questions that get to the real heart of people and place. Do we want a legacy of sameness or diversity? Of elegant respect or brutish disregard? Of hope or despair? Of memory or forgetfulness? It is up to us. Whether we are architects, landscape planners, sociologists, market analysts, developers, or in any other profession, we are all the designers of our future world.

Like the Hannover Principles, which I wrote to guide EXPO 2000, the World’s Fair, the guidelines in this book can be seen as an essay of clues: a humble transmission from well-meaning designers of this era to future generations, honoring our sacred responsibility to one another. As we consider having “designs” on the earth, and as we continue to design our place upon it, the concept of the ecolodge illuminates our path to the most important work ahead. To become indigenous again means engaging the best of human technology with local natural circumstance and culture in ways that honor all of these elements. Ecolodges are a leading strategy for such engagement. One can only hope all buildings will one day be designed like this.

INTRODUCTION

The ecotourism industry is at a crossroads in its development. In the last decade, it has generated much revenue for local and regional economies worldwide, provided new incentives for governments and local communities to preserve protected areas and species, and heightened over-all local awareness of the importance of conservation. Unfortunately however, it also has led to numerous problems, and placed undue pressures and threats on the natural resources that sustain it. From these often-costly lessons, we are learning that the benefits of ecotourism can only be sustained through well-planned and carefully implemented projects that place the long-term wellbeing of the natural resources and local communities as a top priority.

With the rapid growth of nature-based tourism within the last decade has come the development of numerous lodges in and around biologically rich, diverse areas. Such developments often have had detrimental ecological and social impacts. Given the continued demand for ecotourism destinations, the increase in numbers of lodging facilities seems inevitable, and for this reason, these guidelines have been written to allow for the creation of ecolodges. Our aim has been to provide a framework for the design, development and operations of future lodges such that they uphold the social and ecological integrity of their given environments, and thereby allow for sustained benefits from ecotourism without damaging or destroying the very natural resources on which they depend.

An ecolodge is an accommodation facility that satisfies at least five of the criteria listed below, three of which must embody the main principles of ecotourism; that of conservation of neighboring lands, benefits to local communities and interpretation to both local populations and guests:

1. Helps in the conservation of the surrounding flora and fauna.
2. Endeavors to work together with the local community.
3. Offers interpretive programs to educate both its employees and tourists about the surrounding natural and cultural environments.
4. Uses alternative, sustainable means of water acquisition and reduces water consumption.
5. Provides for careful handling and disposal of solid waste and sewage.
6. Meets its energy needs through passive design and renewable energy sources.
7. Uses traditional building technology and materials wherever possible and combines these with their modern counterparts for greater sustainability.
8. Has minimal impact on the natural surroundings during construction.
9. Fits into its specific physical and cultural contexts through careful attention to form, landscaping and color, as well as the use of vernacular architecture.
10. Contributes to sustainable local community development through education programs and research.

Mehta 1999

Efforts to create guidelines for the ecotourism profession and industry date back to the early 1990s. Ecolodge guidelines are particularly needed at this time, in order to ensure that ecolodges meet the highest possible international standards, not the cost-saving eco-efficiency approaches being promoted by the mass tourism industry. The demand for ecolodge guidelines has never been greater, as national governments,

NGOs, and development banks all set their sites on using ecotourism as a sustainable development tool.

Within the field of tourism, there is perhaps no more important and potentially achievable goal than setting sustainability standards for lodging. The International Ecotourism Society (TIES) recognized the importance of creating a whole new type of lodge — called “ecolodges” — and held two International Ecolodge Forums and Field Seminars in 1994 and 1995 at Maho Bay Camps in the U.S. Virgin Islands, and in Costa Rica. The second forum in Costa Rica held multi-sectoral stakeholder participatory work-sessions for the creation of international ecolodge guidelines. Representatives from 35 countries worldwide took part, local communities in two key locations in Costa Rica were included, and the results were summarized in Spanish in 1996.

This book is the culmination of six years of work. With the exception of the chapter on “Operations and Management,” each of the chapters included in the guidelines has been contributed by collaborators who participated at the 1995 field seminar. The editors and collaborators represent five continents. TIES’ intention has been to provide international guidelines that would be flexible and performance standard, and hence could be adapted to the local situation by the user. We hope that this book will be published in Spanish, French and Portuguese in the future, making it more readily accessible to a much larger audience.

Since the field seminar and workshops, the guidelines have been updated, and new ideas and concepts have also been included. We have covered age-old concepts and ways of design such as Feng Shui and Vastu Shastra, as well as modern concepts such as “six senses” and permaculture, allowing for a universal approach. We have also included bibliographies and internet sites for readers who seek more detailed information on specific subjects covered in the various chapters.

These guidelines are designed for use by any group connected to ecolodges: developers, planners, architects, owners, managers, marketing directors, consultants, government representatives, NGOs, etc. We also encourage their use for other ecotourism facilities, such as visitor centers, wardens’ houses, staff accommodation, and entrance gates. Most of the principles presented may also be applied to improving existing establishments, rendering them more ecologically friendly and sustainable.

We hope that these guidelines will be useful not only in the emerging field of ecolodge development, but also that their recommendations be applied in some measure to the traditional hospitality sector as a whole. Furthermore, we hope that these guidelines will provide a better definition and understanding of the ecolodge, and in doing so, assist tourism agencies in setting up criteria in determining whether or not a lodge is truly an ecolodge.

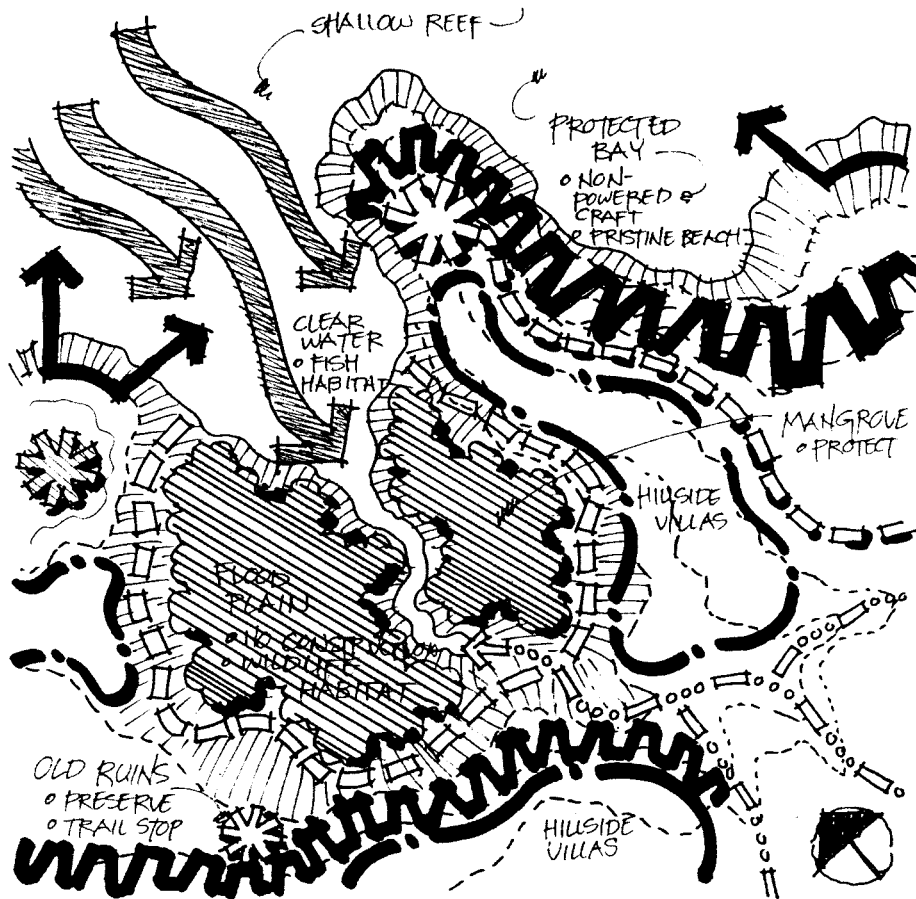
We realize that it may be prohibitively expensive and uneconomical to follow all the guidelines mentioned in this book. However, we do encourage that the reader use and implement as many of them as possible, making sure at the same time that there is return of investment. This book is intended to be a reference guide and therefore we do not expect readers to read all the chapters. In this regard, there are overlaps within certain chapters.

And finally, we hope that these guidelines will in some way encourage a conscientious approach to developing ecotourism facilities, and in doing so, contribute to the conservation of our global natural heritage.

Hitesh • *Ana* • *Paul*

“...in many ways the environmental crisis is a design crisis.”

