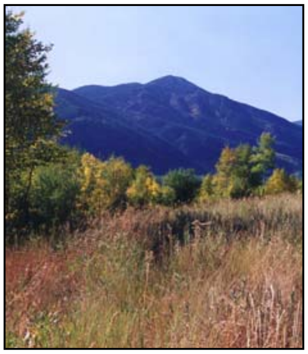
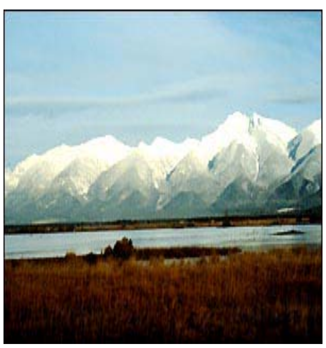



CANADIAN ROCKY MOUNTAINS ECOREGIONAL ASSESSMENT

Volume One: Report

Version 2.0

(May 2004)




The Nature Conservancy
SAVING THE LAST GREAT PLACES ON EARTH

Nature Conservancy Canada

Conservation de la Nature Canada

FWI Freshwater Initiative

Montana Natural Heritage Program

British Columbia Conservation Data Centre

Washington State Department of Natural Resources

Washington Department of Fish and Wildlife

Natural Heritage Information Centre Alberta

Idaho Conservation Data Center

TABLE OF CONTENTS

"At length the Rocky Mountains came in sight like shining white clouds in the horizon, and as we proceeded they rose in height, their immense masses of snow appeared above the clouds and formed an impassable barrier, even to the Eagle."
David Thompson, 1787 [1]

"It is inconceivable to me that an ethical relation to land can exist without love, respect, and admiration for land, and a high regard for its value. By value, I of course mean something far broader than mere economic value; I mean value in the philosophical sense."
Aldo Leopold, 1949, "A Sand County Almanac"

[1] Quoted in the Shining Mountains Mapping Project.

A. CANADIAN ROCKY MOUNTAINS ECOREGIONAL TEAM

The planning team for the Canadian Rocky Mountains ecoregion consisted of a core team with representatives from Montana, British Columbia, Idaho, Washington and The Nature Conservancy's Western Science Division and Ecoregional Planning Office. Leadership was shared between the Montana Field Office of The Nature Conservancy and the Nature Conservancy of Canada's British Columbia Office (NCC). Technical teams were assembled with participants from Idaho, Washington, Alberta, Montana and British Columbia. The entire planning team benefited from the participation of state, provincial and national TNC and NCC staff. The core team and their roles are listed below.

Canadian Rocky Mountains Ecoregional Assessment Core Team

Marilyn Wood, NW Program Manager, TNC, Montana
Charles Rumsey, Director of Conservation Programs, NCC, British Columbia
Bart Butterfield, Consultant, GIS and Data Management
Cathie Jean, Terrestrial Ecologist, Montana Natural Heritage Program
KJ Torgerson, Inland Northwest Manager, TNC, Idaho
Renee Mullen, Conservation Planner, TNC, Conservation Science Division
Carlos Carroll, Wide-ranging carnivore research, Oregon State University and Klamath Center for Conservation Research
Gwen Kittel, Terrestrial Ecologist, TNC, Western Resource Office
David Hillary, Canadian Rocky Mountains Program Manager, NCC, British Columbia
Pierre Iachetti, Conservation Planner, NCC, British Columbia
Mark Bryer, Aquatic Ecologist, TNC, Freshwater Initiative
Jeff Lewis, Wildlife Biologist, Washington Department of Fish & Wildlife

Coordination Team

Andrew Harcombe, Coordinator, BC Conservation Data Centre
Pat Comer, Senior Regional Ecologist, TNC, Western Resource Office
John Reilly, National Director of Science and Stewardship, NCC
Jan Garnett, Regional Director British Columbia Program, NCC
John Humke, Government Relations, TNC, Western Resource Office
Bob Mosely, Director, Idaho Conservation Data Center
Craig Groves, Director of Conservation Planning, TNC
Trish Klahr, Director of Conservation, TNC, Idaho
Peter Dunwiddie, Director of Conservation, TNC, Washington
Terry Cook, Director of Conservation and Stewardship, TNC, Washington
Mike Andrews, VP, Director Canada Conservation Partnership, TNC
Phil Hoose, Canada Conservation Science Program, TNC
Peter Achuff, Conservation Biologist, Parks Canada
Fred Samson, Regional Wildlife Programs, US Forest Service
Marcy Mahr, Science Director, Yellowstone to Yukon Initiative
Dan Casey, American Bird Conservancy Western Director, Partners in Flight
Lorna Allen, Community Ecologist, Alberta Natural Heritage Information Centre

Rex Crawford, Natural Heritage Ecologist, Washington Department of Natural Resources
Steve Cooper, Botanist, Montana Natural Heritage Program
Rick Rowell, Land Conservation Representative, Rocky Mountain Front, NCC, Alberta
Margaret Green, Director of Land Conservation, NCC, Alberta

Canadian Rocky Mountains Assessment Contact

For questions or to provide information for the next iteration of this assessment, please contact The Nature Conservancy of Canada, 207-26 Bastion Square, Victoria, BC, V8W1H9 at (250) 479-3191 and The Nature Conservancy Montana Field Office, P.O. Box 1139, Bigfork, Montana, 59911, at (406) 837-0909. See Appendix 11.0 for list of Conservancy contacts in the ecoregion.

B. ACKNOWLEDGEMENTS

This project could not have been completed without the generous and significant support of the Wilburforce Foundation, the Vancouver Foundation, the 444S Foundation, the Ian Cummings Foundation, the Nature Conservancy chapters of Idaho and Montana, The Nature Conservancy's Western Regional Office, and Washington Department of Fish and Wildlife.

A special thank you to the following people who not only participated in the expert review, but went the extra mile in our formative and summary review process: Paul Galbraith, Larry Halverson, Dave Gilbride, Bill Dolan, Garry Tipper, Ted Antifeau, Jim Thorsell, Bob Jamieson, Darrell Smith, and Paul Sihler.

A special thank you also goes to Andrew Harcombe, Marta Donovan, Steve Moslin, Carmen Cadrin, Sharon Hartwell, Andy Stewart, Leah Ramsay, George Douglas, Adolf Ceska, Samantha Flynn, and all of the staff at the British Columbia Conservation Data Centre for providing data and expertise. Thank you also to Ian Parfitt, Beth Woodbridge, Tom Braumandl, Dennis Demarchi, Mable Jankovsky-Jones, Maureen Ketcheson, Ted Lea, Del Meidinger, Scott Smith, Greg Utzig, Terry Wood, Robert Matt, Steve Binnall, Jeff McCreary, Bill Browne, Dr. John Woods, Murray Peterson, and Mitch Firman who provided data and/or expertise.

Agency support was provided by the Washington Department of Fish & Wildlife, Parks Canada – Western Region, the Montana Natural Heritage Program, British Columbia Ministry of Water, Land and Air Protection, the Alberta Natural Heritage Information Centre, the British Columbia Ministry of Sustainable Resource Management, the Idaho Conservation Center, and the Grasslands Conservation Council (Ryan Holmes and Bruno Delaselle).

Many thanks to the Science and Technology Association of The Rockies, Heather Mountain Lodge, Kicking Horse Coffee, Westroc Industries Inc., and Canmore Catering who provided either cash or in-kind support in hosting the expert workshops.

Thank you to the following people who committed at least one day of time to participate in the expert review process:
Ed Abbott, Paul Galbraith, Jan Simonsen, Ian Syme, Rob Niel, Bob Forbes, Rob Walker, Steve Donelon, Ray Andrews, Jim Skrenek, Perry Jacobsen, Lorna Allen, Peter Achuff, Garth Mowatt, Guy Woods, Ted Antifeau, John Krebs, Cameron Carlisle, Rob Watt, Cyndi Smith, Jon Jorgenson, Larry Ingham, Gerry Wilkie, Meredith Hamstead, Wayne Tucker, Trevor Kinley, Nancy Newhouse, Alan Dibb, Craig Dodds, Darcy Monchak, David Zehnder, David Phelps, Craig Smith, Kevin Weaver, Kathleen Shepherd, Kari Stuart Smith, Anne Skinner, Tom Volkers, Gail Berg, John Bisset, Bill Westover, Robert Matt, Marsha Gilbert, Steve Binnall, Jeff McCreary, Mary Terra-Burns, Bob Ralphs, Gerald Greene, David Leptich, Howard Ferguson, Kevin Robinette, Jeff Azerrad, David Volsen, Steve Zender, Dana Base and Al Palmanteer.

Thank you to the following people who provided guidance, review, and a willingness to share information: Dan Casey, Dr. Steve Barrett, Dr. John Weaver, Gael Bissell, Alan Wood, Leo Marnell, Jack Potter, Steve Gniadek, Steve Shelly, Pete Lesica, Rick Mace, and Jeff Jones.

Thank you to the following people who provided valuable advice and guidance with the freshwater classification:
Steve Carlson, Marc Porter, Linda Ulmer, Bruce Reimer, Dale Becker, Tony Cheong, Jack Stanford, Chris Frissell, Gordon Haas, Dave Tredger, Art Tautz, Dave Mayhood, Nathan Hitt, and Marcy Mahr.

Finally, thanks must also be given to several other regional planning efforts that generously allowed us to borrow from their texts for part of this report. In particular, we thank the Conservation Biology Institute and Jim Strittholt for use of text from the Institute's Pacific Northwest Conservation Assessment Report, (http://www.consbio.org/cbi/pacnw_assess/assess-main.htm).

Similarly, we thank the Southern Rocky Mountains Ecoregional planning team (Neely *et al*. 2001) and the Utah-Wyoming Rocky Mountains planning team (Noss *et al*. 2001), as both formatting and text from those two plans have been drawn from in the writing of this report.

C. EXECUTIVE SUMMARY

Description

The Canadian Rocky Mountains ecoregion (CRM) covers approximately 27.1 million hectares (66.9 million acres) extending across three states and two provinces. The ecoregion extends over a large portion of the Rocky Mountains from southeastern British Columbia and southwestern Alberta to northern Idaho, northwestern Montana and a small part of northeastern Washington. Elevation ranges from 915 m to 3,954 m (3,000 ft to 12,972 ft), with Mt. Robson (BC) being the highest peak in the ecoregion. Geologically, this ecoregion is very complex, containing bedrock of sedimentary, igneous, and metamorphic origin; and is largely characterized by steep glaciated over thrust mountains with sharp alpine ridges and cirques at higher elevations. Historic and current glaciation has sculpted the mountainous landscape filling many of the intermountain valleys with glaciofluvial deposits and moraines.

Land Ownership

Most of the ecoregion is public land and managed for various purposes by provincial, federal and state agencies. The largest land manager in the ecoregion is the Province of British Columbia, which controls 46.4% of the land base in the form of multiple use Crown Lands, Timber Supply Areas and Provincial Parks. The second largest land manager is the U.S. Forest Service, which manages 16.6% of the land within the ecoregion, followed by the Province of Alberta with 9.6% and Parks Canada with 8.4% of the ecoregion's land base under their jurisdiction. Most of the public and industrial land holdings are on the lowest productivity soils, either in the mountains or in arid valleys. Aside from a few mining claims in the mountains, private land occurs in the valley bottoms containing the best soils and access to water. Only 13.1% of the land within the ecoregion is privately held.

Protected Status

The CRM has one of the most extensive protected area systems of any conterminous North American ecoregion. Protected areas make up approximately 23.8% of the ecoregion. A combination of extensive rugged topography and public ownership favored these areas for protected status. Several large wilderness areas account for most of the total, but there is an extensive system of smaller public and private reserves throughout the ecoregion. A detailed study of protected status carried out for this ecoregional plan identified 358 protected areas and reveals that approximately 2.2% of the ecoregion is managed strictly for biodiversity values (equivalent to GAP Status I), and 21.0% is moderately protected (equivalent to GAP Status II).

Biodiversity Status

At least 67 plants, animals and plant communities are known to be endemic to the CRM. There are 56 known globally imperilled (G1-G2) species and 21 species federally listed as threatened or endangered (*U.S. Endangered Species Act* and the *Committee On the Status of Endangered Wildlife In Canada (COSEWIC)*). Another 9 are of special concern due to their vulnerable, declining, endemic, and/or disjunct status.

This ecoregion is best recognized for its full complement of large mammals. Elk, Rocky Mountain bighorn sheep, mountain goats, mule deer, white-tailed deer, moose, and woodland caribou are among the large ungulate species. Some of the most threatened species are carnivores, and this ecoregion supports populations of grizzly bears, gray wolves, wolverines, fishers and lynx. More common carnivores include the black bear, cougar, coyote, bobcat, and American marten. While populations for some of these species are stable, others are declining as a result of cumulative impacts from roads and other human uses.

The CRM also contains significant freshwater biodiversity values. This ecoregion includes the headwaters of many of the major rivers in North America (including the Fraser, Saskatchewan, Missouri, and Columbia) and many large natural lakes and reservoirs (Kinbasket, Quesnel, Arrows, and Flathead). Within the ecoregion are populations of white sturgeon (the largest freshwater fish in North America) and salmonids, including anadromous salmon and some of the last remaining strongholds for westslope cutthroat trout and bull trout, as well as a number of endemic species.

Ecoregional Assessment

The Nature Conservancy and Nature Conservancy of Canada convened a multi-jurisdictional team in March 2000 with the objective of employing a science-based approach to design a portfolio of conservation areas for the Canadian Rocky Mountains ecoregion. This assessment is not meant to serve as a protected areas strategy since it is recognized that conservation in this ecoregion will require a wide range of public/private conservation and stewardship strategies. The CRM ecoregional assessment represents a first step in this process by developing a network of conservation areas that with proper management would ensure the long-term persistence of the ecoregion's species, communities and ecological systems.

Conservation Targets

Conservation targets, the focus of conservation efforts in the CRM, include both coarse-scale (40 terrestrial ecological systems and 77 aquatic ecological systems) and fine-scale targets (75 rare plant communities, 94 plants, and 56 animals). The team selected the fine filter targets based on their imperilment, vulnerability, endemism, declining status, and the inability of coarse-scale measures alone to conserve them. Aquatic and terrestrial ecological systems were used to represent a broader level of biological diversity across the ecoregion. We assumed that a combination of fine-scale and coarse-scale target selection would be a robust way to capture the broadest array of biodiversity in the ecoregion. According to Haufler et al. (2002), this strategy has the advantages of being scientifically defensible and feasible to implement, and allows for the integration of social and economic objectives.

Portfolio Design

The team compiled and analyzed data from numerous sources, including British Columbia, Alberta, Washington, Idaho and Montana Conservation Data Centres and Natural Heritage Programs, the Washington Department of Fish & Wildlife, GAP Analysis Programs, and expert workshops. The team convened 10 expert workshops and meetings, with over 100 participants, to fill data gaps and obtain up-to-date information on conservation targets and places of significance. The team also used biophysical models as tools to identify, evaluate, and represent the natural variability of aquatic and terrestrial systems across environmental gradients within the ecoregion.

A key component of this ecoregion is its full complement of large mammals, in particular wide-ranging carnivores – grizzly bears, gray wolves, wolverines, fishers and lynx. Traditional ecoregional planning methods (special element and ecosystem representation approaches) have struggled with integrating wide-ranging carnivore conservation goals. To address this critical element of conservation planning for the CRM ecoregion, the team coordinated their work with the Rocky Mountain Carnivore Project initiated by World Wildlife Fund Canada with support from The Nature Conservancy. Principle researchers for The Rocky Mountain Carnivore Project included Dr. Carlos Carroll (The Klamath Centre for Conservation Research), Dr. Reed Noss (Conservation Science, Inc.), and Dr. Paul Paquet (World Wildlife Fund Canada)[2] worked with the team to develop a number of static and dynamic models that allowed the CRM team to design a portfolio that would adequately conserve wide-ranging carnivores and their habitat.

After assessing the viability of target occurrences and developing conservation goals for targets, the team used SITES, a computerized algorithm and software program, to select and design a portfolio of conservation areas. The team refined the modeled output through a series of interactive workshops with team members, Conservation Data Centre and Natural Heritage Program scientists, and other experts.

Portfolio of Conservation Areas

A total of 4,836 watersheds were part of the final conservation portfolio, totalling 13,455,793 hectares (33,249,264 acres) and equalling 49.7 % of the ecoregion. Portfolio watersheds were subsequently delineated as Conservation Areas and where possible, individual planning units were aggregated into larger conservation units called Conservation Landscapes. Conservation Landscapes were built by clustering watersheds that were geographically connected and that shared common ecological processes. These groupings were also clustered based on criteria related to conservation opportunity, including tying together areas where land ownership patterns, such as protected areas, created obvious mechanisms for common conservation action. While the bulk of the conservation solution was aggregated into Conservation Landscapes, an additional 20 individual watersheds were selected to meet conservation goals. Typically, these watersheds contain a single occurrence of a conservation target, are geographically isolated, and do not lend themselves well to incorporation into a larger landscape.

[2] For their full report contact World Wildlife Fund Canada (http://www.wwfcanada.org/en/default.asp)

Of the total 74 Conservation Areas in the solution (54 Conservation Landscapes, and 20 smaller, individual watersheds) 27 are entirely within British Columbia, 2 in Alberta, 14 in Montana, 7 in Idaho, 1 in Washington. Seven Conservation Areas were shared between BC and Alberta, 5 between Idaho and Washington, 1 between BC and Montana, 1 between BC and Washington, and 5 between Idaho and Montana. One Conservation Area was common to each of Alberta, BC and Montana, 1 between BC, Idaho and Washington, and 2 between BC, Idaho and Montana. They range in size from 72 hectares (178 acres) to landscapes of 2 million hectares (4.8 million acres). All of the identified Conservation Landscapes meet standards for functional conservation areas, as they include wide gradients of coarse-scale ecological systems and the element occurrences used to identify these landscapes were evaluated for viability. This portfolio represents a first effort at a functional network designed to conserve selected regional-scale species across their range of variability within the ecoregion.

Priority Setting

The CRM assessment team made a preliminary evaluation of conservation area priorities based upon available quantitative measures of conservation value and vulnerability. Conservation value was scored for each planning unit watershed based upon the criteria of richness, rarity, diversity, and complementarity. Vulnerability scores were evaluated for individual planning units based on GIS data layers describing a variety of human impacts and threats.

The mean conservation value and vulnerability scores of the planning units in each Conservation Area were then used for the purposes of comparison and plotted on a graph of conservation value (y-axis) versus vulnerability (x-axis) and the graph divided into four quadrants. The upper right quadrant, labelled Tier 1, included 11 Conservation Areas with higher conservation value and higher vulnerability – areas that may be considered highest priority sites for conservation. The 43 Conservation Areas that fell within the upper left quadrant of higher conservation value but lower vulnerability were labelled as Tier 2 sites. Tier 2 sites may represent an excellent conservation opportunity to protect intact landscapes of high conservation value before they become irreversibly impacted by rapidly proliferating threats. Twenty-one Conservation Areas fell into the two quadrants representing lower conservation value with 4 areas of lower conservation value and higher vulnerability being labelled as Tier 3 sites, compared to 17 Tier 4 sites of lower value and lower vulnerability.

In order to take advantage of the finer scale at which conservation data was developed, each watershed planning unit was also plotted and compared based on conservation value and vulnerability scores. While the total area of the portfolio is 13,455,793 hectares (33,249,265 acres), the analyses shows that only 1,082,062 hectares (2,673,775 acres), or 4% of the ecoregion, falls into the Tier 1 category. Another 6,909,166 hectares (17,072,549 acres) of the CRM portfolio, or 25.8% of the ecoregion, falls into Tier 2. Only 0.3% or 91,204 portfolio hectares (225,365 acres) are classed as Tier 3, while

31.3% of the ecoregion (8,468,591 hectares/20,925,888 acres) are classed as Tier 4 watersheds.

Taking the mean scores of conservation value and vulnerability for each Conservation Areas tended to obscure some of the attributes of the constituent watershed planning units. However, assessing individual watershed planning units did add interpretive power to these results and provided much needed perspective for the scope of the conservation challenge in the CRM ecoregion. For example, the 11 Tier 1 Conservation Areas could be taken on as the initial CRM action sites. However, a more flexible interpretation might involve taking action at Tier 1 watersheds (4% of the ecoregion) wherever they fall within the portfolio. Likewise, as opportunity, leverage and feasibility are assessed, it may be more appropriate to take action at both Tier 1 and 2 watersheds (29.8% of the ecoregion) that fall within the Conservation Areas constituting the optimal, complete ecoregional solution.

Threats Assessment

The objectives of the preliminary threats assessment were to:

1) Identify general threats at each conservation area while keeping individual conservation targets in mind; and
2) Assess and describe patterns across multiple portfolio conservation areas.

This threats assessment was based on site-specific knowledge of the conservation targets at each of the conservation areas, both from Conservancy, Conservation Data Centre, and Natural Heritage Programs staff, with further review by local experts. Comprehensive assessment of all threats (i.e., stresses and sources of stress) at all conservation areas was beyond the scope of this project. Further work through site conservation planning is needed to update and refine threats to targets at the portfolio conservation areas.

The most severe and pervasive threats were identified as incompatible fire management and forestry practices, residential development, invasive species, parasites/pathogens, and recreation uses. These threats were identified as the key sources of stress that are interrupting fundamental ecological processes needed to maintain the conservation targets in the Canadian Rocky Mountains Ecoregion.

Conservation Blueprint

The primary product of this ecoregional assessment can be considered a conservation blueprint— a vision for conservation success—to guide public land managers, land and water conservation organizations, private landowners, and others in conserving natural diversity within this ecoregion. The goal is to conserve the entire portfolio of conservation areas, which will require a combination of strategies, including on-the-ground action at specific conservation areas and multiple-area strategies to abate pervasive threats to targets across the ecoregion.

It is certain that the initial prioritization of conservation areas presented in this plan requires further qualitative assessments based on conservation feasibility, opportunity and leverage. These assessments should be designed to yield a suite of action sites that can then serve as a focus for conservation partners in the immediate future. It is also important to note that some areas not currently within the conservation solution presented here may become more attractive possibilities for conservation in the future. Changes in land ownership and land use designations in particular can dramatically alter the landscape of conservation opportunity. However, the CRM assessment presented here will allow conservation practitioners to quickly put these emerging opportunities into the appropriate ecological context and to take actions that are scientifically defensible and result in the most biodiversity conserved.

D. INTRODUCTION

Background and Purpose

Responding to a growing consensus in the scientific community and to practitioners frustrated by the incremental progress being made to stem the tide of biodiversity loss, The Nature Conservancy (TNC) and the Nature Conservancy of Canada (NCC) have evolved a new approach to their work. Outlined in *Conservation by Design: A Framework got Mission Success* (TNC 1996), the new approach focuses on strategic planning for site-based conservation actions within the context of ecologically defined areas called *ecoregions*. From a conservation planning perspective, ecoregions are defined as: large areas of land and water that have similarities in faunal and floral composition due to large-scale, predictable patterns of solar radiation and moisture (Bailey 1998). These communities (1) share a large majority of their species, dynamics, and environmental conditions, and (2) function together effectively as a conservation unit at global and continental scales.

The Canadian Rocky Mountains ecoregion planning area boundary was cross-walked between the U.S. Forest Service ECOMAP (Bailey 1995; 1998a) and Ecoprovince/ecoregion delineations established by the Province of British Columbia (Demarchi 1996). The ultimate product of an ecoregional planning process is the *"portfolio of conservation sites," which are* those areas identified *as the most important for* the long-term survival of conservation targets over time, including the ecological processes and patterns of biological diversity that sustain these targets.

Conservation Goal for the Canadian Rocky Mountains (CRM) Ecoregion

The conservation goal for the Canadian Rocky Mountains ecoregion Conservation Plan is to:

> *Identify the suite of conservation sites and strategies that ensure the long-term survival of all viable native plant and animals species and natural communities in the ecoregion.*

However, at present, we lack the scientific understanding necessary to confidently state how much is enough. There is very little theory and no scientific consensus regarding how much ecological system or habitat area is necessary to maintain most species within an ecoregion. Therefore, in more realistic terms, the purpose of this assessment is to identify the areas of greatest importance and opportunity for conserving the biodiversity of the Canadian Rocky Mountains Ecoregion.

Planning Process And Results

This report documents the planning process and results of the portfolio design for the ecoregion. The main products of this ecoregional plan are:

(1) a portfolio of sites that collectively conserve biological diversity in the Canadian Rocky Mountains ecoregion; (2) thorough documentation of the planning process, portfolio design methods, and data management, so that future iterations can efficiently build upon past work; (3) an assessment of multi-site threats and priorities for conservation action; (4) a summary of the

lessons learned during the planning process and any innovative practices that came out of the exercise and; (5) identification of obvious portfolio design limitations and important data gaps that would improve the comprehensiveness and quality of the next iteration.

E. CANADIAN ROCKY MOUNTAINS OVERVIEW

Description of the Ecoregion [3]

The Canadian Rocky Mountains ecoregion extends over a large portion of the Rocky Mountains from southeastern British Columbia and southwestern Alberta to northern Idaho and northwestern Montana. Elevation ranges from 915 m to 3,954 m (3,000 ft to 12,972 ft), with Mt. Robson (BC) being the highest peak in the ecoregion. Geologically, this ecoregion is very complex, containing bedrock of sedimentary, igneous, and metamorphic origin; and characterized by steep glaciated over thrust mountains with sharp alpine ridges and cirques at higher elevations. Historic and current glaciation has sculpted the mountainous landscape filling many of the intermountain valleys with glaciofluvial deposits and moraines.

Climate in the ecoregion is heavily modified by elevation resulting in major influences from such factors as rain shadows and thermal inversions. The northern part of the ecoregion is characterized by a cooler, more boreal climate, while in the west there is a moderating maritime influence, and in the east, drier continental conditions prevail. Mean annual precipitation ranges from 500 to 800 mm (20 to 31 in.) in the valleys, to >1,000 mm (>39 in.) at higher elevations (Ricketts et al. 1999). The majority of precipitation falls as snow in the fall, winter, and spring months, while summers are generally dry. The natural disturbance regimes are predominantly fire, periodic flooding, and insects and disease outbreaks.

The dominant vegetation community is coniferous forest with structure largely dictated by elevation. Low- and mid-elevation conifer forests consist of Douglas-fir, western hemlock, western redcedar, western white pine, and western larch. Lodgepole pine stands are common where stand-replacing fires have occurred. Higher elevation forests are dominated by Engelmann spruce and subalpine fir. Important timberline species include limber pine and whitebark pine. At the highest elevations, alpine tundra dominated by sedges and dwarf shrubs are common. Lower elevations merge into the Montana Valley and Foothill Grasslands ecoregion, which is dominated by fescues, wheatgrasses, and oatgrasses. Valley rivers and streams are often lined with willows and cottonwoods.

This ecoregion is best recognized for its mountainous terrain and full complement of large mammals. It is one of the few places in North America where they still exist. Elk, Rocky Mountain bighorn sheep, mountain goats, mule deer, white-tailed deer, moose, and woodland caribou are among the large ungulate species. One of the most threatened groups is carnivores, and this ecoregion supports populations of the grizzly bear, gray wolf, wolverine, fisher and lynx. More common carnivores occurring in the ecoregion include black bear, cougar, coyote,

[3] Landscape descriptions were generously shared by the Conservation Biology Institute from its Pacific Northwest Conservation Assessment Report by Jim Strittholt. For more information refer to http://www.consbio.org/cbi/pacnw_assess/assess-main.htm

bobcat, and American marten. While populations for some of these species are stable, some are declining as a result of the cumulative impacts from roads and other human uses.

The ecoregion also supports both anadromous and freshwater fish species; including Chinook salmon, burbot, white sturgeon, rainbow trout (both native and introduced populations), brook trout (introduced), Dolly Varden, bull trout, mountain whitefish, mottled sculpin and Yellowstone cutthroat trout.

Ecoregional Context

South of the Canada/U.S. border the Canadian Rocky Mountains ecoregion is defined by Bailey et al.'s (1995; 1998) hierarchy of landscapes for North America as the regional-scale Northern Rocky Mountains Forest-Steppe-Coniferous Forest-Alpine Meadow *Ecoregion*, within the continent-scaled Dry *Domain* and the Temperate Steppe *Division*[4]. However, in Canada, the term "*Ecoregion*" in this context denotes a different classification level than that used by the U.S. Forest Service (USFS) and The Nature Conservancy. According to the BC Ecoregion Classification System, the term "*Ecoregion*" as defined by USFS/TNC (Bailey 1995; 1998) is roughly equivalent to the BC "*Ecoprovince*" level of classification. For the purposes of this document, the term *"Ecoregion"* will continue to be used to define the planning area.

The CRM is surrounded by the Middle Rockies and Columbia Plateau ecoregions to the south, the Okanagan to the west, the Central Interior and Boreal Plains to the north, and the Aspen Parklands, and Fescue-Mixed Grass Prairies to the east (See Map 1).

Ecoregional Subdivisions

Shining Mountains

In finding the appropriate ecological criteria for stratifying its assessment of the ecoregion, the planning team had the benefit of using the Shining Mountains mapping project. The British Columbia Ministry of Environment, Lands and Parks developed the Shining Mountains Project for the purpose of determining the distribution and extent of regional and zonal ecosystems that British Columbia shares with the various jurisdictions surrounding the province[5]. The Shining Mountains mapping and classification includes British Columbia and adjacent areas from 45° 45' North latitude to 61° North latitude, and from the Pacific coast east to the 110° West meridian. This area encompasses two provinces, parts of two territories, and all or part of 5 US states. Several government agencies cooperated in this project, including, Agriculture and Agri-Food Canada, the USDA Forest Service - Alaska Region, the US National Park Service - Alaska Region, the BC Ministry of Forests - Research Branch, the Montana Department of Fish, Wildlife and Parks, and the Yukon Department of Renewable Resources. In addition, habitat data used in the project was provided by several US agencies including the USDA National Forests, Idaho and Montana State Forests, and the Indian tribes in Montana, Idaho, and eastern Washington.

---

[4] See US Forest Service "Ecological Subregions of the Unites States: Section Descriptions" web page: http://www.fs.fed.us/land/pubs/ecoregions/ch45.html

[5] For more information on this project refer to the BC Ministry of Sustainable Resource Management, Terrestrial Information Branch webpage: http://srmwww.gov.bc.ca/rib/wis/bei/shine/

Sections and subsections

Although the Canadian Rocky Mountains Ecoregion is consistent in terms of broad climate, physical, and biological patterns, it is remarkably diverse when viewed at finer scales. Assessing the conservation needs of species and communities requires that we take into account these intra-regional ecological gradients. Accounting for the inherent variability of species and communities, and providing redundancy must be incorporated into the portfolio design process (Anderson et al. 1999; TNC 1999). The simplest way to achieve this was to stratify the ecoregion into sections and set conservation goals for each section. There are ten sections and 29 subsections in the Canadian Rocky Mountains ecoregion[6], listed below in Table 1. These sections and subsections are based on the hierarchical structure of the Province of British Columbia's Shining Mountains mapping and classification project (Demarchi 1996). This classification is concentrated at two levels: a regional ecosystem or the Ecoregion level, in order to place continental and regional ecosystems into perspective; and a zonal level in order to place the local ecosystems into a regional perspective. Note that the term "*Ecoregion*" in this context denotes a different classification level than that used by The Nature Conservancy and Nature Conservancy of Canada. The term "*Ecoregion*" as defined by TNC/NCC (Bailey 1995; 1998) is roughly equivalent to the BC "*Ecoprovince*" level of classification. The Province of BC's hierarchical classification levels are defined as follows:

Ecodomain - an area of broad climatic uniformity, defined at the global level; ***Ecodivision*** - an area of broad climatic and physiographic uniformity, defined at the continental level; ***Ecoprovince*** - an area with consistent climatic processes and relief defined at the sub-continental level; ***Ecoregion*** - an area with major physiographic and minor macroclimatic variation defined at the regional level; ***Ecosection*** - an area with minor physiographic and macroclimatic variation, defined at the sub-regional level.

Table 1. Sections and subsections in the Canadian Rocky Mountains ecoregion (Demarchi 1996).

Section Name	Subsection Name	Hectares (Acres)	% of CRM
Columbia Highlands	Bowron Valley	626,103 (1,547,099)	2.3
	Quesnel Highland	785,958 (1,942,102)	2.9
	Shuswap Highland	1,455,186 (3,595,765)	5.3
Northern Columbia Mountains	Cariboo Mountains	1,398,563 (3,455,849)	5.1
	Northern Kootenay Mountains	1,639,092 (4,050,197)	6.0
	Central Columbia Mountains	1,591,964 (3,933,742)	5.9
	Southern Columbia Mountains	1,761,112 (4,351,709)	6.5
Eastern Continental Ranges	Front Ranges	1,639,291 (4,050,689)	6.0
	Banff-Jasper Parkway	2,109,024 (5,211,397)	7.8
Northern Continental Divide	Porcupine Hills	296,617 (732,942)	1.0
	Border Ranges	1,155,675 (2,855,673)	4.2
	Crown Of The Continent	626,379 (1,547,783)	2.3
	Swan-Mission Ranges	803,280 (1,984,905)	3.0
	East Front Mountains	492,103 (1,215,987)	1.8
Selkirk – Bitterroot Foothills	Selkirk Foothills	1,313,545 (3,245,771)	4.8

[6] Equivalent to the Province of BCs Southern Interior Mountains Ecoprovince (Shining Mountains) (Demarchi 1996)

Table 1 cont'd:

Section Name	Subsection Name	Hectares (Acres)	% of CRM
Selkirk – Bitterroot Foothills	Coeur D'Alene Mountains	1,594,649 (3,940,377)	6.0
	Clearwater Mountains	1,235,921 (3,053,960)	4.6
Western Continental Ranges	Northern Park Ranges	730,708 (1,805,579)	2.7
	Central Park Ranges	794,646 (1,963,569)	2.9
	Southern Park Ranges	1,197,658 (2,959,413)	4.4
Southern Rocky Mountain Trench	Upper Fraser Trench	248690 (614512)	1.0
	Big Bend Trench	117,718 (290,882)	0.4
	East Kootenay Trench	541,708 (1,338,561)	2.0
Kootenai Mountains	Clark Fork Valley	733,612 (1,812,756)	2.7
Montana Valley and Foothills	Clark Fork-Flathead	556,133 (1,374,205)	2.0
	Flathead Basin	378,580 (935,471)	1.4
	Clark Fork Basin	369,031 (911,876)	1.4
Purcell Transitional Ranges	Eastern Purcell Mountains	628,918 (1,554,056)	2.3
	McGillivray Ranges	262,554 (648,770)	0.9
Total		**27,084,419 (66,925,598)**	**100**

Section descriptions for the CRM[7]

The **Columbia Highlands** section is a rolling highland area that rises from highlands and isolated ridges on the west and south to culminate in higher mountains along the northeastern margin. Moist Pacific air rising over these highlands brings intense precipitation to this section. This section contains 3 subsections: **Bowron Valley, Quesnel Highland,** and **Shuswap Highland**.

The **Northern Columbia Mountains** section is a rugged, often ice-capped mountainous area that rises abruptly from the Southern Rocky Mountain Trench to the east. The mountains, composed of a series of ranges and alternating trenches, contain many peaks higher than 3000 m (9,843 ft). This block of mountains intercepts eastward flowing precipitation, making these the wettest mountains in the interior of BC. This section contains four subsections: **Cariboo Mountains, Central Columbia Mountains, Northern Kootenay Mountains,** and **Southern Columbia Mountains**.

The **Eastern Continental Ranges** section covers the Rocky Mountains of Alberta incorporating the eastern flanks of the Continental Ranges. The major peaks on the continental divide cluster around the Columbia Icefield, the largest ice field in the Rocky Mountains. Southward, the

[7] See "Southern Interior Mountains Ecoprovince Descriptions" on BC MSRM, Wildlife and Wildlife Habitat Inventory web page: http://srmwww.gov.bc.ca/rib/wis/eco/bcecode3.html; "Narrative Descriptions of Terrestrial Ecozones and Ecoregions of Canada" on Environment Canada web page: http://www.ec.gc.ca/soer-ree/English/Framework/Nardesc/; "Ecological Subregions of the United States, July 1994" on US Forest Service web page: http://www.fs.fed.us/land/pubs/ecoregions/toc.html

mountains are generally lower. This section contains two subsections: **Front Ranges** and **Banff-Jasper Parkway**.

The **Northern Continental Divide** section is an area of wide valleys and rounded mountains that is interspersed with higher ridges of less erodable bedrock. This high elevation, mountainous ecoregion spans the Alberta–British Columbia boundary and into Montana. Much of the ecoregion lies at 1200–2000 m (3937 – 6562 ft) elevation. Winter temperatures are moderated by frequent Chinooks, especially on the eastern slopes. Cold Arctic air may influence this area from both the Southern Rocky Mountain Trench to the west and the Interior Plains to the east. This section contains five subsections: **Border Ranges, Crown of the Continent, Porcupine Hills, Swan-Mission Ranges,** and **East Front Mountains**.

The **Selkirk - Bitterroot Foothills** section is an area of rounded mountains and wide valleys. This area lies between the warm moist highlands to the west and wet cool mountains to the east. It is a complex of subalpine and moist montane vegetation zones. This section contains three subsections: **Selkirk Foothills, Coeur D'Alene Mountains,** and **Clearwater Mountains**.

The **Western Continental Ranges** section has high, rugged mountains, usually with deep narrow valleys, where elevations rise to over 3000 m (9,843 ft) along the continental divide. This section is predominantly composed of subalpine and alpine ecosystems and a few major valley systems covered by montane forests. It includes the western portion of the Columbia Icefield as well as the highest mountain in the CRM, Mount Robson, at just over 3900 m (12,972 ft). The climate is cool and moderately dry. It contains three subsections: **Central Park Ranges, Northern Park Ranges,** and **Southern Park Ranges**.

The **Southern Rocky Mountain Trench** section is a long, wide, flat-bottomed valley that dissects the CRM. Cold Arctic air from the sub-boreal part of BC is able to move down the Trench easily, while in the summer months the southern part of the Trench is the driest part of the ecoregion. This section is a long, narrow complex of ecosystems that occupy the valley of this major geological fault that runs between the Columbia Mountains and the Rocky Mountains. The headwaters of a number of large rivers lie in the Trench. Climate tends to become warmer and drier moving from north to south. It contains three subsections: **Big Bend Trench, East Kootenay Trench,** and **Upper Fraser Trench.**

The **Kootenai Mountains** section contains complex and high, steep mountains with sharp alpine ridges and cirques at higher elevations, glacial and fluvial valleys, lacustrine basins, and alluvial terraces and floodplains. Steep slopes, sharp crests, and narrow valleys are characteristic. Elevation ranges from 763 to 1,983m (2,500 to 6,500 ft) in valleys and 1,220 to 3,050 m (4,000 to 10,000 ft) in the mountains. Most of the precipitation in the fall, winter, and spring is snow and growing season conditions are dry. This section contains one subsection: **Clark Fork Valley**.

The **Montana Valley and Foothills** section contains high mountains, gravel-capped benches, and intermontane valleys bordered by terraces and fans. Plains and rolling hills surround isolated mountain ranges. Most of the precipitation occurs in the spring and fall, winter precipitation is snow and summers are dry. Temperature extremes are common throughout the winter months and strong winds are common throughout the year. This section contains three subsections: **Clark Fork-Flathead, Flathead Basin,** and **Clark Fork Basin.**

The **Purcell Transitional Ranges** section is an area of subdued ridges located in the southeast. It is a mountainous area with high valleys located leeward on the Purcell Ranges and is within a distinct rain shadow. It has a relatively dry climate. This section contains two subsections: **McGillivray Range** and **Eastern Purcell Mountains**.

Ecological Drainage Units

The minimum standard we apply for aquatic ecoregional planning is to represent freshwater diversity at multiple levels of biological organization across multiple spatial scales. For practical reasons, most ecoregions will not have biologically defined aquatic communities and aquatic ecosystems as targets. Instead we rely on surrogates developed using a multi-scale, landscape-based classification framework for freshwater ecosystems.

The first step in aquatic ecoregional planning is to develop Ecological Drainage Units (EDUs) by gathering information about the variety and distribution of aquatic ecosystem types and general patterns of species distribution. EDUs are groups of watersheds (in the US, 8-digit catalogue units as defined by USGS) that share a common zoogeographic history and physiographic and climatic characteristics. We expect that each EDU will contain sets of aquatic system types with similar patterns of drainage density, gradient, hydrologic characteristics, and connectivity. Identifying and describing EDUs allows us to stratify the ecoregion into smaller units so we can better evaluate patterns of aquatic community diversity. Additionally, EDUs provide a means to stratify the ecoregion to set conservation goals.

EDUs in the Canadian Rocky Mountains ecoregion were defined based on two main sources of information: (1) *zoogeography* from Hocutt and Wiley (1986), World Wildlife Fund's freshwater ecoregions (Abell et al. 2000), the US Forest Service (Maxwell et al. 1995), and ABI databases (L. Master, pers. com.); and, (2) *ecoregional/ecozone attributes* as defined by the US Forest Service/EPA (Pater et al.1998) and Environment Canada. Additional data consulted include: US National Marine Fisheries Service (ESU boundaries for salmonids), Haas (1998), and McPhail and Carveth (1994). Map 5 shows EDU's for the CRM, which are further described in Table 2.

Table 2. EDUs in the Canadian Rocky Mountains ecoregion.

EDU	Physiography	Climate	Zoogeography (from Maxwell et al., 1995)	Stream Types
Upper Fraser	High glaciated mountains (some > 3000m (>9,843 ft) a.s.l. composed of a series of ranges and alternating trenches. Active glaciers present.	Highly variable with elevation; moderate precipitation (700–1100 mm/yr (28-43 in./yr))	Upper Fraser	High gradient, glacially fed streams underlain predominantly by glacial features, folded sedimentary and volcanic strata and massive metamorphic rocks, with intrusions of igneous and volcanic rocks.

Table 2. cont'd:

EDU	Physiography	Climate	Zoogeography (from Maxwell et al., 1995)	Stream Types
Middle Fraser – Nechako	Plateau and interior foothills east of the Coastal Mountains; broad, rolling plateau generally lies 1150–1800 m (3773-5906 ft) a.s.l.	250–600 mm/yr (10-24 in./yr); east 600–800 mm (24-32 in./yr)	Upper Fraser	Surface deposits include glacial till with well-developed drumlinoid features, pitted terraces, simple and compound eskers, and areas of glacial lake (lacustrine) deposits.
Thompson	Predominantly rolling plateaus and major valleys with higher glaciated Columbia Mountains in east.	Warm and dry in west; low to moderate precipitation 250-1016 mm/yr (10-40 in./yr) varies with elevation.	Upper Fraser	Large river system with many lakes draining volcanic rocks and glacial deposits in west; headwaters are in a mountainous glaciated landscape of complex geology.
Columbia – Kootenay Headwaters	Mid- to high elevation glaciated mountains, composed of a series of ranges and alternating trenches; active glaciers in eastern portion.	Varies greatly with elevation; generally moderate precipitation (~762 mm/yr (~30 in./yr))	Upper Columbia	Glacially influenced high gradient streams with large sediment load; underlain by limestone and quartzites; glacial lakes predominate
Great Lakes – Columbia Mountains	Mid- to high elevation glaciated mountains, composed of a series of ranges and alternating trenches.	Varies greatly with elevation; generally moderate precipitation (~762 mm/yr (~30 in/yr))	Upper Columbia	Confluence of three large river systems (Columbia, Kootenay, Pend Oreille) and associated large glacially formed oligotrophic lakes; lower energy systems than in headwaters.
Clark Fork-Flathead	High-elevation glaciated mountains with glacial and lacustrine basins.	Cool temperate with some maritime influences; highly variable precipitation (406-2,540mm/yr (16 – 100 in./yr))	Upper Columbia	Small, medium, and large (e.g., Clark Fork) river systems in predominantly metasedimentary geology; most systems have relatively stable hydrologic regimes due to groundwater and timing of snowmelt; many lakes, including Flathead
Clearwater River	Glaciated, mid- to high elevation mountains.	High precipitation (~762 –1272 mm/yr (~30-50 in./yr), mostly as snow; dry summers	Lower Snake	Flashy small to medium river systems; predominantly granitic substrate with some sedimentary and carbonate material

Table 2. cont'd:

EDU	Physiography	Climate	Zoogeography (from Maxwell et al., 1995)	Stream Types
Smoky-Upper Athabasca	High elevation glaciated mountains; lower elevation valleys to east.	Varies greatly with elevation; generally moderate precipitation (~762 mm/yr (~30 in./yr))	Upper Mackenzie /Arctic	Glacial influence
Upper North Sask.	High elevation glaciated mountains; lower elevation valleys to east.	Varies greatly with elevation; generally moderate precipitation (~762 mm/yr (~30 in/yr))	Upper Saskatchewan/ Hudson Bay	Glacial influence
Upper South Sask.-Red Deer-Bow	High elevation glaciated mountains; lower elevation valleys to east	Varies greatly with elevation; generally moderate precipitation (~762 mm/yr (~30 in/yr))	Upper Saskatchewan/ Hudson Bay	Glacial influence
Milk-Marias-Sun	High elevation glaciated mountains (~1676-2591 m (~5500-8500ft.))	Cold continental; highly variable precipitation (~381-2,540mm/yr (~15-100 in/yr)); dry summers	Upper Missouri	Small headwater systems and glacial lakes in complex geology; predominantly snowmelt driven

Anthropogenic Influence

Although this ecoregion does not contain many urban areas, human activities are continually eroding the region's ecological integrity. Modern human use has impacted many areas - especially at lower elevations. Incompatible forest management, altered fire regime, road building, and mining have had the most widespread ecological impacts. While the number of protected areas is higher here than in many other ecoregions, most are centred on the higher elevations where species richness is low. A number of east-west highway corridors (Highway 2, Highway 3, and I-90) fragment regional habitat connectivity for wide-ranging species, especially large carnivores. Many of the intermountain valleys have either already been degraded or are being degraded by new construction, mines, and incompatible timber harvesting. As an example, the Clark Fork River was recently given most endangered river status by American Rivers largely due to mining activity. Dams, water diversion, and release of exotic species (e.g., stocking of fish to pristine alpine lakes) negatively impact aquatic species and are conservation issues in the ecoregion.

Land Ownership and Management

The Canadian Rocky Mountains Ecoregion covers approximately 27.1 million hectares (66.9 million acres) and straddles three states and two provinces. Just over half of the planning area falls in British Columbia while only 2.5% of the ecoregion is within the borders of Washington State. Table 3 contains the total hectares/acres and percentage of land distribution by state and province in the ecoregion.

Table 3. Land area in the Canadian Rocky Mountains Ecoregion by state and province

State or Province	Hectares	Acres	Percent
British Columbia	13,797,610	34,094,496	51.0
Montana	4,854,188	11,994,911	17.9
Alberta	4,672,052	11,544,845	17.3
Idaho	3,056,597	7,552,985	11.3
Washington	675,030	1,668,029	2.5
TOTAL	**27,055,478**	**66,855,267**	**100.0**

Most of the ecoregion is public land managed for various purposes by provincial, federal and state agencies (Table 4). By far, the largest land manager in the ecoregion is the Province of British Columbia, which controls 46.4% of the land base in the form of multiple use Crown Lands, Timber Supply Areas and Provincial Parks. The second largest land manager is the U.S. Forest Service, which manages 16.6% of the ecoregion, followed by the Province of Alberta with 9.6% and Parks Canada with 8.4% of the ecoregion's land area under their jurisdiction. Only 13.1% of the ecoregion is privately held. Aside from a few mining claims in the mountains, private land occurs in the valley bottoms containing the best soils and access to water.

Table 4. Major Landowners within the Canadian Rocky Mountains Ecoregion.

Major Owner	% of ecoregion owned
Province of BC	46.4%
USDA Forest Service	16.6%
Private	13.1%
Province of Alberta	9.6%
Parks Canada	8.4%
USDI Bureau of Indian Affairs Trust or Tribal Land	1.3%
State of Idaho	1.1%
Water	0.7%
State of Montana	0.6%
USDI Bureau of Land Management	0.2%
State of Washington	0.2%
Mixed Ownership	0.1%
USDI Fish and Wildlife Service	0.1%
First Nations Reserve	0.1%
USDI Bureau of Reclamation	0.1%
Non-Governmental Organizations	0.1%

Socio-Economic History and Trends

First Inhabitants

Humans have lived in the Canadian Rocky Mountains ecoregion since the last great Ice Age. Approximately 15,000 years ago as the Continental and Cordilleran ice caps retreated, native communities living in the south began to slowly move north, along the Rocky Mountain Front and into the interior valleys and plateaus. During the Late Prehistoric Period, which began around 1 A.D. and lasted until European contact, indigenous peoples continued a slow migration north to where they live today. First Nations in the area include the Cree, Slavey, Beaver, Sarcee, Stoney, Blood, Blackfoot, Kutenai, Shuswap, Flathead, Kootenai, Coeur d'Alene, Nez Perce, Peigan, Flathead, Salish, Thompson, Okanogan and Crow. Many of these Nations differ significantly in their history, culture, and language - reflecting the diverse environments in which they live. Today, many Native Americans are involved in complex and politically charged negotiations with all levels of government. These negotiations include not only financial compensation for past wrongs, but also land claim negotiations and rights to both renewable and non-renewable resources.

European Contact

The arrival of explorers from the east coast in the early 1700's brought horses, manufactured goods and small pox to the ecoregion and resulted in many changes in both the territories and cultures of the tribes. The eventual settlement of the west by Europeans led to further change. As the fur trade advanced westward through the 1700's, outposts began to spring up throughout the region. Where once only trappers and buffalo hunters ventured, a new influx of settlers and farmers followed. Much of the exploration of the region by non-native Americans didn't take place till the early 1800's and was sparked by increased competition for resources. Searching for new fur-trading territory in the early 1800's David Thompson of the North West Company surveyed the Columbia River, the Kootenay River and other parts of British Columbia, Montana, Idaho and Washington (Rasker and Alexander 1997).

The Early Years of Settlement

Between 1850 and 1875, prospectors from the depleted gold fields of California and the south descended on the region in search of instant riches; responding to reports of large gold finds in the Wild Horse and Barkerville areas of southeast British Columbia. Along with this influx of people came dramatic impacts on timber (used for fuel, building supplies and mining operations), and fish and game (utilized to support the new population). By 1875 the easily gathered gold was gone and many of the newcomers moved on. Placer mining for gold significantly changed the riparian and aquatic zones of some watersheds.

In the 1880's, the building of two transcontinental railways through the mountains permanently broke the economic isolation of the region. The Northern Pacific Railway crossed the continent just south of the U.S.-Canada border in 1883, and the Canadian Pacific Railway line was built through the mountains of Canada in 1885 The industrialization of North America and the construction of railways and telegraph lines created an enormous demand for metals throughout the region and beyond. This demand led to increased prospecting throughout the region. In subsequent years, important mineral deposits including lead, zinc, silver and copper were discovered and developed - as was coal mining toward the turn of the century. Mining continues to make a significant contribution to the regional economy.

After the turn of the century, the economy of the region began to diversify beyond fur trading and mining. The timber industry had developed in response to an increasing demand for timber for mining operations, railway and canal construction, and construction of new towns. Concurrently, the prairies to the east were experiencing an enormous housing boom as new cities were established and populated by new immigrants. By 1920, much of the easily accessible valley bottom timber had been extracted and lands once forested were being converted for agricultural purposes. The timber industry also continues to be a significant driver in the regional economy.

Agricultural production began in earnest around the turn of the 20th century. This included both crop production (including fruit) and ranching. The first wave of agricultural expansion was to feed railway workers and the miners coming into the region. In turn, many of these new workers settled farms in the region. In the early years, the settlement and agricultural activity were closely related and helped to form the basis of today's settlement patterns. Vegetable, fruit, dairy and grain farming developed to meet local needs, but the main agricultural activity was cattle ranching. This industry served not only local needs, but also an increasing demand from the east. Cattle ranching continues to be widespread in the ecoregion.

Mining, timber extraction, and agriculture continued to expand throughout the 20th century. From humble beginnings grew large, complex and increasingly efficient industries. The construction booms during and following World War I and World War II, dramatically increased demand for products in all three sectors. Technological advances also made the production and distribution of these products easier. Oil and gas exploration also became increasingly important in some parts of the region during this period. Tourism, although started in the late 1890's, began to flourish in the 20th century and now accounts for a significant portion of the regional economy (Rasker and Alexander 1997).

Population and Economic Growth

The region and adjacent regions have experienced rapid population growth and drastic changes in land use over the last 50 years. Traditional industries and occupations throughout the region now co-exist with non-traditional activities in an economy based increasingly on service and knowledge. Much of the recent population and economic growth has been stimulated by business owners, retirees and entrepreneurs who have decided that living in the Rocky Mountains is important to their quality of life. However, the current economy, although increasingly diverse, is still dependent on traditional resource extraction industries and tourism. In the last three decades, the development of hydroelectric power projects has also had a major impact on both the regional economic outlook and the landscape. Where other regions have developed manufacturing, high-tech and secondary/tertiary industries, limitations based on geography and technology have impacted the speed of this change within the ecoregion. The tourism sector, including skiing, hiking, hunting, fishing, water sports, and biking, has shown the most substantial growth resulting in increased commercial/recreational developments and associated vacation home/retirement communities. As an example, the economic impact of visitor expenditures to Alberta's Rocky Mountain National Parks (Banff, Jasper, Waterton) was estimated at $954 million in 1998 (Rasker and Alexander 1997).

Biodiversity Status

For the purpose of this planning framework, "biodiversity" is defined as the variety of living organisms, the ecological complexes in which they occur, and the ways in which they interact with each other and the physical environment (Redford and Richter 1999). This definition characterizes biodiversity by its three primary components: composition, structure, and function (Groves et al. 2002). At least 62 plants, animals and plant communities are known to be endemic to the CRM, meaning they are not known from anywhere else in the world. Endemic species include invertebrates such as the Rocky Mountain Capshell (*Acroluxus coloradensis*) and Longmouth Pondsnail (*Stagnicola elrodiana*), mammals such as the Selkirk Least Chipmunk (*Tamias minimus selkirki*) and Creston Northern Pocket Gopher (*Thomomys talpoides segregatus*), plants such as the Lake Louise Arnica (*Arnica louiseana*), Case's Corydalis (*Corydalis caseana var. hastata*), Woolly Fleabane (*Erigeron lanatus*) and the Alpine Glacier Poppy (*Papaver pygmaeum*), and rare plant communities such as the Hybrid White Spruce/Western Skunk Cabbage Forest (*Picea (engelmannii X glauca, engelmannii)/Lysichiton americanum forest*) and the Black Cottonwood/Red-osier Dogwood/Nootka Rose community (*Populus balsamifera ssp. trichocarpa/Cornus stolonifera/Rosa nutkana community*). There are 56 known globally imperilled (G1-G2) species - e.g., Meltwater Lednian Stonefly (*Lednia tumana*), Flathead Pondsnail (*Stagnicola elrodi*), the Spacious Monkeyflower (*Mimulus ampliatus*), Clearwater Phlox (*Phlox idahonis*), and the Whitebark Pine/Pinegrass Woodland community (*Pinus albicaulis/Calamagrostis rubescens woodland community*). There are 6 species federally listed as threatened or endangered (*U.S. Endangered Species Act* and the *Committee On the Status of Endangered Wildlife In Canada (COSEWIC)*), e.g., Bald eagle (*Haliaeetus leucocephalus*) - Grey Wolf (*Canis lupus*), and Woodland Caribou (*Rangifer tarandus caribou*), the Southern Maidenhair-fern (*Adiantum capillus-veneris*), the Mexican Mosquito-fern (*Azolla mexicana*) and the Phantom Orchid (*Cephalanthera austiniae*). Another 7 are of special concern due to their vulnerable, declining, endemic, and/or disjunct status- e.g., the Ferruginous Hawk (*Buteo regalis*).

This ecoregion is recognized for its full complement of large mammals. Elk, mountain sheep, mountain goats, black-tailed deer, white-tailed deer, moose, and woodland caribou are among the large ungulate species. One of the most threatened groups is carnivores, and this ecoregion supports populations of grizzly bears, gray wolves, wolverines, fishers and lynx. More common carnivores present in the ecoregion include the black bear, cougar, coyote, bobcat, and marten. While populations for some of these species are stable, some are declining as a result of the cumulative impacts from roads, mines, and other human uses.

The CRM also contains significant freshwater biodiversity values. This ecoregion includes the headwaters of many of the major rivers in North America (including the Fraser, Saskatchewan, Missouri, and Columbia) and many large natural lakes (Kinbasket, Quesnel, Arrows, and Flathead). The ecoregion contains populations of white sturgeon (the largest freshwater fish in North America) and salmonids, including anadromous salmon and some of the last remaining strongholds for westslope cutthroat trout and bull trout, as well as a number of endemic species, including burbot. Unlike many other regions in North America, there still remains an opportunity to protect many intact systems within the CRM.

