

The Importance and Principles of State of Ecosystem Reporting and Indicators

Introduction

The five papers in this section of THE GEORGE WRIGHT FORUM are linked by three common themes: state of the environment reporting, indicators, and protected areas. However, they differ in a number of important elements, such as the scales being used, the purposes being served, the interests being considered, and the clients being addressed.

This paper is intended to address the concepts and principles that underlie state of the environment reporting and indicators. The achievements in these two related fields of work vary from place to place, and from jurisdiction to jurisdiction. Overall, the work has not reached an even level of maturity, and innovations continue. Within North America, for example, these two fields of study have a more developed history at the national level. Such jurisdictions as provinces, states, and territories have less experience. For national jurisdictions, Canada has the most experience, having completed three major state of the environment reports (Government of Canada 1986; 1991; 1996) and numerous indicator bulletins. Protected areas have constituted an important part of all these publications and reviews. A previous

paper in THE GEORGE WRIGHT FORUM (Wiken and Lawton 1995) touched upon some of the reporting topics.

The four papers that follow this introductory article serve as both case studies and discussion pieces. Protected area networks and systems plans have a strong connection to ecosystems. As ecosystems vary across spatial and temporal scales, so do reporting and indicator needs:

- The second paper describes a North American context. The Commission for Environmental Cooperation (created pursuant to the North American Free Trade Agreement) and an earlier Tri-Lateral Committee on Environmental Information initiated much of this work (NAEWG 1997).
- The third paper takes on a national perspective. The achievements

made in reporting on protected areas in Canada's state of the environment reports (referenced above) serve as the main basis for discussions.

- The fourth paper examines a continental macro-ecosystem: the Great Plains of North America. This is one of the continent's most heavily disturbed and altered ecosystems.
- The final paper describes needs in the context of a natural resource sector: forestry. The resource sector, and the character and distribution of productive forest ecosystems, are closely interwoven to further forest sustainability.

Decision-Making and Concerns

Decisions concerning natural resources and life-sustaining systems are becoming more crucial. Historically, the repercussions of using resources unwisely may have taken substantial time periods to affect our daily lives. This is no longer the case. Many factors have contributed to accelerating the pace of impacts:

- The resource demands of a rapidly growing population (6 billion globally) translate into an increasing number of stakeholders and interest groups.
- Technology has allowed us to see and detect more, and to do so more rapidly.
- Stocks of prime resources have commonly been depleted or sub-

jected to wider demands. For instance, we have fewer forest wilderness areas, and those that remain that are competitively sought-after to meet biodiversity conservation, resource harvesting, recreation, and wildlife habitat goals.

- Stakeholders and interest groups have far greater access to decision-making bodies and processes.

Owing to their dearth, protected areas have increasingly become specialized warehouses holding the vestiges of disappearing assets. The ecological integrity of these places has become the focal points of many debates. Today, some people debate whether protected areas should occupy 10-20% of the landscape/ seascape. Others emphasize a different perspective and argue that protected areas are the 100% solution of tomorrow. Without some minimum having been retained, ecosystems can be degraded to the stage that restoration is impossible simply because many of the original assets have disappeared. From a purist's standpoint, how can we truly restore the prairies when historical ingredients like the passenger pigeon, plains grizzly, and wolves are no longer there? Will the reintroduction of the swift fox and black-footed ferret to parts of the prairies be successful now? In some cases, our history book has not only a few chapters with torn pages, but is missing entire chapters. When this stage is reached,

there is no longer a benchmark ecosystem type to act as a standard.

Some groups and individuals ponder over how protected areas can fit within the context of the greater landscape. How can protected areas survive and maintain their integrity given the types of land uses and human activities that surround them? In contrast to the more encompassing look, others adhere to mere cartographic “counts and measures” of particular types of protected areas. For instance, do we have 10-15% of each regional ecosystem protected as a national park? Protected areas should not be seen so much as boundary lines and percentages on a present-day map. Rather, they should be construed as lines to the future of sustainability.

