

# Best Management Practices for Activities Adjacent to Parks and Protected Areas

## MITIGATING RISKS TO PPA VALUES



July 2005

# DRAFT v.3

**Ecosystems - Omineca Region**



**BRITISH  
COLUMBIA**

Ministry of Environment  
Ecosystem Standards and Planning  
Biodiversity Branch

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# Preface

British Columbia is recognized globally for its exceptional wildlife, diversity of ecosystems and its rich natural resources. It is also recognized for the system of Parks and Protected Areas (PPAs) that has been established over the years. The Ministry of Environment (MOE) works to maintain these valuable natural assets, which are at the heart of many recreational and economic activities enjoyed by British Columbians in all regions of the province.

MOE has responsibility for the protection and stewardship of BC's environment. To achieve this goal, the Ministry develops policy and legislation, regulations, codes of practice, environmental contracts and covenants (legal agreements). In addition, the Ministry sets science- and results-based objectives and standards for activities that affect biodiversity. It monitors and reports on selected species and habitats, and acquires information on habitat and species health.

Clear goals, objectives, meaningful performance measures and science-based tools guide Ministry actions in improving environmental management. Regulatory frameworks allow headquarters and regional staff to set and report on standards for environmental quality, and for discharges and emissions to air, land and water. Regulatory compliance is addressed through policy development, enforcement and publicly reporting the results of compliance monitoring.

## **An Increasing Role for Stewardship**

While the Ministry takes a leading role in the protection of BC's natural resources, species and habitats, environmental protection and stewardship is the responsibility of all British Columbians. Stewardship of natural resources is key to maintaining and restoring the province's natural diversity, and achieving the Ministry's important environmental mandate. A stewardship approach involves all British Columbians taking responsibility for the well being of the environment by acting to restore or protect its health.

The Ministry is actively pursuing opportunities for sharing the responsibility of environmental stewardship and protection. As a Ministry, MOE looks to establish vital partnerships and move forward together to protect the environment and the health of all British Columbians. MOE is listening to and developing partnerships with governments, First Nations, communities, academic institutions, industries, volunteer organizations and citizens. The involvement of these partners in the shared environmental protection and stewardship of BC's resources is essential because of their local knowledge, resources and expertise. Also, no single agency or group can protect the environment alone. We will benefit as a result of an increased level of responsible environmental stewardship ethics, immediate and long-term

improvements to environmental health and an increased awareness of ecosystem needs among the partners.

## **A Changing Process**

Over the next several years, the Ministry will be making strategic shifts (changes in business practices) towards:

- Shared stewardship between the Ministry and other stakeholders;
- Clear roles for gathering environmental information and achieving environmental objectives;
- Integrated MOE program delivery based on the best available science and an ecosystem-based approach; and
- Clear, reasonable environmental outcomes, with discretion as to how to achieve these outcomes.

This document is an interim document and will change in the future. Changes to the delivery model of this information are also expected, through the movement towards Internet-based access.

## **What will this document do for me?**

This document exists to help you act as a good steward of the environment. The information you will find in this document will help to ensure that your proposed development activities are planned and carried out in compliance with the various legislation, regulations and policies that apply to your activity. By understanding the standards your development must meet, you can choose an appropriate set of best practices to help you carry out your activities to achieve the required standards.

BC Parks of the Environmental Stewardship Division within MOE, “has statutory obligations for the protection of the natural environment; the preservation and maintenance of recreational values; and to preserve representative and special natural ecosystems, species, features and phenomena” (BC Parks Conservation Principles). This document provides information regarding types of activities that traditionally have been considered a threat to the natural, historic and cultural values protected in these special places within the Omineca Region of BC. It recommends measures to mitigate adverse effects from high risk activities adjacent to or impacting on parks and protected areas. How the desired results are achieved is left to the discretion of the proponent. Best Management Practices (BMPs) are non-legal guidelines recommended to attain desired environmental results.

# Acknowledgements

The authors wish to thank the following people for their input and critical review which aided in the development of this handbook:

- Wayne Van Velzen, BC Parks Area Supervisor for Mount Robson Provincial Park, Omineca Region, MOE, for the initial draft.
- Omineca Region's Ecosystems and Parks staff for providing comments and editing services.
- BC Parks Conservation Specialists for providing references and critical comments.
- Chris Ritchie, Ecosystems Section Head, Omineca Region, MOE, for comments and creativity.
- Al Soobotin, Ecosystems Section Head, Kootenay Region, MOE, for permission to complete.

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# 1 Introduction

BC Parks is responsible for the protection and management of natural and cultural features found within the spectacular PPA system in BC. This document outlines risks and implications to parks, protected areas, nature conservancy areas, fish and wildlife reserves, ecological reserves and other conservation lands in the Omineca Region from human activities either directly adjacent to them or close enough to have an impact. As MOE moves towards a ‘results-based’ management regime, proponents will need to identify as early as possible, the ramifications of their activities that impact PPA’s values. These proponents will need to consider implementing measures to mitigate any negative impacts of the possible implications from their proposed activities.

## 2 Purpose/Scope

While BC Parks branch has a very strong role in directing land use within parks and protected areas, it has very limited authority on the immediately adjacent landscape. Human activities adjacent to PPAs can strongly affect park values. These effects range from the fairly dramatic, such as blow down or windthrow of trees within a park caused by land clearing just outside the boundary, or illegal fishing from an access road built close to a park boundary. Effects can also be very subtle, such as a harvested clearcut block appearing on the distant viewscape from a recreation area within a PPA. MOE has prepared this document for the “neighbours” of PPAs for their consideration, to inform them of the implications to PPA values of their adjacent or nearby activities. Industrial proponents may be able to increase their company’s international stature, get qualified for industrial certification (where available) and promote product marketability when they act proactively to reduce, limit or mitigate negative effects to protected areas.

This document is intended for distribution and use by a wide variety of sectors. The broad range of locations and settings of BC’s PPAs means that nearly any segment of the human population and their associated activities can be beside a PPA. The main sectors that can benefit from information contained in this document include: commercial recreation and tourism, forestry, agriculture, mining and other industries, corporations maintaining energy transmission lines and transportation routes, plus private dwellings and cottage developments.

## 3 Background

BC Parks was created in part to protect wilderness and represent the natural diversity of BC landscapes, and to provide and sustain appropriate outdoor recreation opportunities. Each provincial park, ecological reserve, nature conservancy area, fish and wildlife reserve, conservation land or otherwise

protected area had some reason for being protected in the first place that is reflected in a planning document. Each of these documents varies in detail and complexity to provide management direction for that PPA. They can range from a simple purpose statement (PS), to a more detailed management direction statement (MDS), or to a full management plan (MP), often incorporating science based ecosystem details (Ecosystem Based MP) that guide the uses allowed within the PPAs boundaries. (Section 6 provides more discussion on PPA objectives).

In 1999 the Conservation Risk Assessment tool (CRA) was developed to rank PPAs in a pilot project in the Omineca Region. It numerically ranks three general variables for each PPA: the conservation values inherent in each PPA, the recognized current risk factors observed acting on that PPA and lists the stressors and threats contributing to the risk. The conservation value describes key ecological values and applies a numerical rank (the higher this number, the more ecological ‘value’ the PPA has). The risk factor is an assigned number that indicates the PPA’s susceptibility to the stressors and threats (the higher this number, the more vulnerable the PPA). Stress is thought of as a disturbance or perturbation event that may occur. Threat to the ecosystem occurs when a stress is of sufficient magnitude and duration as to cause an undesirable change in the structure or function of the system. The first Omineca CRA was completed in 2000 and then updated in 2002, and has been used as a tool to prioritize regionally where resources should be directed for maximum benefit (where to spend public funds wisely).