—Sim Van der Ryn



CHAPTER 1

SITE SELECTION, PLANNING AND DESIGN

Hitesh Mehta

E D S A (Edward D Stone Jr. & Associates)

Hector Ceballos-Lascurain

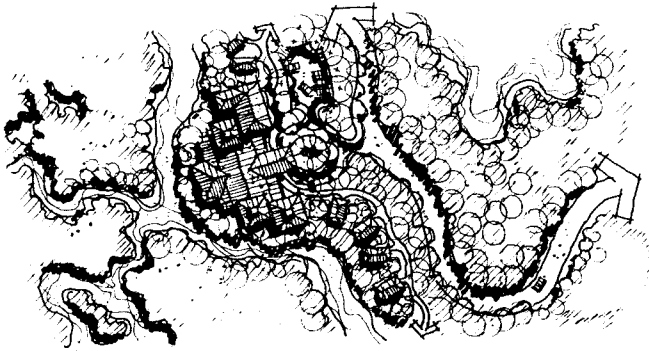
Program of International Consultancy on Ecotourism

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1.1 INTRODUCTION

Careful, well-researched master site planning, and ecologically and socially conscious site design is crucial to creating harmony between tourism developments and environmental/cultural protection. Preserving the special characteristics of a place requires an in-depth understanding of the natural systems on the site, and the cultural responses to that environment's history, opportunities and constraints. We need a new way of thinking about site planning and design in order to change the way we build traditional tourism facilities. Opportunities exist to employ better ways of designing projects, using environmentally friendly materials, techniques and systems in a way that also incorporates traditional methods (possibly unique to the region) and practical local knowledge.



Sustainable site planning and design can lead to a closer harmony between ecolodges and their setting and can indeed help to lessen their environmental impact. Site planning and design for any ecolodge project must involve in an integral way land use, human circulation, existing structures (if any), facilities and utilities in the natural and human environment. Information and data on the project and site is best laid out clearly in accurate scale plans, showing location, layout, general size and shape, and orientation of the different elements of the project. Project development needs to be guided by a schedule, which is effectively a timetable showing the proposed sequence of activities for the project. Most often the schedule is written in the form of a grid, with tasks listed down the page and the time-span of the project evenly marked along the foot of the graph, allowing planners to clearly mark when activities and stages take place. Accompanying these documents will be a range of attachments and notes, among which will be standards and guidelines on minimizing the negative impacts of the project. Contract documents must clearly identify penalties for breaches of the impact standards you have set.

Therefore, the site planning and design for an ecolodge must first of all safeguard the sustainability and conservation of the area's natural assets and cultural heritage, and improve where possible on impacts that may already be present on the site. A fundamental goal for any "eco" oriented project is that the development of the site must leave the site better off after development than before. The scope for reforestation, water resource enhancements, soil enrichment and wildlife protection and restoration programs is often limited by funds and broadened by the availability of voluntary help. These factors should be taken into account during planning stages once the extent and capacity of voluntary work is established.

1.2 SITE EVALUATIONS AND SELECTION

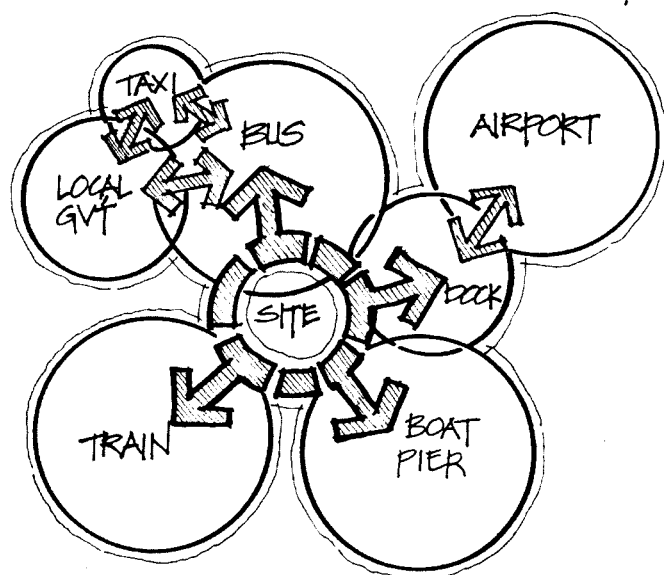
The success of an ecolodge can pivot on the initial processes of site evaluation and selection. Careful evaluation, in some instances, may reveal that the site is not appropriate for development at all. Given the environmental impacts of increasing numbers of visitors to wilderness areas, it is prudent, although not always possible, to select ecotourism sites just outside a nature preserve. As such, a well-conducted site evaluation can assist developers in finding alternatives to developing in protected areas. The selected site should support the lodge within natural and biophysical resource limits while offering ecotourists the opportunity to experience and enjoy the natural environment. All considerations involved in selecting the most appropriate site for an ecolodge will be essential to following decisions dealing with design and construction.

It is important to mention that sites appropriate for ecolodge development often have little or no supporting infrastructure or public services.

GENERAL GUIDELINES

1. Select a site whereby the ecolodge itself would not directly affect the focal (or flagship) ecotourism attractions of the area, or visually compete with these attractions. In other words, a balance must be struck between easy accessibility to outstanding natural areas and minimization of negative biophysical and cultural impacts (including visual impacts) of the environs.
2. Take account of the following infrastructure elements and public services as part of your site evaluation:
 - a) Access to or provision for electricity, drinking water, sewage, telephone line, public lighting.

- b) Transport options to the site: land motor vehicles (bus, taxi, rent-a-car, etc.); regular commercial, charter, or private flights; motor boats, cruise ships, yachts, ferries; railway (schedules of nearest railway station), etc. On site: walking paths and trails, bicycles, shuttle carts, solar/electric vehicles, etc.
- c) Regional geography: site proximity to highways, roads, trails (tracks), airport, landing fields, railway, docks, electricity pylons, dams, mining or farming activities, dangerous ruins, etc.
- d) Postal service, garbage collection and disposal, medical services, schools, commercial facilities, etc.



- 3. Carry out an initial feasibility “scoping” exercise for each site option before the particular site is selected. Scoping is the process by which positive and negative impacts are jotted down after physical inspection and brainstorming sessions with the local people, consultants, etc. This can be done using the well-documented Participatory Rural Appraisal (PRA) method. Scoping should include biophysical features (see Chapter 2 for more details) of the site (climate, land, vegetation, wildlife, etc.), as well as cultural features (archaeological sites, traditional villages, etc.).
- 4. Look for clues on the site and search for areas that have a spiritual quality — the sacredness of place. These areas should be protected and not built over. This factor is often overlooked during the site-selection process. As ecologically conscious planners and developers, we should protect the sanctity of a site, its spirit, and the people that inhabit in and around the site.

- 5. Develop a quick program for the different site options; i.e. market niche, site potential, sustainable use, profitability (economic sustainability). All this fits into determining what you need in a site and what the ecolodge should be like. The selected site must meet the needs of the program, have the resources to provide this day after day, tourist after tourist, and be done in a sustainable fashion.

1.2.1 Location and Accessibility

The location of the ecolodge is undoubtedly one of the most important criteria for selecting a site. The site should be the compelling reason for the existence of the lodge. The quality of the surrounding environment is crucial to the success of any ecolodge: the nearby natural and cultural attractions, the way ecotourism circuits are set up, operated and marketed, and also the way in which local populations are actively involved in the process.

GUIDELINES

1. When locating an ecolodge, consider the quality of the surrounding cultural and natural environment, site access, sewage disposal, energy sources, water supply, and impact on the neighboring ecosystem.
2. Consider travel distances as a critical siting criterion, as well as the natural and cultural features that can be visited and, perhaps, maintained economically from the site.
3. Consider proximity of the lodge to major transport modes in the region. However, the ecolodge should not be too close to airports or major transportation routes due to the excessive noise and pollution.
4. Choose the most adequate location for an ecolodge based upon a comparative analysis of alternative sites.

1.2.2 Local Communities and Cultural Resources

Just as one looks at the natural resources and how they might provide for programming, one should carefully research the local people and their culture. See Chapter 4 for more details on what kinds of research will be helpful. A good amount of time should be spent with the local people who may have lived on the site for centuries and have invaluable knowledge of the site and its surroundings. The designer should never underestimate the know-how of the local communities.

GUIDELINES

1. Complete a detailed study on local communities that are in the surrounding area during the site selection process.
2. One criterion when selecting the site should be the availability of labor in local communities to participate in the realization of the lodge from initial planning to construction and day-to-day management.
3. Other questions that need to be asked include:
 - Does the site have any sacred significance to the local communities?
 - What benefit will the local people receive from the development of the lodge?
 - Will the ecotourism nature of the development be compatible with adjacent land uses?
 - What cultural features (both past and present) are found at or near the site?
 - Does the local community have claim to the area despite legal ownership?
 - Does the local community accept the development of the ecolodge?
 - Will the ecolodge impact the community?
4. Developers and architects need to be frank and honest with the people about their plans and should in-fact elicit the local peoples' help in understanding and exploring the area. Meetings should be undertaken in a way that is sensitive to local customs and respectful of the rights of the local people.



1.2.3 Appropriate Technology and Availability of Environmentally Friendly Materials

If environmentally friendly local materials are not locally available, it may become uneconomical to import materials and thus, the site may not be appropriate for development. It is also important to note that in many cases, use of local materials may not be the best option as it may end up causing more damage to the environment than bringing the materials from elsewhere in the country. Using appropriate technology also usually means involving local community wisdom and labor. For a more detailed discussion of this subject, see section 3.6.