What Do We Understand?

Across the continent, terms such as protected areas, reporting and indicators all seem to be familiar. Even particular types of conservation areas, such as national parks, IBPs (International Biological Program sites) and biosphere reserves, appear to be part of the everyday language. Many of the major ecosystems across North America in which protected areas exist, like the Canadian Arctic, the Central Grasslands, and the Sonoran Desert, are also seemingly well-known.

However, within the context of North America or any of its member nations, how well do we understand

any of these terms specifically? What are the collective status, achievements, and gaps in wildlife areas or protected areas in general? Why is the reporting on the state of protected areas an important function for average citizens within each of the three countries, as well as for conservation specialists? Do indicators have any particular importance in a reporting process? Can strategic planning and comprehensive assessments emerge in the absence of authoritative reporting? Should the scope of reporting be based on jurisdictions or ecosystems alone, or should it embrace both?

Individual conservation organizations tend to reflect their particular interests and achievements fairly well. The wide knowledge that people have about national parks is an example. Areas that are less-frequented by people, such as wildlife areas, are well-known too but to a smaller range of people. In many nations, for instance, the term “protected area” is almost synonymous with “parks.” In Canada, few people understand that the Canadian Wildlife Service has over 11,350,600 ha protected for wildlife purposes (Beric 1998)—an extent nearly as large as that of the country’s national parks. If a national system of major wildlife areas is not well known, what about all the other contributions (e.g., forest reserves, wilderness areas, conservation areas) to the protected area estate? Are the possible

synergies underlying these separate endeavours capitalized on? How well do parks conserve wildlife habitats? And how well do wildlife areas protect representative ecosystems?

Changing Goals

For a long time, progress in establishing protected areas in any given field of conservation was largely seen as an "interesting announcement" occasionally reported in newspapers. The addition of new areas or the management of existing ones was not really viewed within the context of such mainstream ecosystem issues as acid rain impacts. Thus the success in the field of protected areas was welcome, but was largely seen as something happening in the background. Without obvious and ubiquitous evidence of ecosystems and species becoming endangered, there was little public unrest and few concerns shown by professional groups.

Our Common Future (WCED 1987), the World Conservation Strategy (IUCN, UNEP, and WWF 1980), and the Convention on Biological Diversity (UNEP 1992) are examples of global initiatives that started to markedly advance protected areas as a more visible issue. A more integrated conscientiousness was created about the disappearing legacy of natural areas. The need to further conserve native ecosystems and their inherent biological and physical resources was steadily being

recognized at state, provincial, national, and regional levels (Wiken and Gauthier 1998). Encroaching land uses (e.g., forest harvesting, agriculture, urbanization), expanding exploitation of natural resources, and competing demands on prime lands and waters were all common stress factors. They were contributing to the erosion of opportunities to acquire areas and to the sense of urgency to complete individual protected area system plans. The increasing numbers of endangered ecosystems and species were also obvious signals of the inadequacy of conservation measures.

With protected areas, the new and elevated principles of sustainable development and ecosystem management drew attention to the need to be more inclusive in understanding the basics of conservation objectives. Parks, wildlife areas, marine sanctuaries, wilderness areas, ecological reserves and forest reserves have for a long time appeared to be very different enterprises. Notwithstanding their success in meeting older objectives, these protected areas have newer roles in achieving biodiversity protection and, in cases, in directly meeting the goals of other agencies (e.g., a wildlife organization may protect vital habitat and indirectly serve a park organization's goal of protecting a representative ecosystem). These commonalities in goals are benefits. Applying the principles of sustainable resource man-

agement or an ecosystem approach has also meant that managers and planners must be aware of the conditions that prevail within and around each protected area and the entire protected area network. Having knowledge of the entirety and dynamics of the landscapes/seascapes of which protected areas are a part is seen to be more vital to assess potential impacts and to maintain the integrity of ecosystems. The desire to understand land-use and land-cover changes is an example of a fairly common interest.