F. ECOREGIONAL PLANNING PROCESS

Background

The Nature Conservancy and the Nature Conservancy of Canada carried out this assessment guided by the methodology outlined in *Designing a Geography of Hope: A Practitioner's Handbook to Ecoregional Conservation Planning* (TNC 2000). Participants included staff from The Nature Conservancy, the Nature Conservancy of Canada, Natural Heritage Programs in Montana, Idaho, Washington, and Alberta, the British Columbia Conservation Data Centre, and the Washington Department of Fish and Wildlife, with input and assistance from many other individuals and agencies (see Acknowledgements and Appendix 10.0). This ecoregional planning process involved the compilation and analysis of the most up-to-date biological and physical data on the location and quality of conservation targets (e.g., species, communities, and ecological systems) and cutting edge research on wide-ranging carnivore modeling.

Ecoregional Planning Steps

Ecoregional planning is an iterative process built around five key steps:

1. Select conservation targets (e.g., species, communities, and ecological systems) to be the focus of conservation efforts within the ecoregion.

2. Set conservation goals in terms of number and distribution of the targets to be captured in the portfolio. These goals were primarily a device for assembling an efficient conservation portfolio, and should not be interpreted as guaranteeing the necessary and sufficient conditions for long-term survival of species, plant communities, or ecological systems.

3. Assess viability of individual target occurrences to determine which sites currently support viable target occurrences.

4. Identify a portfolio of conservation areas that effectively meets conservation goals.

5. Identify preliminary threats to targets at conservation areas and identify action steps to conserve the portfolio.

This type of rigorous analysis employs thousands of pieces of detailed information. It requires location-specific information for conservation targets as well as the past, current, and potential future status of lands where they occur. The team used the best available information for this assessment. However, given the quantity and quality of information involved—and the reality of ecological change—our knowledge will remain incomplete. We therefore approach this assessment with the intention of clarifying and filling information gaps over time, and to periodically revisit our analysis with new information that becomes available.

G. DATA SOURCES AND INFORMATION MANAGEMENT

Information Management

Data management was co-handled by the Nature Conservancy of Canada's B.C. Region and an independent contractor and supported by The Nature Conservancy's Western Resources Office, the Freshwater Initiative, and the Montana Natural Heritage Program. Data were largely managed using Microsoft Access, Excel and ESRI Geographic Information System (GIS) software products such as ArcView 3.2 and Arc/Info.

Conservation partners and outside scientific experts contributed to the data collection and management process by providing input on conservation targets, goal setting, and formative review of the draft portfolio. Botany, zoology and ecology sub-teams were formed early in the planning process in order to efficiently identify conservation targets for the ecoregion. See Table 5 for a list of sub-teams and members.

Data Sources

Numerous data layers were obtained from a variety of sources for the project. Examples of basic data included transportation, hydrography, digital elevation models (DEMs), ecoregional and political boundaries, land ownership, and geology. Biodiversity information layers included, but were not limited to, conservation target locations, vegetation coverage, and habitat models. Threat layers included, but were not limited to, city growth projections, locations of mines, dams and Superfund sites, land protection status, and fire condition.

Data for terrestrial and aquatic targets were made available from Natural Heritage Programs and Conservation Data Centers in Montana, Idaho, Washington, Alberta, and British Columbia. In order to fill in data gaps, experts were consulted throughout the planning process via both workshops and one-on-one interviews (see below). Additionally, habitat models for each of the plan's wide-ranging carnivore targets were created based on habitat values and resource selection functions (RSFs) derived from satellite imagery.

Information for terrestrial ecosystems was derived from the Shining Mountains mapping project, a transboundary mapping project that provided a "wall to wall" coverage for vegetation and sectional classifications (Demarchi 1996). The British Columbia Ministry of Environment, Lands and Parks originally developed the Shining Mountains Project for the purpose of determining the distribution and extent of regional and zonal ecosystems that British Columbia shares with the various jurisdictions surrounding the province. The ecological systems map was also refined at the experts workshops.

An aquatic ecosystem classification was created for the CRM by TNC's Freshwater Initiative using GIS data layers made available by a variety of federal, state and provincial agencies including:

- 1997 US Federal study of the Interior Columbia Basin Ecosystem (e.g., Digital Elevation Model, hydrography, geology, fisheries, existing conservation priorities)

- US Geological Survey (hydrography, flow gauges)
- USEPA (hydrography, water quality)
- University of Montana (fisheries)
- Departments of Environmental Quality in US (water quality)
- British Columbia Ministry of Sustainable Resource Management (hydrography, hydrologic data, fisheries data)
- University of British Columbia (fisheries data)
- Environment Canada (ecoregionalization)
- Pacific Rivers Council (existing conservation priorities)

The aquatic classification was also informed by over 30 experts that were interviewed and asked to review and comment on the targets, supply appropriate data sets for use in planning, and aid in identification of critical areas for conservation.

Table 5. Technical groups and participate lists for the CRM

Technical Groups	Targets	Participants
Botany	Vascular and non-vascular plants	Bonnie Heidel, Steve Shelly, George Douglas (BC Conservation Data Centre), Sharon Hartwell (BC Conservation Data Centre), Joyce Gould (Alberta Natural Heritage Information Centre), Michael Mancuso (Idaho Conservation Data Center), Peter Lesica (private consultant), Ksenija Vujnovic (Alberta Natural Heritage Information Centre)
Zoology	Rare terrestrial animals	Paul Hendricks (Montana Natural Heritage Program), Syd Cannings (BC Conservation Data Centre), Dan Casey (American Bird Conservancy, Partners In Flight), Drajs Vujnovic (Alberta Natural Heritage Information Centre), Leah Ramsay (BC Conservation Data Centre), Chuck Harris
Aquatic	Rare aquatic animals; Aquatic macrohabitats	Steve Carlson (Montana Department of Fish, Wildlife and Parks), Marc Porter (University of British Columbia; now at the Department of Fisheries and Oceans, Canada), Linda Ulmer (US Forest Service), Bruce Reimer (US Forest Service), Dale Becker, Tony Cheong (BC Fisheries), Jack Stanford (University of Montana), Chris Frissell (University of Montana; now with Pacific Rivers Council), Gordon Haas (BC Fisheries; now at University of Alaska), Dave Tredger (BC Fisheries), Dan Mayhood (Freshwater Research Ltd)

Table 5. cont'd:

Technical Groups	Targets	Participants
Aquatic (cont'd)	Rare aquatic animals; Aquatic macrohabitats	Nathan Hitt (University of Montana), Marcy Mahr (Yellowstone To Yukon Initiative)
Plant Ecology	Rare plant communities; Ecological systems	Steve Cooper (Montana Natural Heritage Program), Peter Achuff (Parks Canada), Samantha Flynn (BC Conservation Data Centre), Lorna Allan (Alberta Natural Heritage Information Centre), Pete Lesica (private consultant), Mable Jankovsky-Jones (Idaho Conservation Data Center), Rex Crawford (Washington Natural Heritage Program)

Experts Workshops

The planning team held a series of experts workshops in all of the jurisdictions within the CRM. The goals of the workshops were to:

1. Review and refine the preliminary lists of conservation targets
2. Identify and gather information for areas that contain populations/occurrences of the conservation targets, and obtain information about viability of the targets and threats to the conservation areas or targets
3. Obtain expert opinion for use in developing conservation goals for the targeted species, communities, and ecological systems
4. Identify gaps and inventory/research needs for conservation targets and geographical areas.

An experts workshop on terrestrial vegetation was hosted by the BC Conservation Data Center in Victoria, BC on February 27, 2001. Participants consisted of TNC and NCC ecoregional planning staff and BC and Alberta terrestrial ecosystems scientists. Over a hundred locations were nominated during the workshop. Each location was attributed with at least one ecological system or rare plant community target. When possible, information was supplied that would help determine the viability of the ecological system.

Subsequently, NCC staff hosted many formative reviews following the first draft portfolio, gathering new locations of places important for conservation and receiving valuable feedback regarding preliminary mapping products. Workshops were held in Canmore Alberta, Victoria BC, the Heather Mountain Lodge in Glacier National Park BC, Waterton Lakes National Park, Glacier National Park (Canada), Radium Hot Springs BC, Cranbrook BC, Nelson BC, and Spokane WA. In addition, workshops were held in Coeur d'Alene, Idaho and a number of experts were interviewed on a one-on-one basis in Montana. In total, we consulted with over 100 experts during the course of this planning project. . See Appendix 10.0 for a list of workshop participants and experts consulted.

H. PROTECTED AREAS ASSESSMENT[8]

The CRM has one of the most extensive protected area systems of any conterminous North American ecoregion. A combination of rugged topography and public ownership is largely responsible for the high percentage. Several large wilderness areas account for most of the total, but there is an extensive system of smaller public and private reserves throughout the ecoregion.

Overall, protected areas occupy approximately 23.8% of the ecoregion. A detailed study of protected status carried out for this ecoregional plan identified 358 protected areas and reveals that approximately 2.2% of the ecoregion is managed strictly for biodiversity values (equivalent to GAP Status I), and 21.0% is moderately protected (equivalent to GAP Status II). Finally, 0.6% of the ecoregion falls into parks or protected areas that are, in fact, managed for high impact activities (equivalent to GAP Status III). For Gap Status definitions, see Table 6.

Major protected areas include the Waterton Lakes - Glacier National Park, which forms the center for the Crown of the Continent Biosphere Reserve. Glacier and Waterton Lakes were both placed on the World Heritage List in 1995. A number of other national parks on the Canadian side of the ecoregion include Yoho, Banff, Jasper, and Revelstoke. Large provincial parks include Wells Gray, Bowron Lake, and Mt. Robson. Outside of Glacier National Park, the U.S. side has two very large Wilderness Area complexes. Most notable of these is the Bob Marshall in Montana. Other wilderness areas include the Selway-Bitterroot Wilderness Area in western Montana and east-central Idaho, the Salmo/Priest Wilderness in Washington, and a portion of the Frank Church River of No Return Wilderness in Idaho.

Table 6. Land Status Categories of the GAP Analysis Program.

GAP Category	Definition
Category 1	An area having permanent protection from conversion of natural land cover and a mandated management plan in operation to maintain a natural state within which disturbance events (of natural type, frequency, intensity, and legacy) are allowed to proceed without interference or are mimicked through management.
Category 2	An area having permanent protection from conversion of natural land cover and a mandated management plan in operation to maintain a primarily natural state, but which may receive uses or management practices that degrade the quality of existing natural communities, including suppression of natural disturbance.
Category 3	An area having permanent protection from conversion of natural land cover for the majority of the area, but subject to extractive uses of either a broad, low-intensity type (e.g., logging) or localized intense type (e.g., mining). It also confers protection to federally listed endangered and threatened species throughout the area.

[8] Kimball, S. 2000. Methods for Existing Conservation Areas Assessment in the Canadian Rocky Mountain Ecoregion. Prepared for The Nature Conservancy.

Table 6 cont'd:

GAP Category	Definition
Category 4	There are no known public or private institutional mandates or legally recognized easements or deed restrictions held by the managing entity to prevent conversion of natural habitat types to anthropogenic habitat types. The area generally allows conversion to unnatural land cover throughout.

I. CONSERVATION TARGETS

Conservation by Design identifies all viable native species and communities as the elements to be represented in an ecoregional portfolio of sites (TNC 1996; 1997). This represents the coarse filter/fine filter approach to biodiversity conservation developed by The Nature Conservancy (Noss 1987) and refined through experience and planning (see Geography of Hope, TNC 2000). The coarse filter is a community-level conservation strategy whereby natural community types are used as conservation targets to represent 85-90% of species and many ecological processes, without having to inventory and manage each species individually. Given the status of our knowledge, however, this ecosystem approach cannot be counted on to maintain and protect all biodiversity. Some species, especially the rarest, will fall through the screen of the coarse filter. Therefore, a fine filter for rare species conservation planning is needed as a complement to the coarse filter approach (Noss and Cooperrider, 1994). See Table 7 for summary of conservation targets.

Table 7. Target Summary for the Canadian Rocky Mountains Ecoregional Assessment.

Conservation Targets	**#**	**Data Source**	**Goal Description**
FINE FILTER TARGETS			
Plants	**94**		
Non-Vascular Lichens & Mosses	*28*	EOR data from WA, ID, MT, BC and AB Heritage & Conservation Data Centers	Goals expressed as # of occurrences, stratified by subsection and vary depending on rarity, spatial pattern and distribution of target.
Vascular	*66*		
Terrestrial Animals	**31**		
Wide Ranging Carnivores	*5*	Habitat Modeling (Carroll, Noss and Paquet)	Goals for wide ranging species based on percent of habitat value and stratified by subsection based on results from PATCH modeling.
Invertebrates	*7*	EOR data from WA, ID, MT, BC and AB Heritage & Conservation Data Centers	Goals expressed as # of occurrences, stratified by subsection and vary depending on rarity, spatial pattern and distribution of target.
Amphibians	*7*		
Birds	*6*		
Mammals	*6*		
Aquatic Animals	**25**	EOR's and StreamNet	Goals expressed as # of occurrences, stratified by Ecological Drainage Unit.
Insects	5	EOR	
Mollusks and Snails	5	EOR, expert contributions	
Fish	15	EOR and StreamNet	
Rare Plant Communities	**75**	EOR and expert workshop	Goals expressed as # of occurrences, stratified by subsection and vary depending on rarity, spatial pattern and distribution of target.
Total Fine Filter Targets	**225**		

Table 7 cont'd:

COARSE FILTER TARGETS			
Aquatic Ecosystems	**77**	Modeled by stream reach using Freshwater classification methodologies	Goals expressed as % of known historical extent of system by stream length, stratified by Ecological Drainage Unit
Terrestrial Ecosystems	**40**		
Small patch ecological systems	12	Shining Mtns. vegetation map project and ELU's used as surrogates along with expert nominated locations	Goals expressed as # of occurrences, stratified by subsection and will vary depending on rarity, spatial pattern and distribution of target as indicated in Table 10.0
Matrix & large patch systems	28	Shining Mtns. vegetation map project and ELU's used as surrogates along with expert nominated locations	Goals expressed as percent of known historical distribution, stratified by subsection.
Total Coarse Filter Targets	**117**		
Total Number of Targets	**342**		

Coarse Filter Targets

Both terrestrial and aquatic coarse-filter targets were used in designing the portfolio of conservation sites for the Canadian Rocky Mountains ecoregion. The planning team's strategy with coarse filter conservation was to develop a landscape portfolio of sites that captures the size and extent of natural communities and terrestrial habitats so that natural processes such as fire, avalanche and flood can continue to function across the ecoregion.

Terrestrial Coarse Filter

Ecological systems are groups of ecological communities that share underlying environmental features or gradients and similar processes such as disturbance; and serve as surrogates for terrestrial communities. They are dynamic complexes, but form a robust, cohesive, and distinguishable unit. The ecological systems described for the Canadian Rocky Mountains ecoregion are used to represent the full range of terrestrial habitats. Systems are organized along an elevation gradient, from highest to lowest, and are structured in parallel (where possible) with the *Biogeoclimatic Zones* and the *Shining Mountains* mapping units. Several sources of information were used to identify and describe ecological systems: *An Alliance Level Classification of Vegetation of the Conterminous Western United States* (Reid et al 1999); *A National Ecological Framework for Canada* (ESWG 1995)*; Ecosystems of British Columbia* (Meidinger and Pojar (eds) 1991)*; Natural Regions, Subregions and Natural History Themes of Alberta* (Achuff 1992*);* and plant association descriptions from various Canadian national park vegetation classifications. See Appendix 3.0 for complete descriptions of ecological systems. Table 8 outlines the spatial pattern used to describe ecological systems and plant communities.

Table 8. Spatial Pattern Used to Describe Ecological Systems and Plant Communities (from Anderson et al. 1999)

Spatial pattern	Characteristics
Matrix	Vegetation communities form extensive and contiguous cover 2,000 to 500,000 ha in size. Occur on ecoregion's most extensive landforms and typically have ecological tolerances; aggregate of all matrix communities covers 70-80% of ecoregion; often influenced by large-scale processes.
Large Patch	Vegetation communities with interrupted cover ranging in size from 50-2,000 ha. Aggregate of all large patch communities may cover as much as 20% of the ecoregion.
Small Patch	Vegetation communities that form small, discrete areas of cover one to 50 ha in size. Occur in very specific ecological settings, such as on specialized landform types or in unusual microhabitats. May contain disproportionately large percentage of ecoregions total flora, and also support a specific and restricted set of specialized fauna.
Linear	Communities occur as linear strips. Often represent ecotone between terrestrial and aquatic systems. Aggregate of all linear communities covers only a small percentage of the natural vegetation of the ecoregion. Local scale processes, such as river flow regimes, strongly influence community structure and function, leaving communities highly vulnerable to alterations in the surrounding land and waterscape.

We also developed a list of terrestrial natural vegetation community types native to the CRM and nested these within the ecological system framework. This group of plant association targets includes 477 terrestrial and wetland communities aggregated into 40 ecological systems. Riparian systems were divided into four elevation bands with the following titles: *Alpine Riparian Shrubland and Meadows*; *Subalpine Riparian Forest and Shrublands*; *Montane Riparian Forest and Shrublands;* and *Foothill Riparian Forest and Shrubland.* See Appendix 1.2 for a complete list of terrestrial coarse filter targets.

Finally, in order to ensure that the full range of environmental variability and gradients were being targeted within the broad ecosystem types identified, a model was created to depict known driving abiotic variables such as insulation, temperature, soil moisture, and nutrients. These variables (or indirect measures) were combined with a vegetation map to characterize and assess biophysical variation in terrestrial ecological systems. Given available spatial data on elevation, landform, and substrate characteristics, the team mapped terrestrial ecological land units (ELUs) for the ecoregion. ELUs are mapping units used in large-scale conservation planning projects that are defined by two or more environmental variables such as elevation, geological types, and landform. Variables used to develop ELUs were derived from documented knowledge of driving ecological factors within the ecoregion (e.g., Weaver 1970, DeVelice et al. 1986, Kaufman et al. 1992, Dick-Peddie 1993, Peet 2000). Appendix 2.0 provides a full description of the process used for developing these units.

Aquatic Coarse Filter

As no existing freshwater community or ecosystem classification exists within this ecoregion, we developed coarse filter targets using the hierarchical classification framework described in Appendix 4.0. This multi-scale, landscape-based classification framework for freshwater ecosystems is based upon hierarchy theory, and key principles of empirical studies in freshwater ecology. [9]

Aquatic ecosystems (1) occur together in an aquatic landscape with similar geomorphological patterns (2) are tied together by similar ecological processes (e.g., hydrologic and nutrient regimes, access to floodplains and other lateral environments) or environmental gradients (e.g., temperature, chemical and habitat volume) and (3) form a robust, cohesive and distinguishable spatial unit. Using a GIS platform, macrohabitats were classified based on variables of size, geology, gradient, elevation, and upstream/downstream connectivity. Aquatic ecosystem types for the CRM were created using multivariate analysis to group neighboring macrohabitats that share similar patterns.

Over 5000 watersheds were classified into 77 aquatic ecosystem types which served as surrogates for coarser-scale patterns in freshwater biodiversity, common species, and key ecological processes; and mapped in a GIS for each of the EDUs as described previously in Section E: Canadian Rocky Mountains Overview. This work was checked against ecological theory, expert review, and existing studies both in Canada (e.g., the Aquatic Ecozone classification) and the US (e.g., Interior Columbia Basin Ecosystem Management Project (ICBEMP) assessment). Additionally, 11 large drainages were identified to stratify the CRM into smaller watersheds that captured biogeographic differences and major climatic and physiographic gradients important to freshwater biodiversity (Appendix 4.0 and 5.0).

Fine Filter Targets

As per guidelines set out in *Designing a Geography of Hope: A Practitioner's Handbook to Ecoregional Planning* (TNC 2000), fine filter conservation targets were selected based on the following criteria:

Imperilled species are species (or subspecies) that have a global rank of G1-G2 (T1-T2), meaning that they are recognized as imperilled or critically imperilled throughout their ranges by Natural Heritage Programs/Conservation Data Centers. Regularly reviewed and updated by

---

[9] Much research has been done on this topic. For example, local patterns of aquatic physical habitats and their biological components are the product of a hierarchy of regional spatial and temporal processes (Tonn 1990; Angermeier and Schlosser 1996; Angermeier and Winston 1999; Mathews 1998; Frissell et al. 1986). Continental and regional aquatic zoogeographic patterns result from drainage connections changing in response to climatic and geologic events (e.g., Hocutt and Wiley 1986). Regional patterns of climate, drainage, and physiography determine aquatic ecosystem characteristics [morphology, hydrologic, temperature and nutrient regimes] that in turn influence biotic patterns (Hawkes et al. 1986; Maret et al. 1997; Poff and Ward 1990; Poff and Allan 1995; Pflieger 1989; Moyle and Ellison 1981). Within regions, there are finer-scale patterns of stream and lake morphology, size, gradient, and local zoogeographic sources resulting in distinct aquatic assemblages and population dynamics (e.g. Maxwell et al. 1995; Seelbach et al. 1998; Frissell et al. 1986; Rosgen 1994; Angermeier and Schlosser 1995; Angermeier and Winston 1999; Osborne and Wiley 1992; see Mathews 1998 for extensive review). The overall basis for our approach stems from an expert workshop that TNC held in 1996 (Lammert et al 1997).

experts, these ranks take into account number of occurrences, quality and condition of occurrences, population size, range of distribution, threats and protection status.

Endangered and threatened species are federally listed or proposed for listing under the Endangered Species Act (also includes proposed and petitioned species) and by the Committee On the Status of Endangered Wildlife In Canada (COSEWIC).

Species of Special Concern are species or subspecies ranked G3-G5 by Natural Heritage Programs/Conservation Data Centres, but fit one or more of the following criteria:

- *Declining species:* Declining species exhibit significant, long-term declines in habitat and/or numbers, are subject to a high degree of threat, or may have unique habitat or behavioral requirements that expose them to great risk. Determination of which species were declining was based on Partners in Flight ranks, Breeding Bird Survey trends, expert opinion, and data from the Natural Heritage Program Network.

- *Endemic species:* Endemic species are restricted to the ecoregion (or a small geographic area within an ecoregion), depending entirely on the ecoregion for survival, and are therefore more vulnerable than species with a broader distribution.

- *Disjunct species*: Disjunct species have populations that are geographically isolated from other populations.

- *Peripheral species*: Species that are more widely distributed in other ecoregions but have populations in the CRM at the edge of their geographical range.

- *Vulnerable species:* Vulnerable species are usually abundant and may or may not be declining, but some aspect of their life history makes them especially vulnerable (e.g., migratory concentration or rare/endemic habitat.

- *Focal species*: Focal species have spatial, compositional, and functional requirements that may encompass those of other species in the region and may help address the functionality of ecological systems. Focal species may not always be captured in the portfolio through the coarse filter. Several types of focal species can be considered, including wide-ranging and keystone species. Wide-ranging species are regional-scale species that depend on vast areas. These species often include top-level predators (e.g., wolves, wolverine, grizzly bear), wide-ranging herbivores (e.g., caribou), and wide-ranging omnivores (e.g., black bear) but also migratory mammals, anadromous fish, birds, bats and some insects. Wide-ranging species can be especially useful in examining the need for linkages among conservation areas and creating a functional network of areas.

- *Species aggregations:* These are unique, irreplaceable habitats for the species that use them, or are critical to the conservation of a certain species or suite of species.

- *Globally significant examples of species aggregations* (i.e., critical migratory stopover sites that contain significant numbers of migratory individuals of many species).

A full listing of fine filter targets for the CRM ecoregion is available in Appendix 1.0. Below is a summary by taxa groups.

<u>*Vascular and Non-Vascular Plants*</u>
The botany technical team identified 66 vascular and 28 non-vascular plants as conservation targets in the ecoregion (Appendix 1.0). These are primarily ranked G1- G3, with the exception of several disjunct species and/or species believed to be in decline. Of these 94 fine filter plant targets, 19 species (23%) are endemic or near endemic to the ecoregion. Two plant conservation targets, Water howellii (*Howellia aquatilis*) and Spalding's campion (*Silene spaldingii*) are listed as '*Threatened*' by the US FWS; Southern maidenhair-fern (*Adiantum capillus-veneris*) is '*Endangered*' and Missouri iris (*Iris missouriensis*), Phantom orchid (*Cephalanthera austiniae*) and Mexican mosquito-fern (*Azolla mexicana*) are listed as '*Threatened*' by COSEWIC (2001). Three Palouse species are experiencing habitat loss and were selected as targets: Jessica's aster (*Aster jessicae),* smallhead goldenweed *(Pyrrocoma liatriformis)* and Spalding's campion *(Silene spaldingii).*

<u>*Rare Plant Associations*</u>
The terrestrial team identified 75 rare plant associations in the ecoregion (Appendix 1.0) that were found in uncommon environments and would not be adequately represented using the more broadly defined ecological systems. These included all G1 and G2 plant communities from the National Vegetation Classification System (NVCS), as well as those S1 and S2 plant communities recognized by either British Columbia or Alberta CDC programs that did not cross walk to existing types currently in the NVCS.

<u>*Amphibians*</u>
Seven amphibians were selected as targets. These include two salamanders, Coeur D'Alene salamander (*Plethodon idahoensis*) and Idaho Giant Salamander (*Dicamptodon anterrimus*); both are regional endemics. Two species with high G-Ranks were chosen as targets due to declining habitat or breeding sites: Western toad (*Bufo boreas*) (G4) and Northern leopard frog (*Rana pipiens*) (G5).

We did not select *Rana pretiosa* (Oregon spotted frog - G2G3) as a target because this species has undergone taxonomic revision that is not reflected in the database. The Rocky Mountain form (*Rana luteiventris)* (G4) is widespread and presumably stable; the Cascade form is believed to be in decline. Since *Rana luteiventris* is known from 241 element occurrence records in the ecoregion, the team decided not to include the Oregon spotted frog as a fine filter target.

<u>*Mammals*</u>
Of the 11 mammals, 5 are wide-ranging carnivores (grizzly bear, lynx, wolverine, fisher, gray wolf) and another, the caribou, is a wide-ranging herbivore. Two of the small mammals selected as targets: the Selkirk least chipmunk (*Tamias minimus selkirkii*) (G5T1T3), a subspecies known only from the type locality in the Purcell Mountains, BC (1940); and Creston northern pocket

gopher (*Thomomys talpoides segregatus*), a subspecies known only from the type locality on the benchlands of Goat Mountain near Wyndel, above the Kootenay River, BC. Both are presumably vulnerable due to their localized distribution (Hafner et al. (eds) 1998). Townsend's big-eared bat (*Corynorhinus townsendii)* (G4) was selected as a target because this species is believed to be declining.

Wide-Ranging Carnivores
This ecoregion is best recognized for its full complement of large mammals, in particular the wide ranging carnivores –grizzly bears, gray wolves, wolverine, fisher and lynx. Traditional ecoregional planning methods (special element and ecosystem representation approaches) have struggled with the best way to integrate carnivore conservation goals and the protection of other conservation targets. To address this critical element of conservation planning for the CRM, the planning team coordinated their work with the Rocky Mountain Carnivore Project initiated by World Wildlife Fund Canada with support from The Nature Conservancy. Principle researchers for The Rocky Mountain Carnivore Project included Dr. Carlos Carroll (The Klamath Center for Conservation Research), Dr. Reed Noss (Conservation Science, Inc.), and Dr. Paul Paquet (World Wildlife Fund Canada)[10]. Dr. Carroll was an active participant throughout the entire ecoregional planning process and worked closely with our data manager, Bart Butterfield.

The planning team incorporated static models (species distribution and habitat characteristics) for 5 carnivore species, grizzly bear, gray wolf, lynx, wolverine, and fisher. The static models for these species were determined by the Carnivore Project leaders to be the best available information on a region-wide basis. Species distribution data included sightings, denning, and trapping records of fisher, lynx, and wolverine, grizzly bear radio telemetry locations, and boundaries of wolf pack territories. Habitat data included vegetation, satellite imagery metrics, topography, climate, and human impact variables.

Invertebrates
A total of 7 terrestrial invertebrates were selected as targets including three mountains snails (*Oreohelix* spp. & *Oreohelis* spp.) endemic to the ecoregion.

Birds
A bird target list that included conservation goals for bird habitat were compiled which included species of conservation concern as identified by the Partners in Flight (PIF) program (Ritter 1999; D. Casey pers. comm.). PIF recommendations were made for both fine filter and coarse filter targets. Suitable habitat to maintain long-term viability for coarse filter species was met through the ecological system and other fine filter conservation targets.

Aquatic Animals
A total of 25 species, fish, mollusks, insects were chosen using the criteria of high natural rarity, severe threat, and overall declining distribution. Included on the target list were white sturgeon, Upper Fraser River populations of anadromous salmonids (sockeye, pink, coho, steelhead, chinook) as well as westslope cutthroat trout and bull trout. Two data sets were used to compile the list (1) CDCs/Heritage Programs, generally represented as points, and (2) state/provincial/federal datasets, represented generally as presence/absence by watershed.

[10] For their full report contact World Wildlife Fund Canada (http://www.wwfcanada.org/en/default.asp)

J. CONSERVATION GOALS

Background

Conservation goals represent the end toward which we direct conservation efforts for targeted species, communities, and ecosystems. Goals provide the quantitative basis for identifying and prioritizing areas that contribute to the reserve network. Reserve design is appropriately dictated by target goals, thus creating a vision of landscape functionality at a regional scale. Establishing conservation goals is among the most difficult - and most important - scientific questions in biodiversity conservation (e.g., How much is enough? How many discrete populations and in what spatial distribution are needed for long-term viability?). There is no scientific consensus regarding how much is enough. As some have pointed out (e.g. Noss 1996, Soule & Sanjayan 1998), these questions can't really be answered by theory, but require an empirical approach, target-by-target, and a commitment to monitoring and continual re-evaluation over the long-term.

Goals for conservation targets define the number and spatial distribution of on-the-ground occurrences. As a general rule, our goal is to conserve multiple examples of each target, stratified across its geographic range in such a way that we capture (1) the variability of the target and its environment, and (2) redundant occurrences to provide a high likelihood of persistence in the face of environmental stochastically.

We define a **viable species** or **population** as one that has a high probability of continued existence[11] over a specified period of time. Conservation goals should support the target species in continually changing ecosystems, looking into the future at least 100 years or 10 generations. While that concept of viability could be said to apply to all targets, in practice we use several closely related, though distinct, groups of targets. It is important to distinguish "fine filter" (*species*) targets from "coarse filter" (*communities* and *ecosystems*) targets in terms of conservation strategies. Fine filter strategies appropriately emphasize maintenance of multiple occurrences or viable populations. . In addition to species viability, coarse filter strategies emphasize the conservation of ecosystem functions (e.g. air, water, nutrient cycling, etc.), perhaps better characterized as **ecological integrity** at an ecoregion scale (Pimentel et al. 2000). While conservation goals for species emphasize representation and redundancy, coarse filter goals focus more strongly on capturing the full range ecological variability and environmental gradients.

Conservation Goals for Terrestrial Species

Goals for terrestrial species are described in Table 9 and are based on spatial pattern and ecoregional distribution. Rarity is a factor in so far that for G1-G2 taxa, the goal was to maintain all potentially viable occurrences and to develop strategies for their recovery with the ecoregion. All terrestrial goals were stratified by subsections as delineated by Demarchi et al. (1996) so that at least 2 occurrences per subsection were required (where possible) in attaining the overall ecoregional goals.

[11] 95% certainty of surviving 100 years and/or 10 generations

Table 9. Ecoregional Conservation Goals for Terrestrial Species

Spatial Pattern[12]	**Regional**[1]	**Coarse**[2]	**Intermediate**[2]	**Local**[2]
Distribution[13]				
Endemic	Maintain core areas for dispersal and connecting habitat for wide ranging mammals.	10	18	25
Limited		5	9	13
Disjunct		5	9	13
Widespread		3	5	7
Peripheral		1	2	3

[1] Target-by-target, range-wide (multi-ecoregional) goals are applied. Targets represented within each ecoregion by "potentially occupied" core and connecting habitat components.
[2] Ecoregional goals stratified by subsection for fine filter terrestrial and aquatic targets.
* Separation distance for each target occurrence specified, or default of 10 km. Many naturally rare and endemic G1-G2 species may have historically occurred with fewer than 25 populations. In these cases, the goal is 'all potentially viable occurrences up to 25.'

Conservation Goals for Terrestrial Ecosystems

Conservation goals for terrestrial ecological systems and rare communities considered the target's distribution relative to the ecoregion and their typical spatial pattern (Anderson et al. 1999). For ecological systems, we selected ecologically based representation goals for each of the 40 system-types. These goals are expressed by minimum size, distribution and number of examples. Table 10 describes these goals. Our objective was to ensure that each ecological system was represented in the portfolio. The coarse filter thus captures a sample of each terrestrial habitat type, spread across the ecoregion. Where we sought to protect known, specific sites, they are captured in the fine filter, as described below.

Table 10. Ecoregional Conservation Goals for Terrestrial Ecosystems [14]

Distribution Relative to Ecoregion	Conservation goals for selected *large patch* and *small patch* systems (expressed as a number of occurrences) and for remaining *large patch*, *matrix* and *linear* vegetation systems.	
	Spatial Pattern in Ecoregion	
	Selected Large Patch and all Small Patch Systems	*Matrix, Large Patch, and Linear Systems*
Endemic	25 occurrences	30% Known historical distribution
Limited/Disjunct	13 occurrences	
Widespread	7 occurrences	
Peripheral	3 occurrences	

[12] Regional: > 1,000,000 acres, migrate long distances; Coarse: 20,000 – 1,000,000 acres; Intermediate: 1,000 – 50,000 acres; Local: > 2,000 acres.
[13] Restricted / Endemic targets occur primarily in the ecoregion. Limited: targets typically occur within the ecoregion but also occur within a few adjacent ecoregions. Widespread: targets widely distributed in several to many ecoregions. Disjunct: occurs in ecoregion as a disjunct from the core of its distribution. Peripheral: more commonly found in other ecoregions
[14] Ecological systems are described in ***Section G – Target Selection*** and described in Appendix 4.0 and 5.0.

Conservation Goals for Aquatic Species and Ecosystems

The nature of the distribution and spatial configuration of aquatic species data made it difficult to apply the same goal rules for aquatic fine filter targets. As such, aquatic species goals were based on global rarity (both G and T ranks) and goals for all targets were stratified by 10 large watersheds (EDUs) - each of which has a distinct climate and zoogeography. Table 11 describes the goals for aquatic fine-filter targets and coarse-filter ecosystems.

Table 11. Conservation Goals for Aquatic Fine-filter Targets and Ecosystems

Target	Goal
G1/T1 species	All occurrences.
G2/T2 species	All occurrences up to 10 per EDU for endemics, 8 per EDU for non-endemics.
G3/T3 species	All occurrences up to 5 per EDU when occurring in more than one EDU, 10 per EDU when endemic to a single EDU.
G4 and G5 fishes	30% of current distribution within each EDU, with the exception of westslope cutthroat trout, bull trout, and coho salmon, which were set at 50% of current distribution within each EDU because of higher threat/decline in the ecoregion.
Ecosystems	30% of historical distribution within each EDU

Conservation Goals For Wide-Ranging Carnivores

Goals for the carnivore species were expressed as a percentage of the total habitat "value" in the region. This was more realistic than the common approach of classifying areas into just two classes of unsuitable and suitable habitat. Habitat value was measured by the output of the resource selection function (RSF) model (Carroll et al. 2002). The RSF is proportional to the number of animals that can be supported in an area. Thus, a goal of 30% of the RSF value might be expected to conserve 30% of the potential regional population. The RSF values for lynx, fisher, and wolverine were based on non-modeled data. Because the conservation goals for grizzly bears and wolves were based on conceptual models and not RSF values, conserving 30% of modeled habitat "value" would actually protect more than 30% of their populations. Some additional percentage of the population would also be present on non-reserve (portfolio) lands. It was thought that wide-ranging carnivore modeling would be particularly applicable in the CRM because the region still retains well-distributed populations of all carnivore species (unlike the Middle Rockies or Southern Rockies ecoregions).

With little information as to what constitutes a threshold amount of habitat for insuring viable populations, and because we did not want to ignore such factors as connectivity, we ran SITES solutions with differing levels of habitat as goals and compared the ability of the resulting SITES terrestrial portfolios to conserve viable populations, using the PATCH model (Schumaker 1998). The PATCH model takes static data (spatial data like prey availability, mortality risks) and dynamic models (non spatial data like carrying capacity) and provides an evaluation of population survival over a period of time. The evaluation was performed for two carnivore species, the grizzly bear and wolf, for which we had the most developed and accurate PATCH models (Appendix 6.0).

The PATCH analyses revealed that there were no significant thresholds or breakpoints in goal setting and that future populations of wolf and grizzly had a linear positive response to increases in habitat goals. Analyses also showed that the current network of protected areas were insufficient for preventing declines in carnivore populations over the next 25 years (see Table 12). The planning team ultimately decided to set a goal of capturing 40% of habitat values for all targeted wide-ranging carnivores in the conservation portfolio—a solution that PATCH modeling indicated would yield a slight increase in carnivore populations over the next 25 years.

Table 12. Evaluation of SITES solutions using the PATCH model (Carroll et al. 2002).

SITES solution	% of region (parks included)	% of RSF habitat value (including parks)		share of current carrying capacity (PATCH model)		total regional carrying capacity 2025 (as % of 2000 capacity)	
		GRIZZLY	WOLF	GRIZZLY	WOLF	GRIZZLY	WOLF
no action (parks alone)	22.6	25.5	23.5*	32.9	27.9	92.9	92.7
carnivore goal 0%, parks not locked [1]	41.1	44.5	43.4	49.1	46.2	102.2	107.1
carnivore goal 0%, parks locked in [2]	42.3	44.5	43.7	49.0	46.4	106.7	116.8
carnivore goal 30%, parks locked in	42.8	45.2	44.5	49.8	47.3	106.7	114.0
carnivore goal 50%, parks locked in	46.8	49.8	49.5	53.9	52.3	109.2	118.8
carnivore goal 40%, parks locked in	52.2	55.6	56.0	58.8	58.3	112.8	125.6
* approximate due to areas of missing data							

1. Indicates carnivore population response to the conservation portfolio created from a coarse/fine filter approach that does not specifically target carnivores and set goals for capturing carnivore habitat
2. Refers to the same conditions, as note 1, but the resulting portfolio would also include all current protected areas as part of the solution.

K. VIABILITY ASSESSMENT

The element occurrence (EO) ranks given by CDC and Natural Heritage Programs were used for determining occurrence viability of species targets when available. EO ranks of A (excellent), B (good), C (fair) were all considered as viable while database records were deleted where EO Rank = F, O, H, X, D. We also removed records where the EO Type = extirpated population, probable sighting and unconfirmed sighting. Animal records older than 20 years old were deleted, with the following exceptions: one occurrence each for Preble's Shrew (*Sorex preblei*), Selkirk least chipmunk (*Tamias minimus selkirki*), and Creston northern pocket gopher (*Thomomys talpoides segregatus*). Plant records older than 40 years old were also deleted.

There were many unranked element occurrences. The SITES model is programmed to select for the best records first before moving on to find lower ranked examples (Appendix 7.0). Not wanting unranked records to have equal weight and not knowing the viability of these records, we ranked them as 'C'. In addition to unranked occurrences, much of the biodiversity information used in the planning process included wide-ranging species models and coarse filter classifications that had no direct viability rankings. As such, surrogates for viability information were incorporated into a suitability index during portfolio design using SITES (see Section L for a description of the Suitability Index). The suitability index itself provided an indirect measure of ecological integrity for ecological systems, where no expert opinion was available.

L. PORTFOLIO ASSEMBLY

Portfolio Design Methods

The overall goal of this assessment was to identify a portfolio of conservation areas that, with proper management, would ensure the long-term survival of the species, plant communities, and ecological systems, and the ecological processes needed to maintain them.

The team used the following principles, based on guidelines outlined in *Designing a Geography of Hope: A Practitioner's Handbook to Ecoregional Planning* (TNC 2000), to assemble the portfolio.

- Coarse-scale focus: Represent or capture in conservation areas all coarse-scale targets that exist in the ecoregion or are restorable followed by targets at finer scales.
- Representative-ness: Capture multiple examples of all conservation targets across the diversity of environmental gradients appropriate to the ecoregion (e.g., ecoregional section, ecological land units, and ecological drainage units).
- Efficiency: Give priority to occurrences of coarse-scale ecological systems that contain multiple targets at other scales.
- Integration: Give priority to areas that contain high-quality occurrences of both aquatic and terrestrial targets.
- Viability/Integrity: Ensure that all areas in the portfolio are functional or feasibly restorable to a functional condition. Functional areas maintain the size, condition, and landscape context within the natural range of variability of the conservation targets.
- Completeness: Capture all targets within functional landscapes.

Conservation areas were identified using the most reliable and up-to-date information through a combination of computer-assisted and manual processes that evaluated the following data:

1. Element-occurrence and site information from Conservation Data Centres and Natural Heritage Programs of British Columbia, Alberta, Montana, Idaho and Washington (only viable records and records since 1980 for animals and 1960 for plants);
2. Occurrence and area information from experts workshops;
3. Existing and nominated conservation areas;

4. Additional spatial data sets depicting distributions of ecological systems;
5. Habitat-suitability models for selected wide-ranging mammals;
6. Indices of biophysical variation from biophysical models; and
7. Land conservation status along with indices of landscape integrity and conservation suitability.

SITES Optimization Tool

The CRM ecoregional data set was compiled and analyzed with the goal of developing a comprehensive and strategic conservation blueprint. Because of the large number of conservation targets, the relatively large data set, and the complexity of the ecoregion, the CRM team decided to use SITES (Andelman et al. 1999), a site-selection software program developed by the National Center for Ecological Analysis and Synthesis, University of California at Santa Barbara, specifically for ecoregional assessment. The SITES program enabled the team to assemble and compare alternative portfolios. See Appendix 7.0 for more details regarding the portfolio design methods.

The overall objective of the portfolio selection process is to minimize the cost of the portfolio while ensuring that all conservation goals have been met. SITES selects areas to meet goals for conservation targets while balancing objectives of efficiency, defined as the greatest number of goals met for the lowest cost or least amount of suitable land. This set of objectives is summarized in the following equation (Andelman et al. 1999):

Total Portfolio Cost = Cost of Selected Areas + Target Penalty + Boundary Length

Where *Total Portfolio Cost* is the objective (see below) to be minimized, *Cost of Selected Areas* is the number of hectares in all units of analysis selected for the portfolio (see suitability index discussion below), *Target Penalty* is a cost of not meeting conservation goals for each target, and *Boundary Length* is a cost of spatial dispersion of the selected sites as measured by the total boundary length of the portfolio. The algorithm seeks to minimize the *Total Portfolio Cost* by selecting a set of conservation areas which covers as many targets as possible as cheaply as possible in as compact a set of areas as possible. The solutions depend on how site cost is measured, on the target levels, on the penalty cost for each target, and on how heavily the boundary lengths are weighted. The modeling program compares millions of possible portfolio designs to determine the most efficient or "optimal" portfolio.

Suitability Index

The team developed a suitability index, an integration of methodologies employed by TNC (2000) and techniques used by the wide-ranging carnivore team in their development of focal species models (Carroll et al., 2002). The index was derived from a variety of land use factors, such as road density, mines, dams, natural land cover, projected future urban development, and minimum land area, to represent the cost associated with conserving an area. The suitability index was used as a comprehensive, albeit indirect, measure of environmental conditions on the landscape. While not a direct measure of ecological integrity, it provided a useful complement to ranked occurrences in determining which areas might be most suitable for meeting conservation goals. The team also set different levels of perimeter in an attempt to reduce fragmentation of the portfolio and increase clustering of the conservation areas (i.e., adjusting boundary length).

Units of Analyses

Data on species distribution and viability were attributed to 3rd Order watersheds cross-walked to 6-unit HUCS on the U.S. side of the planning area. The SITES optimization tool was then used to generate a series of potential conservation "solutions" based on the data attributes of each watershed.

Expert Review

In order to evaluate the various scenarios being generated by the SITES tool, results were taken to a series of expert workshops and interviews in order to generate constructive feedback. These reviews helped to identify planning units selected by SITES that were based on modeled data but that had few on-the-ground values in actual fact. Additionally, through this review process, experts were able to identify many important landscapes that were being missed by SITES because of insufficient data inputs. In particular, connectivity values were underrepresented as a result of the limitations of the optimization tool. To compensate, the team embedded into the solution expert identified landscapes with high connectivity and/or exceptional habitat values into subsequent SITES runs.

Aggregation of Planning Units

A total of 4,836 watersheds were part of the final conservation portfolio (see below) and these were then aggregated into 54, larger "*Conservation Landscapes*". Conservation Landscapes were built by clustering watersheds that occurred together and shared common ecological processes. These groupings were also clustered based on criteria related to conservation opportunity such as areas where protected areas created obvious mechanisms for common conservation action among portfolio watersheds. Conservation Landscapes were delineated in such a way that they also included watersheds not selected within the portfolio. These areas—landscapes not essential to the conservation solution but rather swept into the Conservation Landscape for strategic or practical purposes--are referred to as "*landscape linkage areas*."

M. PORTFOLIO RESULTS

Background

The portfolio of conservation areas represents a rigorously established vision for biodiversity conservation with the best available data. The iterative nature of ecoregional assessment requires that we interpret results carefully. While the team compiled substantial new information, no amount of effort, within the timeframe of this project, could produce a "complete" data set. We intend to clarify and fill information gaps over time, and to revisit/refine the portfolio as new information becomes available.

Nearly all conservation targets are represented in the portfolio, and many had sufficient numbers to meet conservation goals. Others will require additional field inventory and research in order to finalize and/or meet conservation goals. Many previously undocumented occurrences will undoubtedly be found with further field survey work within portfolio conservation areas.

Alternative Portfolio Scenarios

The CRM planning team took advantage of the flexibility provided by the SITES algorithm to test various conservation solutions for the ecoregion. In particular, efficiencies were explored with regards to incorporation of the current protected areas network and with combining and separating terrestrial and aquatic solutions. Initial test runs of SITES were performed solely on terrestrial targets, comparing SITES runs where protected areas were "locked in" or forced into the conservation solution to solutions without such constraints. The locked in solution yielded a conservation portfolio that covered 48% of the ecoregion compared to 39% in SITES runs that were unconstrained by protected areas.

SITES runs for aquatic targets yielded a portfolio covering 44% of the ecoregion. When the aquatic solution was overlaid with the terrestrial solution with protected areas locked in, 66% of the ecoregion was needed for the conservation solution compared to 61% when the aquatic solution was overlain with the terrestrial solution unconstrained by the current protected areas network.

In either case, these solutions were viewed as inefficient in terms of total area occupied by the portfolio and efficiencies were sought by combining aquatic and terrestrial targets into a single sites run. This improved the "locked in" efficiency by reducing the area needed from 66% of the ecoregion down to 62%. However, the greatest improvement came from combining aquatic and terrestrial targets in a conservation solution unconstrained by the current protected areas network—total area needed for the solution dropped to just under 50% of the ecoregion.

Testing various scenarios proved invaluable for finding efficiencies and also allowed the planning team to solicit expert opinion on the merits of various portfolio configurations. For example, to the team's surprise, several park managers registered their disapproval with assuming current protected areas should be part of the conservation solution. Instead, they expressed a desire to see the portfolio unconstrained so that the results would better inform them as to the contribution parks were making to biodiversity conservation in the region. Unconstrained results informed managers as to which parts of parks held more conservation values than others, as opposed to "locked in" scenarios that assumed all parts of a park equal to the conservation solution for the ecoregion. Details of the final conservation portfolio are discussed below.

Final Portfolio

A total of 4,836 watersheds were part of the final conservation portfolio for the totalling 13,455,793 hectares (33,249,264 acres) and equalling 49.7 % of the ecoregion. The seemingly large portfolio size can be attributed to several factors: 1) the types of conservation targets selected, which included matrix-forming ecological systems and wide-ranging mammals; 2) the existing natural variability and the desire to represent variability across all environmental gradients within the ecoregion; and 3) manual over-rides of the original SITES output based on additional knowledge about conservation areas. See Map 14 for the portfolio of conservation areas.

Conservation Landscapes

The majority of the 4,836 selected portfolio watersheds were subsequently aggregated into larger conservation units called "*Conservation Landscapes*". Conservation Landscapes were built by clustering watersheds that were geographically connected and that shared common ecological processes. These groupings were also aggregated according to conservation opportunity including tying together areas where protected areas created obvious mechanisms for common conservation action among portfolio watersheds. Conservation Landscapes were delineated in such a way that they also included watersheds not selected within the portfolio. These areas—landscapes not essential to the conservation solution but rather swept into the Conservation Landscape for strategic or practical purposes—are referred to as "*landscape linkage areas*."

While the bulk of the conservation solution was aggregated into Conservation landscapes, an additional 20 individual watersheds were selected to meet conservation goals. Typically, these watersheds contain a single occurrence of a conservation target, are geographically isolated, and do not lend themselves well to incorporation into a larger landscape. See Appendix 8.0 and Map 14 for detailed information on these watersheds.

Of the total 74 Conservation Areas in the solution (54 Conservation Landscapes, and 20 smaller, individual watersheds) 27 are entirely within British Columbia, 2 in Alberta, 14 in Montana, 7 in Idaho, 1 in Washington. Seven Conservation Areas were shared between BC and Alberta, 5 between Idaho and Washington, 1 between BC and Montana, 1 between BC and Washington, and 5 between Idaho and Montana. One Conservation Area was common to each of Alberta, BC and Montana, 1 between BC, Idaho and Washington, and 2 between BC, Idaho and Montana. They range in size from 72 hectares (178 acres) to landscapes of 2 million hectares (4.8 million acres). All of the identified Conservation Landscapes meet standards for functional conservation areas, as they include wide gradients of coarse-scale ecological systems and element occurrences used to define these landscapes were assessed for viability. This portfolio represents a first effort at a functional network designed to conserve selected regional-scale species across their range of variability within the ecoregion.

The portfolio of conservation areas produced during this assessment represents the current state of our knowledge using the best available information about where to conserve biodiversity in the ecoregion. The assessment results were incorporated into a series of maps and tables, descriptions of the portfolio of conservation areas, and different analyses of the portfolio, including levels of conservation value, threat status, and activity.

While these conservation areas were designed with knowledge of the size requirements of conservation targets, these areas do not specifically describe the lands/waters needed to maintain each target at that location. Site conservation planning is needed to determine what lands and waters are actually necessary to ensure conservation of the targets at any particular area. Also, because of the way in which portfolio conservation areas were assembled, it may be appropriate to join conservation areas at a later time. Similarly, it may be necessary to segregate individual conservation areas from larger ones. This refinement will be completed during later analyses that consider site-specific targets, threats, and goals. Thus the current boundaries are starting points for further analyses.

Protected Status

Approximately 30% of the 33.2 million acre portfolio is in currently designated protected areas. Assuming the portion of the portfolio within parks is already protected, an additional 33.9% of the ecoregion requires some form of conservation action in order to conserve the full portfolio. A full breakdown of the protected status of the portfolio is found in Table 13.

Table 13. Protected Areas within the CRM conservation portfolio.

GAP Category	Hectares (Acres) in Ecoregion	% of Ecoregion	Hectares (Acres) in Portfolio	% of Portfolio
Category 1	601,713 (1,486,834)	2.2	340,446 (841,260)	3
Category 2	5,779,637 (14,281,484)	21.0	3,436,243 (8,491,142)	26
Category 3	191,173 (472,389)	0.6	94,353 (233,150)	1
Total	**6,572,524 (16,240,707)**	**23.8**	**3,871,042 (9,565,552)**	**30**

Landownership Patterns

The patterns of land ownership and management within the portfolio of conservation areas generally follow the overall pattern for the ecoregion (see Table 14). Public lands, both federal and state/provincial, make up the majority of the ecoregional portfolio; 55% of the portfolio is provincial land and 2% is state land. The two largest land managers are the Province of BC (42%) and the US Forest Service (16%). Private lands encompass approximately 12% of the portfolio conservation areas.

Table 14. Land ownership within the CRM conservation portfolio.

Owner	% in Portfolio	Hectares (Acres) in Portfolio
Province of BC	42	5,684,795 (14,047,128)
US Forest Service	16	2,165,152 (5,350,090)
Province of Alberta	13	1,780,488 (4,399,587)
Private	12	1,556,000(3,844,876)
Parks Canada	10	1,355,358 (3,349,090)
First Nations/Tribal Lands	1	160,975 (397,769)
State of Idaho	1	139,901 (345,696)
Total	**95**	**12,842,669 (31,734,236)**

Target Representation and Conservation Goals

Major ecological gradients and variability are well represented across the portfolio of conservation areas, as evidenced by the high degree of representation of ecological systems and the ecological variables used to represent them (vegetation, elevation, landform, riverine characteristics, geologic substrate, etc.). This should help buffer the conservation targets against the impacts of climate change. Terrestrial and aquatic systems were represented using expert derived occurrences and spatial models. Additional field verification is needed for occurrences of terrestrial and aquatic ecological systems, emphasizing the evaluation of their quality and condition. Additional data collection will likely refine the classification of freshwater aquatic ecological systems.

Eighty-three percent of the terrestrial ecological systems, 100% of the aquatic ecological systems, 49% of the rare plant communities, and 34% of the species met stated conservation goals. For the species groups: 71% of the amphibians, 80% of the birds, 87% of the fishes, 82% of mammals, 4% of non-vascular plants and 26% of the vascular plants met stated conservation goals (see Table 15). Unfortunately, goals for none of the invertebrate targets were achieved. Finally, habitat goals were entirely satisfied for each of the six wide-ranging carnivore species. See Appendix 8.1 for conservation goals for all targets.

A number of plants and rare plant communities are currently only known from one to five occurrences and therefore the goal could not be met until further inventories reveal more occurrences. Another group of 169 targets (78 animals, 54 plants, 32 plant communities, and 5 terrestrial systems) have no documented occurrences or data are lacking regarding the distribution and viability. Future work should focus on systematic inventory of these conservation targets not meeting goals or with no representation in the portfolio. With additional knowledge of target distributions and quality, we will further refine conservation goals for conservation targets.

Table 15. Summary of goal performance for CRM Taxa Groups.

Target Group	# of Targets	# of Targets Meeting Goals	% of Targets Meeting Goals
VASCULAR PLANTS	66	17	26
NON-VASCULAR PLANTS	28	1	4
BIRDS	10	8	80
INVERTEBRATES	17	0	0
AMPHIBIANS	7	5	71
MAMMALS	11	9	82
RARE PLANT COMMUNITIES	75	37	49
FISH	15	13	87
TERRESTRIAL SYSTEMS	40	33	83
AQUATIC SYSTEMS	77	77	100

N. PRIORITY SETTING

Background

The portfolio design phase of the CRM identified a very large proportion of the ecoregion as Conservation Areas. With almost half the ecoregion included in the results it was necessary to apply a prioritization scheme to help distinguish which Conservation Areas need conservation action more immediately than others, and to also try and determine which areas within those Conservation Areas require the most focus for implementing conservation strategies.

The assessment described below is intended as a means of presenting conservation strategists within the CRM with an evaluation of priorities based upon quantitative measures emerging from the CRM assessment. This work was based on criteria established in TNC's *Geography of Hope* (2000) and methods applied by Noss *et al*. in the Utah-Wyoming Rocky Mountains ecoregional plan (2001). A more thorough evaluation of priorities is required and will need to build on the quantitative summary presented here with more subjective qualitative measures related to conservation feasibility, opportunity and leverage.

Conservation Value

A key concept in conservation planning is irreplaceability (Pressey et al. 1994, Margules and Pressey 2000, Pressey and Cowling 2001). Irreplaceability provides a quantitative measure of the relative contribution different areas make toward reaching conservation goals, thus helping planners choose among alternative sites in a portfolio. As noted by Pressey (1998), irreplaceability can be defined in two ways: 1) the likelihood that a particular area is needed to achieve an explicit conservation goal; or 2) the extent to which the options for achieving an explicit conservation goal are narrowed if an area is not conserved. For the CRM, irreplaceability was rolled into a broader measure of Conservation Value that was applied to each watershed unit of analysis. Conservation value was calculated as a composite measure, scaled between 0 and 1, based on the following four criteria:

> **Rarity** – the degree to which rare elements are represented within the planning unit. Rarity was calculated by assigning a rarity score of 1 to all G3 targets, 2 to all G2 targets, and 3 to all G1 targets. Targets that did not have G-ranks were assigned rarity scores of 1 for all Limited, Disjunct and Peripheral targets and 3 for Endemic targets. The rarity scores were then summed and scaled from 0 to 1.
>
> **Richness –** a measure of the overall abundance of target elements and systems within the planning unit. Richness was quantified by first calculating the total amount of each target in the planning unit (number of occurrences, hectares, stream length etc.) and expressing that as a proportion of the total amount found within the entire ecoregion. The richness score for the planning unit was then taken as the mean proportion of the total amount available in the ecoregion, for each target.

