Railways run through several national parks, fragmenting wildlife habitat
Blackbird Design

CHAPTER 12: SHRINKING THE ECOLOGICAL FOOTPRINT

Insist on the right of humanity and nature to co-exist in a healthy, supportive, diverse and sustainable condition.

Nilsen (1993)

The built environment of national parks, including infrastructure, visitor facilities, and the procedures needed to maintain them, directly affects ecological integrity and visitor's perceptions of Parks Canada's commitment to it. There is a need for mechanisms that will contribute to, rather than work against, ecological integrity.

Managing the environmental aspects of the built environment can be done through three mechanisms:

- designing the built environment to minimize, or eliminate where possible, the ecological impacts of human activities;
- incorporating state of the art, ecologically sustainable infrastructure technologies, services, and maintenance operations in such a way as to eliminate or minimize ecological impacts;
- undertaking strong environmental assessments to determine whether, and how, new infrastructure should be built or existing infrastructure should be altered or decommissioned.

A Task for Everyone, Every Day

Successfully limiting the size and impact of the built environment will require that responsibility and accountability for ecological integrity become part of the daily tasks of every national park staff person. Additionally, protection of ecological integrity must translate into appropriately-designed and operated infrastructure.

For the most part, this capacity does not exist currently and there are no resources to support the changes proposed by the Panel. If Parks Canada is to "walk the talk" and be a model of environmental sensitivity, new resources and staff skills will be necessary.

Shrinking the ecological footprint, both in terms of built environment and human behaviour and actions within national parks, is a positive objective that presents a "win-win" situation: the environment wins, and park users win through better-designed facilities and built environments. Limiting the ecological footprint while maintaining opportunities for appropriate human use and visitor satisfaction offers exceptional opportunities for innovation.

This chapter builds on Parks Canada's system-wide directive developed as a result of the Banff-Bow Valley Study and endorsed by the Minister of Canadian Heritage. In June 1998 a Ministerial Statement established the principle of "no net negative environmental impact" for park communities. This principle is also enshrined in the proposed new National Parks Act. This principle raises the benchmark for environmental management of daily operations within national parks. The Ministerial Statement specifies that the "no net negative environmental impact" principle will be achieved through environmental stewardship, and taking corrective action on any environmental stresses that yield negative impacts, such as solid waste, water management and transportation.

The directive also sets legal boundaries for each for each of the seven communities located within national parks, establishes permanent caps on commercial development and establishes the statutory requirement to use the "no net negative environmental impact" principle in all community development plans.

Ecological Design

The "ecological footprint" is the human mark upon the landscape. The ecological footprint encompasses urban development and associated infrastructure such as water, sewage and waste disposal systems, roads, parking lots and facilities such as trails, ski developments, and golf courses.

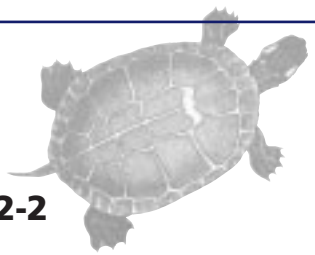
...sustainable site design requires holistic, ecologically based strategies to create projects that do not alter or impair but instead help repair and restore existing site systems. Site systems such as plant and animal communities, soils and hydrology must be respected as patterns and processes of the living world. These strategies apply to all landscapes, no matter how small or how urban.

Nilsen (1993)

Ecological design involves the concept of sustainability. The purpose of ecological design is to eliminate or greatly reduce the effects of human activity and use of the landscape through sensitive site planning and design. As a proactive discipline, it integrates ecological integrity with appropriate levels and types of use in relation to specific ecological conditions, locations and sensitivities. The result is a determination of the limits of acceptable change — thresholds below which the use of parks is compatible with the maintenance of ecological integrity.

Consideration of design from an ecological integrity viewpoint entails several key principles:

- ecological integrity should take precedence over aesthetics;
- future retrofits of park communities should be based on contemporary theory and practice in community design and environmental sustainability;
- every design solution should reflect the unique regional setting of the national park — its inherent sense of place;



- every ecological design solution should present multiple benefits. For instance, well-designed storm water ponds and constructed wetlands make major improvements to water quality and at the same time create wetland habitats. In addition, ecological design solutions may be less costly than conventional designs and have considerable interpretation and aesthetic value.

The ecological footprint of the park community of Waterton is relatively large for the town's population
P. Wilkinson

Park Communities

The present physical planning and design of communities within national parks is inconsistent with protecting ecological integrity. Barring a scenic backdrop, there is little or no difference between a town or settlement located in a national park and a town or settlement located anywhere else. National park communities should be models of ecological sustainability, reflecting their unique location and the parks' primary focus on ecological integrity.

There are commendable applications of sensitive ecological design in individual park communities, and there is, currently, a movement in a number of parks to address the environmental impacts of park communities. This includes physically reducing the community's ecological footprint by dismantling and closing down facilities, and reducing the effects of an activity through environmental design and stewardship.

