

# MONITORING FOR ECOLOGICAL INTEGRITY AND STATE OF THE PARKS REPORTING

DONALD MCLENNAN<sup>1</sup> AND PAUL ZORN

<sup>1</sup>National Monitoring Biologist

Parks Canada, Ecological Integrity Branch

25 Eddy Street

Gatineau, Québec, K1A 0M5

Phone: (819) 953-6464

E-Mail: donal.mclennan@pc.gc.ca

## ABSTRACT

*A brief summary of the Parks Canada Agency program for ecological integrity (EI) monitoring and state of the park reporting is given. These program elements are required as part of recent legislation and policy changes following the review of the Ecological Integrity Panel and the Minister's First Priority Report. The intent of the Agency's ecological integrity monitoring and state of the park reporting programs are to clearly and concisely answer two fundamental questions: 1) "What is the state of EI of Canada's national parks?"; and, 2) "What is Parks Canada doing to improve that state?"*

## WHAT IS ECOLOGICAL INTEGRITY?

The following definition of ecological integrity (EI) is taken from the *Canada National Parks Act* (Government of Canada, 2000): "... 'ecosystem integrity' means, with respect to a park, a condition that is determined to be characteristic of its natural region and likely to persist, including abiotic components and the composition and abundance of native species and biological communities, rates of change, and supporting processes." Section 2. (1) *Canada National Parks Act* [2000: Section 2(1)]. A state of EI implies that both abiotic and biotic processes of park ecosystems are functioning properly, and that they support, and will continue to support, viable populations of the suite of organisms representative of the natural area the park was established to represent.

## WHAT IS ECOLOGICAL INTEGRITY MONITORING?

EI Monitoring measures changes over time in ecological variables of interest, in a repeatable manner, in relation to some standard or reference level of the ecological variable. A useful definition for monitoring EI in protected areas has been put forward by Elzinga *et al.* (1998): "... the collection and analysis of repeated observations or measurements to evaluate changes in condition and progress toward meeting a management objective." In the context of monitoring EI in national parks, the over-riding management objective is the maintenance or restoration of EI. Typical sub-objectives will include maintaining all native species at viable population levels, maintaining a forest ecosystem productivity that optimizes representation and habitat requirements, or maintaining lake and stream water quality to a predefined standard. To meet these objectives park managers need reliable information on progress towards or away from management targets. To this end, park EI monitoring will collect and analyze data on a suite of carefully selected monitoring indicators in a rigorous and consistent manner, and compare and report results to pre-identified management targets and thresholds.

## WHY MONITOR FOR ECOLOGICAL INTEGRITY?

The requirement for monitoring and reporting EI in Canada's national parks is rooted in the enabling legislation that underlies the formation and mandate of the agency. Parks Canada Agency (PCA) was created by the Government of Canada "...for the purpose of ensuring that Canada's national parks, national historic sites and related heritage areas are protected and presented for this and future generations." (Government of Canada, 1998). The PCA mandate underscores the responsibility to "protect and present" national parks. This mandate can be expressed as a three-point agency responsibility to protect EI, provide high quality visitor experiences, and effectively present heritage values to Canadians: "On behalf of the people of Canada, we protect and present nationally significant examples of Canada's natural and cultural heritage and foster public understanding, appreciation and enjoyment in ways that ensure their ecological and commemorative integrity for present and future generations." (Parks Canada, 2005).

Finally, the *Canada National Parks Act* (Government of Canada, 1998: Section 8.2) makes clear the role of EI within the agency: "Maintenance or restoration of ecological integrity, through the protection of natural resources and natural processes, shall be the first priority of the Minister when considering all aspects of the management of parks." Thus the principle reason for monitoring and reporting EI in national parks is to provide clear information to all Canadians that national parks are being protected "for present and future generations". Monitoring information generated by the program will provide essential data to report to Canadians on one of the key objectives of the *National Parks Action Plan*: "...to ensure that the state of ecological integrity... is improved over the next 10 years in each of Canada's 42 national parks". (PCA, 2000: n.p.)

## MONITORING QUESTIONS

A goal of EI monitoring and *State of the Parks Reports* (SoPRs) is to clearly communicate answers to the following questions:

### **1. What is the state of park EI and how is it changing?**

Park managers are required to report the EI of national parks to Canadians through individual SoPRs very five years, and national-scale *State of the Protected Heritage Areas Reports* (SoPHARs) every two years. SoP and SoPHA reports will provide comprehensive assessments of the state of park EI, based on clearly communicated and scientifically credible information gathered through park EI monitoring programs.

### **2. How are our management activities affecting park EI?**

A second, equally important function for EI monitoring and reporting is to provide useful and clear feedback to managers on the ecological outcomes of park management activities. Programs to measure these outcomes will be aimed at answering specific EI monitoring questions about particular management activities such as ecosystem restoration, prescribed fire, the creation of an improved heritage presentation program, or changes in how visitors use the park.

