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# Isle au Haut Principles: Ecosystem Management and the Case of South Florida



Human-Dominated Systems Directorate



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## **Isle au Haut Principles: Ecosystem Management and the Case of South Florida**

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Human-Dominated  
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## Isle au Haut Principles

**T**he U.S. Man and the Biosphere Program is conducting a 5-year interdisciplinary study on ecosystem management for sustainability. In June 1994 at Isle au Haut, Maine, a charette was convened to apply these concepts to South Florida as a case study. The charette concluded that what is being done now for Everglades restoration will not achieve ecological sustainability. A sustainable South Florida environment is achievable only through utilizing ecosystem management principles that recognize the interdependency of humans and their environment. The resulting vision for South Florida would provide for the long-term security of both the ecological and agricultural systems of the region, while supporting the adjacent urban area.

The core of the South Florida ecosystem is the Everglades Biosphere Reserve, a treasured natural resource of significant regional, national, and international value. It is part of a human-dominated South Florida ecosystem, whose ecological sustainability is threatened by the pressures of urban and agricultural development.

The upland, wetland, and coastal ecological systems that make up the Everglades of South Florida are unique in the world. The people of South Florida require the economic support, clean water supply, flood control, recreational experiences, environmental quality, and aesthetic values that only a healthy Everglades can provide.

The natural Everglades originally spanned vast areas between the eastern and western coastal ridges from Lake Okeechobee through the interior of Southern Florida and opened into Florida Bay and the Gulf Coast estuaries. Although most urban development has been concentrated along the upland ridges, since the early 1900s this ecosystem has undergone extensive habitat loss and degradation as a result of major hydrological and other physical alterations designed to accommodate human activities. The cumulative pressures of rapid population growth along the southeastern coast of Florida and the conversion of wetlands to agricultural lands in the northern and southeastern reaches of the ecosystem have degraded the remaining Everglades and surrounding protected wetland and upland areas.

Today, only half of the natural Everglades remains and a mere 20 percent of the original ecosystem falls within the boundaries of the Everglades Biosphere Reserve, which constitutes our nation's most endangered national park. Some large-scale approaches to management of the ecosystem have been undertaken, especially focused on nutrients and endangered species, but the fundamental loss of habitat and water remains to be confronted.

The environment of South Florida has much more water on an average annual basis than is required to support all anticipated urban, agricultural, and ecological needs. However, under the present water management system, the major portion of freshwater is lost to the sea, creating competition among users. The ultimate issue is not competing water needs but the storage and wise management of this renewable resource.

## Isle au Haut Charette

The U.S. Man and the Biosphere Program (U.S. MAB) Human-Dominated Systems Directorate (HDS) is conducting an independent scientific study to define ecological sustainability in the context of regional, watershed-based ecosystems, advance ecosystem management principles, and apply them to the South Florida environment.

Three years of planning and research activities involving over 100 scientists culminated in an intensive workshop, or charette, on the South Florida/Everglades ecosystem from June 5-16, 1994, at Isle au Haut, Maine. The charette participants were a broadly diverse group of more than 40 natural and social scientists with particular expertise in ecosystem management of the South Florida environment.

The charette established a new model of human/environment interactions and developed hydrological and ecological sustainability goals for the South Florida landscape. Scenario-consequence analyses were used to examine a range of regional management options with respect to agricultural and ecological sustainability and the needs of urban communities. The charette reached consensus on ecosystem management principles and articulated a vision for a sustainable South Florida.

The Everglades ecosystem has become a significantly degraded remnant of the natural ecosystem. The dominant force causing this degradation is the lack of adequate quantities and timely distribution of water to match the natural cycles of the Everglades. We are faced not just with endangered species but much more critically with endangered ecosystems.

## Ecosystem Management Principles

Much attention is currently focused on the South Florida ecosystem by policy makers, scientists, and natural resource managers at all levels. Activities include a White House ecosystem management initiative, a federal inter-agency task force, a Governor's commission, and many agency programs at federal, state, and local levels.

Ecosystem management is emerging as an innovative framework for achieving harmonious and mutually dependent sustainability of society and the environment. Ecosystem management focuses on human and natural systems at regional scales across intergenerational time periods.

### South Florida Vision

The Greater Everglades ecosystem is a unique regional and national resource of global significance whose continued existence is severely threatened. Our vision is to recover and sustain a healthy South Florida ecosystem including a diverse human culture and its social and economic needs.

The ecosystem management principles crystallized at Isle au Haut reflect currently developing concepts and the relevant scientific literature. These resulting principles must be considered as an integrated whole.