Shrinking the Ecological Footprint

In Banff National Park, several actions arising from the 1996 Banff-Bow Valley Study, the April 1997 Banff National Park Management Plan, and decisions made in 1998 pertaining to the town of Banff, are reducing the ecological footprint. These actions include:

- the town boundary is in the process of being reduced by approximately 18 per cent;
- a former cadet camp in a wildlife corridor is being dismantled;
- recreational use of the air strip has been stopped;
- the bison enclosure has been removed (the bison have been relocated to another park);
- horse corrals have been relocated;
- leasehold properties are not being developed.

Such efforts are not limited to Banff. Caps are being placed on all park communities and the amount of commercial infilling drastically reduced from previous plans. Community boundaries are being reduced. The town of Jasper could have allowed up to 5,292,800 square feet of commercial development, whereas the current plan recommends only 1,319,499 square feet. Similarly, the community of Waterton could have allowed 770,459 square feet of commercial development but the current Park Management Plan permits 392,934 square feet.

Staff and public vehicular use of fire roads in Banff National Park was eliminated almost 20 years ago and those roads reverted to trails. Public access to Lake O'Hara (in Yoho National Park) has been controlled by setting a specific bus capacity and controlling the number of back country campers. Mountain bikes have been banned from the Byrant Creek trail in Banff National Park.

Field Unit Superintendent, submission to the Panel

There are numerous examples of inappropriate development practices that are jeopardizing ecological integrity, in many aspects of the design and management of park communities and their associated infrastructure. Socially and ecologically responsible sustainable practices that have entered mainstream thinking in Canada's major urban regions are still absent from the planning and operation of most national park communities.

Factors associated with park communities that negatively affect ecological integrity include the following:

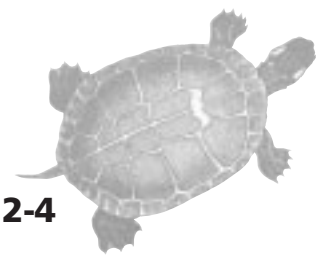
Location and siting. Some communities block essential wildlife corridors, inhibiting natural movement and encouraging wildlife to invade communities (such as in Waterton Lakes, Banff and Jasper). This situation leads to conflict: animals become habituated to humans and lose their fear of people, and people assume the animals are "tame" and approachable, creating significant potential for injury to people and wildlife.

Low-density development. Large areas of poorly designed and used space greatly increase the impact of many park communities. So do site plans that attempt to incorporate the natural landscape into the community plan, largely for aesthetic reasons.

Requirements of infrastructure, services and roads. Much of the community development in national parks represents past approaches to human settlement that have proved to be both ecological liabilities and financially costly. These forms of infrastructure often have a negative impact on wildlife movement and do not reflect the unique qualities of the park environment. An example is in Waterton Lakes National Park, where curbs installed on a roadway became barriers to annual salamander migration. Wildlife needs could have been incorporated at the design stage rather than having to retrofit the project after construction, when the problem was discovered.

Vegetation management. The introduction of non-native vegetation in communities, park arrival areas and recreation facilities (golf courses, picnic sites, campgrounds, and so on) may threaten native plant communities, encourages wild animals to graze within developed areas, diminishes the natural attributes of the park's surrounding natural region and are inappropriate to the park experience. Lawns affect ecological integrity from the application of fertilizers and pesticides. Although the public may appreciate well-kept lawns for recreational and visual reasons, and they may perceive an "unkempt" or "wild" appearance as a poor reflection upon park maintenance practices, in fact within the context of a national park the "wild" look is completely appropriate. This new or redefined aesthetic must be communicated to park staff and to the public. Further discussion on actively managing to remove non-native plant species is in Chapter 5.

One possible reason that national park communities do not reflect ecological sensitivity in the way that they should is because there is no broad vision for ecological design of park communities. In addition, neither Parks Canada nor Public Works and Government Services Canada have the necessary skills to create ecologically-sensitive design.



This hotel is outside the main area of Waterton, thus increasing the town's ecological footprint
P. Wilkinson

Among the potential means available for decreasing the ecological footprint caused by park communities is to cap development at current levels and to stimulate greater efficiency in the use of infrastructure. The proposed new National Parks Act will provide the Minister with specific powers to cap development. Redesigning and rebuilding infrastructure elements with state of the art technologies and sustainability in mind will also serve to reduce the ecological footprint over the long term. The Panel notes that the October 1999 federal Speech from the Throne made mention of "green" infrastructure funding. Parks Canada has an opportunity to make use of a portion of this funding to build or retrofit park infrastructure.

Reconfiguring existing park communities represents not only a significant challenge but also a significant opportunity for progressive and innovative design. Opportunities also exist for Parks Canada to advocate similarly progressive improvements in settlements adjacent to national parks — another potential benefit of advocacy and regional integration. In addition, urban outreach programs focused upon "green" infrastructure design and implementation in parks can illustrate ecologically sustainable choices. Developing environmental awareness and ethics in this way will help foster broad support for Parks Canada's primary mandate of protecting ecological integrity in national parks.