GUIDELINES

1. Conduct a survey of indigenous building practices, availability of environmentally friendly materials and their likely costs, which can be helpful at this stage. When embarking on an analysis of ecolodge construction, apply the "life-cycle" approach in architecture and building (also called "cradle-to-cradle" analysis); i.e. how much "embodied" energy does the building material create over its entire life? This should take into account the energy consumption of the different construction stages from the extraction of the raw material, transporting, refining, packaging and final delivery of the building product. This includes on-site erection, the energy required for cleaning and maintenance over its useful life, and the energy eventually used in its demolition, dismantling or relocation.
2. Analyze and confirm the practicality, cost and durability of old and contemporary building materials and practices of the region and the community.

1.2.4 Impacts of Development

This is a preliminary "brainstorming" component of the site selection process. Judgements of the various phases of development and protection of significant existing features must be thought out at the selection stage to assure that the site will not be degraded by the development of the ecolodge. The application of environmental impact assessment (EIA) practices in the development of every ecolodge is of the utmost importance. EIA provides a procedure for the full consideration of the environmental impacts of programs, activities and projects before any decision to proceed. It precludes "behind closed doors" decision-making in the public and private sectors.

GUIDELINES

1. Study possible environmental and cultural impact for each site for both the construction and operation phases of the development of the ecolodge. See Chapter 2 for more information.
2. Consider both mid- and long-term scenarios for development impacts.

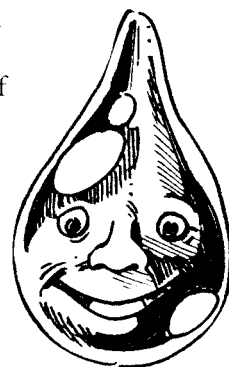
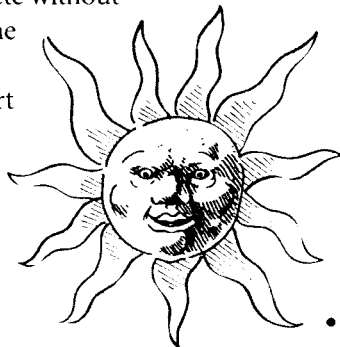
1.3 SITE INVENTORY AND PHYSICAL ANALYSIS

Once the optimal site has been selected, a more specific analysis must be carried out at that site. An ecolodge is not separable from the environment in which it is located, and for this reason an analysis of the natural and cultural characteristics of the site should take place before the design and building stages.

Any inventory or analysis would be incomplete without at least a rudimentary understanding of how the local population relates to the land spiritually, culturally and physically. This is a research effort that can guide many decisions that need to be made during the design phase. Throughout the process of site design, from concept to construction, the development of the ecolodge will benefit by a continued awareness of the specific cultural and physical environment into which it is being introduced.

The main purpose of a site inventory and analysis is to identify the natural and cultural resources available to the site. This should include a site boundary survey; hydrology and drainage patterns; wetlands and other water features; wildlife habitat, geology, vegetation, topography, soil types, climatic conditions, views, existing structures, local communities and culture, etc. For a more detailed discussion of this subject, see Chapter 2.

Tourism in most parts of the world is placing increasing demands on natural resources, so planners and landscape architects are turning to new and better alternative tools such as computers and design programs. These tools are proving very helpful in planning and developing ecotourism sites, particularly for analyzing the potential impacts of planned developments in ecologically sensitive areas. However, it is important to note that no information from aerial photos, surveyors or other databases presented on computers is a substitute for an extended site visit with local guides before the design process begins.



1.3.1 Analysis of Biophysical Features

GUIDELINES

1. Contract appropriate professionals to analyze the site in regards to its major biophysical characteristics. Characteristics to be analyzed include the following: a) Climate: sunlight, temperature, precipitation and humidity, wind direction; b) Land: physiography, soils, geology, hydrology; c) Vegetation: native and exotic species, vegetation types, precise locations; d) Wildlife: native and introduced fauna, transient fauna, seasonal fluctuations.

a) **Climate** — Carefully analyze and note the climatic factors of the site such as:

i) **Sunlight**

- Monthly sunrise and sundown hours through the year.
- Angle of solar incidence through the year.
 - Solar intensity.
 - Landscape and vegetation obstacles to sunrays.
- Local potential for generating solar energy.
- Natural/vegetative shading for cooling purposes.
- Cloudiness: dominating types of clouds, seasonal patterns of cloud cover, average number of clear and cloudy days per year.

ii) **Temperature**

- Monthly temperature variations: mean, maximum and minimum.
- Temperature variations between day and night.
- Frequency and mean duration of temperature extremes.
- Human comfort ranges.
- Location variations (north and south slopes aspects).



iii) **Precipitation and humidity**

- Monthly and yearly mean precipitation (measured in mm).
- Identification of dry and rainy seasons.
- Absolute and relative humidity.
- Snow accumulations and disposition pattern (drifts, whiteouts).

iv) Winds

- Monthly mean and maximum wind velocities.
- Wind orientation patterns.
- Incidence and frequency of destructive winds.
- Potential for generating wind energy.



b) Land — Carry out a detailed analysis of the following land characteristics:

i) Physiography

- Topography — is the land basically horizontal, inclined, or with gentle or pronounced slopes?
- Dominant landscape forms, including, the horizon — flat, mountainous, sloping, abrupt canyons and ravines, etc.
- Degree of erosion caused by diverse agents.
- Identification of most attractive landscape views from site, and natural screening of ecododge to reduce visual impact.
- Potential for integrating landscape features with architectural design.

ii) Soils

- Dominant types of soil.
- Resistance and compaction of soil: fitness for different types of foundation and construction.
- Thickness of the different layers, degree of maturity, texture, strength, susceptibility to compaction, presence of organic materials, presence of alluvial soils, degree of permeability, fertility, rockiness, erosion, etc.
- What type of cultivation and crops could grow in this soil to attain a certain degree of food self-sufficiency?

iii) Geology

- Rock type and seismic characteristics of site.
- Presence or absence of geothermal or volcanic features.

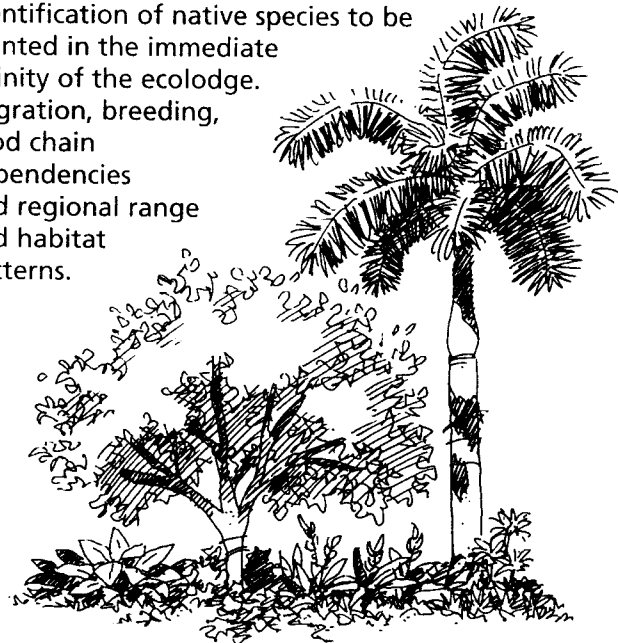


iv) Hydrology

- Presence of rivers, streams, wadis, lakes, marshes, reservoirs, or oceans (or distance to these features).
- Subterranean waters.
- Degree of water pollution.
- Risk and frequency of floods.
- Depth of water table.
- Sources of potable water.
- Potential for making use of hydroactive energy systems.
- Soil recharge characteristics.

c) Vegetation

- Vegetation types and plant communities present.
- Native and introduced vegetation (exotic species).
- Endemic (peculiar to the area), characteristic and threatened flora species.
- Identification of focal (flagship) flora species (if any) from the ecotourism attraction viewpoint.
- Precise location of specific individual plants of particular interest or beauty.
- State of degradation or disturbance of native vegetation.
- Regeneration indicators.
- Tolerance or susceptibility to different types of disturbance, such as trampling, fire, etc.
- Protection status of native vegetation and plant communities.
- Possible measures for regenerating local native vegetation.
- Potential for integrating site plan and architectural design with surrounding native vegetation and plant communities.
- Identification of native species to be planted in the immediate vicinity of the ecododge.
- Migration, breeding, food chain dependencies and regional range and habitat patterns.



d) Wildlife

- Species of native fauna (mammals, birds, insects, reptiles and amphibians, fish, invertebrates).
- Native and introduced fauna (exotic species).
- Resident, transient and seasonal species.
- Identification of focal species as regards their degree of ecotourism attraction (the most beautiful, singular or rare).
- Seasonal fluctuation of animal populations.
- Game species (if any).
- Status of local wildlife protection.
- Factors that have influenced decrease of local native wildlife.
- Possible measures to control exotic wildlife species.
- Impacts on planned program and design on wildlife communities, rare and endangered species.

1.3.2 Analysis of Cultural Features

Apart from the biophysical features discussed in the preceding section, it is equally important to perform a more specific analysis of the local cultural elements (both of the past and the present — i.e. including archaeology) in the site and its vicinity. During the quick analysis of the cultural situation in the feasibility stage, you should have already developed at least a dialogue with people in developing agreements. This analysis will also provide important input for the subsequent design and construction stages.