In a separate process in 2004, independent of the CRA, local BC Parks staff were asked what the greatest threats were to Omineca PPAs, based on their own personal experience. Five human activities were selected and appear in the table below. These incidentally turned out to include the top five stressors and threats identified from both Omineca CRA assessments (2000 & 2002).

<b>Human Activities Ranked Highest for Env'l Risk 2004*</b>	<b>Examples</b>	<b>Possible short term env'l Stand/Site Impacts?</b>	<b>Possible longer term env'l Landscape Impacts?</b>
<b>I</b> Fire & Suppression	-fire effects based on severity/intensity -fireguards & blading -access roads & trails -landings and helipads -stream crossings (bank & riparian damage)	-increased erosion & sedimentation -altered hydrology in burn & 'hardened' areas -invasive plant encroachment -temporary disturbance -visual quality impact	-alters forest stand structure, patch size distribution -reverts succession to earlier seral stage, invasives may increase -impacts to wildlife from cumulative disturbance
<b>II</b> Access Development	-roads, tracks & trails (beetle probe skid trails, ATV & mt. bike routes, hiking & game trails, etc) -linear developments	-could see habitat fragmentation & movement corridors gone (loop roads?) -invasive plant encroachment	- wildlife populations impacted (possibly see increases or decreases in numbers, changes



	with vegetation removal (energy transmission lines, gas pipelines, fibre optics lines, etc)	-human disturbance -altered hydrology due to harder surfaces, possible erosion issues -impacts to wildlife from construction disturbance -visual quality impact	in richness & types of spp.) -impact on interior forest dependent wildlife spp. -altered predator prey relationships -changes in wildlife spp. to more 'tolerant' types -invasives may increase
<b>III</b> <b>Land Clearing</b> (fire is listed separately as burnt land is reclaimed or allowed to rehabilitate)	-forest harvest -industrial development (from gravel pits to cabins & resorts, marinas, from communications towers to waste transfer stations, etc) -agriculture & range -subdivision development	-increased erosion & sedimentation possible -altered hydrology in cleared & 'hardened' areas -possible waste/pollution issues -clearing & construction disturbance -visual quality impact	-alters forest stand structure, patch size distribution -reverts succession to earlier seral stage (or if planted to new spp. possibly changed totally?) -impacts to wildlife from permanent disturbance, loss of habitat
<b>IV &amp; V</b> <b>Recreation</b> (resorts included under land clearing due to the permanence of the land loss)  <i>Activities 4 (Day Use/Campgrounds) &amp; 5 (Hunting) are combined into one category 'Recreation' as their CRA ratings were too close to separate in 2000/2 and impacts are often interdependent.</i>	-campgrounds (day use picnic sites, beaches, playgrounds, tent sites, etc) -hunting/fishing -ATV's & mt bikes -hiking/birding/climbing -skiing (heli & cat and non- motorized) -raft & float tours, kayaking/boating -hang gliding/para sailing -llama/horse treks  -> the next popular sport or tourism opportunity?	-increased erosion & sedimentation possible -possible waste/pollution issues -human disturbance <u>more</u> from motorized activities (able to get farther into the wilderness, noise issues for other users, wildlife become habituated or sensitized to noise, etc) -altered hydrology in cleared & 'hardened' areas -invasive plant encroachment	-changes in wildlife spp. to more 'tolerant' types -invasives may increase -seasonal impacts to wildlife when humans in area (longer term get changed behaviour from 'learned' response - eg: waste issues & garbage bears) -possible impacts to watercourses & erosion issues from associated forest damage & trail development (see "access" above)

\*adapted from 'Northern Cartel' Risk List by Activity (2003), Omineca Region BC Parks Conservation Risk Assessments (2000 & 2002).

In yet another independent process, this one initiated by the northern WLAP regions in 2003 (now MOE), a risk ranking list by activity was developed. This 'Northern Cartel' listing also classed these same five human endeavours as 'high risk' activities.

To summarize, the PPA planning documents and CRA guide BC Parks management actions to achieve specific objectives for each park or protected area, while attempting to minimize the threats from these recognized five

human activities. These five activities were acknowledged by three independent processes as being “high risk”. This BMP should assist in evaluating the environmental risk of development proposals and suggests a range of mitigative measures to apply.

## 4 How to Use this Document

The interrelated nature of the effects of human activities is overwhelmingly complex. They can cause direct ecosystem impacts as well as indirect impacts to ecosystem function. For example, a direct impact would be when a proponent cuts down the forest to put in a road and both canopy trees and understory vegetation are removed. An indirect example would be when that same road now fragments the home range of a rare jumping mouse species which restricts the mouse’s gene flow, and eventually eliminates that wildlife species (from limited genetic variability plus vehicle mortality). This then alters the vegetative species ‘mix’ or composition throughout the local ecosystem because the mice no longer disperse the seeds. The original ecosystem function has been compromised by the road. This hypothetical example may be considered farfetched, but many such impacts go unnoticed because we don’t know to even look for them. The presence of a PPA boundary through the ecosystem in our example only adds another level of complexity to this situation.

This BMP document has been cross referenced in sections #5 and #8 to increase ease of use by both impact assessors as well as proponents. The “Key Issues of Concern” section (#5) identifies and describes some of the direct and indirect ecosystem impacts that we should avoid or mitigate when conducting our five high risk activities. The “Best Management Practices” section (#8) provides a risk management checklist in the form of a general key. Some suggested mitigative measures for the selected high risk activities that may help to reduce negative environmental impacts in the short and long term are also included.

In practice, when a proponent creates development plans for lands adjacent to or impacting on PPAs, these BMP recommendations should be combined with the most recent Conservation Risk Assessment for the region and its ranking for that specific PPA. This should allow the proponent to refine their proposal for that site, by indicating what impacts could become a critical issue.

The information provided in this document is general, limited in scope and details. Readers are encouraged to use appropriately qualified professionals (AQPs) when using BMPs to make their specific projects less harmful to the environment, or when using alternate guidelines or new technologies.

## 5 Key Issues of Concern

British Columbia's PPAs system is intended to maintain and protect a wide range of recreation and conservation values. Nearly every PPA value can be impacted by some form of human activity, either from within or adjacent to the park. The PPA values discussed in this document are limited to the following that have been selected because of their sensitivity to our five high risk human activities:

### 5.1 Maintenance of functioning natural plant communities within PPAs (dangers from invasive plants)

There is a long history of unintended, unwanted and at time catastrophic impacts arising from introduction of exotic or foreign species (invasives) to an ecosystem. The time and expense needed to eradicate the foreign species once it is established and rehabilitate the ecosystem, far outweigh thoughtful planning and cautious implementation.

