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Biodiversity Indicators: the accounting point of view

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Abstract

According to the Convention on Biological Diversity, biodiversity is the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems. The key value of biodiversity lies in its role in ensuring the functioning of ecosystems and their ability to provide services to humans and other living organisms that comprise them. For that reason, maintaining a sufficient degree of biodiversity is the key to the continued delivery of essential ecosystem services and the need to ensure the conservation of biological diversity is now widely accepted. In spite of this global sentiment, there is not a national or international convergence towards a framework to report to different stakeholders' groups the performance of organizations like protected areas and national parks, in terms of their biodiversity and the conservation activities they are achieving. After describing the concept of biodiversity, its value and the information needs of the community related to it, the main purpose of the paper is to propose a theoretical and systemic framework for its reporting by public sector organizations established for the protection of the natural capital, by means of some specific indicators deduced mainly by the literature concerning biological sciences. Following the GRI (*Global Reporting Initiative*) guidelines, these indicators, interpreted in terms of KPI (*Key Performance Indicators*), should lead to an increase in the transparency and in the accountability of Protected Areas.

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1. Introduction

The term biodiversity refers to the variety of life on Earth at all its levels, from genes to ecosystems, and the ecological and evolutionary processes that sustain it. Biodiversity includes not only species we consider rare, threatened, or endangered, but every living thing —even organisms we still know little about, such as microbes, fungi, and invertebrates.

The 1992 United Nations Earth Summit defined "biological diversity" as "*the variability among living organisms from all sources, including, 'inter alia', terrestrial, marine, and other aquatic ecosystems, and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems*". This definition is used in the United Nations Convention on Biological Diversity.

Biodiversity is under increasing pressure. Habitats available to wildlife have undergone dramatic modifications, and significant biodiversity has already been lost over modern times. In order to counter global biodiversity loss and consequent impacts on human well-being, there have been several recent high-profile international political commitments to improve biodiversity conservation. These have mainly consisted of goal setting, in the form of conservation targets to which governments, decision-makers, and the international community are committed; the most notable example of which are the targets set by the Convention on Biological Diversity (CBD; Convention on Biological Diversity, 2011). However, because of the complexity of biological systems, and a lack of long-term biodiversity data, nations are hampered not only in assessing progress towards such targets, but also in developing appropriate policy and legislative responses to reverse biodiversity declines.

Global commitments to stemming biodiversity loss have contributed to the development of methods to track changes in many metrics of biodiversity, and addressing biodiversity information requirements has become one of the fastest growing areas of research in the field of conservation biology.

It has been suggested that effective conservation requires addressing three fundamental questions (Salafsky *et al.*, 2002), namely:

- what should our goals be and how do we measure progress in reaching them?
- how can we most effectively take action to achieve conservation?
- how can we learn to do conservation better?

The effectiveness of biodiversity conservation therefore depends on our ability to define, measure, and monitor biodiversity change, and on adaptive responses to biodiversity loss of a wide group of stakeholders and actors, including governments, local communities, and international society.

The objective of this paper is to evaluate the best way to report and to monitor the biodiversity level and conservation activities in Protected Areas, according to the GRI guidelines, in terms of different metrics that will assume the nature of *Key Performance Indicators* (KPI).

After the introduction, the first paragraph will first underline the need to consider and to value biodiversity and then the issue of its reporting to various stakeholders. The second paragraph will present the GRI approach to biodiversity reporting. The third paragraph will be focused on the presentation of some indicators, useful to assess the Biodiversity in Protected Areas. Finally, the fourth paragraph will be devoted to discussion and conclusions, with some indications for future research.

2. Biodiversity: valuation and reporting issues

The combination of unsustainable consumption in developed countries and persistent poverty in developing nations is destroying the natural world and the biodiversity they encompass. Extinction is the gravest consequence of the biodiversity crisis, since it is irreversible. The road to extinction is made even more perilous to people by the loss of the broader ecosystems that underpin our livelihoods, communities, and economies (McNeely et al., 2009). Loss of biodiversity on land in the past decade alone is estimated to be costing the global economy $500 billion annually (TEEB, 2009). Reduced diversity may also reduce resilience of ecosystems and the human communities that depend on them.

One of the most important issue before deciding what is the best way to value and to report biodiversity, is how to identify it. How do we know whether biodiversity has changed? Scientists use different methods to assess biodiversity. Biodiversity among areas can be compared with statistical indexes of species diversity (Magurran,