GUIDELINES

1. Find noteworthy local cultural elements, both past and present:
 - Specific ethnic groups.
 - Traditional settlements.
 - Local traditions and folklore: language, architecture, clothing, handcrafts, dance, music, ceremonies, magic and religion.
 - Archaeological features.
 - Sacred grounds.
 - Potential for integrating design with cultural environment.
 - Ways of avoiding negative impacts on local culture.
2. Understand and respect the main cultural elements and traits of the region.
3. Research the population and distribution of groups and their distance from the proposed ecolodge.

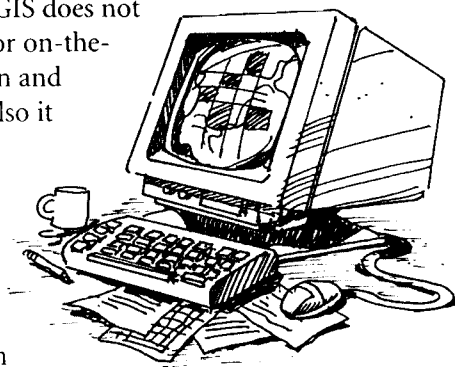
1.3.3 CAD Generated Analysis: The Overlay GIS Method (Environmental Mapping Approach)

Geographic Information Systems (GIS), is a sophisticated computer-based way of generating and superimposing mapped data, and, in the right hands, can help manage tourism-related resources while improving the quality of recreational opportunities. Many environmental issues, including site planning and impact assessment, analysis of soil and vegetation interactions, mapping and modeling of atmosphere events, animal and population distributions, etc., can be effectively mapped using GIS. It is important to understand that GIS is only as good as the information that is fed into it. GIS does not replace the need for on-the-ground verification and further analysis. Also it can become expensive.

Computer manipulation permits greater flexibility and data manipulation and is increasingly being used for site analysis. Computer-aided design (CAD) programs are an enormous asset at any stage of the site planning and architectural design, so long as you do not have to recreate the program for each proposal.

Faster, less-expensive, user-friendly computers have made GIS technology more accessible to wider audiences. With the use of these new data sources, GIS allows us to interpret the site in specific “layers” so that analysis and individual programs can be made for such diverse concerns as vermin control and monitoring of erosion impacts. GIS-based tourism resource and planning models can provide a common framework for the understanding of many aspects of ecotourism that affect the multitude of government agencies, private interest groups, and businesses that require an accurate and current information base.

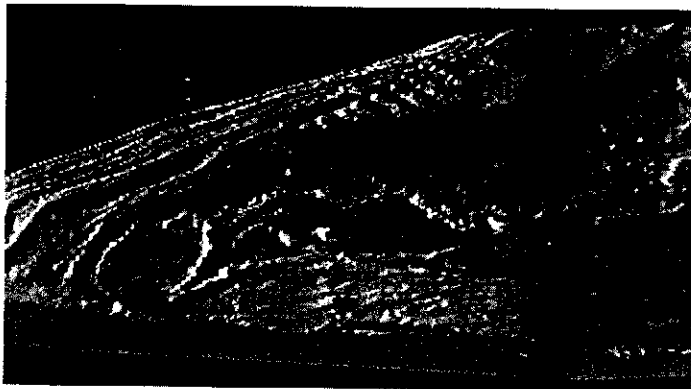
GIS can bring together extremely diverse data, such as data on vegetation, geology, existing and proposed land uses, planned routes, etc. GIS makes it possible to analyze the site’s capability and suitability in connection with proposed uses. It can perform view shed analyses; select optimum pedestrian and vehicular routes; identify the best locations for facilities and campsites; identify especially sensitive sites for complete preservation, and monitor data of various kinds of tourist activities. Provided with monitoring data of various kinds (field sampling, remote sensing, activity



reports), GIS can provide a continuing overview of the impact of tourists and travellers on the areas visited. GIS models of the visited environments can be created and the impacts of planned activities can be tested on these models, leading to more informed decisions.

It is also possible to use GIS to identify the locations of features in a particular area that are capable of supporting various tourism activities. This type of information is extremely important for supporting tourism's interests in integrated resource management.

The overlay method of site analysis is extremely sensitive to which components of the environment are selected for mapping. It is therefore essential that those mapped components represent the key issues among which site evaluation must be resolved. To do this, firsthand knowledge of the terrain must be acquired by a small team of competent observers from different backgrounds in relevant disciplines. For ecotourism sites it is advisable to have at least one person present from each of the geological, ecological and social sciences to assist the landscape architect and architect. Experts in economics, biology, agriculture, horticulture and wildlife behavior can be utilized if required.



GIS terrain modeling using 3-D Spatial Analyst software. Source: EDSA

GUIDELINES

1. Consider using the 3-D analyst, Spatial Analyst and Model Builder extensions to the GIS Arcview program to analyze the site. This is expensive technology to use in the short term but very economical in the long term, given a) an appropriate reason for its use in the first place, and b) depending on the quality of (repeatable) data and information.
2. Use knowledgeable consultants to provide the data required to initiate a GIS study and undertake sufficient training in GIS yourself to be able to run and build your own programs.

1.4 MASTER SITE PLANNING

New tourism destinations are benefiting from regional master planning whether they are initiated privately, by non-governmental organizations (NGO's) or by government. Of all the professions, landscape architects, planners and architects (with a strong ecological and environmental foundation) are among the best trained to design a sustainable development in nature-based areas. They bear a special responsibility for the design of facilities that are to be developed in pristine, ecologically rich areas. However, a considerable number of ecolodges are being designed and built without the services of a landscape architect. In some instances, even architects are ignored. This is rather unfortunate considering that planning is one of the most important aspects of a successful ecolodge. For ecolodges, it would be prudent to include a landscape architect specializing in ecologically sustainable development as an integral member of the design team. In many projects around the world, it is becoming quite common for landscape architects to be the prime consultants, providing the lead role in the design team.

All the elements of ecolodge site planning and design must have a purpose and have in mind the following:

- In the case of a protected area, the relationship of this area with other neighboring areas and the importance of the bioregion and wildlife corridors.
- Understanding of the overall site and its natural and cultural resources.
- Links between all physical facilities (including the ecolodge) and the natural and human environment.
- Links with any other facilities, transport points or infrastructure.
- Links with the general management goals of the surrounding or nearby protected area.

A new paradigm to master site planning is required: one that not only respects the ecosystems of the site and neighboring communities, but also strives to retain and in some cases enhance, the "sense of place" of the site. Therefore, a professional master site plan should cover zoning and the access to the site.

1.4.1 Zoning

Zoning is the process of applying different management objectives and regulations to different parts or zones of a specific area. Once the most appropriate location for the ecolodge has been defined within a relatively undisturbed natural area, a zoning system is required in order to evaluate and classify the surrounding area, according to its most suitable use.

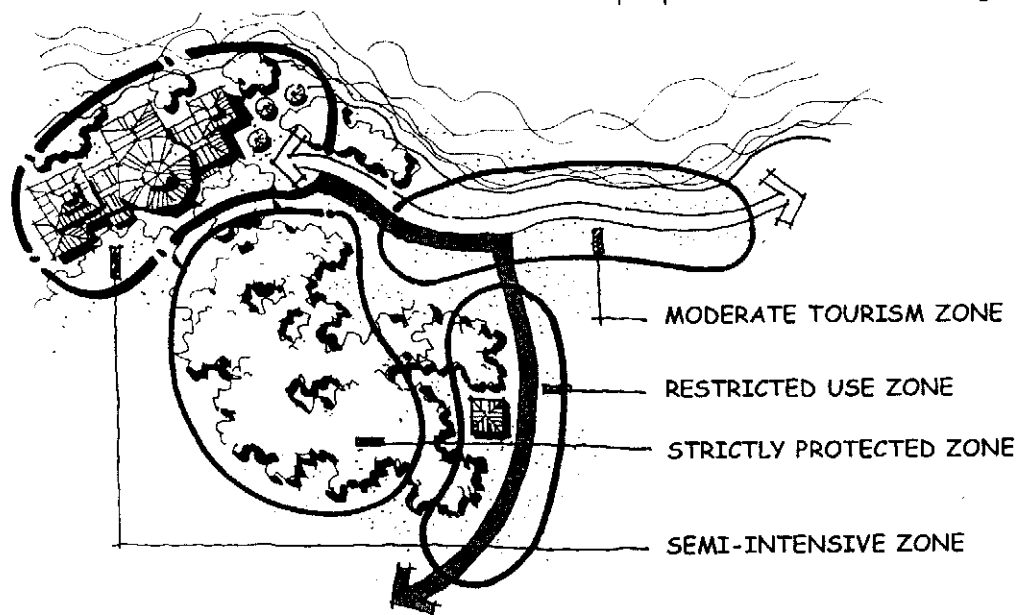
The proposed site plan and zoning scheme for the ecolodge must comply with existing management plans and bylaws (i.e., in the case of legally protected areas).