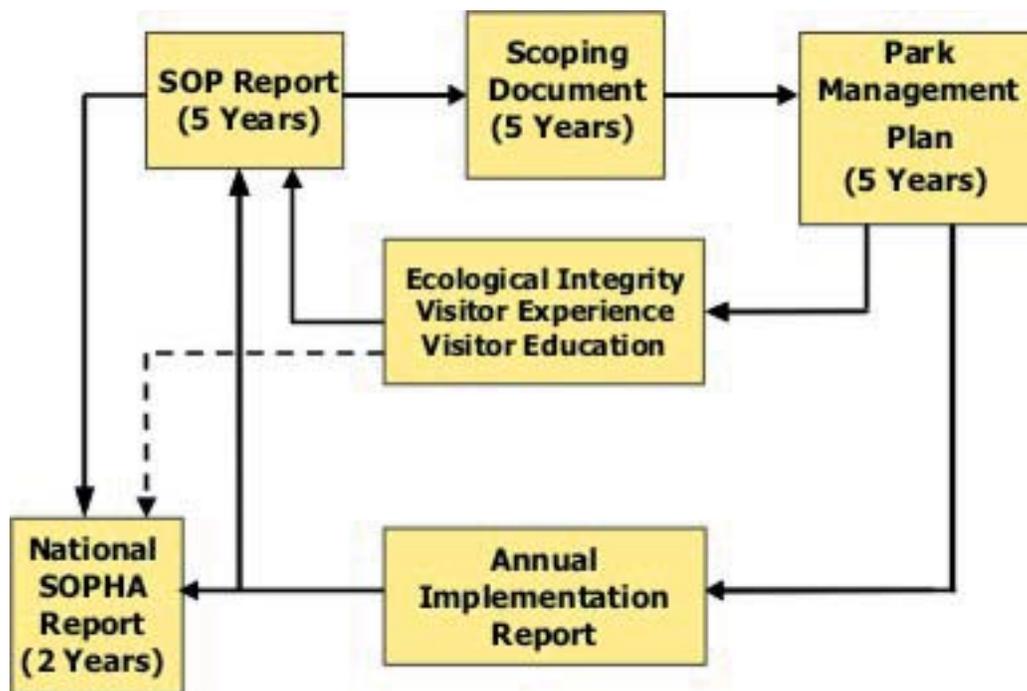
The PCA *EI Monitoring and Reporting Program* builds on the considerable amount of monitoring already ongoing across the PCA network to develop park monitoring programs that meet these new park reporting requirements.

## PARK MANAGEMENT AND ECOLOGICAL INTEGRITY MONITORING

The principal aim of the PCA *EI Monitoring and Reporting Program* is to provide clear and relevant information for park managers on the state of park EI, and the effects of our management actions on it. The agency

impetus to conduct EI monitoring flows from the requirements of Section 11 of the *Canada National Parks Act* (Government of Canada, 2000), which states that: “The minister shall, within five years after a park is established, prepare a management plan for the park, containing a long-term ecological vision for the park, a set of ecological integrity objectives and indicators and provisions for resource protection and restoration, zoning, visitor use, public awareness and performance evaluation, which shall be tabled in each House of Parliament.” Park EI monitoring thus flows from a long-term EI vision statement in the park management plan, as illustrated in Figure 1. The requirement in the *Act* for the development of EI objectives and indicators provides clear direction and motivation for the development of EI monitoring programs in all parks. Furthermore, the *Act* also directs that the EI indicators developed must measure the present state of park EI, and report progress towards achieving the EI vision outlined in the park management plan. This requirement from the *Canada National Parks Act* (Government of Canada, 2000), along with PCA’s *Executive Board* direction, provides park biologists with their “marching orders” for the development of park EI monitoring and reporting programs.

Figure 1. EI monitoring and links to key park management planning documents.



Understanding the relationships amongst the park management plan, the EI monitoring program, the SoPR and the *Scoping Document* is critical to building the PCA *EI Monitoring and Reporting Program* in a way that responds to, and informs, management needs. Specifically: “The park management plan establishes the future vision for the park, including the elements of a long-term vision for ecological integrity. Objectives and actions for achieving the ecological vision are contained in the management plan. Ecological integrity indicators (6-8), tied to the long-term ecological vision, are defined in the management plan. For each indicator, targets, i.e. a desired future condition, and thresholds, i.e., levels of the indicator that represent high, medium and low ecological integrity and invoke appropriate and prescribed management response, are defined in the management plan.” (PCA, 2005: n.p.).

An important challenge for each park EI monitoring program will be to interpret park EI vision in the context of the EI indicators. The monitoring program will track the current condition and trend of a series of ecological measures, which are combined into clear and well-communicated statements of EI – the EI indicators. EI indicators and measures will include management thresholds and targets that define biologically meaningful levels of the indicators and measures. A second purpose of the park EI monitoring program is to monitor the ecological impact of individual management actions, i.e., management effectiveness, which also flow from the management plan, and are an important component of actively achieving the vision

stated in the management plan and the *National Parks Action Plan* (PCA, 2000).