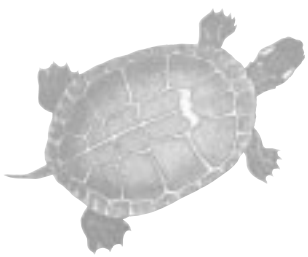
A Model for Park Community Planning

Field, British Columbia, is a community of approximately 300 residents in Yoho National Park. In 1998 Parks Canada undertook the development of a community plan for Field. Community residents had extensive input to the plan's development.

The plan's principles support the national park's mandate:

- no net negative environmental impact - the plan reduces the village's boundaries by approximately 40 per cent and restores a significant wildlife movement corridor. The plan includes provisions for monitoring and possible additional mitigation as required;
- appropriate use guidelines - the plan includes a framework for defining and providing "basic and essential" services. Only those development proposals that are consistent with the guidelines will be approved;
- responsible growth management - the plan fixes limits to growth and density for residential and tourist accommodation, commercial and industrial development;
- leadership in environmental stewardship and heritage conservation - the plan includes recommendations for landscape improvements within the village, including reduction of non-native plant species and ways to discourage large animals from entering the village. Energy and water conservation initiatives will be pursued by village residents and interpretive materials will outline the community's efforts toward sustainability.

adapted from the Field Community Plan



Facility Upgrading

The condition of structural assets in national parks (picnic/day-use areas, recreational services, backcountry facilities, highways) is rapidly deteriorating and warrants upgrading or replacement. *"Approximately 35% of all assets are in either poor or closure condition. These assets are worth roughly $2.3 billion of the $6.4 billion total of all contemporary and historic assets"* (State of the Parks 1997 Report, p. 99).

Prior to upgrading an asset, an environmental assessment should be undertaken to determine whether it would be more financially and ecologically advantageous to withdraw the asset. Upgrading should always take into account appropriate types and levels of visitor use. This might mean that assets are upgraded to a level of use that is below peak demand, which in itself would be a form of demand management (as described in Chapter 10). Upgrading should be based on new designs of facilities and services that have as small an ecological effect as possible and should be linked to ecological restoration programs. Upgrading funds should be limited to current assets; that is, they should not be used to construct new facilities.

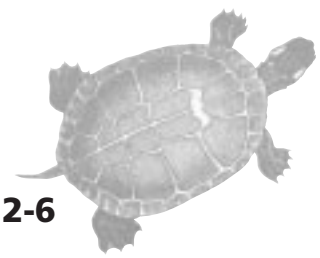
As an example of innovative ecological design, Parks Canada could consider using various forms of tertiary biological water treatment systems for purifying domestic sewage when installing or retrofitting these facilities. Solar aquatic septic treatment systems, for instance, use aquatic plants to achieve high water quality tertiary treatment. They are becoming increasingly common throughout North America because they can provide a less costly and sustainable alternative to conventional treatment. Examples in Toronto alone include several Toronto School Board nature schools, and the Ontario Science Centre.

Infrastructure Renewal and Re-evaluation

National parks contain an array of infrastructure from visitor centres and park offices to trails, interpretation displays, campgrounds and roadways. Most of these facilities have not been upgraded and are either out of date or in a state of disrepair. Interpretation displays, for example, are often 15 to 20 years old with worn flooring, washrooms, heat, light and water systems (to say nothing of outdated interpretation materials and incorrect messages). Many park offices are similarly degraded. For example, in Pacific Rim National Park Reserve the warden building was recently destroyed when it collapsed under a heavy snow load, and a second building has been condemned.

Degraded capital assets can have both direct and indirect effects on ecological integrity. In some situations the degraded infrastructure may pose a direct threat to ecological integrity if facilities are no longer adequate to protect sensitive environments. For example, inadequate sewage treatment facilities threatens water quality in 14 parks (State of the Parks 1997 Report). More commonly, declining park infrastructure can pose health or safety risks to employees or have a significant negative effect on a park visitor's experience. When this occurs, the temptation is to quickly divert otherwise allocated funds to repair the problem.

Somewhat paradoxically, we have also heard and observed that existing park infrastructure is built to a very high standard that is sometimes overbuilt and tends to overwhelm the desired experience of nature. Public washrooms at Long Beach in Pacific Rim National Park Reserve are just one example of overbuilt facilities.



We learned that the agreement between Parks Canada and the federal Treasury Board related to revenue and government credits is insufficient to maintain park infrastructure such as roads, buildings and campgrounds. Currently, a government-wide initiative is under way to assess the magnitude of the problem of degraded assets. The Panel notes that the current asset review does not include:

- any evaluation of the necessity for appropriate standards for park infrastructure (regardless of its condition) to maintain or enhance ecological integrity;
- the potential of infrastructure to have a negative impact on ecological integrity;
- evaluation of opportunities to decommission infrastructure that would result in a win-win situation — an improvement to ecological integrity as well as reduced capital and operating costs.

For example, in Waterton Lakes National Park, the Panel was told the park's ecological integrity was threatened by over-development. Both major valleys in the park contain roads and even the minor valleys contain hiking trails or campsites. Even if the park's ecological integrity was not at risk, it seems obvious that any asset review would question the value of maintaining both major roadways and associated facilities such as traffic pull-offs, picnic sites and interpretation signs. Given the impacts to ecological integrity of intensive, car-based recreation, it seems reasonable to evaluate removal of one of the roads and its accompanying facilities. This would enhance ecological integrity and result in reduced infrastructure maintenance.