In essence, a zoning scheme shows the development suitability of the different portions of a site striving in every case to minimize impacts on the natural and cultural environment, as well as optimizing the ecotourist's experience. Zoning also indicates to us where facilities, activities or services should not be developed.

Among other things, the zoning strategy consists of concentrating visitor impacts and physical facilities in certain areas and dispersing or prohibiting them in other areas.

GUIDELINES

1. In order to carry out a proper zoning plan, you should consult with professionals and technicians of different areas and field expertise. Consultants may include landscape architects, architects, planners, engineers, ecologists, biologists, geographers, anthropologists, archaeologists and local authorities. Also very important is the consultation with the local people who generally have a better knowledge of the site. If at all possible, employ locally. As is the case with other expenses, fees for some of these professionals need to be considered right at the beginning.
2. Have each one of the proposed zones correspond to a specific management plan, always in accordance with habitat management planning objectives of the surrounding natural and cultural ecosystems. The following zoning scheme (especially for terrestrial ecosystems) is proposed:
 - a) Strictly protected zone — In the strictly protected zone (sometimes called
 - b) Restricted tourism use zone — In the restricted tourism use zone (sometimes called "wilderness" zone), allow only access to a strictly limited number of tourists, usually on foot (or, in some cases, by rowboat), taking rigid measures for minimizing impacts (one way of doing this, is by having the tourists always accompanied by a guide). Include only trails (foot tracks) and never highways or roads.
 - c) Moderate tourism use zone — In the moderate tourism use zone, encourage visitors to enjoy activities that will endeavor to enhance environmental education and ecological awareness, as well as a conservationist ethic. These zones may have limited low-impact tourist services (mainly of an interpretative nature). If roads are to be included, they must be strictly low-impact and low-speed. Tourists may move around this type of zone by foot, bicycle, horse, camel, rowboat, electric motorboat or low-impact land motor vehicle, but always on previously specified, controlled, and mutually exclusive paths.
 - d) Semi-intensive tourism development zone — In the semi-intensive tourism development zone, which should always be an area of limited size, concentrate on the main tourism facilities, including the ecolodge itself and complementary services (such as an interpretative center, staff dwellings, highway or road access and parking space, etc.). Preferably, this zone should be located in peripheral areas where clearings exist or that



may already show a certain degree of environmental damage or deforestation. Never locate this zone in a primary vegetation area (including a mangrove or a marshland). In every case restoration and reforestation tasks should be carried out in this zone, based on endemic and native species.

- e) It is important to mention that ecolodge development should never consider an intensive tourism development zone.
3. Use zoning to define allocation of areas for different uses and services based on the limits of acceptable change (described in Chapter 2) of the natural and cultural resources as well as other biophysical and climatic conditions. It must also support efforts to conserve the area's natural and human resources and also contribute to enhance the quality of the ecotourist's experience.
4. Consider allowing proposed land uses to increase if it has been determined that project areas and corresponding levels of intensity are found not to cause degradation or decrease the quality of the user's experience. The result is a project area that has a management plan that allows "development creep."
5. For each of the zones, plan for a specific density related to buildings and their primary uses. Examine relative merits of concentration versus dispersion, remembering that natural landscape values can normally be best conserved if the physical plan is carefully dispersed but also, inversely, knowing that by concentrating buildings and other structures (in the semi-intensive tourism development zone) you leave more available undisturbed natural zones. Again, the challenge is striking the right balance.
6. Remember that activities carried out in different zones are normally mutually exclusive (and often conflict), so that zoning decisions must be taken very carefully.

7. Design a flexible plan that allows a diverse range of clients to enjoy different experiences at different times of the time of the year.

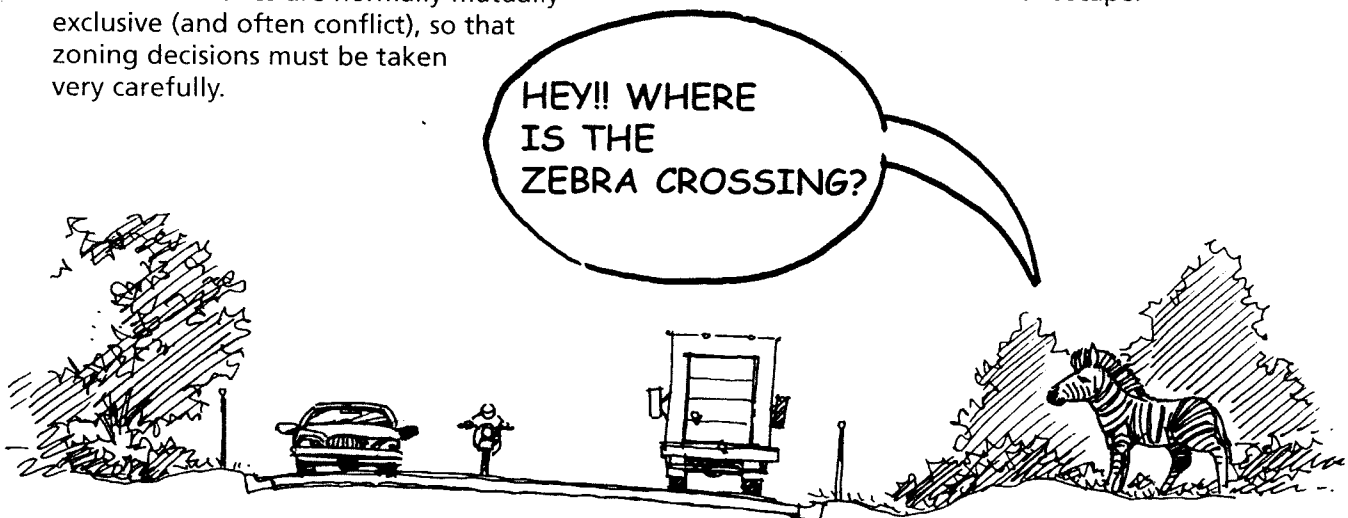
1.4.2 Access to Site

Ecolodges often are located in remote and wild areas, and therefore few typical amenities and services found in towns are normally available. This includes access by paved highway, public transport, electric and telephone lines, piped potable water, public drainage and sewage, garbage collection and disposal, nearby school and medical services, shopping areas, etc.

For this reason, a different approach to planning is required, based on a high level of functional, energy and food self-sufficiency. Before designing and building your ecolodge, realistically and clearly identify the specific characteristics of isolation and difficulty of access to services and amenities to determine the level of self-sufficiency you wish or need to provide for the lodge to be sustainable and viable.

GUIDELINES

1. Negotiate appropriate public transport links with the local authority or bus operator.
2. Provide your own shuttle bus service to and from a nearby settlement with secure car parking. This will add immensely to an ecolodge's feeling of wilderness. It also gives you full control of vehicular movements around the lodge and eliminates the need for sacrificing land to visitor parking.
3. Design roads in a way that reduce speed.
4. Avoid building roads with a width of more than 5m/16ft within a protected area or ecotourism destination. Wider roads become veritable barriers for wildlife mobility and also mar the natural landscape.



5. Create the most appropriate access to your ecolodge, striking the right balance between ease of approach and impacts on the natural environment. Limit the number of entry points to your site (preferably only one) in order to facilitate surveillance control and management.
6. Remember that paved highways are usually an invitation for all kinds of human settlement and that they stimulate branching effects. If there is no existing paved highway access and the distance from the tourism distribution points is considerable, sometimes there is less impact in developing a landing field for light planes than to build a paved highway.
7. Keep in mind that construction of highways, roads and other motorways within a natural area or near to it will impact on the natural resources that one wishes to protect. Consequently, they should be strictly limited and justified only if no other viable solutions exist.
8. Impose rigid limits on the use of automobiles and other motor vehicles, according to a clear and strict zoning scheme. In any case, establish a low speed limit for any motor vehicle in the immediate vicinity of your ecolodge, and where appropriate, within the natural area.
9. Understand impacts of any roadways as barriers to small animals — particularly to breeding migrations, e.g. frogs and salamanders.
10. Whenever possible, use waterways (fluvial, ocean or lake), ensuring the use of boats with minimum negative impact. Avoid the use of internal combustion motors as much as possible within fragile areas such as mangroves or marshes. Consider the use of electric-powered boats. For short distances and wildlife-watching excursions it is best to use a stable rowboat. Particularly appropriate are catamarans, which make good, floating platforms if boards are laid across the two canoes. These waterways are often crucial to local fishermen and hence the local economy, so their use is a sensitive issue and needs to be negotiated.
11. Try to locate your project a fair distance from airports or main highways, in order to minimize in general the negative environmental impacts they cause and avoid, among other things, continuous contact with excessive noise and fumes. However, do note that being far away from airports and main highways carries with it the potential need to build more roads, so you will need to weigh the impacts on a case to case basis.
12. Other design considerations that you need to incorporate are: the provision of safe paths for pedestrians, cyclists, etc., the provision of multi-modal access corridors and the use of road surfaces that are local and non-petroleum based so as to increase recharge of water and reduce runoffs.
13. Include signboards in critical terrestrial areas (turtle nesting beaches, bird nesting or roosting colonies, dangerous marshes, and vulnerable sand dunes) to which the public would normally have ready access. They remind people of entry restrictions, inform tourists of behavior codes, carry educational information, and warn people of potential hazards. It may be necessary to fence off particularly sensitive habitats to discourage public entry.
14. Minimize impermeable surfaces when possible to reduce runoff and maximize groundwater recharge.

