

Landscape designs that emphasize native trees, vines,

food for your guests. Remember that trees provide shade, climatic and erosion control.

on the canyon floodplains. Hopi people lived in the southwest United States, in what was known to them as the spiritual center of the continent.

Below is a selection of quotes from well-known native spiritual leaders. They give a poignant picture of how the natives viewed the land.

*"The Great Spirit said not to take from the Earth — not to destroy living things."* Thomas Banyacya, Hopi Indian

*"The ground on which we stand is sacred ground. It is the dust and blood of our ancestors. A few more passing suns will see us here no more, and our dust and bones will mingle with these same prairies."* Chief Plenty-Coups

*"When we dug roots, we make little holes. When we built houses, we make little holes. We don't chop down trees. We only use dead wood."* Old holy Wintu woman

*"Loneliness is an aspect of the land. All things in the plain are isolated; there is no confusion of objects in the eye, but one hill or one tree or one man. To look upon that landscape in the early morning, with the sun at your back, is to lose the sense of proportion."* Scott Momaday

*"The earth and myself are of one mind. The measure of the land and the measure of our bodies are the same."* Chief Joseph

*"In our every deliberation, we must consider the impact of our decisions on the next seven generations."* From the Great Law of Haudenosaunee (Six Nations Iroquois Confederacy)

The Pitjantjatjara — an indigenous Central Australian tribe — is just one of the many tribes of a network of a religiously secretive and fundamentally nomadic people, who share common beliefs despite having developed more than 700 languages over 40,000 years in their movements across the continent. This information has been provided by Diana James and Architect Paul Pholeros who worked with the people to develop a visitor center.

The design of housing and the spatial arrangement of houses to each other and the environment are vitally important to the spiritual health of a people who have had to adapt to settlement. If anangu maru (a tribal people) live too long inside houses and in large settlements that close them off from their environment, they lose heart. They need to see the country, feel the wind and the early morning sun on their skin. Then they can hear the land and know themselves.

The Pitjantjatjara people understand that energy lines criss-cross the earth; these are the Tjukurpa trails, the suggested "songlines" the Creation Ancestors made as they traversed the country.

The Tjukurpa — Dreaming/ Creation Law — established the inter-relatedness of all things. These ancestors were forebears of the animals and humans today, they created all the foods people eat, the plants, the rocks, the landforms, the water systems and the stars that guide travelers and mark the seasons in their movements.

Human beings are an integral part of this whole system. Where they live and how they position their dwellings is determined by the spiritual, ecological, topographical, hydrological and sociological aspects of this continuous living Tjukurpa (Dreaming). All people need to be part of a rich cultural life that gives meaning to all our actions and relates us to our living environment and the land.

Nganyinytja, a senior custodian of Pitjantjatjara Grandmother Law, speaks of her people's relationship to country: "Our spirit stands open. I live in the open, where I can see the hills and the bush. Living in the open, not enclosed, one's spirit is strong. A long time ago everything became related — the stars, the earth, the hills, the different animals, the different bush foods — everything."

Metaphysical Importance of Open Space — Being in and part of the open environment is essential for the wellbeing of the soul — listening to the wind, feeling the sun on skin, listening to the birds, observing the stars to tell the passage of time and the seasons, and participation in the extended communal family is vital to health.

It is important for the well being of the host community and its environment that visitors are cared for spiritually as well as physically, and develop a feeling of kinship with the places they visit.

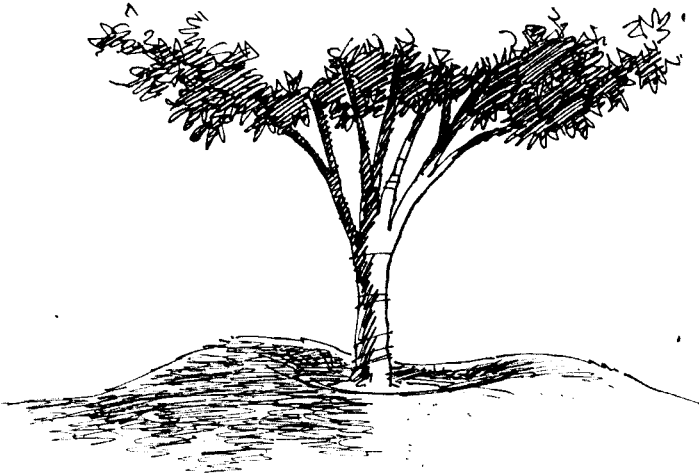
## D) SENSE OF PLACE — SIX SENSES APPROACH

An interesting method of metaphysical site analysis is the six-senses approach, in which environments can be therapeutic in that light, color, scent, sound and water can all be used as therapies when incorporated into ecolodge design and decoration. Aromatherapy, color therapy, hydrotherapy, sound and light therapy can all bring their deep and personal healing qualities into the ecolodge.

Clare Cooper Marcus, Professor Emeritus at University of California - Berkeley advocates that in order to become "one" with the site, the designer should spend a couple of days and experience the site via each one of the six senses. The main objective of this method is for the designer to enter and experience the essence of the site, and how it is for the designer.

Before objective data collection begins, it is a good idea to allow time to experience the chosen site subjectively in person. Sit somewhere comfortable with a view. Take a few minutes to relax, breathe deeply — really "be" in the place. Try to let go of current anxieties,

3. When raising the grade around an existing tree, avoid "new" soil from coming in contact with the bark.



4. If invasive landscaping adjacent to trees is essential, cut outside of the drip line where possible and remove the same percentage of branches as roots lost.
5. Whenever possible, an on-site plant nursery for helping propagate, manage and sell endemic plant stocks will be a strong advantage, particularly if it incorporates the ecolodge's composting system.

### 1.6.3 Integrated Pest Management

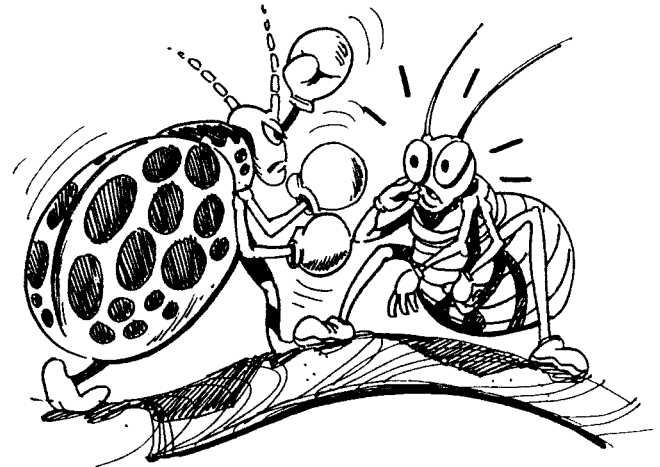
Pest management would not be necessary in an ideal ecosystem. However, in the real world, you will have to protect the biodiversity and fitness of land in your care from a range of threats such as plagues of insects, the invasion of genetically modified pollens or a continual problem with feral domestic animals destroying habitat or preying on protected native species.

In disturbed and landscaped areas, especially in tourist areas, lawn and landscape maintenance can generate a high concentration of pesticides, nutrients and other pollutants. Integrated Pest Management (IPM) uses biological controls as a first defense. These include parasitic insects that destroy pests, pheromone (sex-scent) traps, natural pesticides like pyrethrum and companion planting. If such non-toxic controls fail, carefully timed and targeted pesticides should be used. These controls need to be supervised by a knowledgeable biologist.

Lawns generally have no place in ecolodges unless they are part of an existing historic property.

### **GUIDELINES**

1. Minimize and if possible, eliminate the use of high maintenance lawns. Turf grasses typically need more water, maintenance, and chemicals than other types of plants. Native or drought-tolerant turf species or beds planted with shrubs, groundcovers and perennials can replace exotic lawns. The use of introduced annual plants should also be avoided.
2. Two goals for all planned plantings are that invasive species should never be introduced, and plantings should need only the minimum of maintenance, particularly in terms of water and trimming, once they are established.
3. Understand the entire range of pests you are dealing with and the benefits of integrated pest management (IPM). A pest is part of a food chain, and simply eliminating one pest species at a time gives advantage to competitor, or lower-order pests.



"...AND IN THE GREEN CORNER..."

4. Write a pest management plan and make sure that the landscape contractor is capable and bound by an agreement to use proven IPM biological controls as first resort in destroying pests where that is appropriate.
5. Many pests originate from neighboring properties and a most effective part of your pest control management may be negotiations with nearby farmers, combined with specialist fencing, poisoning, shooting or trapping. Most often the effectiveness of pest management is a result of its budget.
6. Use alternatives to commercial pesticides such as mulching, alternative mowing and composting to maintain plant health. Organic mulch around

plantings conserves water and maintains favorable soil temperatures. Cleared or trimmed vegetation can be chipped economically for mulch or composted. Compost maintains soil fertility better than chemical fertilizers, and helps landscape plants resist pests and diseases without pesticides.