**Fire & Suppression Activities** When an area of Crown Land burns naturally, for example, through lightning ignition, it is now often left to burn itself out, especially in those remote areas where no significant economic timber damage is anticipated. Where there is risk to private or public property however, extensive effort is made to halt the fire's progress as soon as possible. These burned over areas are considered to be part of the natural range of variability of the broader landscape and have been classified as to average size of burn (patch size), distribution of these across the landscape and average number of years between burns (fire return interval/disturbance frequency).

In the Omineca Region, limited information exists on pre-burn invasive plant species on Crown Land to be able to measure if/how much change in species composition and richness occurs post-burn (some baseline inventory work has been initiated in 2005). Only in those prescribed fire cases where data is available, are conclusions on the rate of spread of invasive plants possible. Wherever the amount of early seral stage community changes, you have altered that ecosystem for years to come. Intense burns often alter soil fertility and composition, thus allowing 'disturbance' plant species to successfully invade previously inhospitable sites. Fire activated species may flourish post-burn. These different plant species may now out-compete the former native ones because of the changed conditions, should their seeds or vegetative propagules arrive on site. Where erratic outcrops of plants that "shouldn't be there" appear, we can speculate that they were carried in by some vector (for example, ornamentals brought to a remote resort for beautification that escape, survive and spread). Also, fire suppression activities may bring in invasive seeds through road and fire guard construction, as well as supply/emergency vehicles using these access routes. These seeds may be carried directly into the PPA or establish a seed bank adjacent to one.

Natural ecological succession has been studied and natural early seral 'invaders' of fresh burns have been documented (i.e.: fire weed). A distinction must be made between traditional early seral plant species and truly invasive species, for as ecological succession naturally proceeds, the

plant community normally changes.

**Land Clearing Activities** When an area of Crown Land is logged under tenure, all the disturbed areas (harvested cut blocks) are usually revegetated according to a professional's silviculture prescription/site plan or other specifications. The tree species used in replanting cut blocks may not always be totally representative of the natural species composition but intended to produce fast growing merchantable trees for the next harvest rotation. This may have the effect of altering the new forest's structure from the previous natural ecosystem (becomes an even aged monoculture), and alter the site conditions sufficiently to change the natural species composition of the understory layers, allowing introduced species to spread. Forest health issues may also arise (ie: mountain pine beetle epidemic). The 'natural' setting adjacent to the PPA has now been altered, with new tree species providing seed for future regeneration.

**Access Development Activities** Roads associated with timber harvest, land development or fire suppression activities (especially their ditch lines and cut banks), are usually revegetated to reduce surface soil erosion. Grass seed mixes currently used are often composed of agronomic species, not native to the surrounding ecosystem. Introduction of non-native grass species is of particular concern when a PPA is managing for native grassland ecosystems. Hybridization has been documented in grass species. Agronomic species often are a preferred and more nutritious food for wild ungulates and others, so wildlife behaviour may even be changed as they are attracted to seeded road edges.

**Recreation Activities** As well as the construction of new roads themselves, use of new access routes may introduce non-native plants. New roads always mean increased vehicular traffic (which does transport seeds), but often, also horse/llama use. Horses and llamas, via their food or manure, may seed new plant species into areas where they have never existed before. Similar grass hybridization issues may occur.

## 5.2 Maintenance of 'natural' views from the PPA

The quality of the visual landscape is an important value in most PPAs. Artificial elements on the viewscape (eg: man made facilities and structures, angular clearings, linear developments) negatively impact this value. This is perceived to reduce the quality of the recreational experience. Some mountainous PPAs have very long, wide and high viewsapes. While there is diminished visual impact with distance from the vantage point, some PPAs will benefit from extensive viewshed management over the surrounding area.

**Fire & Suppression, Access Development, Land Clearing Activities** Many types of human development can have an effect on the viewscape from a PPA. Natural and prescribed fires, new campgrounds and resorts, access and road development all have the potential to alter the "look" of the land. In the Omineca Region, the most common impact to viewsapes from any vantage point is from timber harvest cutblocks.

The replanted forest, regardless of how close to representative, is typically managed aggressively to allow it reach a 'free growing' state for harvest as soon as possible. The current mechanical brushing or chemical vegetation management methods may result in an abrupt and unnatural transition from the forest ecosystem in the PPA to the cut block.

Transportation corridors, seismic lines or energy pipelines and their cleared right-of-ways, mine and placer sites, ski runs and agricultural clearings can also have impacts. In smaller parks with high recreation objectives, the preservation of adjacent views may not be a high priority. However, in larger parks with a high wilderness value the user/client often has different expectations.

**Recreation Activities** Controversy exists when a 'natural' view is marred by the presence of a vehicle or boat (for example, a sailboat is tolerated well while a jetski is often not; a horse is more accepted while an ATV is often not). The variety of responses from PPA clients is as varied as the clients themselves and is beyond the scope of this document. Common sense should be applied when introducing a new recreation activity into a park and all planning documents and CRA results followed. A diversity of recreation opportunities should be provided to accommodate as wide a range of human interests as possible.

### 5.3 Maintenance of landscape level biodiversity values within PPAs (dangers from isolation)

PPAs are often considered "islands" of biodiversity and recreation values in a sea of surrounding human activity. In fact, the values within and outside PPAs must compliment each other to be sustainable. As such, they must remain "connected" across the PPA boundary at the landscape level. Isolating PPAs will result in the gradual erosion of at least some of the PPAs values (for example, wildlife viewing may be reduced, as wildlife needs to be able to emigrate/immigrate to maintain flow of genetic material to have sustainable populations).

### **Fire & Suppression, Access Development, Land Clearing,**

**Recreation Activities** Ecosystems and habitats in PPAs usually provide a function at a landscape scale that exceeds the boundary of the PPA. When the PPA is isolated from other elements/aspects of the landscape, these functions may be diminished. For example, ringing a PPA in clear cuts and linear corridors may restrict seasonal movement of wildlife, insects or fish into and out of the PPA. Isolating this PPA may also change its amount and quality of 'interior forest condition' which normally requires contiguous intact forest > 500 m across to maintain the associated light, humidity levels and thermal conditions. Reducing this amount impacts all the associated interior forest dependent species (plant and animal). Ecosystem alteration will occur, although the impaired ecosystem function may take years to be discerned.

Parks typically are zoned into ‘human use’ areas as a strategy to limit the amount of human traffic to different parts of the park. Each of these ‘use’ zones will have its own objectives and management techniques to attain these objectives (for example, posting signs as ‘closed to use’ to allow recovery time for ecosystems or ‘primitive use’ to limit vehicles). Zoning allows some areas in the park to be maintained as undisturbed habitat benchmarks or refuge areas. There is a threshold however, where these refugia become too small to be of value to maintain populations (more scientific study is needed on thresholds and refugia).

#### 5.4 Maintenance of natural, self-maintaining predator-prey relationships within PPAs (dangers from removing/altering ecosystem components)

Human understanding of the intricacies of ecosystem relationships is far from perfect or complete. The goal has been “to maintain biodiversity”, while acknowledging our scientific limitations. One area of research that requires more study is evaluating the ‘learned’ response of wildlife to certain stimuli. There are some classic studies, for example: flight response by mountain goats and caribou to helicopters, behaviour of bears conditioned to human garbage, use of roads by wolves in winter. As humans spend more time in the backcountry, we provide a wide variety of wildlife species with learning opportunities. Our PPA management must adapt to the new ‘learned’ behaviour of wildlife.

