

Chapter III Restoration and Management of Ecosystem and Biodiversity

Chapter 3: Restoration and Management of Ecosystem and Biodiversity

3.1. - Goods and Services of Biodiversity

Biodiversity is important at several levels for society; biodiversity and ecosystems provide a large number of goods and services that support human life by:

- The provision of food, fuels, and building materials
- The purification of air and water
- The stabilization and moderation of the planet's climate
- The moderation of floods, droughts, and extreme temperatures
- The generation and renewal of soil fertility
- The maintenance of genetic resources (crops, animals, medicines, and other products) Cultural, recreational, and aesthetic benefits

At a global scale, biodiversity must be considered in relation to major issues such as poverty reduction, food security, and the provision of drinking water, economic growth, conflicts related to resource use and appropriation, human, animal, and plant health, energy, and climate change (ONU).

Forests shelter 80% of what remains of biodiversity on Earth. They also play a protective role for water resources and in reducing the risks of natural disasters and erosion. Restoration tends toward the return of the ecosystem to its historical trajectory, rehabilitation emphasizes repair, and reallocation aims at another use.

In practice, it is common to distinguish several categories of biodiversity:

Biodiversity «domestique»/ Biodiversity «sauvage»: The former refers to species and subspecies domesticated or cultivated by humans and subjected to their selection. The latter refers to species and subspecies that occur spontaneously but are often influenced by human activities.

3.2. - Ecological Restoration and the Content of Restoration Project Plans

Ecological restoration is a comprehensive attempt that seeks to embrace both cultural and environmental realities and trends, from an ecological and socio-economic perspective rather than purely technical or developmental.

Restoration therefore tends toward returning an ecosystem to its historical trajectory; thus, historical conditions are an ideal starting point for a restoration plan.

3.3. - Difference between Ecological Restoration and Ecological Rehabilitation

Both concepts share the goal of using historical or pre-existing ecosystems as references, but their purposes and strategies differ: restoration aims to re-establish the pre-existing biotic

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integrity in terms of species composition and community structure, while rehabilitation focuses on repair and recovery of processes, thus targeting productivity and ecosystem services.

3.4. - Ecosystem Management Steps

Restoration project plans include, at minimum:

- A holistic (global) reasoning on the necessity of restoring a landscape portion
- An ecological description of the site
- A list of aims and objectives
- A designation and description of the reference
- An explanation of the integration of restoration into the surrounding landscape
- Explicit plans, schedules, and budgets for site preparation
- Restoration activities including a strategy for rapid mid-course corrections
- Developed and explicitly established performance standards, with monitoring protocols through which the project can be evaluated
- Strategies for long-term maintenance of the restored ecosystem
- When possible, an untreated control point should be included on the project site to allow comparison with the restored ecosystem.
- A well-planned restoration project clearly attempts to achieve set goals that reflect the important attributes of the reference ecosystem. Goals are achieved by following specific concrete measures.

Two fundamental questions must be asked regarding the evaluation of the restored ecosystem: Have the measures been taken? Have the goals been achieved? Answers are only valid if measures were set before works started.

Evaluations include all goals and measures relating to cultural, economic, or social aspects. For this, evaluation techniques must include social sciences. The evaluation of socio-economic goals is important for decision-makers and subsequently for policymakers who choose (or not) the implementation of restoration projects.

Biodiversity «remarquable» / Biodiversity «ordinaire»: The former is associated with rare or threatened organisms and/or habitats, the latter corresponds to the rest of biodiversity.

Without biodiversity, no ecological goods or services can exist (Limoges, 2011; EM, 2005b). Ecological goods and services are benefits from ecosystems that humans enjoy and that contribute to well-being. The quality and quantity of these ecological services seem to depend on ecosystem integrity and biodiversity maintenance; the more an ecosystem generates usable ecological goods and services for humans, the higher its economic value.

3.4.1. - Status Assessment

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The site status assessment is the foundation of the management plan. It is a synthesis of existing data. It guides the definition of issues from which the entire management strategy (long-term objectives, operational objectives, actions, monitoring) must be derived. Thus, it is important to understand its different components. Generally, a thorough status assessment is performed during the first management plan and then updated in subsequent versions. Its inventory part, when significant, can be the subject of a separate volume.

3.4.1.1. - Why Conduct a Status Assessment?

The status assessment is the first step of the management cycle aiming to:

- Have sufficient, pertinent, and updated knowledge about the site to produce a portrait of the protected natural area (context, characteristics, functioning, evolutionary trends)
- Organize base data to analyze responsibilities and identify issues at the site scale
- Understand the overall functioning of the site and identify determining factors for management

3.4.1.2. - Issues

Literally, an issue means “what is at stake,” “what can be lost or gained” at the site. In the context of drafting the management document, issues consist of elements of heritage (natural, geological, or cultural) or functioning (ecological or socio-economic) of the protected natural area for which it holds responsibility and which must be preserved or improved.

3.4.2. - Identifying Issues in Regard to Responsibilities

3.4.2.1. - Representativeness of the Natural Area for this Natural Heritage

It provides information on: the proportion present in the considered sector relative to a broader scale. This criterion can be expressed as a share of range, population size of a species, total surface occupied by a habitat, or total biomass.

- The Functional Role of the Site

This defines the site's importance in terms of functionality. These criteria are more delicate to specify. For species, functionality relates to how critical the natural area is for completing their life cycle (breeding, migration, overwintering zones, etc.). For habitats, it concerns functions fulfilled at the site scale and at a broader scale (e.g., primary production, interconnected habitats, biodiversity reservoirs/refuge zones, rivers with still active dynamics).

- Sensitivity of Natural Heritage

It informs about fragility and resilience capacity.

Example: dependency on a specialized habitat and/or microhabitat;

Very low tolerances or environmental thresholds liable to be exceeded at any life cycle stage;

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Ø Long-term Objectives

A long-term objective defines the desired state or functioning compared to the current situation of the issue; it must be targeted for preservation. It is not about what is to be DONE but what is to be ACHIEVED as a result. Hence, it is a strategic choice — a shared political decision that engages stakeholders for the long term and guides their decisions. The consultation phase at this stage is crucial and must be well prepared.

Example

Ø Operational Objectives

These are medium-term management choices established considering factor analyses influencing issues and long-term objectives' attainment.

Ø Evaluation

Evaluation consists in measuring outcomes produced by management of the protected natural area, determining if legal, administrative, financial, and technical means used produce expected results relative to site responsibilities.

Evaluation is multidimensional; it answers questions like: What happened? Did we do well? How to do better? Evaluation must not be disconnected from the management plan or be thought of a posteriori. On the contrary, it anticipates at every stage of the management cycle.