7. Consider fire management for invasive plant species control.

#### 1.6.4 Landscape Lighting

Site lighting should be limited and controlled to avoid disruption to the nocturnal cycles of wildlife, and so light the minimum area for the minimum time at the lowest wattage. All-night illumination to areas with all-night use or extreme security concerns should be limited and simple timers or photocells can be used to turn lights on and off at seasonally appropriate times. For security lighting, motion-sensors can spotlight intruders without beaming constant glaring lights. Numerous solar-powered landscape lighting fixtures are also available on the market.

Low-voltage lighting may offer moderate benefits. 12 or 24-volt lighting is effective and increasingly popular for site lighting. Lower-voltage fixtures are safer and often less expensive to install than typical 240/120-volt options. The most important advantage is that they waste far less energy. Low-consumption fittings are still dearer than traditional fittings but are much cheaper over the long run and their purchase prices are improving all the time. Compact-fluorescent lighting is substantially cheaper and more energy conservative than incandescent lighting (including halogen and low-voltage).

If your ecolodge is located near sea turtle breeding areas, it is important to note that nearly all activity (egg laying and the return of hatchlings to the ocean) takes place under the cover of darkness and relies upon natural light environment, which is too often disrupted by the addition of artificial lighting. On beaches where artificial light is visible, the hatchlings' important journey to the sea is disrupted. Hatchling sea turtles move towards landscape lights, porch lights or interior lights visible through windows, and away from the relative sanctuary of the ocean. Quite literally, a single light left near a sea turtle nesting beach can misdirect and kill hundreds of hatchlings.

#### GUIDELINES

1. Forego exterior lighting entirely except in community areas and provide flashlights and portable lanterns, keeping in mind the fire risk.

2. Use the least artificial lighting outside the ecolodge, in order to avoid disturbance to wildlife.
3. Review outdoor lighting to assure that neighboring properties are protected from the view of bright light sources and plant screening shrubs to protect the lodge from off-site light pollution.
4. Eliminate all upward radiation of light through use of full cut-off luminaries. Avoid disturbance on the horizon so stars are clearly visible at night.
5. Make sure that any illumination necessary for evening activities is of low wattage, directed downward and only bright enough to be safe and effective.
6. Whenever possible, integrate necessary required lighting (on a photocell) into such features as steps, handrails, posts and curbs.
7. You can achieve pleasant effects through the use of landscape lighting, when it doesn't conflict with your ecological standards. Accent spotlight fixtures directed upwards into tree or native palm foliage can provide low intensity but often-dramatic illumination of pedestrian areas between buildings.
8. Use unobtrusive landscape lights.
9. Shield all landscape fixtures through plantings.
10. Design lighting that reflects the architectural character of the lodge. Creative uses for traditional fixtures may work well.
11. Consider essential driveway lighting attached to low bollards, directed downwards only and spaced along the edges. For a cheaper and more environmentally responsible solution, use posts with reflectors.
12. Keep beachfront lighting turned off during the sea turtle nesting and hatching season.



13. Reduce the number of lights near nesting beaches to the minimum necessary to accomplish lighting goals. Lighting used purely for decorative purposes should be kept off.
14. Reduce the light reaching the nesting beach by lowering, shielding, recessing and/or redirecting light sources. Any light source that is visible to an observer on the beach is likely to affect sea turtles.
15. Apply dark window tinting to windows visible from the beach and draw curtains after dark.
16. Replace existing light fixtures with those that emit light less detrimental to sea turtles. For instance, a pure yellow light such as that from a low-pressure sodium vapor source does not appear as attractive to turtles as some other lights. Yellow incandescent light bulbs also are preferred if they are kept at low wattage.
2. In windy areas and hot climates, use trees as windbreaks and shelterbelts.
3. Use gravity on a slope to move materials and water. A slope defines a flow of energy and nutrients.
4. Encourage symbiotic relationships by putting elements together to benefit each other and so reducing unused outputs, which cuts down on pollution, e.g. water-loving plants such as mint species grown under eaves prevent erosion by catching excess water. Select only those species that are not invasive.
5. Incorporate elements with multiple relationships as this will help to stabilize the web of life. Planting trees helps to lower the water table where there is ground water salinity, especially in areas along the oceans, thus protecting surface vegetation from excess salt.
6. Replace expensive, toxic, non-renewable chemical fertilizers with biological resources that generate fertility on site. Encourage worms and microbes to multiply rapidly by using animal and green manure and by turning under crop residues.
7. Manage the flow of energy and nutrients; design swales that slow down the flow of water during rainstorms, preventing erosion; and give time for leaf-litter and seeds to penetrate the soil.
8. In restoring a disturbed landscape, speed up the process of natural succession by planting many complimentary native species at once, and letting them play out their natural evolution.
9. Increase the diversity of your system in fundamentally disturbed areas by introducing wetlands. This will increase the stability while minimizing pest problems and competition for nutrients.
10. Contour planting will help control soil erosion on open slopes.

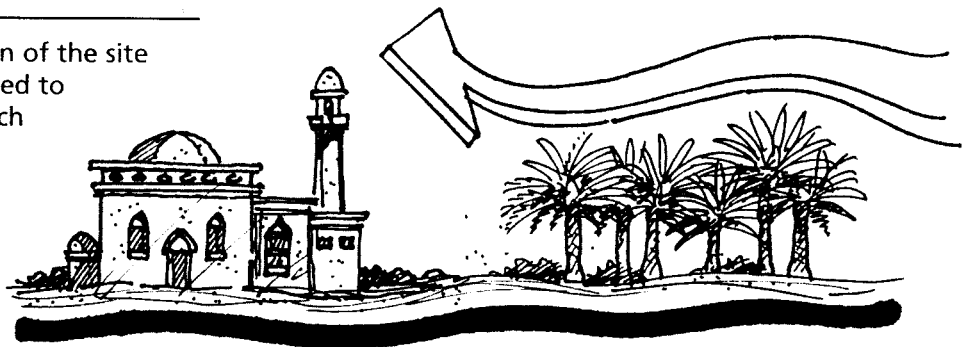
## 1.7 PERMACULTURE

Permaculture is a unique approach to site design that integrates landscapes, gardens, built structures, humans, flora and fauna into permanent systems. It is a design system that mimics the interconnectedness and diversity of animals and plants in natural ecosystems. It focuses on sustainable systems — those with no pollution or waste. To establish these sustainable systems, it uses ecology, biology and agriculture and combines it with engineering methods and architectural design. Once permaculture systems are well established they require a minimum of energy, materials, and labor to maintain. They also minimize pollution by recycling waste back into the system.

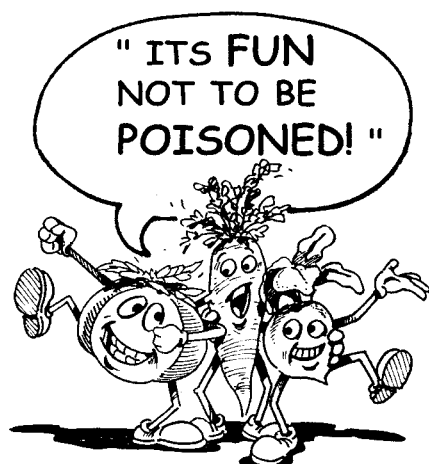
The main concept of permaculture is to turn waste into resources and problems into opportunities. It uses the natural cycles of plant and animal species to: heat and cool buildings using arbors and berms; restore groundwater; aerate the soil; control erosion; build soil fertility; incorporate small-scale food production; incorporate appropriate technology and recycling; and promote reforestation.

## GUIDELINES

1. Observe the slope and orientation of the site to the sun. Orientation can be used to create differing conditions on each slope and for growing a diverse selection of plants.



11. Plant very comprehensively so that you have variety throughout the year, taking care to avoid exhausting the soil. Different trees and plants can fix nitrogen to nourish the soil, extract vital nutrients from deep in the sub-soil, repel insects, host beneficial predator insects, provide shade for tender seedlings, and serve as trellises for native climbing vine.
12. Maintain plant health by using clean and simple methods such as gravity, renewable energy, easily available natural materials, worms and micro-organisms, etc.
13. If possible, provide for an organic (chemical-free) kitchen garden and/or orchard near your ecolodge to grow sustainable crops of fruit trees, date palms, vegetable garden, cereals, etc. Other food growing techniques such as aquaculture, hydroponia and bee-keeping may best suit your circumstances.
14. A good alternative to domesticating precious wild space is contracting local farmers to grow organic produce for your ecolodge.



