

Ecosystem Restoration Provincial Strategic Plan



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Executive Summary

This Ecosystem Restoration (ER) strategy will form the foundation for a multi-agency provincial initiative facilitated and led by the Ministry of Forests and Range (MFR). The expected benefits of the initiative are ecological, economic, social, and cultural, including:

- mitigating effects and adapting ecosystems to the influence of climate change;
- recognizing managed fire as one of the First Nations historical influences on the landscape that is inherent in their culture;
- reducing excessive fuel loads and continuity to mitigate catastrophic wildfire risks;
- improving air quality by managing emissions through prescribed fire and/or other treatments as opposed to emissions resulting from a wildfire potentially occurring during less favourable atmospheric conditions;
- restoring damaged native open forest and grassland ecosystems, which are habitat to 30% of the province's at-risk species;
- improving long-term timber harvest values by spacing over dense, stagnated stands while also providing a potential bioenergy source;
- increasing natural forage to sustain wildlife and livestock and their related industries;
- increasing resilience of community watersheds to maintain potable water supplies; and
- improving recreational and aesthetic values.

Vision

Forest and grassland ecosystems restored to an ecologically appropriate condition creating a resilient landscape that supports the economic, social, and cultural interests of British Columbians.

Mission

To establish and maintain an effective multi-sectoral Ecosystem Restoration initiative.

Guiding Principle of the MFR ER Program

The Ministry of Forests and Range (MFR) will provide leadership through its ER program to facilitate a multi-sectoral ER initiative that achieves the mission and goals related in this strategy, and creates synergies with other related programs and initiatives.

Goals and Strategic Priorities

From 2009 to 2012, a provincial ER initiative will be implemented that initially focusses on the fire-maintained ecosystems. This will be accomplished by addressing three core goals through a set of strategic priorities.

Goal 1. Establish a sustainable ER initiative

Strategic priorities

- a. Establish ER as a core workload activity within the Ministry of Forests and Range.
- b. Establish a multi-sector planning structure.
- c. Incorporate the principles of the government's "New Relationship with First Nations" into the ER initiative.
- d. Develop alternative funding sources to help achieve ER treatment goals.
- e. Facilitate ER treatment activities by addressing economic challenges, and explore opportunities such as bioenergy and carbon credits.

Goal 2. Develop an effective resource management framework

Strategic priorities

- a. Develop a planning framework for prioritizing key treatment areas that incorporates the principles of sustainable management.
- b. Implement an adaptive management framework to inform and guide the ER initiative into the future, supported by a monitoring and research program and a sub-committee with links to related initiatives.
- c. Complete district-specific ER plans and apply prescribed treatments (harvesting, mechanical, and fire, as required) to key areas to begin the restoration process.
- d. Provide the Provincial ER Strategic Plan and district-specific ER plans to other MFR and government initiatives to develop synergies and enhance program effectiveness.
- e. Judiciously expand the application of prescribed fire within the broader fire management planning process.

Goal 3. Attract effective people and partners to the ER initiative

Strategic priorities

- a. Develop a communication plan to assist in informing the public, First Nations, and other partner groups about the ER initiative.
- b. Develop partnerships with academic institutions and First Nations to provide joint learning opportunities.
- c. Position British Columbia as a world leader in ER.

Performance Measures

Short-term performance measures (by 2012)

- Completion of the Implementation Plan to operationalize the Provincial ER Strategic Plan
- ER is a recognized core workload activity within the MFR
- An established Provincial ER Steering Committee
- 14 forest districts with Steering Committees and Operations Working Groups
- Engagement of First Nations on Provincial and District Steering Committees
- Provincial and district ER projects funded by multiple sources
- Legislation and policy developed to address economic challenges
- Endorsement of research and development projects for validating economic opportunities such as bioenergy and carbon credits
- Established planning tools available to assist the District Steering Committees with prioritizing treatment areas
- An established science sub-committee to identify research needs, and to establish monitoring protocols and a data management system to inform the ER process
- 14 forest districts with ER activities occurring on the ground
- 12,000–17,000 ha of restored area moved into a maintenance condition per year (0.025% of province per year)
- 10,000–12,000 ha of judiciously applied prescribed fire per year
- 25–30 provincially certified Burn Bosses
- Fully implemented communication plan
- Collaboration with other related initiatives within the MFR, First Nations, government, non-government, industry, and academic institutions is actively occurring
- Concepts underlying ER are recognized as part of Ministry culture

Medium- to long-term performance reviews

- Vision, mission, and guiding principles reviewed in 5–10 years
- Goals reviewed in 3–5 years
- Strategic priorities reviewed in 3 years

Preface

Ecosystem Restoration is internationally defined as the process of assisting with the recovery of an ecosystem that has been degraded, damaged, or destroyed by re-establishing its structural characteristics, species composition, and ecological processes.

In the fire-maintained ecosystems of British Columbia's Interior, a lack of wildfire due to decades of suppression, the absence of prescribed fire, and the application of no other intervention or disturbance processes as an adequate surrogate for the role of fire have contributed to trees encroaching onto historic grasslands, as well as excessive in-growth of trees in previously open forests.

Province-wide, this ecological change has affected hundreds of thousands of hectares, causing a reduction of ecosystem resiliency to climate-change pressures and a host of other related negative trends in open forest and grassland ecosystems. These trends include:

- reductions in available First Nations traditional plants and ecosystem values;
- increased risk of catastrophic wildfire, which includes impacts to air quality;
- degraded native grassland integrity and associated critical wildlife habitats;
- reduced timber quality, and increased susceptibility to insects and disease;
- reduced quantity and quality of forage for wildlife and livestock;
- increased risk to community watershed health; and
- reduced recreational and aesthetic values.