The Panel is concerned that the narrow framework of the current asset review has been designed for the needs of the federal government as a whole and is not tailored to Parks Canada's distinctive mandate. This could lead to expensive capital upgrading that is not aligned with the purpose of protecting ecological integrity.

Commercial Accommodations and Facilities

Most older national parks contain a range of commercial accommodations (hotels, motels, guest cabins) and facilities (boat rentals, downhill ski centres, food service venues). The majority of these facilities are on lands leased from Parks Canada and operate under a business licence. As with Parks Canada's facilities, many of the commercial accommodations and facilities are in need of upgrading and refurbishment. The challenge is to allow this to occur without changes or additional development that might negatively affect ecological integrity.

Significant impacts from infrastructure (both commercial and Parks Canada's) were reported in 24 parks in the State of the Parks 1997 Report. This is a large and complex issue. Parks Canada must establish consistent conservation-based principles to approve any capital redevelopment of commercial accommodations and facilities.

Wildlife crossing roads creates danger for both animals and motorists J. Pleau/Parks Canada

Transportation Routes

Many southern parks are bisected by highways and some by railways. Highways and railways have huge impacts upon wildlife and can also affect water quantity and quality, air quality and a number of other aspects of a park's ecosystems.

In addition to severe problems associated with roads and highways including direct loss of habitat, habitat fragmentation, wildlife mortality and the risk of hazardous materials spills, the costs associated with maintaining roads and highways have a large impact on park budgets. Costs include not only maintenance and upgrading of these facilities but also costs from environmental assessments, staff time and resources to patrol and police these roads and the significant costs of mitigating their impacts. National and provincial funding for maintenance and mitigation of highways has not always been forthcoming.

In the realm of design, however, we note that pilot projects are underway to mitigate the effects of roads in national parks. For example, both overpasses and underpasses have been constructed to aid wildlife movement across the Trans-Canada Highway in Banff National Park. The Panel contends however that long-term monitoring of the success of these structures is essential prior to further construction or twinning of the highway, in keeping with the practice of adaptive management.

While we recognize that there is a historical precedent regarding the presence of railways in national parks, particularly in the West, there have been few mitigation efforts to protect wildlife from conflicts with trains while ensuring that wildlife movement is not impaired. Spillage of hazardous and non-hazardous materials during railway construction and maintenance, and from materials being transported through national parks, is a continual problem.

Oil Spill at Gros Morne

In August, 1999, a tanker truck carrying 38,000 litres of diesel fuel overturned and spilled its entire load while travelling through Gros Morne National Park. The fuel was spilled on a highway immediately adjacent to Bonne Bay.

Park staff and the local volunteer fire department immediately employed oil-absorbent booms and gravel berms. Within two hours, an oil spill response team arrived with more booms and absorbent materials.

Drill cores revealed that the diesel fuel had moved into fractured bedrock and was destined to slowly leach into Bonne Bay. Consequently, a rock berm was constructed to seal off the edge of the cove into which the fuel was leaking. Cleanup of the bay within the bermed area is ongoing.

Parks Canada needs to have sufficient resources and knowledge to protect ecological integrity. Without them, significant negative effects on ecological integrity will result from similar accidents.

Workers mop up spilled diesel fuel from Bonne Bay in Gros Morne National Park
P. Wilkinson

RECOMMENDATIONS

Approaches to facility and community developments in national parks need to be updated to reflect a broader ecological and social view of sustainable development and practice.

12-1. We recommend that Parks Canada establish a highly qualified core design/planning group within Parks Canada's National Office or in regional Service Centres, to be responsible for developing ecologically sensitive design criteria to ensure that ecologically sustainable design and management in all development projects in national parks is realized on the ground.

12-2. We recommend that Parks Canada procure all professional services on an open and competitive basis, emphasizing environmental performance criteria as much as other criteria such as design quality, cost, and timeliness of delivery.

12-3. We recommend that Parks Canada assess any capital redevelopment of facilities, accommodations and infrastructure belonging to both Parks Canada and to private or commercial operators.

This should be based on the following principles:

- maintenance of ecological integrity must be the first priority in all redevelopment decisions;
- apply the principle of "no net negative environmental impact" to all redevelopment decisions;
- conduct a needs analysis on all facilities, accommodations and infrastructure to determine whether they are required in the park and still acceptable, given current ecological understanding;
- all facilities, accommodations and infrastructure should be models of environmental management, including water and energy conservation, use of biocides, transportation and waste management;
- consider cumulative effects of facilities, accommodations and infrastructure at local and regional scales;
- most parks should not experience any increase in the present facility footprint;
- ensure that any redevelopment is consistent with the Park Management Plan and, if applicable, the community plan;
- facilities, accommodations and infrastructure developments should be responsible for providing staff accommodation so as to avoid undue burdens on park communities. This principle especially applies to accommodations for seasonal staff.