Diversity – an assessment of the variety of elements and systems within a planning unit. Diversity was scored according to the number of different target types (see Appendix 8.1) present within the planning unit.

Complementarity – a measure based upon the principle of selecting conservation areas that complement or are "most different" from sites that are already conserved. The spatial configuration of the CRM portfolio was optimized for complementarity using the SITES algorithm. Subsequently, the score for planning unit complementarity was generated from the 'sum runs' of portfolio SITES analysis. Sum runs is the number of times each planning unit was selected by SITES in our 20 SITES runs.

Watershed planning units were then assigned a conservation value by adding all four factors together and rescaling the result from 0 to 10. The results of this evaluation are displayed in Map 16.

Vulnerability

Another key consideration in conservation planning is threat or vulnerability (Margules and Pressey 2000). It can be argued that the more vulnerable or threatened an area is, the greater the urgency or need for conservation action. Based on available quantitative threat data (e.g., human population growth, development trends, road density), a coarse vulnerability score for each watershed planning unit was created (see Appendix 9.0 for a full list of measures). The results of this evaluation are displayed in Map 15.

Conservation Area Evaluation

The next step in this evaluation of conservation priorities was to calculate the mean conservation value and vulnerability scores of the planning units in each Conservation Area. These scores were then plotted on a graph of conservation value (y-axis) versus vulnerability (x-axis) and the graph divided into four quadrants, similar to the procedure of Margules and Pressey (2000). The upper right quadrant, which includes Conservation Areas with higher conservation value and higher vulnerability, potentially comprises the highest priority sites for conservation. This top tier of Conservation Areas is followed by the upper left and lower right quadrants (Tier 2 and Tier 3, which could be ordered differently depending on needs of planners), and finally, by the lower left quadrant, Tier 4, comprising areas that are relatively replaceable and face less severe threats.

Tier 1 – Areas of Highest Conservation Value and Highest Vulnerability
Tier 2 – Areas of Highest Conservation Value but Lower Vulnerability
Tier 3 – Areas of Lower Conservation Value and Highest Vulnerability
Tier 4 – Areas of Lower Conservation Value and Low Vulnerability

As per Noss *et al*. (2001a, 2001b), the CRM assessment team differs from Margules and Pressey (2000) in giving higher weight to the upper left quadrant (our Tier 2, their quadrant 3) over the lower right quadrant, because we feel that sites of very high and irreplaceable biological value merit conservation action even if not highly threatened today. That is, it is a good idea to protect these sites while they are still reasonably intact. In the CRM, at least, the private lands in these areas are generally less expensive to protect than more threatened sites, because they are usually in areas with lower population growth and development pressure.

The conservation value vs. vulnerability prioritization resulted in 11 Conservation Areas totalling 368,666 hectares (910,605 million acres) in the Higher Value/Higher Vulnerability Tier 1 (Fig. 1, Map 17). Forty-three conservation areas in Tier 2 (Higher Value/Lower Vulnerability) cover 8,713,698 hectares (21,522,834 million acres); 4 conservation areas in Tier 3 (Lower Value/Higher Vulnerability cover 61,708 hectares (152,419 million acres); and 4 conservation areas in Tier 4 (Lower Value/Lower Vulnerability cover 4,311,470 hectares (10,649,330 million acres).

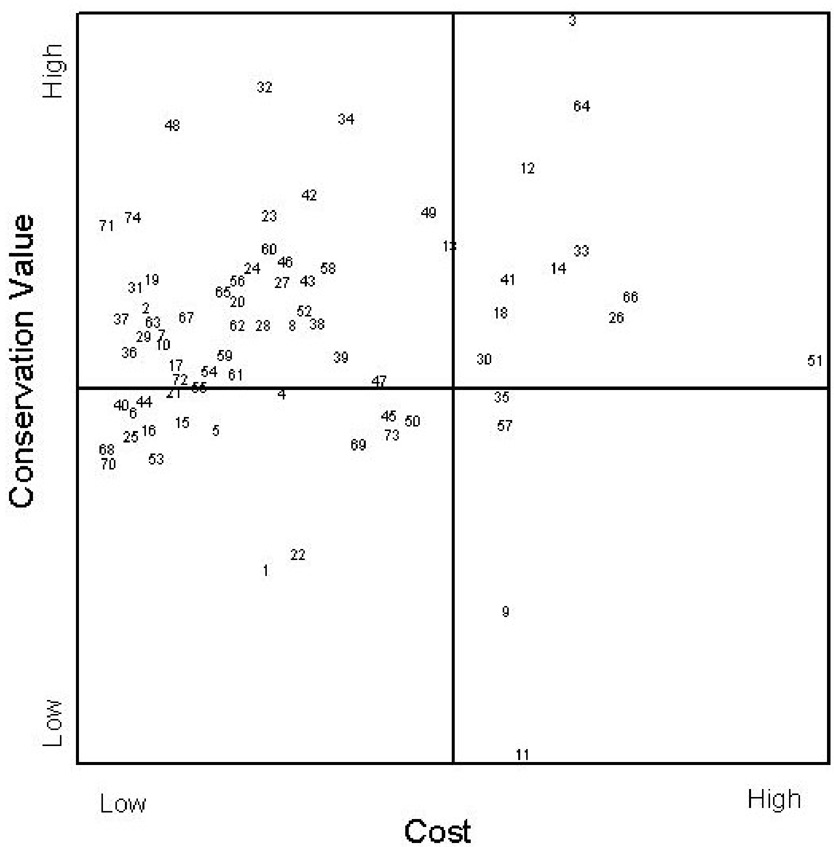
Comparison of Conservation Value and Vulnerability Among Planning Units

In order to take advantage of the finer scale at which conservation data was developed, each watershed planning unit was also plotted and compared based on conservation value and vulnerability scores. From these results, the team was able to review the distribution of planning units within Conservation Areas according to the tiered ranking system (Map 18). While the total area of the portfolio is 13,455,541 hectares, the analyses shows that only 1,082,062 hectares, or 4% of the ecoregion, falls within Tier 1 (Table 16). Another 6,909,166 hectares of the CRM portfolio, or 25.8% of the ecoregion, falls into Tier 2. Only 0.3% or 91,204 portfolio hectares are classed as Tier 3, while 31.3% of the ecoregion or 8,468,591 portfolio hectares are classed as Tier 4 watersheds.

Table 16. Distribution of Planning Unit Area according to Tiers.

Watershed Planning Unit Tier	Area within Ecoregional Portfolio (Hectares)	% Ecoregional Area
1	1,082,062	4.0%
2	6,909,166	25.5%
3	39,400	0.1%
4	5,424,913	20.1%

Figure 1. Comparison of conservation value and vulnerability (i.e., cost) amongst CRM Conservation Areas



1 = Adams River
2 = Ahbou Lake
3 = Bitterroot Mountain Snail EO
4 = Bitterroot Range (Middle Clark Fork)
5 = Bull River / Cabinet (Bull Lake/East Cabinets)
6 = Bull Trout Spawning Site
7 = Burbot Spawning Site
8 = Camas Prairie
9 = Cougar Bay
10 = Crown of the Continent
11 = Cusick
12 = Cyr Culch Bald Eagle Nest EO
13 = Dayton / Hog Heaven
14 = Dishman Hills / Mica Peak
15 = East-West Connectivity North
16 = East-West Connectivity South
17 = Elk River Valley
18 = Flathead Lake and Wetlands
19 = Fleabane / Salmon Driven
20 = Fraser River Headwaters
21 = Granby
22 = Hixon Creek Headwaters
23 = Hunt Girl Creek
24 = Jocko River
25 = Kakwa / Willmore
26 = Kootenai River
27 = Kootenay River A
28 = Kootenay River B
29 = Kootenay River C
30 = Lake Pend Oreille
31 = Landslide
32 = Least (Selkirk) Chipmunk
33 = Little Bitterroot River
34 = Little NF CDA Trib Model Data
35 = Lower Coeur d'Alene
36 = Lower Columbia A
37 = Lower Columbia B
38 = Lower Columbia C
39 = Mabel Lake
40 = Middle Columbia
41 = Mission Valley
42 = Moffat Creek
43 = Moody Creek Model Data
44 = Mountain Parks
45 = Moyie R Headwaters Model Data
46 = Murphy Creek Model Data
47 = North Thompson River
48 = Orofino / Ford Creeks
49 = Palouse
50 = Pend Oreille River
51 = Pleasant Valley
52 = Purcell Mountains
53 = Red Cedar Stand on Snowshoe Cr
54 = Rocky Mountain Front
55 = Rocky Mountain Trench A
56 = Rocky Mountain Trench B
57 = Salmo / Priest / Selkirks
58 = Salmo River
59 = Scotchman Peak
60 = SF Lolo Creek Model Data
61 = Shuswap Highlands
62 = Slender-Spike Manna Grass EO
63 = Slocan River
64 = Spirit Lake
65 = St. Joe / Clearwater
66 = Swamp Creek Model Data
67 = Thompson / Lower Clark Fork
68 = Torpy River Model Data
69 = Upper Coeur d'Alene
70 = Wapiabi Cave
71 = Weitas Creek
72 = Wells Gray / Bowron
73 = Wolf Creek Model Data
74 = Wooly Daisy EO

Discussion

Taking the mean scores of conservation value and vulnerability for each Conservation Areas tended to obscure some of the attributes of the constituent watershed planning units. As a result, most Conservation Landscapes were lumped together in Tier 2, the Higher Value/Lower Vulnerability category, while smaller areas constituting one to five planning units, tended to fall within Tier 1. However, the assessment amongst watershed planning units did add interpretive power to these results and provided much needed perspective for the scope of the conservation challenge in the CRM ecoregion. For example, the 11 Tier 1 Conservation Areas could be taken on as the initial CRM action sites. However, a more flexible interpretation might involve taking action at Tier 1 watersheds (4% of the ecoregion) wherever they fall within the portfolio. Likewise, as opportunity, leverage and feasibility are assessed, it may be more appropriate to take action at both Tier 1 and 2 watersheds (29.8% of the ecoregion) that fall within the Conservation Areas constituting the optimal, complete ecoregional solution (Map 19). In order to aid interpretation of these results at the Conservation Area scale, a map of Conservation Area watershed tiers is provided with each Conservation Area description in Volume 3 of this Assessment.

In practice, the results of this assessment need to be improved upon via a more rigorous qualitative assessment of conservation opportunity, feasibility and leverage—a task that is to be undertaken by a CRM implementation planning team. Further, site-specific factors considered in planning exercises, more detailed and fine-scale than the regional assessment described here, will be required to evaluate the relative values of different areas that may be scored in close proximity by our method.

O. CONNECTIVITY/LINKAGE ZONES

One of the defining characteristics of the CRM is the presence and persistence of wide-ranging species, in particular the large carnivores. Their presence is a testimony to relatively low levels of development and human populations and the high degree of intact, functional landscapes. Intact, functional landscapes imply a great deal of habitat connectivity. Connectivity can be defined as the relative degree to which individual animals and genes can move across a landscape. Natural landscapes have an inherent degree of connectivity to which species have adapted over time. The concept of landscape connectivity has been accepted by conservation biologists who recognize that connected populations have the highest likelihood for persistence over time (see Noss 1991). In the last decade, researchers and conservationists have focused on threats to connectivity, in particular habitat fragmentation. At the landscape or larger scale, many populations of wide-ranging species are at risk because of habitat fragmentation and the loss of connectivity.

Habitat fragmentation is the process of separating populations of animals and their habitats into smaller and smaller units. Small, fragmented populations of any species are less likely to survive. The main factor causing habitat fragmentation is human development, especially when development occurs in a linear fashion. Development in mountain valleys and transportation systems such as highways and railroads are common problems for wildlife. Maintaining connectivity or "linkage" between potentially isolated populations could prevent the many detrimental consequences of habitat fragmentation. Identifying areas important for connectivity or linkage to other habitats are an important component of carnivore conservation. Connectivity or linkage zones are broad areas of seasonal habitat where animals can find food, shelter, and security cover and provide connectivity between areas of core habitat (Servheen et al. 2001).

Relevant Research

Identifying and maintaining landscape "connectivity" within the CRM is the focus of current research and conservation efforts. This issue is being addressed by a number of scientists and conservationists within the ecoregion. Most efforts focus on federally listed species, such as the grizzly bear, as part of the recovery efforts. Little information on connectivity or linkage zones is available for other wide-ranging species, such as wolverine, fisher, caribou, and Canada lynx (although see Apps 2001). The Interagency Grizzly Bear Committee (a committee of US state, federal, and Canadian agencies) is working cooperatively to implement the Grizzly Bear Recovery Plan. They support the concept of linkage zones and have identified several sites within the CRM. These sites include linkage areas between Cabinet/Yaak and the Bitterroot recovery areas; Cabinet/Yaak and Selkirk recovery areas; Northern Continental Divide Ecosystem and Bitterroot recovery areas; and between the Northern Continental Divide Ecosystem and Cabinet/Yaak recovery areas. They also identified potential linkage areas between Cabinet Mountains and the Yaak River drainage. Predictive models identified the areas within these linkage zones where grizzly bears and other species movements are most likely successful because human activity is relatively low (Servheen et al. 2001).

Richard Walker and Lance Craighead, supported by American Wildlands through their Corridors of Life project, developed GIS analysis of core reserve and corridor habitat in the Rockies Mountains of Montana and Idaho using effectiveness (least cost) models for 3 species: elk, mountain lion and grizzly bear (Walker and Craighead 1998). Within the CRM, their models identified a corridor between the Salmon/Selway (ID)-Northern Continental Divide (MT) Ecosystems. This corridor lies at the southern end of the CRM and the northern end of the Middle Rockies ecoregion and connects (roughly) our Crown of the Continent Conservation Area and the Bitterroot Mountains/Middle Clark Fork Conservation Area.

Dr. John Weaver, Wildlife Conservation Society, identified the Transboundary Flathead region as a critical linkage zone for carnivores occupying the Glacier/Waterton area and connecting the protected National Parks land with public lands in both Montana and southeast British Columbia (Weaver 1997). The USFWS recently completed a study documenting the connectivity values for carnivores in the Middle Fork of the Flathead River (Waller pers. communication).

Canadian researches have been studying the same concepts in the BC and Alberta portion of the CRM. Dr. Mike Gibeau and Dr. Steven Herrero have researched grizzly bear security areas and connectivity within Banff, Yoho and Kootenay National Parks (Gibeau and Herrero 1998; Gibeau 1998). Dr. Shelley Alexander and Dr. Paul Paquet with the University of Calgary (AB) and the Miistakis Institute analyzed the impacts of human development on wolf and cougar movement in the Canmore Corridor Project (www.rockies.ca). The Eastern Slopes Grizzly Bear Project (AL) principle researchers, Dr. Gibeau and Dr. Herrero documented movement of bears along the Kananaskis region of the Rocky Mountains (Gibeau and Herrero 2002). Identification of grizzly bear linkage zones along Highway 3 corridor of southwest Alberta was the focus of studies by Dr. Clayton Apps (Apps 1997).

How did the CRM team deal with connectivity issues?

The team recognized that the SITES program analysis used to develop the draft portfolio does not adequately identify or address connectivity areas for wide-ranging species. We addressed the conservation gap in four ways: 1) PATCH analysis of carnivore persistence with a draft terrestrial portfolio; 2) including expert nominated sites known as important linkage areas for carnivores or prey species (BC); 3) increasing the carnivore RSF goals to 40% to provide greater habitat inclusion in the final portfolio; and 4) comparing our portfolio results to identified linkage zones from other studies and identifying gaps in connectivity.

The team, through Dr. Carlos Carroll's PATCH analysis (see Appendix 6.0), reviewed the portfolio at different goal levels for the carnivore resource selection function. By increasing the goals for carnivore resource selection function to 40% during the portfolio analysis, our actual portfolio increased in size and resulted in larger aggregated sites in the Conservation Areas. The resultant portfolio contained larger portfolio areas with greater assumed connectivity for wide-ranging species.

During various workshops in Canada, we obtained site-specific information on important areas for both prey (ungulates) and carnivores. These corridors or linkage areas were included in the SITES runs as expert identified sites and therefore showed up in the final portfolio. In particular, three areas in British Columbia specifically addressed connectivity – the Elk River Valley Conservation Area (based upon an earlier proposed provincial Southern Rockies Management Area), the East/West Connectivity North Conservation Area, and the East/West Connectivity Area South.

Finally, team members reviewed the aggregated portfolio watersheds within Conservation Areas and compared them to existing known or predicted linkage areas. In many cases, the Conservation Areas included identified linkage zones. In a few cases where the linkage zones were not included in the Conservation Areas, the team decided to show these as separate layers over the Conservation Areas. The results are as follows:

Montana and Idaho– we compared our portfolio watersheds and the aggregated Conservation Areas to the Grizzly Bear Linkage Zones identified by Servheen et al. (2001). Dr. Servheen and colleagues analyzed potential linkage areas within and between ecosystems identified for the grizzly bear recovery plan.

Connectivity between Cabinet/Yaak and Bitterroot Ecosystems
Areas along Interstate 90 and Montana Highway 200 were identified as potential fracture zones between the Cabinet/Yaak and Bitterroot Ecosystems.

1) Four Linkage Zones were identified along Montana Highway 200 between the Plains, Montana and the Idaho border. All zones were embedded within the Thompson/Lower Clark Fork/Bull Rivers Conservation Area.
2) Three Linkage Zones were identified along Interstate 90 between St. Regis, Montana and Lookout Pass on the Idaho border. Two linkage zones (Haugen to Saltese and St. Regis) were embedded within the Bitterroot Mountains/Lower Clark Fork River Conservation Area. The Lookout Pass Linkage Zone was outside the portfolio watersheds.

Connectivity between the Cabinet/Yaak and Selkirks Ecosystems
Severe habitat fragmentation has occurred in the broad valley between Colburn and the Idaho-Canada border along Highway 95 and Idaho Highway 1, however, Servheen et al identified a few areas that may allow movement between these two ecosystems.

1) The McArthur Lake Linkage Zone along Highway 95 north of Elmira, Idaho is embedded within the Salmo/Priest/Selkirk Conservation Area.
2) The Moyie River Linkage Zone along Idaho Highway 1 east of Copeland is embedded within the Kootenai River A Conservation Area.
3) North Priest Lake Linkage Zone northeast of Nordman, Idaho is embedded within the Salmo/Priest/Selkirk Conservation Area.

Connectivity between the Northern Continental Divide and the Bitterroot
Fragmentation along Interstate Highway 90 between Missoula and Superior, Montana and along US Highway 93 north of Missoula impact connectivity between core habitat in the Northern Continental Divide ecosystem and the proposed reintroduction area within the Selway/Bitterroot ecosystems.

1) The Evaro Hill Linkage Zones along Highway 93 north of Missoula is embedded within the Jocko River Conservation Area.

2) Four Linkage Zones along Interstate Highway 90 between Missoula and Superior are embedded with the Bitterroot Mountain/Middle Clark Fork River Conservation Area.

Connectivity between the Northern Continental Divide and the Cabinet/Yaak
There area two primary obstacles to movement of bears between these two ecosystems – US Highway 93 and US Highway 2.

1) The Sunday Creek Linkage Zone along Highway 93 between Olney and Trego, Montana was embedded within both the Purcell Mountain and the Crown of the Continent Conservation Areas.

Connectivity between the Yaak and the Cabinets Ecosystems
US Highway 2 separates the Cabinet Mountains and the Yaak River watershed and Montana Highway 56 separates the West Cabinet Mountains from the East Cabinet Mountains.

1) Two Linkage Zones (Burrel/Dad Creeks and confluence of Yaak River/Kootenai River), along US Highway 2 between Libby and Troy, Montana are embedded within the Kootenai River and Purcell Mountain Conservation Areas.

2) The Lower Bull River Linkage Zone along Montana Highway 56 is embedded within the Thompson/Lower Clark Fork/Bull Rivers Conservation Area.

Connectivity within the Northern Continental Divide Ecosystem
Primary fracture zones within the Northern Continental Divide Ecosystem include the US Highway 2 corridor along Marias Pass between Glacier National Park and the Great Bear/Bob Marshall Wilderness Complex and Montana Highway 83 between the Bob Marshall Wilderness and the Mission Mountain Wilderness.

1) Seven potential Linkage Zones along the Middle Fork of the Flathead River and US Highway 2 were identified. All zones were embedded within the Crown of the Continent Conservation Area.

2) Four potential Linkage Zones along Montana Highway 83 (the Swan Valley) were identified. All zones were embedded within the Crown of the Continent Conservation Area.

In southeast British Columbia and southwest Alberta – (based on work by Dr. Clayton Apps 1997):

Connectivity along the Transboundary Region of US and Canada
Dr. Apps reported that populations are particularly prone to fragmentation where human impacts are concentrated in a linear manner and where there is a trend toward increased and permanent development. Such is the case along Highway 3 southeast British Columbia and southwest Alberta. Dr. Apps identified several important linkage zones along this transportation corridor.

1) Three linkage zones were identified in the area between Creston and Cranbrook, including the Kitchener and Goatfell area, the Yahk and Moyie Lake area, and the Cranbrook to Lumberton area. The Yahk/Moyie Lake linkage zone was embedded in the Purcell Mountains Conservation Area but both of the other linkages zones were not captured in conservation areas.
2) Three linkage zones were identified in the area known as the Elk River/Crow's Nest Pass area, including the Morrissey Creek/Lizard Range site, the Sparwood/Hosmer area, and the eastern extent of Crow's Nest Pass. These linkage zones were embedded in the Elk River and Rocky Mountain Front Conservation Areas.

East-West Connectivity in Southeast British Columbia
A few areas were identified during expert workshops as important connectivity between river systems such as the Columbia River and Kootenay River and areas across the Rocky Mountain Trench. These areas were treated as expert identified sites and were included as actual Conservation Areas.

Summary

Areas that were considered important linkage zones for connectivity were generally captured in our broadly defined Conservation Areas. However a few linkage zones as identified by researchers, did not show up in conservation areas and should be further refined or included during the conservation area planning process.

P. THREATS ASSESSMENT

The objectives of the preliminary threats assessment were to: 1) identify general threats at each conservation area while keeping individual conservation targets in mind; and 2) assess and describe patterns across multiple portfolio conservation areas. Threats analyses at the level of site conservation planning typically include evaluation of both the *stress* (something that impairs or degrades the size, condition and landscape context of a target, resulting in reduced viability) and the *source of stress* (activity or factor causing the stress). However, for purposes of this broad-brush ecoregional threats analysis, the team decided the most meaningful factor to evaluate threats to species, communities, and systems at conservation areas was the source of stress- the cause of destruction, degradation, fragmentation, or impairment of conservation targets at a conservation area.

Understanding the threats to targets at specific conservation areas and patterns of threats across multiple areas helps to determine which conservation areas are in urgent need of conservation action, and to inform the development of multi-site strategies. This threats assessment was based on site-specific knowledge of the conservation targets at each of the conservation areas, both from Conservancy staff and Natural Heritage Programs, with further review by local experts. Comprehensive assessment of all threats (i.e., stresses and sources of stress) at all conservation areas was beyond the scope of this project. Further work through site conservation planning is needed to update and refine threats to targets at the portfolio conservation areas.

Severity and Urgency

Degree of threat was considered to be a function of the severity and urgency of the threat to the conservation targets at conservation areas. Using the best available information, the core team identified and refined the key threats to each conservation area (where known) and ranked them according to their severity and urgency. The team did not rank the degree of threats to individual conservation targets but developed ranks for the conservation areas with the primary targets in mind. Definitions and ranks are provided below.

Severity: What level of damage to the primary target(s) at a conservation area can be expected within 10 years under current circumstances?

- High: stress is likely to seriously degrade, destroy or eliminate the target(s) over some portion of the targets' occurrence at the site
- Medium: stress is likely to moderately degrade the conservation target(s) over some portion of the targets' occurrence at the site
- Low: stress is likely to slightly impair the conservation target(s) over some portion of the targets' occurrence at the site

Urgency: How urgent is the threat within the conservation area or portion of area.

- High: threat exists now or is likely to exist within next 2-4 years
- Medium: threat is likely to exist within 5-10 years
- Low: threat is not likely to exist within 10 years.

Data for conservation area threats analysis were gathered from Core Team members on their respective states or provinces. Additional information for threats in Idaho and Montana was obtained from the U.S. Forest Service Region 1 Cohesive Strategy for both information on fire and invasive species (www.fs.fed.us/r1/cohesive_strategy/). The current fire condition class map was used as an indicator of the severity of the fire management threat to the targets at each conservation area. The map delineates the degree of departure from the historic fire regime (high: missed multiple return intervals; medium: moderately altered, missed one or more return intervals; and low: near historic return intervals). Data for the Montana and Idaho conservation areas are presented in Appendix 9.0. Similar data on fire condition was not available for British Columbia and Alberta.

Results of Threats Assessment

While further documentation, research, and analysis of threats to targets at each area is needed, the results of this threats assessment represent a good starting point for addressing issues that cross site and political boundaries (e.g., invasive species). This analysis was not intended to be exhaustive but represents the knowledge, experience, and observations of the team members and interviewed experts. Other new threats not identified here may also have an impact on the targets. See Table 17 for a summary of major threats at Conservation Landscapes (by number of areas with high severity and urgency) and the complete threat analysis is located in Appendix 9.0.

Table 17. Summary of Major Threats to CRM Conservation Landscapes

Threat	# of areas with high severity and urgency	% of areas with high severity and urgency	# of areas impacted by threat	% of areas impacted by threat
Invasive species – plants	15	28%	26	48%
Fire management	14	26%	25	46%
Forestry practices	13	24%	39	72%
Recreation (all sources combined)	12	22%	42	78%
Dam construction or operation of dams	11	20%	19	35%
Residential development	11	20%	26	48%
Point/non-point sources of pollution	9	17%	18	33%
Recreational infrastructure development	7	13%	15	28%
Transportation/utility corridors	7	13%	13	24%
Landownership patterns	5	9%	10	19%
Mining practices	5	9%	12	22%
Small population size and distribution	5	9%	7	13%
Conversion to agriculture or silviculture	4	7%	12	22%
Invasive species - animals	4	7%	12	22%
Recreational use	4	7%	16	30%
Commercial/industrial development	3	6%	6	11%
Oil or gas drilling	3	6%	5	9%

Table 17 cont'd:

Threat	# of areas with high severity and urgency	% of areas with high severity and urgency	# of areas impacted by threat	% of areas impacted by threat
Over fishing	3	6%	8	15%
Channelization of rivers or streams	2	4%	13	24%
Ditches, dikes, drainages and diversions	2	4%	13	24%
Grazing practices	2	4%	16	30%
Road Density	2	4%	16	30%
Stream bank/Shoreline stabilization	2	4%	5	9%
Management of/for certain species	1	2%	4	7%
Recreational vehicles	1	2%	11	20%
Stream sedimentation	1	2%	6	11%
Wastewater treatment	1	2%	1	2%
Crop production practices	0	0%	10	19%
Livestock production practices	0	0%	4	7%
Multi-jurisdictional policies don't match	0	0%	4	7%
Poaching or commercial collecting	0	0%	2	4%

The analysis reflects the widespread nature of the major threats impacting conservation areas within the ecoregion. The most severe and urgent threats across landscapes were invasive plants, fire management, forestry practices, and parasites/pathogens. Recreational uses/development, hydrologic alterations and residential development also scored as severe and urgent threats. These threats also tended to be pervasive throughout the CRM's Conservation Landscapes. Most notably, recreation based threats were identified at 78% of CRM Conservation Landscapes and incompatible forestry practices were listed as a source of stress to conservation targets at 72% of landscapes.

These threats or sources of stress are interrupting fundamental ecological processes needed to maintain the conservation targets in the Canadian Rockies Ecoregion. A brief description of the pervasive and urgent/severe threats is below (listed in alphabetical order).

Fire Management Practices

Fire management practices, activities that significantly change the natural fire regime, were identified as a threat within 46% of the conservation areas) and ranked high for both severity and urgency at 26% of the areas. In the fire-adapted ecosystems of the Canadian Rockies, fire is undoubtedly the dominant process in terrestrial systems that influences vegetation patterns, habitats, and ultimately species composition. Fire management practices interact with several other threats to conservation areas. For example, altered natural fire regimes can lead to invasion by non-native fire adapted plants, or forests that are more prone to insect and disease impacts (Stark and Hart 1997).

For thousands of years, western forests have been under the influence of burning. Frequent, low-intensity, small fires once cleared out brush and small trees, leaving a mosaic of seral stands and openings. In the past 150 years, humans have significantly altered fire regimes, both in terms of setting fires and suppressing them, changing both the severity and frequency across the landscape.

Before Euro-Americans settlement, most fires in the low and mid-elevation forest were non-lethal (does not kill the dominant layer of plants). Forests and grasslands benefited from the frequent, surface fires, which thinned vegetation and favored growth of fire-tolerant trees. Lethal or stand-replacing fires played a lesser role in the landscape. Lethal fire regimes now exceed non-lethal fire regimes in forested areas throughout the ecoregion. Rural development, fire suppression and exclusion, slash and burn timber harvest techniques, and invasion by non-native fire adapted plants have contributed to these changes. (Quigley et. al. 1997)

As a result, several range and forest characteristics have changed dramatically. Native grasslands and shrublands have declined. Noxious weed spread is expected to accelerate dramatically. Tree species mix and age classes have changed. For example, historically, there were older and mixed age class stands. Now uniform stands of middle-aged trees predominate. (Quigley et al. 1997) Since the early 1900's, fire suppression in the interior northwest has resulted in a successional replacement of seral species such as, ponderosa pine (*Pinus ponderosa*) and western larch (*Larix occidentalis*) to stands of Douglas-fir (*Pseudotsuga menziesii*). This successional replacement has profound ecological implications, including alteration of water, nitrogen, and carbon cycles. Fire suppression has also resulted in overcrowded forests. Crowded forest stands are less diverse and their trees have less vigor. They're more susceptible to insect outbreaks, large forest fires and disease.

When fires occur outside a range of historical or natural variability—too much, too little or the wrong kind—ecosystems often undergo wholesale changes, including loss of biodiversity at several levels. "Fire-adapted" ecosystems possess a structure, composition and function resilient over time to repeated fire, and include many native fire-dependent species. When fire is excluded, vegetative succession occurs. Seral species are lost. Flammable fuels accumulate, ultimately resulting in large and destructive wildfires. In contrast, "fire-sensitive" ecosystems rarely experience natural fire. In these ecosystems, large, intense wildfires lead to dramatic reductions in diversity and conversion of plant communities. Thus, threats are of two primary types:

Fire exclusion in fire-adapted ecosystems
Leading causes include: national or local suppression policies geared toward protecting property; incompatible grazing and forestry practices that alter fuels; landscape-level fragmentation that hinders fire spread; escalating encroachment of humans and human infrastructure into wildlands; misperceptions about the benefits of fire; and lack of prescribed fire capability.

Indiscriminate burning in fire-sensitive ecosystems
Leading causes include: escaped agricultural fires; fires set to clear forests or burn logging slash (legal and illegal); invasion by non-native fire-adapted plants; lack of policy or enforcement; lack of understanding and knowledge; and lack of suppression capability.

Across the ecoregion, natural fire regimes are significantly altered, posing major threats to biodiversity. The threat posed to biodiversity by altered fire regimes is both severe and vast. Millions of acres of highly diverse lands are at risk from inappropriate fire regimes: too much fire, too little fire, fire in the wrong season, or fire at an inappropriate intensity and scale. Altered fire regimes can inflict devastating wounds, from the loss of a single fire-dependent species to wholesale ecosystem change. Inappropriate fire suppression techniques pose an additional threat.

Fire—as an ecologically beneficial or harmful *process*—is a local phenomenon, occurring at the scale of landscapes and individual land ownerships. The *sources* of fire-related threats, however, originate at local, as well as regional and global scales, including trends in politics, economics and wet/drought cycles. Because the scope of the problem is enormous, unprecedented interagency cooperation and public support, along with strong science, will be key to addressing the challenge.

Forestry Practices

Forestry practices were identified as a threat to the conservation targets at 72% of the areas (ranked as high severity and urgency at 24% of the areas). Poor forestry practices, including inappropriate harvest prescriptions and fire suppression, have contributed to the serious decline in forest health throughout the ecoregion. Poor historic practices have resulted in change in forest compositions and the introduction of damaging diseases, insects or vegetation. Historical and current logging practices have eliminated most low-elevation, old growth forests, particularly of ponderosa pine, Douglas-fir, and mixed coniferous forests (Shinneman et al. 2000). In addition, forest logging practices often create different temporal and spatial patterns than natural disturbances such as wind throw and fire (Sousa 1984).

While there are demonstrated ecologically beneficial uses for some harvest prescriptions, the inappropriate use of harvest prescriptions such as shelter wood harvests, even- age management, and single species selective harvests have significantly contributed to the reduction of forest health in areas throughout the ecoregion. Fortunately, vast areas of the ecoregion still exhibit intact forests of native tree species. However, in some areas, species compositions have changed substantially, in part due to poor forestry practices, as provided for in the two examples below:

Ponderosa Pine

Historically, ponderosa pine forests predominated on warm-to-hot, dry sites at the lower elevations along the east slope of the mountains and in major river valleys. Mature ponderosa pine forests were commonly quite open, a condition that was maintained by intermittent low intensity fires averaging every 5 to 25 years. These surface fires consumed the needle duff and killed most understory trees. Bark beetles killed individual or small groups of aging or stressed trees, which were eventually replaced by regeneration that had survived the fires.

Ponderosa pine is now less common, having been replaced by denser forests of Douglas-fir or grand fir. The change is a result of fire suppression and timber harvesting. Without fire, the more shade-tolerant Douglas-fir and grand fir become established and out compete the ponderosa pine.

Early species-selective harvesting of ponderosa pine accelerated the shift in composition toward Douglas-fir and grand fir. The net result has been a change from predominantly semi-open, mature ponderosa pine forests to dense, younger forests, many of which are multi-storied, shade tolerant species more susceptible to fire and disease.

Western White Pine

Until about 50 years ago, western white pine was an abundant forest type. Prior to European settlement, the landscape pattern consisted of large mosaics of many thousands of acres, major portions of which were of a similar age class, a legacy of mixed-severity and large stand-replacement fires. White pine forests of 200 or more years of age were common. The combination of poor historic forestry practices, fire suppression and the white pine blister rust has nearly eliminated mature western white pine stands. White pine was and still is a highly prized wood product. The forestry practice of harvesting the oldest and best white pine significantly contributed to its decline. Additionally, fire suppression allowed western redcedar, western hemlock, or grand fir species to eventually take over white pine stands and dominate many sites. The primary agent of change is the white pine blister rust. The rust, a disease of white pines, did not formerly occur in North America until accidentally introduced into Vancouver Island, British Columbia in about 1910. By the 1940s, the disease was epidemic in the Interior Northwest.

Invasive Species

Invasive exotic plants were identified as threats at 48% of the areas for plants (ranked with high severity and urgency at 28%) and 22% of the areas for animals (ranked with high severity and urgency at 7% of the areas). Some plants such as Canada thistle (*Cercium canadensis*) and cheatgrass (*Bromus tectorum*), and animals such as non-native trout (brown, rainbow) are widespread in the Canadian Rockies. These invasive species often out-compete native species or disrupt natural processes native species need for survival. For example, non-native trout, introduced for sport fishing, out-complete and hybridize with native cutthroat trout, degrading the genetic purity of native trout populations (Oelschlaeger 1995). Invasive species, especially plants, often have a difficult time establishing in pristine, and unfragmented areas. These species often arrive following disturbances or stresses to the landscape such as residential development, roads, utility corridor development, or long-term improper grazing.

All natural vegetation communities are somewhat at risk. The communities most at risk include low-elevation grassland communities and the drier forest types threatened by invasive plant species such as leafy spurge (*Euphorbia esula*), the knapweeds (*Centaurea spp.*) and dalmatian toadflax (*Linaria genistifolia ssp. dalmatica*). Some wetland types are also particularly threatened by invasive species such as purple loosestrife (*Lythrum Salicaria*), and Eurasian water milfoil (*Myriophyllum spicatum*).

The scientific study of invasion is in its infancy. We know enough, however, to be confident that aggressive action is warranted to slow the flow of new invaders and to reduce the impacts of established, habitat-altering species. Many impacts are poorly understood, and these include the long-term impacts of some control methods (e.g., chemical, mechanical, or biological methods) that may themselves pose a threat to native systems.

Of the many non-native species that may be introduced to a native ecosystem, some act as competitors, predators, pathogens, or disrupters of key ecological processes (nutrient cycling, flood or fire regimes, etc.). Others exhibit no clear negative impacts, or may enhance the habitat for certain native species while harming other native components.

Mining Practices

Mining practices were identified as a threat to the conservation targets at 22% of the areas, and ranked high for both severity and urgency at 9% of the areas. Mining, including hard rock mining and gravel mining, historically and currently occurs throughout the Canadian Rockies. There are numerous active or abandoned mines in the region, many of which have degraded downstream aquatic and riparian systems. Mining is British Columbia's third largest industry. The province provides more than half of Canada's coal production, along with a growing range of metals, industrial minerals and structural materials used domestically and exported around the world. Along with coal, British Columbia is a major producer of copper, gold, zinc, silver, lead and non-metallic minerals (http://www.gov.bc.ca/em/).

Leaching of toxic chemicals and heavy metals has destroyed or seriously degraded aquatic systems downstream of release areas. Gravel mining destroys riparian vegetation and alters hydrology. While mining activities are a direct threat to aquatic targets, the associated fragmentation and weed invasion along roads impact many large-scale ecological systems.

Oil and Gas Exploration and Development

Oil and gas exploration was identified as a threat to the conservation targets at 9% of conservation areas (ranked as high severity and urgency at 6% of the areas). The eastern fringe of the Canadian Rockies ecoregion has demonstrated the greatest potential for economic discoveries. This area includes those portions of the Overthrust Belt and the Western Canadian Sedimentary basins. Exploratory activity is occurring in other areas as well. Coal bed methane gas exploration is the latest potential development. While actual habitat loss may be relatively minor, associated impacts with gas and oil development including road construction, seismic lines and access may contribute greater impacts to some conservation targets.

Parasites and Pathogens

Parasites and pathogens were identified as a threat in 50% of the areas and rank high severity and urgency in 24%. The category includes organisms that impact forest vegetation, disturbances by major forest pathogens and insects beyond the natural variability, and organisms that impact to native trout. Diseases and insect pests of conifer trees are important features of forests in the Canadian Rockies. While some level of native insects and diseases play an important role in forests, alien pests and diseases and altered fire regimes and other factors have contributed to changes in the landscape.

Native insects, including Douglas-fir beetle (*Dendroctonus pseudotsugae*), Douglas-fir tussock moth (*Orgyia pseudotsugata*), Mountain pine beetle (*Dendroctonus ponderosae*), western pine beetle (*Dendroctonus brevicomis*) and western spruce budworm (*Choristoneura occidentalis*) may have artificially high populations due to fire exclusion, past inappropriate timber management practices, and drought conditions.

Mountain Pine Beetle
Mountain pine beetle (*Dendroctonus ponderosae*) populations continue to expand and impact lodgepole pine and whitebark pine stands throughout northern Idaho and western Montana. Mountain pine beetle was considered the most damaging pest in British Columbia during 2001 (Westfall 2001). White pine blister rust (*Cronartium ribicola*) causes extensive tree mortality throughout the range of western white pine. Mortality of naturally occurring regeneration has virtually eliminated western white pine from many forests. This has resulted in major changes in historical transitions in forest types over broad areas.

White-pine blister rust
Blister rust is also causing extensive mortality in high-elevation five needle pines. Recent surveys in northern Idaho and western Montana high elevation forests have found infection rates in whitebark pine (*Pinus albicaulis*) regeneration of up to 90%. Whitebark pine is an ecologically important species of the subalpine forest of the Rocky Mountains. There is growing concern that severe losses of large diameter whitebark pine due to mountain pine beetle coupled with regeneration losses due to blister rust may have significant impacts on water and wildlife in these fragile ecosystems (Harris et al. 2002).

Root Diseases
Root diseases are common in the moist Douglas-fir, grand fir and high elevation cool sub-alpine forests in the Rockies. Root diseases have increased significantly over the past several decades. In mixed species stands, disease has a thinning effect by removing susceptible and leaving disease-tolerant species. In stands of susceptible species, the entire stand can be killed. Root diseases are variable in distribution, but can have major effects in some areas. For example, a root disease assessment in the Coeur d'Alene River Basin in the Rockies indicated that 35 % of the basin consisted of Douglas fir or grand fir cover types with root disease (Hagle et al. 1994). Of the infested acres, 62% were rated as severely affected, meaning more than a 20% reduction in canopy had occurred.

Dwarf Mistletoe
Dwarf mistletoes are obligate parasites that survive only on live branches or stems of living trees. Dwarf mistletoes grow in tree bark and wood, absorbing water and nutrients of the host tree that are otherwise used for growth. Dwarf mistletoes influence the health of coniferous forests because they reduce the vigor of heavily infected trees. The infection can kill the affected trees outright or predisposes them to attack by insects and/or other pathogens. Fire suppression efforts and selective harvesting practices have left infected overstory trees above those being regenerated.

Whirling Disease
Whirling disease is a parasitic (*Myxobolus cerebralis*) infection that attacks the nerves and cartilage of small trout, reducing their ability to feed and avoid predators. The disease has been in some eastern states and provinces for many years but was first found in Idaho in 1987 (St. Joe

and Coeur d'Alene rivers) and in Montana (Swan and Clark Fork rivers) in late 1994. It is considered the "greatest single threat to Montana's wild and native trout populations" (Montana Whirling Disease Task Force, www.whirlingdisease.org). Whirling disease has not yet been detected in British Columbia and Alberta.

Point/Non-Point Source Pollution

Point/Non-Point Source Pollution was identified as a threat to the conservation targets at 33% of the areas (high severity and urgency at 17% of the areas). Non-point source pollution (NPS) is when pollution originates from many different sources rather than one specific, identifiable source. NPS occurs when rainfall, snowmelt, or irrigation runs over land or through the ground, picks up pollutants, and deposits them into rivers or lakes, or introduces them into ground water. Not only can it contaminate water, it can also cause adverse changes to the vegetation and affect the shape and flow of streams and other aquatic systems. Examples of non-point source pollution in the Canadian Rockies include heavy metals or toxins (e.g., mining activities, industrial wastes), nutrients (e.g., fertilizers, animal wastes, industrial discharges.), pesticides (e.g., herbicides, insecticides, fungicides), and sediments (e.g., erosion of roads, crops, forest lands).

Point sources of pollution comes from a concentrated originating point that directly discharges wastes into water bodies, such as an industrial factory, sewage treatment plant, or livestock facility. In the CRM, point sources include pulp mills, smelters, domestic sewage, and mining operations.

Recreational Development and Use

Recreation use (all recreation uses combined) was identified as a threat to the conservation targets at 78% of the portfolio areas and was ranked with a high severity and urgency at 22% of the areas. Recreation use, especially off-road vehicles, can degrade or destroy small populations of rare plants, disturb wildlife, modify habitat, spread invasive species, and fragment large-scale ecological systems (Knight and Gutzwiller 1995, Knight et al. 2000). The ecoregion has long been known for its outstanding recreational opportunities. The ecoregion has been and continues to be used intensively for hunting, fishing, camping, horseback riding, skiing, off-road vehicle use, and more recently heli-tours, heli-hiking, and heli-skiing. Recreational use, particularly motorized vehicle use, heli-hiking and heli-skiing of the region's resources are likely to increase over the coming years.

Public policies toward recreation uses will also have a great impact on some conservation targets. A shift toward more commercial recreation permits and tenures in British Columbia will likely cause increases in numbers of recreational users as well as a potential increase in the distribution or location of recreational use.

Residential Development

Residential development was identified as a threat to the targets at 48% of the conservation areas with high urgency and severity at 20% of the areas. The majority of the conservation areas are on public lands, but a significant portion of low-elevation valleys and woodlands, riparian areas, and montane grasslands are in private ownership and susceptible to development.

Urban sprawl and expansion of low-density residential areas into natural landscapes are among the most significant threats to conservation targets in the Canadian Rockies due to the severity of the impacts. Residential development is causing fragmentation and significant changes in land use with the conversion of forested and agricultural lands to development. Residential development and associated infrastructure development (e.g., roads, commercial development, ski area expansion) cause fragmentation and habitat loss, remove and alter native vegetation, degrade wetlands and aquatic systems, increase human activity and recreation, inhibit wildlife movement, and spread invasive species. Additionally, urban development, especially in forested areas is contributing to the alteration of natural fire regimes. When landscapes are developed and human health and property values are at risk, wildfires are controlled, resulting in change to the natural functioning ecosystem process (see Fire Management above).

Comparable data for demographics and residential development in the U.S. and Canadian portions of the Canadian Rockies ecoregion was not available. However, it is clear that some areas within the Canadian Rockies are experiencing rapid growth including the Flathead Valley in Montana, Lake Pend d'Oreille in Idaho, Fernie and the Invermere Valley of British Columbia, and Alberta's East Front of the Rockies. Residential development especially outside the incorporated cities can dramatically impact natural systems and conservation targets by altering environments in the low elevation, easily accessed yet critical habitat areas. As example, in the Flathead Valley, nearly 70% of growth is occurring outside the incorporated cities (Flathead Regional Development Office). Contributing to the growth is an influx of "urban refugees" who choose to retire or run their businesses in a rural setting in the Rocky Mountains. Quality of life and outdoor recreation opportunities contribute to the continuing attraction to newcomers.

Road Density

Road density was identified as a threat to the conservation targets at 30% of the areas (ranked as high urgency and severity at 4% of the areas). Road building is one of the most damaging threats to intact landscapes, particularly regarding hydrological function and habitat fragmentation. Roads are corridors for dispersal of invasive species, inhibit some wildlife movement, and can cause elevated mortality of wildlife species (Knight el al. 2000). In particular, species such as grizzly bear are impacted by road networks that extend into what would be otherwise remote wilderness areas. These roads increases the frequency of human/bear contact—an interaction that often results in a bear being killed either accidentally or purposely (McLellan and Shackleton 1988).

In the CRM, road proliferation is largely a consequence of other threats listed in this section such as forestry operations, residential development, recreational development as well as oil and gas exploration. Public policies on road management will greatly impact several conservation targets including natural communities, aquatic species, and wide-ranging carnivores.

Transportation and Utility Corridors

Transportation and utility corridors were identified as a threat at 24% of the conservation areas (ranked with high urgency and severity at 13% of the areas). These corridors have been specifically highlighted from other threats posed by road density and proliferation, due to the dramatic fragmenting effect large improved highway systems and the associated utility and railway development can have at an ecoregional scale.

Both road density and road/utility corridors threat is critical to the wide-ranging species conservation targets. Carnivores are particularly vulnerable to habitat fragmentation from highway development because of the large spatial requirement of individuals and populations. Highways adversely affect carnivores by an increase in direct and indirect mortality, displacement and avoidance of habitat near highways, habitat fragmentation, direct habitat loss and habitat loss due to associated human developments. The impacts on carnivores resulting from upgrading highways are often permanent and severe (Ruediger et al. 2000).

Several major highway systems impact the Canadian Rockies ecoregion including several that cut east-west such as U.S. Highway 2 (Montana and Idaho), the Trans-Canada Highway 1 and Canada Highway 3 (British Columbia and Alberta), and several more that run north-south including U.S. Highway 95 (Idaho), Highway 93 (Montana) and Highway 95 (British Columbia). Even more ominous are proposed four lane highway expansions for U.S. Highway 2 and Canadian Highway 3. As highways are improved and traffic volumes increase, the impacts of habitat fragmentation, mortality and displacement increase.

Large highway and railway transportation corridors also present different impacts especially since they are generally located near major rivers. Potential for toxic spills exists for both truck and railroad traffic. Some grizzly mortalities along Highway 3 corridor (Montana) can be attributed to direct collisions with trains and indirectly with grain spills attracting grizzlies to the highway/train corridor.

Water Management

Water management practices were identified as a threat to the conservation targets at a total of 69% of areas (dam/reservoir operation at 35% of the areas; ditch, dikes, diversions at 24% of the areas; and channelization at 24% of the areas). Water related threats that ranked with a high urgency and severity were dam/reservoir operation at 20%, ditches and diversions at 4%, and channelization at 4% of the areas. There are dozens of dams in the Canadian Rockies and hundreds of diversions, and ditches which have altered hydrologic functions and reduced water flows and quality, impacting aquatic and riparian systems and flooding natural wetlands and small ponds (Shinneman et al. 2000, Hammerson 1999). The result of these human modifications of watersheds and stream systems has lead to severe impacts on aquatic systems through the ecoregion.

Q. CLIMATE CHANGE

The team addressed potential climate change impacts in this assessment by ensuring that the portfolio as a whole spanned the full range of climatic gradients in the ecoregion and that individual conservation areas spanned the greatest possible altitudinal range within contiguous natural areas. This was accomplished by: 1) classifying terrestrial and aquatic ecosystems and mapping their current distributions in a near-comprehensive manner; 2) establishing minimum size thresholds for each system type to account for a wide potential range of variation in natural disturbance regimes; 3) using sections and Ecological Drainage Units to ensure sub-ecoregion-scale climatic variation was well represented among both terrestrial and aquatic systems; and 4) using ELU's and aquatic macrohabitat models to represent local-scale variability within and among ecological systems in contiguous portfolio areas. The ELU's/macrohabitat models addresses factors of elevation, slope/aspect, hydrologic gradient, stream size, landscape position, geologic substrate, and soil moisture regime. This ensured the inclusion of contiguous ecological gradients, and likely habitat "refugia" with climate changes we have yet to measure. Additionally, as evidenced by major vegetation types, most portfolio areas include wide elevational gradients, many from alpine to foothills.

Climate change was not addressed in the direct analysis of threats to conservation targets by conservation area. The team recognized that climate change could significantly impact biodiversity over time at some level in all of the conservation areas. Specific impacts to conservation targets at conservation areas are highly speculative at this point. While it was not possible for this team to address specifics related to biodiversity conservation and global climate change, regional research provide some clues as to expected impacts to some conservation targets.

Over the 20th century, the region has grown warmer and wetter. Annual average temperature has increased 1-3 degrees over most of the region. Forests of the Canadian Rockies are quite sensitive to climate variation because warm dry summers stress them directly, by limiting seedling establishment and summer photosynthesis, as well as indirectly by creating conditions favorable to pests and fire. The extent, species mix, and productivity of the forests are likely to change, but the specifics of these changes are not known with confidence at this time (US Climate Change Science Program, www.usgcrp.gov and www.climatescience.gov).

Model scenarios project regional warming in the 21st century to be much greater than observed during the 20th century, with average warming about 3 degrees by 2050. A seasonal pattern of wetter winters and drier summers, the projections show the annual precipitation increasing, while water availability decreases. By the 2090's average summer temperature are projected to rise by 7-8 degrees, while winter temperatures rise by 8-11 degrees. Projected annual precipitation increases range from a few percent to 20% and up to 20-50% increase in a Canadian model. The projected warming and drier summer will likely increase summer water shortage because there is less snow pack and because it melts earlier (U.S. Climate Change Science Program, http://www.climatescience.gov/).

What does the projected global climate change mean for western mountains and protecting unique natural resources? An interdisciplinary team of US Geological Survey, National Park

Service, US Forest Service and University of Montana scientists has conducted 9 years of research at Glacier National Park and can provide some insight. Research at Glacier Park (US) has documented ecosystem responses to a warming climate – less than 1/3 of the glaciers present in 1850 exist today and most remaining glaciers are mere remnants of their previous size. The scientists expect a future with a 30% rise in precipitation and slight increase in annual average temperature (currently the most likely scenario for the Glacier National Park area within the next 50 years).

The cedar-hemlock forests are favored to expand in lower elevations but coarse woody debris accumulation and other forest responses increase the frequency of large, stand-replacing forest fires in other areas. Stream temperatures rise earlier in the summer, altering the abundance and distribution of stream organisms while subalpine fir trees become more nitrogen-stressed at tree line.

Stream/wetland complexes possess diverse temperature regimes and have diverse aquatic faunal assemblages containing many rare species. Many of these species have very narrow habitat requirements and respond quickly to thermal changes, as temperature can be a predominant limiting factor.

Modeled interaction of future climate and fire management scenarios at Glacier Park (US) demonstrated that different landscape patterns are likely to dominate in future years, influencing ecosystem process and vulnerability to external stresses. Models indicate a future trend towards larger, homogeneous habitat patches as a result of more frequent stand-replacing fires.

R. DATA GAPS/RESEARCH AND INVENTORY NEEDS

Broad Data Gaps/Research Needs

Species Occurrences
The initial exercise of compiling and analyzing data and selecting targets for the Canadian Rocky Mountains ecoregion illustrated a significant un-evenness in the distribution of available EO data. Three important factors attributing to the unevenness of data are that 1) individual Heritage and CDC programs maintain independent species tracking lists, 2) the longevity of state or provincial programs influence the total number of element occurrence records, and 3) past inventory history (or lack of) in the ecoregion. It was necessary to gather new occurrence data for terrestrial animals, rare plant communities, and small and large patch ecological systems. Efforts should be made to continue to harmonize the operation of CDC and Heritage programs and resources should be found to encourage continued inventories and assessments.

Conservation Goals
Conservation goals need to be tested and assumptions validated. At present, we lack the scientific understanding necessary to confidently state how much is enough. There is very little theory and no scientific consensus regarding how much ecological system or habitat area is necessary to maintain most species within an ecoregion. Inventory efforts should be directed towards targets that did not meet conservation goals, particularly those not represented or documented in the portfolio.

Viability
Viability specifications were developed to rank the viability or integrity of priority species (e.g., G1, G2, S1, S2) and all terrestrial ecological systems. Specifications are needed for all targets (and need to be applied) in the ecoregion. These viability specifications should be refined as new information is obtained on targets and should be validated. Also, field assessments of the viability of a number of conservation targets lacking data are needed.

Verification of Biophysical Models and Species Inventory
The aquatic ecological systems should be one of the highest priorities for systematic and comprehensive inventory—to field validate the initial classification developed through this assessment. Further field validation is also needed for the terrestrial ecological systems, including assessments of integrity (e.g., quality and condition), extent, and threats. A number of conservation targets were not represented in the portfolio or did not meet goals due to lack of data; these targets should be priorities for future inventory efforts (particularly the invertebrates, reptiles, and plants).

Portfolio Design and Analysis
Further refinement of the SITES model is recommended, particularly so that users can easily document what targets are selected at an area and which targets met goals. One important post-portfolio analysis that is needed is to test the coarse filter to see how well it captures common species and watch-listed species. This analysis is particularly important for bird targets wherein, most species have been assumed to be captured through the conservation of habitat in the coarse filter.

Connectivity
A more thorough analyses of the portfolio's connectivity is needed to ensure that the conservation solution presented here is indeed a network of conservation areas suitable to maintaining the long-term viability of targets—particularly the wide-ranging species that are so much a part of this ecoregion's identity. Additionally, it is important to evaluate the connectivity of this portfolio with surrounding ecoregional portfolios. Again, this is of particular importance for ensuring long-term viability of wide-ranging species throughout the Rocky Mountain ecoregions.

Threats
Further analysis is needed to better understand the pattern of multi-area threats, target type, and land ownership. More information about current and future threats is needed for conservation areas. Future efforts might include an experts workshop to obtain more information about threats and policies that might be impacting conservation targets. Levels and impacts of current activities, such as oil and gas exploration, need to be investigated.

Wide-Ranging Mammals
This assessment is a first attempt at a preliminary functional network, based on the targeted wide-ranging mammals. A range-wide approach to these species can be achieved by analyzing wide-ranging mammals at the multi-ecoregional level and incorporating new analyses and information resulting from nearby ecoregions.

Climate Change
Global warming could accelerate a number of the threats to conservation targets within the portfolio, such as spreading of invasive species and increasing the risk of devastating wildfires. While the team designed the portfolio to ensure that it spans the full range of climatic gradients and that individual sites span the greatest possibly altitudinal range within contiguous natural areas, addressing specific impacts of global climate change was beyond the scope of this assessment. Further work is needed to guide conservation efforts in light of different climate change scenarios. For example, it would be useful to predict level of endangerment for certain species (especially in the alpine zone) and ecological systems based on certain global warming scenarios.