To partially mitigate these adverse effects on Crown land in British Columbia, an Ecosystem Restoration (ER) initiative led by the Ministry of Forests and Range (MFR) was announced by the Minister in the fall of 2006. This initiative is supported by funding through 2009/10.

This strategy is in response to that announcement and has been developed by the MFR ER program to initially target the fire-maintained ecosystems. However, in certain cases, it may be deemed necessary to initiate treatment activities on other key ecosystems as well.

The strategy will be refined through a review by other related government and non-government organizations to facilitate the formation of an effective, collaborative ER initiative.

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"This is a complex problem. However, we must recognize that areas with excessively high fuels create a risk to the public and to important forest values, such as community watersheds and habitat for endangered species. We need to take action through our forest policy and practices to prevent further fuel build-up. We also need to begin reducing the fuel levels in those areas most at risk" Bruce Fraser (2006) Chair, Forest Practices Board.

1 Introduction

1.1 Our Changing Forests and Grasslands

Through history, biotic and abiotic factors have shaped British Columbia's ecosystems into what we see today. However, resource managers are recognizing that over recent decades many of these factors have changed, largely due to human influence and management practices. Many of our ecosystems are now on ecological trajectories out of a natural range of variation.

The effects of climate change are expected to compound these pressures over the next few decades. Consequently, in some key areas, the existing ecosystems may not have the resiliency to endure the normal periodic stress events in the local environment that serve to maintain their integrity.

At risk are public safety and a host of important forest values. Having healthy, well-managed ecosystems leads to ecological functions that are closely tied to products, services, and values used socially, culturally, and economically.

1.2 The Changing Climate

It is projected that effects of climate change will create widespread resource management challenges in British Columbia including: species migrations, extirpations, floods, droughts, insect infestations, forest diseases, invasive plants, and possible catastrophic fires.

Although ecosystems and species have responded to past changes in climate, future responses may not be compatible with our current patterns of use or desires. Consequently, there may be significant economic, social, and biological impacts.¹ Management of British Columbia's forests and ecosystems will therefore play a critical role in facilitating adaptation and mitigation efforts.

Facilitating adaptation includes preparing ecosystems to be resistant, resilient, and adaptive to future climatic and biological factors. This may include various approaches to ensure that appropriate healthy ecosystems are established on a site. Among many options are approaches that assist ecosystems to adapt to a drier, warmer climate, include thinning in-grown stands, treating grassland areas experiencing forest encroachment, and assisting plant species migration.

Mitigating global climate change involves the long-term provincial objective of managing carbon balance. The role of managed fire on the landscape is critical not only in shaping many ecosystems but also in managing carbon emissions and biological damage that will occur from unmanaged catastrophic wildfire events. Managing towards healthy vigorous ecosystems that naturally sequester more carbon contributes to mitigating the global increase in atmospheric carbon.

Research is occurring into bioenergy and other opportunities to both reduce fossil-fuel consumption and emissions while finding economic options for the affected volumes of fibre associated with increased wildfire, insects, and disease.

¹ D. Spittlehouse. 2003. Climate change, impacts, and adaptation scenarios: Climate change and forest and range management in British Columbia. www.for.gov.bc.ca/hfd/pubs/Docs/Tr/Tr045.htm (Accessed Aug. 28, 2008).

1.3 A Proactive Response

To manage the changing forest and grassland ecosystems and the effects of a changing climate proactively, the Minister announced the Ministry of Forests and Range (MFR) Ecosystem Restoration (ER) initiative in the fall of 2006, supported by funding through 2009/10.

The MFR ER program developed this Provincial Ecosystem Restoration Strategic Plan in response to that announcement. The strategy will deliver a multi-sectoral approach to implementing a Provincial ER initiative involving government, non-government, First Nations, and industry organizations. The MFR will take the lead role in its implementation.

This plan provides a strategic approach to managing damaged or degraded ecosystems in a milieu of changing and emerging challenges that have their own environmental, economic, social, and cultural complexities.

2 Background

2.1 Definition of Ecosystem Restoration

Different terms explain management activities implemented to improve the condition of a degraded ecosystem. Understanding some of these definitions help managers focus on the vision of restoring an ecosystem. Table 1 includes some of the terms used to describe resource management activities related to improving ecosystem conditions.²

Table 1. *Definitions of terms related to ecological restoration*

Term	Definition
Restoration	The process of assisting with the recovery of an ecosystem that has been degraded, damaged, or destroyed by re-establishing its structural characteristics, species composition, and ecological processes.
Rehabilitation	Restore or improve some aspects of an ecosystem but not necessarily to fully restore all components.
Habitat enhancement or improvement	Improve the quality of an ecosystem through direct manipulation.
Reclamation	Return an area to its previous ecosystem type but not necessarily to restore fully all ecological functions.
Mitigation	Actions taken other than rehabilitation to alleviate or compensate for potentially adverse effects on ecosystems that have been modified or lost through human activity.
Maintenance	Activities performed that conserve ecosystem functions and attributes through time.

² Modified from: P. Roni (editor). 2005. Monitoring stream and watershed restoration. American Fisheries Society, Bethesda, Md. 350 p.

The intent of the strategy is to focus on the “restoration” of identified key areas to a condition that contains suitable ecological conditions and features (such as tree stocking and species representation) and, through “maintenance,” assist the areas in conserving natural ecological functions and communities thereafter.

2.2 Scope of Ecosystems that Can Be Restored

Ecosystem restoration is not limited to a type of restoration practice; the science and art of restoration apply to any ecosystem that has been damaged or degraded. The source of the damaging agent is often a clue to the approach that may be appropriate to address it. Some examples of ecosystem types and potential sources of damage are listed in Table 2.