Using Reporting and Indicators as Strategic Devices

How do we establish a more collective and strategic view of achievements and goals? How do we improve the collection of important data and information? Canada's 1991 state of the environment report (Government of Canada 1991) is one of the first comprehensive assessments of protected areas undertaken in North America. A broad range of stakeholders and agencies contributed to its development. The document included a special chapter on protected areas. It used the national ecosystem framework (Wiken et al. 1996; NAEWG 1997) of 217 ecoregions to assess the progress that had been achieved by two of the nation's leading federal departments (Parks Canada, Environment Canada), the ten provincial and two territorial jurisdictions, and 125 non-govern-

mental organizations (e.g., The Nature Conservancy-Canada, Ducks Unlimited, Island Nature Trust).

This 1991 report was the second concerted effort to develop principles of reporting. Based on feedback from the first state of the environment report (Government of Canada 1986), participants and contributors from across Canada and abroad agreed that the:

- Material should be *authoritative*;
- Scope of the work should be as *inclusive* as possible;
- Assessments and conclusions should be completed in an *objective* manner;
- Context should be *ecosystemic*; and
- Underlying yardsticks should further foster a *preventative and anticipatory* mode of sustainable resource use and management.

Each of these adjectives can be used in a parallel and extended way. For instance, "objectivity" is in many ways an equivalent word for "credibility." Also, objectivity means divorcing discussions from inordinate biases. From the selection of data through to discussions, reporting calls for a dispassionate view. Otherwise, how can things be "matter of fact" when the data and the information that comes from them are not?

The state of the environment analysis, conclusions, and reviews embraced varied stakeholders and interest groups involving different levels of governments industries, en-

environmental groups, academics, etc. What did it do? It provided a:

- Means to measure progress on the status of protected areas;
- Way to communicate and monitor results;
- Chance to learn by presenting information and not propaganda;
- Method to assess gaps and set targets for the successful achievement of system plans;
- Mechanism to set priorities and adjust goals;
- Capacity to see the broader picture and improve linkages between protected areas initiatives;
- Means to create an understanding of the use and application of indicators;
- Basis to allocate resources and efforts;
- Vehicle to evaluate trends and conditions;
- a means to build synergies and integrate talents and expertise of different organizations;
- a basis to advance protected area science and research; and
- a vehicle to improve knowledge of state–pressure–response relationships.

Ironically, state of the environment reporting works most effectively when the core set of activities is rooted within ecosystems—here, meaning people *and* the environment (Wiken 1996). The condition of ecosystems and the status of their assets are the fundamental worries. What is

the desired state for ecosystem health, social well-being, economic stability, etc.?² The worries cover a range of ecosystems from small to large and time scales from the near- to the long-term. The state of the environment reporting process typically starts with a robust discussion of the issues and concerns. In a sense, they provide an initial measure of the impacts, the implications, and the goals. The problems as well as the perspectives of different groups must be clearly understood. The analysis of stressors is simply an analysis of causes (probable and known). An evaluation of trends determines the rate, consistency, and location of changes. Actions and policies become the means whereby governments, the public, industry, and businesses can enhance existing mechanisms to deal with issues or devise totally new approaches. Measures and indicators concern all of the basic inventory, monitoring, and research activities. They are the vital engines behind acquiring relevant information and indicators. Review and adjustment activities are associated with those stages in decision-making where periodically the current set of actions and policies are evaluated to see if they are effectively addressing the issues, or whether the measures and indicators are in need of refinement. The overall state of the environment reporting process is seldom strictly linear. It works most successfully when it capitalizes on

iterations between stages.

Moving Ahead

Reporting on the status of protected areas and using various indicators to measure progress appear to be quite simple endeavours. Environmental groups, governments, universities, individuals and industries typically want this information for doing strategic planning, meeting public accountability requirements, and fulfilling mandated responsibilities (Government of Canada 1986).