S. CONSERVATION STRATEGIES AND ACTION PLAN

NCC and TNC program staff in the ecoregion are currently developing a separate implementation plan to serve as an adjunct to this biodiversity assessment. The implementation plan will draw upon conservation and threats information generated during the ecoregional planning process and will focus on identifying multi-site strategies as well as high leverage strategies for priority conservation areas identified in this plan.

T. SUMMARY AND CONCLUSION

The primary product of this assessment is an ecoregional portfolio of conservation areas, based on the best available and current information, representing the targeted species, natural communities, and ecological systems of the CRM. The portfolio consists of 54 Conservation Landscapes and an additional 20 individual smaller conservation sites. The final portfolio encompasses 33.2 million acres, or roughly 50% of the ecoregion. The ecoregional portfolio is considered a conservation blueprint—a vision for conservation success—to guide public land managers, land and water conservation organizations, private landowners and others in conserving natural diversity within this ecoregion. The goal is to conserve the entire portfolio of conservation areas, which will require a combination of strategies, including on-the-ground action at specific conservation areas and multiple-area strategies to abate pervasive threats to targets across the ecoregion.

The CRM portfolio provides an opportunity to engage in an implementation process that identifies multi-area approaches to implement biodiversity conservation efficiently across the ecoregion. Some priority actions should be taken to assure conservation success within the CRM portfolio conservation areas. These include but are not limited to: 1) ensure that key landowners and land managers are aware of the results of this assessment and the biodiversity significance of the lands they own and manage; 2) develop multi-area strategies to abate pervasive threats, including plant and animal invasives, forest and fire management practices, and parasites/pathogens; 3) develop site conservation plans for portfolio conservation areas in order to determine site specific strategies for threat abatement; and 4) focus inventory efforts on ecological systems and species lacking sufficient occurrence information.

It is certain that the initial prioritization of conservation areas presented in this plan requires further qualitative assessments based on conservation feasibility, opportunity and leverage. These assessments should be designed to yield a suite of action sites that can then serve as a focus for conservation partners in the immediate future. With regard to taking action at priority conservation areas, the planning team recognizes that in the real world, protection opportunities will not arise in an orderly sequence that corresponds to science-based priorities. It is also important to note that some areas not currently within the conservation solution presented here may become more attractive possibilities for conservation in the future. Changes in land ownership and land use designations in particular can dramatically alter the landscape of conservation opportunity. However, the CRM assessment presented here will allow conservation practitioners to quickly put these emerging opportunities into the appropriate ecological context and to take actions that are scientifically defensible and result in the most biodiversity conserved.

U. REFERENCES

Abell, R., D.M. Olson, E. Dinerstein, P. Hurley, J.T. Diggs, W. Eichbaum, S. Walters, W. Wettengel, T. Allnutt, C. Loucks, and P. Hedao. 2000. Freshwater ecoregions of North America: A conservation assessment. Island Press. Washington, D.C., USA. 319 pp.

Achuff, P. L. 1992. Natural regions, subregions and natural history themes of Alberta. Parks Services, Alberta Environmental Protection. Updated and revised December 1994. 72 pp.

Achuff, P. L., W. D. Holland, G. M. Coen and K. Van Tighem. (eds.) 1984a. Ecological land classification of Kootenay National Park, British Columbia. Vol. I: Integrated resource description. Alberta Institute of Pedology, Publication No. M-84-10: 43-321.

Achuff, P. L., W. D. Holland, G. M. Coen, and K. Van Tighem. (eds.) 1984b. Ecological land classification of Mount Revelstoke and Glacier National Parks, British Columbia. Vol. I: Integrated resource description. Alberta Institute of Pedology, Publication No. M-84-11: 33-211.

Alberta Environmental Protection. 1996a. Selecting protected areas: the Foothills Natural Region of Alberta. One of a series of reports prepared for the special places provincial coordinating committee. Natural Resources Services, Recreation and Protected Areas Division, Natural Heritage and Education Branch. 21pp.

Alberta Environmental Protection . 1996b. Selecting protected areas: the Foothills Natural Region of Alberta. Appendices, One of a series of reports prepared for the special places provincial coordinating committee. Natural Resources Services, Recreation and Protected Areas Division, Natural Heritage and Education Branch. 114 pp.

Andelman S., I. Ball, F. Davis, and D. Stoms. 1999. Sites v 1.0: an analytical toolbox for designing ecoregional conservation portfolios. Santa Barbara, CA: University of California. Manual prepared for The Nature Conservancy.

Anderson, M, P. Comer, D. Grossman, C. Groves, K. Poiani, M. Reid, R. Schneider, B. Vickery & A. Weakley. 1999. Guidelines for Representing Ecological Communities in Ecoregional Plans. The Nature Conservancy, Arlington, VA.71 pp.

Angermeier, P. L., and I. J. Schlosser. 1995.Conserving aquatic biodiversity: Beyond species and populations. American Fisheries Society Symposium 17: 911-927.

Apps, C.D. 2001. Draft factors influencing Canada lynx distribution in southeast British Columbia. Southern Canada lynx project, Aspen Wildlife Research, Calgary, Alberta.

Apps, C.D. 1997. Identification of grizzly bear linkage zones along Highway 3 corridor of southeast British Columbia and southwest Alberta. Aspen Wildlife Research, Calgary, Alberta.

Association for Biodiversity Information. 2000. International Classification of Ecological Communities: Terrestrial Vegetation: Natural Heritage Central Databases. The Association for Biodiversity Information, Arlington, VA.

Bailey, R.G. 1998. Ecoregions: the ecosystem geography of the oceans and continents. Springer-Verlag, New York, NY. 176pp.

Bailey, R. 1998a. Ecoregions map of North America: Explanatory note. USDA Forest Service, Misc. Publication no. 1548. 10 pp. + map scale 1:15,000,000.

Bailey, R.G. 1995. Descriptions of the ecoregions of the United States. Miscellaneous Publication 1391. USDA Forest Service, Washington, DC. 108 pp., plus map.

Brunson, R. B., and N. Kevern. 1963. Observations of a colony of Magnipelta. Nautilus 77:23-27.

Campbell, W., N.K. Dawe, I. McTaggart-Cowan, J.M. Cooper, G.W. Kaiser, and M.C.E. McNall. The Birds of British Columbia Volume II. UBC Press, Vancouver, BC. 636pp.

Canadian Endangered Species Council (CESCC). 2001. Wild Species2000: The General Status of Species of Canada. Minister of Public Works and Government Services Canada, Ottawa, ON. 48pp + CD-ROM.

Carroll, C., R.F. Noss, and P. C. Paquet. 2002. Rocky Mountain Carnivore Project. Prepared for the World Wildlife Fund Canada. An online copy of the report can be obtained at URL: http://www.wwfcanada.org/en/res_links/rl_resources.asp

Committee On the Status of Endangered Wildlife In Canada. 2001. Canadian Species as Risk, May 2001. Committee on the Status of Endangered Wildlife in Canada, Ottawa, ON. 31 pp.

Conservation Biology Institute. 2002. Pacific Northwest Conservation Assessment Report. URL: http://www.consbio.org/cbi/pacnw_assess/assess-main.htm. (Accessed December 2002).

Demarchi, D. 1996. An Introduction to the Ecoregion of British Columbia.Wildlife Branch, Ministry of Environment, Lands and Parks, Victoria, BC. 46 pp plus appendices.

Ecological Stratification Working Group. 1995. A National Ecological Framework for Canada. Agricultural and Agri-Food Canada, Research Branch, Centre for Land and Biological Resources Research and Environment Canada, State of the Environment Directorate, Ecozone Analysis Branch, Ottawa/Hull. Report and national map at 1:7 500 00 scale.

Firman, M. 1999. Townsend's Big-eared Bat (Plecotus townsendii) in the East Kootenays. Prepared for The Columbia Basin Fish and Wildlife Compensation Program. 35pp plus map.

Forrester, D. J. 1962. Land mollusca as possible intermediate hosts of Protostrongylus stilesi, a lungworm of bighorn sheep in western Montana. Proceedings of the Montana Academy of Sciences 22:82-92.

Gibeau, M. and S. Herrero. 2002. Eastern Slopes Grizzly Bear Project: A Progress Report for 2001 (ESGBP): April 2002. Eastern Slopes Grizzly Bear Project, University of Calgary, Calgary, AB. Available online: http://www.canadianrockies.net/Grizzly/report2001.pdf

Gibeau, M.L. and S. Herrero. 1998. Managing for grizzly bear security areas in Banff National Park in the Central Canadian Rockies. 11th International Conference on Bear Research and Management. In Press.

Gibeau, M.L. 1998. Grizzly bear habitat effectiveness model for Banff, Yoho and Kootenay National Parks, Canada. *Ursus* 10: 235-241.

Grossman, D.H., D. Faber-Langendoen, A.S. Weakley, M. Anderson, P. Bourgeron, R. Crawford, K. Goodin, S. Landaal, K. Metzler, K.D. Patterson, M. Pyne, M. Reid & L. Sneddon. 1998. International Classification of Ecological Communities: Terrestrial Vegetation of the United States. Volume I: The Vegetation Classification Standard. The Nature Conservancy. Arlington, VA. 126 pp.

Groves, C.G., D.B. Jensen, L.L. Valutis, K.H. Redford, M.L. Shaffer, J.M. Scott, J.V. Baumgartner, J.V. Higgins, M.B. Beck, and M.G. Anderson. 2002. Planning for biodiversity conservation: putting conservation science into practice. BioScience 52:499-512.

Haas, G. 1998. Indigenous fish species potentially at risk in British Columbia, with recommendations and prioritizations for conservation, forestry/resource use, inventory and research. British Columbia, Ministry of Fisheries, Fisheries Management Report No. 105.

Hafner, D.J., E. Yensen, and G.L. Kirtland Jr. (eds). 1998. North American Rodents. Status Survey and Conservation Action Plan. IUCN/SSC Rodent Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. 171 pp.

Hagle, S.K., Byler, Jeheber-Mattews, Barth, Stock, Hansen, Hubbard. 1994. *Root disease in the Coeur d'Alene river basin: an assessment*. In Interior Cedar- hemlock-white pine forests: Ecology and Management symposium proceedings, March 2-4, 1993. Washington State University, Dept. of Natural Resources Sciences: 335-344.

Hammerson, G. A. 1999. Amphibians and reptiles in Colorado. Second edition. University Press of Colorado, Boulder. xxvi + 484 pp.

Harris, J.L, R. Mask, and J. Witcosky. 2002. Forest Insect And Disease Conditions In The Rocky Mountain Region: 2000-2001. USDA Forest Service, Rocky Mountain Region, Lakewood, CO. 42pp. Available online: http://www.fs.fed.us/r2/fhm/reports/r2cond_r2-02-10_00-01.pdf

Haufler, J.B., R.K. Baydack, H. Campa, III, B.J. Kernohan, C. Miller, L.J. O'Neil, and L. Waits. 2002. Performance measures for ecosystem management and ecological sustainability. Wildl. Soc. Tech. Rev. 02-01, 33pp.

Herrero, S. and M. Gibeau. 2000. Status of the Eastern Slopes Grizzly Bear Project. April 2000. Eastern Slopes Grizzly Bear Project, University of Calgary, Calgary, Alberta. 5 pp.

Herzog, P.W. 1977. Summer habitat use by white-tailed Ptarmigan in southwestern Alberta. Canadian Field Naturalist. 91:367-371.

Hocutt, C.H., and E.O. Wiley, eds. 1986. The Zoogeography of North American Freshwater Fishes. John Wiley and Sons, New York. 866 pp.

Holland, W. D., and G. M. Coen (eds.). 1982. Ecological (biophysical) land classifications of Banff and Jasper National Parks. Vol. II: Soil and vegetation resources. Alberta Institute of Pedology, Publication No. SS-82-44: 71-539.

Knight, R. L., F. W. Smith, S. W. Buskirk, W. H. Romme, and W. L. Baker. 2000. Forest fragmentation in the Southern Rocky Mountains. University Press of Colorado, Niwot.

Knight, Richard L., K.J. Gutzwiller. 1995. Wildlife and recreationists: coexistence through management and research. Washington, DC: Island Press. 372 p.

Lammert, M., J.V. Higgins, D. Grossman, and M. Bryer. 1997. A classification framework for freshwater communities: Proceedings of The Nature Conservancy's Aquatic Community Classification Workshop. The Nature Conservancy, Arlington, VA.

MacPhail, J. and R. Carveth. 1994. Field Key to the Freshwater Fishes of British Columbia. Draft for 1994 field-testing. Fish Museum, Department of Zoology, University of British Columbia, Vancouver, BC. URL: http://www.for.gov. bc.ca/ric.

Margules, C. R. and R.L. Pressey. 2000. Systematic Conservation Planning. *Nature*, 405: 243-253.

Maxwell, J.R., C.J. Edwards, M.E. Jensen, S.J. Paustian, H. Parrott, and D.M. Hill. 1995. A Hierarchical Framework of Aquatic Ecological Units in North America (Nearctic Zone). U.S. Forest Service, North Central Forest Experimental Station, General Technical Report NC-176. 72pp.

Mayhood, D. 1995. The fishes of the Central Canadian Rockies Ecosystem. Freshwater Research Limited Report No. 950408 prepared for Parks Canada, Banff National Park. 59pp.

McLellan, B.N. and D.M. Shackleton. 1988. Grizzly bears and resource-extraction industries: effects of roads on behaviour, habitat use and demography. J. Appl. Ecol. 25: 451-460.

Meidinger, D., and J. Pojar (eds.). 1991. Ecosystems of British Columbia. Special report series 6. Research Branch, British Columbia Ministry of Forests. 298 pp.

Nagorsen, D. W., and R. M. Brigham. 1993. The bats of British Columbia. UBC Press, Vancouver, BC. 164 pp.

Neely, B., P. Comer, C. Moritz, M. Lammert, R. Rondeau, C. Pague, G. Bell, H. Copeland, J. Humke, S. Spackman, T. Schulz, D. Theobald, and L. Valutis. 2001. *Southern Rocky Mountains: An Ecoregional Assessment and Conservation Blueprint*. Prepared by The Nature Conservancy with support from the U.S. Forest Service, Rocky Mountain Region, Colorado Division of Wildlife, and Bureau of Land Management.

Noss, R., G. Wuerthner, K. Vance-Borland, and C. Carroll. 2001a. A Biological Conservation Assessment for the Utah-Wyoming Rocky Mountains Ecoregion. Report to the Nature Conservancy.

Noss, R.F., C. Carroll, K. Vance-Borland, and G. Wuerthner. 2001b. A Multicriteria Assessment of the Irreplaceability and Vulnerability of Sites in the Greater Yellowstone Ecosystem. In Conservation Biology 16(4): 895-908.

Noss, R.F. 1996. Protected areas: How much is enough? In: *National Parks and Protected Areas* (R.G. Wright ed.). Blackwell, Cambridge, MA. pp. 91-120.

Noss, R.F., and A.Y. Cooperrider. 1994. Saving nature's legacy: Protecting and restoring biodiversity. Island Press, Washington, D.C. 416 pp.

Noss, R.F. 1991. Landscape connectivity: different functions at different scales. Pp27-39 in: W.E. Hudson (ed.) Landscape Linkages and Biodiversity. Washington, Island Press.

Noss, R.F. 1987. From plant communities to landscapes in conservation inventories: A look at The Nature Conservancy. Biological Conservation 41:11-37.

Oelschlaeger, M. 1995. "Taking the Land Ethic Outdoors: Its Implications for Recreation," in R. L. Knight, K. Huylsman, K. Gutzwiller, (eds.), *Wildlife and Recreationists: Coexistence through Management and Research.* Washington, D. C.: Island Press.

Pater, D.E., Bryce, S.A., Thorson, T.D., Kagan, J., Chappell, C., Omernik, J.M., Azevedo, S.H., and Woods, A.J., 1998, Ecoregions of Western Washington and Oregon: Reston, Virginia, U.S. Geological Survey, map scale 1:1,350,000.

Pilsbry, H. A., and R. B. Brunson. 1954. The Idaho-Montana slug Magnipelta (Arionidae). Notulae Naturae 262:1-6.

Pimentel, D., L. Westra, and R. Noss (eds.). 2000. Ecological Integrity. Integrating Environment, Conservation, and Health. Island Press. Washington, D.C. 428 pp.

Pressey, R.L., and R. M. Cowling. 2001. Reserve Selection Algorithms and the Real World. Conservation Biology 15 (1): 275.

Pressey, R. L., 1998. Algorithms, politics and timber: an example of the role of science in a public, political negotiation process over new conservation areas in production forests. Pp 73-87 *in* Ecology for Everyone: Communicating Ecology to Scientists, the Public and Politicians. ed by R. Willis and R. Hobbs. Surrey Beatty and Sons, Chipping Norton.

Pressey, R. L., Humphries, C. J., Margules, C. R., Vane-Wright, R. I. and Williams, P. H., 1993. Beyond opportunism: key principles for systematic reserve selection. *Trends in Ecology and Evolution*, 8: 124-128.

Quigley, T. M., and H.B. Cole. 1997. Highlighted scientific findings of the Interior Columbia Basin Ecosystem Management Project. Gen. Tech. Rep. PNW-GTR-404. Portland, OR. U.S. Department of Agriculture, Forest Service. Pacific Northwest Research Station, U.S. Department of Interior, Bureau of Land Management. 34 pp.

Rasker, R. and B. Alexander. 1997. The New Challenge: People, Commerce and the Environment in the Yellowstone to Yukon Region. Bozeman, Montana: The Wilderness Society.

Redford, K.H., and B.D. Richter. 1999. Conservation of biodiversity in a world of use. Conservation Biology 13: 1246-1256.

Reid, M.S., K.A. Schulz, P.J. Comer, M.H. Schindel, D.R. Culver, D.A. Sarr, and M.C. Damm. 1999. An alliance level classification of vegetation of the conterminous western United States. Unpublished final report to the University of Idaho Cooperative Fish and Wildlife Research Unit and National Gap Analysis Program, in fulfillment of Cooperative Agreement 1434-HQ-97-AG-01779. The Nature Conservancy, Western Conservation Science Department, Boulder, CO.

Ricketts, T.H., E. Dinerstein, D.M. Olson, C.J. Loucks, W. Eichbaum, D. DellaSalla, K. Kavanaugh, P. Hedao, P. Hurley, K. Carney, R. Abell, and S. Walters. 1999. Terrestrial ecoregions of North America: a conservation assessment. Island Press, Washington, DC.

Ritter, S. 1999. Idaho Partners in Flight draft Idaho bird conservation plan, July 1999 Draft. Idaho Department of Fish and Game, Boise, ID.

Ruediger, B., J. Claar, S. Mighton, B. Naney, T. Rinaldi, F. Wahl, N. Warren, D. Wenger, L. Lewis, B. Holt, G. Patton, J. Trick, A. Vandehey, and S. Gniadek. 2000. Canada Lynx Conservation Assessment and Strategy. USDA Forest Service; USDI Bureau of Land Management; USDI National Park Service and USDI Fish and Wildlife Service. 120 pp.

Salt, J.R. 1984. Some notes on white-tailed Ptarmigan in the Alberta Rockies. Alberta Naturalist. 14: 121-125.

Schumaker, N.H. 1998. A users guide to the PATCH model. EPA/600/R-98/135, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Western Ecology Division, Corvallis, OR.

Servheen, C., J.S. Waller, and P. Sandstrom. 2001. Identification and management of linkage zones for grizzly bears between the large blocks of public lands in the northern Rocky Mountains. U.S. Fish and Wildlife Service, Missoula, Montana. 87 pp.

Shinneman, D., R. McClellan, and R. Smith. 2000. *The state of the southern Rockies ecoregion*. The Southern Rockies Ecosystem Project, Nederland, Colorado.

Soulé, M.E. and M.A. Sanjayan. 1998. Conservation targets: Do they help? Science 279:2060-2061.

Sousa, W. P. 1984. The role of disturbance in natural communities. Annual Review of Ecology and Systematics 15:353-391.

Stark, J. M., and S. C. Hart. 1997. High rates of nitrification and nitrate turnover in undisturbed coniferous forests. Nature 385:61–64.

The Nature Conservancy. 2000. Designing a Geography of Hope: A Practitioner's Handbook to Ecoregional Conservation Planning. The Nature Conservancy, Arlington, VA.

The Nature Conservancy (TNC). 1999. Geography of hope: Practical guidelines for setting conservation priorities in ecoregions. Review draft. The Nature Conservancy, Arlington, VA. 113 pp., plus appendices.

The Nature Conservancy (TNC). 1997. Designing a geography of hope: Guidelines for ecoregion based conservation in The Nature Conservancy. The Nature Conservancy, Arlington, VA. 84 pp.

The Nature Conservancy (TNC). 1996. Conservation by design: A framework for mission success. The Nature Conservancy, Arlington, VA. 16 pp.

Vonhof, M.J. and J.C. Gwilliam, 2000. A summary of bat research in the Pend d'Oreille Valley in southern British Columbia. Report prepared for the Columbia Basin Fish & Wildlife Compensation Program.

Walker, R. and L. Craighead. 1998. Corridors: key to wildlife from Yellowstone to Yukon. Pp 113-121 in A. Harvey (ed.) A sense of place: an atlas of issues, attitudes and resources in the Yellowstone to Yukon ecoregion, Yellowstone to Yukon Conservation Initiative. Canmore, Alberta, Canada.

Weaver, J.L. 1997. The transboundary Flathead, British Columbia and Montana – a critical landscape for carnivores in the Rocky Mountains. Wildlife Conservation Society. 59 pp.

Westfall, J. 2001. 2001 Summary of Forest Health Conditions in British Columbia. Report prepared for the BC Ministry of Forests, Forest Practices Branch, Victoria, BC. 24pp.

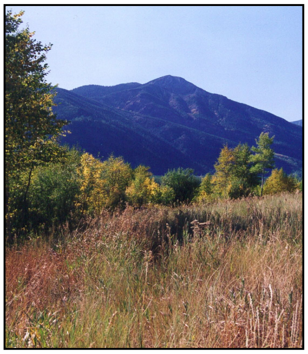
Williams, E. H. 1988. Habitat and range of *Euphydryas gillettii* (Nymphalidae). Journal of the Lepidopterists' Society 42:37-45.

Willoughby, M. G. 1999. Range plant community types and carrying capacity for the subalpine and alpine subregions. Alberta Environmental Protection, Lands and Forest Service. Pub. No.: T/438. 107 pp.

Willoughby, M. G., and D. Smith. 1999. Range plant communities and carrying capacity for the Upper Foothills subregion. Alberta Environmental Protection, Lands and Forest Services. Pub. No.: T/356. 86 pp.

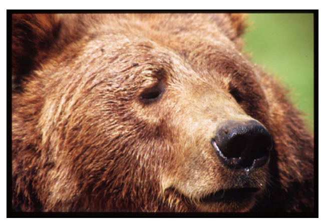
Woods, A.J., J. M. Omernik, J.A. Nesser, J. Shelden, S.H. Azevedo. 1999. Ecoregions of Montana (color poster with map, descriptive text, summary tables, and photographs): Reston, VA, US Geological Survey (map scale 1:1,500,000).

Wright, P.L. 1996. Status of rare birds in Montana with comments on known hybrids. Northwestern Naturalist 77: 57-85.




CANADIAN ROCKY MOUNTAINS ECOREGIONAL ASSESSMENT

Volume Two: Appendices

The Nature Conservancy
SAVING THE LAST GREAT PLACES ON EARTH

Nature Conservancy Canada

Conservation de la Nature Canada

FWI FRESHWATER INITIATIVE

Montana Natural Heritage Program

British Columbia
Conservation Data Centre

Washington State Department of Natural Resources

Washington Department of Fish and Wildlife

Natural Heritage Information Centre Alberta

Idaho Conservation Data Center

Citation:
Rumsey, C., M. Wood, B. Butterfield, P. Comer, D. Hillary, M. Bryer, C. Carroll, G. Kittel, K.J. Torgerson, C. Jean, R. Mullen, P. Iachetti, and J. Lewis. 2003. *Canadian Rocky Mountains Ecoregional Assessment, Volume Two: Appendices*. Prepared for The Nature Conservancy and the Nature Conservancy of Canada.

Cover page photo credits:

Top, *left to right*:
The Nature Conservancy of Canada's Mount Broadwood Conservation Area (*Dave Hillary*); Water howellia (*howellia aquatilis*); Grizzly bear (*Ursus arctos horribilis*) (*Dave Fraser*); Northern Leopard Frog (*rana pipiens*), Columbia Valley Wildlife Management Area (*Dave Hillary*); Maligne Lake, Jasper National Park (*Pierre Iachetti*)

Bottom, *left to right*:
Mission Valley, Montana (*Marilyn Wood*); Palouse Prairie, Idaho (*KJ Torgerson*); Harlequin duck (*histrionicus histrionicus*)

TABLE OF CONTENTS

APPENDIX 1.0 SPECIES CONSERVATION TARGETS

Appendix 1.0 Species Conservation Targets

SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK	BC	AB	MT	ID	WA	STATUS		CRM DISTRIBUTION*	SCALE*	ECOLOGICAL GOALS MET?
								ESA[1]	COSEWIC[2]			
AMPHIBIANS												
Ambystoma tigrinum	Tiger Salamander	G5		X	X				Endangered	Widespread	Local	Yes
Ascaphus montanus	Rocky Mountain Tailed Frog	G4	X						Endangered	Widespread	Local	Yes
Bufo boreas	Western Toad	G4	X	X	X		X		Special Concern	Widespread	Intermediate	Yes
Dicamptodon aterrimus	Idaho Giant Salamander	G3				X				Limited	Intermediate	No
Plethodon idahoensis	Coeur d'Alene Salamander	G3	X		X				Special Concern	Limited	Intermediate	Yes
Rana pipiens	Northern Leopard Frog	G5	X	X	X		No recent		Endangered	Widespread	Local	Yes
Spea intermontana	Great Basin Spadefoot	G5	X		X				Threatened	Widespread	Local	No
BIRDS												
Asio flammeus	Short-eared Owl	G5	X				Migrant			Widespread	Intermediate	Yes
Buteo regalis	Ferruginous Hawk	G4			X		Migrant		Special Concern	Widespread	Intermediate	No
Cygnus buccinator	Trumpeter Swan	G4	X		X		Migrant			Peripheral (breeding)	Regional	No
Cypseloides niger	Black Swift	G4	X	X	X		X			Widespread	Local	No
Gavia immer	Common Loon	G5	X	X	X		X			Widespread	Regional	Yes
Haliaeetus leucocephalus	Bald Eagle nest site	G4	X	X	X		X	Threatened		Widespread	Regional	Yes
Haliaeetus leucocephalus	Bald Eagle wintering area	G4	X					Threatened		Widespread	Regional	Yes

An "X" indicates the target occurs in the province or state

* See Appendix 1.1

[1] **U.S. Endangered Species Act** (http://endangered.fws.gov/esa.html)

[2] **Committee On the Status of Endangered Wildlife In Canada** (http://www.cosewic.gc.ca/)

Appendix 1.0 Species Conservation Targets

SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK	BC	AB	MT	ID	WA	STATUS		CRM DISTRIBUTION*	SCALE*	ECOLOGICAL GOALS MET?
								ESA[3]	COSEWIC[4]			
BIRDS												
Histrionicus histrionicus	Harlequin Duck	G4	X	X	X					Widespread	Regional	Yes
Lagopus leucurus	White-tailed Ptarmigan	G5	X	X	X					Limited	Coarse	Yes
Melanerpes lewis	Lewis' Woodpecker	G4	X		X		X		Special Concern	Widespread	Intermediate	Yes
Otus flammeolus	Flammulated Owl	G4	X		X		X		Special Concern	Widespread	Intermediate	Yes
AQUATIC												
Acipenser transmontanus Pop 1	White Sturgeon – Kootenay River	G4T1Q	X		X					Limited	Local	Yes
Acipenser transmontanus Pop 2	White Sturgeon – Columbia River	G4T?Q	X				X			Limited	Local	Yes
Cottus confusus	Shorthead Sculpin	G5	?		X				Threatened	Widespread	Linear	Yes
Lota lota	Burbot	G5	X	X	X		X			Widespread	Linear	Yes
Oncorhynchus clarki lewisi	Westslope Cutthroat Trout	G4T3		X	X		X			Widespread	Linear	Yes
Oncorhynchus gorbuscha	Pink Salmon – Upper Fraser	G5	X							Widespread	Linear	Yes
Oncorhynchus kisutch	Coho Salmon – Upper Fraser	G4	X							Widespread	Linear	Yes
Oncorhynchus mykiss	Steelhead	G5		X	X					Widespread	Linear	Yes

An "X" indicates the target occurs in the province or state

* *See Appendix 1.1
[3] **U.S. Endangered Species Act** (http://endangered.fws.gov/esa.html)
[4] **Committee On the Status of Endangered Wildlife In Canada** (http://www.cosewic.gc.ca/)

Appendix 1.0 Species Conservation Targets

SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK	BC	AB	MT	ID	WA	STATUS ESA[5]	STATUS COSEWIC[6]	CRM DISTRIBUTION*	SCALE*	ECOLOGICAL GOALS MET?
AQUATIC												
Oncorhynchus mykiss gairdneri	Inland Redband Trout	G5T4			X		X			Widespread	Linear	Yes
Oncorhynchus nerka	Sockeye Salmon – Upper Fraser	G5	X							Widespread	Linear	Yes
Oncorhynchus tshawytscha	Chinook Salmon – Upper Fraser	G5	X							Widespread	Linear	Yes
Rhinichthys osculus	Speckled Dace	G5	X	X	X	X	X		Special Concern	Limited	Local	Yes
Rhinichthys umatilla	Umatilla Dace	G4	X						Special Concern	Limited	Local	Yes
Salvelinus confluentus	Bull Trout	G3	X	X	X					Widespread	Linear	Yes
Acroloxus coloradensis	Rocky Mountain Capshell	G1	X	X	X					Endemic	Local	No
Enallagma optimolocus		G2			X					Limited	Local	No
Lednia tumana	Meltwater Lednian Stonefly	G1			X					Endemic	Local	No
Physella johnsoni	Banff Springs Snail	G1		X						Endemic	Local	Yes
Rhyacophila ebria		G1			X					Endemic	Local	No
Rhyacophila glacieri		G1			X					Endemic	Local	No

An "X" indicates the target occurs in the province or state

** See Appendix 1.1

[5] **U.S. Endangered Species Act** (http://endangered.fws.gov/esa.html)

[6] **Committee On the Status of Endangered Wildlife In Canada** (http://www.cosewic.gc.ca/)

Appendix 1.0 Species Conservation Targets

SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK	BC	AB	MT	ID	WA	STATUS		CRM DISTRIBUTION*	SCALE*	ECOLOGICAL GOALS MET?
								ESA[7]	COSEWIC[8]			
AQUATIC												
Salmasellus steganothrix		G2G3		X	X					Limited	Local	No
Stagnicola elrodi	Flathead Pondsnail	G1			X					Endemic	Local	No
Stagnicola elrodiana	Longmouth Pondsnail	G1			X					Endemic	Local	No
Zapada glacier	Western Glacier Stonefly	G2			X					Limited	Local	No
MAMMALS												
Corynorhinus townsendii	Townsend's Big-eared Bat	G4	X		X		X			Widespread	Local	Yes
Sorex preblei	Preble's Shrew	G4			X					Disjunct	Local	No
Tamias minimus selkirki	Selkirk Least Chipmunk	G5T1T3	X							Endemic	Local	No
Taxidea taxus	Badger	G5	X	X					Endangered	Widespread	Local	Yes
Thomomys talpoides segregatus	Creston Northern Pocket Gopher	G5T1T3	X							Endemic	Local	No
WIDE RANGING SPECIES												
Canis lupus	Gray Wolf	G4	X	X		X	X	Listed Endangered		Widespread	Regional	Yes
Gulo gulo luscus	North American Wolverine	G4T4	X	X		X	X		Special Concern	Widespread	Regional	Yes
Lynx canadensis	Canada Lynx	G5	X	X		X	X	Listed Threatened		Widespread	Regional	Yes
Martes pennanti	Fisher	G5	X	X		X				Widespread	Regional	Yes

An "X" indicates the target occurs in the province or state

* *See Appendix 1.1

7 **U.S. Endangered Species Act** (http://endangered.fws.gov/esa.html)

8 **Committee On the Status of Endangered Wildlife In Canada** (http://www.cosewic.gc.ca/)

Appendix 1.0 Species Conservation Targets

SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK	BC	AB	MT	ID	WA	STATUS ESA[9]	COSEWIC[10]	CRM DISTRIBUTION*	SCALE*	ECOLOGICAL GOALS MET?
WIDE RANGING SPECIES												
Rangifer tarandus	Woodland Caribou	G5T4	X	X	X		X	Listed Endangered	Threatened	Widespread	Regional	No
Ursus arctos horribilis	Grizzly Bear	G4T4	X	X	X		X	Listed Threatened	Special Concern	Widespread	Regional	No
BUTTERFLY												
Euphydryas gellettii	Gillette's Checkerspot	G3	X	X	X					Limited	Local	No
SNAILS AND SLUGS												
Discus brunsoni	Lake Disc; Mission Range Disc	G1			X					Endemic	Local	No
Magnipelta mycophaga	Spotted Slug	G2G3			X					Limited	Local	No
Oreohelix alpina	Alpine Mountainsnail	G1			X					Endemic	Local	No
Oreohelix amariradix	Bitterroot Mountainsnail	G1			X					Endemic	Local	No
Oreohelix elrodi	Carinate Mountainsnail	G1			X					Endemic	Local	No
Zacoleus idahoensis	Sheathed Slug	G3			X					Limited	Intermediate	No
VASCULAR PLANTS												
Adiantum capillus-veneris	Southern maidenhair-fern	G5	X					Endangered		Disjunct	Local	No
Allium columbianum	Columbia onion	G3			X					Disjunct	Local	No
Arenaria longipedunculata	Low sandwort	G3Q	X	X						Peripheral	Local	No
Arnica louiseana	Lake Louise arnica	G3	X	X						Endemic	Local	No
Aster jessicae	Jessica's aster	G2				X				Peripheral	Local	Yes

An "X" indicates the target occurs in the province or state

* *See Appendix 1.1

[9] U.S. Endangered Species Act (http://endangered.fws.gov/esa.html)

[10] Committee On the Status of Endangered Wildlife In Canada (http://www.cosewic.gc.ca/)

Appendix 1.0 Species Conservation Targets

SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK	BC	AB	MT	ID	WA	STATUS ESA[12]	COSEWIC[13]	CRM DISTRIBUTION*	SCALE*	ECOLOGICAL GOALS MET?
VASCULAR PLANTS												
Astragalus lackschewitzii	Lackschewitz' Milkvetch	G2			**X**					Endemic	Local	No
Azolla mexicana	Mexican mosquito-fern	G5	**X**		**X**			Threatened	Threatened	Disjunct	Local	No
Botrychium ascendens	Upward-lobed moonwort	G3*	**X**	**X**	**X**		**X**			Limited	Local	Yes
Botrychuim boreale	Northern grape fern	G?	**X**	**X**						Limited	Local	No
Botrychium crenulatum	Crenulate moonwort	G3	**X**	**X**	**X**		**X**			Limited	Local	Yes
Botrychium hesperium	Western moonwort	G3	**X**	**X**	**X**		**X**			Limited	Local	Yes
Botrychium lineare	Linear leaf moonwort	G2*			**X**		**X**	Proposed Threatened		Limited	Local	No
Botrychium montanum	Mountain moonwort	G3	**X**		**X**					Limited	Local	Yes
Botrychium pallidum	Pale moonwort	G2		**X**	**X**					Limited	Local	No
Botrychium paradoxum	Peculiar moonwort	G3*	**X**	**X**	**X**		**X**			Limited	Local	Yes
Botrychium pendunculosum	Stalked moonwort	G3*	**X**	**X**	**X**		**X**			Limited	Local	Yes
Botrychium spathulatum	Spoon-leaf moonwort	G3	**X**	**X**	**X**					Peripheral	Local	Yes
Calochortus nitidus	Broad-fruit mariposa	G3				**X**				Peripheral	Local	Yes
Cardamine constancei	Constance's bitter cress	G3				**X**				Endemic	Local	Yes
Carex amplifolia	Big-leaf sedge	G4	**X**		**X**					Disjunct	Local	No
Carex comosa	Birstly sedge	G5	**X**		**X**		**X**			Disjunct	Local	No

An "X" indicates the target occurs in the province or state

* *See Appendix 1.1

[12] U.S. Endangered Species Act (http://endangered.fws.gov/esa.html)

[13] Committee On the Status of Endangered Wildlife In Canada (http://www.cosewic.gc.ca/)

Appendix 1.0 Species Conservation Targets

SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK	BC	AB	MT	ID	WA	STATUS ESA[14]	COSEWIC[15]	CRM DISTRIBUTION*	SCALE*	ECOLOGICAL GOALS MET?
VASCULAR PLANTS												
Carex lenticularis var. dolia	Goose-grass sedge	G5T3Q	X	X	X					Limited	Local	Yes
Carex stenoptila	Small-winged sedge	G3?			X					Limited	Local	No
Cephalanthera austiniae	Phantom orchid	G4				X		Threatened		Limited	Local	Yes
Conimitella williamsii	William's conimitella	G3		X	X					Limited	Local	No
Corydalis caseana var. hastata	Case's corydalis	G5T3				X				Endemic	Local	Yes
Cypripedium fasciculatum	Clustered lady's slipper	G4			X					Disjunct	Local	Yes
Dasynotus daubenmirei	Daubenmire's dasynotus	G3				X				Endemic	Local	No
Draba kananaskis	Tundra whitlow-grass	G1Q		X						Peripheral	Local	No
Draba porsildii	Porsild's whitlow-grass	G3		X	X					Limited	Local	No
Draba ventosa	Wiind River whitlow-grass	G3		X	X					Limited	Local	No
Erigeron lackschewitzii		G3		X	X					Endemic	Local	No
Erigeron lanatus	Woolly fleabane	G3G4			X					Endemic	Local	No
Erigeron radicatus	Dwarf fleabane	G3		X	X					Widespread	Local	No
Erigeron trifidus	Barren ground fleabane	G2G3Q		X						Endemic	Local	No
Glyceria leptostachya	Slim-head manna grass	G3	X							Disjunct	Local	No
Grindelia howellii	Howell's gum-weed	G3			X					Limited	Local	No

An "X" indicates the target occurs in the province or state

* *See Appendix 1.1

[14] U.S. Endangered Species Act (http://endangered.fws.gov/esa.html)

[15] Committee On the Status of Endangered Wildlife In Canada (http://www.cosewic.gc.ca/)

Appendix 1.0 Species Conservation Targets

SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK	BC	AB	MT	ID	WA	STATUS		CRM DISTRIBUTION*	SCALE*	ECOLOGICAL GOALS MET?
								ESA[16]	COSEWIC[17]			
VASCULAR PLANTS												
Howellia aquatilis	Water howellia	G2			X		X	Listed Threatened		Limited	Local	Yes
Hedeoma sp. nov.	Pend Oreille Hedeoma	G1?	X				X			Endemic	Local	No
Iris missouriensis	Missouri iris	G5		X	X				Threatened	Widespread	Local	No
Lathyrus bijugatus	Latah tule pea	G4	X		X					Endemic	Local	No
Lilaea scilloides	Flowering quillwort	G5?		X	X					Disjunct	Local	No
Lomatium salmoniflorum	Salmon-flower desert-parsley	G3				X				Peripheral	Local	No
Lupinus minimus	Least lupine	G3G4		X	X					Widespread	Local	No
Malaxis paludosa	Bog adder's-mouth	G4	X	X						Disjunct	Local	No
Mimulus ampliatus	Spacious monkeyflower	G1				X				Peripheral	Local	No
Mimulus patulus	Washington monkeyflower	G2			X		X			Limited	Local	No
Myriophyllum ussuriense	Ussurian water-milfoil	G3	X							Disjunct	Local	No
Nymphaea leibergii	Dwarf water-lily	G5		X	X					Disjunct	Local	No
Oxytropis campestris var.columb.	Columbia crazyweed	G5T3	X	X	X		X			Limited	Local	No
Packera contermina	High alpine butterweed	G3?	X		X					Endemic	Local	No
Papaver pygmaeum	Alpine glacier poppy	G3	X	X	X					Endemic	Local	No
Pellaea gastonyi	Gastony's cliff-brake	G3	X	X						Limited	Local	Yes

An "X" indicates the target occurs in the province or state

* *See Appendix 1.1

[16] U.S. Endangered Species Act (http://endangered.fws.gov/esa.html)

[17] Committee On the Status of Endangered Wildlife In Canada (http://www.cosewic.gc.ca/)

Appendix 1.0 Species Conservation Targets

SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK	BC	AB	MT	ID	WA	STATUS		[CRM DISTRIBUTION]*	[SCALE]*	ECOLOGICAL GOALS MET?
								ESA[18]	COSEWIC[19]			
VASCULAR PLANTS												
Phacelia lyallii	Lyall phacelia	G3	X	X	X					Endemic	Local	No
Phlox idahonis	Clearwater phlox	G1				X				Endemic	Local	No
Phlox kelseyi var. missoulensis	Missoula phlox	G2			X					Limited	Local	No
Poa laxa ssp. Baniffianna		G5?T1	X	X	X					Limited	Local	No
Potentilla concinna var. macounii	Macoun's early cinquefoil	G2		X	X					Endemic	Local	No
Prenanthes sagittata	Arrow-leaf rattlesnake root	G3	X	X	X					Endemic	Local	No
Pyrrocoma liatriformis		G2				X				Peripheral	Local	No
Salix raupii		G2		X						Peripheral	Local	No
Saussurea densa	Dwarf saw-wort	G3G4	X	X	X					Endemic	Local	No
Silene spaldingii	Spalding's campion	G2	X		X		X	Listed Threatened		Limited	Local	No
Synthyris platycarpa	Pennell's kittentail	G3				X				Endemic	Local	No
Tauschia tenuissima	Leiberg's tauschia	G3					X			Endemic	Local	Yes
Waldsteinia idahoensis	Idaho strawberry	G3			X					Endemic	Local	No
NON-VASCULAR PLANTS												
Barbula eustegia		G3?	X		X					Limited	Local	No
Bryoria friabilis		G3			X					Disjunct	Local	No
Bryum calobryoides		G3	X	X	X					Limited	Local	No
Bryum knowltonii		G3		X						Limited	Local	No
Bryum schleicheri		G5?		X	X					Limited	Local	No

An "X" indicates the target occurs in the province or state

* *See Appendix 1.1

18 U.S. Endangered Species Act (http://endangered.fws.gov/esa.html)

19 Committee On the Status of Endangered Wildlife In Canada (http://www.cosewic.gc.ca/)

Appendix 1.0 Species Conservation Targets

SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK	BC	AB	MT	ID	WA	STATUS		CRM DISTRIBUTION*	SCALE*	ECOLOGICAL GOALS MET?
								ESA[20]	COSEWIC[21]			
NON-VASCULAR PLANTS												
Cladonia andereggii		G1		X						Endemic	Local	No
Cladonia bacilliformis		G3	X							Peripheral	Local	Yes
Cladonia imbricarica		G2				X				Limited	Local	No
Cladonia luteoalba		G2	X							Limited	Local	No
Cladonia merochlorophaea		G2		X						Limited	Local	No
Cladonia norvegica		G3		X						Limited	Local	No
Cladonia parasitica		G3G5	X							Limited	Local	No
Collema curtisporum		G3			X					Endemic	Local	No
Drepanocladus crassicostatus	Brown moss	G3G5		X						Limited	Local	No
Grimmia brittoniae		G1			X					Endemic	Local	No
Hygrohypnum norvegicum		G2	X							Disjunct	Local	No
Mielichhoferia macrocarpa		G2		X	X					Disjunct	Local	No
Phascum vlassovii		G2?		X						Disjunct	Local	No
Platydictya minutissima		G3?		X						Limited	Local	No
Pohlia brevinervis		G1		X						Limited	Local	No

An "X" indicates the target occurs in the province or state

* *See Appendix 1.1

[20] U.S. Endangered Species Act (http://endangered.fws.gov/esa.html)

[21] Committee On the Status of Endangered Wildlife In Canada (http://www.cosewic.gc.ca/)

Appendix 1.0 Species Conservation Targets

SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK	BC	AB	MT	ID	WA	STATUS ESA[22]	STATUS COSEWIC[23]	CRM DISTRIBUTION*	SCALE/SPATIAL PATTERN*	ECOLOGICAL GOALS MET?
NON-VASCULAR PLANTS												
Pohlia crudoides		G3		X						Peripheral	Local	No
Schistidium heterophyllum		G3		X						Peripheral	Local	No
Seligeria subimmersa		G5?		X						Limited	Local	No
Tayloria acuminata	Point-leaf small-kettle moss	G3		X	X					Limited	Local	No
Tayloria splachnoides		G2G3	X	X						Limited	Local	No
Tetrodontium repandum		G2G3	X							Limited	Local	No
Tortula bartramii		G3		X	X					Limited	Local	No
RARE COMMUNITY TYPES												
Abies grandis/Taxus brevifola Forest	Grand fir / Pacific yew Forest	G2			X	X				Widespread	Large Patch	No
Abies lasiocarpa – Pinus albicaulis –Picea engelmannii/Empetrum nigrum	Subalpine fir – Whitebark pine – Engelmann spruce / Crowberry	S2		X						Widespread	Large Patch	No
Abies lasiocarpa – Pinus albicaulis/Xerophyllum tenax	Subalpine fir – Whitebark pine / Bear grass	S1S2		X						Widespread	Large Patch	No
Anemone occidentalis – Carex nigricans	Western anemone – Black alpine sedge	S2Q	X							Peripheral	Small Patch	No

An "X" indicates the target occurs in the province or state

* *See Appendix 1.1

[22] U.S. Endangered Species Act (http://endangered.fws.gov/esa.html)

[23] Committee On the Status of Endangered Wildlife In Canada (http://www.cosewic.gc.ca/)

Appendix 1.0 Species Conservation Targets

SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK	BC	AB	MT	ID	WA	STATUS		CRM DISTRIBUTION*	SCALE/SPATIAL PATTERN*	ECOLOGICAL GOALS MET?
								ESA[24]	COSEWIC[25]			
RARE COMMUNITY TYPES												
Antennaria lanata- Artemissia norvegica	Woolly pussytoes – Mountain sagewort	S1		X						Widespread	Small Patch	No
Artemisia norvegica – Mertensia paniculata- Leymus innovatus	Mountain sagewort/Tall bluebells/Northern wildrye	S1		X						Widespread	Small Patch	No
Artemisia tridentata / Elymus spicatus – Balsamorhiza sagittata	Big sagebrush/ Bluebunch wheatgrass/ Arrow-leaved balsamroot	S2Q	X		X					Endemic	Small Patch	No
Artemisia tridentata - Rhamnus alnifolia	Big sagebrush – Alder leaved buckthorn	S1		X						Peripheral	Small Patch	Yes
Artemisia tridentata slope community	Big sagebrush slope community	S1		X						Peripheral	Large Patch	Yes
Betula glandulosa/ Carex/ Sphagnum	Scrub birch / Sedge /Sphagnum	S2Q	X		X					Endemic	Small Patch	No
Betula occidentalis – Amelanchier alnifolia/ Artemisia campestris – Elymus lanceolatus (Agropyron dasystachyum)	Water birch/ Saskatoon berry / Northern wormwood – Northern wheatgrass	S1		X						Widespread	Linear	No

An "X" indicates the target occurs in the province or state

[*] *See Appendix 1.1

[24] U.S. Endangered Species Act (http://endangered.fws.gov/esa.html)

[25] Committee On the Status of Endangered Wildlife In Canada (http://www.cosewic.gc.ca/)

Appendix 1.0 Species Conservation Targets

SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK	BC	AB	MT	ID	WA	STATUS ESA[26]	COSEWIC[27]	CRM DISTRIBUTION*	SCALE/SPATIAL PATTERN*	ECOLOGICAL GOALS MET?
RARE COMMUNITY TYPES												
Betula papyrifera/ Betula occidentalis/ Arctostaphylos uva - ursi	Paper birch / Water birch / Kinnikinnick	S1		X						Widespread	Linear	No
Carex aperta Herbaceous Vegetation	Columbian sedge Herbaceous Vegetation	G1?	X		X		X			Endemic	Small Patch	No
Cornus stolonifera/ Carex spp.	Red-osier dogwood / Sedge spp.	S2	X		X					Endemic	Small Patch	No
Crataegus douglasii – (Crataegus chrysocarpa) Shrubland	Black hawthorn Shrubland	G2Q			X					Widespread	Large Patch	No
Distichlis stricta – Hordeum jubatum	Saltgrass (or Desert saltgrass) – Foxtail (or Wild) barley	S1	X		X					Endemic	Small Patch	No
Elaeagnus commutata	Silverberry	S2		X	X					Widespread	Large Patch	No
Elymus spicatus - Koeleria macrantha	Bluebunch wheatgrass - Junegrass	S2Q	X		X		?			Endemic	Matrix	No
Festuca altaica – Leymus innovatus (Elymus innovatus)	Rough fescue/Northern wildrye	S2			X					Widespread	Large Patch	No

An "X" indicates the target occurs in the province or state

* *See Appendix 1.1

[26] U.S. Endangered Species Act (http://endangered.fws.gov/esa.html)

[27] Committee On the Status of Endangered Wildlife In Canada (http://www.cosewic.gc.ca/)

Appendix 1.0 Species Conservation Targets

SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK	BC	AB	MT	ID	WA	STATUS		CRM DISTRIBUTION*	SCALE/SPATIAL PATTERN*	ECOLOGICAL GOALS MET?
								ESA[28]	COSEWIC[29]			
RARE COMMUNITY TYPES												
Juncus drummondii – Carex saxatilis – Ranunculus nivalis	Drummond's rush/Russet sedge/Snow buttercup	S1?		X						Widespread	Small Patch	No
Larix occidentalis/ Calamagrostis rubescens	Western (or Mountain or Montana) larch / Pinegrass	S1		X	X		?			Widespread	Matrix	No
Leymus cinereus – Pascopyrum smithii Herbaceous Vegetation	Basin (or Giant or Ashy) wildrye – Western wheatgrass Herbaceous Vegetation	G3			X					Widespread	Large Patch	No
Penstemon ellipticus talus barren	Elliptic – leaved beardtongue talus barren	S1?		X						Widespread	Small Patch	No
Picea (engelmannii X glauca, engelmannii) / Lysichiton americanum Forest	Hybrid White spruce / Western skunk cabbage Forest	G2	X		X					Endemic	Linear	No
Picea engelmannii – Abies lasiocarpa/ Salix vestita/ Cassiope tetragona	Engelmann spruce/Subalpine fir/ Rock willow / Four-angled Mtn heather	S2		X						Widespread	Large Patch	No
Picea engelmannii/ Leymus innovatus	Engelmann spruce / Northern (or Boreal) wildrye	S2		X						Widespread	Large Patch	No

An "X" indicates the target occurs in the province or state

* *See Appendix 1.1

[28] U.S. Endangered Species Act (http://endangered.fws.gov/esa.html)

[29] Committee On the Status of Endangered Wildlife In Canada (http://www.cosewic.gc.ca/)

Appendix 1.0 Species Conservation Targets

SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK	BC	AB	MT	ID	WA	STATUS ESA[30]	COSEWIC[31]	CRM DISTRIBUTION*	SCALE/SPATIAL PATTERN*	ECOLOGICAL GOALS MET?
RARE COMMUNITY TYPES												
Picea engelmannii/ Salix drummondiana	Engelmann spruce / Drummond willow	S1?		**X**	**?**					Widespread	Large Patch	No
Picea engelmannii X P. glauca/ Oplopanax/ Hylocomium	Hybrid White Spruce/ Devil's club / Step moss	S2	**X**							Endemic	Large Patch	No
Picea engelmannii X P. glauca/ Matteuccia struthiopteris	Hybrid White spruce / Ostrich fern	S2	**X**							Endemic	Large Patch	No
Picea engelmannii – Abies lasiocarpa/ Dryas octopetala	Engelmann spruce - Subalpine fir/ Mountain avens	S2S3		**X**						Widespread	Large Patch	No
Picea glauca /Rosa acicularis / Thuidium abietinum	White spruce / Prickly rose/ Fern moss	S1		**X**						Peripheral	Large Patch	Yes
Picea glauca/ Shepherdia canadensis/ Thuidium abietinum	White spruce / Canada buffaloberry / Fern moss	S2		**X**						Peripheral	Large Patch	No
Picea glauca / Thuidium abietinum	White spruce/ Fern moss	S2S3		**X**						Peripheral	Large Patch	No
Picea mariana / Carex / Pleurozium schreberi	Black spruce / Sedge spp. / Schreber's Red Stem moss	S2	**X**							Endemic	Large Patch	No

An "X" indicates the target occurs in the province or state

* *See Appendix 1.1

30 U.S. Endangered Species Act (http://endangered.fws.gov/esa.html)

31 Committee On the Status of Endangered Wildlife In Canada (http://www.cosewic.gc.ca/)

Appendix 1.0 Species Conservation Targets

SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK	BC	AB	MT	ID	WA	STATUS ESA[32]	STATUS COSEWIC[33]	CRM DISTRIBUTION*	SCALE/SPATIAL PATTERN*	ECOLOGICAL GOALS MET?
RARE COMMUNITY TYPES												
Pinus albicaulis – Abies lasiocarpa / Luzula hitchcockii – Vaccinium myrtillus	Whitebark pine – Subalpine fir / Smooth woodrush – Low bilberry	S1S2		X			?			Widespread	Large Patch	No
Pinus albicaulis – Picea engelmannii / Dryas octopetala	Whitebark pine – Engelmann spruce / Mountain avens	S1		X						Widespread	Large Patch	No
Pinus albicaulis / Calamagrostis rubescens Woodland	Whitebark pine / Pinegrass (or Pine reedgrass) Woodland	G2			X		?			Endemic	Small Patch	No
Pinus contorta / Polystichum kruckebergii – Aspidotis densa	Lodgepole pine / Kruckeberg's holly fern – Pod (or Indian's-dream) fern	S1	X							Endemic	Large Patch	No
Pinus contorta / Vaccinium myrtilloides / Cladonia	Lodegepole pine / Velvet – leaved blueberry / lichen spp.	S2	X							Endemic	Small Patch	No
Pinus flexilis – Pseudotsuga menziesii / Juniperus spp. / Arctostaphylos uva-ursi	Limber pine – Interior Douglas-fir / Juniper spp. / Kinnikinnick	S2		X	X (w/o Pseud. menz. & Arcto. uva.)					Widespread	Large Patch	Yes
Pinus monticola / Clintonia uniflora Forest	Western white pine / Queen's cup Forest	G1Q			X		X			Widespread	Large Patch	No

An "X" indicates the target occurs in the province or state

* *See Appendix 1.1

[32] U.S. Endangered Species Act (http://endangered.fws.gov/esa.html)

[33] Committee On the Status of Endangered Wildlife In Canada (http://www.cosewic.gc.ca/)

Appendix 1.0 Species Conservation Targets

SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK	BC	AB	MT	ID	WA	STATUS		CRM DISTRIBUTION*	SCALE/SPATIAL PATTERN*	ECOLOGICAL GOALS MET?
								ESA[34]	COSEWIC[35]			
RARE COMMUNITY TYPES												
Pinus ponderosa – Populus tremuloides / Rosa woodsii	Ponderosa pine – Trembling aspen / Prairie rose	S2	X							Peripheral	Small Patch	No
Pinus ponderosa / Elymus spicatus / Lupinus	Ponderosa pine / Bluebunch wheatgrass / Lupine spp.	S2	X				?			Peripheral	Large Patch	No
Pinus ponderosa / Physocarpus malvaceus Forest	Ponderosa pine / Mallow ninebark Forest	G2			X		X			Peripheral	Large Patch	Yes
Populus balsamifera ssp. trichocarpa / Cornus stolonifera – Rosa nutkana	Black cottonwood / Red-osier dogwood / Nootka rose	S1S2	X		X (w/o Ros. nutk.)		?			Endemic	Linear	No
Populus tremuloides – Populus balsamifera ssp. trichocarpa / Osmorhiza occidentalis Forest	Trembling aspen – Black cottonwood / Sweet cicely Forest	G2Q			X					Widespread	Linear	No
Populus tremuloides / Leymus innovatus – Aster conspicuus avalanche community	Trembling aspen / Northern (or Boreal) wildrye – Showy aster avalanche community	S2		X						Widespread	Small Patch	No

An “X” indicates the target occurs in the province or state

* *See Appendix 1.1

[34] U.S. Endangered Species Act (http://endangered.fws.gov/esa.html)

[35] Committee On the Status of Endangered Wildlife In Canada (http://www.cosewic.gc.ca/)