Table 2. *Types of ecosystems potentially in need of restoration*³

Ecosystem type	Typical sources of damage
Meadows, bogs	Drainage, alien species invasion, overgrazing, pollution, and off-road vehicle damage
Sand dunes	Alien species invasion, off-road vehicle damage, structural damage
Grasslands	Overgrazing, forest encroachment, weed invasion, off-road vehicle damage, roads, utility corridors, cultivation
Dry forests	Forest in-growth, alien species invasion, high-grade logging, soil erosion or compaction, wildfire, fire suppression, loss of old-growth or wildlife trees, loss of understorey communities
Wet forests	High-grade logging, soil erosion or compaction, wildfire, loss of old-growth or wildlife trees
Riparian communities	Overgrazing, alien species invasion, pollution, bank degradation, loss of habitat from damming, channelization, bank armouring, or water diversion
Lakes and streams	Alien species invasion, pollution, overfishing, bank degradation, loss of habitat from damming, channelization, bank armouring, or water diversion
Marine	Pollution, alien species invasion, logging/sawmilling debris accumulation, siltation, estuary destruction, overfishing

Most commonly, an ecosystem can be restored solely through focussed management practices that reduce or remove a damaging agent. However, as an ecosystem becomes increasingly degraded, it may require management interventions to place it on a more natural biological trajectory.

³ D. Gayton. 2001. Ground work: Basic concepts of ecological restoration in British Columbia. Southern Interior For. Extension and Res. Partnership, Kamloops, B.C. SIFERP Ser. 3.

"Two key factors are contributing to the increasing fire risks. One is the population growth in areas where interface fires occur. The other is the build-up of combustible vegetation, a consequence of years of fire suppression activities" Wayne Strelloff (2001) Auditor General.

2.3 Natural Disturbance Types and Historic Natural Fire Regimes

British Columbia is an ecologically diverse province containing 14 distinct ecosystems ranging from dry grasslands to wet coastal rainforests (Figure 1). The *Biodiversity Guidebook* (1995)⁴ recognized the role that natural disturbances played in creating and maintaining British Columbia's ecosystems.

The *Biodiversity Guidebook* effectively linked the various ecosystems described by the biogeoclimatic ecological classification system into Natural Disturbance Types (NDTs) 1–5.

NDT1 – Ecosystems with rare stand-initiating events

NDT2 – Ecosystems with infrequent stand-initiating events

NDT3 – Ecosystems with frequent stand-initiating events

NDT4 – Ecosystems with frequent stand-maintaining fires

NDT5 – Alpine Tundra and Subalpine Parkland ecosystems

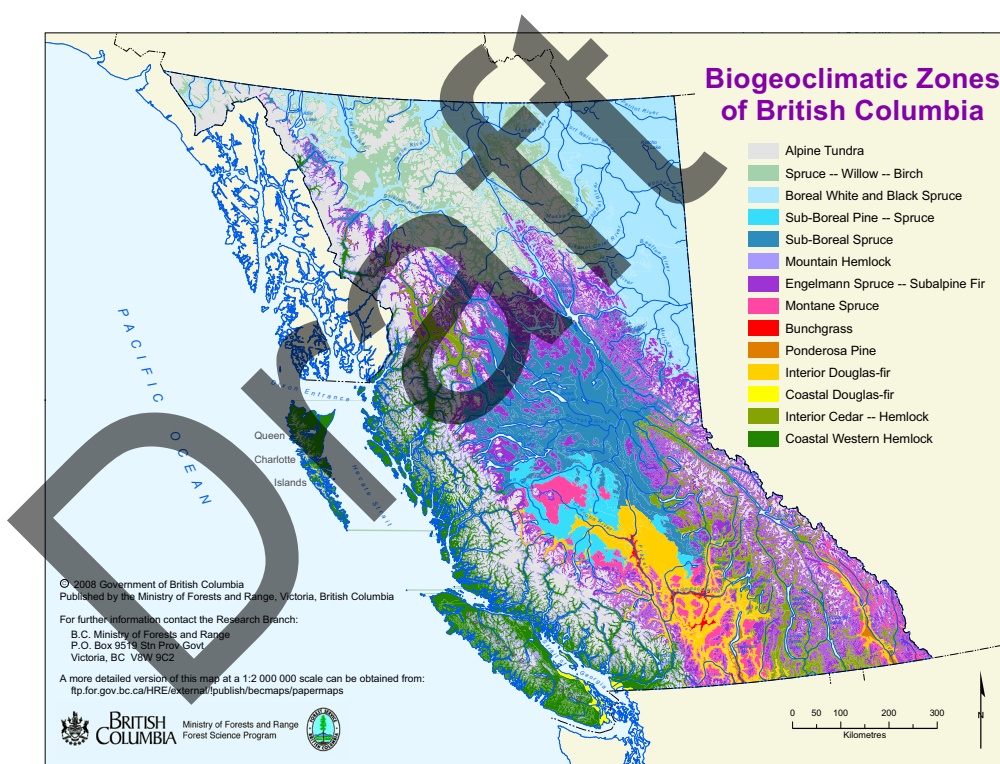


Figure 1. Biogeoclimatic zones of British Columbia.⁵

4 B.C. Ministry of Forests and B.C. Ministry of Environment. 1995. Biodiversity guidebook. Victoria, B.C. For. Pract. Code Guide.

5 Government of British Columbia. 2008. Published by the Ministry of Forests and Range, Victoria, BC.

"High fuel loads are not the only consequence of skipping (fire) disturbance intervals. Recent research shows that biodiversity and forage production are reduced, wildlife habitats are altered and the forests become susceptible to insects and diseases" Hon. Gary Filmon (2004) Chair, Firestorm Review.