**Fire & Suppression Activities** Burned over areas have dramatic impacts on naturally occurring wildlife populations, depending upon what species were there initially. Natural and anthropogenic ignition sources of fire usually have the same effect of removing vegetation (which provides shelter and food for a wide range of wildlife). Fire normally drives endemic wildlife away to seek these necessities elsewhere, and opens the door for early seral dependent species. New animals that are driven into new territories may have to fight old ‘owners’ to acquire proprietary rights and access to life’s necessities.

**Access Development Activities** New road and trail or ‘access structure’ creation and their associated ditches, culverts and stream crossings are a necessary component of many developments. While creating access, a proponent needs to consider user safety, duration of use (both seasonal and total projected life), maintenance, and amenity value. Inadvertent or unmanaged access close to PPA boundaries can result in management problems/challenges within the park. These problems include illegal uses (eg: poaching, unlicensed guiding), human use in excess of a PPAs feature capacity (eg: angling pressure), and introduction of foreign and possibly invasive species (both plant and animal, see section 5.1).

Another unfortunate aspect of roads and trails are wildlife collisions and mortalities. Grass seeding of ditches and exposed road cuts often provides an attractant for wildlife, as well as salt and other chemicals used under winter driving conditions.

**Land Clearing Activities** Land clearing of any magnitude can skew the balance of habitat availability for wildlife. Road corridors may isolate sections of habitat, especially if vehicular traffic volumes are high (home range fragmentation, barriers to movement, noise disturbance). This can benefit some species, such as moose, through enhanced forage availability when early seral herbs and shrubs come up in recently harvested timber cutblocks/land clearings. But an increase in moose numbers following clearing or timber harvesting can “artificially” elevate predator numbers (eg: wolves or cougar). This increase in predators can have an undesirable affect on other vulnerable species, such as caribou, and often their mortality rate will increase.

Clearing riparian vegetation may impact water temperatures downstream. For example, if removed along traditionally ‘cold’ streams with Bull trout in some areas, it may tip the scales in favour of more temperature tolerant Rainbow trout.

**Recreation Activities** All planning documents and CRA results must be followed when introducing a new recreational activity into a PPA. Introducing new snowmobile activity to an area of Crown Land adjacent to a PPA can facilitate unnatural predator-prey interactions all throughout the area. This has been demonstrated by the impact that wolves can have on high elevation endangered mountain caribou herds through their use of packed snowmobile trails to by-pass deep snow barriers. The technological abilities of sleds mean that they can go almost everywhere all winter, with their associated noise disturbance (stress effects).

Ploughing roads in winter can also provide access corridors for predators that would not otherwise exist.

Illegal angler stocking of favourite fishing holes has contributed to disrupting the natural balance and composition of species in some areas.

### 5.5 Maintenance of a diversity of recreational opportunities in PPAs (dangers from concentrating human use/‘loving areas to death’)

This key concern appears to be contradictory to the first four environmental issues listed here, but recreation management is crucial to mitigating negative impacts on all of the above.

**Recreation Activities** Parks typically are zoned into ‘human use’ areas as a strategy to limit the amount of human traffic to different parts of the park. Each of these ‘use’ zones will have its own objectives and management techniques to attain them. These zones are intended to separate different human interests and provide ‘buffer zones’, for example, keeping recreational noise disturbance a safe distance from wilderness enjoyment and wildlife viewing. Increasing human use in popular PPAs often causes erosion effects (trails and campgrounds) and

capacity issues (over crowding). The reservation system was created in part to assist in addressing these concerns and acknowledges a maximum absorption capacity.

When interests outside a park provide access into a new area/drainage adjacent to a park, more ‘people use’ in the form of backcountry recreation normally follows (camping, hunting, fishing, berry picking, bird watching, partying, etc). Increased human use usually includes additional impacts of pollution (solid waste, point source pollution, noise disturbance) which must also be managed. This can create human management issues, but coming from outside the park where PPA staff have no jurisdiction. PPA boundaries are usually only marked on recognized trails and access points, so inadvertent trespass may easily occur. This may require more Conservation Officer, RCMP or Environmental Protection enforcement staff and increasingly complicated legal interventions. For example, the *Wildlife Act* provides the means to create more regulations for closure of areas to hunting or fishing and adding enforcement activities. An example would be when a previously unexploited fish bearing lake within a park suddenly becomes a particular target for anglers from new access established from outside the park. *(Note that this initial access issue that allows unregulated recreation also impacts landscape level biodiversity values (5.3) and may affect natural predator-prey relationships (5.4) as well).*

## 6 Objectives

### SMART Objectives:

**S**pecific  
**M**easurable  
**A**chievable  
**R**ealistic  
**T**ime specific

An objective is a concise, measurable statement of a desirable future condition for a resource or resource use which is attainable through management action (MELP 1999). Objectives normally include measurement factors, such as quantity or quality so that the outcomes can be verified during monitoring or auditing of activities within a specified time period. Objectives are specific to each PPA, so monitoring or audits would include measuring impacts to the values identified in the purpose or management statement for individual PPAs. Any measurement of impacts must be conducted through a monitoring strategy tailored to the particular PPA value(s) and the specific activity threatening it.

The 2005\_06 WLAP Business Plan has an objective for the Parks business area that states: “Optimize the economic contribution of park, fish and wildlife recreation.” This can be achieved by managing and protecting those PPA values that support the recreational uses. This same plan has an objective for the Ecosystems business area, to present “Clear strategies and legislation to protect and restore ecosystems, species and their habitats.” One strategy noted to achieve this objective is to “Undertake park management planning to ensure long-term management of conservation and recreation in parks and protected areas.” If the plans within PPAs are to be effective, the influences of outside factors need to be understood and controlled. The objective for this BMP document is:



“Manage human activities occurring in close proximity to PPAs such that they do not negatively impact recreational or ecological values in the PPA. Activities must leave natural viewsapes, a diversity of recreational experiences (where appropriate) and naturally functioning ecosystems capable of contributing to landscape biodiversity outside PPAs.”

## 7 Standards

Standards are quantifiable and measurable mandatory thresholds that are typically defined in law or regulation. They are statements outlining how well something should be done, rather than how it should be done (Dunster and Dunster 1996). Monitoring and assessing impacts to PPA values is currently conducted on an infrequent voluntary basis, as there are no official standards or legal requirements to assess development impacts (direct, indirect or cumulative). There may be consequences in the future if the proponent of an activity has not been duly diligent in making their best effort to avoid adverse impacts to PPA values. Should monitoring efforts reveal negative impacts are happening, rehabilitation may be requested.

### Legal Requirements

The *Park Act* is the main legislation governing parks, protected areas and ecological reserves in BC. It also provides for the designation and administration of provincial recreation areas and nature conservancy areas. Conservation lands (eg: fish and wildlife reserves, sensitive areas) are designated by a variety of legal tools including the *Land Act* and *Wildlife Act* as well as leases, covenants and Orders in Council. Additional applicable legislation includes the *Protected Areas of BC Act*, the *Environment and Land Use Act* and the *Ecological Reserve Act*. None of these however, apply outside their designated boundaries or provide for a “PPA scenic zone”.