Appendix 1.0 Species Conservation Targets

SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK	BC	AB	MT	ID	WA	STATUS ESA[36]	STATUS COSEWIC[37]	CRM DISTRIBUTION*	SCALE/SPATIAL PATTERN*	ECOLOGICAL GOALS MET?
RARE COMMUNITY TYPES												
Populus tremuloides / Menziesia ferruginea	Trembling aspen / False azalea	S1		**X**						Widespread	Large Patch	No
Populus tremuloides / Rubus parviflorus	Trembling aspen / Thimbleberry	S2		**X**						Widespread	Large Patch	No
Populus tremuloides / Symphocarpos albus / Poa pratensis	Trembling aspen / Common snowberry / Kentucky bluegrass	S2			**X**		**?**			Endemic	Large Patch	No
Pseudoroegneria spicata/Leymus innovatus/ Aster conspicuus	Bluebunch wheatgrass/Northern wildrye/Showy aster	S1		**X**						Widespread	Large Patch	No
Pseudotsuga menziesii – Pinus flexilis / Juniperus communis / Festuca campestris	Interior Douglas-fir – Limber pine / Common juniper / Rough fescue	S2S3		**X**	**?**					Widespread	Large Patch	Yes
Pseudotsuga menziesii – Thuja plicata / Dicranum	Interior Douglas-fir - Interior Western redcedar / Moss	S2?	**X**							Endemic	Small Patch	No
Pseudotsuga menziesii / Mahonia aquifolium / Cryptogramma	Interior Douglas-fir / Oregon grape / Parsley Fern	S2?			**X**					Endemic	Small Patch	No
Pseudotsuga menziesii / Symphocarpos albus / Balsamorhiza sagittata	Interior Douglas-fir / Common snowberry / Arrow-leaved balsamroot	S2	**X**		**X** (w/o Bals. sag.)		**?**			Endemic	Large Patch	No

Appendix 1.0 Species Conservation Targets

---

* *See Appendix 1.1

[36] U.S. Endangered Species Act (http://endangered.fws.gov/esa.html)

[37] Committee On the Status of Endangered Wildlife In Canada (http://www.cosewic.gc.ca/)

								STATUS				
SCIENTIFIC NAME	**COMMON NAME**	**GLOBAL RANK**	**BC**	**AB**	**MT**	**ID**	**WA**	**ESA[38]**	**COSEWIC[39]**	**CRM DISTRIBUTION***	**SCALE/SPATIAL PATTERN***	**ECOLOGICAL GOALS MET?**
RARE COMMUNITY TYPES												
Purshia tridentata / Elymus spicatus	Antelope bush (or Bitterbrush) / Bluebunch wheatgrass	S2	**X**		**X**					Endemic	Large Patch	No
Purshia tridentata / Festuca campestris Shrub Herbaceous Vegetation	Antelope bush (or Bitterbrush) / Rough fescue (or Buffalo bunchgrass) Shrub Herbaceous Vegetation	G2?			**X**					Widespread	Large Patch	No
Rosa woodsii / Festuca idahoensis	Prairie rose / Idaho fescue	S2	**X**							Endemic	Small Patch	No
Salix drummondiana – Thalictrum venulosum	Drummond willow – Northern meadow rue	S1		**X**						Widespread	Small Patch	No
Stipa richardsonii - Koeleria macrantha – Antennaria parvifolia	Spreading needlegrass – Junegrass (or Prairie junegrass) – Rocky Mountain (or Littleleaf or Nuttall's) pussytoes	S2S3		**X**						Widespread	Large Patch	No

An "X" indicates the target occurs in the province or state

* *See Appendix 1.1

[38] U.S. Endangered Species Act (http://endangered.fws.gov/esa.html)

[39] Committee On the Status of Endangered Wildlife In Canada (http://www.cosewic.gc.ca/)

Appendix 1.0 Species Conservation Targets

SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK	BC	AB	MT	ID	WA	STATUS ESA[40]	COSEWIC[41]	CRM DISTRIBUTION*	SCALE/SPATIAL PATTERN*	ECOLOGICAL GOALS MET?
RARE COMMUNITY TYPES												
Symphoricarpos occidentalis – Festuca idahoensis	Western snowberry (or Wolfberry)	S2?		**X**						Peripheral	Small Patch	No
Thuja plicata / Rubus idaeus / Gymnocarpium	Western redcedar / Red raspberry / Fern	S2	**X**				**?**			Widespread	Large Patch	No
Thuja plicata / Adiantum pedatum Forest	Interior Western redcedar / Maidenhair fern Forest	G2?					**X**			Widespread	Matrix	Yes
Thuja plicata / Aralia nudicaulis Forest	Interior Western redcedar / Wild sarsaparilla Forest	G2			**X**		**X**			Widespread	Matrix	No
Thuja plicata / Lysichiton americanum / Sphagnum	Interior Western redcedar / Skunk cabbage / Sphagnum	S2	**X**		**?**					Endemic	Small Patch	No
Thuja plicata / Oplopanax horridus / Matteuccia	Interior Western redcedar / Devil's club / Fern	S1S2	**X**		**X** (w/o Matt.)		**X**			Endemic	Large Patch	No

An "X" indicates the target occurs in the province or state

* *See Appendix 1.1

[40] U.S. Endangered Species Act (http://endangered.fws.gov/esa.html)

[41] Committee On the Status of Endangered Wildlife In Canada (http://www.cosewic.gc.ca/)

Appendix 1.0 Species Conservation Targets

SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK	BC	AB	MT	ID	WA	STATUS		CRM DISTRIBUTION*	SCALE/SPATIAL PATTERN*	ECOLOGICAL GOALS MET?
								ESA[42]	COSEWIC[43]			
RARE COMMUNITY TYPES												
Tsuga heterophylla / Menziesia ferruginea / Cladonia	Western hemlock / False azalea / lichen	S2	**X**							Endemic	Small Patch	No
Tsuga heterophylla / Menziesia ferruginea Forest	Western hemlock / False azalea Forest	G2	**X?**		**X**		**X**			Widespread	Matrix	No
Tsuga heterophylla / Vaccinium myrtilloides - Paxistima	Western hemlock / Velvet – leaved blueberry - Falsebox	S1	**X**							Endemic	Small Patch	No
Tsuga heterophylla / Xerophyllum tenax Forest	Western hemlock / Bear-grass Forest	G2					**X**			Widespread	Matrix	No
Tsuga mertensiana / Streptopus amplexifolius Forest	Mountain hemlock / Clasping twisted stalk Forest	G2			**X**	**X**				Widespread	Linear	No

An “X” indicates the target occurs in the province or state

* *See Appendix 1.1

42 U.S. Endangered Species Act (http://endangered.fws.gov/esa.html)

43 Committee On the Status of Endangered Wildlife In Canada (http://www.cosewic.gc.ca/)

APPENDIX 1.1 CONSERVATION TARGETS CHARACTERISTICS

DISTRIBUTION	CHARACTERISTICS
Endemic	Restricted to an ecoregion (or a small geographic area within an ecoregion), depend entirely on a single area for survival, and are therefore often more vulnerable; >90% of global distribution in ecoregion.
Disjunct	Have populations that are geographically isolated from other populations. Distribution in ecoregion quite likely reflects significant genetic differentiation from main range due to historic isolation; roughly >2 ecoregions separate this ecoregion from central parts of it's range.
Limited	Global distribution in 2-3 ecoregions.
Widespread	Global distribution >3 ecoregions.
Peripheral	<10% of global distribution in ecoregion.
SCALE	
Local	These typically include all/most plants, invertebrates, herps, and small mammals. They are often associated with "small patch" and "large patch" terrestrial ecosystems, and small lake/stream systems.
Intermediate	These typically include small/medium-size mammals, birds, and fish, and some herps. They are often associated with "large patch" and "linear" terrestrial ecosystems, and medium-size lake and river systems.
Coarse	These typically include medium-size mammals, birds, and fish. They are often associated with "matrix-forming" terrestrial ecosystems, large lakes and medium-large river systems.
Regional	These typically include large mammals and fish associated with diverse and extensive complexes of terrestrial, aquatic, and marine ecosystems
SPATIAL PATTERN	
Matrix	Vegetation communities form extensive and contiguous cover 2,000 to 500,000 ha in size. Occur on ecoregion's most extensive landforms and typically have ecological tolerances; aggregate of all matrix communities covers 70-80% of ecoregion; often influenced by large-scale processes.
Large Patch	Vegetation communities with interrupted cover ranging in size from 50-2,000 ha. Aggregate of all large patch communities may cover as much as 20% of the ecoregion. Example:
Small Patch	Vegetation communities that form small, discrete areas of cover one to 50 ha in size. Occur in very specific ecological settings, such as on specialized landform types or in unusual microhabitats. May contain disproportionately large percentage of ecoregions total flora, and also support a specific and restricted set of specialized fauna.
Linear	Communities occur as linear strips. Often represent ecotone between terrestrial and aquatic systems. Aggregate of all linear communities covers only a small percentage of the natural vegetation of the ecoregion. Local scale processes, such as river flow regimes, strongly influence community structure and function, leaving communities highly vulnerable to alterations in the surrounding land and waterscape.

APPENDIX 1.2 HABITATS/ECOSYSTEMS CONSERVATION TARGETS

COMMON NAME	BC	AB	MT	ID	WA	CRM DISTRIBUTION*	SPATIAL PATTERN*	ECOLOGICAL GOALS MET?
ECOLOGICAL SYSTEMS								
Alpine Cushion Plant		X	X			Widespread	Matrix	Yes
Alpine Grassland (dry)		X	X			Widespread	Matrix	Yes
Alpine Meadow (wet)		X	X			Widespread	Small Patch	Yes
Aspen		X	X		X	Widespread	Large Patch	Yes
Aspen Parkland		X				Peripheral	Matrix	Yes
Black Spruce Bog		X				Widespread	Small Patch	Yes
Conifer Swamp			X			Widespread	Small Patch	Yes
Disturbed Colluvial/Landslide		X	X		X	Widespread	Small Patch	Yes
Dwarf-Shrubland		X	X		X	Widespread	Small Patch	No
Engelmann Spruce – Subalpine fir Dry Parklands		X	X		X	Widespread	Large Patch	Yes
Engelmann Spruce Riparian Forests		X	X		X	Widespread	Linear	No
Engelmann Spruce / Subalpine Fir Dry Forests		X	X		X	Widespread	Matrix	Yes
Fen		X	X		X	Widespread	Small Patch	Yes
Foothills Boreal Forests		X				Peripheral	Matrix	Yes
Glacier		X	X			Widespread	Large Patch	Yes
Hybrid Spruce Forests		X	X			Peripheral	Large Patch	Yes
Interior Douglas-fir Forests			X		X	Widespread	Matrix	Yes
Interior Grand Fir Forests			X		X	Widespread	Large Patch	Yes
Interior Western Redcedar – Hemlock – Douglas-fir Forests			X		X	Widespread	Matrix	Yes
Limber Pine Forests		X	X			Widespread	Large Patch	Yes
Lodgepole Pine Forests and Woodlands		X	X		X	Widespread	Large Patch	Yes
Montane Riparian Shrubland		X	X		X	Widespread	Linear	Yes
Marsh		X	X		X	Widespread	Small Patch	Yes
Montane Dry Grasslands		X	X		X	Widespread	Large Patch	Yes
Montane Riparian Forest		X	X		X	Widespread	Linear	Yes
Montane Spruce		X	X			Peripheral	Large Patch	Yes
Montane Scrub		X	X		X	Widespread	Large Patch	Yes

An "X" indicates the target occurs in the province or state

* *See Appendix 1.1

APPENDIX 1.2 HABITATS/ECOSYSTEMS CONSERVATION TARGETS

COMMON NAME	BC	AB	MT	ID	WA	CRM DISTRIBUTION[*]	SPATIAL PATTERN*	ECOLOGICAL GOALS MET?
ECOLOGICAL SYSTEMS								
Montane Wet Meadows		X	X		X	Widespread	Small Patch	Yes
Ponderosa Pine Woodland			X		X	Peripheral	Large Patch	Yes
Rock Outcrop / Cliff		X	X		X	Widespread	Small Patch	Yes
Rough Fescue Prairie		X	X		X	Peripheral	Matrix	Yes
Sagebrush Steppe			X			Peripheral	Large Patch	Yes
Sparsely Vegetated Rock & Talus		X	X		X	Widespread	Small Patch	Yes
Sphagnum Bog		X			X	Widespread	Small Patch	Yes
Subalpine Dry Grassland		X	X		X	Widespread	Large Patch	Yes
Subalpine Fir – Mountain Hemlock Forests			X		X	Widespread	Matrix	Yes
Subalpine Fir – Mountain Hemlock Woodlands			X		X	Widespread	Large Patch	Yes
Subalpine Larch Forests		X	X		X	Limited	Large Patch	Yes
Subalpine Shrublands		X	X		X	Widespread	Small Patch	No
Subalpine Wet Meadow		X	X		X	Widespread	Small Patch	Yes
MAPPED VEGETATION TYPES								
Aspen Parkland		X				Peripheral	Matrix	Yes
Foothills Boreal Forests		X				Peripheral	Matrix	Yes
Hybrid Spruce Forests		X	X			Peripheral	Large Patch	Yes
Interior Alpine Zone			X					Yes
Interior Douglas-fir Forests			X		X	Widespread	Matrix	Yes
Interior Grand Fir Forests			X		X	Widespread	Large Patch	Yes
Interior Subalpine Forest Zone			X		X			Yes
Interior Western Redcedar – Hemlock – Douglas-fir Forests			X			Widespread	Matrix	Yes
Montane Spruce		X	X			Peripheral	Large Patch	Yes
Ponderosa Pine Woodland			X		X	Peripheral	Large Patch	Yes
Rough Fescue Prairie		X	X		X	Peripheral	Matrix	Yes
Sagebrush Steppe			X			Peripheral	Large Patch	Yes

An "X" indicates the target occurs in the province or state

[*] *See Appendix 1.1

APPENDIX 1.2 HABITATS/ECOSYSTEMS CONSERVATION TARGETS

COMMON NAME	BC	AB	MT	ID	WA	CRM DISTRIBUTION*	SPATIAL PATTERN*	ECOLOGICAL GOALS MET?
ELEVATIONAL RIPARIAN								
Alpine Riparian		X	X			Widespread	Linear	Yes
Foothills Riparian		X	X			Widespread	Linear	Yes
Montane Riparian		X	X			Widespread	Linear	Yes
Subalpine Riparian		X	X			Widespread	Linear	Yes

An "X" indicates the target occurs in the province or state

* *See Appendix 1.1

APPENDIX 1.3 GOALS CAPTURED IN THE CANADIAN ROCKY MOUNTAINS ECOREGIONAL PORTFOLIO

Target Type	Scientific Name	Common Name	G RANK	Percent of SITES Goal Captured	Percent of Ecological Goal Captured	SITES Goal	Ecological Goal	Captured in Portfolio	Total Amount in Ecoregion
Vascular Plants (Goals Measured as # of Element occurrences)	Allium columbianum	Columbia onion	G3	100.0%	7.7%	1	13	1	1
	Arenaria longipedunculata	Low sandwort	G3Q	100.0%	66.7%	2	3	2	2
	Arnica louiseana	Lake Louise arnica	G3	100.0%	4.0%	1	25	1	1
	Aster jessicae	Jessica's aster	G2	100.0%	100.0%	25	25	25	27
	Astragalus lackschewitzii	Lackschewitz' Milkvetch	G2	100.0%	32.0%	8	25	8	8
	Azolla mexicana	Mexican mosquito-fern	G5	100.0%	15.4%	2	13	2	2
	Botrychium ascendens	Upward-lobed moonwort	G3*	123.1%	123.1%	13	13	16	20
	Botrychium crenulatum	Crenulate moonwort	G3	284.6%	284.6%	13	13	37	69
	Botrychium hesperium	Western moonwort	G3	100.0%	100.0%	13	13	13	18
	Botrychium lineare		G2*	100.0%	30.8%	4	13	4	4
	Botrychium montanum	Mountain moonwort	G3	369.2%	369.2%	13	13	48	71
	Botrychium pallidum	Pale moonwort	G2	100.0%	23.1%	3	13	3	3
	Botrychium paradoxum	Peculiar moonwort	G3*	153.8%	153.8%	13	13	20	26
	Botrychium pedunculosum	Stalked moonwort	G3*	115.4%	115.4%	13	13	15	31
	Botrychium spathulatum	Spoon-leaf moonwort	G3	300.0%	300.0%	3	3	9	10
	Calochortus nitidus	Broad-fruit mariposa	G3	133.3%	133.3%	3	3	4	5
	Cardamine constancei	Constance's bitter cress	G3	112.0%	112.0%	25	25	28	41
	Carex amplifolia	Big-leaf sedge	G4	100.0%	23.1%	3	13	3	3
	Carex comosa	Birstly sedge	G5	100.0%	46.2%	6	13	6	6
	Carex lenticularis var. dolia	Goose-grass sedge	G5T3Q	100.0%	100.0%	13	13	13	13
	Carex stenoptila	Small-winged sedge	G3?	100.0%	15.4%	2	13	2	2
	Cephalanthera austiniae	Phantom orchid	G4	123.1%	123.1%	13	13	16	24
	Conimitella williamsii	William's conimitella	G3	100.0%	84.6%	11	13	11	11
	Corydalis caseana var. hastata	Case's corydalis	G5T3	100.0%	100.0%	25	25	25	44

APPENDIX 1.3 GOALS CAPTURED IN THE CANADIAN ROCKY MOUNTAINS ECOREGIONAL PORTFOLIO

Target Type	Scientific Name	Common Name	G RANK	Percent of SITES Goal Captured	Percent of Ecological Goal Captured	SITES Goal	Ecological Goal	Captured in Portfolio	Total Amount in Ecoregion
Vascular Plants (Goals Measured as # of Element occurrences)	Cypripedium fasciculatum	Clustered lady's-slipper	G4	400.0%	400.0%	13	13	52	74
	Dasynotus daubenmirei	Daubenmire's dasynotus	G3	100.0%	8.0%	2	25	2	2
	Draba kananaskis	Tundra whitlow-grass	G1Q	66.7%	66.7%	3	3	2	3
	Draba porsildii	Porsild's whitlow-grass	G3	100.0%	46.2%	6	13	6	6
	Draba ventosa	Wind River whitlow-grass	G3	100.0%	61.5%	8	13	8	8
	Erigeron lackschewitzii		G3	100.0%	48.0%	12	25	12	12
	Erigeron lanatus	Woolly fleabane	G3G4	100.0%	24.0%	6	25	6	6
	Erigeron radicatus	Dwarf fleabane	G3	100.0%	71.4%	5	7	5	5
	Erigeron Trifidus	Barren ground fleabane	G2G3Q	100.0%	52.0%	13	25	13	13
	Glyceria leptostachya	Slim-head manna grass	G3	100.0%	15.4%	2	13	2	2
	Grindelia howellii	Howell's gum-weed	G3	100.0%	15.4%	2	13	2	2
	Howellia aquatilis	Water howellia	G2	100.0%	100.0%	93	93	93	93
	Iris missouriensis	Missouri iris	G5	100.0%	28.6%	2	7	2	2
	Lathyrus bijugatus	Latah tule pea	G4	100.0%	8.0%	2	25	2	2
	Lilaea scilloides	Flowering quillwort	G5?	100.0%	7.7%	1	13	1	1
	Lomatium salmoniflorum	Salmon-flower desert-parsley	G3	100.0%	33.3%	1	3	1	1
	Lupinus minimus	Least lupine	G3G4	100.0%	85.7%	6	7	6	6
	Malaxis paludosa	Bog adder's-mouth	G4	100.0%	7.7%	1	13	1	1
	Mimulus ampliatus	Spacious monkeyflower	G1	100.0%	33.3%	1	3	1	1
	Mimulus patulus	Washington Monkeyflower	G2	100.0%	7.7%	1	13	1	1
	Myriophyllum ussuriense	Ussurian water-milfoil	G3	100.0%	23.1%	3	13	3	3
	Nymphaea leibergii	Dwarf water-lily	G5	100.0%	30.8%	4	13	4	4
	Oxytropsis campestris var. columbiana	Columbia crazyweed	G5T3	100.0%	53.8%	7	13	7	7
	Packera contermina	High alpine butterweed	G3?	100.0%	32.0%	8	25	8	8

APPENDIX 1.3 GOALS CAPTURED IN THE CANADIAN ROCKY MOUNTAINS ECOREGIONAL PORTFOLIO

Target Type	Scientific Name	Common Name	G RANK	Percent of SITES Goal Captured	Percent of Ecological Goal Captured	SITES Goal	Ecological Goal	Captured in Portfolio	Total Amount in Ecoregion
Vascular Plants (Goals Measured as # of Element occurrences)	Papaver pygmaeum	Alpine glacier poppy	G3	100.0%	56.0%	14	25	14	14
	Pellaea gastonyi		G3	100.0%	100.0%	13	13	13	15
	Phacelia lyallii	Lyall phacelia	G3	100.0%	56.0%	14	25	14	14
	Phlox idahonis	Clearwater phlox	G1	100.0%	32.0%	8	25	8	8
	Poa laxa ssp. Baniffianna	A bluegrass	G5?T1	100.0%	7.7%	1	13	1	1
	Prenanthes sagittata	Arrow-leaf rattlesnake root	G3	100.0%	44.0%	11	25	11	11
	Pyrrocoma liatriformis		G2	100.0%	36.0%	9	25	9	9
	Salix raupii	A willow	G2	100.0%	33.3%	1	3	1	1
	Saussurea densa	Dwarf saw-wort	G3G4	100.0%	32.0%	8	25	8	8
	Silene spaldingii	Spalding's campion	G2	100.0%	44.0%	11	25	11	11
	Synthyris platycarpa	Pennell's kittentail	G3	100.0%	60.0%	15	25	15	15
	Tauschia tenuissima	Leiberg's tauschia	G3	100.0%	100.0%	25	25	25	27
	Waldsteinia idahoensis	Idaho strawberry	G3	100.0%	20.0%	5	25	5	5
	Barbula eustegia		G3?	100.0%	7.7%	1	13	1	1
	Bryoria friabilis		G3	100.0%	7.7%	1	13	1	1
	Bryum calobryoides	a moss	G3	100.0%	30.8%	4	13	4	4
	Bryum knowltonii		G3	100.0%	7.7%	1	13	1	1
	Bryum schleicheri	a moss	G5?	100.0%	30.8%	4	13	4	4
	Cladonia bacilliformis		G3	133.3%	133.3%	3	3	4	4
	Cladonia imbricarica		G2	100.0%	15.4%	2	13	2	2
	Cladonia merochlorophaea		G2	100.0%	23.1%	3	13	3	3
	Cladonia norvegica		G3	100.0%	7.7%	1	13	1	1
	Collema curtisporum		G3	100.0%	32.0%	8	25	8	8
	Dermatocarpon moulinsii	a lichen	G?	100.0%	15.4%	2	13	2	2

APPENDIX 1.3 GOALS CAPTURED IN THE CANADIAN ROCKY MOUNTAINS ECOREGIONAL PORTFOLIO

Target Type	Scientific Name	Common Name	G RANK	Percent of SITES Goal Captured	Percent of Ecological Goal Captured	SITES Goal	Ecological Goal	Captured in Portfolio	Total Amount in Ecoregion
Vascular Plants (Goals Measured as # of Element occurrences)	Drepanocladus crassicostatus	brown moss	G3G5	100.0%	15.4%	2	13	2	2
	Grimmia brittoniae		G1	100.0%	24.0%	6	25	6	6
	Hygrohypnum norvegicum		G2	100.0%	7.7%	1	13	1	1
	Mielichhoferia macrocarpa		G2?	100.0%	8.0%	2	25	2	2
	Phascum vlassovii		G2?	100.0%	7.7%	1	13	1	1
	Pohlia crudoides		G3	100.0%	33.3%	1	3	1	1
	Seligeria subimmersa	a moss	G5?	100.0%	15.4%	2	13	2	2
	Tayloria acuminata	Point-leaf small-kettle moss	G3	100.0%	7.7%	1	13	1	1
	Tayloria splachnoides		G2G3	100.0%	7.7%	1	13	1	1
	Tetrodontium repandum		G2G3	100.0%	7.7%	1	13	1	1
	Tortula bartramii		G3	100.0%	7.7%	1	13	1	1
Birds (Goals Measured as # of Element occurrences)	Asio flammeus	Short-eared Owl	G5	140.0%	140.0%	5	5	7	7
	Cygnus buccinator	Trumpeter Swan	G4	100.0%	60.0%	3	5	3	3
	Cypseloides niger	Black Swift	G4	100.0%	42.9%	3	7	3	3
	Gavia immer	Common Loon	G5	1420.0%	1420.0%	5	5	71	106
	Haliaeetus leucocephalus nest site	Bald Eagle nest site	G4	2020.0%	2020.0%	5	5	101	155
	Haliaeetus leucocephalus wintering area	Bald Eagle wintering area	G4	100.0%	100.0%	5	5	5	7
	Histrionicus histrionicus	Harlequin Duck	G4	1580.0%	1580.0%	5	5	79	105
	Lagopus leucurus	White-tailed Ptarmigan	G5	1433.3%	1433.3%	3	3	43	45
	Melanerpes lewis	Lewis' woodpecker	G4	360.0%	360.0%	5	5	18	18
	Otus flammeolus	Flammulated Owl	G4	340.0%	340.0%	5	5	17	28

APPENDIX 1.3 GOALS CAPTURED IN THE CANADIAN ROCKY MOUNTAINS ECOREGIONAL PORTFOLIO

Target Type	Scientific Name	Common Name	G RANK	Percent of SITES Goal Captured	Percent of Ecological Goal Captured	SITES Goal	Ecological Goal	Captured in Portfolio	Total Amount in Ecoregion
Snails and Slugs (Goals Measured as # of Element occurrences)	Discus brunsoni	Lake disc	G1	100.0%	4.0%	1	25	1	1
	Magnipelta mycophaga	Spotted slug	G2G3	100.0%	53.8%	7	13	7	7
	Oreohelix alpina	Alpine mountainsnail	G1	100.0%	8.0%	2	25	2	2
	Oreohelix amariradix	Bitterroot mountainsnail	G1	100.0%	4.0%	1	25	1	1
	Oreohelis elrodi	Carinate mountain snail	G1	100.0%	12.0%	3	25	3	3
Amphibians (Goals Measured as # of Element occurrences)	Ambystoma tigrinum	Tiger salamander	G5	100.0%	100.0%	7	7	7	7
	Ascaphus montanus	Tailed frog	G4	600.0%	600.0%	7	7	42	64
	Bufo boreas	Western toad	G4	1560.0%	1560.0%	5	5	78	150
	Dicamptodon aterrimus	Idaho giant salamander	G3	100.0%	33.3%	3	9	3	3
	Plethodon idahoensis	Coeur d'Alene salamander	G3	755.6%	755.6%	9	9	68	111
	Rana pipiens	Northern leopard frog	G5	285.7%	285.7%	7	7	20	20
Mammals (Goals Measured as # of Element occurrences)	Corynorhinus townsendii	Townsend's big-eared bat	G4	171.4%	171.4%	7	7	12	16
	Sorex preblei	Preble's Shrew	G4	100.0%	7.7%	1	13	1	1
	Tamias minimus selkirki	Selkirk Least Chipmunk	G5T1T3	100.0%	4.0%	1	25	1	1
	Thomomys talpoides segregatus	Creston Northern Pocket Gopher	G5T1T3	100.0%	3.8%	1	26	1	1
Wide Ranging Species (Goals Measured as 40% of Total Available Resource Selection Function Values)	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	131.3%	131.3%	42714.268	42714.268	56066.78	106785.67
	High Value Gulo gulo luscus RSF	High Value North American wolverine RSF	G4T4	144.9%	144.9%	8116.272	8116.272	11757.61	20290.68
	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	120.7%	120.7%	17628.136	17628.136	21284.19	44070.34
	High Value Martes pennanti RSF	High Value Fisher RSF	G5	109.5%	109.5%	2931.904	2931.904	3211.34	7329.76
	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	133.9%	133.9%	29567.204	29567.204	39592.18	73918.01

APPENDIX 1.3 GOALS CAPTURED IN THE CANADIAN ROCKY MOUNTAINS ECOREGIONAL PORTFOLIO

Target Type	Scientific Name	Common Name	G RANK	Percent of SITES Goal Captured	Percent of Ecological Goal Captured	SITES Goal	Ecological Goal	Captured in Portfolio	Total Amount in Ecoregion
Insects (Goals Measured as # of Element occurrences)	Euphydryas gellettii	Gillette's Checkerspot	G3	100.0%	76.9%	10	13	10	10
Community (Goals Measured as # of Element occurrences)	Abies grandis / Taxus brevifolia Forest		G2	100.0%	14.3%	1	7	1	1
	Abies lasiocarpa - Pinus albicaulis / Xerophyllum tenax		S1S2	100.0%	42.9%	3	7	3	3
	Antennaria lanata - Artemisia norvegica		S1	100.0%	14.3%	1	7	1	1
	Artemisia norvegica - Mertensia paniculata - Leymus innovatus		S1	100.0%	14.3%	1	7	1	1
	Artemisia tridentata - Rhamnus alnifolia		S1	100.0%	100.0%	3	3	3	3
	Artemisia tridentata / Elymus spicatus - Balsamorhiza sagittata		S2Q	100.0%	4.0%	1	25	1	1
	Artemisia tridentata slope community		S1	166.7%	166.7%	3	3	5	5
	Betula glandulosa / Carex / Sphagnum		S2Q	100.0%	16.0%	4	25	4	4
	Betula occidentalis - Amelanchier alnifolia / Artemisia campestris - Elymus lanceolatus (Agropyron dasystachyum)		S1	100.0%	42.9%	3	7	3	3
	Betula papyrifera / Betula occidentalis / Arctostaphylos uva-ursi		S1	100.0%	14.3%	1	7	1	1
	Carex aperta Herbaceous Vegetation		G1?	100.0%	8.0%	2	25	2	2
	Elaeagnus commutata		S2	100.0%	28.6%	2	7	2	2
	Juncus drummondii - Carex saxatilis - Ranunculus nivalis		S1?	100.0%	28.6%	2	7	2	2
	Larix occidentalis / Calamagrostis rubescens		S1	100.0%	14.3%	1	7	1	1
	Penstemon ellipticus talus barren		S1?	100.0%	14.3%	1	7	1	1
	Picea (engelmannii X glauca, engelmannii) / Lysichiton americanus Forest		G2	90.0%	36.0%	10	25	9	10
	Picea engelmannii - Abies lasiocarpa / Salix planifolia / Hylocomium splendens		S1	100.0%	14.3%	1	7	1	1
	Picea engelmannii - Abies lasiocarpa / Salix vestita / Cassiope tetragona		S2	100.0%	85.7%	6	7	6	6

APPENDIX 1.3 GOALS CAPTURED IN THE CANADIAN ROCKY MOUNTAINS ECOREGIONAL PORTFOLIO

Target Type	Scientific Name	Common Name	G RANK	Percent of SITES Goal Captured	Percent of Ecological Goal Captured	SITES Goal	Ecological Goal	Captured in Portfolio	Total Amount in Ecoregion
Community (Goals Measured as # of Element occurrences)	Picea engelmannii / Leymus innovatus		S2	100.0%	85.7%	6	7	6	6
	Picea engelmannii-Abies lasiocarpa / Dryas octopetala		S2S3	100.0%	85.7%	6	7	6	6
	Picea glauca / Rosa acicularis / Thuidium abietinum		S1	233.3%	233.3%	3	3	7	7
	Picea glauca / Shepherdia canadensis / Thuidium abietinum		S2	100.0%	66.7%	2	3	2	2
	Picea glauca / Thuidium abietinum		S2S3	100.0%	66.7%	2	3	2	2
	Pinus albicaulis - Abies lasiocarpa / Luzula hitchcockii - Vaccinium myrtillus		S1S2	100.0%	28.6%	2	7	2	2
	Pinus albicaulis - Picea engelmannii / Dryas octopetala		S1	100.0%	28.6%	2	7	2	2
	Pinus contorta / Polystichum kruckebergii - Aspidotis densa		S1	100.0%	4.0%	1	25	1	1
	Pinus contorta / Vaccinium myrtilloides / Cladonia		S2	100.0%	4.0%	1	25	1	1
	Pinus flexilis - Pseudotsuga menziesii / Juniperus spp. / Arctostaphylos uva-ursi		S2	114.3%	114.3%	7	7	8	8
	Pinus monticola / Clintonia uniflora Forest		G1Q	100.0%	42.9%	3	7	3	3
	Pinus ponderosa - Populus tremuloides / Rosa woodsii		S2	100.0%	66.7%	2	3	2	2
	Pinus ponderosa / Elymus spicatus / Lupinus		S2	100.0%	66.7%	2	3	2	2
	Pinus ponderosa / Physocarpus malvaceus Forest		G2	100.0%	100.0%	3	3	3	3
	Populus balsamifera ssp. trichocarpa / Cornus stolonifera - Rosa nutkana		S1S2	100.0%	4.0%	1	25	1	1
	Populus tremuloides - Populus balsamifera ssp. trichocarpa / Osmorhiza occidentalis Forest		G2Q	100.0%	14.3%	1	7	1	1
	Populus tremuloides / Leymus innovatus - Aster conspicuus avalanche community		S2	100.0%	14.3%	1	7	1	1
	Populus tremuloides / Menziesia ferruginea		S1	100.0%	14.3%	1	7	1	1

APPENDIX 1.3 GOALS CAPTURED IN THE CANADIAN ROCKY MOUNTAINS ECOREGIONAL PORTFOLIO

Target Type	Scientific Name	Common Name	G RANK	Percent of SITES Goal Captured	Percent of Ecological Goal Captured	SITES Goal	Ecological Goal	Captured in Portfolio	Total Amount in Ecoregion
Community (Goals Measured as # of Element occurrences)	Populus tremuloides / Rubus parviflorus		S2	100.0%	28.6%	2	7	2	2
	Pseudoroegneria spicata - Leymus innovatus - Aster conspicuus		SU	100.0%	71.4%	5	7	5	5
	Pseudotsuga menziesii - Pinus flexilis / Juniperus communis / Festuca campestris		S2S3	128.6%	128.6%	7	7	9	9
	Pseudotsuga menziesii / Mahonia aquifolium / Cryptogramma		S2?	100.0%	4.0%	1	25	1	1
	Purshia tridentata / Elymus spicatus		S2	100.0%	4.0%	1	25	1	1
	Salix drummondiana - Thalictrum venulosum		S1	100.0%	14.3%	1	7	1	1
	Stipa richardsonii - Koeleria macrantha - Antennaria parvifolia		S2S3	100.0%	71.4%	5	7	5	5
	Thuja plicata / Adiantum pedatum Forest		G2?	100.0%	100.0%	7	7	7	8
	Thuja plicata / Aralia nudicaulis Forest		G2	100.0%	28.6%	2	7	2	2
	Thuja plicata / Lysichiton americanum / Sphagnum		S2	100.0%	20.0%	5	25	5	5
	Thuja plicata / Oplopanax horridus		S1S2	100.0%	20.0%	5	25	5	5
	Tsuga heterophylla / Menziesia ferruginea Forest		G2	100.0%	28.6%	2	7	2	2
	Tsuga heterophylla / Rubus pedatum Forest		G2	100.0%	14.3%	1	7	1	1
	Tsuga heterophylla / Xerophyllum tenax Forest		G2	100.0%	14.3%	1	7	1	1
	Tsuga mertensiana / Streptopus amplexifolius Forest		G2	100.0%	28.6%	2	7	2	2
Mapped Veg. Type (Goals Measured as 30% of Available Hectares of each Veg Type)	Aspen Parkland			137.1%	137.1%	78593.49	78593.4899	107744.58	261978.3
	Foothills Boreal Forests			131.5%	131.5%	59807.16	59807.1602	78665.58	199357.2
	Hybrid Spruce Forests			333.3%	333.3%	2.4300001	2.43000011	8.1	8.1000004
	Interior Alpine Zone			176.5%	176.5%	1223188.4	1223188.37	2158488.8	4077294.6
	Interior Douglas Fir Forests			173.3%	173.3%	398666.53	398666.53	690987.51	1328888.4

APPENDIX 1.3 GOALS CAPTURED IN THE CANADIAN ROCKY MOUNTAINS ECOREGIONAL PORTFOLIO

Target Type	Scientific Name	Common Name	G RANK	Percent of SITES Goal Captured	Percent of Ecological Goal Captured	SITES Goal	Ecological Goal	Captured in Portfolio	Total Amount in Ecoregion
Mapped Veg. Type (Goals Measured as 30% of Available Hectares of each Veg Type)	Interior Grand Fir Forests			127.5%	127.5%	137372.27	137372.274	175160.88	457907.58
	Interior Subalpine Forest Zone			163.7%	163.7%	3248845.6	3248845.6	5317151	10829485
	Interior Western Cedar - Hemlock - Douglas Fir Forests			149.2%	149.2%	1511062.9	1511062.94	2253778.8	5036876.5
	Montane Spruce			212.6%	212.6%	344835.71	344835.711	733168.26	1149452.4
	Ponderosa Pine Woodland			207.5%	207.5%	46530.369	46530.3686	96573.06	155101.23
	Rough Fescue Prairie			194.9%	194.9%	7005.447	7005.44704	13650.12	23351.49
	Sagebrush Steppe			114.1%	114.1%	26483.841	26483.8413	30213.81	88279.471
Aquatic Fine Filter Species (Goals Measured as # of Element occurrences)	ACROLOXUS COLORADENSIS	ROCKY MOUNTAIN CAPSHELL	G1	100.0%	12.0%	3	25	3	3
	COTTUS CONFUSUS	SHORTHEAD SCULPIN	G5	100.0%	100.0%	13	13	13	14
	ENALLAGMA OPTIMOLOCUS	A DAMSELFLY	G2	100.0%	7.7%	1	13	1	1
	LEDNIA TUMANA	MELTWATER LEDNIAN STONEFLY	G1	100.0%	8.0%	2	25	2	2
	PHYSELLA JOHNSONI	STRIATE PHYSA	G3	100.0%	15.4%	2	13	2	2
	RHINICHTHYS OSCULUS	SPECKLED DACE	G5	100.0%	7.7%	1	13	1	1
	RHYACOPHILA EBRIA	A CADDISFLY	G1	100.0%	4.0%	1	25	1	1
	RHYACOPHILA GLACIERI	A RHYACOPHILAN CADDISFLY	G1	100.0%	4.0%	1	25	1	1
	SALMASELLUS STEGANOTHRIX	A CAVE OBLIGATE ISOPOD	G1	100.0%	8.0%	2	25	2	2
	STAGNICOLA ELRODI	FLATHEAD PONDSNAIL	G1	100.0%	48.0%	12	25	12	12
	STAGNICOLA ELRODIANA	LONGMOUTH PONDSNAIL	G1	100.0%	16.0%	4	25	4	4
	ZAPADA GLACIER	WESTERN GLACIER STONEFLY	G2	100.0%	38.5%	5	13	5	5

APPENDIX 1.3 GOALS CAPTURED IN THE CANADIAN ROCKY MOUNTAINS ECOREGIONAL PORTFOLIO

Target Type	Scientific Name	Common Name	G RANK	Percent of SITES Goal Captured	Percent of Ecological Goal Captured	SITES Goal	Ecological Goal	Captured in Portfolio	Total Amount in Ecoregion
Wide Ranging Fish (Goals Measured as % of Total Available Kilometers of Stream Length Occupied by Target Species)	ACIPENSER TRANSMONTANUS POP 2	White Sturgeon	G4T?Q	99.8%	99.8%	1112515 (100%)	1112515	1110765.3	1112514.9
	COHO SALMON	COHO SALMON	G4	104.6%	104.6%	716456.6 (30%)	716456.6	749141.32	1432913.3
	Lota lota	Burbot	G5	100.0%	100.0%	75415.27 (50%)	75415.27	75415.269	75415.269
	Onchorhynchus mykiss	Steelhead		241.2%	241.2%	120459.2 (30%)	120459.2	290572.8	401530.59
	Onchorhynchus mykiss gairdneri	Redband Trout	G5T4	124.3%	124.3%	71158.06 (50%)	71158.06	88462.73	142316.13
	Onchorhynchus tshawytscha	Chinook Salmon		181.4%	181.4%	731047.3 (50%)	731047.3	1326432.8	2436824.4
	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	107.5%	107.5%	4553390 (30%)	4553390	4892981.4	9106780
	PINK SALMON	PINK SALMON	G5	177.3%	177.3%	82253.8 (30%)	82253.8	145829.48	274179.33
	RHINICHTHYS OSCULUS	SPECKLED DACE	G5	206.1%	206.1%	25642.63 (30%)	25642.63	52836.707	85475.433
	RHINICHTHYS UMATILLA	UMATILLA DACE	G4	329.9%	329.9%	105457.8 (50%)	105457.8	347871.23	351526.14
	SALVELINUS CONFLUENTUS	Bull Trout	G3	111.5%	111.5%	4100802 (30%)	4100802	4572937.8	8201604.1
	SOCKEYE SALMON	SOCKEYE SALMON	G5	178.5%	178.5%	410520.8 (50%)	410520.8	732864.4	1368402.6
Generic Wetlands (Goals Measured as 30% of Total Available Wetland Hectares)	Wetlands	Wetlands		176.1%	176.1%	41098.2	41098.2	72361	136994

APPENDIX 1.3 GOALS CAPTURED IN THE CANADIAN ROCKY MOUNTAINS ECOREGIONAL PORTFOLIO

Target Type	Scientific Name	Common Name	G RANK	Percent of SITES Goal Captured	Percent of Ecological Goal Captured	SITES Goal	Ecological Goal	Captured in Portfolio	Total Amount in Ecoregion
Aquatic Systems (Goals Measured as 30% of Total Available System Type Hectares)	Clark Fork - Flathead foothill tributaries			103.4%	103.4%	19074.68	19074.6801	19718.082	63582.267
	Clark Fork - Flathead large rivers			172.3%	172.3%	65390.85	65390.8504	112645.74	217969.5
	Clark Fork - Flathead medium rivers			333.3%	333.3%	15430.26	15430.2574	51434.19	51434.191
	Clark Fork - Flathead montane headwaters			333.3%	333.3%	358.911	358.910999	1196.37	1196.37
	Clark Fork - Flathead montane small rivers			150.9%	150.9%	34483.16	34483.158	52044.93	114943.86
	Clark Fork - Flathead subalpine headwaters			206.4%	206.4%	28187.65	28187.6459	58186.247	93958.82
	Clearwater foothill small rivers			330.5%	330.5%	157.0756	157.075575	519.079	523.58525
	Clearwater foothill tributaries			333.3%	333.3%	211.4635	211.463452	704.878	704.87817
	Clearwater large river			315.5%	315.5%	1053.618	1053.61818	3324.683	3512.0606
	Clearwater medium rivers			284.4%	284.4%	1195.981	1195.98076	3400.921	3986.6025
	Clearwater montane headwaters			96.7%	96.7%	5521.24	5521.23972	5339.038	18404.132
	Clearwater montane small rivers			333.3%	333.3%	4638.141	4638.14099	15460.47	15460.47
	Clearwater subalpine headwaters			218.9%	218.9%	32448.26	32448.2597	71014.254	108160.87
	Great Lakes alpine headwaters			125.9%	125.9%	434790.3	434790.318	547568.54	1449301.1
	Great Lakes large river			333.3%	333.3%	53548.69	53548.6921	178495.64	178495.64
	Great Lakes medium rivers			333.3%	333.3%	2419.24	2419.23984	8064.133	8064.1328
	Great Lakes montane headwaters			107.7%	107.7%	6956.814	6956.81408	7492.574	23189.38
	Great Lakes montane small rivers			116.8%	116.8%	34965.51	34965.5104	40826.87	116551.7
	Middle Fraser alpine headwaters			159.7%	159.7%	64627.61	64627.6043	103227.32	215425.35
	Middle Fraser alpine, glacial headwaters			255.1%	255.1%	27827.29	27827.2951	70998.127	92757.65

APPENDIX 1.3 GOALS CAPTURED IN THE CANADIAN ROCKY MOUNTAINS ECOREGIONAL PORTFOLIO

Target Type	Scientific Name	Common Name	G RANK	Percent of SITES Goal Captured	Percent of Ecological Goal Captured	SITES Goal	Ecological Goal	Captured in Portfolio	Total Amount in Ecoregion
Aquatic Systems (Goals Measured as 30% of Total Available System Type Hectares)	Middle Fraser alpine, glacial small rivers			217.2%	217.2%	14545.49	14545.4941	31590	48484.98
	Middle Fraser large lake			330.9%	330.9%	26395.56	26395.5648	87330.85	87985.216
	Middle Fraser montane headwaters			109.8%	109.8%	49583.39	49583.3931	54466.654	165277.98
	Middle Fraser montane small rivers			126.8%	126.8%	4730.247	4730.24689	5999.083	15767.49
	Middle Fraser subalpine headwaters			230.7%	230.7%	41200.63	41200.6256	95069.017	137335.42
	Middle Fraser subalpine small rivers			100.1%	100.1%	18464.79	18464.7851	18488.064	61549.284
	Milk-Marias-Sun alpine headwaters			150.1%	150.1%	5468.383	5468.38271	8208.242	18227.942
	Milk-Marias-Sun foothill small rivers			140.2%	140.2%	71.99777	71.997773	100.971	239.99258
	Milk-Marias-Sun foothill tributaries			112.6%	112.6%	436.5994	436.599422	491.493	1455.3314
	Milk-Marias-Sun medium rivers			333.3%	333.3%	2485.918	2485.91807	8286.394	8286.3936
	Milk-Marias-Sun montane small rivers			117.6%	117.6%	10924.93	10924.9348	12853.141	36416.449
	Milk-Marias-Sun subalpine headwaters			242.8%	242.8%	12610.38	12610.3782	30617.515	42034.594
	Okanagan foothill tributaries			333.3%	333.3%	2891.645	2891.64515	9638.816	9638.8172
	Okanagan large river			322.2%	322.2%	6224.515	6224.51507	20058.045	20748.384
	Okanagan medium rivers			186.1%	186.1%	1796.312	1796.3121	3342.716	5987.707
	Okanagan montane headwaters			198.9%	198.9%	2844.933	2844.93272	5659.638	9483.1091
	Okanagan montane small rivers			123.1%	123.1%	16973.51	16973.509	20890.265	56578.363
	Okanagan subalpine headwaters			104.1%	104.1%	51048.4	51048.4024	53160.462	170161.34
	Palouse foothill tributaries			133.9%	133.9%	6021.219	6021.21941	8059.937	20070.731
	Palouse montane headwaters			102.1%	102.1%	13517.38	13517.385	13799.876	45057.95
	Palouse montane small rivers			317.3%	317.3%	4161.047	4161.04672	13201.72	13870.156
	Smoky - Upper Athabasca alpine headwaters			248.8%	248.8%	29324.17	29324.1706	72963.939	97747.235

APPENDIX 1.3 GOALS CAPTURED IN THE CANADIAN ROCKY MOUNTAINS ECOREGIONAL PORTFOLIO

Target Type	Scientific Name	Common Name	G RANK	Percent of SITES Goal Captured	Percent of Ecological Goal Captured	SITES Goal	Ecological Goal	Captured in Portfolio	Total Amount in Ecoregion
Aquatic Systems (Goals Measured as 30% of Total Available System Type Hectares)	Smoky - Upper Athabasca alpine, glacial headwaters			116.9%	116.9%	13185.86	13185.8604	15410.718	43952.868
	Smoky - Upper Athabasca medium rivers			194.9%	194.9%	13396.44	13396.4364	26106.458	44654.788
	Smoky - Upper Athabasca montane headwaters			144.5%	144.5%	227.5108	227.510852	328.791	758.36951
	Smoky - Upper Athabasca montane small rivers			244.1%	244.1%	1370.071	1370.07078	3344.25	4566.9026
	Smoky - Upper Athabasca subalpine headwaters			211.6%	211.6%	5517.589	5517.58945	11674.157	18391.965
	Smoky - Upper Athabasca subalpine small rivers			239.5%	239.5%	54473.03	54473.0254	130440.24	181576.75
	Smoky - Upper Athabasca subalpine, glacial small rivers			143.1%	143.1%	54955.24	54955.2428	78664.352	183184.14
	Thompson alpine headwaters			109.5%	109.5%	56344.31	56344.3138	61719.655	187814.38
	Thompson large river			208.1%	208.1%	5750.021	5750.02069	11968.25	19166.736
	Thompson medium rivers			215.3%	215.3%	48247.18	48247.1752	103865.66	160823.92
	Thompson montane headwaters			104.9%	104.9%	117078.7	117078.695	122856.07	390262.32
	Thompson montane small rivers			108.1%	108.1%	32684.21	32684.2155	35315.631	108947.39
	Upper Columbia alpine, glacial headwaters			110.4%	110.4%	180259.1	180259.064	199022.63	600863.55
	Upper Columbia large river			333.3%	333.3%	2014.583	2014.58318	6715.278	6715.2773
	Upper Columbia medium rivers			333.3%	333.3%	3277.788	3277.78762	10925.959	10925.959
	Upper Columbia montane headwaters			176.9%	176.9%	121117.2	121117.241	214197.52	403724.14
	Upper Columbia montane small rivers			185.0%	185.0%	3683.156	3683.15643	6814.457	12277.188
	Upper Columbia montane, glacial small rivers			161.5%	161.5%	68403.7	68403.7028	110480.16	228012.34
	Upper Columbia subalpine headwaters			100.6%	100.6%	39140.99	39140.9934	39376.064	130469.98
	Upper Fraser alpine headwaters			100.0%	100.0%	75915.87	75915.8685	75895.561	253052.89
	Upper Fraser alpine, glacial headwaters			99.9%	99.9%	58582.35	58582.3519	58525.621	195274.51
	Upper Fraser alpine, glacial small rivers			94.6%	94.6%	23064.56	23064.5583	21820.896	76881.861

APPENDIX 1.3 GOALS CAPTURED IN THE CANADIAN ROCKY MOUNTAINS ECOREGIONAL PORTFOLIO

Target Type	Scientific Name	Common Name	G RANK	Percent of SITES Goal Captured	Percent of Ecological Goal Captured	SITES Goal	Ecological Goal	Captured in Portfolio	Total Amount in Ecoregion
Aquatic Systems (Goals Measured as 30% of Total Available System Type Hectares)	Upper Fraser foothill tributaries			306.0%	306.0%	3478.512	3478.51232	10642.534	11595.041
	Upper Fraser large river			333.3%	333.3%	9809.634	9809.63401	32698.78	32698.78
	Upper Fraser medium rivers			313.4%	313.4%	6707.578	6707.57762	21019.97	22358.592
	Upper Fraser montane headwaters			113.6%	113.6%	14141.11	14141.113	16067.589	47137.043
	Upper Fraser montane small rivers			83.2%	83.2%	2224.993	2224.9934	1850.85	7416.6447
	Upper Fraser subalpine headwaters			227.3%	227.3%	7502.862	7502.86165	17057.266	25009.539
	Upper Fraser subalpine small rivers			127.3%	127.3%	28830.59	28830.5887	36710.648	96101.962
	Upper Kootenay alpine headwaters			111.5%	111.5%	133658.3	133658.247	148977.12	445527.49
	Upper Kootenay large river			333.3%	333.3%	45251.63	45251.632	150838.77	150838.77
	Upper Kootenay medium rivers			243.1%	243.1%	18959.77	18959.7721	46098.52	63199.24
	Upper Kootenay montane headwaters			113.2%	113.2%	84589.16	84589.1645	95773.996	281963.88
	Upper Kootenay montane small rivers			333.3%	333.3%	5760.192	5760.19245	19200.642	19200.641
	Upper Kootenay subalpine headwaters			100.0%	100.0%	59720.74	59720.7378	59708.793	199069.13
	Upper North Saskatchewan alpine headwaters			178.0%	178.0%	25639.26	25639.2555	45641.656	85464.185
	Upper North Saskatchewan alpine, glacial headwaters			150.0%	150.0%	6068.58	6068.57959	9100.518	20228.599
	Upper North Saskatchewan medium rivers			204.7%	204.7%	16145.25	16145.2452	33043.216	53817.484
	Upper North Saskatchewan montane headwaters			333.3%	333.3%	1375.993	1375.99263	4586.642	4586.6421
	Upper North Saskatchewan subalpine small rivers			244.8%	244.8%	32870.54	32870.5369	80456.461	109568.46
	Upper North Saskatchewan subalpine, glacial small rivers			212.2%	212.2%	19830.49	19830.4949	42081.893	66101.65
	Upper South Saskatchewan Red Deer Bow alpine headwaters			251.7%	251.7%	156598.2	156598.193	394184.61	521993.98
	Upper South Saskatchewan ? Red Deer ? Bow foothill small ri			220.4%	220.4%	7575.378	7575.37782	16698.591	25251.259
	Upper South Saskatchewan ? Red Deer ? Bow medium rivers			219.5%	219.5%	2662.34	2662.34008	5844.624	8874.4669
	Upper South Saskatchewan ? Red Deer ? Bow montane small riv			195.3%	195.3%	5511.548	5511.54846	10764	18371.828

APPENDIX 2.0 ECOLOGICAL LAND UNITS

ECOLOGICAL LAND UNITS

Development and Application of Ecological Land Units

An ecological *coarse filter* strategy should account for ecological and environmental change. Ecosystems are dynamic, changing at varying rates, with short-term cycles, and long-term trajectories. So in essence, we are attempting to conserve a moving target. Our task is to understand natural dynamics, then evaluate human alterations and mitigate their effects. One first step towards addressing the dynamic nature of ecosystems is to assess the representation of major environmental gradients for the ecoregion as a whole, and within potential conservation areas.

Identifying representative ecological assemblages across all major environmental gradients aids in protecting ecological processes and species habitats within their natural range of variability. By protecting a wide range of environmental gradients, we provide a "buffer" against a changing environment, either through changes in climate, or through other sources. This assessment is critical to identifying and protecting highly functional, landscape-scale conservation areas.

We need to ask the question; *Does this set of conservation areas look like the ecoregion as a whole?* If our proposed conservation sites encompass sufficient area to meet our stated conservation goals for each conservation target *and* represent all major environmental gradients, the answer to this question may indeed be "*Yes.*" We used a biophysical model of the Canadian Rocky Mountains ecoregion (CRM) to help evaluate this question.

Ecological Land Units

A variety of factors, such as insulation, temperature, soil moisture, and plant-available nutrients, can be considered driving abiotic variables influencing vegetation pattern across the earth's surface. Indirect measures of these variables may be combined with a vegetation map to characterize and assess biophysical variation captured by the set of conservation sites. Ideally, indirect measures to use in the CRM could include climatic zone, elevation, landform, slope, aspect, hydrologic regime, soil depth, soil texture, pH/salinity, exposed bedrock, etc. Given available spatial data, we adapted methodologies developed in the eastern United States (Anderson et al. 1998) to map *Ecological Land Units* (ELUs) for the CRM Ecoregion. Figure 1 provides a schematic of our process for developing ELUs. Spatial data sets included a 90m digital elevation model (DEM) developed from 1:250,000 scale topography, and surficial geology from British Columbia, Montana, Idaho, Alberta, and Washington (Table 1). Variables and variable classes used to develop ELUs were derived from documented knowledge of driving ecological factors within the ecoregion.

Table 1. Geology classess in the Canadian Rocky Mountains Ecoregion

GEOCLASS	HECTARES	PERCENT
BEDROCK	901069	3.34%
ALKALINE INTRUSIVE/EXTRUSIVE	599642	2.22%
BASALTIC-MAFIC	191726	0.71%
CARBONATE-LIMESTONE	2797724	10.36%
COARSE OUTWASH/LACUSTRINE	276156	1.02%
ERODABLE VOLCANIC	172755	0.64%

Table 1 cont'd:

GEOCLASS	HECTARES	PERCENT
FINE LACUSTRINE--COLLUVIUM	452643	1.68%
GLACIAL TILL	12494038	46.25%
GLACIER	347055	1.28%
GRANITIC-SILICIC	1887271	6.99%
LOESS	143073	0.53%
MIXED TEXTURE ALLUVIUM -COLLUVIUM	2632892	9.75%
SANDSTONE/META-SEDIMENTARY	813540	3.01%
SHALE/MUDSTONE	266050	0.98%
SILTSTONE/META-SILTSTONE	1988286	7.36%
SLATE/PHYLLITE/SCHIST	466670	1.73%
ULTRAMAFIC (SERPENTINE)	5390	0.02%
WATER	610141	2.26%

First, the DEM was used to develop a classification of seven major landforms that are known to effect vegetation pattern (Fig. 2). Landform character is primarily a function of slope angle (from flat topography to steep cliff faces) and landscape position (from lowest to highest). The continuous elevation grid is broken into discrete classes for slope angle (5 classes) and landscape position (5 classes). Five classes of slope angle were developed to help distinguish very flat topography at low angles, and steep cliff faces at higher angles. Landscape position is a relative measure assigned to each grid cell using the relative elevation of surrounding grid cells; e.g. if surrounding cells are all above a given cell, that cell receives a positive value. Negative values are applied to cells surrounded by others of lower elevation. Cells along side slopes (surrounding cells both higher and lower) and cells along flat topography (elevations similar to original grid cell) receive neutral values. All grid cells may then be categorized into five major slope positions (highest, high, mid-slope, low and bottom). The various combinations of slope angle and landscape position were then combined to highlight characteristic landforms for the ecoregion (Figure 1).