The NDTs were further described in terms of the mean return interval of an ecosystem-defining event, be it fire, wind, insects, disease, or landslides. For example, the NDT1 ecosystems were described as having an event return interval of between 250 and 350 years, while the mean return interval in NDT4 ecosystems ranges from 4 to 20 years. The NDT system provides coarse zoning of ecosystem types that is fairly easy to apply at the landscape level. However, it does have limitations in terms of recognizing the effect that topography (slope, aspect, and adjacency) and fire severity play in shaping ecosystems.

A lack of wildfire due to decades of suppression, the absence of prescribed fire and the application of no other intervention or disturbance processes to partially mimic the role of fire have contributed to ecological changes in certain ecosystems. In some cases, the changes have stressed ecosystems, leaving them more susceptible to the other disturbance agents such as insects and disease, which begin to magnify their influence on shaping the ecosystem. Work defining historical natural fire regimes (HNFR) has classified the influence of fire by frequency and severity (Table 3).⁶

Table 3. Description of fire regime codes

Fire regime code	Description
0	Little or no occurrence of fire
I	0–35 year frequency, low severity
II	0–35 year frequency, mixed severity
III	0–35 year frequency, stand-replacement severity
IV	35–100 year frequency, mixed severity
V	35–100 year frequency, stand-replacement severity
VI	100–200 year frequency, mixed severity
VII	100–200 year frequency, stand-replacement severity
VIII	200+ year frequency, stand-replacement severity

The longer fire is removed from a system that previously had fire occur frequently, the greater the likelihood of ecosystem degradation; therefore, fire regimes I–III are currently deemed most at risk. Management efforts that restore the role of wildfire (or surrogates for wildfire) in shaping the land base will contribute to allowing the other disturbance agents to normalize their influences as well.

2.4 Historic Role of First Nations and Fire Disturbance

Natural ecosystems have been at the environmental, economic, social, and cultural centre of First Nations communities for thousands of years. The natural environment continues to be a source of food, shelter, tools, and medicine, as well as of materials for art and cultural activities, leisure and entertainment, and scientific and spiritual knowledge.⁷

Historical records suggest that First Nations used fire for food preparation and warmth but also for ecosystem management. First Nations employed fire in different ways and for purposes such as revitalizing berry or medicinal plant crops, creating browse and habitat for game species, and clearing travel corridors for easier movement. As the land stewards

"We used to keep it open, for berries and for mule deer, now it's all dead and dying and bug infested, and you can't even walk through it. It's just like a plague, all over" David Walkem (2008) Chief, Cook's Ferry Indian Band.

6 B.A. Blackwell, R.W. Gray, D. Ohlson, and F. Feigl. 2003. Developing a coarse scale approach to the assessment of forest fuels. Can.For.Ser., Pac.For.Cen., Victoria, B.C. Contract Rep. R2003-0112.

7 BC First Nations Forestry Council. 2008. BC First Nations Forestry and Land Stewardship Action Plan. www.fnforestrycouncil.ca/documents/ForestryActionPlan.pdf (Accessed January 2009).

during the pre-contact era, First Nations developed a deep and inherent connection and understanding of the plants, animals, water, and soils, their connections to each other, and the role of fire in the ecosystem. Methodologies and understanding developed into a traditional knowledge base that has been formed through generations of learning and application.

A cooperative focus on reintroducing and examining the role of fire to shape the landscape and its natural environmental attributes has the potential to improve management of many of First Nations traditional values, including:

- habitat maintenance to ensure that First Nations people can continue to exercise aboriginal rights to hunt and trap;
- improved travel through traditional lands through the treatment of in-growth and blowdown areas;
- increased number of sites suitable for traditional food, medicinal, and spiritual use plants;
- maintained ecosystem components that were traditionally used for non-timber forest products;
- protection of archaeological sites from catastrophic high-intensity wildfire;
- community protection from wildfire, and
- a renewed spiritual connection with the forest ecosystems, and a contribution towards cultural pride.

The provincial government and British Columbia First Nations organizations are working together to develop a New Relationship founded on respect, recognition, and reconciliation of Aboriginal rights and title. In March 2005, the Province began meetings with representatives of the First Nations Summit, the Union of BC Indian Chiefs, and the BC Assembly of First Nations to develop a vision for a New Relationship. A resulting document, outlining the vision and principles of the New Relationship, sees forest and range management occurring in a sustainable manner, including a primary responsibility of preserving healthy lands, resources, and ecosystems for present and future generations.

Undertaking a range of ER treatments including the judicious application of prescribed fire back into ecosystems, as was applied by First Nations people pre-European contact, will contribute towards the restoration of the goods, services, and values they historically derived sustainably from the land base, and help to achieve the New Relationship.

3 Moving Forward

3.1 Prioritizing the Dry Forest Fire-Maintained Ecosystems

The lower-elevation savannah grasslands, shrublands, and open forest areas in British Columbia's Interior are rich in biological diversity. These same areas are also highly favoured for agriculture, settlements, cultural activities, and recreation.

"At the broad scale, four biogeoclimatic zones (Coastal Douglas-fir, Interior Douglas-fir, Ponderosa Pine, and Bunchgrass), representing approximately 5% of British Columbia's land base, are of provincial conservation concern (critically imperiled, imperiled or vulnerable)..." Taking Nature's Pulse (2008).

Historically, these areas were a mixed-severity fire regime that included low-, moderate-, and high-severity fires that shaped the ecosystems. Collectively the areas are referred to as "fire-maintained ecosystems." Under British Columbia's biogeoclimatic ecological classification system, these areas are in the Ponderosa Pine, Interior Douglas-fir, and Bunchgrass biogeoclimatic zones.