1.5 SITE DESIGN

Site design, as compared to master site planning, is specific to the property on which the ecolodge is to be developed. It deals with issues that are within the ecolodge site.

Ecolodge site design should enable the principles of adaptation, reduction, reuse, repair, recycling and energy conservation to be used. Successful site designs for ecolodges will derive their strength from the specifics of the site. In ecolodges, the overall context of the site is one of the main reasons for its existence and must be recognized as such by the designer. Site design should be based on an understanding of the relationship between the indigenous cultures and the land. Research into traditional site planning and land use and incorporation of their sustainable principles can help engender a site plan that is sensitive to the spirit of the place and the indigenous culture.

The main objective of the site design process is to balance human needs with the viability of natural systems. Working with what the land has to offer is the key to creating a built environment that exists in harmony with the natural one.

GENERAL GUIDELINES

1. Take into account the area's biodiversity and any specific ecosystems and the site's relationships with any nearby farming or fishery resources, minimizing all environmental impacts. Following with the zoning strategy, sensitive areas should be strictly off-limits or have limited access. Concentrate development in less sensitive areas. Protect coastal dunes and the natural vegetation,

and avoid having negative impacts on nesting and spawning grounds. Strictly avoid the construction of large artificial “features” such as lagoons with direct discharge to the sea. Visitors wishing to swim may be perfectly happy with a mixed-use earth dam, or perhaps a moderately sized swimming pool. Note that swimming pools have significant impacts in terms of chemical storage, handling and the regular disposal of significant volumes of contaminated backwash water. Carelessly managed pool chemicals are toxic and highly explosive. For more information on pools, see section 1.5.6 later in this chapter.

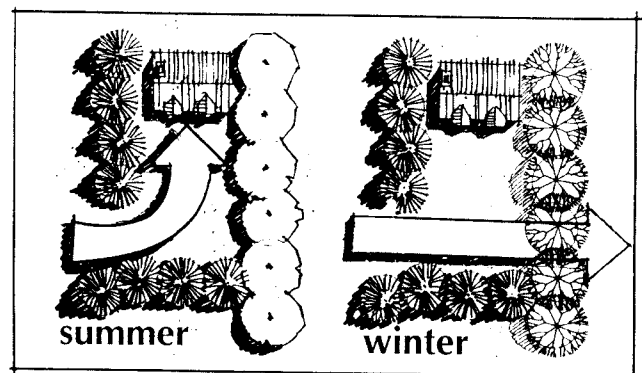


2. Take great care in the design of the proposed ecolodge, and comply with the corresponding management plan of the respective protected area. Frequently the site selected for an ecolodge will be within or near a legally or officially protected area.
3. Avoid prominent marinas, embankments and jetties, which are counter to a natural image. Provide a simple jetty for small boats and canoes. Apply appropriate systems for controlling all sources of pollution from boats/ships. Strictly prohibit jet-skis and the like.
4. Phase your project so that its impact can be monitored, and modify subsequent phases based on the study results.
5. In hot localities, if you include an area for swimming, consider a natural or semi-natural area, like a lake, artificial lake, river, or the sea, but be sure there are no immoderate risks (noxious fauna, excessive sea waves or undertow, etc.) and avoid disturbance to aquatic fauna.

6. Become responsible for the best natural or manmade views from your site. Don't ruin other people's views to your site.
7. Preserve existing trees and other natural habitats, such as low shrubs, especially along edges of wetlands and forests.
8. Avoid blocking the views that adjacent owners have of marshes, lakes, etc.
9. Note any drainage ditches that need to have unimpeded flow.
10. Note any special restrictions such as habitat preservation areas or setbacks. Ensure that more than adequate buffer space is provided so that any intrusion is minimized and reinforced with appropriate signs.
11. The goal of ecolodge site design is to emphasize the natural characteristics of the site. Site design consists of the following main elements:
 - Physical structure siting
 - Road design
 - Nature trails
 - Fences and retaining walls
 - Grading and drainage

1.5.1 Physical Structure Siting

From the lessons learned through the site analysis process, a site plan should be designed whereby the buildings are in harmony with the landscape. Draw upon local precedents for determining the relationship between structure and environment. To achieve this, one of the primary techniques would be to protect sensitive habitats from development. The ecolodge should be planned around natural features rather than imposing typical resort design solutions. Buildings should not try to compete with the surrounding plant and landforms, which, after all, are the main attractions. In colder climates, wind directions are a major factor when siting ecolodge units.



GUIDELINES

1. Whenever possible, develop in previously disturbed sites. Redevelopment requires minimal disturbance of natural systems since the disturbed area may already be impacting the site. Suitable old or traditional buildings on the site should be converted into ecotourism facilities. Conversion of existing facilities is one of the lowest impact design techniques.
2. Consider the concept of cluster design. Consolidating functions or segment facilities can reduce footprints of individual structures. Having stacked guestrooms is better than being side by side. However, be careful not to build above the tree line. For example, if a visitor's lodge is sited on a ridge with a view over the valley below, the building will be visible from many angles and it will look glaringly conspicuous. But if it is sited below the ridgeline, on the slope, is single-storied and mimics the color of the landscape, it will be far less obtrusive.



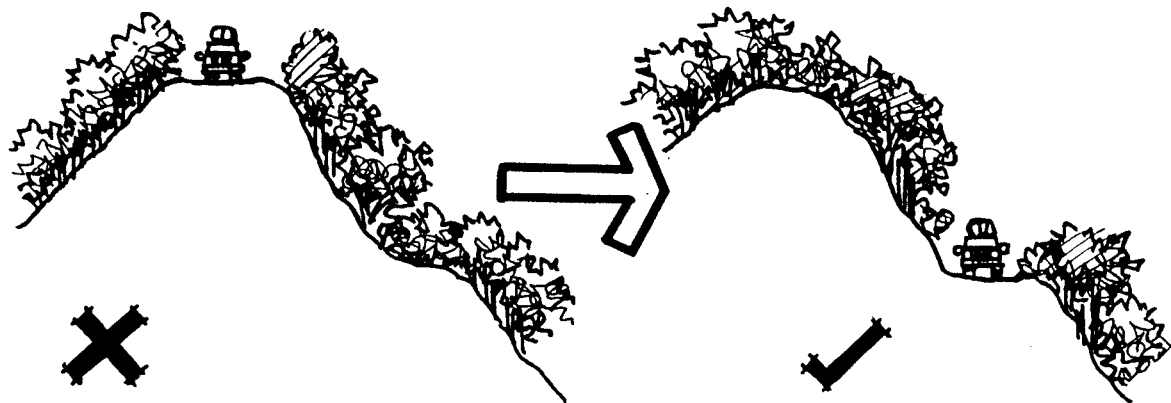
3. In the spacing of buildings, allow for animal movement, plant growth and integration with the existing site. If possible, build on stilts to allow for animal movements.
4. The orientation of buildings is also very important. The building should be oriented to take advantage of shade and airflow for cooling in summer, and solar energy for heating and wind protection in winter.
5. If solar collectors or other photo-voltaic systems are proposed, orientation should allow maximum access to sunlight.

6. The landscape architect/architect should not carry out any design without a topographical map of the site that shows the location, girth and canopy diameter for every major tree on the site. Retention of existing grades around trees is critical to their survival. Through very simple cut-and-fill calculations the designer can minimize earthwork and clearing by aligning long buildings and parking lots with landscape contours or breaking them into smaller units on a series of terraces that can take up the excess slope.
7. Site buildings and other structures to avoid cutting trees and to minimize disruption of other natural features.
8. Locate pasture and corral areas for any horses, camels, and other grazing stock away from natural sources of potable water or watersheds.
9. Avoid sources of disagreeable sounds and smells near your ecolodge. In your project, utilize technologies that diminish gas emissions.
10. Site your ecolodge far from local communities and create buffer zones that will not permit human habitation.
11. No coastal ecolodge should affect or modify the natural coastline in any way.
12. Avoid building on low areas. Aside from the danger of flooding, humidity will be higher and breezes less obvious.

1.5.2 Road Design

The main approach to the layout of the ecolodge should limit roads and vehicular traffic. All by themselves, roads can change the perception and function of the ecolodge. The creation of any road will alter the configuration of the landform and will lead to topsoil loss, erosion and increased run-off. Minimize the width and length of roads and use traffic-calming techniques, incorporating prominent bicycle routes and pedestrian path networks.

Road construction can have a devastating impact on the surrounding environment for literally hundreds of meters on either side. The opening of the environment can change microhabitat, including relative humidity, canopy and sun levels, hydro-period, and physical factors related to soils. The construction and type of cover (porous versus nonporous), the width and the methods used to reconstruct these areas of habitat change will have a great affect on the success of subsequent regeneration. The best solution is always to carefully remove and store the topsoil lost to any construction, for re-use adjacent to the finished development.