## Ecosystem Management Principles

- Use an ecological approach that would recover and maintain the biological diversity, ecological function, and defining characteristics of natural ecosystems.
- Recognize that humans are part of ecosystems, and they shape and are shaped by the natural systems; the sustainability of ecological and societal systems are mutually dependent.
- Adopt a management approach that recognizes ecosystems and institutions are characteristically heterogeneous in time and space.
- Integrate sustained economic and community activity into the management of ecosystems.
- Develop a shared vision of desired human/environmental conditions.
- Provide for ecosystem governance at appropriate ecological and institutional scales.
- Use adaptive management as the mechanism for achieving both desired outcomes and new understandings regarding ecosystem conditions.
- Integrate the best science available into the decision-making process, while continuing scientific research to reduce uncertainties.
- Implement ecosystem management principles through coordinated government and non-government plans and activities.

## A Model of Human-Environment Interactions

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Historically, environmental and natural resource management was viewed as separable from social and economic concerns. The model proposed by the charette sets as its goal the complete integration of ecological and societal components so that ecosystem management can be fully effective and successful. This is founded on the premise that humans are an integral part of ecosystems, that people both shape and are shaped by natural systems, and that society is nurtured by the maintenance of sustainable ecosystems.

The charette examined human-environment interactions, including economic, legal, social, and demographic issues, and characterized the connections between humans and natural systems as interdependent. Societal systems affect the environment through land use, pollution, competition for resources, and other ecosystem uses, and the environment provides a diversity of essential support to societal systems and the quality of human life. The charette also considered issues of governance, resource management, and societal and cultural values. The importance of a sustainable ecosystem to society's basic needs, to the quality of human life, and to the intangible but powerful human sense of environmental ethics was seen as a driving force in society's efforts to sustain the Everglades and other irreplaceable natural systems.

## Ecological Sustainability Goals

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The loss of more than half of the original Everglades ecosystem makes full restoration and a complete return to historical conditions impossible. The charette, therefore, defined ecological sustainability goals as the *recovery of the defining features of the original Everglades*. Two critical ecological characteristics are the defining features for sustainability of the natural dynamics of the Everglades. Large space and time scales supported large populations of animals; localized climatic conditions, disturbances such as fires, freezes, and storms, and small variations in topography created and maintained a complex mosaic of habitats across the landscape. This mosaic is necessary to support the teeming life that was characteristic of the natural Everglades.

The abundant native species and diverse mosaic of habitats of the natural Everglades were sustained by an inter-play of fundamental organizing forces across the landscape: the large spatial scale of the system, the patterns of dynamic water storage and sheet flow, and the low water nutrient levels of the region. These features must be restored if a healthy Everglades is ever again to be experienced.

Ecological sustainability requires the scientific identification of an interacting set of ecological and societal conditions that constitute a healthy environment. The ecosystem management process is designed to adapt human/environment interactions in order to achieve ecological and societal sustainability goals.

## Scenario Consequence Analysis

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The Isle au Haut charette used a scenario-consequence approach to explore a range of spatially explicit management options. It was agreed that the present system is not ecologically sustainable. Some of the hypothetical scenarios appeared inadequate to meet ecological sustainability goals or appeared inconsistent with societal constraints. Other scenarios suggest a potential win-win situation, establishing both sustainable agricultural and sustainable ecological systems while also meeting anticipated urban needs.

Ecological sustainability of a healthy Everglades requires reestablishment of much of the natural hydrological system in order to provide the water quantity, timing, and distribution. This is necessary over a sufficiently large area to support the ecological components, such as wading birds and a mosaic of habitats, that constitute the essence and uniqueness of the Everglades.

## Toward a Shared Vision

Further analysis of these scenarios should become part of the continuing local, state, and federal dialogue on the future of the South Florida ecosystem. The ecological, agricultural, and societal consequences of a range of scenarios need to be analyzed in more detail to confirm the initial findings of the charette. This continuing process is essential to reducing uncertainty and to developing a shared vision for a sustainable South Florida.

Throughout the charette, the participants sought to balance the needs of the human population, the historical agricultural sector, and the unique and inexpressibly beautiful Everglades. Through the spirit and synergism of the people who gathered at Isle au Haut, a vision has now emerged for a sustainable South Florida ecosystem.

A complex process examining the requirements for a sustainable South Florida has recently been established at federal, state, and local levels. A continuing dialogue among governmental, academic, and public groups is essential, using the Isle au Haut ecosystem management framework for ecological and agricultural sustainability. The principles and conclusions of the Isle au Haut charette offer a vision of a win-win situation for achieving long-term regional security and human/environment sustainability. This process is a rare and critical opportunity that must be seized.

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- U.S. Bureau of the Census Population Division
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- Governor's Commission for a Sustainable South Florida
- Everglades National Park
- South Florida Water Management District
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