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## APPENDIX: METAPHYSICAL SITE ANALYSIS AND DESIGN

By Hitesh Mehta

The majority of all the site analysis and planning techniques that are being practiced today are unfortunately objective, and so, somewhat one-dimensional. A subjective approach is needed in order to create a plan that is in total harmony with the existing landscape. A sense of place and the feeling of sacredness are missing from most existing tourism lodges. Ec lodge sites need to provide the ecotourist with a spiritual communion with nature and the feeling of being “one with nature.” In the context of the ecosystem theory, holism is based on the concept that non-living components and living components function together as a whole according to well-defined biological laws. Everything is connected: humans, plants, animals and non-living objects.

Holistic philosophies are being widely practiced in many parts of the world. Of particular note are the Chinese philosophy of FENG SHUI and the Indian Vedic philosophy of VASTU SHASTRA. Also, numerous indigenous tribes have a holistic philosophy, including the native Indians of the Americas and the aboriginal peoples of Australia. All these philosophies are ways of living, which depend on the interdependence of humans and nature. Recognizing these ways of life calls for a fundamental shift in the priorities of our culture from a civilization based on endless, unsustainable economic growth at the expense of nature, towards a sustainable world based on ecological principles and respect for both cultural and natural diversity.

These are complex topics and require much research to adequately understand the various indigenous thought processes and belief systems. In this book, we would like to make connections between interesting and often ignored philosophical standpoints and aspects of site analysis and design. Hopefully, in the next edition, we shall have guidelines for those who want more information on these topics. You are welcome to contact the author for additional information and feedback.



The Western reader may find some of these philosophies a little “foreign,” un-scientific or esoteric. These introductions are meant for those who believe in ancient methods of site analysis and design and would want to adapt them to your ecolodges.

There are many ancient and traditional methods that have not been mentioned in this book such as Mayan, Aztec, Egyptian and other African cultures, which also contain many metaphysical references to the themes of planning and siting.

I will also be introducing a modern holistic approach to site analysis and design that I have found very useful in the ecolodges that I have worked with. It is the “Six-senses” approach as practiced by Professor Emeritus Clare Cooper Marcus.

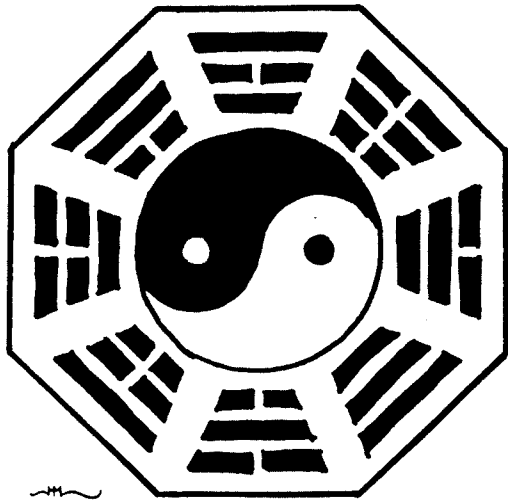
The four holistic approaches to design that will be mentioned are: Feng Shui, Vastu Shastra, Aboriginal methods, and the modern methods/six-senses approach.

### A) FENG SHUI

The Chinese based the science and art of siting and orienting buildings upon the workings of earth forces, which are known as Feng Shui, literally “wind” and “water.” Rooted deeply with ecology, geology, astronomy and hydrology, Feng Shui aims to harmonize nature with the built environment. Feng Shui offers an ancient method of site planning that adds to balance and harmony for those who live on the land and for the earth itself.

The Chinese believe that the earth is criss-crossed with energy lines that affect and are affected by virtually all geographical and topographical phenomena. This means that humans are affected by their environment, and we in turn modify our environment by what we do within it. Chinese believe that Chi (the Chinese word for energy) pervades every element in the cosmos and is the beginning of all life. Yin and yang are two kinds of Chi with opposite characteristics. Yin is characterized as female: negative and passive; while yang is characterized as male: positive and active. Only when yin and yang

meet and stay in balance can life begin. Their continually complementary interaction creates the ideally harmonious site.



Feng Shui is a form of “geomancy,” or geographical divination that uses principles such as astrology as well as psychic and physical phenomenon to determine whether the siting and orientation of a building is auspicious or inauspicious. Buildings using the natural elements of the land and tap into its energy are healthy, auspicious places to live or work while places that are antagonistic to their energies are unhealthy and inauspicious.

All natural shapes in the landscape have meaning to the Chinese and correspond to the ground qualities that they reflect. Feng Shui is a widely practiced concept for site planning in China, Korea and Japan. More recently, it has become the topic of interest, both professionally and personally for a growing number of developers, architects and landscape architects globally. They can use this knowledge in designing ecolodges to actually enhance aspects of visitor’s lives.

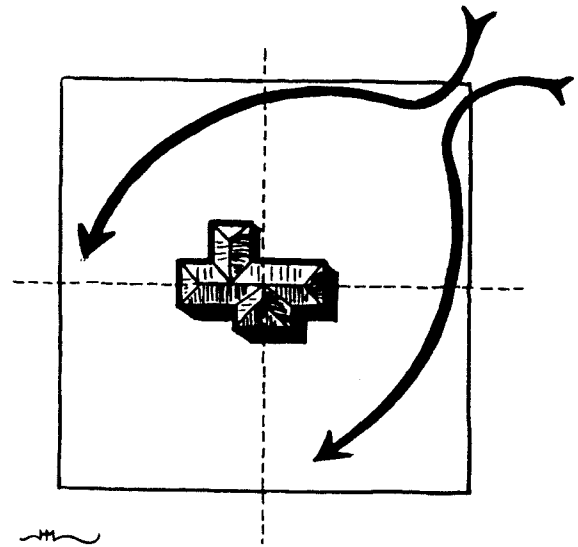
It is crucial that you choose a Feng Shui expert who understands the principles and can make the correct adjustments for the various situations.

## B) VAASTU SHASTRA

In India from time immemorial, eternal principles of Vaastu Shastra have been applied in the designing of villages, towns, and cities apart from temples, palaces, public buildings and residences. Vaastu is derived from the verb “Vaasa” meaning to “dwell” or “place of residence.” The principles of Vaastu are pedagogical, geometrical, geophysical and botanical, and above all cosmological and celestial.

Vaastu Shastra states that every form creates a concentration or dispersal of cosmic and earth energies, which are harmful or beneficial to human beings. Therefore, Vaastu Shastra can bring about harmony

between people, nature and buildings. Since a property represents a fixed form, it will radiate positive as well as negative energies depending upon its shape, properties, direction and location.



Vaastu Shastra recognizes with simple logic that all people live in an environment influenced by the five basic elements: Akash (Sky), Pruthvi (Earth), Pani (Water), Agni (Fire) and Vayoo (Wind) and followers of Vaastu Shastra will respect and be in harmony with these forces when building a lodge. These elements have an interactive influence on human beings whose physical constitution too is made of these same “parachutes.” The external physical buildings, building materials, and nature in the form of the land, exert an influence or a natural force, which can be reoriented for the ultimate benefit of the individual.

Like yoga, Ayurveda, acupuncture and other holistic systems of India, Vaastu Shastra too can be beneficially used by all humanity. The human and nature are essentially interdependent parts of a sacred metabolic system, everything throbbing with life. In short, the fate of man is inextricably bound to the whims and cycles of heaven and earth.

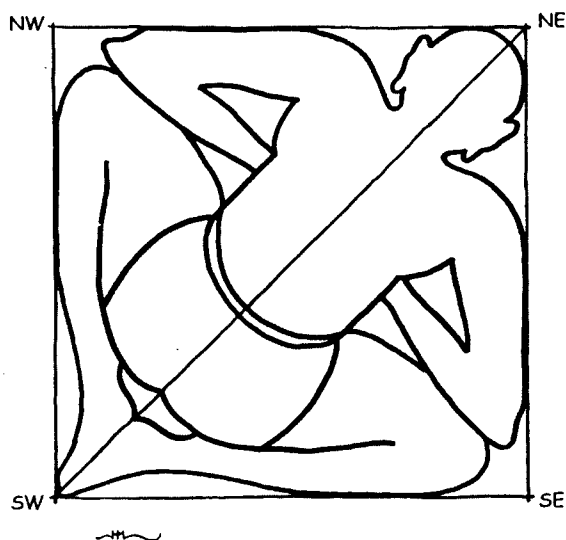
Vaastu Shastra is essentially the art of correct setting where one can position himself in such a manner, so as to be able to absorb maximum benefits of the parachutes, as well as magnetic fields surrounding the earth, apart from the influence of plants, sun and stars. The scientific use of these elements ensures a perfectly balanced environment leading to enhanced health, wealth and prosperity.

In site planning (Vaastu Pada Vinyaasa) and design, the direction that the lodge and accommodation units face is essential to the well being of the occupants. There are several principles of orientation (Dikniraya).