Post-European contact management practices in the fire-maintained ecosystems of the Interior have resulted in trees encroaching onto historic grasslands, and excessive in-growth in previously open forests. Provincially, this has caused negative impacts on ecosystem resiliency, First Nations values, wildfire hazard, forage supply, habitat, timber values, and susceptibility to insects and disease.

Because of these issues, the Ministry has established that fire-maintained ecosystems will be the highest priority for restoration activity under the ER initiative.

This strategy will establish a framework for a coordinated approach to address facets of the new challenges. Expected benefits include:

- mitigating effects and adapting ecosystems to the influence of climate change;
- recognizing managed fire as one of the First Nations historical influences on the landscape that is inherent in their culture;
- reducing excessive fuel loads and continuity to mitigate catastrophic wildfire risks;
- managing emissions through prescribed fire and other treatments as opposed to those produced by a wildfire on the same site;
- restoring damaged native open forest and grassland ecosystems, which are habitat to 30% of the province's at-risk species;
- improving long-term timber harvest values by spacing over dense, stagnated stands;
- increasing natural forage to sustain wildlife and livestock and their related industries; and
- increasing resilience of community watersheds to maintain potable water supplies.

3.2 Relationship to Other Related Government Initiatives

Embarking on a sustainable ER program and an ongoing cycle of ecosystem maintenance thereafter will require the involvement and cooperation of many existing government agencies, First Nations, industry, and non-government organizations. Table 4 provides a summary of existing related government initiatives and the relationship they have to the ER initiative. To be sustainable, relevant, and effective, the ER initiative will maintain and develop synergies with these other initiatives.

Beyond provincial government initiatives, other stakeholder groups and organizations will also have related and complementary initiatives at both provincial and district levels that may be relevant to the ER initiative.

Table 4. *Relationship to other related government initiatives**

Initiative	Purpose and Relationship to the ER Initiative
Ministry of Forests and Range Protection Program Fuel Management & Wildfire Management Planning	<p>Purpose: To address fuel hazard reduction and wildfire management planning to proactively integrate wildfire action, ongoing resource management, and community protection.</p> <p>Relationship to ER: Will provide opportunities to link planned ER treatments to resource management and wildfire planning activities and with community wildfire protection plans to enhance decision making and to take advantage of operational efficiencies.</p>
Ministry of Forests and Range Wildlife Management Wildland Fire Management Strategy (WFMS)	<p>Purpose: Manage the role of wildfire in ecosystem processes in a way that is safe and acceptable to the public of British Columbia.</p> <p>Relationship to ER: ER and the WFMS complement each other's goals by reintroducing fire's role back in ecosystem management. ER focusses on prescribed fire treatments for ecosystem values, while the WFMS focusses on wildfire management.</p>
Ministry of Environment B.C. Air Action Plan	<p>Purpose: To continue to reduce emissions from industry, transportation, urban growth, ports, and marine vessels, and continue to develop and support airshed management.</p> <p>Relationship to ER: Applied treatments may include prescribed burns that will contribute to airshed loading and will need to be modelled, and managed to indices to mitigate impacts.</p>
Ministry of Environment Healthy and diverse native species and ecosystems	<p>Purpose: The Ministry is engaged in a range of activities from species-at-risk inventories, to habitat restoration and provincial park restoration initiatives.</p> <p>Relationship to ER: Inventory and management goals will assist in prioritizing ecosystems for restoration or maintenance and the type of activities that may be appropriate.</p>
Species at Risk Act	<p>Purpose: To identify and protect endangered, threatened, or vulnerable wildlife species through legislation.</p> <p>Relationship to ER: Treatment activities will consider at-risk species, and improve health and resilience of ecosystems/habitat.</p>
Ministry of Aboriginal Relations and Reconciliation	<p>Purpose: The Ministry is leading the way in building new relationships with Aboriginal people, founded on reconciliation, recognition, and respect. The Ministry negotiates treaties and other agreements to create economic certainty over Crown land and resources, and to improve the lives of Aboriginal people.</p> <p>Relationship to ER: Provides opportunities to meet, in part, goals as outlined in the New Relationship document.</p>
Provincial Water Strategy	<p>Purpose: To ensure healthy watersheds, aquifers, and ecosystems, sustainable water use and benefits, and public health and safety.</p> <p>Relationship to ER: Restoration activities will assist watersheds to become more resilient to catastrophic damage and adaptable to change.</p>

8 Adapted and modified from: Future Forest Ecosystems Initiative. www.for.gov.bc.ca/hts/Future_Forests/ (Accessed August 20, 2008).