12-4. Over a long-term, programmed time frame, we recommend that Parks Canada redesign, replace, rebuild or remove existing facilities and infrastructure in national parks to reduce their ecological footprints.

Such improvements include:

- removing barriers to wildlife habitat and movement corridors, compacting and intensifying park communities, and using space with greater economy;
- applying ecologically-sensitive site planning for roads, parking areas and pedestrian traffic, pedestrian spaces and park arrival areas, consistent with best management practices and ecological design principles;

- modifying maintenance practices for manicured areas such as lawns, picnic sites, campgrounds and park arrival areas to a natural regime with native plants. Communicate the reasons for a "wild" or "unmanaged" appearance to park staff and to the public;
- eliminating alien, non-native plant species in park communities and open spaces;
- upgrading assets and facilities in the context of ecological integrity;
- making resources and skilled staff available in each park to conduct an environmental assessment prior to upgrading or decommissioning any asset or facility.

Daily Operations

This composting outhouse in Pacific Rim National Park Reserve is virtually waste-free. In addition, its fan is solar powered
P. Wilkinson

The infrastructure components supporting the daily operations of national parks, and the associated efficiency of resource use and treatment of wastes and pollutants, are currently inconsistent with protection of ecological integrity. An environmental management system is one tool to bring daily operations within national parks in line with ecological protection.

Environmental Management Systems

An environmental management system is a systematic, structured and accountable method for an organization to identify and manage the significant environmental aspects of its operations.

Under the 1995 amendments to the Auditor General Act and the associated Guide to Green Government signed by Cabinet, federal departments and agencies are required to develop and implement sustainable development strategies and environmental management systems and to report annually to Parliament on their progress and implementation. In 1997, Parks Canada confirmed that the ISO 14004 international standards would be the foundation for Parks Canada's environmental management system.

Environmental management systems are used within Parks Canada to ensure appropriate environmental management of Parks Canada's operations. They are not intended to direct the mandated activities of Parks Canada such as the protection and presentation of natural and cultural heritage.

The purpose of Parks Canada's environmental management system is:

To contribute to improving the Canadian Government's environmental performance and supporting the international effort to strive towards sustainable development, by preparing and implementing a uniform management system application to all sites administered by Parks Canada.

Parks Canada's Environmental Management System 1997, p. 1

A Missing Connection

Despite Parks Canada's commitment to an environmental management system, the Panel observed numerous examples of park operations causing internal ecological stresses. Examples include:

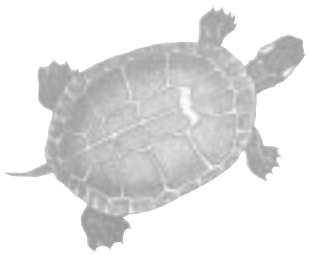
- inadequate waste water treatment for some park communities is resulting in deteriorated water quality and ability to support an unimpaired aquatic system;
- a pier under construction without the required permit from the Department of Fisheries and Oceans;
- use of pressure-treated lumber for pier construction, with potential for contaminants to leach into aquatic ecosystems;
- a small oil spill adjacent to a waterway during routine maintenance;
- the absence of sustainable solid waste management programs in most parks;
- environmentally harmful cleaning fluids used for building maintenance.

At a minimum, an environmental management system is a key method of bringing environmental considerations and ecological integrity protection into the daily operations of every staff person in every park. At a more ambitious level, environmental management systems can be a key tool for achieving the high standards of environmental performance in Parks Canada's operations that are part of the requirements for maintaining ecological integrity in the parks.

Environmentally Preferred Products and Procedures

Environmentally benign cleaning products are now widely available. In some instances, "green" products may not be equal to the task of heavy-duty cleaning for floors, showers, toilets or other high-use facilities. However, even if industrial-strength or toxic substances must be used until a superior "green" product is available, simple procedures or product substitution can regulate or reduce the amount of toxic substances used.

In addition, materials and colours chosen during the design of public facilities can have a critical effect on the types and amounts of cleaning products — including chemicals, paper, water and power — required over the facilities' lifespan. A simple design choice such as avoiding white surfaces or fixtures in favour of a darker colour can significantly reduce the materials and energy used for cleaning. The Panel notes that janitorial and cleaning/maintenance staff in many parks are rarely if ever consulted during facility design yet these people have considerable experience and innovative ideas to share.



Day to day activities profoundly influence the ecological integrity of the parks. There is a need for Parks Canada to promote support and participation on the part of all park staff, which could be facilitated through respect and acknowledgement for innovation and ideas from all staff levels. Park maintenance and operations personnel have pride in their work and have plenty of practical experience to share. Consultation and feedback can work both ways (bottom up and top down) to ensure that all park staff are involved in maintaining ecological integrity regardless of the job they perform.

Using Environmental Management Systems to Achieve Legislative Commitments

An environmental management system also can be a tool for managing and monitoring and managing for "no net negative environmental impact." This will require stretching Parks Canada's environmental management systems from their current minimalist focus on compliance to a more ambitious focus on environmental excellence.