In parks such as Denali National Park, Alaska, and Grand Canyon National Park, Arizona, vehicular routes are being closed and reclaimed and shuttle systems have been introduced. Provision of transport hubs and public transport systems will be necessary to limit visitor impacts for many protected areas in the world and may be a wise option for a new ecododge. This concept could be crucial to highly visited areas like Yosemite National Park, where visitor impacts have reached critical levels.

GUIDELINES

1. Although in some cases roads may be built in order to bring tourists into relatively close contact with wildlife, they should avoid sensitive areas such as breeding sites or hunting grounds. Roads in nature areas should avoid as much as possible any direct interaction with the wildlife and the flora. Therefore, they should not follow river courses for long stretches but have various viewpoints along the way and they should also not encircle waterholes. Both these approaches would help maintain wildlife behavior patterns.
2. Prior to construction of roads, inventory and move plants and topsoil that could be disturbed by construction activities. After road gradation has been completed, the plants and topsoil should be returned as closely as possible to their original sites.
3. Appropriately signpost all roads, endeavoring to stimulate appreciation of the natural and cultural environment, while providing interesting and pertinent information, and also encouraging suitable behavior. Avoid excessive signposts, which mars the natural landscape. Provide additional rules in brochures placed in visitors' rooms.
4. On hilly areas, avoid locating roads on ridgelines since this scars the landscape. They should be a minimum of 5-8m (16-26 ft) distance below the ridgeline.
5. Design roads using the topography to minimize visual impacts and create dynamic variation in views and orientation. Allow for wildlife movement patterns and habitat requirements, disturbing as little vegetation as possible.
6. Ensure that water runoff from the road does not create erosion channels. Consult an engineer if there is doubt about building gravel sinks or other drainage tools.
7. Clearly mark vehicle access and parking areas and limit it to those locations.
8. Draw up contracts with road builders and contractors that have conservation clauses with penalties for unnecessary impacts. The contract should specify the materials and methods to be used and include a timetable of construction. Additionally, give incentives for tree protection.
9. Locate your driveway to meander around trees and other natural features.
10. Limit the impervious cover of the ground to the minimum needed, especially around existing trees. Excessive areas for driveways should be avoided. A pervious surface, such as shell, turf, stone, brick or marl is recommended.

1.5.3 Nature Trails

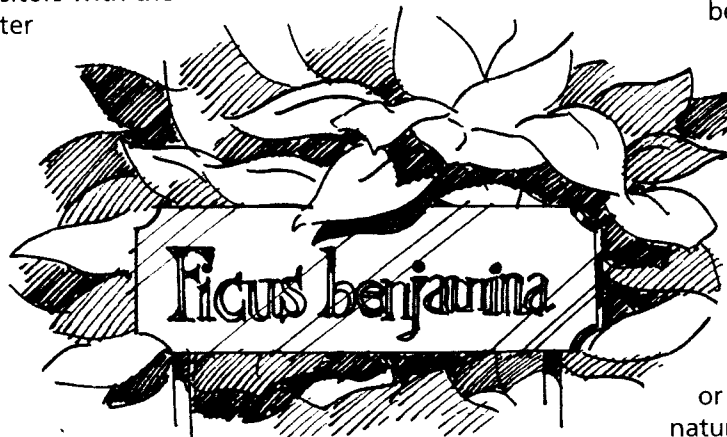
Since trails are meant to be interpretative, it is important that they be designed and planned hand in hand with the rest of the program plan and site design. The information obtained from the GIS overlay site analysis is vital and should be used to prepare an inventory of the various landscapes, and wildlife that exist in the nature trail area.

During the planning stages, biological experts need to evaluate and determine the places and types of infrastructure that is needed to protect the environment while providing efficient access. Planning requires a good understanding of environmental and species sensitivity and knowledge of trail design and limits of acceptable change.

Guided trails are those in which the local guide (along with the “tour leader” in some instances, especially for organized groups) leads the way. In this case, excessive signage could at times be a negative factor that can eliminate the more natural experience of visiting predominantly “unlabeled” trails and ecosystems. Further, “unsigned” nature trails provide greater job opportunities for the guide and local experts.

GUIDELINES

1. Take special care when planning trails through pristine areas. It is prudent to hire a naturalist to help place the trail system to minimize disruption of wildlife and habitat.
2. Capture the “sense of place” and design the nature trail to be in harmony with its surrounding. The visitor should not feel that there is intrusion taking place; otherwise the feeling of wildness or sacredness will be lost.
3. Place unobtrusive labels in those trees and bushes that are closest to your ecolodge so as to familiarize your visitors with the species that they will later be encountering in the nature trails.
4. Design a network of nature trails (footpaths) with suitable signage. Provide trails with an adequate spectrum of options for different fields of interest and physical strength of the tourist.
5. Include a sign with a map of your trail network in a conspicuous spot. Signposts should be clear yet sufficiently subtle so as not to ruin the feeling of being in naturally pristine environments.
6. Make sure that all trails respect wildlife movement patterns and habitat requirements, as well as location and growth and expansion patterns of the local flora.
7. Make the most of interpretative opportunities. Nature trails can be a valuable aid to ecological education, interpretation and awareness.
8. Preferably design your nature trails as closed circuits, so that walkers return to the starting point without having to retrace their steps. Give options for a short-cut return for tired visitors.
9. Always clearly indicate at the trail’s starting point the distance to be covered and the degree of difficulty (level ground, gentle slopes, abrupt terrain, etc.), including a map of the trails and an explanation with photos or drawings of the local flora and fauna they may see. Along the trail indicate unobtrusively but clearly the covered and remaining distances (approximately every 200m or 650ft) and the time based on normal walking speed.
10. Provide erosion controls (caused by direct and indirect factors) for all trails. Deviate water flow away from trails before it attains too much speed and intensity and starts creating erosion problems. Control vegetation on the sides of the trail, periodically trimming it so as to avoid plants invading the path.
11. Always use low-impact and low profile techniques and materials. The surface of your trail should be resistant to continuous use, but avoiding as much as possible the use of concrete or asphalt and synthetic pavements. It is better to use natural permeable materials or solutions that allow water absorption by the ground and not surface flow; materials such as gravel, sand, wood shavings, small cross sections of tree trunks or branches, or boards, etc. Consider natural resin-based paving mixes instead of asphalt.
12. Minimize stream crossings by nature trails and roads.
13. In the case of crossing mangroves or wetlands, use elevated boardwalks with handrails. In abrupt terrain (especially steep ascent) use well-anchored staircases, with possible complementary use of cables and ropes for tourist safety.





14. Where appropriate, consider designing and building a limited number of observation towers and blinds (hides) for watching wildlife, especially alongside marshlands and mangroves and in the forests.
15. If you include horse trails, make them wide enough to accommodate two horses at a time. Free height to branches of roadside trees (if any) should be at least 3.5m (11ft). Bicycle paths should be a minimum width of 2m (7ft) with all-weather surface material such as compacted gravel.
16. Design horse (or camel) trails and bicycle paths so they are separated from each other and from foot trails, since their use is mutually exclusive and potentially conflicting.
17. Use foundation systems that minimize excavation and site disturbance.
18. Avoid use of conventional preservative-treated wood. Instead specify FSC-certified tropical hardwood or, if not available, use recycled plastic lumber products.
19. As for access roads, existing nature trails should be repaired and used. The impacts should be assessed, fragile features may be used for interpretation; other stretches may require slope stabilization, drainage or other erosion control measures.
20. If possible, make shorter trails with regularly spaced bench seating for elderly or handicapped visitors. A nature trail should be inviting and must have clear, well-marked entry and exit areas. These short trails should be wide and flat

enough to walk along in comfort. Steep climbs and physical obstacles should be avoided, though in some areas it will not be possible to have flat trails.

21. Select location, alignment and grade considering aesthetic (scenic beauty, harmony with natural landscapes), technical (soil type, bedrock, excavation, slope and drainage) and if you so wish, metaphysical criteria (Vaastu Shastra, Feng Shui) (see Appendix at end of this chapter). Technical consultants should be approached to design the trail, which should be located in such a way that the area's features and scenery can be enjoyed without disturbance to the natural setting.
22. Design your signs to be fun and educational at the same time and make them able to withstand the weather and be clearly visible.
23. Clearly mark your nature trails in order to encourage visitors to stay on paths and not stray into sensitive areas.

1.5.4 Fences and Retaining Walls

Fences and retaining walls are an important element in many landscapes. However, in ecolodges both should be avoided as much as possible. Poorly designed fences can spoil a view and restrict wildlife movement, and retaining walls are sometimes a result of cutting into a natural landscape. In ecolodges, providing adequate housing for working within a confinable yard should be a basic requirement. Domestic animals pose serious threats to indigenous wildlife, particularly in pristine areas and restrictions must be imposed on introduced animals to avoid having fences around the ecolodge.

GUIDELINES

1. Avoid erecting fences as much as possible. Fences undoubtedly have a visual impact and should only be used for the protection of your guests. If this is the case, then plant a tree fence similar to those found in places like Central and South America.
2. Plant quick-growing species of hedge or shrubbery to screen undesirable views. Rainwater tanks, outbuildings, etc. may be decoratively painted or camouflaged before considering fencing.
3. If walls or fences are necessary, site them away from visitors and provide appropriate openings to permit wildlife movement wherever possible.
4. Design the fencing or retaining walls to relate to the architecture and not the property line, unless the fence has a pest control function, when you will want to maximize wildlife protection.