The *SoPR* uses EI monitoring data (and data drawn from other sources) to assess the state of EI of the park. More specifically, it reports on the current condition and trend of the EI indicators and on the effectiveness of the individual management actions taken, and it identifies key ecological issues facing the park. The *Scoping Document* takes the conclusions of the *SoPR*, i.e., the key ecological issues facing the park, and identifies the need to address them, along with other park management issues, in the next park management planning cycle.

Given the iterative nature of the relationship among the management plan, EI monitoring, the *SoPR* and the *Scoping Document*, it is very important that monitoring programs develop in close connection with the ecological vision and objectives outlined in the park management plan. The park monitoring program must in turn deliver very clear messages on progress towards meeting these goals back to the park management planning process. Also, park ecological vision and management objectives, actions, targets and thresholds can change over time, and these new priorities and directions will need to be reflected in adaptations to the park management plan and the park monitoring program. For all of these reasons, early, ongoing, and meaningful dialogue between management teams and those developing the park monitoring program is critical.

## PROGRAM VISION AND CHALLENGE

A major challenge in designing park monitoring and reporting will be to translate the general definition of EI from the *Canadian National Parks Act* (Government of Canada, 2000) into useful and measurable, park-specific interpretations that can be expressed by a meaningful group of measures and indicators for each of our national parks. This will require park biologists and managers to describe an EI vision and park management goals in the context of specific park ecological characteristics. For example, what distribution of forest ecosystems in a park represents a desirable state of forest EI? How do management activities such as prescribed fire affect this objective? What population of speckled trout is desirable in park aquatic ecosystems, and how does recreational fishing affect this objective? How do we set biologically meaningful targets so we can interpret monitoring results and provide clear assessments for park management? The PCA mandate includes park visitors, but at what level of effect on a coastal dune ecosystem would we conclude that the effects of visitor activities are no longer compatible with our vision for park EI? How do we show the improvements in EI we make by managing visitors in creative ways that maintain or improve the visitor experience and improve park EI? How do we account for the positive effects of restorative management activities such as riparian ecosystem restoration, invasive alien plant eradication, or road fencing in the context of park EI? The answers to all of these questions, as they apply to a park, will be an important and required component of park EI monitoring and reporting programs.

### *Program Vision*

The vision for the program is to develop park EI monitoring and reporting programs so that each park has an effective program in place by the 2008-2009 fiscal year. Park monitoring programs will be directly linked to park EI vision expressed in the park management plan, communicated through the development of ecosystem conceptual models, and assessed and reported through a small suite of carefully selected EI indicators that report the state of park EI. Monitoring and reporting programs will be designed to reflect the financial and human resources committed to deliver them, and will optimize those resources through bioregional cooperation among parks, careful consideration of the most cost-effective suites of measures, and by working cooperatively with partners and stakeholders to develop and sustain regional-scale monitoring initiatives. Information generated by park monitoring programs will form the basis for *SoPRs*, and for assessing and reporting the effectiveness of park management actions in the context of park EI.

### *Program Challenge*

To achieve the vision described for the program, park monitoring and reporting will need to be designed to be *useful, comprehensive, and feasible*. A *useful* program will provide clear messages about the state of park EI and how it is changing, and will provide feedback on the effectiveness of park management activities, in the context of EI. A *comprehensive* program includes measures from all major park ecosystems that are targeted to our reporting and management needs, that are measured using scientifically robust methods, and that are effectively synthesized and communicated to both non-technical and technical audiences. *Feasible* programs are sustainable in the long-term in terms of both financial and human resources, and are within the capabilities of park technical and scientific capacities.

## REFERENCES

- Elzinga, C.L., D.W. Salzer, and J.W. Willoughby. 1998. *Measuring and Monitoring Plant Populations*. BLM Tech. Reference 1730-1. BLM/RS/ST-98/005+1730. Bureau of Land Management: Denver, Colorado.
- Government of Canada. 1998. *Parks Canada Agency Act*. C. 31.
- Government of Canada. 2000. *Canada National Parks Act*. C. 32.
- Parks Canada. 2005. *Parks Canada Mandate*. Available Online: [http://www.pc.gc.ca/agen/chart/chartr\\_E.asp](http://www.pc.gc.ca/agen/chart/chartr_E.asp) [Accessed December 22, 2005]
- Parks Canada Agency (PCA). 2000. *National Parks Action Plan*. Her Majesty the Queen in Right of Canada: Gatineau, Quebec.
- Parks Canada Agency (PCA). 2005. *Park Management Plan Guideline*. Her Majesty the Queen in Right of Canada: Gatineau, Quebec. [Draft Document]