For example, the environmental management plans presently do not include targets to reduce greenhouse gas emissions, notably from vehicular sources, nor targets for managing vehicle emissions in national parks. By buying "green" electricity (generated from renewable sources such as solar or wind

"Green" energy is available to some national parks, such as the electricity generated by these windmills near Waterton Lakes National Park. Blackbird Design

power) and implementing efficiency and economy measures for energy, Parks Canada can contribute to the transition away from fuels that contribute to climate change, acid deposition, and smog. In this manner, Parks Canada would bring its moral authority and buying power to help society at large make the shift towards more environmentally sustainable practices that will themselves reduce many of the external stresses on parks. By setting a good example, Parks Canada can help to persuade industries, project developers, communities and individual Canadians to change their decisions and actions in favour of environmental sustainability.

This same principle has relevance for efficiency measures for the use of water, the development of solid waste and recycling programs (where support industries are available or can be developed) and the use of environmentally benign cleaning materials.

Finally, by showcasing leading environmentally appropriate technologies and practices, Parks Canada can bring a strong national public message of conservation, awareness of natural processes, and the links between humans and ecological integrity, through interpretation programs and materials with clear messages linking environmentally appropriate actions to the protection of ecological integrity.

In keeping with the Panel's purpose to streamline park planning and reporting, we are not recommending that Parks Canada adopt the full ISO 14001 certification standard. However, public reporting on Parks Canada's environmental management achievements will support progress in this area, and increased public awareness of the links between good environmental management in national parks and the ecological integrity objective.

RECOMMENDATIONS

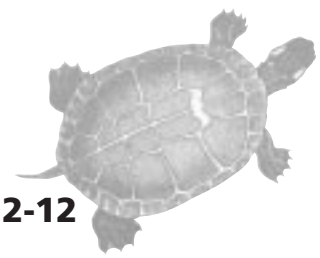
12-5. We recommend that Parks Canada use environmental management systems as integral to conducting daily operations in keeping with the preservation of ecological integrity.

The widespread adoption of the environmental management system could be facilitated by:

- communicating the importance of environmental management to all staff and contractors, and communicating the results of environmental management to the public through interpretation and outreach programs;
- including an environmental management system section, listing objectives, targets and progress indicators, in the State of the Park(s) reporting documents. Set environmental performance objectives in Park Management Plans and report on attainment in State of the Park Reports.

12-6. We recommend that Parks Canada, over time, incorporate sustainable infrastructure, energy systems, materials and practices in park management and activities. There are many ways to achieve this recommendation, such as:

- using benign technologies for energy systems (photo-voltaic solar power, wind turbines) or purchasing "green power" (electricity generated using renewable sources such as solar and wind) where this option is available;
- reducing vehicle emissions through a number of means from ensuring regular maintenance to using natural gas-powered or other low-emission vehicles;



- making tertiary treatment of sewage effluent in park communities and related park developments a priority and incorporate tertiary treatment systems as existing sewage treatment facilities require replacement;
- using water and energy conservation measures in all park buildings and communities; collaborate with residents and tourism facility operators to develop such conservation measures and systems;
- changing from environmentally harmful cleaning materials and procedures to benign products and procedures;
- incorporating composting systems and recycling programs in all park communities, park arrival areas, and recreation facilities where supporting recycling industries are available. Where these are not available, provide leadership to develop appropriate recycling industries working in collaboration with local and regional jurisdictions or waste management operators;
- sharing advice and expertise among parks and park staff, incorporating ideas from all staff levels to improve design, maintenance and procedures.

Environmental Assessment

This stream has been modified to reduce flooding in a campground in Waterton Lakes National Park.
P Wilkinson

In many cases, the environmental effects of a proposed development are difficult to describe and quantify. Parks Canada has a reputation for leadership in environmental assessment of individual projects but has not yet used environmental assessment as a tool for reducing the ecological footprint of development. By reviewing project proposals from a policy standpoint, by more fully integrating environmental assessment within an adaptive approach to decision-making, and by addressing critical capability issues, Parks Canada can enhance its ability to make decisions that complement policy objectives for ecological integrity.

The Current Role

Parks Canada's policies guiding the general application of the environmental assessment process are clear. They complement the broader Parks Canada policy, which directs decision-makers to consistently support and maintain the ecological integrity of national park ecosystems.

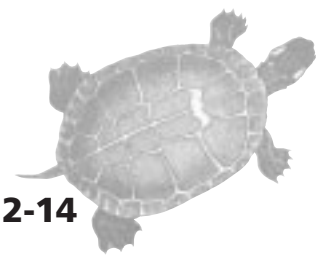
The use of environmental assessment in national parks reflects the daily application of Parks Canada's values and priorities. Parks Canada's ability to make decisions that support and maintain ecological integrity, while addressing demands for recreational and economic opportunities within parks, is demonstrated in part by the way Parks Canada uses the environmental assessment process.