Just as in Feng Shui, it is important to opt for a Vaastu



master and an experienced landscape architect/architect who has a thorough knowledge of Vaastu Shastra.



Vaastu Purusha — the cosmic man who protects the dwelling place, and the spirit of the lodge.

### C) INDIGENOUS ABORIGINAL METHODS

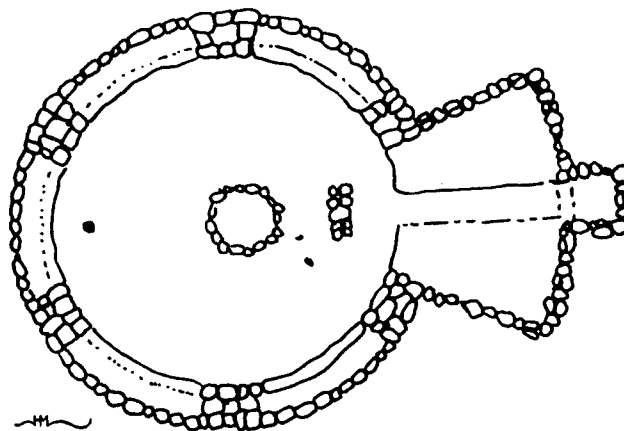
Indigenous aboriginal methods of design have shown a deep connection to the earth. Traditional cultures are the “librarians” of our “gene library” and each holds a stack of index cards carefully drawn up after thousands of years of patient trial and error. The deep respect for the environment is none more evident than in the American Indians of South and North America and the Aboriginal peoples of Australia. This is just one example of the various traditional holistic methods of design. I have taken examples of Native Americans and Australians as I feel that their respect for the earth is greater than I have seen anywhere.

This section will present some of their views and philosophies on the interconnectedness of humans and the earth.

Indigenous Native Americans have always been known to have a deep connection with the earth. Each tribe looked at the land in a different way but they all agree on one thing — that everything was connected; i.e. human, plants, sky, rivers and lakes.

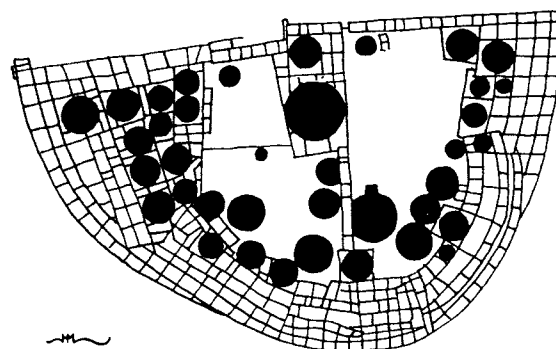
Everything that a Native American does is in circles. The flowering tree was the living center of the hoop, and the circle of the four quarters nourished it. The east gave peace and light, the south gave warmth, the west gave rain, and the north with its cold and mighty wind gave strength and endurance. Many native tribes camped in a circle and in the middle of the circle was a place called Hocoka, the center.

The Wintu of California lived on very densely wooded land where it was difficult even to find clear



land to erect houses; nevertheless, they would use only dead wood for fuel, out of respect for nature.

The ancient tribes of the southwest United States farmed the floodplains of the canyons and built pit houses and pueblos in alcoves in the cliff walls. These people were constrained by their environment, but not controlled by it. The Anasazi created some of the most remarkable villages anywhere in the New World. These villages are tucked away in isolated caves or rock shelters or suddenly arise from the middle of seemingly barren terrain. They create vivid images that remain with visitors for a lifetime. Settlements such as the promontory site, the bluff site, and the Connie site all lie on top of steep ridges or mesas. Some sites are also surrounded by what appear to be stone walls of considerable size.



Many Pueblo groups symbolize the place of emergence from the underworld, the sipofene or sipapo, by a small hole in the floor of their kivas. The sipapo, a small hole in the floor of both historic and prehistoric kivas, symbolizes the location where Pueblo people first emerged from the underworld to build villages in the upper world.

Chacoans captured the rain from intense summer thunderstorms that fell on the bedrock mesas of the canyon and cascaded into the arroyos below. They built small dams that diverted the water from the arroyos into canals and then into bordered gardens constructed

on the canyon floodplains. Hopi people lived in the southwest United States, in what was known to them as the spiritual center of the continent.

Below is a selection of quotes from well-known native spiritual leaders. They give a poignant picture of how the natives viewed the land.

*"The Great Spirit said not to take from the Earth — not to destroy living things."* Thomas Banyacya, Hopi Indian

*"The ground on which we stand is sacred ground. It is the dust and blood of our ancestors. A few more passing suns will see us here no more, and our dust and bones will mingle with these same prairies."* Chief Plenty-Coups

*"When we dug roots, we make little holes. When we built houses, we make little holes. We don't chop down trees. We only use dead wood."* Old holy Wintu woman

*"Loneliness is an aspect of the land. All things in the plain are isolated; there is no confusion of objects in the eye, but one hill or one tree or one man. To look upon that landscape in the early morning, with the sun at your back, is to lose the sense of proportion."* Scott Momaday

*"The earth and myself are of one mind. The measure of the land and the measure of our bodies are the same."* Chief Joseph

*"In our every deliberation, we must consider the impact of our decisions on the next seven generations."* From the Great Law of Haudenosaunee (Six Nations Iroquois Confederacy)

The Pitjantjatjara — an indigenous Central Australian tribe — is just one of the many tribes of a network of a religiously secretive and fundamentally nomadic people, who share common beliefs despite having developed more than 700 languages over 40,000 years in their movements across the continent. This information has been provided by Diana James and Architect Paul Pholeros who worked with the people to develop a visitor center.

The design of housing and the spatial arrangement of houses to each other and the environment are vitally important to the spiritual health of a people who have had to adapt to settlement. If anangu maru (a tribal people) live too long inside houses and in large settlements that close them off from their environment, they lose heart. They need to see the country, feel the wind and the early morning sun on their skin. Then they can hear the land and know themselves.

The Pitjantjatjara people understand that energy lines criss-cross the earth; these are the Tjukurpa trails, the suggested "songlines" the Creation Ancestors made as they traversed the country.

The Tjukurpa — Dreaming/ Creation Law — established the inter-relatedness of all things. These ancestors were forebears of the animals and humans today, they created all the foods people eat, the plants, the rocks, the landforms, the water systems and the stars that guide travelers and mark the seasons in their movements.

Human beings are an integral part of this whole system. Where they live and how they position their dwellings is determined by the spiritual, ecological, topographical, hydrological and sociological aspects of this continuous living Tjukurpa (Dreaming). All people need to be part of a rich cultural life that gives meaning to all our actions and relates us to our living environment and the land.

Nganyinytja, a senior custodian of Pitjantjatjara Grandmother Law, speaks of her people's relationship to country: "Our spirit stands open. I live in the open, where I can see the hills and the bush. Living in the open, not enclosed, one's spirit is strong. A long time ago everything became related — the stars, the earth, the hills, the different animals, the different bush foods — everything."

Metaphysical Importance of Open Space — Being in and part of the open environment is essential for the wellbeing of the soul — listening to the wind, feeling the sun on skin, listening to the birds, observing the stars to tell the passage of time and the seasons, and participation in the extended communal family is vital to health.

It is important for the well being of the host community and its environment that visitors are cared for spiritually as well as physically, and develop a feeling of kinship with the places they visit.

## D) SENSE OF PLACE — SIX SENSES APPROACH

An interesting method of metaphysical site analysis is the six-senses approach, in which environments can be therapeutic in that light, color, scent, sound and water can all be used as therapies when incorporated into ecolodge design and decoration. Aromatherapy, color therapy, hydrotherapy, sound and light therapy can all bring their deep and personal healing qualities into the ecolodge.

Clare Cooper Marcus, Professor Emeritus at University of California - Berkeley advocates that in order to become "one" with the site, the designer should spend a couple of days and experience the site via each one of the six senses. The main objective of this method is for the designer to enter and experience the essence of the site, and how it is for the designer.

Before objective data collection begins, it is a good idea to allow time to experience the chosen site subjectively in person. Sit somewhere comfortable with a view. Take a few minutes to relax, breathe deeply — really "be" in the place. Try to let go of current anxieties,

concern about the next appointment, etc. Take half an hour to be in the here and now.

Take out a notebook and write down what you are sensing and feeling in this place at this moment. Try to spend at least five minutes focusing on each of the major senses.

Sight: What can you see? What attracts your visual attention? What kinds of vegetation, animals and people etc. do you see? What colors and textures are you aware of? What is the volume of the space like? Is your view enclosed, or can you see beyond this space? Who else can you see in this space? What kinds of people, what are they doing, and what seems to be their mood (relaxed, frantic, bored, busy)?

Feel: At the same time you write down what you see, also record your feelings about what you see. Do these sights make you happy or sad? Is the space relaxing, uncomfortable or dull? Does the presence of other people enrich or detract from the space for you? Do certain people or activities or groups attract your attention or make you feel uncomfortable?