1.5.5 Grading and Drainage

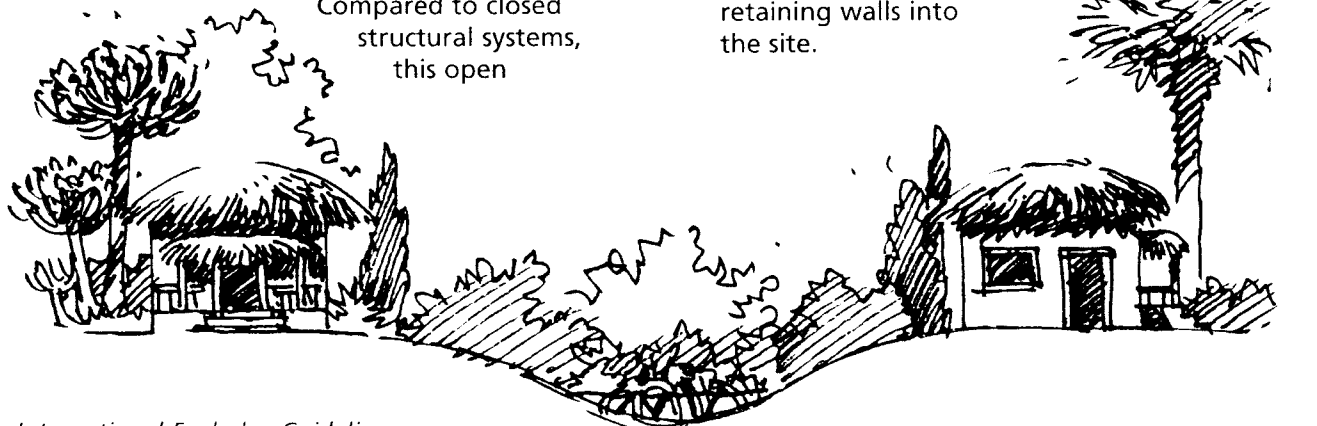
Every ecolodge site is in a watershed, and everything the developers and tourists do on a site has an impact on the watershed's condition. Sediment from soil disturbance, oil leaks from cars, and fertilizers pollute streams; excessive runoff aggravates flooding and erosion; and deflection of rainwater from its natural paths dries out streams and wetlands. Clearing and earthmoving increase erosion by as much as 40,000 times the rate occurring in undisturbed sites. Siting construction and earthwork away from drainage courses preserves vegetated buffers and protects stream quality.

"No cut, no fill" is a worthy goal.

GUIDELINES

1. Use vegetated swales as a natural way of conveying concentrated runoff. This is more environmentally friendly and more aesthetic than structural gutters or pipes. When runoff contacts vegetation and porous soil, its volume is reduced, and pollutants are filtered.

Compared to closed structural systems, this open



drainage increases plant variety, reduces need for irrigation water, and reduces drainage velocity and erosion. In addition, it decreases downstream peak flow and runoff volume, increases infiltration, supports wildlife habitat, symbolizes interaction with nature, and needs less maintenance.

2. Carefully design the grading and excavation in an ecotourism site. Using the existing topography will save both construction and maintenance costs and conserve topsoil, as will minimize paved areas.
3. Make managing runoff an important facet in your ecolodge. If drainage controls are implemented at the beginning of site planning they can be integrated economically in the overall development. The concept should be to capture rainwater from roofs and filter runoff from impervious pavements with minimal disturbance to natural drainage patterns.
4. Use natural processes for beach restoration and safeguarding. On most resort beaches, this is done with heavy engineering equipment and traditional methods. Ecologically sensible strategies, such as planting native vegetation to trap and hold the sand, are usually much more effective in achieving long-term dune and shoreline stability.
5. Keep site grading to a minimum and avoid alteration of existing drainage systems or tree drip lines.
6. Avoid building in the wet season.
7. Have conservation clauses in building contracts that spell out conservation protection measures and penalties for non-compliance and the catching and eating of wildlife on site.
8. Avoid allowing heavy equipment or topsoil storage to occur within drip line zones.
9. Integrate unavoidable retaining walls into the site.

10. Do not directly channel runoff into water bodies or marshes, conservation areas or other impervious surfaces without adequate filtration.
11. Divert artificial runoff into existing natural swales.

1.5.6 Swimming Pools

In our increasingly health conscious society, more and more “soft focus” ecolodges are recognizing that the provision of swimming pools and “health centers” give them a competitive edge, especially in warm areas. Many tourists, after a long and sweaty day in the field, like to enjoy a swim in the late afternoon or early evening. However, any swimming pool in an ecolodge must be carefully planned to reduce their additional burden on the environment. A lodge with existing natural swimming opportunities such as a lake or the sea should avoid having a swimming pool.

Swimming pools and spas can be voracious consumers of water and energy, require substantial chemical treatment to ensure that they meet hygiene standards, and create a substantial additional laundry demand. If it is felt that swimming pools are a necessity, especially in hot areas, we suggest that they be built with the following guidelines in mind.

GUIDELINES

1. Design

- a) Design swimming pools only in sites where water supply is sufficient to support them, perhaps where catchment or solar distillation is an option.
- b) Ensure that your water treatment and filtration is the most effective available to minimize water, chemical and energy consumption. Consider the various alternatives to chlorine and bromine for treating pool water, such as electrolytic chlorine generators, ozone generation and ionization systems.
- c) The size, shape, and siting of swimming pools and equipment enclosures must be carefully considered to achieve a feeling of compatibility with the surrounding natural elements and the architecture of the lodge.
- d) Carefully site the pool’s plant room as this can minimize routing and ducting of services and increase heat recovery potential. Ensure that sound from any audible equipment does not intrude on guest accommodation. Controls, dosing and filtration maintenance should have clear and simple instructions and the staff responsible must be properly trained in pool operation.
- e) Install safety barriers around pools to stop children and other small animals falling unobserved into the pool. Build in climb-outs and safety catches for animals that have fallen into a pool or drain.
- f) Securely cover a pool when it is not in use. Aside from the safety benefits, a cover that excludes light will effectively turn a pool into a tank — preventing algae growth, and reducing maintenance of the water to a bare minimum. Usually one slow-release chemical disinfectant will last a winter closure (but it would be wise to monitor your first off-season).
- g) Use filtered water from backwashing and draining the pool to irrigate gardens.
- h) Encourage bathers to use the toilet and (poolside) shower before using the pool, which will significantly lessen demands on filtration and treatment, and reduce backwashing. You can also buy urine-sensitive dyes for pools that turn the water around offenders an embarrassing red color.
- i) Consider shading some pool areas to reduce evaporation and chlorine loss and to allow guests to avoid ultraviolet light exposure.
- j) For swimming pool areas; use solar powered, in preference to high efficiency, lamps with time switches for remote area lighting, and sensors for areas that have periods of non-occupancy.
- k) Consider using solar energy heating and a solar-power assisted pump for the pool.
- l) In areas where water is a scarce commodity, consider the pros and cons of a reverse-osmosis plant to convert sea water for all your water needs; normally it is considered inappropriate for “environmentally sensitive” development, bearing in mind the significant impact this will have on marine biodiversity.
- m) Remember, excellent design and performance can inspire good management, will showcase environmentally-sustainability and win the enthusiasm of the staff.



2. Swimming Pools for Cold Climates

- a) Seriously consider using solar energy heating for your pool (see section 3.5.1).
- b) Install highly efficient thermal insulation as a priority.
- c) Consider the influence of solar radiation and daylight. Good quality glazing systems can offer increased daylight for minimal heat loss.
- d) Recirculate air and use run-around coils to recover heat wherever possible; e.g. venting sauna heat to the pool hall using waste heat from refrigeration and run-around coils on heater flues.
- e) Consider using condensing boilers, which are ideally suited to under-floor heating and swimming pools.
- f) A pool cover is essential whether you are indoors or outdoors. Fully automatic cover systems are a possibility, but only if the technology is readily available and not excessively expensive. Ensure it will cover your pool if it is an irregular shape. Use of pool covers reduces evaporation, enabling savings to be made in heating, and also has safety benefits.
- g) Consider the wind direction, so that entrances and ventilation points are sheltered.

3. Operation

- a) Manage the running hours of the pool circulation pump carefully. These can be dramatically reduced or eliminated at night.
- b) Pools need daily management and there should be a strict monitoring and maintenance program with a timetable covering the full year.
- c) In cold climates, check that heating, hot water, ventilation and lighting time switches are set correctly according to season.
- d) In cold climates, maintain air conditioning vents and heating outlets for operating efficiency.

1.5.7 Herbal Therapy / Meditation / Health Centers

Health centers are becoming very popular and have become important considerations for ecolodges. "Mind, Body and Spirit" packages are well sought after by urbanites. Also, baby boomers have come of age and in the fast pace of today's societies, tourists will always be looking for periods of relaxation on their vacations. Health centers provide recuperation from hiking, rafting, kayaking, etc., and they should be designed with a very natural look.