The *Forest and Range Practices Act* (FRPA) does apply to Crown Land adjacent to conservation lands, see FRPA Section 5 ‘Protection of Resources’. It provides protection for the environment on Crown Land (S.46), maintenance of Crown scenic areas and visual quality objectives (S.150.3), prohibits unauthorized construction and occupation of structures (S.54) and protects private land boundaries against trespass by timber harvest activities on Crown Land (S.53). Additionally, it protects the public’s right to enjoy recreational opportunities (“the recreation resource”) in designated areas on Crown Land, under S.58.

Social importance and intrinsic value has been afforded PPAs for their scenery and recreational opportunities. This BMP suggests that a proponent’s activities on Crown Land near or adjacent to PPAs should be conducted with greater care to avoid impacting the park, than those designated areas of Crown Land set aside for recreation elsewhere. Proponents should consider if their proposal negatively impacts the recreational resource or scenic value within all adjacent PPAs. (*Readers should always consult the official version of any legislation mentioned here, if they intend to use it for legal purposes*).

## 8 Best Management Practices

Best management practices (BMPs) are approaches based on known science that, if followed appropriately, should allow the client to meet the standard or achieve the desired objective. Note that there may be more than one way to meet a stated objective. The BMP, the standard and the objective as used here, are non-legal elements.

Clients may follow the BMPs suggested in this document, or they may opt to follow different practices with or without the advice of an appropriately qualified professional (AQP). If the objective is not met, but the client can clearly demonstrate that they have followed the prescribed BMPs, they may not be held responsible for non-compliance with the objective. If the objective is not met, the client (and the AQP) can be held responsible for demonstrating that the alternative practices were an appropriate choice. If this cannot be demonstrated, the client (and professional) could be held accountable for any environmental damage.

### 8.1 BMP to Reduce Risks to Natural Plant Communities from Invasive Plant Species

**Objective:** Maintain ‘natural’ levels of plant diversity and composition in a ‘naturally’ occurring pattern across the landscape. Natural is defined as levels typical to the area prior to human disturbance, for the purposes of this document.

A risk assessment checklist follows that suggests means to reduce risks. Please review and assess if your proposed works require mitigative measures. This risk assessment applies to all activities involving the revegetation of disturbed sites, new plantings or transportation of non-native forage/seeds through sensitive areas.

#### **Risk Management Checklist for Invasive Plant Species**

A) Have you consulted the most detailed plan available/produced for the PPA(s) adjacent to the proposed activity to ascertain PPA values most at risk by the proposed activity?

If Yes, go to B.

If No, refer to PPA plans & CRA to assess values and risks.

B) Are the proposed activities within 1 km of a PPA that is managed to protect a rare plant community or sensitive ecosystem?

If Yes, go to E.

If No, go to C.

C) Are the proposed activities within ½ km of any PPA?

If Yes, go to D.

If No, go to Section 8.2.

- D) Are the activities the first of their type within 5 km of the PPA?  
 If Yes, go to E.  
 If No, go to Mitigation Measures.
- E) Do the proposed works involve introducing a seed source (eg: planting vegetation, hauling seeds/hay, using horses/llamas?)  
 If Yes, go to F.  
 If No, go to Section 8.2.
- F) Is the seed source of a natural species typically found in the BGC variant?  
 If No, go to G.  
 If Yes, go to Mitigation Measures.
- G) Are there physical barriers which would prevent the expansion of the introduced species into the PPA (eg: ice fields, mountain ranges, large lakes...)?  
 If No, retain the services of an AQP to develop measures to contain spread and include in plan.  
 If Yes, go to Mitigation Measures.

### **Mitigative Measures**

- Conduct appropriate site assessments and pre-planning for any activity to allow responsible implementation, and maintain a record for audit purposes. Use of an Appropriately Qualified Professional (AQP) is recommended.
- Consult the most detailed plan available/produced for the PPA(s) adjacent to the proposed activity to ascertain its values that are most at risk by the proposed activity.
- Where possible, use only native plant species (typically found in the immediate BGC variant) in replanting/revegetating disturbed sites (eg: construction sites, road or transmission line Right of Ways, exposed ditch lines...)
- Manage the vegetation/plant community on the site such that at its end state (final desired seral stage) it achieves the vegetative character (species diversity, species composition, species distribution) that would typically occur at that seral stage in that BGC variant. For example, if the final state is a climax forest, it would have the tree species mix and distribution of the pre-harvest forest. If the final state is an earlier seral phase (eg: herb/forb or shrub), the plant species mix would mimic that occurring in unmanaged sites in the vicinity.
- Manage the vegetation/plant community on the site such that at its end state it has the same level of endemic forest health pests and/or pathogens (eg: is not contributing to an outbreak).
- Where possible, use native plant sources as feed. Non-sterile agronomic plants transported as feed must be managed to ensure they are not spread (eg: immediate spill clean up, protective covers or wraps, clean tires and treads...).

- Provide training to planting/seeding staff on the impacts from exotic species and the procedures to be used at the site.
- Develop, and have on site, clearly illustrated plans for the proposed planting/seeding locations.
- Take precautions around streams which may be flowing at the time of planting/seeding and which flow towards PPAs, to ensure seed does not escape the planting/seeding location or site.

## 8.2 BMP to Reduce Risks to Viewscapes

**Objective:** Maintain ‘natural’ scenery at the same levels as it ‘naturally’ occurs across the landscape.

A risk assessment checklist follows that suggests means to reduce the risk of an impact on visual quality. Please review and assess if your proposed works require mitigative measures.

### **Risk Management Checklist for Visual Landscapes**

A) Have you consulted the most detailed plan available/produced for the PPA(s) adjacent to the proposed activity to ascertain PPA values most at risk by the proposed activity?

If Yes, go to B.

If No, refer to PPA plans & CRA to assess values and risks.

B) Are the proposed development(s) going to be visible from human use areas (eg: trails and campsites) within any PPA?

If Yes, go to C.

If No, go to Section 8.3

C) Are the proposed development(s) visible from a PPA designated as a wilderness or conservation area (that derives more important value from the natural visual landscape)?

If Yes, go to D.

If No, go to Mitigation Measures.

D) Are the development(s) the first of their type visible from the PPA?

If Yes, go to E.

If No, go to Mitigation Measures.

E) Is the visual impact to the PPA the result of an intentional fire?

If Yes, go to F.

If No, go to Mitigation Measures.

F) Has a rehabilitation plan been developed that considers the fires effects in the context of the landscape, plus replants fire guards, roads and trails?

If Yes, go to Mitigation Measures.

If No, retain the services of an AQP to develop a rehabilitation plan.

### **Mitigative Measures**

- Conduct appropriate site assessments and pre-planning for any activity to allow responsible implementation, and maintain a record for audit purposes. Use of an Appropriately Qualified Professional (AQP) is recommended.
- Consult the most detailed plan available/produced for the PPA(s) adjacent to the proposed activity, to assess the importance of visual landscapes to the PPA.
- Identify the prominent view points within PPA(s) adjacent to the proposed activity.
- For clearings, locate the development(s) as much as practicable to be screened or obscured from view points by topographic features.
- For clearings, configure/shape the development(s) as much as practicable to mimic the shape of naturally occurring openings, avoiding long straight lines and right angles (eg: burn scar, avalanche tract, talus slope...)?
- For clearings, re-establish natural vegetation cover (species, form and function) on all exposed/disturbed areas as soon as possible (eg: World Construction Set or other software will model the successional changes that will occur over time).
- For structures, locate the development(s) as much as practicable to be screened or obscured from view points by topographic features, retained forest cover, etc.
- For structures, design and construct the development(s) as much as practicable to mimic the shape, colour and orientation of naturally occurring features (eg rocky prominences, cliffs, talus slopes).
- Whenever practicable, plan prescribed burning for the early spring burn window to take advantage of the seasonal period of lower tourist use. Remember to provide public information to increase understanding of this management tool.