Hearing: Try to spend some minutes with your eyes closed to allow yourself to focus on what you can hear. What kinds of sounds are there? What are their sources? Do they originate from inside or outside this space? Do these sounds lull or irritate you? Can you imagine how others are reacting to these sounds?

Touch: Feel this place. Touch it with your hands or other parts of your body. What textures or temperatures or qualities do you discover? Can you feel the movement of air, changes of temperature? How do these sensations make you feel (secure, comforted, repelled, bored)? Touching can enrich or confirm what we see and hear.

Smell and Taste: Close your eyes and sniff this place. What do you smell? Does this place smell fresh, stuffy, old, new, restful? Are there things to taste here? Is it appropriate to eat and drink here? Bring some food on one visit and try it out.

The questions suggested are intended to stimulate and help you sense the essence of a place, how it is for you and, perhaps, for others. Exactly how you record your experience is entirely up to you, but stream-of-consciousness writing, without pausing or censoring what is written down, is often the most revealing.

The most productive part of this technique is the final experience, when the designer tries to imagine that he/she is the place. The designer should ask some of the following questions and then write the answers in the notebook: "How does this place feel? Does this place feel happy or invaded to have people in it? Are there parts of this place that feel neglected or lonely? How do the plants, trees and the animals feel?" You may feel a little uncomfortable at first, but give it a try. You may be surprised at what you learn about the site by "becoming "it."

The designer should also spend time on the site developing a thorough understanding of the place and the harmonies into which the development must fit. The designer should look for the "sense of place" and for spiritual qualities that can often escape the ordered dimensions of the site.

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*"In the wildness is the preservation of the world."*

—Henry David Thoreau



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## CHAPTER 2 BIO-PHYSICAL IMPACT

Ray Ashton  
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## 2.1 INTRODUCTION

The basic measures of the sustainability of an ecolodge are its impacts on the environment. These impacts begin with the construction phase and continue with day-to-day operations. The goal from an economic, social and moral standpoint is to plan, construct and operate a development in a sustainable manner. The ecolodge is selling biological and cultural diversity, and some of the most beautiful landscapes the world has to offer. If the ecolodge is designed, built and operated in a way that degrades the assets in your stewardship, its credibility, and that of the “ecologically sustainable hospitality industry,” is damaged; the lodge loses its selling point and any community support — and ultimately fails. With this in mind, there are key elements that are presented here in the three critical periods of ecolodge development, planning and construction, and operation.

## 2.2 ENVIRONMENTAL ASSESSMENT PROGRAM (EAP)

The first stage for establishing a sustainable plan is careful evaluation of the proposed site and factors under consideration for development. Usually, an Environmental Assessment Program (EAP) is applied to this purpose. EAP is a crucial part of the planning process; it guides the pragmatic consideration of the proposal’s environmental and cultural benefits and impacts. Without a robust EAP, a development may degrade its site and surroundings, destroying the very attraction that tourists come to enjoy. The EAP should ideally be completed before large sums of money are spent on developing a business plan.

Specialists — such as ecologists, biologists, economists, sociologists, anthropologists and others — with skills and relevant experience must be contracted to help complete the evaluation process. An EAP should be carried out for any ecolodge development, however small.

An EAP should examine the following potential impacts:

- Landscape
- Water, both surface and potable
- Soils
- Air
- Waste management
- Habitat and biodiversity (aquatic, marine, terrestrial)
- The site’s history and regional context
- Economically important portions of the biodiversity
- Human communities

The study should carefully evaluate and determine acceptable levels of use and impact, and potential methods that should be used to mitigate for impacts. The experts should make clear recommendations on whether or not the site should be used at all if it is a sensitive and fragile site. Once these evaluations are made, a feasibility analysis should be established.

## GENERAL GUIDELINES

1. Identify the appropriate specialists to carry out the EAP.
2. Evaluate environmental and cultural impacts and propose pragmatic remedial actions.
3. Identify alternative technologies that can be easily implemented.
4. Establish priorities in the best interests of the local human and wildlife communities.
5. Involve the local community as their participation is critical to the success of the EAP.
6. Prepare cost-effective mitigation strategies and include them in the agreed work schedule.
7. Incorporate the EAP into the tender and contract documentation and provide clear construction guidelines. The contractor should be held responsible and liable for any environmental impacts under his management. The contractor should have supervisors trained in, or at least conversant with, mitigation strategies and principles of ecologically sensitive construction techniques. Contractors should be encouraged to use local labor and craftsmen.
8. Retain consultants on an hourly basis for periodic audits during the construction process. This team should also be brought in to carry out an evaluation 6-12 months after the lodge has been opened for recommendations on its future management.
9. Establish a holistic monitoring program that quantifies impacts and benefits over time. High school students from a nearby school could easily do this work, and involving the local community helps raise awareness and stimulate people’s support and interest in your work. Refer to Chapter 9 for more details on monitoring.

Environmental impacts can be classified into two categories: Abiotic (Non Living) — Soil, Water, Air and Sound — and Biotic (Living) — Flora and Fauna. It is important to understand that impact is NOT always negative. Also, impact is NOT always damage. This is a common misconception with many people.



## 2.3 IMPACTS ON ABIOTIC SYSTEMS

The development and operation of tourism infrastructure and the presence of tourists have both direct and indirect impacts on soils, water and air. Direct impacts stem from use of resources like potable water and changing the lay of the land to establish roads, trails and building footprints. When resources like potable or fresh water habitats are limited on certain islands or desert or savannah communities, then the impacts can have serious effects on human and natural communities. Similarly, the use of diesel engine generators and vehicles in areas where air does not move or in extremely confined and delicate areas like caves can have devastating effects on the natural communities. It is extremely important during the planning and impact evaluation stage for ecolodge development to take these factors into account.

### 2.3.1 Soils

Healthy soils are an important factor of any ecosystem and all attempts should be made to preserve existing soils before and during construction of an ecotourism facility, and to stop any human-made erosion with an effect on the site.

#### GUIDELINES

##### 1. During the planning stages

- a) Design the development along contours and avoid disturbance to existing topsoil. Emphasize the preservation of mature vegetated soils in lowland areas. These natural systems make the watershed work by allowing rainwater and runoff to infiltrate the soil. In lowland areas, groundwater discharges into surface drainage ways, streams and wetlands. Stable vegetation around drainage ways and streams filters

incoming runoff, prevents channel erosion and creates habitat for aquatic ecosystems.

- b) Design the project empathetically to the original landscape with regard to cutting, excavations and landfill. Specify and make the fewest required earthworks strictly necessary for construction, avoiding the need for big machinery, and using hand tools whenever possible.
- c) Avoid important soil movements, especially during the phases of excavation and construction, since this creates erosion and soil sterilization.
- d) Avoid erosion caused by rupture and fragmentation of superficial soils that expose less fertile layers.

##### 2. During construction

- a) Avoid compressing soil to the point of eliminating aeration that would thus kill existing micro-organisms necessary for plant and animal life. In delicate areas like deserts, where plant growth is very slow, a single vehicle trail can remain clearly visible many decades after it was made.
- b) Build stages or phases according to a schedule of work activities, taking season and climate into consideration. Disturb only what is necessary and do not interfere with the whole area at once.
- c) Silt fences (which hold sediment on-site during construction) should be installed before construction begins and should be maintained until construction is complete and after all slopes are vegetated.
- d) Water lines should be laid for minimal soil disruption; i.e. adjacent to or under roads and trails wherever possible.
- e) Access and movements of the following should be controlled:

- i) **Vehicles**
  - Set priorities and limit access for all vehicles, including heavy transport (which may damage plants and compact earth) during construction to and from the ecolodge.
- ii) **People**
  - Clearly separate and identify access for pedestrians and prohibit the concentration of people on specific sites.
- iii) **Bicycles, horses and others**
  - Clearly signpost different zones for their capacity according to season.
- c) Similarly, ocean-side lodges that are considering desalination plants as alternative water sources need to carefully evaluate the significant environmental impacts of these plants.
- d) Avoid the use of potable water for any uses other than human consumption. Grey water should be used for toilets, irrigation, and other compatible uses.
- e) The size and systems of plunge pools, swimming pools, spas and other facilities that waste large volumes of water should be planned to take into consideration water availability and the impacts of various water disinfectant systems.