Initiative	Purpose and Relationship to the ER Initiative
Future Forest Ecosystems Initiative	<p>Purpose: The Future Forest Ecosystems Initiative is adapting British Columbia's forests and range management framework so that it continues to maintain and enhance the resilience and productivity of British Columbia's ecosystems as our climate changes.</p> <p>Relationship to ER: The ER initiative is listed as one of the mechanisms to deliver findings and science developed by the FFEI.</p>
Land Use Plans	<p>Purpose: Established land use plans for regions, sub-regions, and local areas that establish protected areas, provincial forests, and objectives for managing land resources.</p> <p>Relationship to ER: Land use plans will be effective mechanisms for incorporating strategic resource management objectives to meet ER goals.</p>
Forests For Tomorrow	<p>Purpose: The program was established to respond to the catastrophic wildfires and the mountain pine beetle epidemic.</p> <p>Relationship to ER: When specific fire-maintained ecosystems within the timber harvesting land base that may be reforested are also identified as key priority areas for ER treatments.</p>
Mountain Pine Beetle Action Plan	<p>Purpose: To mitigate the impact of an unprecedented mountain pine beetle epidemic on forest values, communities, and the provincial economy and to ensure sustainability into the future.</p> <p>Relationship to ER: The ER initiative will assist some key areas in re-establishing healthy ecosystems and addressing multiple social and economic values.</p>
Bioenergy	<p>Purpose: The BC Bioenergy Strategy will examine opportunities to develop the province's bioenergy resources.</p> <p>Relationship to ER: ER activities will often generate biomass that will have bioenergy potential.</p>
Forest Certification	<p>Purpose: To provide independent third-party verification that a woodland operation is operating according to a set of principles and criteria determined by a particular certification program.</p> <p>Relationship to ER: The structure and the ER multi-sectoral steering committee format and goals to incorporate a multitude of values will lend themselves to dovetailing with licensee certification criteria.</p>
Allowable Annual Cut Review	<p>Purpose: To forecast the amount of timber available for harvesting under a specified time period under a timber supply area or tree farm licence, to support the Chief Forester's review of the Allowable Annual Cut.</p> <p>Relationship to ER: Will improve timber supply certainty in areas where forests have had conflicting management goals and/or have been at high risk of damaging events/agents. Also provide a mechanism to address forests identified through the AAC process as: problem forests or low-merchantable timber types.</p>

Initiative	Purpose and Relationship to the ER Initiative
Ecosystem-Based Management on the Coast	<p>Purpose: To establish an ecosystem-based management framework that supports land and resource management planning in coastal British Columbia.</p> <p>Relationship to ER: Consistent with the objectives of the ER initiative.</p>
Invasive Alien Plant Control Program	<p>Purpose: To control the spread of invasive alien plants, which often exhibit aggressive growth and typically out-compete native plant species in new habitats. As a result, invasive plants are difficult to control and can adversely affect British Columbia's natural resources.</p> <p>Relationship to ER: Damaged and destroyed ecosystems may have become susceptible to invasion during restoration activities. ER practices must meet and exceed the standards of care exercised by other primary forest users. Large-scale treatments of invasive plants may effectively become ER treatments.</p>
Conservation Framework (linked to the report <i>Taking Nature's Pulse: The Status of Biodiversity in British Columbia</i>)	<p>Purpose: To address provincial biodiversity status and conserve species at risk especially in ecosystems of concern.</p> <p>Relationship to ER: The ER initiative will be one of the mechanisms to help the government restore and maintain biodiversity.</p>

3.3 The Provincial Template – Rocky Mountain Trench ER Program

The need for recovery of historic grasslands and open forests of the Rocky Mountain Trench (RMT) in southeastern British Columbia was first expressed by interest groups in the 1950s. Over the decades, several reports and field assessments confirmed the deteriorating grasslands and open forests and the attendant economic and social consequences. However, it was not until 1996 that the Rocky Mountain Forest District initiated and facilitated a district-based ER program.

The collective effort of many agencies, interest groups, and individuals passionate about ecosystem restoration of the RMT has resulted in cooperative success that is unparalleled in the province or Canada. This success is due solely to a non-partisan approach with a common goal that has been applied to southeastern British Columbia.

The ER program has been led by a local Steering Committee (supported by an Operations Working Group) who are responsible for strategic planning and delivery of ER activities throughout the RMT. Committee members represent government ministries and agencies, the local ranching industry, timber licensees, restoration program funders, hunters and guide-outfitters, environmentalists, and other citizen stakeholder organizations. Close relationships are also in place with local municipal governments and First Nations.

Addressing ER in the RMT has been enacted through the Kootenay Boundary Higher Level Plan Order and managed through defining the land base as Open Range,⁹

⁹ **Open Range** is grassland with shrubs and a scattering of mature trees. The driest of the ecosystem components, open range includes south- and west-facing slopes where soil moisture is the major limiting factor. Open Range sites provide critical winter forage. The goal for these sites is to restore 100% of range value by maintaining crown closure of 10% or less. Tree stocking range < 75 stems per hectare; target 20 stems per hectare.

Shrublands,¹⁰ Open Forest,¹¹ and Managed Forest.¹² Activities associated with restoring a healthy ecosystem for each of those types are guided by a strategic plan and combine harvesting, mechanical slashing/thinning, and prescribed fire treatments.

The success of the established processes and structure of the RMT ER program continues to be effectively proven over 12 years. As such, the organizational concepts successfully applied in the RMT will be the template through which the ER initiative will be implemented in forest districts elsewhere in the province.

For further information on the strategic ER plan in the RMT, consult the *Blueprint for Action* (2006)¹³ document.

3.4 Desired Future Condition – What To Restore To?

Addressing the needs of restoration must recognize the historical role of First Nations people in shaping and maintaining certain ecosystems. In this regard, their management practices and the resulting ecological conditions will be considered a reference ecosystem that existed during the pre-European contact era.

Coupling traditional knowledge with science-based techniques to reconstruct and provide inferences of historic conditions suggests that a mixed fire regime likely existed within the dry forests and grasslands, experiencing frequent (0–35 yr) disturbance events that created a landscape mosaic of shrublands, open range, open forests, and closed forests.

Ecosystem restoration efforts also have to take into account the effects of our recent (post-European contact) history and modern era. In the fire-maintained ecosystems, factors such as wildfire management, climate change, invasive plant dispersal, wildland/urban interface, livestock and wildlife forage supply issues, and land use conversion will contribute to shaping and maintaining the ecosystems.

At times it may be difficult to reconstruct historical conditions with certainty; however, the ER initiative will use the best knowledge available to compare the historic baseline to the present state, to understand an ecosystem's trajectory. ER activities will be anchored by this historical perspective to assist in identifying the key features of ecosystem structure, composition, and processes to be restored to achieve a desired future condition.