### 8.3 BMP to Reduce Risks to Landscape Level Biodiversity from Land Clearing (Habitat Fragmentation)

**Objective:** Maintain ‘natural’ levels of plant diversity and composition in a ‘naturally’ occurring pattern across the landscape.

A risk assessment checklist follows that suggests means to reduce the risk of eroding landscape level connectivity of its biodiversity and recreation values. Please review and assess if your proposed works require mitigative measures.

#### **Risk Management Checklist for Maintaining Landscape Level Biodiversity Values.**

A) Have you consulted the most detailed plan available/produced for the PPA(s) adjacent to the proposed activity to ascertain PPA values most at risk by the proposed activity?

If Yes, go to B.

If No, refer to PPA plans & CRA to assess values and risks.

B) Is the PPA managed to protect BGC representation or other landscape scale biodiversity values?

If Yes, go to C.

If No, go to 8.4.

C) Is the activity or the proposed development(s) within ½ km of a PPA (500 m is considered to be the minimum width for ‘interior forest conditions’)?

If Yes, go to D.

If No, go to 8.4.

D) Does this development plus any other existing human development in the area adjacent to the PPA, affect >25% of the perimeter of the PPA?

If Yes, retain the services of an AQP to create a plan to mitigate the developments impacts.

If No, go to E.

E) Does the development occur adjacent to a PPA feature that continues outside the PPA (eg: heritage or hiking trail, canoe route, wildlife movement corridor, contiguous marsh or grassland, etc)?

If Yes, retain the services of an AQP to create a plan to mitigate the developments impacts. Suggest to share plan with local community planners and groups.

If No, go to Mitigation Measures.

### **Mitigative Measures**

- Conduct appropriate site assessments and pre-planning for any activity to allow responsible implementation, and maintain a record for audit purposes. Use of an Appropriately Qualified Professional (AQP) is recommended.
- Consult the most detailed plan available/produced for the PPA(s) adjacent to the proposed activity to assess the importance of landscape biodiversity to the PPA.
- Identify any localized biodiversity features within the PPA(s) that extend outside the PPA. Locate the development to avoid overlap with the localized feature.
- If unable to avoid overlap, implement management in the overlap area that is complimentary to the feature. This may involve retaining forest or other natural cover along trails as a screen, conducting partial harvest in wildlife movement corridors, restricting activities to the annual period of least disruption to the feature, reducing the intensity of management activity, etc (eg: herbicide use, fire suppression, altering stocking standards...)
- Manage the vegetation/plant community on the site such that at its end state (final desired seral stage) it achieves the vegetative character (species diversity, species composition, species distribution) that would typically occur at that seral stage. For example, if the final state is a climax forest, it would have the same dominant tree species, and species mix, as well as the distribution of the pre-harvest forest.

## 8.4 BMP to Reduce Risks to the Wildlife Resource from Access

**Objective:** Maintain 'natural' pre-disturbance populations with self-maintaining predator-prey relationships.

A risk assessment checklist follows that suggests means to reduce the risks of introducing unintended access. Please review and assess if your proposed works require mitigative measures.

### Risk Management Checklist for Unintended Access

A) Have you consulted the most detailed plan available/produced for the PPA(s) adjacent to the proposed activity to ascertain PPA values most at risk by the proposed activity?

If Yes, go to B.

If No, refer to PPA plans & CRA to assess values and risks.

B) Are the proposed access developments within ½ km of a PPA if a new road or 1 km of a PPA if a new trail/transmission line ROW or other linear clearing?

If Yes, go to C.

If No, go to 8.5.

*Note: Vegetation management aspects of roads dealt with in 8.1*

C) Are the proposed activities within ½ km of a PPA that is managed to protect a rare plant community or sensitive ecosystem?

If Yes, go to D.

If No, go to 8.5.

*Note: Vegetation management aspects of roads dealt with in 8.1.*

D) Is the access the first of its type in the vicinity (defined as within 5 km)?

If Yes, go to E.

If No, go to 8.5.

E) Are there physical barriers (eg: ice fields, mountain ranges, large lakes, etc) or legal tenures (eg: private land) which would prevent the expansion of human use via this access to PPA(s)?

If Yes, go to G.

If No, go to F.

F) Are effective measures in place to ensure no unauthorized expansion of access (as presently planned)?

If Yes, go to Mitigation Measures.

If No, retain the services of an AQP to create a plan to mitigate the impacts of access.

G) Does the access structure proposed pose a risk of breaching physical barriers (eg: deep snow, major water bodies, other?) that may directly alter predator-prey relationships?

If Yes, retain the services of an AQP to create a plan to mitigate the impacts of access.

If No, go to Mitigation Measures.

### Mitigative Measures

- Conduct appropriate site assessments and pre-planning for any activity to allow responsible implementation, and maintain a record for audit purposes. Use of an Appropriately Qualified Professional (AQP) is recommended.
- Consult the most detailed plan available/produced for the PPA(s) adjacent to the proposed activity to ascertain its values that are most at risk from this access.
- Use existing roads or trails, if they can be re-established without compromising user safety or environmental values.
- Establish access to the minimum standard needed to maintain user safety and prevent environmental damage.
- Plan for the seasonal or end-life closure of the access structure to prevent out-of-season use or use after deactivation. Examples may include: bridges removed on un-fordable streams, physical access control barriers placed at strategic locations, complete rehabilitation of select portions of the access structure, no snow ploughing, etc.
- Maintain any naturally occurring physical barriers that exist on the site, to avoid expansion of access towards PPAs (eg: avoid filling deep gullies, retain densely forested areas, do not drain very wet ground, do not plough deep snow belts, other).
- On large developments (eg: resorts) limit the amount or quality of access structure that is at the edge of the development closest to the PPA.
- Report un-intended use of access structures to PPA staff.
- Rivers and waterways through PPAs are access routes and are administered under federal legislation (Fisheries and Oceans or Coast Guard Navigable Waters). Until or unless an activity touches bottom or shore, it is not managed under the *Park Act*. Any floating conveyance (canoe, kayak, raft, boat, etc) or float plane access to the PPA must comply with a valid park use permit if shoreline use is requested. Unauthorized fishing/hunting has the ability to reduce wildlife and fish populations and possibly alter predator-prey relationships.

### 8.5 BMP to Reduce Risks to Natural Values from Recreation

**Objective:** Maintenance of a diversity of recreational opportunities in those PPAs or management zones within PPAs that have this focus, while maintaining PPA values.

The spectrum of recreational opportunities now available in PPAs is expanding almost as rapidly as on Crown Land. Possible impacts from all types of recreation are beyond the scope of this document. Careful planning and management are required to monitor the environmental impacts of this



increasing diversity of human activity, both within and adjacent to PPAs.