### 2.3.2 Potable Water

Clean drinking water is becoming increasingly precious, particularly where potable water use is at or beyond natural carrying capacity. Tourism facilities like hotels and lodges are notorious consumers of water, and laundries, gardens, kitchens and bathing facilities consume enormous amounts of water. With this in mind, the following guidelines should be taken into consideration:

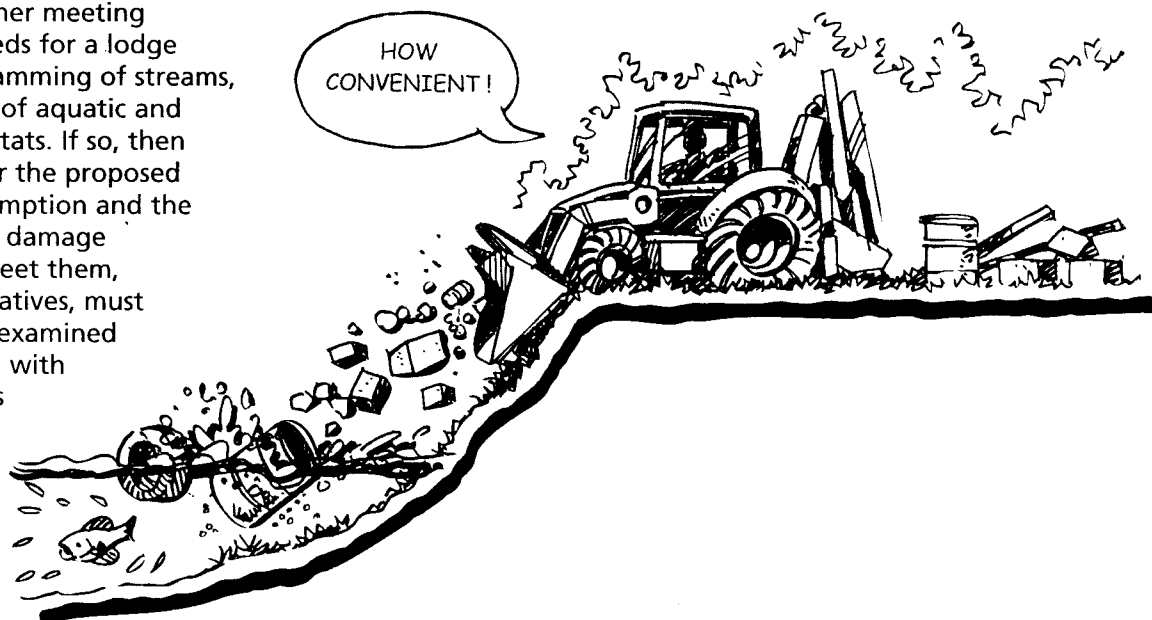
#### **GUIDELINES**

##### **1. During the planning stages**

- a) Determine the area's ability to provide a consistent supply of potable water. If the projected use by the proposed ecolodge will reduce available water for human settlements or potentially have a negative impact on aquatic and terrestrial communities during dry or drought periods, then alternative water resources should be found or the location of the lodge should be reconsidered.
- b) Examine whether meeting freshwater needs for a lodge requires the damming of streams, or elimination of aquatic and terrestrial habitats. If so, then justification for the proposed levels of consumption and the environmental damage proposed to meet them, and any alternatives, must be stringently examined in consultation with interest groups before a site is confirmed.

##### **2. During construction**

- a) Analyze the risks posed by construction materials and methods that could cause pollution or other harm to the destination's habitats. Suitable alternatives must be stipulated in the event that a ban on a particular product or system is recommended.
- b) Provide clear and enforceable guidelines for the storage, use, contamination and fire control for toxic and explosive fuels and products such as gasoline, oils, timber preservatives, acids, bleaches and others as part of management during the construction phase.
- c) Enforce a practical and comprehensive program for waste management, including recycling and composting, which must be in place from the outset of site activity. Disposal of construction waste in nearby waters must lead to the immediate removal and banning of offenders from the site, instant termination of contract, and a detailed report to enforcement authorities.





### 3. Operational considerations

- a) Conservation of water should be entrenched at all levels of operation, including laundry, kitchen, maintenance, grounds and cleaning activities.
- b) Water conservation should be basic to staff training, as is routine maintenance and emergency repairs for leaks, waste, corrosion contamination, etc.
- c) Locate all potential contaminants or polluting activities away from water sources.
- d) Prevent waste-water from flowing into rivers or any other natural hydrologic systems. Use appropriate methods for waste management, treatment and disposal (see Section 3.4.3).
- e) Never allow waste from your lodge to enter neighboring properties or waters. Compost appropriate kitchen and garden waste.
- f) Minimize the use of motor boats, with their physical and chemical impacts on water bodies. Use four-stroke engines in lieu of two-stroke engines, which cause additional air, water and noise pollution. Use electric motors where feasible.



#### 2.3.3 Maintaining Water Quality

Ecolodges can cause a range of negative impacts on surrounding water bodies, often affecting local potable water supplies. Following are some guidelines to avoid negative impacts on water quality. Nutrient flows from on-site waste-water systems are one of the greatest polluters, as are two-stroke boat engines that pollute many lakes, rivers and oceans. These engines may inject a quarter of the fuel being put through the engine into the water. Added to this are leaking lubricants, fuel spills and other toxic substances that can find their way into the water and thus cause serious negative impacts.

## GUIDELINES

### 1. During the planning stages

- a) Do not alter watercourses (rivers, creeks) including banks and shorelines.
- b) Do not build on flood plains.
- c) Plan for those areas where vehicle fuels, oils and other toxic substances are being used and stored, including contamination and spillage contingency facilities.

### 2. During the operational stages

- a) Establish the capacity and reliability of water sources to the lodge and ensure that demand never exceeds the resource's recharge rate. Your calculations must include a consumption "buffer zone" that accounts for factors such as fire management, seasonal fluctuations in water demand, drought and lodge expansion.
- b) Specify filtration that is able to return used water to the area's natural drainage and watercourses free of contaminants.
- c) Avoid making landfills or any other landscape alterations close to aquatic ecosystems. Remember the premise: minimal alteration.
- d) Avoid using pesticides and insecticides that could pollute waters and affect aquatic ecosystems.
- e) Consider the use of constructed wetlands for sewage. This is particularly effective in tropical and subtropical areas where a number of water plant species can be used to break down bacteria. You can both solve a possible pollution problem in a cheap way and even create a small wetland habitat that can attract wildlife near the ecolodge (see Section 3.4.3.5).
- f) Consider using electric or more contemporary four-stroke boat engines, which are quieter and less conducive to pollution. Boat operators should be trained and policies established to avoid emptying or spilling fuel, bilge-water, paint, grease and other toxic substances overboard. On-board toilets must discharge into sealed "pump out" tanks or portable containers.

#### 2.3.4 Air Quality

Few lodges consider the effects they may have on air quality around the area or in general. Heating systems, power generation, vehicles and picnic areas may emit toxic substances into the air. As an environmentally sound facility, an ecolodge should consider its impact on air quality when planning and purchasing facilities and equipment.

Probably the greatest way to maintain air quality is to use solar power or natural gas if available. Using electric-powered vehicles greatly reduces noise pollution as well. Use of solar panels, solar water heating, and solar and wind power systems can greatly reduce the need for fossil fuel. If this technology is not practical, then getting power from the grid is less polluting than a diesel-powered generator.

Interior air quality is frequently a problem in many hotels and lodges. Uses of aerosol room deodorants, disinfectants and insect spray all add to serious interior air-quality problems. Aside from their needless artificiality, these pollutants carry environmentally unacceptable costs in terms of packaging and waste. Carpets, wood preservatives, paints, rugs, insulation and other materials also can contain harmful chemicals. Sound design, staff training and proper ventilation will help solve these problems.

### **GUIDELINES**

1. Develop and follow a policy of minimal use of air-polluting machinery or power sources.
2. Do not use foggers or aerial application of insecticides.
3. Ensure that effluent from sewage or garbage disposal sites are conveniently designed and located so that no uncomfortable odors reach the ecolodge or areas accessible by visitors.
4. Control strong odors that could disturb local fauna or be a detriment to workers' and guests' health.



### **2.3.5 Sound**

Imposed sound has two major impacts that should be considered: its impact on the ambience and visitor experience, particularly at an ecolodge; and environmental impact on valuable program resources. The common sources of human sound are power generation, vehicles, boats and other sounds coming from the ecolodge, like music. In any case, the quality of the experience can be seriously impaired by human-generated sounds. The design of the facility can help to eliminate mechanical

sounds. Remember that these and other sounds, like music escaping the bar, or noise coming from one room to another can virtually destroy the experience that most ecotourists are seeking.

### **GUIDELINES**

1. Take care to reduce sound impacts, particularly if boats or motorized vehicles are used to transport visitors for wildlife viewing or similar activities. Electric or human-powered transport should be considered for sites that are frequently visited. This will help reduce the incidence of wildlife moving away from noise sources, which effectively reduce habitat area and compound species competition. Monkeys, hoofed animals and many birds have been shown to move away from disturbing sounds and change resting and foraging areas to avoid it. This in turn could greatly reduce the biodiversity seen by visitors.
2. Avoid locating the ecolodge near a village or highway as noises from local communities and vehicles could affect visitor experiences.
3. Seriously question the use of recorded birdcalls that cause disturbance to nesting and territorial birds.
4. Emphasize the disturbance caused to wildlife and fellow visitors by noise pollution in visitor education tools. Provide clear guidance or rules and ensure that staff set a good example.