There appears to be a working assumption that the environmental assessment of a project is a de facto final review, and thus if a project's effects can be mitigated through the environmental assessment process, the project is deemed to be acceptable from a Parks Canada standpoint. Therefore, in practice Parks Canada does not often use the environmental assessment process to either approve or reject projects, but rather to find ways to mitigate the effects of proposed projects. For example, of 962 projected listed by Parks Canada with the Canadian Environmental Assessment Agency registry from April 1, 1998 to March 31, 1999, only six projects were rejected through the environmental assessment process. Instead of using environmental assessment as a decision-making process — a means of assessing and either accepting or rejecting a proposal based on anticipated environmental impacts — Parks Canada more commonly uses environmental assessment to identify mitigating, surveillance and follow-up measures for projects that are very likely to proceed. The result is that larger-scale questions, for example about cumulative effects and appropriateness in relation to policy goals, are not well addressed.

Parks Canada's goals, objectives, policies, capabilities and values must guide decisions, and this is where a gap lies at present. Environmental assessment alone can not be relied upon to produce a decision consistent with policies and objectives. However, being the only formal, documented project review process at Parks Canada's disposal, environmental assessment has sometimes been perceived as a substitute for a policy review. The important discussion about whether, from a policy perspective, a project is appropriate in terms of scale and the project's potential effect on ecological integrity, is sometimes absent and has rarely been documented.

Currently, where Parks Canada is the proponent for a proposed project, the project is discussed and approved in principle during the preparation of the park's annual plans. Projects are then refined through either a "business case" or a project approval process. These steps are oriented towards justification of the project, rather than critical review. At present, projects are not evaluated from the perspective of all relevant policies, and the manager who proposes the project is not always perceived to be accountable for ensuring that the project meets Parks Canada policy objectives related to ecological integrity.

Options which might achieve the same policy goals, but at a reduced level of development, or alternative options which reduce the need for a new service or facility instead of expanding the service or facility, should be presented and discussed at this point. The environmental assessment process has not been an effective substitute for this evaluation of lower-impact options and has not provided the required review of policy and accountability.



Policy Potential

In recognition of the need to evaluate projects from the point of view of policy, Parks Canada has recently revised its directive on environmental assessment. Parks Canada now requires internally initiated projects to undergo a policy review as an initial step. An environmental assessment is not to be undertaken until the project under review is proven to be in compliance with Parks Canada legislation, policies and directions (Parks Canada 1998 Management Directive 2.4.2, Impact Assessment, General Principle 3).

Because this directive is new, formal policy reviews are not yet commonplace. It will be important to monitor the implementation of the policy review process to see whether it enhances decision-making. As presently written, the new environmental assessment directive appears to require the environmental assessment officer for an individual park to determine whether a policy review has been adequately completed for a specific project. This would be an onerous regulatory function for a single person acting alone.

When the policy review becomes standard practice, it will help Parks Canada to make decisions in situations where environmental effects appear to be minimal or are capable of being mitigated, yet the appropriateness of a project is uncertain. However, some decisions will be difficult until a specific policy regarding appropriateness is clarified (the development of such a policy is recommended in Chapter 11). For example, the following statement from Guiding Principle 7 in Parks Canada's Guiding Principles and Operational Policies is inadequate because it raises serious questions about the nature of essential and basic services, and it provides only vague direction regarding cumulative impacts: *"Essential and basic services are provided while maintaining ecological and commemorative integrity and recognizing the effects of incremental and cumulative impacts."*

Likewise, Policy Statement 3.1.2 is broadly-worded and vague. This policy could be interpreted as either banning any development — or permitting everything which is not a certain and immediate threat to ecological integrity: *"Human activities within a national park that threaten the integrity of park ecosystems will not be permitted."*

The decision-making process related to project approval is not adaptive because it lacks the prediction-monitoring-evaluation cycle that is essential for adaptive learning. There are no measures of success identified for determining whether the project continues to meet Parks Canada policy objectives during its operation. For example, once a facility or service has been built or implemented, the question might be asked: "Why bother to monitor the project's success in meeting policy objectives, since it would be virtually impossible to reverse the decision and remove the built facility?" It can be difficult and expensive to quantify how the project did, or did not, meet policy objectives. However, this cost should be built into the cost of the project, because otherwise important questions such as "Did the project meet the standard of a basic and essential service?" or "Did the project create additional demand for services?" go unanswered and the issue of accountability can not be addressed. In short, without evaluation, no learning takes place and there is no improvement to policy or procedures.

Integrating Environmental Assessment and Decision-making

The current approval process for projects and developments in national parks is linear, with the environmental assessment often viewed as a final check-off necessary for a project to proceed. Project managers, faced with meeting budgets and deadlines, may perceive environmental assessment as final hurdle, and indeed a barrier to their project, because costs may increase and schedules may have to be extended in order to meet environmental requirements. This situation results in reduced internal support for environmental assessment and maintenance of ecological integrity. Where project managers feel neither accountable for ecological integrity, nor are they invited to contribute to maintaining ecological integrity, their enthusiasm for environmental assessment may be limited.