### **Mitigative Measures**

- Conduct appropriate site assessments and pre-planning for any activity to allow responsible implementation, and maintain a record for audit purposes. Use of an Appropriately Qualified Professional (AQP) is recommended.
- Consult the most detailed plan available/produced for the PPA(s) adjacent to the proposed recreational activity, to ascertain its values that are most at risk. Consult the current Conservation Risk Assessment for that PPA.
- Several BMPs have been created that pertain solely to recreation, for example the ‘Commercial Recreation Wildlife Guidelines’ (2002). Please see References Section (#10) under “Additional Information Sources”.

### **Additional Guidelines**

Guidelines are a set of recommended or suggested non-legal methods or actions that should be followed in order to meet the desired objectives. They are not legally required, but highly recommended. Guidelines can be thought of as stewardship activities that, if followed will likely help to prevent or limit environmental damage, and if implemented, provide the proponent with a potential due diligence defence if problems do occur.

The guidelines presented here do not provide a complete set of BMPs but are the minimum intended to “help you act as a good steward of the environment” where activities are proposed near PPAs. Additional information particular to the project should be researched and incorporated into the proposal to minimize impacts (see additional sources in section 10).

### **Alternatives to BMPs**

The use of BMPs described in this document is completely at the discretion of the proponent. In a case where the proponent has specific information, more refined than that presented here, they may choose to deploy alternate approaches to addressing the values and risks associated with the PPA and the development. Procedures other than those outlined in the BMP section may be conducted provided that all legislative and regulatory requirements are met as well as short and long term objectives. Some of the possible consequences for not following BMPs and attempting to be a “good steward” could include decreased property values, decreased aesthetics resulting in lost tourism income, loss of industrial certification...

It is recommended that a client developing and implementing alternatives retain the use of an appropriately qualified professional (APQ) to ensure that the best available science and understanding is employed. MOE will conduct effectiveness evaluations to determine if the objectives and standards for BMPs have been met in the future, after regulatory compliance has first been assessed. How the risks of these types of environmental impacts will be

measured has yet to be determined, but will be specific to each PPA's purpose.

## Monitoring and Reporting

MOE now uses fewer resources to review or screen individual proposals, as we move towards a 'results based' approach. Staff will continue to monitor and report on activities potentially impacting biodiversity and recreation values. This monitoring will take the form of regulatory compliance monitoring (where legal requirements exist); adherence monitoring to non-legal guidelines or recommendations (where BMPs available), and effectiveness monitoring to assess whether requirements or recommendations are achieving the desired environmental result. More emphasis will be placed on those situations where a proponent proposes alternative approaches to those outlined above. Where a proponent has successfully achieved the objective using an alternative or 'newer' method, the approach will be documented and included in subsequent versions of this document.

If the objective is not met, but the client can clearly demonstrate that they have followed the prescribed BMPs, they will not be held responsible for failing to achieve the objective. Where an objective is not met, the client (and their professional) will be responsible for demonstrating that the alternative practices were an appropriate choice. If this cannot be demonstrated, the client (and their AQP) will be held accountable for any environmental damage.

## Compliance and Enforcement

In the future, the monitoring program may direct where legal action in the form of enforcement is required to attain the desired environmental results. Legislative revision is also an option if required in the future.

# 9 Glossary

**Anthropogenic:** of, relating to or resulting from the influence of human beings on nature (Webster 2004).

**Audit** (noun): a single set of tests, analyses and confirmations to verify the acceptability and quality of work or data. Audits are usually comprehensive, complex and spatially/temporally discrete. Audits can be considered a type of compliance monitoring. (Quayle 2003).

**Appropriately Qualified Professional:** an applied scientist or technologist specializing in a relevant applied science or technology including, but not limited to: agronomy, forestry, biology, engineering, geomorphology, geology, hydrology, hydrogeomorphology or landscape architecture, and who is registered in British Columbia with their appropriate professional organization and acting under that association's Code of Ethics and who,

through demonstrated suitable education, experience, accreditation and knowledge relevant to the subject matter, may be reasonably relied on to provide advice within their area of expertise. (ISW 2004).

**Best management practices:** methods, measures, or practices designed to prevent or reduce water pollution. Not limited to structural and non-structural controls, and procedures for operations and maintenance. Usually, BMPs are applied as a system of practices rather than a single practice. (Dunster and Dunster 1996).

**Biodiversity** (biological diversity): the diversity of plants, animals, and other living organisms in all their forms and levels of organization, including genes, species, ecosystems, and the evolutionary and functional processes that link them. (MOF Web Glossary). (MELP 1999).

**Compliance monitoring:** Measures performance against some environmental standard to establish a compliance record. May include audits, assessments, and reviews. Legal Context: measurement of performance against practices required by law (e.g. regulations under the *Fish Protection Act*, *Wildlife Act*, etc.). Practices Context: measurement of performance against environmental standards, policies, best management practices or plans that are recommended but not required by law. CAUTION: In some BC ministries, the term “compliance” refers exclusively to performance against legal standards. (Quayle 2003).

**Effectiveness monitoring:** Measures environmental condition in the context of a program, policy, plan or activity to gauge progress towards its desired outcomes or effects. Different from compliance monitoring in that rather than addressing whether people are complying with environmental standards, effectiveness monitoring attempts to uncover whether those standards are having an effect in the environment. (Quayle 2003).

**Goal:** goals provide general purpose and direction. They are the end result of ultimate accomplishment toward which an effort is directed. They generally should reflect perceived present and future need. They must be capable of being effectively pursued. (MOF Web Glossary). An ideal; a desired endpoint; frequently defined in abstract terms. Goals are qualitative and are achieved by means of objectives. (Dunster and Dunster 1996).

**Guidelines:** a set of recommended or suggested methods or actions that should be followed in most circumstances to assist administrative and planning decisions, and their implementation in the field. Guidelines may consist of policy statements, procedures, or checklists. They are provided as a broad framework of recommended actions to be taken and, therefore, provide some flexibility for decision making. Note that guidelines cannot, by definition, be mandatory; such actions are prescribed by regulations or rules. (Dunster and Dunster 1996).

**Impact assessment:** A study of the potential future effects of resource development on other resources and on social, economic and/or environmental conditions. (MOF Web Glossary).

**Inventory:** a single enumeration of an ecological system; generally carried either as a basis for estimating potential yield or to establish a benchmark. An inventory may act as one point in time in a monitoring program. Ecological inventories may be more comprehensive and spatially/temporally discrete than monitoring activities. (Quayle 2003).

**Mitigation:** measures implemented to control, reduce or eliminate a potential adverse impact of a project, including restorative measures. (EAO 2003).

**Monitoring:** repeated, systematic measurements done with a specific purpose in mind. Monitoring is focused on measurements over time in order to detect the change toward, or away from, a stated standard or objective. Monitoring is part of the cycle of assessment and evaluation that is linked to management activities. (Quayle 2003).

**Objective:** a quantifiable, measurable and defined target, capable of attainment within a defined period of time. Objectives are the means by which goals are achieved and should include four main components: 1. They must state the desired outcome (i.e.: what is to be accomplished.); 2. They must indicate the time period within which the expected outcome is to be achieved; 3. They must include measurement factors, such as quantity, quality, or cost, so that the fulfilment of the objective can be verified; 4. They must indicate who is responsible for achieving the indicated result. Desirable (but not absolutely essential) elements of objectives are a description of how they will be achieved and an indication of who will determine whether the results have been achieved. Objectives are typically narrower and shorter in range than goals, and serve as milestones toward goal achievement. (Dunster and Dunster 1996).