#### **2.3.5.1 Generators**

Most ecolodges are in remote areas and as such electricity generation most frequently requires the use of diesel generators, which are inevitably a source of noise pollution. The constant sound of a generator is a distraction that can destroy the entire ambience of the site. Photovoltaic solar power systems are now cost competitive with diesel generators in many areas and their use should be strongly encouraged.

### **GUIDELINES**

1. Mitigate noise through proper planning of buffers, plant locations and muffling systems.
2. Reduce the need to run generators by using complimentary energy such as wind generators or solar panels for hot water. A decent bank of "deep-cycle" batteries will allow you to use stored power at night and other times of low demand.
3. Soundproof the generator room.

### 2.3.5.2 Visitor noise and privacy

Ecologes are places where visitors should be allowed to fully enjoy silence and natural sounds. Guests, too, need to appreciate the value of life without the detritus of modern life such as amplified music, mobile phones and electronic games. Ec lodge hosts share a responsibility to provide an efficient ec lodge in a tranquil setting with guests, who must be given every opportunity to help maintain the peace.

#### GUIDELINES

1. Limit excess noise. Set an example for visitors and invite them to participate in the ec lodge's peaceful atmosphere through guidelines that help them and the lodge make the least possible noise, particularly from dusk to dawn. The aim should be to have no impacts on the surrounding natural patterns of life.
2. During construction, use the quietest machinery possible.
3. Specify building materials and insulation that minimize sounds between rooms. Soundproofing and privacy should be a high priority for the location of cabins, room design, and in all site and building layout.
4. Screen facilities such as swimming pools, bars, restaurants, meeting areas and staff quarters from wildlife locations and private guest quarters.
5. Plan to facilitate quiet activities such as night walks and astronomy courses.

### 2.3.5.3 Wildlife impacts

Infrastructure planning should take into account the impacts of intermittent noise on some species of wildlife. The long-term effects of persistent vehicular and guest noises can cause certain wildlife to move to other locations or behave in ways that make them less accessible to visitors, especially if the noise occurs at times when animals are more sensitive (resting periods, nesting, breeding, etc.).

#### GUIDELINES

1. Locate the ec lodge and roads at safe distances away from migratory routes, breeding and roosting sites, etc.
2. Establish a monitoring system to detect any possible changes in migratory routes, roosting sites, etc., that are in close contact with the lodge or its access roads.

3. Never use noise to flush birds or other wildlife from their habitat; i.e. from boats. In some areas noise is also used to flush bats from caves during the day.
4. Set standards for guests with regard to wildlife observation, photography (especially when using flash), and other related activities so as not to disrupt normal animal behavior. Use red filters on flashlights/torches in certain circumstances — e.g. looking for opossums or other night creatures in Australia, and turtles on Mediterranean beaches.

## 2.4 IMPACTS ON BIOTIC SYSTEMS

As a general rule, traditional lodges are built where the overall landscape or view is attractive. However, lodge developers and designers sometimes have eliminated the natural vegetation and communities in order to create an artificial landscape. Quite simply, whether the lodge specializes in wildlife viewing, birding or mountain climbing, the natural setting is frequently considered to be extremely important by most people who come to these facilities. The natural communities in and around the site are the most important commodities being sold by an ec lodge and those assets are frequently damaged or destroyed without any consultation with biologists, ecologists, wildlife behavior specialists, zoologists, etc., who are familiar with wild communities.

The two major impacts on biotic systems discussed now are impacts on flora and fauna.

### 2.4.1 Impacts on Flora

The ec lodge should be designed in a way that causes minimum alteration on the area's flora.



#### GUIDELINES

1. Above all, avoid cutting down trees in order to locate facilities. Plan, design and build with consideration for all natural plant communities of the site. The ec lodge should look like it grew there just like other plants. It should not destroy what is already there.
2. Avoid using areas of dense vegetation or primary forest. Try to build in areas previously altered, in areas of lesser vegetation, or in disturbed areas within dense vegetation.
3. Consider your ec lodge to be a continuation of a protected area, a forest or a coastal system (or any other environment) and avoid the barriers that could make it an island. Isolation limits the potential of biodiversity in your property and

nearby areas. The project should help expand the buffer zone and/or biological corridors nearby.

4. Keep all construction activities in previously cleared areas to minimize sometimes-irreversible impacts such as compaction. The idea is to plan the construction in order to use only necessary areas.
5. If the ecolodge is to be built in a place previously altered or damaged, then reforestation, restoration and natural regeneration should be considered as an integral part of the project.
6. Use endemic (exclusive to the area) species whenever possible, avoiding the introduction of exotic species (either on purpose or by accident). This said, however, the selection of certain native (i.e. "bio-regional") species in replanting or restoration of the ecolodge grounds or surroundings will help attract different kinds of wildlife such as butterflies, birds and mammals. Some flower- or fruit-producing trees and shrubs can be very successful and bring wildlife closer without the need to artificially feed them. Take into account average distances that wildlife can tolerate when planning the plantings. Use the skills of a wildlife specialist and a landscape architect on this.
7. Plan all trails with care to avoid vegetation "gaps," particularly those that subtly encourage visitors to cut corners. These "extra" trails are called "desire lines" and typically become compacted ruts with attendant erosion and re-vegetation problems.
8. Keep strict control over all species to be used in garden design, ornamentation and landscaping.
9. Avoid "single species" plantations set out in rows. Such monocultures always create negative impacts over natural vegetation and habitat, they destroy life cycles, and they promote deforestation.
10. Avoid all alterations produced by:
  - a) Public Use Areas: Clearly signpost all camping areas, parking areas, trails, lookout points, etc., to avoid unnecessary impacts on the natural environment. Use clearly explained "zoning" in order to assist regeneration programs.
  - b) Motors: Restrict the use of gasoline engines or any other combustion systems that produce pollutants or toxins that will be hazardous to the surrounding vegetation; instead, provide bicycles (possibly with little trailers) for staff and guests.

- c) Fires: Set out clear and strict rules for visitors and locals on appropriate fuel sources, seasonal fire risks, safety zones around individual fires and the effective dousing of fires.
- d) Collectors: Educate your team and visitors on the ecological consequences of collecting plants or any other natural items from the area (as above). Use clear signs indicating that collecting any material is prohibited, quoting relevant bylaws and penalties.

## 2.4.2 Impacts on Fauna

The ecolodge should be designed in a way that causes minimum alteration on the area's wildlife.

### GUIDELINES

1. Avoid interfering with animal life both during construction and on-going operations.
2. Build as far as possible from all known sites of animal activity such as nesting areas, mating areas, resting areas, wildlife travel corridors, food and water sources, etc.
3. Instruct the visitor not to disturb the wildlife; e.g. no screaming, no high-volume radios, no engines, etc.
4. Use a "zoning system" and mark them on maps, along with all-important points to view wildlife.
5. Prohibit any kind of hunting activity inside the project property not directly related to pest control. It is not convenient to mix hunting activities with wildlife observation or photography since most wildlife will be extremely wary and difficult to see.
6. Exclude domestic species (with the exception of guide dogs for the blind or deaf) to the property, as they can seriously disrupt or kill local wildlife. Introduced species also bring with them a great risk of the spread of disease, and domestic animals that have successfully turned feral usually do so at great cost to existing native populations.
7. Enforce collection laws. The diversity, and, potentially, viability of habitat is affected by the indiscriminate collection of specimens, eggs, butterflies, shells, rocks, snails, or any other items that, after all, help make the destination unique. Habitat theft by staff can be curbed via their contracts, and warning signs can inform and



guide visitors. Allow collections only as part of officially sanctioned scientific research in line with the program and habitat management plan.

8. Do not permit visitors to alter by any form natural wildlife patterns for mating, nesting, eating, etc.; for example, taking flash pictures of nesting turtles, lights on the beach, camping in sensitive areas, use of lamps, etc.
9. Do not feed wildlife either on purpose or by accident (garbage cans). This alters their behavioral patterns, makes them dependent, and in some cases even aggressive toward humans.
10. Discourage any other contact or interaction with wildlife (petting, callings, etc.) by visitors.
11. Do not permit the presence of captive animals "for show" in your ecolodge (native or exotic). This practice goes against all respect for the natural environment.
12. Avoid the introduction of diseases using adequate controls; e.g. from domestic animals.
13. Authorize only the reintroduction of native species, supervised by an ecologist or biologist with local knowledge.
14. Follow Reintroduction Specialist Group (IUCN) Guidelines for any restocking or relocation programs and make sure that they have been well flagged in the habitat management plan.
15. Do not permit any on-site wildlife rehabilitation or recovery programs.
16. Avoid destroying natural wildlife habitat. This could create a reduction in natural populations and encourage migration to other areas.