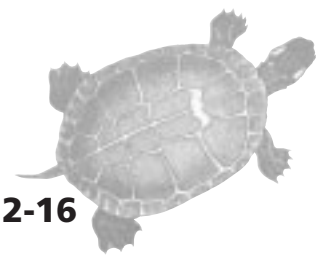
The solution is to involve environmental assessment practitioners in all projects from the conceptual stage to completion, and to ensure that all project managers feel accountable for maintaining ecological integrity, and are entitled to make decisions and take actions in support of ecological integrity. The goal should be to eliminate conflict, and in fact develop a partnership between project managers and environmental assessment practitioners.

Environmental Assessment Capability

Generally speaking, Parks Canada does not have adequate information about national park ecosystems, particularly on a landscape scale, nor does it have sufficient staff to adequately describe and evaluate the impacts of proposals that have the potential to adversely affect park ecosystems. Staff acknowledge the urgent need to begin to understand cumulative and landscape-scale effects however they lack resources to do so at present. As a result, small-scale effects are usually well addressed, but landscape-scale effects are not.

Parks Canada has achieved some success in intervening in projects outside national parks on behalf of park and regional ecosystems, however Parks Canada must enhance its capability in this area. The ecosystem-based management approach requires that parks staff must be able to interact professionally and positively with the managers of adjacent lands, working from a basis of sound ecosystem information. Projects that may affect park ecosystems negatively will continue to be proposed. An enhancement of quantitative knowledge about how national park ecosystems are affected by external stresses is necessary for Parks Canada to intervene successfully on behalf of national park ecosystems.

The volume of requests for environmental assessments, originating from both internal and external sources, is a problem for staff on two fronts. First, dealing with the increasing number of projects is difficult from a workload perspective. Second, without having a sense of the number of projects that will be proposed in the near future, it is very difficult to avoid the "death by a thousand cuts" scenario. Parks Canada needs to address capability in environmental assessment in terms of personnel, particularly in parks that have communities, and needs to determine how to manage the increasing



flow of development requests as a way of limiting cumulative effects.

Dealing with proposals for projects within park boundaries, proposed by a commercial or private leaseholder, has occasionally proven difficult for Parks Canada. Such proposals leave park staff vulnerable to influences that may not support ecological integrity objectives, and sometimes appear to pit development against preservation. Parks Canada needs to continue to enhance its capability to deal co-operatively with stakeholders in the interest of ecosystem integrity, and to strengthen the support it provides to professional park staff so that they may provide the highest quality evaluation of environmental effects. However environmental assessment alone cannot be relied upon to resolve these issues completely. Park Management Plans should report a quantitative assessment of cumulative effects, and their sources, and identify quantitative targets for cumulative effects over the period of the plan.

One useful strategy for dealing with capability issues related to cumulative effects is to adopt the precautionary principle. Evaluating environmental impacts encompasses risk due to the variability of ecosystems, the absence of complete knowledge about ecosystems, and practical limitations on staff time. This uncertainty is well understood and accepted by assessment specialists, but it poses a serious problem from the perspective of project engineering and management. Where costs and schedules must be carefully controlled, risk is something to be minimized or avoided, not accepted.

It is critically important that Parks Canada not permit the risks generated by proposed projects to be transferred to the ecosystem. Parks Canada has many examples (dams, logging sites, contaminated sites, breakwaters) of the difficulty and expense involved in reversing a decision, or of rehabilitating sites after a project has produced unacceptable impacts. Park Management Plans should contain a statement describing how the park will apply the precautionary principle to development proposals.

RECOMMENDATIONS

12-7. We recommend that Parks Canada closely track the implementation of the new policy review component of environmental assessment at all national parks, in order to evaluate its effectiveness in enhancing decision-making related to the scale and appropriateness of proposed projects. Policy review should produce a record of decision that describes project objectives, evaluates alternatives (particularly non-development alternatives), demonstrates concordance with all relevant national park policies and identifies measures for evaluating the success of the project's implementation and operation. Information from the evaluation should be used adaptively to improve future projects and future environmental assessments.

12-8. We recommend that Parks Canada adopt the principle of integrating environmental considerations into all projects. Include environmental assessment practitioners in all phases of a project, from concept to final construction, in partnership with the project manager. As a means of ensuring that ecological integrity becomes everyone's job, project managers, not the environmental assessment practitioner, must be responsible for meeting ecological integrity objectives related to their project.

12-9. We recommend that Parks Canada enhance its expertise in understanding and managing cumulative effects (Chapter 4).

12-10. We recommend that Parks Canada provide individual national parks with the authority to set an annual date beyond which project proposals will not be accepted. This will enable environmental assessment staff to organize their workload and will provide a reference point as an aid in evaluating cumulative effects. Park Management Plans should provide an assessment of cumulative effects and identify quantitative targets for limiting cumulative effects over the period of the Park Management Plan (Chapter 3).

12-11. We recommend that Parks Canada provide training in environmental assessment for all prospective project managers, and provide professional development and networking opportunities for specialist and practitioner positions.

12-12. We recommend Parks Canada establish a policy formally adopting the precautionary principle to ensure that risk to national park ecosystems is reduced. Park Management Plans should contain a statement describing how the park will apply the precautionary principle in managing development proposals.