A surface flow accumulation index was developed that combines the catchment area of each grid cell (i.e. the number of 90m cells above and likely flowing into the grid cell) and the slope angle of the grid cell (indicating drainage conditions of that cell). Slope aspect (*Flat vs. Northeast-Southeast vs. Southeast-Northwest*) was used to modify more steeply sloping landforms.

Finally, all landforms were nested within four elevation zones selected for the ecoregion and mapped using the Shining Mountains vegetation zone classification. This data set was then "smoothed" using a focal majority filter (270 m radius focal window), and with "water" polygons aside, this yielded 1581 ELUs (see Table 2 for sample output).

Figure 1. Schematic for development of Ecological Land Units in the CRM.

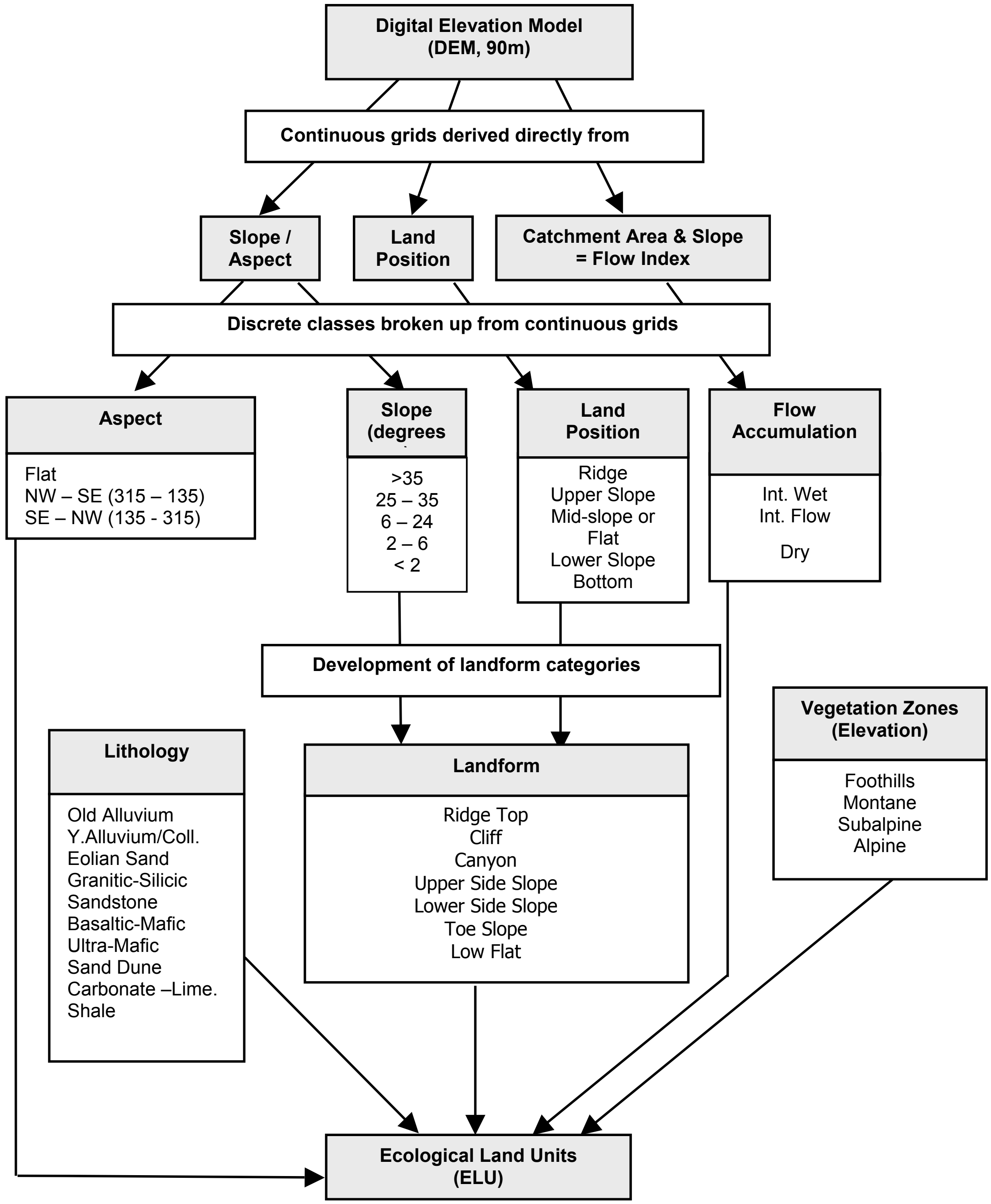


Figure 2. Landform Type using Landscape Position and Slope Angle, with a Digital Elevation Model (DEM).

		Land Position Classes				
		ridge	upper slope	midslope/flat	lower slope	bottom
Slope Classes (degrees)	0-0.999	RIDGE TOP		FLAT		CANYON
	1-3.499			TOE SLOPE		
	3.5-5.999		TOE SLOPE			
	6-24.999			LOWER SIDE SLOPE		
	25-34.999		UPPER SIDE SLOPE			
	35+			CLIFF		

With ELU/vegetation combinations as model input, only percent area requirements were included. This combined approach ensured that the model would simultaneously seek out areas of high conservation suitability (low cost) that represent each terrestrial system in sufficiently large, viable blocks *and* represent all physical gradients in proportion to their natural distribution.

Table 2. Sample output indicating areal statistics for a subset of Ecological Land Units

ELU Code **	ELU Description (Land Position + Moisture Category + Aspect + Elevation + Geology)	Total Area In CRM (Ha)	% Total Area In CRM
502308	Bottom + Moist + North + Subalpine + Glacial Till	1,090,847	4.038%
503308	Bottom + Wet + South + Subalpine + Glacial Till	1,081,353	4.003%
403308	Lower Slope + Wet + South + Subalpine + Glacial Till	719,344	2.663%
402308	Lower Slope + Moist + North + Subalpine + Glacial Till	668,737	2.476%
502208	Bottom + Moist + North + Montane + Glacial Till	629,124	2.329%
503208	Bottom + Wet + South + Montane + Glacial Till	594,096	2.199%
503408	Bottom + Wet + South + Alpine + Glacial Till	472,494	1.749%
403408	Lower Slope + Wet + South + Alpine + Glacial Till	461,497	1.708%
220208	Upper Slope + Wet + Flat + Montane + Glacial Till	313,322	1.160%
102408	Ridge + Dry + North + Alpine + Glacial Till	327,530	1.213%

This approach to portfolio assembly resulted in efficient ecological representation of large patch and matrix-forming terrestrial ecological systems across major ecological gradients. Systematic evaluation of ELU/vegetation relationships could begin with these ecological systems. Documented redundancy among plant associations across multiple

ELUs may indicate areas for future ELU refinements. They may also indicate areas for additional efficiencies in the design of conservation areas.

APPENDIX 3.0 TERRESTRIAL SYSTEMS DESCRIPTIONS

CANADIAN ROCKY MOUNTAINS ECOREGION TERRESTRIAL SYSTEMS DESCRIPTIONS

Ecological Systems are dynamic assemblages or complexes of plant communities (associations) that (1) occur together on the landscape; (2) are tied together by similar ecological processes (e.g. fire, hydrology), underlying environmental features (e.g. soils, geology), or environmental gradients (e.g. elevation); and (3) form a robust, cohesive, and distinguishable unit on the ground. The Ecological Systems for the Canadian Rocky Mountains Ecoregions were derived from known component associations and from the *Shining Mountains Vegetation Map Project.* The ecological systems are organized along an elevation gradient, from highest to lowest, and were structured in parallel (where possible) with the *Biogeoclimatic Zones* and the *Shining Mountains* mapping units. The ecological system descriptions come from a variety of sources including *A National Ecological Framework for Canada, Ecosystems of British Columbia, Natural Regions, Subregions and Natural History Themes of Alberta*, plant association descriptions from various Canadian national park vegetation classifications, and *An Alliance Level Classification of Vegetation of the Coterminous Western United States*. In spite of this, there is a strong US bias in the descriptions that arise because a major source of detailed information is The Nature Conservancy's US alliance descriptions. We used alliance descriptions of western US plant associations known to occur within the CRM, however, because the descriptions are range-wide, some species may be listed that do not occur in the Canadian Rockies. In addition, cross-walking Canadian and US provincial classifications has been imperfect and only partially attempted, therefore, there is room for improvement in these descriptions.

INTERIOR ALPINE ZONE

Alpine Grassland (dry) Ecological System

The Alpine Grassland (dry) Ecological System is a Matrix Patch Grassland Type, occupying vast, if discontinuous, areas within the Alpine Zone. There are 3 associations describing this system and none are considered rare. A dense cover of low growing, perennial graminoids and forbs characterizes this system. Rhizomatous, sod-forming sedges are the dominant graminoids and prostrate and mat-forming plants with thick rootstocks or taproots characterize the forbs. Plant associations in this alliance occur on high, windswept, alpine slopes in the mountains of Montana, Alberta and British Columbia. The vegetation is characterized by a dense cover of graminoids, mainly *Carex* species, and forbs. *Carex scirpoidea*, *Carex nardina, C. rupestris, C. elynoides, Festuca ovina,* and *F. idahoensis* are the dominant graminoids in these turf communities; where a particular species or suite of species is dominant varies considerably with location within the ecoregion *Carex phaeocephala* and *C. albonigra* are common associates. Common forb species include *Potentilla diversifolia, Geum rossii, Phlox pulvinata, Lupinus argenteus*, and *Erigeron simplex*.

Alpine Meadow (wet) Ecological System

The Alpine Meadow Ecological System is a Small Patch herbaceous type that occupies areas of less than one to 50 acres. There are 17 associations describing this system and 3 are considered rare. Sites typically are small depressions located below late melting snow patches or on snow beds (late-persisting snow patches frequently associated with shallow swales). This habitat favors no particular exposure though slopes are generally gently inclined (0-22%), 2 to 4 months snow-free, and well stabilized. Soils are poorly drained and some have an appreciable accumulation of organic matter. Soil pH levels are predominantly acidic, with recorded values ranging from 4.2-5.1. Mat forming, rhizomatous, perennial graminoids characterize this system; canopy cover is typically dense, forming a nearly continuous sward (98%). The forb layer is usually depauperate both in cover and diversity, though notable departures from this case occur where the snow-free period is longer. A moss layer is usually present. Vegetation types within this alliance are classified as seasonally flooded, temperate of sub-polar grasslands. Typical dominant species include *Carex nigricans, C. scopulorum, Deschampsia ceaspitosa, Juncus drummondii*, *Antennaria lanata, Caltha leptosepala, Senecio cymbalarioides,* and *Artemisia norvegica.*

Sparsely Vegetated Rock & Talus Ecological System
The Sparsely Vegetated Rock & Talus Ecological System is a Small Patch type that occupies areas from less than one acre to 50 acres. There are 2 associations that describe this system, and one is considered rare. It is a high elevation, sparsely vegetated habitat, characterized by a mixture of rocky slopes and a sparse cover of grasses, lichens and low shrubs.

Alpine Cushion-plant Ecological System
The Alpine Cushion-plant Ecological System is a Matrix Patch type, occupying vast, if discontinuous areas of the Alpine Zone. Only one association has been described from this system. This system is characterized by a dense cover of low growing, mainly rhizomatous, perennial forbs and graminoids. The moss layer is sparse. Vegetation in this alliance commonly occurs in the alpine tundra. Cushion plant communities occur on extremely wind-exposed sites, often on ridge tops or saddles. Such sites develop little winter snow cover and receive abundant direct insulation, and as a result, are the most xeric high-elevation sites, often thought of as alpine deserts. Soils on these windy unproductive sites are shallow, stony, low in organic matter, and poorly developed; wind deflation often results in a gravelly pavement. Cushion plants with their low, compact growth form are favored in this severely desiccating environment. *Geum rossii* and *Parenchyma pulvinata* are example cushion forming species.

Dwarf-shrubland Ecological System
The Dwarf-shrubland Ecological System is a Small Patch type occupying areas from less than one acre to 50 acres. There are 13 associations described from this system and none are considered rare. A semi-continuous layer of ericaceous dwarf-shrubs, which form a heath type groundcover less than 0.5 m in height, characterizes the associations found within this ecological system. Dense tuffs of graminoids and scattered forbs occur, under the dwarf-shrub layer and in small breaks in the shrub canopy. This system occurs in areas of level or concave glacial topography, with late lying snow, and sub-irrigation from surrounding slopes. In exceptionally wet areas, it may occur on convex slopes with better drainage. Soils are moist, but well drained, strongly acid, and often with substantial

peat layers. The exception being where *Dryas octopetala* occurs on calcareous substrates. This system usually interdigitates with subalpine *Tsuga mertensiana* or *Abies lasiocarpa* parkland at the lower elevation margin, *Carex* meadow on saturated soils, and alpine fell-fields, rock, or ice on higher elevation alpine slopes. Within these communities *Cassiope mertensiana, Dryas integrifolia*, *D. octopetala*, *Salix arctica, S. glauca,* or *Phyllodoce empetriformis* can be dominant shrubs. *Vaccinium deliciosum, Ledum glandulous, Phyllodoce glanduliflora*, and *Kalmia microphylla* may also be shrub associates. The herbaceous layer is usually a lush mixture of forbs and graminoids, especially sedges, including, *Erigeron* spp., *Luetkea pectinata, Antennaria lanata, Aster alpigenus, Pedicularis ornithorhyncha, Castilleja parviflora, Deschampsia cespitosa, Erythronium* spp., *Juncus parryi, Luzula piperi, Carex spectabilis, Carex nigricans*, and *Polygonum bistortoides*.

Glacier Ecological System
Field or body of snow or ice formed at higher elevations in mountainous terrain where snowfall exceeds melting: these areas of snow and ice will show evidence of past or present glacier movement.

INTERIOR SUBALPINE FOREST ZONE

Engelmann Spruce-Subalpine Fir Dry Forest Ecological System
The Engelmann Spruce-Subalpine Fir Dry Forest Ecological System is a Matrix Patch size forest type occupying large continuous areas of 5,000 to 10,000 acres. There are forty-four associations described from system and none are considered rare. This system is typically a dense coniferous forest, with shrub-dominated understories, that include plant communities which may progress through seral lodgepole pine to a varied climax of Engelmann spruce and subalpine fir. Stands of lodgepole pine, often considered to be successional to spruce-fir forests, are treated as their own ecological system. Engelmann spruce and subalpine fir forests comprise a substantial part of the subalpine forests of the Cascades and Rocky Mountains from southern British Columbia east into Alberta. They are the matrix forests of the subalpine zone. Despite the wide distribution of these subalpine forests, their tree canopy characteristics are remarkably similar across their range of distribution. These cool-summer forests are a southern extension of the boreal forests. *Abies lasiocarpa* and *Picea engelmannii* generally are codominant, usually with higher density of *A. lasiocarpa* in the smaller size classes, and with fewer, larger *P. engelmannii*. In some stands, *P. engelmannii* may be absent altogether, or *A. lasiocarpa* may only occur as seedlings and saplings. *Picea engelmannii* will often be prominent on more moist sites or in more mature stands. *Pinus contorta* is an important seral species in *A. lasiocarpa* forests, particularly in the northern Rockies.

The shrub and herbaceous undergrowth is variable depending on moisture and light conditions. Undergrowth shrubs can be dense, low-statured, often dominated by *Vaccinium* spp. or they can be virtually absent. Dominant or diagnostic forb species include *Arnica cordifolia, Thalictrum occidentale, Pedicularis* spp., *Actea rubra, Clintonia uniflora, Cornus canadensis, Gallium triflorum, Linnaea borealis,* and *Xerophyllum tenax.*

Engelmann Spruce Riparian Forest Ecological System

The Engelmann Spruce Riparian Forest Ecological System is a Linear patch Forested Type system. It occurs in long linear bands that follow river courses. This system is described by 20 associations, 5 of which are rare. This system is typically a dense to open coniferous forest, with shrub and forb dominated understories, found on floodplains or small riparian areas, with Engelmann spruce and sometimes black cottonwood. Includes other mixed conifer (closed and open forest) on seeps, sometimes associated with riparian systems. This is a linear system that is embedded in the larger matrix forests of Engelmann spruce and subalpine fir. Often indistinguishable by their canopy from the surrounding upland forest, Engelmann Spruce Riparian System can have considerable variation and diversity of shrubs and herbaceous species that are generally not part of the adjacent upland forest. Understory species include: *Cornus sericea, Ribes spp., Lonicera involucrate, Equisetum arvense, Calamagrostis canadensis, Trautvetteria caroliniensis, Rubus idaeus,* or *Carex scopulorum.*

Subalpine Fir - Mountain Hemlock Forests Ecological System

The Subalpine Fir - Mountain Hemlock Forests Ecological System is a Matrix Patch size system type, occupying large continuous areas of 5,000 to 10,000 acres. There are 8 associations known from this system and none are considered rare. It is typically a dense coniferous forest, with a shrub-dominated understory, that includes plant communities that progress directly to a mixed climax of subalpine fir and mountain hemlock, and sometimes amabilis fir. In the interior mountains of northern Idaho and western Montana, it is generally associated with areas of incursions of maritime air masses, which moderate temperatures and produce deep winter snow packs. Although this system typically occurs in subalpine habitats, it may occur in montane forest environments, such as slope benches or canyon bottoms, which are prone to cold air drainage. Associations in this system are characterized by a dense canopy of needle-leaved evergreen trees, resulting in low light intensities at the forest floor and low understory cover. Trees are often large and widely spaced, with an open undergrowth of occasional shrubs. When present, the shrub layer is often comprised of low ericaceous shrubs, which are sparsely scattered. An herbaceous layer of graminoids is occasionally present. The forests are characterized by a canopy of *Tsuga mertensiana*, a needle-leaved evergreen tree that can approach 35 m in height. Other conifers that may be present include *Abies amabilis, Abies lasiocarpa, Picea engelmannii, Pinus albicaulis*, and *Chamaecyparis nootkatensis*. The understory is often sparse due to dense canopy shading, but may be well developed in northern coastal stands. Undergrowth shrubs are largely ericaceous, including *Vaccinium membranaceum, V. ovalifolium, V. scoparium, Quercus sadleriana, Menziesia ferruginea*, and *Rhododendron albiflorum*. Herbaceous species include *Xerophyllum tenax* (which can be dominant), *Orthilia secunda, Carex* spp., *Luzula glabrata, Clintonia uniflora*, and *Chimaphila umbellata.*

Engelmann Spruce - Subalpine Fir Dry Parkland Ecological System

The Engelmann Spruce - Subalpine Fir Dry Parkland Ecological System is a Large Patch forested system that occupies areas from 50 to 5,000 acres. There are 21 associations describing this system in the Canadian Rocky Mountains ecoregion and 10 are considered rare. This system is typically a high elevation mosaic of stunted tree clumps and herb or dwarf shrub dominated openings, occurring above the closed forest ecosystems and below the alpine communities. It includes open areas with clumps of white bark pine. Woodland stands are more common on sites where high elevation, rocky substrate or xeric habitats limit the tree cover, or occur on less xeric sites that are early successional, where an undergrowth of *Abies lasiocarpa* has not developed into a tree canopy.

Climate is cold, temperate often with deep snow packs, short cool summers, and windswept most of the year. Woodlands included in this subalpine system occur locally on warm, dry, rocky, exposed sites. Some sites have little snow accumulation because of high winds and sublimation. Summers are cool and typically dry from July to September. Stands typically occur intermittently between the closed canopy subalpine forest line and upper treeline, but may occur at lower elevations on rocky, windswept ridges or where disturbance such as avalanche or fire has temporarily reduced more shade tolerant tree species. Above the continuous forest line, these woodlands occur as a mosaic of tree islands or patches separated by subalpine meadow or rock outcrops. Landforms include ridge tops, mountain slopes, glacial trough walls and moraines, talus slopes, land and rockslides, and cirque headwalls and basins. Sites may be nearly level to steeply sloping, on all aspects, but are more typically south- facing.

In the harsh windswept environment where these shrublands occur, trees are stunted and flagged from wind damage. The stands or patches often originate when *Picea engelmannii* or *Pinus albicaulis* colonize a sheltered site such as the lee side of a rock. *Abies lasiocarpa* then can colonize in the shelter of the *Picea engelmannii*, and may form a dense canopy by branch layering. Other woody species include shrubs and dwarf-shrubs such as *Phyllodoce glanduliflora, Kalmia polifolia, Ribes montigenum, Salix brachycarpa, S. glauca, S planifolia, Vaccinium membranaceum* and *V. scoparium,* which may be present to codominant. The herbaceous layer is sparse under dense shrub canopy, or may be dense where the shrub canopy is open or absent. It is often dominated by mesic or xeric alpine forb and graminoid species, but may include subalpine species especially in protected areas.

Adjacent vegetation includes subalpine forests dominated by *Abies lasiocarpa, Picea engelmannii* or *Pinus contorta* at lower elevations, or alpine meadows and fellfields at higher elevations.

<u>*Lodgepole Pine Forest and Woodland Ecological System*</u>
The Lodgepole Pine Forest and Woodland Ecological System is a Large Patch forests system type, occupying areas from 50 to 5,000 acres. Currently there are 22 associations from this system and only one is considered rare. This system consists of subalpine forests where the dominance of *Pinus contorta* is related to fire history and topo-edaphic conditions. Following stand-replacing fires, *Pinus contorta* will rapidly colonize and develop into dense, even-aged stands. Over time, many of these stands can succeed to dominance by other more shade-tolerant conifer species. Most forests in this ecological system are early to mid-successional forests, which developed following fires. Some *Pinus contorta* forest associations occur, and will persist, on sites that are too extreme for

other conifers to establish. These include excessively well-drained pumice deposits, glacial till and alluvium on valley floors where there is cold air accumulation, warm and droughty shallow soils over fractured quartzite bedrock, well drained to xeric stabilized sand dunes, and shallow moisture-deficient soils with a significant component of volcanic ash. Some *Pinus contorta* forests can be persistent for hundreds of years, a result of a lack of seed source or the competitive exclusion of other conifer species, or the frost tolerance of *P. contorta* seedlings and mature trees, which allows the development of monotypic stands in frost-prone areas. Soils supporting these forests are typically well drained, gravelly, have coarse textures (ranging from silty to sands with gravels), are acidic, and rarely formed from calcareous parent materials.

P. contorta is almost always the only mature tree in stands of this alliance, but other conifers are occasionally present. In some stands, species such as *Abies grandis, A. lasiocarpa, Picea engelmannii, Tsuga heterophylla, T. mertensiana*, *Pseudotsuga menziesii,* or *Larix occidentalis* may be present to abundant as seedlings and saplings. The shrub stratum may be conspicuous to absent depending upon canopy closure and soil moisture, but where shrubs are present common species include *Arctostaphylos uva-ursi, Ceanothus velutinus, Linnaea borealis, Mahonia repens, Purshia tridentata, Spiraea betulifolia, Spiraea douglasii, Shepherdia canadensis, Vaccinium cespitosum, V. scoparium, V. membranaceum, Symphoricarpos albus*, and *Ribes* spp. The cover of the herbaceous stratum tends to vary inversely with shrub cover. Where there is a significant herbaceous layer, it can be dominated by either graminoids or perennial forbs. Important graminoids include: *Carex geyeri, C. rossii, Calamagrostis rubescens, Danthonia californica, Elymus glaucus,* or *Stipa occidentalis*. Important forbs include: *Arnica cordifolia, Chimaphila umbellata, Orthilia secunda, Osmorhiza berteroi, O. chilensis, Pedicularis racemosa, Xerophyllum tenax,* and *Thalictrum* spp.

Disturbed Colluvial/Landslide Ecological System

The Disturbed Colluvial/Landslide Ecological System is a Small Patch system that occupies small areas of less than one acre to up to 50 acres. There are 11 associations from this system and one is considered rare. This system includes steep, frequently disturbed colluvial, talus, and avalanche slopes that are typically sparsely vegetated; stands at the base of rock outcroppings or escarpments are also included. Sites are typically dominated by young-aged conifer species and fast growing deciduous tall shrubs or small trees. Stands occur on the lower portions and runout zones of avalanche tracks. Slopes range from 15-60%. These stands can occur on any aspect, but are more common where unstable snow pack conditions frequently occur, such as south- and southwest-facing slopes because of sun crust formation. In some portions of the Canadian Rocky Mountains ecoregion, because of prevailing northwesterly winds, snow cornices develop on southeast aspects. Other areas within the ecoregion show a predominance of avalanche tracks on northeast slopes because of prevailing southwesterly winds. Stands may be more common west on the Continental Divide where snow pack is heavier. Sites are often mesic because avalanche paths are often in stream gullies. The vegetation consists of moderately dense, woody canopy characterized by dwarfed and damaged conifers and small, deciduous trees/shrubs. This canopy is dominated by *Abies lasiocarpa*, *Acer glabrum, Alnus viridis* ssp. *sinuata,* or *A. incana,* or various combinations of these. Other common woody plants include *Paxistima myrsinites, Sorbus scopulina, S. sitchensis* and on drier sites *Pseudotsuga menziesii*. The groundcover is moderately dense to dense and composed of graminoids, forbs in Asteraceae, *Castilleja* spp., *Erythronium grandiflorum, Myosotis alpestris, Veratrum viride, Heracleum lanatum* and *Xerophyllum tenax*. Mosses and ferns are often present. Where avalanches are frequent, stands dominated by conifers less than 4 m tall develop. Where avalanches occur annually or more often, conifers are rare and brushy deciduous trees and shrubs are common.

Subalpine Dry Grassland Ecological System
The Subalpine Dry Grassland Ecological System is a Large Patch system that occupies areas of 50 to 5,000 acres. There are currently 7 associations from this system and one is considered rare.

It is typically a high elevation, lush grassland habitat dominated by perennial grasses and forbs, on dry sites. Typical dominant species include *Leymus innovatus (=Elymus innovatus), Koeleria macrantha*, *Festuca campestris, F. idahoensis, F. viridula, Stipa occidentalis, S. richardsonii, Bromus pumpellianus, Elymus trachycaulus, Trisetum spicatum, Frageria virginiana* and *Epilobium angustifolium.* Subalpine dry grasslands are small meadows to large open parks surrounded by conifer trees but lack tree cover within them. The general rule, if there is one, is that the soil textures are much finer and soils are often deeper under grasslands then in the neighbouring forests. Grasslands, although composed primarily of tussock-forming species, do exhibit a dense sod that makes root penetration difficult for tree species. Disturbance such as fire also plays a role in maintaining these open grassy areas. With fire suppression since the 1850s, many meadows and parks have seen an increase in the amount of tree cover, generally by conifer species.

Subalpine Shrubland Ecological System
The Subalpine Shrubland Ecological System is a Small Patch system that occupies areas of less than one acre to up to 50 acres. There are 24 associations described from this system and one is considered rare. The Subalpine Shrubland Ecological System consists of low stature dry and wet shrublands and associated wetlands in wide mountain valleys of subalpine elevations. Vegetation types dominated by *Salix glauca* occur in dry areas, though they may have a considerable early season snow pack, while the wet sites occur in wide, wet valleys on snow-melt fed swales or along sinuous streams and wet floodplains associated with beaver ponds and where the water table is usually within the top meter of soil, and groundwater slowly seeps to the surface. These wet stands are dominated by *Salix planifolia, Salix wolfii, Salix commutata, Lonicera involucrata, Betula nana,* or *Alnus virdis* ssp. *sinuata.* Undergrowth herbaceous species of drier sites include *Deschampsia cespitosa*, *Carex chalciolepis, Festuca brachyphylla*, *Trisetum spicatum, Artemisia scopulorum, Castilleja occidentalis, Geum rossii*, and *Polygonum bistortoides;* those of moister to wet sites include *Carex aquatilis, C. utriculata, C. simulata, C. lasiocarpa, Deschampsia cespitosa, Aster occidentalis, Epilobium ciliatum, Geum macrophyllum*, and *Senecio triangularis*.

Subalpine Larch Forest Ecological System

The Subalpine Larch Forest Ecological System is a Large Patch Forested system that occupies areas of 50 to 5,000 acres. It is considered Limited in its ecoregional distribution, as it is known only from one other ecoregion. Currently there are 6 associations that describe this system and none are considered rare. This system consists of high elevation coniferous woodlands dominated by larch or mixed larch forests on steep terrain and upper slopes on drier continental environments in the southern half of the Canadian Rocky Mountains Ecoregion. This system generally occurs at or near the treeline on north-facing cirques or slopes where snowfields persist until June or July. Abrasion by wind-driven snow is characteristic, and leads to stunted or flagged trees in most stands. Soils are poorly developed and preponderantly of fractured granitic or quartzite rocks which have not been previously colonized by other vascular plants; however some sites occur on calcareous substrates and have well developed soils. The majority of sites are in areas, which experienced heavy alpine glaciation less than 12,000 years ago. *Larix lyallii* is a very slow growing, long-lived tree, with individuals up to 1000 years in age. It is generally shade intolerant, however extreme environmental conditions limit potentially competing trees. Reproduction is typically by seed and is most favorable on moist mineral soil. Seedling growth is initially very slow and accelerates after an extensive root system is established. Major disturbances to stands of this alliance are wind throw and snow avalanches. Lightning damage to individual trees is common, but sparse canopies and rocky terrain limit the spread of fire. The undergrowth is usually somewhat depauperate but some stands support a near sward of heath plants such as *Phyllodoce empetriformis*, *Empetrum nigrum*, *Cassiope mertensiana*, and can include a slightly taller layer of *Vaccinium scoparium* or *V. myrtillus*. *Deschampsia atropurpurea, Luzula glabrata* and *Juncus parryi* are the most commonly associated graminoids.

Subalpine Wet Meadow Ecological System

The Subalpine Wet Meadow Ecological System is a Small Patch Herbaceous type that occupies areas of less than one acre to 50 acres. There are 17 associations from this system and none are considered rare. This system is typically a high elevation meadow community, dominated by moisture-loving herbaceous species, found on wetter sites in subalpine forested areas. The Subalpine Meadow Ecological System consists of graminoid and forb dominated meadows that have soils that range from very wet, saturated throughout the growing season, to moist but not saturated soils that can dry out by the end of the growing season. Vegetation consists of wetlands dominated by *Carex scopulorum, C. utriculata, C. rostrata*, or *C. aquatilis*. Still moist but slightly drier areas have *Juncus balticus, Deschampsia cesptiosa, Calamagrostis canadenisis,* or *Carex lanuginosa.* Forbs that are common and can also be dominant include *Senecio triangularis, Trollius laxus,* and *Caltha leptosepala*. Stands occur in moist, low-gradient valley bottoms throughout the mountainous areas of the ecoregion. Soils are mineral with a high organic matter content. Soils are derived from alluvial and colluvial deposits predominantly granitic, schist, and gneiss in origin, but can encompass a broad spectrum including calcareous sedimentary. Soils are generally poorly drained to saturated that retard plant decomposition and favor organic matter accumulation. Flooding during spring runoff is common and water tables remain within the root zone throughout the summer. The vegetation occurs at higher elevations in the southern part of its range and in dry interior locations. At lower elevations, the communities are typically wetlands, requiring wet or moist soils through most of the growing season.

Subalpine Fir - Mountain Hemlock Woodland Ecological System
The Subalpine Fir - Mountain Hemlock Woodland Ecological System is a Large Patch Forested type that occupies areas of 50 to 5,000 acres. There are three associations from this system and none are considered rare. This system is typically a high elevation mosaic of tree clumps and subalpine meadows or tundra, occurring above the closed forest ecosystems and below the alpine communities. This system represents the upper elevation of the Interior Hemlock woodlands that occur on the BC side of the Canadian Rocky Mountains Ecoregion. It is similar to the Subalpine fir Park Woodlands, but can have a thicker canopy and is not restricted to only upper tree line droughty places. In the US, this system tends to occur as parklands near treeline where extremely deep snow packs discourage tree growth in topographic depressions, and the forest interdigitates with herbaceous communities. Most soils can be characterized as loose, coarse textured, and well drained. Stands tend to occur on droughty substrates such as scree slopes or lava fields, or on southerly or westerly slopes and ridge tops. Snow packs can be deep, but often melt quickly, and summers are cool. Summer frosts are characteristic, especially in sites where cold air pools. *Tsuga mertensiana* and *Abies lasiocarpa* dominate stands singly or together, and have well developed shrub layers, including *Rhododendron albiflorum,* or herbaceous layers dominated by *Luzula glabrata* var. *hitchcockii.*

INTERIOR MONTANE FOREST ZONE

Interior Douglas-Fir Forests Ecological System
The Interior Douglas-Fir Forest Ecological System is a Matrix Patch size forest type, occupying areas between 5000-10,000 acres in size. Twenty-two associations are known, and 3 of these are rare types. It is primarily restricted to the southern portion of the ecoregion. *Pseudotsuga menziesii* forests found in the Rocky Mountains occur under a continental climate regime, and at higher elevations than in the Pacific Northwest. Precipitation ranges from 50-100 cm with moderate snowfall and with a greater proportion falling during the growing season. These forests are dominated by *Pseudotsuga menziesii* in the canopy and almost always in the tree regeneration layer. *Pinus ponderosa* is an important seral species occurring in many associations, either as older seral remnants or codominating in the canopy. Other trees that can be present to abundant (but which are typically seral) include *Larix occidentalis* and *Pinus contorta.* Dominant understory species in some associations include *Acer glabrum, Arctostaphylos uva-ursi, Linnaea borealis, Mahonia repens, Paxistima myrsinites, Physocarpus malvaceus, Symphoricarpos albus, S. oreophilus, Spiraea betulifolia, Vaccinium cespitosum*, and *V. membranaceum*.

Pseudotsuga menziesii forests were probably subject to a moderate severity fire regime in pre-settlement times; with fire return intervals of 30-100 years. Many of the important tree species in these forests are fire-adapted (*Populus tremuloides, Pinus ponderosa, Pinus contorta, Larix occidentalis*),

Interior Grand Fir Forest Ecological System
The Interior Grand Fir Forest Ecological System is a Large Patch forested type, occupying areas 50 to 5,000 acres in size. There are 11 known associations found within this system, 2 of which are rare. Associations in the *Abies grandis* Ecological system are highly variable montane coniferous forests. The climate regime with which this alliance is associated is usually submesic with annual precipitation ranging from 50 to 100 cm, with a maximum in winter or late spring. Winter snow packs typically melt off in early spring at lower elevation sites. Elevations reported for associations in this alliance range from 460 to 1920 m in the northern Rocky Mountains of Idaho and Montana. *Abies grandis* forests lie between drier *Pseudotsuga menziesii - Pinus ponderosa* and moister *Tsuga heterophylla* or *Thuja plicata* forests on the moisture scale, and are warmer than forests dominated by *Abies lasiocarpa*. Most stands of the associations in this system are dominated by a mix of *Pseudotsuga menziesii* and *Pinus ponderosa*, with lesser amounts of *Abies grandis*. Other typically seral species include *Pinus contorta, P monticola*, and *Larix occidentalis*. *Picea engelmannii* and *Taxus brevifola* become increasingly common towards the eastern edge of the range, (and *Tsuga heterophylla* and *Thuja plicata* may be associates on moister sites.

Abies grandis forests include many sites once dominated by *Pseudotsuga menziesii* and *Pinus ponderosa*, which were formerly maintained by wildfire, that may now be dominated by *Abies grandis* (a fire sensitive, shade tolerant species). Pre-European settlement fire regimes were characterized by frequent, low-intensity ground fires that maintained relatively open stands of a mix of fire-resistant species. With the advent of vigorous fire suppression, longer fire-return intervals are now the rule, and multi-layered stands with *Abies grandis* in various size/age classes now provide fuel "ladders", making these forests more susceptible to high intensity, stand-replacing fires. This system also includes montane forests along rivers and slopes, and in mesic "coves" which were historically protected from wildfires. They are very productive forests, which have been priorities for timber production.

Interior Western Cedar - Hemlock – Douglas-fir Ecological System
The Interior Western Cedar- Hemlock – Douglas-Fir Ecological System is a Matrix Patch Forest type covering vast areas (5000-10,000 acres and up in size). Twenty-four associations have been described within this system, and 9 are considered rare. The Interior Cedar-Western Hemlock Ecological System is characterized by vegetation types dominated by *Tsuga heterophylla* and *Thuja plicata.* It occurs at the lowest elevation of Mount Revelstoke and Glacier National Parks, BC. Much of the annual precipitation occurs as rain. Where snow does occur, it can generally be melted by rain during warm winter storms. Annual precipitation ranges from less than 75 cm in the northern Rockies to 80cm in the Jasper National Park area. Along with *Tsuga heterophylla and T. plicata*, *Pseudotsuga menziesii* commonly shares the canopy, and *Pinus monticola, P. contorta, Abies grandis, Taxus brevifolia*, and *Larix occidentalis* are major associates. *Picea engelmannii*, *Abies lasiocarpa* and *Pinus ponderosa* may be present but only on the coldest or warmest and driest sites. Though not a typical condition, stands within this

system can have as many as eleven tree species represented within a tenth acre plot. *Thuja plicata* is commonly present in these forests and can be much better represented than *T. heterophylla* at sites which are either wetter or drier than optimum for *Tsuga heterophylla*. In the heart of this system's distribution stands generally occur on all slopes and aspects, but grow best on sites with high soil moisture, such as toe slopes and bottomlands. At the periphery of its distribution this system is confined to moist canyons and cooler, moister aspects. These forests generally occur at moist, non-flooded or upland sites that are not saturated yearlong. *Linnaea borealis, Paxistima myrsinites, Alnus incana, Acer glabrum, Rubus parviflorus*, and *Vaccinium membranaceum* are common shrub species.

In the northern Rocky Mountains, stand-replacing disturbance can result in conversion to communities dominated by Larix *occidentalis*, *Pseudotsuga menziesii, Pinus contorta, Abies grandis,* and/or *Pinus monticola*. Typically, stand replacements fire return intervals are 150-500 years with moderate severity fire intervals of 50-100 years. Specific fire influences vary with site characteristics. Generally, wetter sites burn less frequently and are older stands with more *Tsuga heterophylla* and *Thuja plicata*. Drier sites are younger and have more diverse canopies.

U.S. plant associations described for this system includes seral forests types, included those dominated by *Larix occidentalis,* a shade intolerant, fire tolerant, cold-deciduous conifer. Stands are typically even aged, developing after catastrophic disturbances such as crown fires or clearcuts. Stands dominated by *Larix occidentalis* grow best on mesic sites, but also may occur on relatively dry sites. Sites include valley bottoms, benches and lower mountain slopes often on the more mesic north and east aspects, but it is found on all aspects in its northern extent.

In the interior (northern Rockies) stands, *Paxistima myrsinites, Vaccinium membranaceum, Acer glabrum*, and *Spiraea betulifolia* are common shrub species. The composition of the herbaceous layer reflects local climate and degree of canopy closure. In moist stands with dense tree canopies, *Polystichum munitum, Trientalis latifolia, Achlys triphylla*, *Clintonia uniflora, Asarum caudatum* and *Linnaea borealis* are common forbs. In drier habitats, such as south facing slopes, *Pteridium aquilinum* (as a major disturbance increaser species)*, Adenocaulon bicolor*, or *Xerophyllum tenax* become more frequent.

<u>*Limber Pine Forest and Woodland Ecological System*</u>
The Limber Pine Forest and Woodland Ecological System is a Large Patch forested system, occupying areas between 50 and 5000 acres. Seven associations are known from this system and 2 are considered rare. Within this ecoregion it is a highly circumscribed; stands occur on warm, dry, rocky, exposed sites. At least in the northern portion of its range, *Pinus flexilis* is strongly associated with calcareous substrates In the montane and subalpine zones *Pinus contorta, P. ponderosa or Pseudotsuga menziesii* are occasionally present, and in the lower montane transition zone from woodlands to grasslands or shrublands *Juniperus scopulorum* may co-occur with *P. flexilis*. The undergrowth

vegetation is typically sparse because sites are dry and not infrequently have an extensive exposure of rock. The most frequent low shrubs are *Arctostaphylos uva-ursi, Juniperus communis, Mahonia repens, Purshia tridentata* and *Yucca glauca*. The herbaceous layer often dominates the undergrowth. The most common herbs are graminoids reflecting the xeric nature of these sites, including: *Calamagrostis purpurascens, Carex rossii, Festuca idahoensis, F. campestris, F. kingii, Koeleria macrantha, Oryzopsis hymenoides* and *Pseudoroegneria spicata*.

Although some of the conifers that are typically present (rarely codominant) in *Pinus flexilis* stands are more shade tolerant late successional species, they are not likely to displace *Pinus flexilis*. This is because stands preponderantly occur on harsh sites where *P. flexilis* is more competitive (or tolerant) than most other conifer species. These stands are generally considered to be topographic or edaphic "climax" stands. In the Montana portion of this system stands occur well into the subalpine zone on wind-blasted, mostly west-facing slopes and exposed ridges; due to local Venturi effects exposures other than west facing often support woodlands with highly deformed specimens.

Birds and small mammals often eat and cache the large, wingless pine seeds. Most important is the Clark's nutcracker, which can transport the seeds long distances and cache them on exposed windswept sites. This results in the regeneration of pines in clumps from forgotten caches. *Pinus flexulis* is highly susceptible to blister rust (*Cronartium rubicola*) and within the vicinity of Glacier National Park complete mortality of whole stands has been recorded, forming a severe threat to *Pinus flexilis* and its associated species such as nutcracker and grizzly bear.)

Ponderosa Pine Woodland Ecological System

Ponderosa Pine Woodland Ecological System hits its northern most extent within the Rocky Mountains in the Canadian Rocky Mountains Ecoregion, much of its distribution is south, and is considered peripheral to this ecoregion. It occurs as Large Patch woodland, occupying patches (or once occupying) that are 50-5,000 acres in size. This system is typified by a sparse to open coniferous forest dominated by shrubs or perennial grasses. These woodlands typically occur at the lower treeline/ ecotone between grassland or shrubland and more mesic coniferous forest. It is the warmest and driest forested landscape in British Columbia, occurring along very dry valleys as a thin band in the bottoms and/or lower sidewalls of the southern Rocky Mountain Trench. Ponderosa Pine forests in the Canadian Rockies represents the northern limits of a system that is much more extensive in the western United States: however, in the U.S. portion of this ecoregion this system is extremely limited because the lower treeline usually is typified by *Pseudotsuga menziesii*-dominated stands. Canopies tend to open (<60% total cover) with scattered undergrowth including *Arctostaphylos uva-ursi* and *Festuca campestris, Festuca idahoensis, and Pseudoroegneria spicata.*

Fire is a key factor in maintaining the open canopies characteristic of these woodlands, but soil drought or infertility may be equally important in some areas. *Pinus ponderosa* is a drought resistant, shade-intolerant conifer, which usually occurs at lower treeline in the major ranges of the western United States. Historically, ground fires and drought were influential in maintaining open canopy conditions in these woodlands. With settlement and subsequent fire suppression, stands have become denser. Presently, many stands contain understories of more shade-tolerant species, such as *Pseudotsuga menziesii* and/or *Abies* spp., as well as younger cohorts of *Pinus ponderosa*. Modified stand structures have affected fuel loads and altered fire regimes. Pre-settlement fire regimes were characterized by primarily frequent (5-15 year return intervals), low intensity ground fires triggered by lightning strikes or deliberately set fires by Native Americans. With fire suppression and increased fuel loads, fire regimes are now less frequent and often become intense crown fires, which can kill mature *Pinus ponderosa*.

<u>*Aspen Ecological System*</u>
The Aspen Ecological System is a Large Patch forest type, occupying areas 50-5,000 acres in size. There are 9 associations known that describe this system and 4 of them are considered rare. The Aspen Ecological System includes plant communities that succeed through shrub thickets to an edaphic climax of trembling aspen, found in association with shrub/grasslands or grasslands. However, it is predominantly a large patch seral forest type that occurs within the matrix of montane and subalpine forests the Canadian Rocky Mountains Ecoregion. Stands in this system often originate, and are likely maintained, by stand-replacing disturbances such as avalanches, crown fire, disease and wind throw, or clearcutting by man or beaver. The stems of these thin-barked, clonal trees easily killed by ground fires, but they can quickly and vigorously resprout in densities of up to 30,000 stems per hectare. The stems are relatively short-lived (100-150 years) and the stand will succeed to longer-lived, shade tolerant conifer species if undisturbed. Stands are favored by fire in the conifer zone. It is difficult to categorize successionally because the short period since the last disturbance indicates an early or intermediate stage, while the high frequency of disturbance maintains a stable composition, which is characteristic of a mature stage.

Stands are dominated by a canopy of *Populus tremuloides.* Depending on available soil moisture and other factors like disturbance, the understory structure may be complex with multiple shrub and herbaceous layers, or simple with just an herbaceous layer. The herbaceous layer may be dense or sparse, dominated by graminoids or forbs. Associated shrub species include *Symphoricarpos* spp., *Rubus parviflorus*, *Amelanchier alnifolia* and *Arctostaphylos uva-ursi*. Associated herbaceous species include *Osmorhiza occidentalis, Angelica arguta, Geranium richardsonii, Viola canadensis, Leymus innovatus* (=*Elymus innovatus*), *Calamagrostis canadenis, Elymus glaucus, Lathyrus ochroleucus,* Aster *conspicuus and A. engelmannii.*

<u>*Montane Dry Grasslands Ecological System*</u>
The Montane Dry Grasslands Ecological System is a Large Patch Herbaceous type, occupying areas 50-5,000 acres in size. There are 13 associations known from this system and 3 are considered rare. Montane dry grasslands are small meadows to large open parks surrounded by conifer trees but lack tree cover within them. The general rule, if there is one, is that the soil textures are much finer and soils are often deeper under grasslands then in the neighbouring forests. Montane Grasslands are very similar and intergraded with their subalpine counterparts, but are separated here to represent those species that do

not occur at higher altitudes. Stands have a moderately dense graminoid layer of cool season, medium-tall bunchgrasses that are dominated by *Festuca campestris, Pseudoroegneria spicata, Festuca idahoensis, Leymus cinereus, Elymus trachycaulus, Bromus pumpellianus, Stipa richardsonii, S. occidentalis, Koeleria macrantha,* and other graminoids such as *Carex filifolia, Danthonia intermedia.* Common associated forbs include *Geum triflorum, Galium boreale, Campanula rotundifolia, Antennaria microphylla, Geranium viscosissimum, and Potentilla gracilis.* Shrub cover is generally non-existent, but can be adjacent in neighbouring wetlands or riparian areas. *Festuca campestris* is highly palatable throughout the grazing season. Summer overgrazing for 2 to 3 years can result in the loss of *Festuca campestris* in the stand. Although a light-stocking rate for 32 years did not affect range condition, a modest increase in stocking rate led to a marked decline in range condition. The major change was a measurable reduction in basal area of *Festuca campestris*. Long-term heavy grazing on moister sites can result in a shift to a Kentucky bluegrass - timothy type. *Pseudoroegneria spicata* shows an inconsistent reaction to grazing, increasing on some grazed sites while decreasing on others. It seems to recover more quickly from overgrazing than *Festuca campestris*. It tolerates dormant-period grazing well, but is sensitive to defoliation during the growing season. Light spring use or fall grazing can help retain plant vigour. It is particularly sensitive to defoliation in late spring. Exotic species threatening this ecological system through invasion and potential complete replacement of native species include *Bromus japonicus,* sulfur cinquefoil (*Potentilla recta*), leafy spurge (*Euphorbia esula*) and all manner of knapweed (especially *Centaurea maculosa*).

Montane Wet Meadow Ecological System
The Montane Wet Meadow Ecological System is a Small Patch Herbaceous type that occupies areas from less than 1 acre to up to 50 acres in size. There are 18 associations known from this system and 1 is considered rare. This system is typically a high elevation meadow community, dominated by moisture-loving herbaceous species, found on wetter sites in montane forested areas. This system grades easily from the subalpine to the montane because of the wide ecological amplitude of many of the dominant species. The Montane Meadow Ecological System consists of graminoid and forb dominated meadows that have soils that range from very wet, saturated throughout the growing season, to moist but not saturated soils that can dry out by the end of the growing season. Vegetation consists of wetlands dominated by *Carex scirpoidea, C. utriculata, C. rostrata*, or *C. aquatilis*. Still moist but slightly drier areas have *Juncus balticus, Deschampsia cesptiosa, Calamagrostis canadenisis,* or *Carex lanuginosa.* Forbs can also be dominant and include *Senecio triangularis, Cardamine cordifolia, Geum macrophyllum, Aster occidentalis, etc.* and the sub-shrub *Dryas drummondii.* Stands occur in moist, low-gradient valley bottoms throughout the mountainous areas of the ecoregion. Soils are mineral with high organic matter content. Soils are derived from alluvial and colluvial deposits of granitic, schist, and gneiss origins. Soils are generally poorly drained. Saturated soils retard plant decomposition and favor organic matter accumulation. Flooding during spring runoff is common and water tables remain within the root zone throughout the summer. The vegetation occurs at higher elevations in the southern part of its range and in dry interior locations. At lower elevations, the

communities are typically wetlands, requiring wet or moist soils through most of the growing season.

Montane Scrub Ecological System

The Montane Scrub Ecological System is a Large Patch shrub type occupying areas from 50-5,000 acres in size. There are 12 associations known that describe this system and 3 are considered rare. Montane Scrub Ecological System consists of typically moderately sparse microphyllous evergreen (or late cold-deciduous) shrublands with the dominant shrubs varying from 0.5 to 3 m in height. Cespitose graminoids are the typical herbaceous associates and may strongly dominate the ground layer. In some areas, stands in good condition will have a ground surface covered with mosses and lichens. Stands are typically found in xeric uplands sites on steep slopes to relatively mesic upland sites such as flat to rolling plains, plateaus and hills; benches and terraces above valley floors, alluvial fans and foot slopes, mountain parks and ridges, but also well-drained alluvial bottomlands. Sites are nearly level to moderately sloping (to 40%). Plant associations in this alliance are characterized by a sparse shrub canopy of *Purshia tridentata*, *Artemisia tridentata* ssp. *vaseyana, Artemisia tripartita, Pentaphylloides floribunda, Amelanchier spp., Elaeagnus commutata*, *Prunus virginiana,* or *Rosa woodsii.* The herbaceous layer dominates the stands and is composed of a moderately open to dense layer of mid grasses and short grasses. The shrub layer is typically 10-25%, but may be slightly higher or lower in some stands. The dominant species are the medium-tall rhizomatous grass *Pascopyrum smithii*, the bunchgrasses *Festuca idahoensis* or *F. campestris.*

Montane shrublands are maintained by disturbance (such as fire), from rare years when many seedlings survive, or by droughty, unstable soils that preclude tree establishment. In general, it is an upland type associated with coarse, well-drained soils without high salinity or pH. The open nature of the shrublands with predominant thick grasses in-between shrubs can indicate historical and current low grazing pressure and/or a frequent fire regime.

Montane Riparian Forest Ecological System

The Montane Riparian Forest Ecological System is a Linear Patch Forested system, found in long linear bands following river courses. There are 11 associations known from this system and 3 are considered rare. The Montane Riparian Forest Ecological System consists of deciduous and mixed conifer and deciduous forests that occur on stream banks and river floodplains. *Populus balsamifera* is the key indicator species. Several other tree species can be mixed in the canopy, *Populus tremuloides, Betula papyrifera, B. occidentalis, Picea mariana*, and *Picea glauca.* Shrub understory components include *Cornus sericea, Alnus incana, Betula papyrifera*, and *Symphoricarpos albus.*

Riparian forest stands are maintained by annual flooding and hydric soils throughout the growing season. Riparian forests are often accompanied by riparian shrublands or open areas dominated by wet meadows. Riparian shrublands, forests and meadows can, on occasion, occupy large or at least continuous acres; hence they are treated as three ecological systems. If needed for mapping, the three systems can be brought together as a single representative of the riparian/wetland mosaic.

Montane Riparian Shrubland Ecological System

The Montane Riparian Shrubland Ecological System is a Linear Patch Shrubland type that occupies long linear bands of varying lengths and widths. There are 32 associations from this system and none are considered rare. This ecological system consists of shrublands that occur along perennial and intermittent stream courses and hillside seeps. Shrublands can be narrow strips along steep, fast streams, broad expanses of shrubs forming carrs, generally on flat floodplains of slow moving meandering rivers and streams, or tiny wetland pockets on isolated springs. Dominant shrub species include *Alnus incana, Betula occidentalis*, several *Salix* species, *Pentaphylloides floribunda, Cornus sericea*, or *Spiraea douglasii*. Intermittent and ephemeral stream beds may have stands of *Crataegus douglasii, C. succulenta*, or *Elaeagnus communtata.*

Riparian stands are maintained by annual flooding and hydric soils throughout the growing season. Some associations require well-aerated water; others thrive in near anoxic conditions. Riparian shrublands are often accompanied by riparian forests and woodlands or open areas dominated by wet meadows. Riparian shrublands, forests and meadows can, on occasion, occupy large or at least continuous acres; hence they are treated as three ecological systems. If needed for mapping, the three systems can be brought together as a single representative of the riparian/wetland mosaic.

Montane Spruce Ecological System

The Montane Spruce Ecological System is a Large Patch Forested Type that occupies areas of 50 to 5,000 acres in size. It is much more abundant north and west of the Canadian Rocky Mountains Ecoregion, truly a boreal forest type, and is considered only peripheral within the ecoregion. There are 12 associations described from this system and 3 are considered rare. In the montane zone white spruce forests occur on more mesic sites especially along streams on fluvial terraces. The *Picea glauca* and *Picea mariana* forests in the Canadian Rocky Mountains Ecoregion represent the southern most extent (on the western side of North America) of these expansive boreal forests. The southern limit of appears to be related to July mean temperatures exceeding 65°F and maximum of 75° F, and where annual precipitation drops below 15-20 inches.

Picea glauca associations found in Banff, Jasper, Kootenay and Yoho National Parks occur on gentle to moderate slopes, and are generally very mature stands. Canopy ranges from closed to open forests, usually with a shrub canopy, although some stands have only an herbaceous carpet. Other tree species that may be co-dominant in the upper canopy include *Picea mariana, Pseudotsuga menziesii*, *Abies lasiocarpa* and *Larix occidentalis*. Undergrowth components include *Rosa acicularis, Potentilla fruticosa, Sherpherdia canadensis, Menziesia ferruginea* and the subshrubs *Cornus canadensis.* Herbaceous undergrowth species include*: Equisetum arvense* and *Triglochin maritima* and the bryophytes *Thuidium avietinum* and *Hylocomium splendens.*

Conifer Swamp Ecological System

The Conifer Swamp Ecological System is a Small Patch Forested to semi-Forested type, occupying areas of less than 1 acre to 50 acres. There are 11 associations that describe this system and 3 are considered rare. Conifer Swamp Ecological System contains those associations dominated by conifers on poorly drained soils that are saturated year round or may have seasonal flooding in the spring. Soils are never organic, but are mineral. Stands generally occupy sites on benches, toe slopes or valley bottoms along mountain streams. Associations present include wetland phases of *Abies grandis, Thuja plicata, Thuja heterophylla* and *Picea engelmannii* forests. The wetland types are generally distinguishable from other upland forests and woodlands by shallow water tables and mesic or hydric undergrowth vegetation; some of the most typical species include *Athyrium felix-femina, Dryopteris spp., Gymnocarpium dryopteris, Equisetum arvense, Senecio triangularis, Mitella breweri, M. pentandra, Streptopus amplexifolius* and *Calamagrostis canadensis*.

Black Spruce Bog Ecological System

The Black Spruce Bog Ecological System is a Small Patch Forested Type that occupies areas of less than 1 acre to 50 acres. Only one association has been described from this system. The Black Spruce Bog Ecological System consist of bog wetland forests that are typically sparse to open organic wetland, with a peat moss dominated undergrowth, with *Picea mariana* and sometimes, tamarack. (*Larix laricina*). Soils are saturated throughout the growing season from ground-water upwelling.