Although the historical information offers insight into one resilient forest condition, there may be other equally resilient conditions preferred, given that future climate may not resemble the past. Therefore, a reference ecosystem will guide initial restoration efforts at the stand level. However, these efforts may also be modified by landscape-level considerations (e.g., wildfire hazard, land conversion, fragmentation, species losses, invasive plants, and cultural needs) and larger phenomena such as climate change.

"Keep in mind that fire is a natural part of the environment, about as important as rain and sunshine... fire has always been here and everything good has evolved with it" Dr. Harold Biswell (1989) University of California.

10 **Shrublands** are non-productive (timber) forest, wetlands, and brush often with high forage values. Tree stocking range and target is 0.

11 **Open Forest** describes areas with significant values for both range and timber. The goal is to evenly balance tree/grass production by manipulating tree distribution and maintaining crown closure at 40% or less. Treatments in both open range and open forest require retention of a proportion of the largest trees on site. Tree stocking range 76–400 stems per hectare; target 150 stems per hectare.

12 **Managed Forest** is tended primarily for commercial timber values, although some interim forage benefits do follow for 10–30 years after harvesting. Tree stocking range 400–5000 stems per hectare.

13 Rocky Mountain Trench Ecosystem Restoration Steering Committee, *Blueprint for Action* 2006.



District-based ER plans will be developed that identify key priority areas for treatment. Areas of in-grown open forests, grasslands experiencing encroachment, and other damaged or stressed ecosystems will be evaluated by the respective Operations Working Groups and the Steering Committees to develop treatment plans and schedules.

In the RMT, over a decade of detailed site planning, treatments, monitoring, and research have been completed with positive results. As such, RMT-based prescriptions for fire-maintained ecosystems will be used as a starting template by other forest district ER programs. Through time, monitoring, ongoing research, and application of the adaptive management process will inform and refine the prescribed ER treatments at each locale.

Following, is a framework to guide the development of a collaborative provincial ER initiative.

4 Strategic Framework of the ER Initiative

This Ecosystem Restoration strategy will form the foundation and framework for a multi-agency provincial initiative that will be led and facilitated by the Ministry of Forests and Range.

4.1 Vision

Forest and grassland ecosystems restored to an ecologically appropriate condition, creating a resilient landscape that supports the economic, social, and cultural interests of British Columbians.

An adaptive management framework created around restoration activities will encourage effectiveness and efficiency to be refined as the ER initiative moves forward.

Despite broad consensus regarding the need for ER, an inclusive, sustainable province-wide multi-sectoral initiative has not yet occurred. Therefore, achieving the Vision statement extends beyond restoration of ecosystem health and includes a commitment to coordinated government initiatives, with active involvement of First Nations, the public, industry, and non-government organizations.

4.2 Mission

To establish and maintain an effective multi-sectoral Ecosystem Restoration initiative.

4.3 Guiding Principle of the MFR ER Program

The Ministry of Forests and Range will provide leadership through its ER program to facilitate a multi-sectoral ER initiative that achieves the mission and goals related in this strategy, and creates synergies with other related programs and initiatives.

4.4 Goals and Strategic Priorities

From 2009 to 2012, a provincial ER initiative will be implemented that initially focusses on the fire-maintained ecosystems. This will be accomplished by addressing three core goal areas through a set of strategic priorities.

Goal 1. Establish a sustainable ER initiative

The strength of the ER initiative will be through its inclusive structure, in terms of endorsement, reciprocal knowledge exchange, funding, and identifying and realizing joint priorities.

Strategic priorities

- a. Establish ER as a core workload activity within the Ministry of Forests and Range.
- b. Establish a multi-sector planning structure.
- c. Incorporate the principles of the government's "New Relationship with First Nations" into the ER initiative.
- d. Develop alternative funding sources to help achieve ER treatment goals.
- e. Facilitate ER treatment activities by addressing economic challenges, and explore opportunities such as bioenergy and carbon credits.

Goal 2. Develop an effective resource management framework

The nature of the ER initiative requires that a science-based methodology be employed that guides and continually informs the process. Due to the cross-discipline nature of the ER initiative, activities will continue to identify synergies with other initiatives.

The strategic framework will allow ER work to begin in other priority ecosystem types as identified by the Provincial ER Steering Committee and provide a model that can be consulted nationally (or internationally).

Strategic priorities

- a. Develop a planning framework for prioritizing key treatment areas that incorporates the principles of sustainable management.
- b. Implement an adaptive management framework to inform and guide the ER initiative into the future, supported by a monitoring and research program and a sub-committee with links to related initiatives.

- c. Complete district-specific ER plans and apply prescribed treatments (harvesting, mechanical, and fire, as required) to key areas to begin the restoration process.
- d. Provide the Provincial Strategic Plan and district-specific ER plans to other MFR and government initiatives to develop synergies and enhance program effectiveness.
- e. Judiciously expand the application of prescribed fire within the broader fire management planning process.

Goal 3. Attract effective people and partners to the ER initiative

Ecosystem Restoration worldwide has become recognized as an emerging new discipline. Through the professionalism and commitment of the people who become active members of the ER initiative, British Columbia will provide an effective working model.

Strategic priorities

- a. Develop a communication plan to assist in informing the public, First Nations, and other partner groups about the ER initiative.
- b. Develop partnerships with academic institutions and First Nations to provide joint learning opportunities.
- c. Position British Columbia as a world leader in ER.

