

# Ecosystems Discussion Group

## **Background**

The term “ecosystem” is not restricted to any particular spatial unit or scale, and represents one aspect of biological diversity. An ecosystem is a dynamic complex of plant, animal and microorganism communities and their non-living environment, interacting as a functional unit. Humans are an integral component of ecosystems.

The use of ecosystems as a basis for study and sustainable management of biological diversity (i.e., the “ecosystem approach”) is the primary framework for action under the Convention on Biological Diversity--although it does not preclude other management and conservation approaches. It is the preferred framework because ecosystems offer the opportunity to integrate management of land, water and living resources by encompassing the essential processes, functions, and interactions among organisms and their environment.

The focus on ecosystems is explicitly intended to counterbalance the tendency among governments to adopt management approaches that are too site-specific, place too much emphasis on single species conservation or fail to account for the fact that most of the world’s biological diversity falls outside of protected areas.

## **Key Issues for Biodiversity Information Networks**

### **Convention on Biological Diversity Guidance**

The Convention on Biological Diversity recognizes 12 principles of the ecosystem approach, and provides operational guidance for these principles. From this guidance, the following 5 needs are of greatest interest to biodiversity information networks:

- Increased knowledge of ecosystem functions and roles of the components of biological diversity
- Better understanding of ecosystem resilience and the effects of biodiversity loss and habitat fragmentation
- Better enumeration of the benefits to society from services provided by biological diversity
- Improved monitoring protocols to support adaptive management of ecosystems
- Increased intersectoral communication is required among government ministries, management agencies, NGOs, etc.

### **Ecosystem Thematic Areas**

In the international community, ecosystems have been organized into a series of thematic areas that are useful in guiding the study and development of knowledge about ecosystems: marine and coastal systems, inland waters, agricultural systems, forests, and dry/sub-humid lands. These thematic areas have become drivers in the development of research programs and funding mechanisms. While they promote a holistic view of these systems, at times the linkages among the systems are not sufficiently acknowledged.

### **Issues of Scale**

The study and management of ecosystems is confounded by their inherent complexity. Of particular concern is the need to understand ecosystem structure and function at multiple scales—both spatially and over time. Institutional cooperation is an essential step towards making sure that information at different geographic and temporal scales is gathered and shared. In addition, greater understanding is needed of the role that species and genetic resources play in ecosystems because some finer-scale aspects of biological diversity are not adequately captured using an ecosystem approach.

## **Classification and Standards for Ecosystems**

Scientific research and information sharing depend upon the adoption of a “common language” for the identification and description of the objects under study. The classification and nomenclature of ecosystem types is still in its infancy compared to species taxonomy, and this causes many challenges for organizations and individuals who are interested in aggregating data sets or exchanging information. UNESCO has provided a hierarchical framework for the development of ecologically based classifications. However, much work remains to be done to develop more standardized nomenclatures for finer scale natural communities and mid-scale ecological systems, and the mapping units that can be harmonized across international borders.

## **Sample of Existing Initiatives**

### **Millennium Ecosystem Assessment (MA)**

(<http://www.millenniumassessment.org/en/>)

This is an international effort to assess the capacity of ecosystems to support human well-being and life on earth. Over 400 leading social and natural scientists from 66 countries are conducting the assessment, with the help of the public and decision-makers who use and manage ecosystem resources. The MA is funded by the World Bank, donor countries and private foundations, which are represented on the MA Board together with user groups and the United Nations. There are four work groups:

- Sub-Global Assessments – coordinates the work of regional and national assessments
- Condition and Trends - will provide “baseline” information on the geographic extent of different ecosystems, the patterns of use, trends in ecosystem goods and services, and the consequences of ecosystem change for human well-being.
- Scenarios - will present a range of plausible scenarios for how the quantity and quality of ecosystem goods and services may change in coming decades in different regions of the world, and how this will affect human health and economic development.
- Response Options - will identify policy, institutional, legislative or technological changes that could improve the management of ecosystems, thereby increasing their contributions to development and maintaining their long-term sustainability.

### **NatureServe Ecological Communities and Systems Classification**

(<http://www.natureserve.org/prodServices/ecomapping.jsp> and  
<http://www.natureserve.org/publications/usEcologicalsystems.jsp>)

NatureServe is undertaking a hemisphere-wide effort to classify and help map terrestrial ecosystems using the International Classification of Ecological Communities, a consistent and flexible system that can provide the building blocks for conservation planning and action. The classification units are developed and described in cooperation with partners from academic, conservation and governmental sectors. The emphasis is on establishing standardized set of units that can be cross-referenced to more localized classification schemas developed by regional and local experts, thereby supporting comparisons and analyses over large regions that encompass multiple local approaches. In 2002, NatureServe launched a coordinated effort to classify and map mid-level, terrestrial ecological systems. These units are specifically defined as groups of plant community types (associations) that tend to co-occur within landscapes with similar ecological processes, substrates, and/or environmental gradients. NatureServe’s newest information management system, Biotics 4, is designed to capture and maintain data about the classification, status, and location of both plant associations and ecological systems.

### **Conservation Approaches Based on Ecosystem Principles**

Many international and national conservation organizations are adopting planning and implementation strategies specifically based on ecosystem principles. Representative approaches include The Nature Conservancy’s ecoregional assessments, as outlined in *Designing a Geography of Hope* (<http://nature.org/aboutus/howwework/about/art5721.html>), Conservation International’s hotspots

([www.conservation.org/xp/CIWEB/strategies/hotspots/hotspots.xml](http://www.conservation.org/xp/CIWEB/strategies/hotspots/hotspots.xml)), and World Wildlife Fund's Global 200 program ([http://www.panda.org/about\\_wwf/where\\_we\\_work/ecoregions/global200/pages/home.htm](http://www.panda.org/about_wwf/where_we_work/ecoregions/global200/pages/home.htm)). All three approaches use ecosystem-based mapping units as the fundamental planning area, and weave ecological principles regarding species interrelationships and landscape processes into their strategies.

### **Guidance for the Discussion Group**

#### **Opportunities for IABIN / CHM Joint Work Plan**

What would be the most urgent and highest impact activities that could be undertaken by the countries and non-governmental organizations of the Americas to address:

#### **Scientific Cooperation**

- The need for more consistent and integrated data sets for evaluation of ecosystem structure and function
- The need for monitoring protocols that support adaptive management and provide for better understanding of ecosystem resilience
- The development of approaches that incorporate biogeography considerations to ensure conservation of species that occupy either very small areas that may be missed by an ecosystem approach, or roam over very large areas that require linkages between ecosystems
- Increased contribution of information from the Americas in global efforts such as the Millennium Assessment

#### **Technical Cooperation**

- Development of tools, information architectures, and standardized protocols to support the integration of ecosystem data, especially at multiple scales
- Creation of institutional capacity and expertise to implement and use specialized tools for the development of information about ecosystems
- Implementation of information management systems such as Biotics 4 that are designed for ecological data, including links to spatial data (GIS)

#### **Institutional Cooperation**

- The development of information delivery systems that assist governments in understanding the impacts of their decisions on ecosystems (e.g., decision support)
- The need to increase intersectoral communication among government ministries, academic researchers, NGO's, etc.
- Continued dialogue between the academic sector and conservation NGOs to improve the implementation of conservation strategies based on ecosystem principles