**Referral:** the process by which applications for permits, licences, leases, etc., made to one government agency by an individual or industry are given to another agency for review and comment. (MOF Web Glossary).

**Rehabilitation:** the restoration of ecosystem functions and processes in a degraded system or habitat. (Dunster and Dunster 1996).

**Reporting:** the process of effectively communicating the results of monitoring and their potential implications to a target audience. (Quayle 2003).

**Restoration:** a process of returning ecosystems or habitats to their original structure and species composition. Restoration requires a detailed knowledge of the (original) species, ecosystem functions, and interacting processes involved. (Dunster and Dunster 1996).

**Results-based performance standards:** Typically define a maximum permissible disposal or impact threshold. For example, the concentration of a particular chemical in waste water discharge or a receiving environment; minimum in-stream flow levels; forest age class distribution within a defined zone. Requiring users of the environment to stay within the established

threshold is presumed will achieve the environmental goal that the standard relates to. Results-based performance standards must be scientifically supported, as locally-relevant as possible, accepted by the public and stakeholders, enforceable by being capable of being measured, and affordable and feasible to implement (Brown, 2002)

**Risk:** the probability that an undesirable event will or will not occur. It is the product of the probability of the event taking place, the probability of being exposed to the event, and the probability of certain outcomes occurring if exposure did take place. Risk can be statistically quantified in a risk assessment. (Dunster and Dunster 1996).

**Seral stage:** the stages of ecological succession of a plant community, for example, from young to old stage; the characteristic sequence of biotic communities that successively occupy and replace each other, altering in the process some components of the physical environment over time (*FPC Biodiversity Guidebook* 1995)

**Standard:** quantifiable and measurable thresholds that are typically defined in law or regulation, and are mandatory. A statement that outlines how well something should be done, rather than how it should be done. A standard does not necessarily imply fairness or equity, nor an absolute knowledge of cause-and-effect linkages. Standards are typically established using a combination of best available scientific knowledge, tempered by cautious use of an established safety (caution) factor. (Dunster and Dunster 1996).

**Stewardship:** caring for the land and associated resources so that healthy ecosystems can be passed on to future generations. (Dunster and Dunster 1996).

**Sustainability:** the ability of an ecosystem to maintain ecological processes and functions, biological diversity, and productivity over time. (Dunster and Dunster 1996).

**Sustainable development:** a conceptual ideal where development (in whatever form that might be) meets the needs of the present generations without compromising the ability of future generations to meet their own needs. (Dunster and Dunster 1996).

## 10 References

2000 and 2002. BC Parks Conservation Risk Assessment – Omineca Region

2002. Brown, Daryl. Performance-based Environmental Management in British Columbia. Daryl Brown Associates Inc. and Victoria Consulting Network Ltd. Written for MSRM, MWLAP and EAO September 2002.

2003. Environmental Assessment Office. Guide to the British Columbia environmental assessment process. March 2003.  
<http://www.eao.gov.bc.ca/publicat/guide-2003/final-guide1-2003.pdf>

MOF Glossary of Terms.

<http://www.for.gov.bc.ca/hfd/library/documents/glossary/>

1999. MELP. Landscape Unit Planning Guide (Forest practices code of British Columbia). Co-published by Ministry of Environment, Lands and Parks, Resource Stewardship Branch, Environment Regional and District Offices. 1999.

2003. Quayle, James. Glossary of Monitoring Terms.

1996. Dunster, Julian and Katherine Dunster. Natural Resource Management Dictionary. Univ. of BC. Vancouver, BC. 380 pp.

## Additional Information Sources

Check on available BMPs that have been posted in draft form for comment or final versions that have been accepted for publication. All will contain sound advice to help you become a better steward of the environment. Check the BC government website for BMPs plus new updates and additions at <http://wlapwww.gov.bc.ca/wld/BMP/bmpintro.html>. This will link you to these documents below.

### Provincial Guidelines and BMPs

- [Best Management Practices for Amphibians and Reptiles in Urban and Rural Environments in British Columbia](#)
- [Environmental Best Management Practices for Urban and Rural Land Development in British Columbia - DRAFT](#)
- [Commercial Recreation Wildlife Guidelines](#)
- [Standards and Best Management Practices for Instream Works, March 2004](#)
- "Post-Fire Rehabilitation Planning BMP" June 2005

### Region-specific Guidelines and BMPs



#### Regions:

1. [Vancouver Island](#)
2. [Lower Mainland](#)
3. [Thompson-Okanagan](#)
4. [Kootenays](#)
5. [Cariboo](#)
6. [Skeena](#)
7. [Omineca-Peace](#)

### Vancouver Island Region

- [Vancouver Island Region - Beaver Management Guidelines](#)

- [Appendix B: Beaver Management Guidelines in British Columbia](#)
- [Environmental Objectives, Best Management Practices and Requirements for Land Developments](#)
- [Appendices to BMP - Land Development](#)
- [Urban Bio-Inventory: Terms Of Reference](#)
- [Environmental Objectives and Best Management Practices for Aggregate Extraction](#)
- [Sensitive Ecosystems Audit Summary](#)
- [Sensitive Ecosystems Audit](#)

### **Lower Mainland Region**

- [Standards and Best Practices for Instream Works, March 2004](#)
- [Supplemental Information - Instream Works Windows](#)

### **Thompson & Okanagan Regions**

- [Wildlife Information for Commercial Backcountry Recreation Opportunities in the North Central Monashee Mountains](#)
- [Best Management Practices for Recreational Activities on Grasslands in the Thompson and Okanagan Basins](#)

### **Cariboo Region**

- [Guidelines for In-Stream Routine Effectiveness Evaluation](#)
- [Guidelines for Off-Channel Routine Effectiveness Evaluation](#)
- [Terms and Condition for Changes In and About a Stream Specified by MWLAP Habitat Officers, Cariboo Region](#)
- [Timing Windows and Measures to Adequately Manage and Conserve Aquatic Resources in the Cariboo Region](#)

### **Omineca & Peace Region**

- [Fuel Handling, Transportation and Storage Guidelines](#)
- [Reduced Risk Timing Windows and Measures for the Conservation of Fish and Fish Habitat for the Omineca Region](#)
- [Reduced Risk Timing Windows for Fish and Wildlife](#)

### **Guidelines and BMPs - Other**

- [The Stewardship Series](#)  
[http://www.stewardshipcentre.bc.ca/sc\\_bc/stew\\_series/bc\\_stewseries.asp](http://www.stewardshipcentre.bc.ca/sc_bc/stew_series/bc_stewseries.asp)
- [Agricultural Ditch Maintenance - Lower Fraser Valley and Vancouver Island](#)  
<http://www.agf.gov.bc.ca/resmgmt/ditchpol/brochure/AgDitchMtceBrochure.pdf>
- [Agricultural Watercourse Maintenance Guide - Lower Fraser Valley and Vancouver Island](#) (check for current web links)
- [The National Guide to Sustainable Municipal Infrastructure - Best Practices](#) (check for current web links)