4.5 Performance Measures

Short-term performance measures (by 2012)

- Completion of the Implementation Plan to operationalize the Provincial ER Strategic Plan
- ER is a recognized core workload activity within the MFR
- An established Provincial ER Steering Committee
- 14 forest districts with Steering Committees and Operations Working Groups
- Engagement of First Nations on Provincial and District Steering Committees
- Provincial and district ER projects funded by multiple sources
- Legislation and policy developed to address economic challenges
- Endorsement of research and development projects for validating economic opportunities such as bioenergy and carbon credits
- Established planning tools available to assist the District Steering Committees with prioritizing treatment areas
- An established science sub-committee to identify research needs, and to establish monitoring protocols and a data management system to inform the ER process

- 14 forest districts with ER activities occurring on the ground
- 12,000–17,000 ha of restored area moved into a maintenance condition per year (0.025% of province/year)
- 10,000–12,000 ha of judiciously applied prescribed fire per year
- 25–30 provincially certified Burn Bosses
- Fully implemented communication plan
- Collaboration with other related initiatives within the MFR, First Nations, government, non-government, industry, and academic institutions is actively occurring
- Concepts underlying ER are recognized as part of Ministry culture

Medium- to long-term performance reviews

- Vision, mission, and guiding principles reviewed in 5–10 years
- Goals reviewed in 3–5 years
- Strategic priorities reviewed in 3 years

Draft

5 Implementation

The Ecosystem Restoration Provincial Strategic Plan will be operationalized through a collaboratively developed, implementation plan. Each strategic priority that has been identified will have a tactical leader assigned who will be responsible for designing a set of activities and tasks to accomplish it and see that they occur. Usually, that tactical leader will build a group of specialists to assist this effort. Under a best-case scenario, the tactical leaders and their support teams will be composed of multi-sectoral representatives. It is anticipated that a multi-sectoral structure will be used to achieve the ER goals at all levels in the program structure. (See Figure 2.)

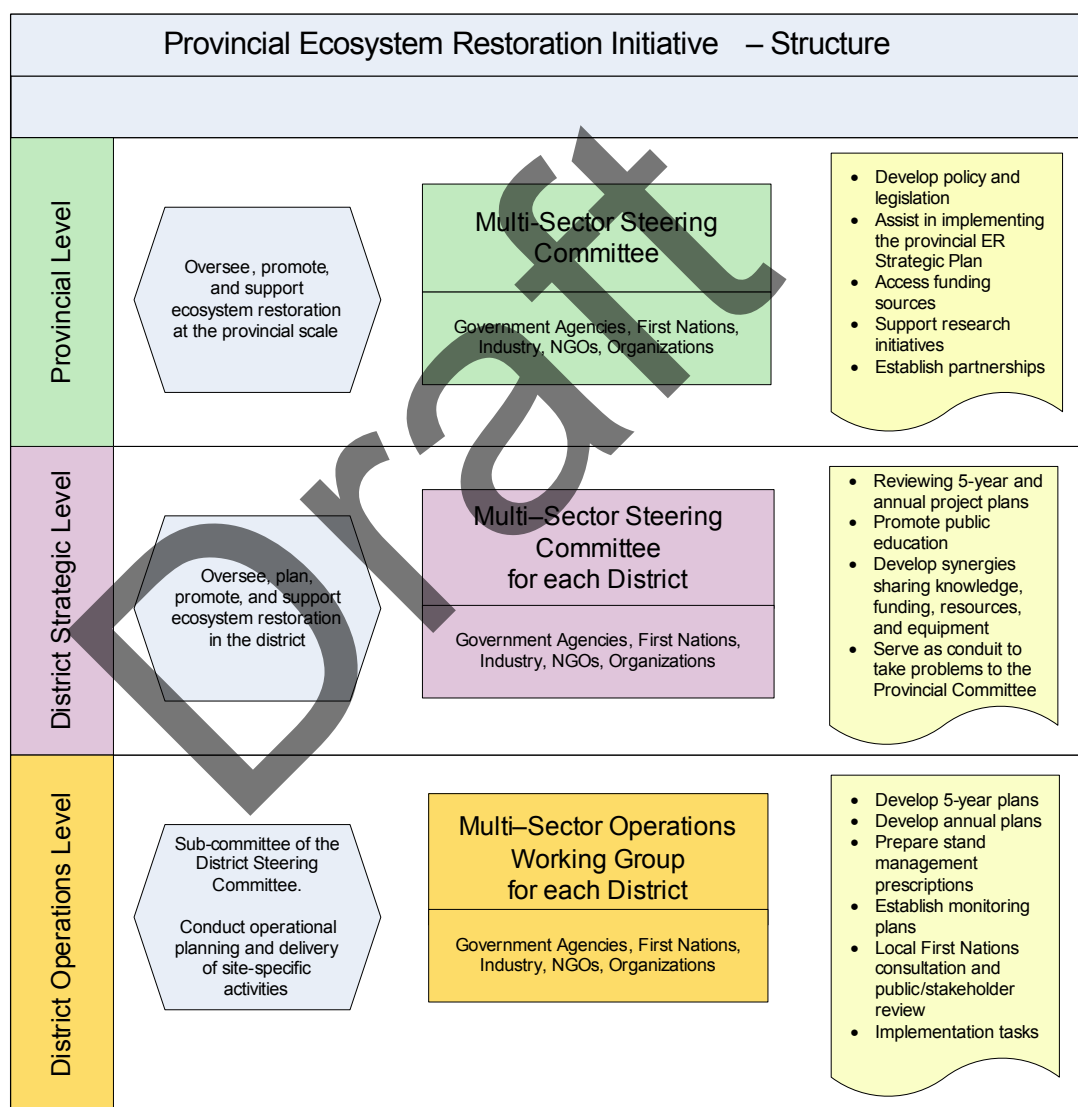


Figure 2. *Organizational structure for the Ecosystem Restoration initiative.*

The implementation plan will be an operational companion document to this strategy and forms an integral part of the success of the ER initiative.