AZONAL WETLANDS

Fen Ecological System

The Fen Ecological Fen System is a Small Patch Herbaceous type that occupies areas of less than one acre to 10 acres. There are 9 associations describing this system and none are considered rare. The Fen Ecological System is a wetland class that typically is an unforested wetland, dominated by sedges, found on poorly drained organic sites. Dominant species include *Carex buxbaumii, C. limosa, C. aquatilis, C. utriculata, C. rostrata, C. vesicaria, C. lasiocarpa, C. simulata*, or *C. scopulorum.* The distinguishing difference between these wetlands and the subalpine and montane wet meadow sedge dominated associations is the organic soils exhibited by fens. Fens are often small, isolated wetlands solely dependent on groundwater upwelling or other underground water source. Typically less than 5 acres in size, the landscape context is the most important factor in weighing their long-term viability. Condition is second; as weeds and other invasive species usually have a hard time surviving within this very specific habitat.

Marsh Ecological System

The Marsh Ecological System is a Small Patch Herbaceous type that occupies areas of less than one acre to 50 acres. Nineteen associations have been described from this system, and none are considered rare in the Canadian Rocky Mountains Ecoregion. The Marsh Ecological System is a wetland class that typically is permanently or seasonally inundated for much of the growing season. Marshes differ from Fens and wet sedge meadows by having shallow to deep standing water for much of the growing season. Stands support an extensive cover of emergent, non-woody vegetation, rooting in a mineral-rich substrate. Dominant species include *Equisetum fluviatile, Nuphar lutea, Scirpus acutus, S. microcarpus, S. tabernaemontani, Typha latifolia, Phalaris arundinacea, Glyceria borealis*, and several *Carex* species.

MISCELLANEOUS LANDSCAPES

Rock Outcrop/Cliff Ecological System

The Rock Outcrop/Cliff Ecological System is a Small Patch system, usually occupying areas from less than one acre to 50 acres. No known associations have been described for this system at this time. This system typically is a mixture of gentle to steep, non-alpine bedrock escarpments and outcroppings, with little soil development and relatively low vascular vegetative cover and possibly high non-vascular cover.

ASPEN PARKLAND ZONE

Aspen Parkland Ecological System

The Aspen Parkland Ecological System is a Matrix Patch size forested system, occupying areas of 5000 to 10,000 acres, and is peripheral to the Canadian Rocky Mountains Ecoregion as it just abuts the Rockies in the foothill region near Calgary. Four associations from this system occur within the Canadian Rockies and none are considered rare. The Aspen Parkland occurs as a broad arc from southwestern Manitoba, northwestward through Saskatchewan to its northern apex in central Alberta where it meets the foothills of the Canadian Rocky Mountains. The Aspen Parkland just fingers into the south central eastern edge of the Northern Rockies ecoregion. It is considered transitional between the boreal forest to the north and the grasslands to the south. Mostly converted to agriculture now, in its natural state the landscape was characterized by trembling aspen, oak groves mixed tall shrubs and intermittent Fescue grasslands. Within the Canadian Rocky Mountains Ecoregion, the Aspen Parkland just laps the outer edges of the transitional foothill region. *Populus tremuloides* is general dominant in the upland forests. Common understory species include *Symphoricarpos albus, Amelanchier alnifolia, Spiraea betulifolia, Rubus parviflorus* and *Urtica dioca.*

ROUGH FESCUE PRAIRIE ZONE

Rough Fescue Prairie Ecological System

The Rough Fescue Prairie Ecological System is a Matrix Patch size herbaceous system, occupying areas of 5000 to 10,000 acres, and is peripheral to the Canadian Rocky Mountains Ecoregion, as it just abuts the Rockies in the foothill region near Calgary. Fifteen associations from this system that occur within the Canadian Rockies and none are considered rare. The Rough Fescue Prairie Ecological System is a plains system once found extensively to the east of the Central Canadian Rocky Mountains. Very small portions of it are found at foothill elevations along the eastern edge of the boundary of the Canadian Rocky Mountains Ecoregion. The system-mapped coverage of this grassland comes into the Canadian Rocky Mountains Ecoregion on the Shining Mountains

Mapping project. While some fescue dominated stands occur further into the mountains as Montane Grasslands, the Rough Fescue Prairie Ecological System represents those grasslands and associated soils and adjacent woodlands that occur in the lower foothill regions. This area of Fescue grassland lies in the chinook belt of southwestern Alberta along the face of the Rocky Mountain foothills. The thick grass ward and Black Chernozemic solid are similar to those of the Aspen Parkland, but trees are found only in very sheltered locations along some of the waterways. This grassland community is dominated by rough Fescue with lesser quantities of Parry oat grass, June grass, and wheat grass. Forbs are abundant and often include yellow bean, sticky geranium, bedstraw, and chickweed. Grazing and tillage have disturbed most of the native vegetation in the region. Grasslands are dominated by *Festuca scabrella, Agropyron spicatum, Danthonia* spp., and *Koleria macrantha.*

WHEATGRASS STEPPE ZONE

Sagebrush Steppe Ecological System

The Sagebrush Steppe Ecological System is a Large Patch open shrubland type that occupies areas of 50 to 5,000 acres. It is considered peripheral to the Canadian Rockies as its range of distribution is much more extensive to the south and west. There are four associations of this system within the Canadian Rocky Mountains Ecoregion, one is considered rare. The sagebrush steppe occurs predominately in the northern portion of the Intermountain Range, but significant stands occur in eastern Washington and north central Montana. While not by any means an extensive system within the Canadian Rocky Mountains Ecoregion, it does occur at its southern boundary and in fingers up and into the lower valleys. The vegetation is characterized by big sagebrush and western wheatgrass (*Pascopyrum smithii*). This system is mapped by the *Shining Mountain vegetation project*.

FOOTHILLS BOREAL ZONE

Foothill Boreal Forests Ecological System

The Foothill Boreal Forest Ecological System is a Matrix Patch Forest type, occupying extensive areas of 5,000 to 10,000 acres. It is much more extensive to the north and is considered peripheral within the Canadian Rocky Mountains Ecoregion. One association from this system occurs in the ecoregion and it is not considered rare. This foothill region just fingers into the eastern edge of the Northern Rockies Ecoregion. Mixed forests of lodgepole pine (*Pinus contorta*), trembling aspen (*Populus tremuloides*), and white spruce (*Picea glauca*) with balsam poplar (P. balsamifera) paper birch (*Betula papyrifera*), and balsam fir, (*Abies balsamea*) are characteristic of this region. The foothills are composed of Cretaceous sediments, rise abruptly above the plains and are mainly linear ridges, rolling plateau remnants, and broad valleys.

SUB-BOREAL SPRUCE ZONE

Hybrid Spruce Forests Ecological System

The Hybrid Spruce Forests Ecological System is a Large Patch Forested type that occupies areas of 50 to 5000 acres. It occurs much more extensively to the north of the Canadian Rocky Mountains Ecoregion, and is considered peripheral here. There is one association from this system found within the ecoregion and it is not considered rare. The Hybrid Spruce Forests Ecological System consists of upland forests of the Upper Foothills subregion of Alberta are nearly all coniferous and dominated by white spruce (*Picea glauca), black spruce (P. mariana),* Lodgepole pine *(Pinus contorta)*, and occasionally subalpine fir (*Abies lasiocarpa)*. Some introgressive hybridization between *Picea glauca* and Engelmann (*P. engelmannii)* occurs in portions of this area. Older stands on mesic sites often have well-developed moss layers dominated by feather mosses. Understory species include *Vaccinium membranaceum, Viburnum edule, Menziesia ferruginea, Shepherdia canadensis, Rosa acicularis,* and *Linnaea borealis.*

APPENDIX 4.0 AQUATIC ANALYSES

ECOLOGICAL DRAINAGE UNITS AND AQUATIC ECOSYSTEMS IN THE CANADIAN ROCKY MOUNTAINS ECOREGION

Described below is an approach used by The Nature Conservancy (TNC-US) and the Nature Conservancy of Canada (NCC) to design a regional conservation plan for freshwater biodiversity in the Canadian Rocky Mountains ecoregion (CRM). The approach follows the guidelines for ecoregional planning[44] set out in Groves et al. (2000), namely to develop a portfolio of conservation areas that captures representative biodiversity of an ecoregion at *multiple spatial and biological scales*. The model used to integrate freshwater biodiversity into this planning generally includes five steps:

1. Develop a general understanding of the variety and distribution of aquatic ecosystems and aquatic species patterns present in the ecoregion.
2. Identify and locate aquatic targets (species, communities, and aquatic ecosystems).
3. Select the best examples of aquatic targets that together represent the full diversity of region.
4. Set conservation goals and design an ecoregional portfolio.
5. Identify information gaps and strategies to address them.

As mentioned above, the minimum standard we apply for aquatic ecoregional planning is to represent freshwater diversity at multiple levels of biological organization across multiple spatial scales. The targets (or foci) for conservation planning include species, natural communities, and ecosystems. For practical reasons, most ecoregions will not have biologically defined aquatic communities and aquatic ecosystems as targets. Instead we rely on surrogates developed using a multi-scale, landscape-based classification framework for freshwater ecosystems, which is described in greater detail in Step 2. Most ecoregions will use only species and aquatic ecosystems as targets.

Step 1 - EDUs

The first step in aquatic ecoregional planning is to develop Ecological Drainage Units (EDUs) by gathering information about the variety and distribution of aquatic ecosystem types and general patterns of species distribution. EDUs are groups of watersheds (in the US, 8-digit catalogue units as defined by USGS) that share a common zoogeographic history and physiographic and climatic characteristics. We expect that each EDU will contain sets of aquatic system types with similar patterns of drainage density, gradient, hydrologic characteristics, and connectivity. Identifying and describing EDUs allows us to stratify ecoregions into smaller units so we can better evaluate patterns of aquatic community diversity. Additionally, EDUs provide a means to stratify the ecoregion to set conservation goals.

EDUs in the CRM were defined based on two main sources of information: (1) *zoogeography* from Hocutt and Wiley (1986), World Wildlife Fund's freshwater ecoregions (Abell et al. 2000), the US Forest Service (Maxwell et al. 1995), and ABI databases (L. Master, pers. com.); and (2) *ecoregional/ecozone attributes* as defined by the US Forest Service/EPA (Pater et al.1998) and Environment Canada. Additional data consulted include: US National Marine Fisheries Service (ESU boundaries for

[44] These same steps are relevant to any landscape or large geographic area planning endeavour.

salmonids), Haas (1988), McPhail and Carveth (1994). Table 1 and Map 5 show EDUs for the CRM.

Table 1. EDUs in the Canadian Rocky Mountains ecoregion.

EDU	Physiography	Climate	Zoogeography (from Maxwell et al., 1995)	Stream Types
Upper Fraser	high glaciated mountains (some > 3000m) composed of a series of ranges and alternating trenches. active glaciers present.	highly variable with elevation; moderate precipitation (700–1100 mm/yr)	Upper Fraser	high gradient, glacially fed streams underlain predominantly by glacial features, folded sedimentary and volcanic strata and massive metamorphic rocks, with intrusions of igneous and volcanic rocks
Middle Fraser – Nechako	plateau and interior foothills east of the Coastal Mountains; broad, rolling plateau generally lies 1150–1800 m asl	250–600 mm; east 600–800 mm	Upper Fraser	Surface deposits include glacial till with well-developed drumlinoid features, pitted terraces, simple and compound eskers, and areas of glacial lake (lacustrine) deposits
Thompson	predominantly rolling plateaus and major valleys with higher glaciated Columbia mountains in east	warm and dry in west; low to moderate precipitation (10-40 in/yr) varies with elevation	Upper Fraser	large river system with many lakes draining volcanic rocks and glacial deposits in west; headwaters are in a mountainous glaciated landscape of complex geology
Columbia – Kootenay headwaters	mid- to high elevation glaciated mountains, composed of a series of ranges and alternating trenches; active glaciers in eastern portion	varies greatly with elevation ; generally moderate precipitation (~30 in/yr)	Upper Columbia	glacially influenced high gradient streams with large sediment load; underlain by limestone and quartzites; glacial lakes predominate
Great Lakes – Columbia Mountains	mid- to high elevation glaciated mountains, composed of a series of ranges and alternating trenches	varies greatly with elevation; generally moderate precipitation (~30 in/yr)	Upper Columbia	confluence of three large river systems (Columbia, Kootenay, Pend Oreille) and associated large glacially-formed oligotrophic lakes; lower energy systems than in headwaters
Clark Fork-Flathead	high-elevation glaciated mountains with glacial and lacustrine basins	cool temperate with some maritime influences; highly variable precipitation (16 – 100 in/yr)	Upper Columbia	small, medium, and large (e.g., Clark Fork) river systems in predominantly metasedimentary geology; most systems have relatively stable hydrologic regimes due to groundwater and timing of snowmelt; many lakes, including Flathead
Clearwater River	glaciated, mid- to high elevation mountains	high precipitation (~30-50 in/yr, mostly as snow); dry summers	Lower Snake	flashy small to medium river systems; predominantly granitic substrate with some sedimentary and carbonate material
Smoky-Upper Athabasca	high elevation glaciated mountains; lower elevation valleys to east	varies greatly with elevation; generally moderate precipitation (~30 in/yr)	Upper Mackenzie /Arctic	glacial influence
Upper North Sask.	high elevation glaciated mountains; lower elevation valleys to east	varies greatly with elevation; generally moderate precipitation (~30 in/yr)	Upper Saskatchewan/Hudson Bay	glacial influence
Upper South Sask.-Red Deer-Bow	high elevation glaciated mountains; lower elevation valleys to east	varies greatly with elevation; generally moderate precipitation (~30 in/yr)	Upper Saskatchewan/ Hudson Bay	glacial influence
Milk-Marias-Sun	high elevation glaciated mountains (~5500-8500')	cold continental; highly variable precipitation (~15-100 in/yr); dry summers	Upper Missouri	small headwater systems and glacial lakes in complex geology; predominantly snowmelt driven

Step 2 – Identify Freshwater Conservation Targets

Conservation by Design identifies the need to select conservation targets at multiple spatial scales and levels of biological organization (Groves et al. 2000). This approach represents the coarse filter/fine filter method of biodiversity conservation developed by TNC (Noss 1987). The fine filter portion represents the species level of biodiversity, focusing on those species which are imperilled, declining, endemic, disjunct, vulnerable, keystone, or wide-ranging. The coarse filter represents a community/ecosystem-level conservation strategy whereby natural community or ecosystem types are used as conservation targets to represent 85-90% of species and many ecological processes, without having to inventory and manage each species individually. This multi-scalar approach has the effect of protecting not only the components of biodiversity but also their ecological and evolutionary contexts (Angermeier and Schlosser 1995). The ecosystem-level strategy is particularly important for freshwater biodiversity, since region-wide data exist for few non-game species and rarely, if ever, for communities.

Fine filter targets

The following table provides a list of freshwater targets in the CRM ecoregion.

SCIENTIFIC NAME	COMMON NAME
ACIPENSER TRANSMONTANUS POP 1	WHITE STURGEON - KOOTENAI RIVER
ACIPENSER TRANSMONTANUS POP 2	WHITE STURGEON - COLUMBIA RIVER
ONCORHYNCHUS CLARKI LEWISI	WESTSLOPE CUTTHROAT TROUT
ONCHORHYNCHUS MYKISS GAIRDNERI	INLAND REDBAND TROUT
SALVELINUS CONFLUENTUS	BULL TROUT
RHINICHTHYS OSCULUS	SPECKLED DACE
RHINICHTHYS UMATILLA	UMATILLA DACE
COTTUS CONFUSUS	SHORTHEAD SCULPIN
SALMASELLUS STEGANOTHRIX	A CAVE OBLIGATE ISOPOD
ENALLAGMA OPTIMOLOCUS	A DAMSELFLY
LEDNIA TUMANA	MELTWATER LEDNIAN STONEFLY
ZAPADA GLACIER	WESTERN GLACIER STONEFLY
RHYACOPHILA EBRIA	A CADDISFLY
RHYACOPHILA GLACIERI	A RHYACOPHILAN CADDISFLY
ACROLOXUS COLORADENSIS	ROCKY MOUNTAIN CAPSHELL
STAGNICOLA ELRODI	FLATHEAD PONDSNAIL
STAGNICOLA ELRODIANA	LONGMOUTH PONDSNAIL
PHYSELLA JOHNSONI	STRIATE PHYSA
ONCHORHYNCHUS GORBUSCHA	PINK SALMON - UPPER FRASER
O. KISUTCH	COHO SALMON - UPPER FRASER
O. TSHAWYTSCHA	CHINOOK SALMON - UPPER FRASER
O. NERKA	SOCKEYE SALMON - UPPER FRASER
O. MYKISS	STEELHEAD

Data sets used to compile the list are from the British Columbia and Alberta CDCs, Idaho, Montana and Washington Heritage Programs, and state, provincial (e.g., Haas 1998), and federal sources (e.g., NMFS). Spatial data showing population occurrences was not available for all targets; these targets will need to be reviewed as additional data are collected.

Salmonids present unique challenges as conservation targets because of their complex life history, large ranges, and uncertain taxonomy. Because of key genetic differences thought to reflect different life history strategies, the US agencies NMFS and FWS (who share responsibility for the salmonids in the US under the ESA) and the Canadian Department of Fisheries and Oceans are subdividing salmonid species into distinctive groups called "Evolutionary Significant Units" or ESUs. We will be adopting critical salmonid areas within these ESUs as identified by these and other state, provincial and federal agencies, as available.

Coarse filter targets

As no existing freshwater community or ecosystem classification exists within this ecoregion, we developed "coarse-filter targets" using the hierarchical classification framework described below. This multi-scale, landscape-based classification framework for freshwater ecosystems is based upon hierarchy theory, and key principles of and empirical studies in freshwater ecology [45]. Using a GIS platform, this framework allows users to partition and map environmental patterns from the stream reach to regional basins that strongly influence the distribution of freshwater biodiversity. A manuscript describing the classification framework in greater detail is currently in preparation (Higgins et al., *in prep*).

As a surrogate for coarse-scales of freshwater biodiversity in the CRM, we have developed and mapped freshwater ecosystems using macrohabitats as described below.

Macrohabitats

Macrohabitats are units of streams and lakes that are relatively homogeneous with respect to size, and thermal, chemical, and hydrological regimes. Each macrohabitat type represents a different physical setting thought to correlate with patterns in freshwater

[45] Much research has been done on this topic. For example, local patterns of aquatic physical habitats and their biological components are the product of a hierarchy of regional spatial and temporal processes (Tonn 1990; Angermeier and Schlosser 1996; Angermeier and Winston 1999; Mathews 1998; Frissell et al. 1986). Continental and regional aquatic zoogeographic patterns result from drainage connections changing in response to climatic and geologic events (e.g., Hocutt and Wiley 1986). Regional patterns of climate, drainage, and physiography determine aquatic ecosystem characteristics [morphology, hydrologic, temperature and nutrient regimes] that in turn influence biotic patterns (Hawkes et al. 1986; Maret et al. 1997; Poff and Ward 1990; Poff and Allan 1995; Pflieger 1989; Moyle and Ellison 1981). Within regions, there are finer-scale patterns of stream and lake morphology, size, gradient, and local zoogeographic sources resulting in distinct aquatic assemblages and population dynamics (e.g. Maxwell et al. 1995; Seelbach et al. 1998; Frissell et al. 1986; Rosgen 1994; Angermeier and Schlosser 1995; Angermeier and Winston 1999; Osborne and Wiley 1992; see Mathews 1998 for extensive review). The overall basis for our approach stems from an expert workshop that TNC held in 1996 (Lammert et al 1997).

biodiversity. Macrohabitats form the basis for creating freshwater ecological systems, the coarse-filter targets used in the CRM.

1. Size – measured as drainage area. This variable corresponds to the controlling factors of stream size (flow rate and velocity), channel morphology, and hydrologic flow regime. The classes chosen reflect broad changes in stream habitat and flow rates.

1	0 – 100 km2 (headwaters, creeks)
2	100 – 1000 km2 (small rivers)
3	1000 – 10000 km2 (medium rivers)
4	> 10000 km2 (large rivers)

2. Geology – dominant geology in the contributing area for each segment. This variable influences flow regime (in conjunction with topography to determine groundwater vs. surface water contribution), water chemistry, stream substrate composition, and stream morphology.

	CRM type	Sediment texture	Chemistry	Degree of consolidation	Stream substrate material	Hydro source
1	FINE LACUSTRINE--COLLUVIUM	3	5	1	silt/clay	surface water
2	LOESS	3	5	1	silt/clay	surface water
3	MIXED TEXTURE ALLUVIUM -COLLUVIUM	4	5	1	mixed	moderate gw
4	GLACIAL TILL	4	5	1	mixed	moderate gw
5	SAND DUNE	3 1!	1	1	sand	moderate gw
6	COARSE OUTWASH/LACUSTRINE	var.	5	1	sand/gravel	high gw
7	CARBONATE-LIMESTONE	var.	4	4 or 2	silt/clay	moderate gw
8	SANDSTONE/META-SEDIMENTARY	var.	1	2	sand	moderate gw
9	SHALE/MUDSTONE	3	1	2	silt/clay	moderate gw
10	SILTSTONE/META-SILTSTONE	var. (~ 3)	1	2	silt/clay	moderate gw
11	SLATE/PHYLLITE/SCHIST	var. (~ 3)	2	2	silt/clay	moderate gw
12	GRANITIC-SILICIC	1 or 2	1	3	sand	surface water
13	ALKALINE INTRUSIVE/EXTRUSIVE	~ 1	~ 2 - 4	~ 3	sand	surface water
14	BASALTIC-MAFIC	1	3	3	silt/clay	surface water

Table Continued:

	CRM type	Sediment texture	Chemistry	Degree of consolidation	Stream substrate material	Hydro source
15	ERODABLE VOLCANIC	2	var.	1 or 2	clay	surface water
16	ULTRAMAFIC (SERPENTINE)	1	3	3	silt/clay	surface water
17	GLACIER	4	5	4	n/a	glacial
		1=coarse	1=felsic	1=weak or none		
		2=medium	2=intermed.	2=moderate		
		3=fine	3=mafic	3=strong		
		4=unknown	4=carb.	4=other		
			5=unknown			
Ranking data on characteristics from Lee et al. (1997)						

3. Gradient – slope of segment (classes are a combination from D. Rosgen, Ian Waite @USGS, Tony Cheong @BC MELP). This variable influences stream morphology, energy, and habitat types.

1 <. 005
2 .005 - .02
3 .02 - .04
4 .04 - .10
5 .10 - .20
6 >.20

4. Elevation – average elevation of segment. This variable corresponds to some species limits, flow regime (snow melt amount and timing), stream temperature, and to some degree, slope. Classes are variable depending on latitude, and assigned according to four broad vegetation types from Shining Mountains biogeoclimatic classification.

5. Upstream/downstream connectivity – type of macrohabitat either immediately upstream or downstream. Downstream connectivity accounts for local zoogeography by considering the species pool differences in downstream habitats; upstream connectivity accounts for the effects from upstream segments on both hydrologic regime and chemistry.
-1 – unconnected
1 – stream/river
2 – lake
3 – reservoir
4 – wetland
5 – glacier (upstream) or coastal (downstream)

Note that we have not created lake macrohabitats in this classification – natural lakes are incorporated into the system classification that follows.

Aquatic Ecosystems
Where macrohabitats create a detailed and often quite complex picture of physical diversity, aquatic ecosystems provide a means to generalize about the patterns in streams and lakes, the ecological processes that link groups of communities; furthermore they are defined at a spatial scale which is more practical for regional planning. Aquatic ecosystems 1) occur together in an aquatic landscape with similar geomorphological patterns; 2) are tied together by similar ecological processes (e.g., hydrologic and nutrient regimes, access to floodplains and other lateral environments) or environmental gradients (e.g., temperature, chemical and habitat volume); and 3) form a robust, cohesive and distinguishable spatial unit.

Aquatic ecosystems are the targets used to represent coarse-scale freshwater biodiversity for the CRM portfolio. They are a practical tool that scales the number of macrohabitats to fewer units, by capturing the diversity of the macrohabitats at a coarser scale. They also provide a framework for selecting potential conservation areas at appropriate scales (watersheds vs. segments).

Ecosystem types for the CRM were created using multivariate analysis to group neighbouring macrohabitats which share similar patterns. Four scales of watersheds – equivalent to the macrohabitat size classes of < 100 km^2, 100 – 999 km^2, 1000 – 10,000 km^2, and > 10,000 km^2 -- are used as the units to assess macrohabitat diversity and define ecosystems. Macrohabitats are measured in each watershed using relative abundance as opposed to total length, to discount differences in watershed size within class. Each set of watersheds within a size is classified separately, and then the system membership is attributed to only the macrohabitats which are of the same size class. Using the PC-ORD multivariate software, the most consistent set of parameters for analysis was determined to be an agglomerative clustering algorithm, Euclidean distance measure, and Ward's group linkage method (see McCune and Mefford 1995). The final clusters for each EDU were determined with manual editing and review.

Over 5000 watersheds were classified into 77 aquatic ecosystem types and mapped in a GIS for each of the EDUs described above.

Step 3 - Select the Best (i.e., Viable) Examples of Each Target
The determination of the viability/integrity of aquatic biodiversity targets is a critical step in the design of an ecoregional portfolio. From an assessment of the condition of the aquatic targets, planners can identify the best conservation opportunities as well as priorities for restoration. Viability of target occurrences is generally measured according to three criteria: size, condition, and landscape context (Groves et al. 2000).

The first step in assessing the viability of aquatic targets is to identify and evaluate existing data relevant to these criteria for their availability, spatial extent, and accuracy. Natural Heritage Programs/CDCs are a critical resource for aquatic species targets as many programs have already ranked occurrences according to their viability. Other relevant data are often available from government agencies (e.g., recovery plans from USFWS) and other freshwater experts. For ecosystem targets, many types of data can also be readily used in a GIS to gain insight about potential viability, including: biomonitoring/chemical samples, land use, sedimentation rates, dam/irrigation withdrawal location and amount, presence/abundance of exotic species, percentage of historic species present, and location of point sources. Finally, expert knowledge is a key layer of information on the location and condition of viable examples of ecosystem targets. In some cases, high quality examples may not exist for a particular target, and it may be necessary to identify the best opportunities for restoration.

In the CRM, we used the ranks of occurrences provided by Heritage/CDC programs to choose viable examples of most species targets. For occurrences of species targets not provided by Heritage/CDC, we consulted with experts when possible to assess viability of each population according to the criteria of population size, biological condition, and surrounding landscape context.

For freshwater ecosystems, we used a three-pronged approach for assessing integrity: 1) use existing data sets identifying priority/high quality areas, 2) have freshwater experts review ecosystems identified as viable, and 3) develop and apply a GIS-based suitability index.

We were fortunate in that a number of datasets already existed that allowed us to assess the integrity of ecosystems within the EDUs. The datasets typically reflect widespread input from experts who are familiar with conditions in the field, and add a critical component to the GIS analysis. We used the datasets in a *post hoc* analysis to compare and adjust the preliminary portfolio, adding and subtracting areas. Some of the data sets we utilized:

For MT/ID/WA:

- Existing protected areas which capture more than half of a watershed (GAP level 3 and 4)
- Idaho Pacific Rivers report (PRC 1998) – critical freshwater refuges and aquatic diversity areas
- Aquatic Diversity Areas in Montana (Hitt and Frissell 1999)
- MT DEQ IBI reference sites
- Bull trout core areas from INFISH/PACFISH (ICBEMP website)
- Snake River steelhead priority watersheds (ICBEMP websites)

For BC:

- Kootenay Aquatic Diversity Analysis done for the Upper Kootenay in BC (Porter and Haas, unpublished)
- Haas (2000) - key watersheds
- DFO – Priority watersheds
- MELP – Fisheries Branch priority watersheds

Our most important sources of information came from the expert workshops that we held across the ecoregion to review a preliminary set of conservation areas, gain additional information about viability/integrity, and determine data gaps.

We also created a freshwater suitability index, which we applied as a post-hoc screening tool to select high quality examples of different freshwater ecosystem. The index -- set between 0 and 1 -- combined variables derived from GIS data known to adversely influence freshwater biodiversity: road density (km/km^2) (data from USFS and BC Ministry of Environment), dam density ($\#/km^2$) (data from: US EPA Basins version 2.0, US Army COE National Inventory of Dams, and BC Ministry of Fisheries), landuse (% non-natural land cover) (data from: in USFS and Baseline Thematic Mapping BTM from BC Ministry of Environment, Lands & Parks), and point sources of pollution (#/km) (US portion only: data from US EPA Basins version 2.0). This process essentially follows the efforts of Moyle and Randall (2000) and Hitt and Frissell (1999).

The watershed of each system occurrence was assessed for each of these four variables, and given a value relative rank between 0 and 1 compared with other system examples, and then averaged for a single score. Thresholds for each of these four factors were set to identify levels at which ecosystem integrity would be lost. Ecosystems for which any factor exceeded a threshold was given the highest cost index found in that EDU. We revised the landuse variable to weight different types of non-natural landuse in the calculation (e.g., urban vs. logged). Our preliminary list of thresholds to lock out systems included the following:

- occurrences with greater than 50% non-native presence
- occurrences with dams having storage capacity > 500 cfs or > 2 dams
- occurrences with > 2 point source facilities (US only) – NPDES, RCRA, TRI, CERCLA
- occurrences falling in the lowest 1/3 of the viability index measuring land use and road density

Step 4 - Meet conservation goals: creating the portfolio

This step has two parts – the first is to set conservation goals for each of the targets and the second is to design a portfolio of sites that meets these goals. The purpose of setting conservation goals for each target is to capture the variability in the target as it occurs across the ecoregion. Choosing the goal for the number of occurrences can be based on the abundance and distribution of each target, stratified by ecological drainage units.

CONSERVATION GOALS

Species Targets

Generally, we work with the assumption that the conservation of multiple examples of each aquatic species target stratified across its geographic range is necessary to capture the variability of the target and its environment and to provide replication to insure persistence in the face of environmental stochasticity and the likely effects of climate change (TNC 2000).

In the CRM, we set conservation goals for each target according to its distribution within the ecoregion and it spatial pattern of occurrence as follows (adapted from P. Comer TNC, pers. comm.):

Initial Ecoregional Conservation Goals for Species

Spatial Pattern	Regional[§]	Coarse[β]	Intermediate[ψ]	Local*
Stratification / **Distribution**	**ecoregion cluster**	**section cluster**	**section**	**subsection**
Endemic	Case-by-case, defining core and connecting habitat components	10	18	25
Limited		5	9	13
Disjunct		5	9	13
Widespread		3	5	7
Peripheral		1	2	3

[§] Target-by-target, range wide (multi-ecoregional) goals are often required. Targets represented within each ecoregion by "potentially occupied" core and connecting habitat components.
[β] Ecoregional goals stratified by USFS Section/Ecological Drainage Unit, or by clusters of 2-3 USFS Sections/Ecological Drainage Units. Targets represented by "known occupied habitat."
[ψ] Ecoregional goals stratified by USFS Section/Ecological Drainage Unit. Targets represented by "known occupied habitat."
* Separation Distance for each target occurrence must be specified. An initial assumption of 10 km may be applied if lacking sufficient life history information. Many naturally rare and endemic G1-G2 species may have historically occurred with fewer than 25 populations. In these cases, the goal is 'all potentially viable occurrences up to 25.'

Goals for salmonids and other wide-ranging fishes should follow those adopted by responsible state/provincial/federal agencies, where identified. We set an initial starting goal for salmonids at 30% of existing occurrences, to which additional habitat and populations were added through expert review. Additional review is required for each salmonid to ensure connectivity between life history stages, especially outside of the ecoregional boundaries.

Details for each species targets are shown below:

COMMON NAME	GRANK	DISTRIBUTION	SCALE	GOALCAT	SECTGOAL	ECOGOAL
WHITE STURGEON - KOOTENAI RIVER	G4T1Q	Limited	Local		2	13
WHITE STURGEON - COLUMBIA RIVER	G4T?Q	Limited	Local		2	13
WESTSLOPE CUTTHROAT TROUT	T3	Widespread	Linear		2	7
Inland Redband Trout	G5T4	Widespread	Linear		2	7
GIANT PYGMY WHITEFISH	G5	Limited	Local		2	13
BULL TROUT	G3	Widespread	Linear		2	7
SPECKLED DACE	G5	Limited	Local		2	13
UMATILLA DACE	G4	Limited	Local		2	13
A CAVE OBLIGATE ISOPOD	G1	Endemic	Local		2	25
aquatic cave isopod	G2G3	Limited	Local		2	13
A DAMSELFLY	G2	Limited	Local		2	13
MELTWATER LEDNIAN STONEFLY	G1	Endemic	Local		2	25
WESTERN GLACIER STONEFLY	G2	Limited	Local		2	13
A CADDISFLY	G1	Endemic	Local		2	25
A RHYACOPHILAN CADDISFLY	G1	Endemic	Local		2	25
ROCKY MOUNTAIN CAPSHELL	G1	Endemic	Local		2	25
FLATHEAD PONDSNAIL	G1	Endemic	Local		2	25
LONGMOUTH PONDSNAIL	G1	Endemic	Local		2	25
STRIATE PHYSA	G3	Limited	Local		2	13
PINK SALMON - UPPER FRASER		Widespread	Linear	30%		
COHO SALMON - UPPER FRASER		Widespread	Linear	50%		
SOCKEYE SALMON - UPPER FRASER		Widespread	Linear	30%		
CHINOOK SALMON - UPPER FRASER		Widespread	Linear	30%		
STEELHEAD		Widespread	Linear	30%		

Ecosystem Targets

Freshwater ecosystems occur over a range of spatial scales and exhibit great variety in their abundance and distribution across an ecoregion. The target types can either be common and widespread, or rare, depending on the ecological features and processes that determine their types and distributions. For instance, in EDUs dominated by lake plain geomorphology, there are low-gradient, warm, surface-runoff headwaters. These headwaters are common and widely distributed. There can also be isolated examples of spring-fed headwaters. These are less common and not widely distributed. As the target gets larger in spatial scale, the type becomes increasingly rare within each EDU.

Conservation goals for each ecosystem type should be based on its distribution, relative abundance, size, condition, and susceptibility to threats and stochastic processes. Our minimum goal is to capture examples of aquatic ecosystems across their ecological and geographic range. Since aquatic ecosystems tend to be large, and there are generally only a few occurrences of each type within each EDU, an initial goal may be to conserve one example of each type within each EDU.

Within the EDUs in the CRM, we opted to use 30% of the potential occurrences mapped in the classification as the preliminary goal for all freshwater systems. This percentage reflects an initial number based on Dobson (1996) and Comer (pers. comm.). It should be noted that the 30% goal refers to the number of total occurrences in an EDU, and not a portion of an occurrence. Therefore, a unique occurrence of a large river system in an EDU would require selection of that *entire* system in order to meet the 30% goal.

The actual selection of specific aquatic ecosystems involves taking a landscape perspective addressed during the portfolio design. The viability of biological communities associated with a given aquatic ecological system is often dependent on linkages to other aquatic ecosystems. This does not necessarily mean that we need to designate entire watersheds as portfolio sites. The spatial extent of the sites will be decided in the subsequent site conservation planning process. However, we should have as a goal to select aquatic ecosystems that maintain a high level of internal connectivity and connectivity to other aquatic ecosystems within the larger drainage network.

Step 5: Design the portfolio

The preferred approach to design a portfolio and priority conservation sites is to choose representative sites that conserve aquatic targets in tandem with terrestrial targets. Alternatively, this can be a separate step from terrestrial targets, or can be completed after terrestrial sites have already been selected.

We followed Groves et al. (2000) for the main criteria to select portfolio sites. These criteria are: coarse scale focus; representative-ness (multiple examples of all targets across environmental gradients); efficiency (system or site has multiple targets); integration (has terrestrial, marine, and freshwater targets); functionality (natural range of variability is present or restorable); and completeness (captures all the targets). To meet these criteria, we relied on a spatially explicit computer optimization program – SITES (Possingham et al. 1999) -- to generate draft portfolios. The SITES model allows the combination of conservation targets (species and ecosystems), spatially referenced occurrences of those targets, viability ranking of those occurrences (using Heritage and CDC data, GIS analysis, suitability indices, and other data sets), and goals for each target (how many occurrences of each target to capture). The intent of the using the program is to “encourage” the computer program to pick those places that have higher viability for the biodiversity while meeting goals, as well as to select occurrences contiguous to one another to form a watershed-based portfolio.

Output from the model, which is provided as a set of watersheds representing different species and ecosystem occurrences, is not meant to supplant good biological information and common sense. Rather, it serves as a starting point for expert review, discussion, and revision. Key questions for review of the planning effort include:

- are there missing or unwarranted targets (including a critical review of the ecosystem classification)?
- are there more appropriate conservation goals to set for the targets?
- are strong populations of salmonids identified, and are these areas well connected to other habitats (both within and outside of the ecoregion) to ensure that full life history requirements can be met?
- are we missing any areas that you know of that are critical for conserving freshwater biodiversity? what biodiversity exists in these places that is not captured in the draft portfolio, and is it viable?
- have we identified any areas where the freshwater biodiversity is not viable, and if so, are there other places that might replace those (i.e., have similar ecosystems, and/or species that are viable)?
- are the data being used the most up-to-date and at the finest resolution?

The ecoregional planning process is inherently iterative and dynamic in nature; as new data become available and ecological conditions change in the ecoregion, the portfolio must change to reflect these and ensure conservation happens with the best available knowledge.

References

Abell, R. et al. 2000. Freshwater Ecoregions of North America: a conservation assessment. World Wildlife Fund – US, Island Press, Washington, DC. 319pp.

Angermeier, P. L., and I. J. Schlosser. Conserving aquatic biodiversity: Beyond species and populations. American Fisheries Society symposium 17: 911-927. 1995.

Haas, G. 1998. Indigenous fish species potentially at risk in British Columbia, with recommendations and prioritizations for conservation, forestry/resource use, inventory and research. British Columbia, Ministry of Fisheries, Fisheries Management Report No. 105.

Lammert, M., J.V. Higgins, D. Grossman, and M. Bryer. 1997. A classification framework for freshwater communities: Proceedings of The Nature Conservancy's Aquatic Community Classification Workshop. The Nature Conservancy, Arlington, VA.

Hocutt, C.H., and E.O. Wiley, eds. 1986. The Zoogeography of North American Freshwater Fishes. John Wiley and Sons, New York. 866 p.

MacPhail, J. and R. Carveth. 1994. Field Key to the Freshwater Fishes of British Columbia. Draft for 1994 field testing. Fish Museum, Department of Zoology, University of British Columbia. http://www.for.gov. bc.ca/ric.

Mayhood, D. 1995. The fishes of the Central Canadian Rockies Ecosystem. Freshwater Research Limited Report No. 950408 prepared for Parks Canada, Banff National Park. 59pp.

Maxwell, J.R., C.J. Edwards, M.E. Jensen, S.J. Paustian, H. Parrott, and D.M. Hill. 1995. A Hierarchical Framework of Aquatic Ecological Units in North America (Nearctic Zone). U.S. Forest Service, North Central Forest Experimental Station, General Technical Report NC-176. 72pp.

Woods, A.J., J. M. Omernik, J.A. Nesser, J. Shelden, S.H. Azevedo. 1999. Ecoregions of Montana (color poster with map, descriptive text, summary tables, and phtotgraphs): Reston, VA, US Geological Survey (map scale 1:1,500,000).

APPENDIX 5.0 AQUATIC SYSTEMS DESCRIPTIONS

AQUATIC ECOSYSTEMS IN THE CANADIAN ROCKY MOUNTAINS ECOREGION

The aquatic ecosystems are described by Ecological Drainage Unit (EDU) as follows:

Palouse (6_1) EDU ecosystems (note: the entire EDU has not been classified)

Creek/stream watershed system types - 4 types:

151 – fine sediment watersheds – foothill elevations, moderate gradients
204 – granitic watersheds – montane elevations, steep gradients
205 – carbonate watersheds – montane elevations, steep gradients
273 – volcanic watersheds – foothill elevations, moderate gradients
(few lakes throughout all types)

Small river systems – 3 types

3 – river in fine sediments – foothills, moderate and low gradients
7 – rivers with volcanic influence - foothills, moderate and low gradients
8 – rivers with carbonate influence – montane river in Bitterroot, moderate and low gradients

Medium river systems – 1 type

1 – mainstem Palouse River/Rock Creek – foothills, medium river in loess, moderate and low gradients

Milk-Marias-Sun (7_1) EDU ecosystems

Creek/stream watershed system types - 9 types:

1 – glacial till watersheds
  1.1 – subalpine/montane elevations, steep gradients
  1.2 – foothill elevations, moderate gradients
10 – slate/shale watersheds
  10.1 – subalpine/montane elevations, steep to moderate gradients
  10.2 – subalpine to foothills elevations, steep to moderate gradients
  10.3 – foothills elevations, moderate gradients
11 – sandstone watersheds
  11.1 – alpine and subalpine elevations, steep gradients, headwaters, few lakes
  11.2 – subalpine to foothill elevations, steep to low gradients, river tributaries, few lakes
204 – granitic watersheds – alpine and subalpine elevations, steep and moderate gradients, headwaters at continental divide, no lakes

205 – carbonate watersheds – alpine and subalpine elevations, moderate and steep gradients, headwaters at continental divide, few lakes

Small river systems – 5 types (low and moderate gradients)

1 – rivers in glacial till
- 1.1 - montane elevations
- 1.2 – mostly foothills. mixture with till.

5 – rivers with sedimentary influence
- 5.1 – montane elevations
- 5.2 – mostly foothills. mixture with till.

8 – rivers with carbonate influence – mixture of glacial till/shale also. flowing east from divide.

Medium river systems – 2 types

1 -- rivers in glacial till – Sun

2 – rivers in shale – Teton, Birch, Milk

<u>Middle Fraser (Quesnel) EDU ecosystems (7_2) (note: the entire EDU has not been classified)</u>

- Note Quesnel Lake and Horsefly Lake are very large lakes in the EDU, which are unique features.

Creek/stream watershed system types - 9 types: (note: lakes present throughout all types, except for types 10 and 204).

1 – glacial till watersheds
- 1.1 – mid elevations, moderate and low gradients; Fraser basin/Plateau
- 1.2 - highest and high elevations, steep gradients; Columbia highlands/mountains

10 – slate/shale watersheds – mostly high to mid elevations; steep gradients, Columbia highlands

11 – sandstone watersheds – high to mid elevations; moderate and steep gradients, Columbia highlands

20 – watersheds with glaciers present – highest to mid elevations; steep gradients; glacial till throughout watersheds; headwaters in Northern Columbia mountains.

55 – coarse outwash watersheds – low to moderate gradients; mid elevation; small and mid-size river connectivity

151 – fine sediment watersheds – low to moderate gradients; mid elevation; small and mid-size river connectivity

204 – granitic watersheds - high to mid elevations; mostly steep gradients, Columbia highlands

205 – carbonate watersheds - moderate gradients; mid elevation; small river connectivity

Small river systems – 5 types

1 – rivers in glacial till – mid elevations, low gradients, mostly outside of ecoregion
2 – rivers with glacial influence – highest elevation, moderate gradients in Northern Columbia Mountains
4 – rivers with granitic influence – high to mid elevations, moderate gradients in Columbia highland
5 – rivers with sedimentary influence - high to mid elevations, moderate gradients in Columbia highlands
6 – large lake – Horsefly Lake

Medium river systems – 2 types

1 - rivers in glacial till – Columbia highlands/mountains (note presence of Quesnel Lake)
2 – rivers in glacial till - Fraser basin/plateau

Large river systems – 1 type

1 – mainstem Quesnel River

Columbia – Kootenay headwaters (7_3) EDU ecosystems

Creek/stream watershed system types - 16 types:

1 – glacial till watersheds
- 1.1 – Columbia headwaters, Northern Columbia Ranges, subalpine/montane elevations, very steep gradients, few small lakes
- 1.2 – Columbia headwaters, Western Continental Ranges, subalpine/montane elevations, very steep gradients, few small lakes
- 1.3 – Columbia headwaters, Rocky Mountain trench large lake/river connected, montane elevations, steep gradients
- 1.4 – Columbia headwaters, Purcell transitional ranges, subalpine/montane elevations, very steep gradients
- 1.5 – Kootenay drainage, Purcell/Columbia Ranges, alpine to montane elevations, very steep gradients, small lakes
- 1.6 – Kootenay drainage, Western/Northern Continental Ranges, subalpine/montane elevations, very steep gradients, small lakes
- 1.7 – Kootenay drainage, Southern Rocky Mountain trench (dammed Lake Koocanusa) connected, montane elevations, steep and moderate gradients, small lakes

10 – slate/shale watersheds– lower Kootenay basin, steep gradients, few lakes
- 10.1 – subalpine elevations
- 10.2 - montane elevations

20 – watersheds with glaciers present

20.1 – Northern Columbia Ranges, alpine elevations, very steep gradients, small lakes
20.2 – Western Continental Ranges, alpine elevations, very steep gradients, small lakes
20.4 - Purcell transitional ranges, alpine elevations, very steep gradients, small lakes

151 – fine sediment watersheds – montane elevations, moderate gradients, and large river connectivity

204 – granitic watersheds – subalpine to montane elevations, steep to moderate gradients, few lakes

205 – carbonate watersheds – lower Kootenay basin, steep gradients, few lakes
205.1 – subalpine elevations
205.2 - montane elevations

273 – volcanic watersheds – subalpine/montane elevations, steep to moderate gradients

Small river systems – 12 types

1 – rivers in glacial till – river valleys in montane elevations with moderate gradients
1.1 – Columbia headwaters, Northern Columbia Ranges
1.2 – Columbia headwaters, Western Continental Ranges
1.3 – Columbia headwaters, Purcell transitional ranges
1.4 – Kootenay drainage, Purcell/Columbia Ranges
1.5 – Kootenay drainage, Western/Northern Continental Ranges
1.6 – Kootenay drainage, lower basin

2 – rivers with glacial influence
2.1 – Northern Columbia Ranges
2.2 – Western Continental Ranges

4 – rivers with granitic influence - river valleys in montane elevations with moderate gradients, connected to lower Kootenay

5 – rivers with sedimentary influence - river valleys in montane elevations with moderate gradients, connected to Kootenay

7 – rivers with volcanic influence – river valley in montane elevations with moderate gradients, connected to lower Kootenay

8 – rivers with carbonate influence – river valleys in montane elevations with moderate gradients, connected to lower Kootenay

Medium river systems – 5 types

1 - rivers in glacial till –
1.1 Columbia headwater reach and major tribs
1.2 Canoe reach and downstream trib (Downie)
1.3 Kootenay headwater reach
1.4 Kootenay major tribs (e.g., Elk, Bull, Goat)

2 – rivers with sedimentary influence – lower Kootenay basin (Voyie, Yaak, Fisher)

Large river systems – 2 types

1 - rivers in glacial till –
- 1.1 – Columbia mainstem
- 1.2 – Kootenay mainstem

Clark Fork - Flathead (7_4) EDU ecosystems

Creek/stream watershed system types - 18 types:

1 – glacial till watersheds
- 1.1 – Spokane tribs, montane/foothill elevations, moderate gradients, large river connectivity
- 1.2 – N., M., S. Forks Flathead, Swan tribs, subalpine to montane elevations, very steep gradients
- 1.3 – Flathead valley tribs - moderate gradients, montane/foothill elevations
- 1.4 – Clark Fork tribs – steep gradients, mostly montane elevations, large river connectivity

10 – slate/shale watersheds - few lakes present
- 10.1 – Coeur d'Alene/St. Joe/St Maries tribs, montane elevations, steep gradients
- 10.2 – N., M., S. Forks Flathead, Swan tribs, subalpine to montane elevations, very steep gradients
- 10.3 – western Flathead valley tribs - steep gradients, montane/foothill elevations
- 10.4 – Clark Fork tribs – steep gradients, mostly montane elevations, large river connectivity

11 – sandstone watersheds
- 11.1 – M. Fk. Flathead, subalpine elevations, steep gradients
- 11.2 - Spokane drainage, montane elevations, steep gradients, some connected to Coeur d'Alene

151 – fine sediment watersheds
- 151.1 – Flathead valley, foothill elevations, low gradients
- 151.2 – Spokane valley, foothill/montane elevations, low/moderate gradients

204 – granitic watersheds - Upper Flathead, subalpine elevations, steep gradients, small lakes

205 – carbonate watersheds –
- 205.1 – Coeur d'Alene/St. Joe/St Maries tribs, montane elevations, steep gradients
- 205.2 – N., M., S. Forks Flathead, Swan tribs, subalpine to montane elevations, very steep gradients, small lakes are prevalent throughout type
- 205.3 – Flathead Lake tribs - steep gradients, subalpine elevations
- 205.4 – Whitefish tribs - steep gradients, subalpine to montane elevations
- 205.5 – Clark Fork tribs – steep gradients, mostly montane elevations, large river connectivity, small lakes present

273 – volcanic watersheds – Spokane tribs, montane elevations in ecoregion, foothills to the west, moderate gradients, large river connectivity

Small river systems – 12 types

3 – rivers in fine sediments – montane and foothill elevations, low gradients
- 3.1 – Spokane valley
- 3.3 – Flathead valley

4 – rivers with granitic influence - river valleys in montane elevations with moderate gradients in the Upper Flathead drainages. Note: lakes present!

5 – rivers with sedimentary influence - river valleys with moderate gradients
- 5.1 - Coeur d'Alene/St. Joe/St Maries
- 5.2 - N., M., S. Forks Flathead
- 5.3 – Flathead valley
- 5.4 – Clark Fork tribs

7 – rivers with volcanic influence – rivers in Spokane valley foothills with low gradients

8 – rivers with carbonate influence – river valleys in montane elevations with moderate gradients
- 8.1 - Coeur d'Alene/St. Joe/St Maries
- 8.2 - N., M., S. Forks Flathead – note lakes present on east side of North Fork
- 8.3 – Flathead valley
- 8.4 – Clark Fork tribs

Medium river systems – 5 types

3 – rivers in fine sediments – Hangman

5 – rivers with sedimentary influence
- 5.2 - M. and S. Forks Flathead
- 5.4 – Clark Fork (Bitterroot to Flathead)

8 – rivers with carbonate influence
- 8.1 – Coeur d'Alene/St. Joe – note: Coeur d'Alene Lake
- 8.2 - N. Fork Flathead, Swan, Whitefish

Large river systems – 3 types

1 – carbonate influenced
- 1.1 Spokane River (Coeur d'Alene Lake to confluence with Snake)
- 1.2 Flathead River and Lake (Flathead Lake to confluence with Clark Fork)

2 – sedimentary influenced – Clark Fork (from Flathead to Pend Oreille Lake)

<u>Upper Fraser EDU ecosystems (7_5) (note: the entire EDU has not been classified)</u>

Creek/stream watershed system types - 17 types:

[Start with 10 clusters. Divide types for geologic consistency, then for elevation, then for gradient, and finally for connectivity. Keep an eye on subsections to pick up differences in climate.]

1 – glacial till watersheds

1.1 – Rocky mountain trench – high to mid elevations; large river connectivity

1.2 – Fraser basin – mid elevation; moderate gradients; large river connectivity

1.3 - western continental ranges; central Canadian Rockies; highest to mid elevations; steep gradients; small river connectivity

1.4 – northern Columbia mountains and highlands; highest to mid elevations; steep gradients; mostly small river connectivity

10 – slate/shale watersheds

10.1 – Rocky Mountain trench, mid elevation, large river connectivity; steep gradients

10.2 – Columbia highlands and mountains; high to mid elevation, small river connectivity; steep gradients

10.3 – Western continental range and Central Rockies; high to mid elevation, small river connectivity; steep gradients

11 – sandstone watersheds – high to mid elevation progression; steep gradients; a few headwater lakes present; mostly throughout the western continental ranges

20 – watersheds with glaciers present – highest elevation to mid elevation progression; steep gradients; small river connectivity; most have lakes in headwaters

20.1 – northern Columbia mountains

20.2 – western continental ranges; central Canadian Rockies

55 – coarse outwash watersheds – mid elevations; mostly low gradients; large river connectivity; few lakes present

151 – fine sediment watersheds – mostly mid elevation, Fraser basin and Rocky Mountain trench; large river connectivity

204 – granitic watersheds

204.1 - Columbia highlands and mountains, high and mid elevations, steep gradients

204.2 – Rocky Mountain trench, lower elevations, large river connectivity

204.3 - western continental ranges; central Canadian Rockies

205 – carbonate watersheds – high to mid elevation progression; mostly steep gradients; river connectivity

273 – volcanic watersheds – high to mid elevation progression; mostly steep gradients; river connectivity; mostly in Columbia highlands

Small river systems – 6 types

1 – rivers in glacial till –

1.1 - western continental ranges; central Canadian Rockies; high elevations; moderate gradients

1.2 – Columbia Mountains; high to mid elevations; moderate gradients

1.3 – rivers in Columbia Mountains with igneous bedrock influence; high to mid elevations; moderate gradients

1.4 – Columbia highlands and Fraser basin; mid elevation; low gradients

2 – rivers with glacial influence; highest elevations; moderate gradients

3 – river in fine sediments; mid elevations; moderate to low gradients

Medium river systems – 2 types

1 - rivers in glacial till --

1.1 - western continental ranges and central Canadian Rockies; mid elevations and low gradients

1.2 - Columbia highlands and mountains; mid elevations and low gradients

Large river systems – 1 type

1 – mainstem Fraser; mid elevations and low gradients

<u>Thompson (7_6) EDU ecosystems (note: the entire EDU has not been classified)</u>

Creek/stream watershed system types - 13 types:

1 – glacial till watersheds

1.1 – Northern Columbia Mtns., alpine to montane elevations, very steep gradients, small lakes throughout

1.2 – Columbia highlands, mostly subalpine elevations, steep gradients, small lakes present

1.3 – Fraser basin, montane to foothill elevations, moderate gradients, small lakes

10 – slate/shale watersheds

10.1 – subalpine to montane elevations, steep gradients, Columbia highlands

10.2 – foothill and montane elevations, moderate and steep gradients, Fraser basin

11 – sandstone watersheds – montane and subalpine elevations, wide range of gradients, small lakes throughout, on border of Fraser basin and Columbia highlands

20 – glacial till watersheds with glaciers present – subalpine/alpine elevations, very steep gradients, some small lakes in Northern Columbia Mountains

55 – coarse outwash watersheds – mostly montane elevations, moderate gradients, few lakes present, Fraser basin and Columbia highlands

151 – fine sediment watersheds – montane elevations, moderate and steep gradients, few lakes present, Fraser basin

204 – granitic watersheds –

204.1 – Columbia highlands, subalpine elevations, steep gradients, small lakes throughout

204.2 – Fraser basin, montane and foothill elevations, moderate/low gradients, small lakes throughout

205 – carbonate watersheds – Columbia highlands and Fraser basin, subalpine to montane elevations, moderate gradients, and few lakes present

273 – volcanic watersheds – Fraser basin, montane elevations, steep to moderate gradients, small lakes throughout

Small river systems – 6 types

1 – rivers in glacial till –
    1.1 – N. Columbia Mountains, many influenced by glaciers, river valleys in montane elevations with moderate gradients, large lakes present in the north
    1.2 – Columbia highlands - river valleys in montane elevations with moderate gradients
    1.3 - Fraser basin - river valleys in montane/foothill elevations with moderate gradients
4 – rivers with granitic influence – Columbia highlands, river valleys in montane elevations with moderate gradients
7 – rivers with volcanic influence – Fraser basin, montane/foothill elevations, moderate/low gradients
8 – rivers with carbonate influence – Fraser basin, montane/foothill elevations, moderate/low gradients

Medium river systems – 1 type

1 - rivers in glacial till – general progression of rivers from Northern Columbia mountains/highlands (alpine/subalpine elevations) to Fraser basin (foothill elevations), moderate to low gradients, some small areas of granitic influence. Large lakes (Canim, Mahood, Azure, Murtle) present in many examples – should capture these features.

Large river systems – 1 type

1 – river in glacial till – mainstem Clearwater/N. Thompson River

Upper South Saskatchewan – Red Deer – Bow (7_7) EDU ecosystems
Note: We did not have digital bedrock geology data for Alberta, so we used paper maps which indicated that the ecoregion is entirely sedimentary rock, predominantly limestone with significant regions of dolomite, shale, argillite, and slate in the CRM, with primarily sandstone in the foothills.