Information is crucial. If the questions are not properly sculptured at the outset, then the answers are of little value. If information does not reflect a comprehensive perspective, then the interests have not been fully represented. If the principles of reporting on the state of the environment are reduced to a single Confucian proverb, it might be:

*If what was meant to be said remains
unsaid,
then what was meant to be done re-
mains undone.*

In managing human activities that affect natural areas, decision-making is far more complicated and significant than ever before (Wiken 1999). How to protect the last of the least? How to judiciously manage the rem-

nants? How to avoid reaching stages of paucity? How to manage protected areas within the realm of their surrounding modified landscapes? How to judge and compensate for long-term trends? How to appease the increasing numbers of stakeholders and interest groups? How effectively are we using and capitalizing on mechanisms like state of protected area reporting, state of the environment reporting, and ecological indicators? If mechanisms like these are not used, how can protected area achievements and gaps be fairly assessed and communicated? These questions illustrate the taxing nature of decision-making today.

Reporting is becoming more onerous, both as a responsibility and as a basis for decision-making. Why? Because the forums for decision-making are increasingly open and contentious, covering numerous jurisdictions, scales, and disciplines. The once-taught ideal that "this is mine" has swung about to "this is ours." The more inclusive nature of ownership is in part a reflection of the shrinking resources base, the shorter impact regimes and turnaround periods, and the appreciation of new principles: long-term equity, shared values and resources, and ecosystem integrity.

References

- Beric, Robert. 1998. Canadian Conservation Database (CCAD). *Eco: Newsletter of the Canadian Council on Ecological Areas* (12), 16-19.
- Government of Canada. 1986. *The State of Canada's Environment*. Ottawa: Minister of Supply and Services.

- . 1991. *The State of Canada's Environment*. Ottawa: Minister of Supply and Services.
- . 1996. *The State of Canada's Environment*. Ottawa: Minister of Supply and Services.
- IUCN, UNEP, and WWF [International Union for the Conservation of Nature and Natural Resources, United Nations Environment Programme, and World Wildlife Fund]. 1980. *World Conservation Strategy: Living Resource Conservation for Sustainable Development*. Gland, Switzerland: IUCN/UNEP/WWF.
- NAEWG [North American Ecosystem Working Group]. 1997. *Ecological Regions of North America: Towards a Common Perspective*. Montréal, Québec: Commission for Environmental Cooperation.
- UNEP [United Nations Environment Programme]. 1992. *Convention on Biological Diversity*. Publication UNEP/CBD/94/1. Also accessible on the Web: <http://www.biodiv.org/convtext/cbd0000.htm>.
- WCED [World Commission on Environment and Development]. 1987. *Our Common Future*. Oxford: Oxford University Press.
- Wiken, E. B. 1996. Ecosystems: Frameworks for thought. *World Conservation* 1/96 (IUCN, Gland, Switzerland).
- . 1999. Casting the bottom line on the blue planet. In Proceedings of the 1997 Canadian Council on Ecological Areas Annual General Meeting: Ecological Areas and the Bottom Line. Fredericton, New Brunswick.
- Wiken, E. B., and D. Gauthier. 1998. Reporting on the state of ecosystems: Experiences with integrating monitoring and state on the environment reporting activities in Canada and North America. In Proceedings of the North American Symposium on Towards a Unified Framework for the Inventorying and Monitoring of Forest Ecosystem Resources: Mexico/U.S. Symposium, Guadalajara, Mexico.
- Wiken, E. B., and K. Lawton. 1995. North American protected areas: An ecological approach to reporting and analysis. *The George Wright Forum* 12(1), 25-33.
- Wiken, E. B., D. Gauthier, I. Marshall, K. Lawton, and H. Hirvonen. 1996. *A Perspective on Canada's Ecosystems: An Overview of the Terrestrial and Marine Ecosystems*. Canadian Council on Ecological Areas Occasional Paper no. 14. Ottawa: CCEA.

Ed B. Wiken, Canadian Council on Ecological Areas, 2067 Fairbanks Avenue, Ottawa, Ontario K1H 5Y9 Canada; ecologic@istar.ca