## 2.5 VISITOR MANAGEMENT

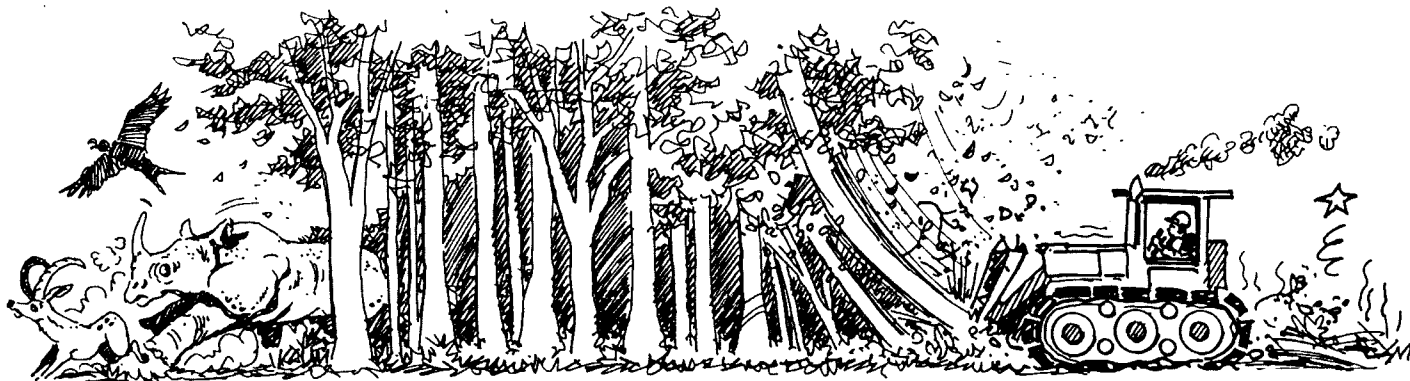
Ecolodge developers must understand that the methods they use to protect the assets for which they are responsible will be key to the lodge's success. The protection of natural and human resources is based on two key tasks. The first is establishing the number of people and frequency of use that any one resource can sustainably support. Second, a robust method of monitoring user impacts on those resources must be devised (and is discussed in Chapter 8).

Given the demands of the modern tourism market, it has become imperative to determine how many people can use an area without impacting habitat, changing wildlife behavior, or overusing natural resources. This approach has become widely successful in planning for the correct number of visitors, controlling erosion on walking trails, improving the quality of park services, and reducing wildlife disturbance.

There are three key points to consider:

- **PHYSICAL / BIOLOGICAL:** limits of the natural environment
- **SOCIAL / PSYCHOLOGICAL:** consistency with some quality of the recreation experience
- **FACILITY / SERVICE / DESIGN:** limits imposed by the facilities and services provided (e.g. the number of parking spaces or seats in an auditorium).

One of the main issues in determining how many people can be supported by a facility is that it ultimately depends on the value judgements of people; e.g. the proprietors and the visitors. The developer of the project should clearly understand the expectations of the target audience. Do they need pristine habitats? Great diversity? Unalloyed remoteness? Or, will they be equally pleased with less? Once this is determined, then a plan needs to be developed based on the combination of economics and the Program Plan, establishing the way people and the environment come together.



The idea of “killing the goose that laid the golden egg” is an important premise for ecolodge developers to take to heart. Ultimately, what makes an ecolodge different and successful from other hotels or lodging is based on their stewardship of the natural and cultural resources they provide for their clients. Most developers or their architects and builders forget this premise and frequently this all-important commodity is drastically reduced. Also, the proprietors of the lodges forget that they are the guardians of these resources, with responsibilities for establishing and maintaining the quality of the resources that provide these experiences. If they fail at this, they find themselves with declining or changing markets.



Anyone in the tourism industry knows that volume is an extremely important concept. The more beds you have in the lodge and the more people you can get into the commodity you are selling, the greater the “bottom line.” However, this can seriously impact local natural resources. Developing an ecolodge, which is based on sustainable development principles, requires that the developer learn about the sensitivity of the habitat. This calls for experts who can go into a habitat to determine the amount of sewage that can be disposed of properly, the projected water intake and its impact on natural and human environments, and impacts of people going into the natural and human environments.

Building for an unsustainable volume is perhaps the fastest road to ruin an “ecological resource,” and “cowboy” developers will see the costs of halting the destination’s increasing degradation rise inversely with the decline of their capacity to pay for it. Creating a robust carrying capacity for a proposed development without disturbing the site requires experienced professionals and the time and resources to obtain reliable results.

What is required is the development of three management plans: The first is a Habitat Management Plan, which establishes the way in which the habitats are managed. Meanwhile, the Program Plan is developed. This plan tells you what programs (e.g. boardwalks, guides and activities) will be offered and how they should be provided to allow the numbers of visitors needed for economic viability and other management goals, which are set out in the Business

Plan. Visitor Impact Management is developed from the synthesis of these plans. The measurement of the success of these plans is discussed in Chapter 9, Monitoring and Evaluation.

Any development causes change — some are temporary and some are permanent. Experts can determine this as well as what changes are acceptable or not. These are called Limits of Acceptable Change (LAC).

### 2.5.1 Key Points In Establishing Limits of Use

Establishing limits of use is an evaluation of the information gathered during the Environmental Assessment Program (EAP) and determining what is sustainable use and acceptable change for key resources. It is very important to understand some key points or assumptions before establishing the limits of acceptable change, to determine if the use of a resource is, in fact, within the limits established and that those limits are sustainable.

Creating a system of limited use requires an EAP on the site and a proposed Program Plan (see Chapter 8) for the use of the resource. Who, what, when and how is the resource being used?

Setting limits will not ensure sustainable use of a resource. It is simply the benchmark established by a group of professionals that has an in-depth understanding of what is necessary to maintain the resource in a sustainable fashion, and whom understand the activities, experiences and infrastructure required to sustain an economically viable ecotourism development. The larger or more complex a system or facility for which limits are being established, the greater the chance for error in detail. Setting limits on use, therefore, may be successfully determined on a trail but less likely for an entire national park.

It is important for the tourism industry (the users) to play a key role in establishing and monitoring their impacts and adjusting products to maintain sustainability. Without direct involvement, operators will not understand that they have a responsibility for protecting the very resources on which their economic well-being is based.

It is most important that the key stakeholders (investors, owners, etc.) develop flexible plans for the use of a resource before going through all the steps in establishing and monitoring visitor impacts.

### **GUIDELINES**

1. Determine the visitor impact on ecosystems at the proposed site and in surrounding areas. The size and capacity of natural areas should be determined on the basis of limiting factors; i.e. the ecological vulnerability of the area,



- water and energy availability, space, access and general site conditions, including visual compatibility. Propose tourism activities that benefit local communities and the environment.
2. Study the EAP, which will contain an inventory of resources that are present; e.g. flora, fauna, water resources, geology, etc. Using this inventory will allow better planning of various activities and zones for the area.
  3. Remember that the main concern is not arriving at a magic figure of how many visitors should visit an area, but defining managerial tools for adequately handling the demands and effects of tourism on your destination.
  4. Have a Program Plan (based on the Business and Marketing plans) that clearly defines who, when and for what reason the resource is going to be used.
  5. Clearly define the resources to be used and the potential impact that the planned uses could have. Note: The resource should be defined in small units; e.g., a patch of rare plants, a bird rookery, one unit of an archaeological complex. By using knowledge of potential impacts (expertise is important here), determine what impacts are possible and what it will take to neutralize them.
  6. Determine whether there is a need to have other similar resources to meet the program needs (numbers of participants and/or visits) to meet economic goals of the ecolodge (see Chapter 8). Develop alternative plans for determining the Limits of Acceptable Change, which is required to meet the "user" requirements (e.g. numbers at the time of year to meet economic goals).
  7. Identify all the biodiversity that is appropriate for tourist "uses."
  8. Underline the special attractions of the site and establish a habitat management plan.
  9. Consider in both the Program and Habitat Management plans, the possibilities for other sustainable use of resources (e.g. fruit collection by local communities).
  10. Understand and fully exploit the site's potential as a conduit for environmental education.
  11. Plan and develop well-designed and clearly defined trails to prevent environmental impacts.
  12. Restrict the number of trails in the property to those strictly necessary to show representative flora and fauna.
  13. Publicize the maximum number of people allowed on trails to prevent disturbance.
  14. Identify all local tourist products and attractions. Quantify the attractions of the project but also those close to the property that may be used in the programming. Those should be considered also in the planning process.