Creek/stream watershed system types - 10 types:

1 – glacial till dominated watersheds, with bedrock (limestone and shale in mountains, sandstone in foothills)
    1.1 – eastern Continental ranges; alpine/subalpine watersheds; very steep to moderate gradients; lakes occasionally present
    1.2 - western Continental ranges; alpine/subalpine watersheds; very steep to moderate gradients; lakes occasionally present
    1.3 – North Continental divide region; alpine/subalpine watersheds; very steep to moderate gradients; lakes occasionally present
    1.4 - North Continental divide region; montane/foothill watersheds; mostly moderate gradients; lakes occasionally present

1.5 – northern foothill watersheds; moderate and low gradients; lakes occasionally present
1.6 - southern foothill watersheds; moderate and low gradients; lakes occasionally present

55 – coarse outwash dominated watersheds – montane elevations, low gradients

99 – bedrock dominated watersheds – mix bedrock (primarily sandstone) with some till
99.1 – northern foothills – montane elevations; mostly low gradients; lakes occasionally present
99.2 – foothills – foothill elevations; low and moderate gradients; lakes occasionally present

151 – fine sediment dominated watersheds in foothills – montane elevations, low gradients

Small river systems – 5 types

1 – rivers in glacial till/bedrock complex – river valleys with moderate/low gradients
1.1 – western and eastern continental ranges – subalpine and montane elevations
1.2 – northern divide range – subalpine and montane elevations
1.3 – northern foothills – montane and foothill elevations
1.4 – southern foothills – foothill elevations

2 – rivers in coarse outwash sediments

Medium river systems – 2 types

1 - rivers in glacial till/bedrock – river valleys with low gradients
1.1 – primarily in northern continental ranges – Bow River
1.2 – headwaters in northern range - Red Deer, Highwood
1.3 - headwaters in northern foothills – Little Red Deer, Elbow, Sheep
1.4 – headwaters in southern range – Oldman, Castle, Willow Creek, Waterton, St. Mary
1.5 – headwaters in southern foothills – Little Bow, Belly

Large river systems – 2 types

1.1 – northern large river in glacial till/bedrock – Bow River
1.2 – southern large river in glacial till/bedrock – Oldman River

Upper North Saskatchewan (7_8) EDU ecosystems

Note: We did not have digital bedrock geology data for Alberta, so we used paper maps which indicated that the ecoregion is entirely sedimentary rock, predominantly limestone with significant regions of dolomite, shale, argillite, and slate in the CRM, with primarily sandstone in the foothills.

Creek/stream watershed system types - 8 types:

1 – glacial till watersheds, with some bedrock (shale/limestone in mountains, sandstone in foothills)

    1.1 – Continental ranges; alpine/subalpine watersheds; very steep to moderate gradients; lakes occasionally present
    1.2 -- foothills –- montane elevation; moderate and low gradients

20 – watersheds with glaciers present

    20.1 – Western Continental ranges, glaciers present with glacial till and bedrock, alpine and subalpine elevations, steep gradients, lakes present
    20.2 – Eastern Continental ranges, glaciers present with glacial till and bedrock, alpine and subalpine elevations, steep gradients, lakes present

55 – coarse outwash dominated watersheds – montane elevations, low gradients

99 – bedrock dominated watersheds – mix of till and bedrock (primarily limestone and shale in mountains, sandstone in foothills)

    99.1 – Continental ranges – moderate and steep gradients, alpine to montane elevations
    99.2 - foothills – montane elevations; wide-range of gradients (low to steep) and elevations
    99.3 – foothills – montane elevations; low and moderate gradients

151 – fine sediment dominated watersheds in foothills – montane elevations, low gradients

Small river systems – 3 types

1 – rivers in glacial till/bedrock complex – river valleys with moderate/low gradients

    1.1 – continental ranges – subalpine and montane elevations
    1.2 – foothills - montane elevations

2 – rivers with glacial influence

Medium river systems – 2 types

1 - rivers in glacial till/bedrock – river valleys with low gradients at low elevations

    1.1 – originating in continental ranges – Brazeau, Blackstone, N. Saskatchewan, Ram, Clearwater
    1.2 - originating in foothills – Nordegg, Baptiste

Large river systems – 1 type

1 – large river in glacial till/bedrock – North Saskatchewan; foothills; low gradient

Great Lakes/Columbia Mountains (7_9) EDU ecosystems

Creek/stream watershed system types - 10 types:

1 – glacial till watersheds – steep gradients and small lakes throughout
 1.1 – N. Columbia Mountains, alpine to montane elevations
 1.2 – N. Columbia Mountains, subalpine to montane elevations, many connected to large lakes/rivers
 1.3 – Selkirk/Bitterroot foothills, montane elevations
10 – slate/shale watersheds – montane elevations, steep gradients, very few lakes
11 – sandstone watersheds - montane elevations, steep gradients, no lakes
20 – watersheds with glaciers present – N. Columbia Mountains, alpine to montane elevations, steep gradients, small lakes
204 – granitic watersheds – subalpine and montane elevations, steep gradients, mostly connected to large lake/river connected
 204.1 – N. Columbia Mountains
 204.2 – Selkirk/Bitterroot foothills
205 – carbonate watersheds – montane elevations, steep gradients, few small lakes, mostly connected to large rivers/lakes
273 – volcanic watersheds -- montane elevations, steep gradients, few small lakes, mostly connected to large rivers/lakes

Small river systems – 5 types

1 – rivers in glacial till – river valleys in montane elevations with moderate gradients
 1.1 – N. Columbia Mountains
 1.2 – Selkirk/Bitterroot foothills
2 – rivers with glacial influence - montane elevations with moderate gradients
4 – rivers with granitic influence – river valleys in montane elevations with moderate gradients
5 – rivers with sedimentary influence - river valleys in montane elevations with moderate gradients
7 – rivers with volcanic influence – river valleys in montane elevations with moderate gradients

Medium river systems – 2 types

1 - rivers in glacial till – large lakes (some dammed) are a major feature of these systems
2 – rivers in a mix of glacial till, granite, and carbonate – Pend Oreille R., includes large lakes (Priest and Pend Oreille)

Large river systems – 1 type

1 – mainstem Columbia

<u>Smoky - Upper Athabasca (7_10) EDU ecosystems</u>

Note: We did not have digital bedrock geology data for Alberta, so we used paper maps which indicated that the ecoregion is entirely sedimentary rock, predominantly limestone with significant regions of dolomite, shale, argillite, and slate in the CRM, with primarily sandstone in the foothills.

Creek/stream watershed system types - 17 types:

1 – glacial till watersheds, with areas of exposed bedrock (mostly shale and limestone in mountains, sandstone in foothills)

> 1.1 - southern Continental range; alpine/subalpine watersheds; very steep to moderate gradients; lakes occasionally present (Athabasca headwaters)
> 1.2 – northern Continental range; alpine/subalpine watersheds; very steep to moderate gradients; lakes occasionally present (Smoky headwaters)
> 1.3 – southern transition (Athabasca tribs) - subalpine/montane elevations; steep to moderate gradients
> 1.4 – northern transition (Smoky tribs) - subalpine/montane elevations; steep to moderate gradients
> 1.5 – southern foothills – montane elevations; wide-range of gradients (low to steep)
> 1.6 – northern foothills – montane elevations; wide-range of gradients (low to steep)

20 – watersheds with glaciers present

> 20.1 – Western Continental ranges, glaciers present with glacial till and bedrock, alpine and subalpine elevations, steep gradients, lakes common (Athabasca headwaters)
> 20.2 – Eastern Continental ranges, glaciers present with glacial till and bedrock, alpine and subalpine elevations, steep gradients, lakes common (Smoky/Wapiti headwaters)

55 – coarse outwash dominated watersheds – montane elevations, wide-range of gradients (low to steep)

> 55.1 – southern foothills
> 55.2 - northern foothills

99 – bedrock dominated watersheds – mix of till and bedrock (primarily limestone and shale)

> 99.1 – southern Continental ranges (Athabasca headwaters) – alpine/subalpine elevations, steep to moderate gradients, few lakes present

99.2 – northern Continental ranges (Smoky headwaters) – alpine/subalpine elevations, steep to moderate gradients, few lakes present
99.3 – southern transition (Athabasca tribs) - subalpine/montane elevations; steep to moderate gradients
99.4 - northern transition (Smoky tribs) – subalpine/montane elevations; steep to moderate gradients
99.5 – southern foothills – montane elevations; wide-range of gradients (low to steep)
99.6 – northern foothills – montane elevations; wide-range of gradients (low to steep)

151 – fine sediment dominated watersheds in southern foothills – montane elevations, low gradients

Small river systems – 6 types

1 – rivers in glacial till/bedrock complex – river valleys with moderate/low gradients
1.1 – northern ranges – subalpine and montane elevations
1.2 – southern ranges – subalpine and montane elevations
1.3 – northern foothills – montane elevations
1.4 – southern foothills – montane elevations

2 – rivers with glacial influence

3 – rivers in fine sediments

Medium river systems – 4 types

1 - rivers in glacial till/bedrock – river valleys with low gradients at low elevations
1.1 – originating in northern ranges – Kakwa, Smoky
1.2 - originating in northern foothills – Wapiti, Narraway, Nose, Cutbank
1.3 – originating in southern ranges – Snake Indian, Athabasca, Rocky
1.4 - originating in southern foothills – Berland, Wildhay, McLeod, Erith

Large river systems – 2 types

1.1 – northern large river in glacial till/bedrock – Smoky River
1.2 – southern large river in glacial till/bedrock – Athabasca River

Clearwater (8 3) EDU ecosystems

Creek/stream watershed system types - types:

10 – slate/shale watersheds – subalpine/montane elevations, steep to moderate gradients, headwaters

11 – sandstone watersheds
11.1 – N. Fork Clearwater, montane elevations, steep gradients, many connected to Dworshak reservoir
11.2 – Lochsa, subalpine elevations, steep gradients, headwaters
11.3 – Middle and South Fork, montane elevations, steep gradients, many connected to rivers
151 – fine sediment watersheds – moderate and steep gradients, no lakes
151.1 – montane elevations
151.2 – foothills elevations, large river connections
204 – granitic watersheds
204.1 – Potlatch R. tribs, montane elevations, steep to moderate gradients
204.2 – N., M. and S. Fork tribs., montane elevations, steep gradients
204.3 -- N., M. and S. Fork tribs., subalpine to montane elevations, steep gradients, some lakes present
205 – carbonate watersheds – subalpine and montane elevations, steep gradients, very few lakes, and headwaters
273 – volcanic watersheds – montane elevations, moderate to low gradients

Small river systems – 7 types

3 – river in fine sediments – foothills, moderate and low gradients
4 – rivers with granitic influence - river valleys in montane elevations with moderate gradients
4.1 - in montane elevations
4.2 – with subalpine influence
5 – rivers with sedimentary influence - river valleys with moderate gradients
5.1 - in montane elevations
5.2 – with subalpine influence
7 – rivers with volcanic influence – river valleys in at mostly montane elevations with moderate gradients
8 – rivers with carbonate influence – river valleys in montane elevations with moderate gradients

Medium river systems – 4 types

1 - rivers with granitic influence – Lochsa/Middle Fork
2 – rivers with sedimentary influence
2.1 – plus granitic influence (Bitterroot ecoregion) – note large dam in this example
2.2 - Middle Rockies influence
3 – river in fine sediments - Potlatch

Large river systems – 1 type

1 – mainstem Clearwater to confluence with Snake

Southern Okanagan (68_1) EDU ecosystems (note: the entire EDU has not been classified)

Creek/stream watershed system types - 10 types:

1 – glacial till watersheds – small lakes throughout
1.1 -- subalpine and montane elevations, steep to moderate gradients, headwater
1.2 – montane and foothill elevations, steep to moderate gradients, larger river connected
10 – slate/shale watersheds – few lakes present
10.1 -- subalpine and montane elevations, steep to moderate gradients
10.2 – montane and foothill elevations, steep to moderate gradients
11 – sandstone watersheds – montane elevations, steep and moderate gradients, few lakes
151 – fine sediment watersheds – foothill elevations, mostly steep elevations, no lakes, large river connectivity
204 – granitic watersheds – small lakes throughout
204.1 -- subalpine and montane elevations, steep to moderate gradients
204.2 – montane and foothill elevations, steep to moderate gradients
205 – carbonate watersheds -- montane elevations, steep and moderate gradients, few lakes
273 – volcanic watersheds -- foothill elevations, mostly steep elevations, no lakes, large river connectivity

Small river systems – 7 types

1 – rivers in glacial till – river valleys in montane elevations with moderate gradients
1.1 – draining subalpine elevations of Selkirk/Bitterroot
1.2 – draining lower montane elevations
4 – rivers with granitic influence - river valleys in montane elevations with moderate gradients
4.1 – draining subalpine elevations of Selkirk/Bitterroot
4.2 – draining lower montane elevations
5 – rivers with sedimentary influence - river valleys in montane elevations with moderate gradients
7 – rivers with volcanic influence – river valleys in montane elevations with moderate gradients
7.1 – draining subalpine elevations of Selkirk/Bitterroot
7.2 – draining lower montane elevations

Medium river systems – 2 types

1 - rivers in glacial till – Spokane, Colville
2 – rivers in granite – Kettle River (note: complex occurrence with large lake – Cristina Lake)

Large river systems – 1 type

1 – mainstem Columbia throughout EDU

APPENDIX 6.0 WIDE RANGING SPECIES - CARNIVORES

WIDE RANGING SPECIES – CARNIVORES

Introduction

This ecoregion is best recognized for its full complement of large mammals, in particular the wide ranging carnivores –grizzly bears, gray wolves, wolverine, fisher and lynx. Traditional ecoregional planning methods (special element and ecosystem representation approaches) have struggled with the best way to integrate carnivore conservation goals with the protection of other conservation targets.

To address this critical element of conservation planning for the Canadian Rocky Mountains ecoregion (CRM), the planning team coordinated their work with the Rocky Mountain Carnivore Project (RMC) initiated by World Wildlife Fund Canada with support from The Nature Conservancy. Principle researchers for The Rocky Mountain Carnivore Project included Dr. Carlos Carroll (The Klamath Center for Conservation Research), Dr. Reed Noss (Conservation Science, Inc.), and Dr. Paul Paquet (World Wildlife Fund Canada)[46]. Dr. Carroll was an active participant throughout the entire ecoregional planning process and worked closely with our data manager, Bart Butterfield.

There were several specific challenges that we needed to address in order to adequately consider carnivore species in our final network of conservation areas:

- How do we incorporate carnivores as conservation targets with their appropriate goal requirements within the SITES methodology?
- How well does our portfolio of conservation areas meet the long-term survivability of carnivore species?
- How do we express the role of connectivity of habitats in the final portfolio?
- How sensitive is the SITES analysis in assessing whether the portfolios were robust enough to complement carnivore and non-carnivore goals?

Background - The Rocky Mountain Carnivore Project (RMC) [47]

Focal species analysis adds an important component to ecoregional conservation planning. Wide-ranging carnivores were proposed as potential focal species because, due to their low population density and dispersal requirements, their populations may respond most rapidly to the landscape fragmentation expected to eventually affect a larger suite of species. Most existing modeling approaches for carnivores in the Rocky Mountains have evolved out of a single-species or site-level planning approach. Moreover, regional reserve designs and specific conservation areas often made little use of spatially explicit models and instead relied on expert opinion and verbal models.

---

[46] For their full report contact World Wildlife Fund Canada (http://www.wwfcanada.org/en/default.asp)
[47] Carroll, C., R.F. Noss, and P.C. Paquet. 2002. Rocky Mountain Carnivore Project Final Report, June 2002.Prepared for World Wildlife Fund Canada.

The RMC team developed dynamic, individual based population viability analyses, using a program called PATCH, for five focal species – gray wolf, wolverine, grizzly bear, lynx, and fisher. They also used the site-selection algorithm, SITES, to select a subset of the study region that would most efficiently (i.e., in the least area) capture the best habitat for all five species. As expected, the wild northern portion of the study region generally showed higher habitat quality for carnivores than areas further south. Because goals were set to include maintaining well distributed and connected populations across the region, the RMC team had to compensate for the fact that SITES selected intact priority areas chiefly in northern B.C. and fewer and more fragmented areas in the south. The RMC researchers did this by setting both regional and subregional goals for the SITES model, such that a certain percentage of high-quality carnivore habitat was selected across the region, but also a minimum amount of high-quality habitat was selected within each subregion.

Identification of planning units that were selected in a number of runs of the SITES model, though not necessarily appearing in the "best" (i.e., lowest-cost) solution, provides flexibility to decision making and illuminates potential habitat linkages among core areas. In several cases the team also identified restoration actions required for areas to contribute effectively to conservation goals. The overall design developed from the SITES model shows high-priority conservation areas and surrounding areas that may serve as buffer zones or linkages. The RMC researchers used the PATCH population viability model to build on the static models of habitat suitability developed in Phase I of their study. PATCH links carnivore survival and fecundity to GIS data on mortality risk and habitat productivity, then tracks populations through time as individuals are born, disperse, and die. The PATCH model allowed the researchers to discriminate potential population source areas, where reproduction is expected to exceed mortality in an average year, from sink areas, where mortality is predicted to exceed reproduction. PATCH was found to be very useful for predicting the effects of landscape changes, such as degradation by development or restoration by road closures, on the viability of carnivore species.

The research team also assessed the effects of restoring corridors, for example in the Crowsnest Pass area, and found complex responses that varied with species. For example, the corridor became more valuable with time for grizzly bear but not necessarily for other species. The dynamic model predictions were highly correlated with independently collected validation data from grizzly bear DNA-based surveys in three regions of B.C., lending confidence to conservation strategies built from these models. Results from independent studies of carnivores in the study region conform best to the model predictions at a regional scale, but not as well at a local scale, where higher-resolution data on habitat conditions would improve predictability. Also, the models for the large carnivores species generally proved to have greater prediction accuracy than models for mesocarnivores such as lynx. The PATCH model also allowed the researchers to assess the vulnerability of potential core, buffer, and linkage areas to degradation, expressed in terms of reductions in expected population growth rates of carnivore species over the next 25 years as development proceeds. An average of about 15% regional decline in carrying capacity for carnivores was predicted within this time period if no additions to protected areas occur.

In contrast, increasing the proportion of reserves in the region from the current 17.2% to 36.4% would result in a 1- 4% increase over current carrying capacity. As protected area increases, the potential future carrying capacity increases. The PATCH results highlighted as critically important several areas in northern B.C., for example between the Muskwa-Kechika area and Jasper National Park, as well as better-known areas such as the Crown of the Continent, and identified several potential linkage areas that were not chosen by the SITES model but whose protection would promote population viability. Moreover, PATCH identified areas that were likely to have both high value as source habitat and a high level of threat if current trends continue.

An important question in conservation planning is whether areas selected to serve one set of goals, such as conserving carnivores, will also serve other goals, such as capturing locations of rare species or representing a broad range of habitat types in the region of interest. The team compared the priority areas selected by SITES for carnivores with those selected for other conservation targets (i.e., ecosystem representation and protection of rare species and other special elements). For this task, the researchers coordinated their work with that of The Nature Conservancy and Nature Conservancy of Canada's Canadian Rocky Mountains ecoregional planning team, whose study region encompassed the central portion of the RMC study area. A SITES design based on non-carnivore conservation goals coincidentally captured a large amount of carnivore habitat, but missed some critical areas for carnivore viability, for example north-central Idaho and between Wells Gray and Jasper Parks in British Columbia and Alberta. On the other hand, areas selected to capture the best 35% of habitat for carnivores across the region met representation goals for 76% of ecosystem types but failed to protect many of the documented and localized occurrences of rare species (for example, only 19% of non-vascular plants and 26% of vascular plants). Although a suite of carnivores provides much better coverage than any single carnivore species, carnivores are an imperfect umbrella for biodiversity. However, in regions such as the Rocky Mountains, where intensive biodiversity surveys have not been conducted but where relatively few endemic species exist; the focal species approach is particularly useful to define conservation priorities.

Conclusions and Recommendations

- Both static and dynamic models provided useful information for carnivore conservation, and management implications from the two types of model were similar. In addition, comparison of model predictions with new survey data suggests that both models were quite robust for large carnivores, but somewhat less so for mesocarnivores.
- Nevertheless, dynamic, spatially explicit population models (e.g., PATCH) provide many advantages over static models, particularly with respect to insights regarding population processes such as source-sink dynamics and the effects of landscape context and alternative future scenarios on population viability. Reserve

designs based on static models alone may be poor at conserving species that are more vulnerable than expected due to unique aspects of their demography or social structure (e.g., the wolf, with its large pack territories).

- Carnivores are excellent focal species for regional-scale conservation planning. They are particularly useful in regions where the potential for maintaining or restoring large core areas and broad-scale connectivity is high.
- The umbrella function of carnivores (i.e., where protection of adequate habitat area for carnivore species incidentally protects many other species or ecosystems) is fairly high but incomplete. Coverage of localized rare species or communities is poor. Hence, carnivores may be superior umbrella species in regions, such as the northern Rocky Mountains, with relatively low endemism and habitat heterogeneity.
- A suite of carnivore species provides a better umbrella function than any single species, because the range of habitats covered is greater.
- A contrast in habitat associations exists between carnivore species that use rugged terrain (grizzly bear and wolverine) vs. those that avoid such areas (wolf), and between forest species that are relatively tolerant of human activities (lynx, fisher, black bear) vs. habitat generalists that are less tolerant of human activity (grizzly bear, wolverine, wolf).
- Private lands are less valuable for most carnivore species than their proportion in the region would suggest, but have disproportionately high value for wolf, fisher, and black bear. Hence, current protected areas, which are concentrated in the most rugged portions of the study region (e.g., the central Canadian Rockies), should be augmented by new protected areas in regions of lower topographic relief and higher biological productivity.
- Continuation of recent trends in development on both private and public lands will lead to the loss and fragmentation of carnivore habitat over the next several decades, making some local populations of carnivores more vulnerable to extinction.
- Given no change in the amount or configuration of protected area in the region, populations of most carnivore species can be expected to decline over time as habitat surrounding reserves becomes less suitable and as populations within reserves become more isolated. Substantial conservation commitments will be needed to prevent the northward retreat of carnivore populations in the region and sustain small transboundary populations.
- Thresholds are apparent in the effect of increased habitat protection on population
- Viability, with increasing network size having the greatest effect on population viability up to approximately 37% of the study region.
- Tradeoffs must be addressed between allocating scarce conservation resources toward protecting strong population source areas, stemming the degradation of lands surrounding reserves, or restoring linkages that are already degraded to some degree, but which might contribute to long-term persistence of metapopulations.
- A useful way to resolve tradeoffs and prioritize conservation actions is to plot the
- Irreplaceability of sites (i.e., the relative extent to which they contribute to conservation goals) vs. their vulnerability (i.e., their risk of being degraded in the

near future). In the context of species conservation, irreplaceability can be approximated as the predicted rate of population growth (i.e., the value of a site as source habitat), and vulnerability can be measured by the predicted decline in growth rate over a defined period of time, given particular trends in habitat conditions.

- Probably the two highest-priority areas for habitat conservation to enhance populations of carnivores in the study region are 1) the area between the Muskwa - Kechika conservation areas and Jasper National Park in northern British Columbia and Alberta, and 2) north central Idaho. Both of these regions combine high biological productivity and relatively low human influence, yet both are threatened by ongoing development and resource extraction. New protected areas and linkages are needed to connect the Muskwa-Kechika area to Jasper National Park and to connect protected areas in central Idaho northeastward to the Northern Continental Divide Ecosystem and eastward to the Greater Yellowstone Ecosystem.
- A third priority area for conservation is the transboundary region, from the Northern Continental Divide Ecosystem (e.g., the North Fork of the Flathead River, adjacent to Waterton Lakes and Glacier National Parks) north across Hwy. 3 (in the vicinity of Crowsnest Pass) to Banff National Park. This area is already a strong filter, if not absolute barrier, to several carnivore species, and will significantly isolate carnivore populations to the north and south unless conservation actions are implemented quickly. The RMC results suggest that adding reserves in the transboundary region would prevent the loss of connectivity between the Northern Continental Divide Ecosystem and the Canadian Rocky Mountain parks and sustain smaller grizzly bear populations in southeastern British Columbia and the northern U.S. The level of uncertainty that propagates through the models used in this study suggests that they are most informative for identifying generalized areas of conservation emphasis rather than exact reserve or management boundaries. Hence, the RMC study provides a regional-scale picture of conservation priorities, which must be supplemented by site-level analysis and planning.

Incorporating the RMC with the Canadian Rocky Mountains Ecoregional Plan

The CRM planning team incorporated static models (species distribution and habitat characteristics) for 5 carnivore species, grizzly bear, gray wolf, lynx, wolverine, and fisher. The static models for these species were determined by the RMC researchers to be the best available information on a region-wide basis. Species distribution data included sightings, denning, and trapping records of fisher, lynx, and wolverine, grizzly bear radiotelemetry locations, and boundaries of wolf pack territories. Habitat data included vegetation, satellite imagery metrics, topography, climate, and human impact variables.

Goals for the carnivore species were expressed as a percentage of the total habitat “value” in the region. This is more realistic than the common approach of classifying areas into just two classes of unsuitable and suitable habitat. Habitat value was measured by the output of the resource selection function (RSF) model (Carroll et al. 2001a). The RSF is proportional to the number of animals that can be supported in an area, thus making a goal of 30% of the RSF value might be expected to conserve 30% of the potential regional population. The RSF values for lynx, fisher, and wolverine were based on non-modeled data. Because the conservation goals for grizzly bears and wolves were based on conceptual models and not RSF values, conserving 30% of modeled habitat "value" will protect more than 30% of their populations. Some additional percentage of the population will also be present on non-reserve (portfolio) lands. Carnivore modeling works in the Canadian Rocky Mountains ecoregion because we still retain well distributed populations of all carnivore species (unlike the Middle Rockies or Southern Rockies ecoregion).

With little information as to what constitutes a threshold amount of habitat for insuring viable populations, and because we did not want to ignore such factors as connectivity, we ran SITES solutions with differing levels of habitat as goals and compared the ability of the resulting SITES portfolios to conserve viable populations, using the PATCH model (Schumaker 1998). The PATCH model takes static data (spatial data like prey availability, mortality risks) and dynamic models (non spatial data like carrying capacity) and provides an evaluation of population survival over a 25-year timetable. The evaluation was performed for two carnivore species, the grizzly bear and wolf, for which we had the most developed and accurate PATCH models.

Results for the Canadian Rocky Mountains Ecoregional Plan

Comparing portfolios based on carnivore goals only with those based on special elements and representation goals only:

Portfolios were nearly the same in size and about half (55%) of the portfolio areas were shared indicating a moderate degree of overlap between carnivore habitat and other facets of biodiversity. Areas of overlap tended to be located in those areas with both high biological productivity and low human impacts, including the Clearwater drainage (Idaho), the Purcell Wilderness, Wells-Gray and Kootenay Parks (BC), and portions of the Rocky Mountain Front. Areas selected only for carnivores tend to lie in the northern, less developed portions of the ecoregion. Areas selected only in the non-carnivore portfolio are scattered throughout the region.

What about a portfolio developed without carnivore species as a goal?
A SITES solution portfolio without carnivore goals still captures 30-34% of the total habitat value for different carnivore species. The non-carnivore based portfolio captures only slightly more carnivore habitat captured than that captured in a random portfolio, but at least is not biased against representation of certain species. This bias is a problem with current protected areas, which are disproportionately in higher-elevation areas. Protected areas capture disproportionately large amounts of habitat value for wolverine, grizzly bear, and wolf, but perform more poorly at capturing habitat value for lynx and especially fisher. In summary, a reserve network based on representation and special element goals

(but not carnivore goals) gives more balanced protection to focal species than do current protected areas, but does not do this in the most efficient manner for some species of carnivores.

What about a portfolio developed with carnivores as an umbrella function?
A SITES solution developed from carnivore goals only (35%level) produced a portfolio with poor coverage of special elements but better coverage of representation targets. However, very few special elements are recorded in British Columbia as compared to the United States and thus may lead to artificially poor congruence between carnivore and special elements targets. In this ecoregion, coverage of representation (ELU) targets may give a more accurate assessment of the ability of carnivores to serve as umbrella species. Whereas the proportion of targets covered by carnivores ranged from 19% (non-vascular plants) to 50% (birds) for special elements, carnivores covered 76% of the representation targets.

Comparison of SITES solutions with differing carnivore target levels
SITES solution based on special elements and terrestrial representation goals along coincidentally captured about 30% of carnivore habitat value for all five species. Adding a carnivore goal of 30% adds areas of only minor extent. As carnivore targets are increased to 40% and 50%, the portfolio add areas in north central Idaho and between Wells-Gray and Jasper Parks, as well as smaller areas in the Cabinet-Yaak (MT) and Monashee Mountains (BC). Portfolio size increases to 38% and then 47% of the region for the 40% ad 50% carnivore goals, respectively.

Protected areas in the non-locked portfolios: what portions of the parts are most important for biodiversity?
Even when protected areas are not "locked in" to the SITES solution, they tend to be included more often than do non-protected areas. This is somewhat more pronounced when carnivore goals are present. However, even non-carnivore based portfolios assume that "cost" of land is lower within less developed areas. Thus they tend to favor inclusion of parklands if they contain significant amounts of conservation targets. However, portions of the Rocky Mountain Parks (Alberta and BC) that are primarily "rock and ice" are generally not included in either the non-carnivore or carnivore based portfolios.

The "locked-in" SITES solutions
In general, all the locked-in portfolios choose to add new sites in the relatively unprotected transborder region and north central Idaho, as well as adding areas to the periphery of the Canadian parks. Although SITES cannot explicitly target functional connectivity as a goal, t can seek to build larger reserves starting from several small reserves, as in southeastern B.C. It is somewhat surprising that including current protected areas in the portfolio, although it changes the location of new priority sites, does not reduce the size of the final conservation network. In other words, even if SITES already credits all biodiversity values within the parts as part of the solution, it still must add the same amount of non-park area as it would when starting from a blank slated. This may be due to the fact that many targets are associated with low-elevation productive sites that are poorly represented in current protected areas.

How well do the SITES solution function as a conservation networks? results for the PATCH model

As the SITES carnivore goals were increased and the resulting portfolios grew in size, the portfolios captured an increasing proportion of the current carrying capacity of the region for that species. These results offer no surprises. However, if we project current development trends to 2025, and use the PATCH model to assess how the alternate portfolios function as a network in an increasingly developed matrix, we find results that cannot be predicted based on the static model results.

For example, both the locked and not-locked portfolios based on special elements and representation (carnivore goal0%) capture similar amounts of habitat value. However, because a portfolio that builds off of current parks results in a portfolio with larger core areas, this locked portfolio is more able to maintain carnivore populations in the face of landscape change.

When we contrast the future distribution of grizzly bear and wolf under the 'no-action" scenario to that under the "carnivore 40% locked" SITES solution we find that the portfolio's addition of sites in the transborder region, as well as the addition of a corridor in the form of the Southern Rocky Mountains Conservation Area, prevents the loss of connectivity between the NCDE and the Rocky Mountain Parks and sustains smaller subpopulations in south-eastern B.C. and the northern U.S. Grizzly bear populations in the Selkirks and Granby, although not the Cabinet-Yaak, show increased viability. The wolf shows similar, but more broadly distributed increases in distribution.

Sensitivity Analysis

Uncertainty and flexibility in the SITES Solution

Where most information on the distribution of biodiversity is based on models (habitat values, natural community types) and not point locations, and much of the land base is relatively pristine, the SITES Solution may identify several reserve designs that have close to identical optimality. The best portfolio out of 100 alternate SITES runs (40% carnivore goals plus non-carnivore goals, not locked in protected areas) confirmed this. However, portfolio design was only flexible in the northern portions of the ecoregion; areas in the U.S. and transboundary areas show little flexibility. In the northern portion, many alternate areas lie outside the portfolio and could be useful in identifying potential corridor areas.

SITES Solutions were fairly sensitive the "costs" parameter. Alternate portfolios were produced with "cost" measured by area of a site or by a complex formula, which included information on human impacts. Using development data in the cost calculations moves more of the portfolio into the less settled northern portions of the region.

Discussion

It is important to remember that complex reserve selection algorithms such as SITES must be seen as a decision-support tool, rather than as a "black box" that identifies a single best portfolio. In the Canadian Rocky Mountains ecoregion where 1) much of the landscape has not yet been developed and thus is in a sense available for conservation, and 2) due to lack of development, intensive biodiversity surveys have not been conducted throughout the region, there is high variability in areas selected for conservation. This means that conservation planners have some flexibility in selecting areas to implement strategies. This holds true for the northern portion of the ecoregion but not so in the U.S. and transboundary areas.

Results indicate no easy shortcuts for conserving biodiversity. We cannot assume that even a well-selected group of umbrella species will coincidentally conserve rare species or other special elements. While a carnivore driven portfolio captures representative ecosystem level targets fairly well, a representative approach alone, if you ignored development information would not work for ecosystems.

From reserve selection to reserve design: assessing connectivity in the portfolio
Reserve designs for wide-ranging species must consider issues such as connectivity. Results indicate that a representative based reserve network, while appearing to capture sufficient carnivore habitat may be weakened if the collection of individual sites do not form a functionally connected network. No obvious thresholds emerge from comparisons of portfolios of different size. However, the PATCH results indicate northward retreat of carnivore populations unless substantial conservation efforts are made to sustain small transborder populations such as the Selkirks, Cabinet-Yaak, and Granby, and thereby maintain connections between the Northern Continental Divide and more northerly populations. Building portfolio from protected areas results in larger and more connected core areas that can sustain larger carnivore populations.

APPENDIX 7.0 THE SITES ALGORITHM

THE SITES ALGORITHM [48]

A common mechanism used to identify sites for protection is to set as a goal some minimum representation of biodiversity features for the smallest possible cost. The results of this procedure are a discrete set or portfolio of sites that presumably protect biodiversity features efficiently. An important caveat to such an effort is that just because the minimum representation level is protected does not ensure that such a reserve system is adequate.

Such a set of goals requires a replicable procedure for identifying the set or portfolio of sites that achieve these goals. Early attempts to solve this problem have included heuristic decision support tools and the greedy algorithm, which "greedily" attempts to maximize the rate of progress towards the objective at each step by selecting the best available sites sequentially until limits, such as the cost or size of the reserve system, are reached. More recent models have achieved enhanced efficiency in selecting sites by beginning with a random set of parcels and iteratively examining various combinations of sites while the model seeks to minimize the 'cost' to protect the set of sites. This mechanism enables the decision making algorithm to select the set of sites that achieves the prescribed goals most efficiently and is able to avoid the pitfalls of adding sites sequentially because it is able to experimentally exclude any site after its inclusion. Just this sort of decision-making tool has been provided to a broad audience as a software extension to ESRI's ArcView GIS software.

Developed for The Nature Conservancy in 1999 by the National Center for Ecological Analysis and Synthesis, University of California at Santa Barbara (Andelman et al. 1999), SITES is an analytical tool developed to aid scientists and land managers in their attempts to identify a portfolio or group of areas for conservation. SITES allows inputs of target occurrences represented as points, polygons, or lines in a GIS environment and allows for conservation goals to be stated in a variety of ways, such as percent area, numbers of point occurrences, linear distances, etc. The program also allows for the integration of many available spatial data sets on land use pattern and conservation status, and enables a rapid evaluation of alternative portfolio configurations. The SITES program will allow the team to update the portfolio in the future as new data become available[49].

The goal of this program is to minimize the cost of the total portfolio according to the following simple formula:

---

[48] More information about this analytical tool can be found by visiting the following website: http://www.biogeog.ucsb.edu/projects/tnc/toolbox.html.

[49] Neely, B., P. Comer, C. Moritz, M. Lammert, R. Rondeau, C. Pague, G. Bell, H. Copeland, J. Humke, S. Spackman, T. Schulz, D. Theobald, and L. Valutis. 2001. *Southern Rocky Mountains: An Ecoregional Assessment and Conservation Blueprint*. Prepared by The Nature Conservancy with support from the U.S. Forest Service, Rocky Mountain Region, Colorado Division of Wildlife, and Bureau of Land Management.

Total Portfolio Cost = (cost of selected sites) + (penalty cost for not meeting the stated conservation goals for each species or element) + (cost of spatial dispersion of the selected sites as measured by the total boundary length of the sites in the portfolio).

SITES uses a "simulated annealing" algorithm to efficiently select representative sets of sites (Possingham et al. 2000). The algorithm attempts to minimize portfolio "cost" while maximizing attainment of conservation goals in a compact set of sites. The function SITES seeks to minimize is *Cost + Species Penalty + Boundary Length*, where Cost is the total monetary or area cost of all planning units selected for the portfolio, Species Penalty is a cost imposed for failing to meet target goals, and Boundary Length is a cost determined by the total boundary length of the portfolio (Andelman et al. 1999). Hence, SITES attempts to select the smallest overall area needed to meet target goals and select clustered rather than dispersed planning units. SITES performed 1,000,000 iterative attempts to find the minimum cost solution per run and performed 20 such runs for each alternative conservation scenario the team explored. SITES does not guarantee an optimal solution, which is prohibitive in computer time for large, complex data sets. However, performing such a large number of iterations does provide a solution that is near optimal. Besides identifying this near-optimal "best run", SITES also rates areas by how often they were selected in the 100 alternate runs. An area that scored highly in this "summed runs" output might not be included in the best solution, but could be considered a good alternative site [50].

Analysis Unit

The CRM team selected third order watersheds (equivalent to 6 digit HUCs) as the unit of analysis for running SITES. All conservation targets, threats, and goals were analyzed from the perspective of these watersheds. The team found that a third order watershed, roughly the size of a small landscape-scale area, was sufficient for efficiently representing local-scale targets in small functional sites while allowing for aggregation of ecological systems into extensive landscape scale conservation areas. Each watershed was populated by overlaying GIS data layers with points or polygon information for targeted species, communities and ecological systems.

[50] Carroll, C., R.F. Noss, and P.C. Paquet. 2002. Rocky Mountain Carnivore Project Final Report, June 2002.Prepared for World Wildlife Fund Canada.

APPENDIX 8.0 CONSERVATION AREA SUMMARY RESULTS

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Adams River	Wide Ranging Fish	PINK SALMON	PINK SALMON	G5	59.51%	17.85%
	Wide Ranging Fish	SOCKEYE SALMON	SOCKEYE SALMON	G5	11.92%	3.58%
	Wide Ranging Fish	COHO SALMON	COHO SALMON	G4	6.83%	3.42%
	Wide Ranging Fish	Onchorhynchus tshawytscha	Chinook Salmon		6.70%	2.01%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	1.19%	0.60%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		2.34%	0.70%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.42%	0.13%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		0.12%	0.03%
	Generic Wetlands	Wetlands	Wetlands		2.55%	0.76%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	1.20%	0.48%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.78%	0.31%
	Wide Ranging Species	High Value Gulo gulo luscus RSF	High Value North American wolverine RSF	G4T4	0.48%	0.19%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.39%	0.16%
	Aquatic Systems	Thompson montane small rivers	Thompson montane small rivers		38.29%	11.49%
	Aquatic Systems	Thompson medium rivers	Thompson medium rivers		31.94%	9.58%
	Aquatic Systems	Thompson alpine headwaters	Thompson alpine headwaters		14.36%	4.31%
Ahbou Lake	Wide Ranging Fish	Onchorhynchus tshawytscha	Chinook Salmon		0.25%	0.08%
	Mapped Veg Type	Hybrid Spruce Forests	Hybrid Spruce Forests		0.55%	0.17%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.03%	0.01%
	Generic Wetlands	Wetlands	Wetlands		0.05%	0.01%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.10%	0.04%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	0.06%	0.02%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.04%	0.02%
	Aquatic Systems	Middle Fraser montane headwaters	Middle Fraser montane headwaters		132.32%	39.70%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Bitterroot Mountain Snail EO	Expert Nominated Sites	Dwarf-Shrubland	Dwarf-Shrubland		14.29%	25.00%
	Expert Nominated Sites	Alpine Meadow (wet)	Alpine Meadow (wet)		14.29%	14.29%
	Expert Nominated Sites	Disturbed Colluvial / Landslide	Disturbed Colluvial / Landslide		14.29%	10.00%
	Expert Nominated Sites	Subalpine Larch Forests	Subalpine Larch Forests		2.26%	0.68%
	Expert Nominated Sites	Engelmannii Spruce - Subalpine Fir Dry Parklands	Engelmannii Spruce - Subalpine Fir Dry Parklands		1.94%	0.58%
	Expert Nominated Sites	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.07%	0.02%
	Snails and Slugs	Oreohelix amariradix	Bitterroot mountainsnail	G1	4.00%	100.00%
	Mapped Veg Type	Ponderosa Pine Woodland	Ponderosa Pine Woodland		1.33%	0.40%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.73%	0.22%
	Mapped Veg Type	Sagebrush Steppe	Sagebrush Steppe		0.41%	0.12%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.05%	0.01%
	Generic Wetlands	Wetlands	Wetlands		0.03%	0.01%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.01%	0.00%
Bitterroot Range (Middle Clark Fork)	Expert Nominated Sites	Disturbed Colluvial / Landslide	Disturbed Colluvial / Landslide		28.57%	20.00%
	Expert Nominated Sites	Montane Riparian Shrubland	Montane Riparian Shrubland		28.57%	1.82%
	Expert Nominated Sites	Ponderosa Pine Woodland	Ponderosa Pine Woodland		5.45%	1.64%
	Expert Nominated Sites	Aspen	Aspen		0.52%	0.16%
	Expert Nominated Sites	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.35%	0.10%
	Birds	Haliaeetus leucocephalus nest site	Bald Eagle nest site	G4	100.00%	3.23%
	Vascular Plants	Cypripedium fasciculatum	Clustered lady's-slipper	G4	92.31%	16.22%
	Amphibians	Plethodon idahoensis	Coeur d'Alene salamander	G3	33.33%	2.70%
	Amphibians	Bufo boreas	Western toad	G4	20.00%	0.67%
	Birds	Histrionicus histrionicus	Harlequin Duck	G4	20.00%	0.95%
	Mammals	Corynorhinus townsendii	Townsend's big-eared bat	G4	14.29%	6.25%
	Aquatic Eos	COTTUS CONFUSUS	SHORTHEAD SCULPIN	G5	7.69%	7.14%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Bitterroot Range (Middle Clark Fork) (cont'd)	Vascular Plants	Waldsteinia idahoensis	Idaho strawberry	G3	4.00%	20.00%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	3.64%	1.82%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	1.63%	0.82%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		20.70%	6.21%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		7.16%	2.15%
	Mapped Veg Type	Interior Grand Fir Forests	Interior Grand Fir Forests		2.87%	0.86%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		1.87%	0.56%
	Mapped Veg Type	Ponderosa Pine Woodland	Ponderosa Pine Woodland		1.17%	0.35%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		0.02%	0.01%
	Generic Wetlands	Wetlands	Wetlands		0.01%	0.00%
	Wide Ranging Species	High Value Martes pennanti RSF	High Value Fisher RSF	G5	3.72%	1.49%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	1.03%	0.41%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	0.28%	0.11%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.11%	0.05%
	Aquatic Systems	Clark Fork - Flathead medium rivers	Clark Fork - Flathead medium rivers		227.39%	68.22%
	Aquatic Systems	Clark Fork - Flathead montane small rivers	Clark Fork - Flathead montane small rivers		74.93%	22.48%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		40.37%	12.11%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		40.20%	12.06%
	Aquatic Systems	Clark Fork - Flathead large rivers	Clark Fork - Flathead large rivers		14.90%	4.47%
	Aquatic Systems	Clearwater subalpine headwaters	Clearwater subalpine headwaters		0.00%	0.00%
Bull River / Cabinet (Bull Lake/East Cabinets)	Expert Nominated Sites	Montane Riparian Forest	Montane Riparian Forest		14.29%	2.00%
	Expert Nominated Sites	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		7.94%	2.38%
	Expert Nominated Sites	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.70%	0.21%
	Birds	Haliaeetus leucocephalus nest site	Bald Eagle nest site	G4	20.00%	0.65%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Bull River / Cabinet (Bull Lake/East Cabinets) (cont'd))	Wide Ranging Fish	Onchorhynchus mykiss gairdneri	Redband Trout	G5T4	17.40%	8.70%
	Mammals	Corynorhinus townsendii	Townsend's big-eared bat	G4	14.29%	6.25%
	Vascular Plants	Botrychium pedunculosum	Stalked moonwort	G3*	7.69%	3.23%
	Vascular Plants	Botrychium montanum	Mountain moonwort	G3	7.69%	1.41%
	Wide Ranging Fish	ACIPENSER TRANSMONTANUS POP 2	White Sturgeon	G4T?Q	0.93%	0.93%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	0.73%	0.37%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	0.25%	0.13%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		1.19%	0.36%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.69%	0.21%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.49%	0.15%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.41%	0.12%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		0.20%	0.06%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	0.38%	0.15%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.19%	0.08%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.05%	0.02%
	Aquatic Systems	Upper Kootenay subalpine headwaters	Upper Kootenay subalpine headwaters		39.03%	11.71%
	Aquatic Systems	Upper Kootenay montane small rivers	Upper Kootenay montane small rivers		23.87%	7.16%
	Aquatic Systems	Upper Columbia subalpine headwaters	Upper Columbia subalpine headwaters		14.42%	4.33%
	Aquatic Systems	Upper Kootenay montane headwaters	Upper Kootenay montane headwaters		4.54%	1.36%
	Aquatic Systems	Upper Kootenay montane headwaters	Upper Kootenay montane headwaters		3.16%	0.95%
Bull Trout Spawning Site	Expert Identified Sites	Bull Trout	Bull Trout		0.06%	0.06%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	0.01%	0.01%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	0.01%	0.01%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.04%	0.01%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Bull Trout Spawning Site (cont'd)	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.00%	0.00%
	Generic Wetlands	Wetlands	Wetlands		0.02%	0.01%
	Aquatic Systems	Upper Kootenay subalpine headwaters	Upper Kootenay subalpine headwaters		0.83%	0.25%
	Aquatic Systems	Upper Kootenay montane small rivers	Upper Kootenay montane small rivers		0.18%	0.06%
Burbot Spawning Site	Expert Identified Sites	Burbot	Burbot		0.48%	0.48%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	0.01%	0.00%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	0.01%	0.00%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.05%	0.02%
	Generic Wetlands	Wetlands	Wetlands		0.06%	0.02%
	Aquatic Systems	Upper Kootenay montane small rivers	Upper Kootenay montane small rivers		0.78%	0.23%
	Aquatic Systems	Upper Kootenay subalpine headwaters	Upper Kootenay subalpine headwaters		0.10%	0.03%
Camas Prairie	Vascular Plants	Allium columbianum	Columbia onion	G3	7.69%	100.00%
	Mapped Veg Type	Sagebrush Steppe	Sagebrush Steppe		16.80%	5.04%
	Mapped Veg Type	Ponderosa Pine Woodland	Ponderosa Pine Woodland		2.94%	0.88%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.25%	0.07%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.01%	0.00%
	Generic Wetlands	Wetlands	Wetlands		0.34%	0.10%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		17.11%	5.13%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		2.73%	0.82%
Cougar Bay	Expert Nominated Sites	Marsh	Marsh		14.29%	0.70%
	Expert Nominated Sites	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.35%	0.10%
	Birds	Haliaeetus leucocephalus nest site	Bald Eagle nest site	G4	20.00%	0.65%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	0.12%	0.06%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Cougar Bay (cont'd)	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.56%	0.17%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.11%	0.03%
	Generic Wetlands	Wetlands	Wetlands		0.27%	0.08%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		19.83%	5.95%
Crown of the Continent	Expert Nominated Sites	Fen	Fen		1142.86%	45.45%
	Expert Nominated Sites	Marsh	Marsh		814.29%	40.14%
	Expert Nominated Sites	Montane Wet Meadows	Montane Wet Meadows		700.00%	65.33%
	Expert Nominated Sites	Montane Riparian Shrubland	Montane Riparian Shrubland		585.71%	37.27%
	Expert Nominated Sites	Montane Riparian Forest	Montane Riparian Forest		285.71%	40.00%
	Expert Nominated Sites	Aspen Parkland	Aspen Parkland		242.36%	72.71%
	Expert Nominated Sites	Montane Scrub	Montane Scrub		195.01%	58.50%
	Expert Nominated Sites	Montane Spruce	Montane Spruce		186.01%	55.80%
	Expert Nominated Sites	Rough Fescue Prairie	Rough Fescue Prairie		185.21%	55.56%
	Expert Nominated Sites	Alpine Cushion Plant	Alpine Cushion Plant		181.03%	54.31%
	Expert Nominated Sites	Conifer Swamp	Conifer Swamp		157.14%	68.75%
	Expert Nominated Sites	Lodgepole Pine Forest and Woodlands	Lodgepole Pine Forest and Woodlands		146.36%	43.91%
	Expert Nominated Sites	Alpine Grassland (dry)	Alpine Grassland (dry)		66.60%	19.98%
	Expert Nominated Sites	Interior Grand Fir Forests	Interior Grand Fir Forests		53.10%	15.93%
	Expert Identified Sites	Howellia aquatilis	Howellia aquatilis		50.00%	50.00%
	Expert Identified Sites	Westslope Cutthroat Trout	Westslope Cutthroat Trout		47.51%	47.51%
	Expert Identified Sites	Bull Trout	Bull Trout		45.76%	45.76%
	Expert Identified Sites	Wetlands	Wetlands		44.23%	44.23%
	Expert Identified Sites	Grizzly Bear	Grizzly Bear		43.04%	43.04%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Crown of the Continent (cont'd)	Expert Nominated Sites	Engelmannii Spruce - Subalpine Fir Dry Parklands	Engelmannii Spruce - Subalpine Fir Dry Parklands		38.35%	11.51%
	Expert Nominated Sites	Subalpine Larch Forests	Subalpine Larch Forests		36.10%	10.83%
	Expert Identified Sites	Aquatics	Aquatics		34.11%	34.11%
	Expert Nominated Sites	Aspen	Aspen		32.39%	9.72%
	Expert Nominated Sites	Interior Douglas Fir Forests	Interior Douglas Fir Forests		31.20%	9.36%
	Expert Nominated Sites	Engelmann Spruce / Subalpine Fir Dry Forests	Engelmann Spruce / Subalpine Fir Dry Forests		30.44%	9.13%
	Expert Nominated Sites	Montane Dry Grasslands	Montane Dry Grasslands		29.17%	8.75%
	Expert Nominated Sites	Limber Pine Forests	Limber Pine Forests		28.72%	8.62%
	Expert Nominated Sites	Subalpine Wet Meadow	Subalpine Wet Meadow		28.57%	25.00%
	Expert Nominated Sites	Disturbed Colluvial / Landslide	Disturbed Colluvial / Landslide		28.57%	20.00%
	Expert Identified Sites	Connectivity	Connectivity		25.62%	25.62%
	Expert Identified Sites	Riparian Forest	Riparian Forest		25.27%	25.27%
	Expert Nominated Sites	Sparsely vegetated rock & talus	Sparsely vegetated rock & talus		14.29%	50.00%
	Expert Nominated Sites	Subalpine Shrublands	Subalpine Shrublands		14.29%	33.33%
	Expert Nominated Sites	Dwarf-Shrubland	Dwarf-Shrubland		14.29%	25.00%
	Expert Nominated Sites	Rock Outcrop / Cliff	Rock Outcrop / Cliff		14.29%	25.00%
	Expert Nominated Sites	Engelmannii Spruce Riparian Forests	Engelmannii Spruce Riparian Forests		14.29%	16.67%
	Expert Nominated Sites	Alpine Meadow (wet)	Alpine Meadow (wet)		14.29%	14.29%
	Expert Identified Sites	Badger	Badger		13.75%	13.75%
	Expert Nominated Sites	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		9.57%	2.87%
	Expert Identified Sites	Alberta ESA	Alberta ESA		3.39%	3.39%
	Expert Identified Sites	Grassland Communities	Grassland Communities		1.32%	1.32%
	Birds	Lagopus leucurus	White-tailed Ptarmigan	G5	1400.00%	93.33%
	Amphibians	Bufo boreas	Western toad	G4	1000.00%	33.33%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Crown of the Continent (cont'd)	Birds	Gavia immer	Common Loon	G5	960.00%	45.28%
	Birds	Histrionicus histrionicus	Harlequin Duck	G4	580.00%	27.62%
	Birds	Haliaeetus leucocephalus nest site	Bald Eagle nest site	G4	440.00%	14.19%
	Amphibians	Ascaphus montanus	Tailed frog	G4	400.00%	43.75%
	Community	Artemisia tridentata slope community		S1	166.67%	100.00%
	Vascular Plants	Botrychium montanum	Mountain moonwort	G3	107.69%	19.72%
	Community	Artemisia tridentata - Rhamnus alnifolia		S1	100.00%	100.00%
	Vascular Plants	Howellia aquatilis	Water howellia	G2	98.92%	98.92%
	Vascular Plants	Lupinus minimus	Least lupine	G3G4	85.71%	100.00%
	Vascular Plants	Botrychium paradoxum	Peculiar moonwort	G3*	76.92%	38.46%
	Vascular Plants	Carex lenticularis var. dolia	Goose-grass sedge	G5T3Q	69.23%	69.23%
	Vascular Plants	Botrychium spathulatum	Spoon-leaf moonwort	G3	66.67%	20.00%
	Birds	Cygnus buccinator	Trumpeter Swan	G4	60.00%	100.00%
	Vascular Plants	Papaver pygmaeum	Alpine glacier poppy	G3	56.00%	100.00%
	Vascular Plants	Botrychium hesperium	Western moonwort	G3	53.85%	38.89%
	Vascular Plants	Botrychium crenulatum	Crenulate moonwort	G3	53.85%	10.14%
	Vascular Plants	Phacelia lyallii	Lyall phacelia	G3	52.00%	92.86%
	Vascular Plants	Erigeron lackschewitzii		G3	48.00%	100.00%
	Vascular Plants	Prenanthes sagittata	Arrow-leaf rattlesnake root	G3	44.00%	100.00%
	Community	Abies lasiocarpa - Pinus albicaulis / Xerophyllum tenax		S1S2	42.86%	100.00%
	Aquatic Eos	ZAPADA GLACIER	WESTERN GLACIER STONEFLY	G2	38.46%	100.00%
	Insects	Euphydryas gellettii	Gillette's Checkerspot	G3	38.46%	50.00%
	Vascular Plants	Saussurea densa	Dwarf saw-wort	G3G4	32.00%	100.00%
	Vascular Plants	Astragalus lackschewitzii	Lackschewitz' Milkvetch	G2	32.00%	100.00%
	Vascular Plants	Conimitella williamsii	William's conimitella	G3	30.77%	36.36%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Crown of the Continent (cont'd)	Vascular Plants	Botrychium ascendens	Upward-lobed moonwort	G3*	30.77%	20.00%
	Vascular Plants	Cypripedium fasciculatum	Clustered lady's-slipper	G4	30.77%	5.41%
	Amphibians	Ambystoma tigrinum	Tiger salamander	G5	28.57%	28.57%
	Community	Pinus albicaulis - Abies lasiocarpa / Luzula hitchcockii - Vaccinium myrtillus		S1S2	28.57%	100.00%
	Community	Pinus albicaulis - Picea engelmannii / Dryas octopetala		S1	28.57%	100.00%
	Community	Picea (engelmannii X glauca, engelmannii) / Lysichiton americanus Forest		G2	28.00%	70.00%
	Vascular Plants	Packera contermina	High alpine butterweed	G3?	28.00%	87.50%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	23.51%	11.75%
	Aquatic Eos	COTTUS CONFUSUS	SHORTHEAD SCULPIN	G5	23.08%	21.43%
	Non-Vascular Plants	Bryum calobryoides	A moss	G3	23.08%	75.00%
	Vascular Plants	Botrychium lineare		G2*	23.08%	75.00%
	Birds	Asio flammeus	Short-eared Owl	G5	20.00%	14.29%
	Non-Vascular Plants	Bryum schleicheri	A moss	G5?	15.38%	50.00%
	Vascular Plants	Botrychium pallidum	Pale moonwort	G2	15.38%	66.67%
	Vascular Plants	Nymphaea leibergii	Dwarf water-lily	G5	15.38%	50.00%
	Vascular Plants	Botrychium pedunculosum	Stalked moonwort	G3*	15.38%	6.45%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	14.46%	7.23%
	Amphibians	Rana pipiens	Northern leopard frog	G5	14.29%	5.00%
	Community	Populus tremuloides - Populus balsamifera ssp. trichocarpa / Osmorhiza occidentalis Forest		G2Q	14.29%	100.00%
	Community	Populus tremuloides / Rubus parviflorus		S2	14.29%	50.00%
	Community	Pseudotsuga menziesii - Pinus flexilis / Juniperus communis / Festuca campestris		S2S3	14.29%	11.11%
	Vascular Plants	Iris missouriensis	Missouri iris	G5	14.29%	50.00%
	Vascular Plants	Erigeron radicatus	Dwarf fleabane	G3	14.29%	20.00%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Crown of the Continent (cont'd)	Aquatic Eos	STAGNICOLA ELRODIANA	LONGMOUTH PONDSNAIL	G1	12.00%	75.00%
	Aquatic Eos	STAGNICOLA ELRODI	FLATHEAD PONDSNAIL	G1	12.00%	25.00%
	Snails and Slugs	Oreohelis elrodi	Carinate mountain snail	G1	12.00%	100.00%
	Aquatic Eos	LEDNIA TUMANA	MELTWATER LEDNIAN STONEFLY	G1	8.00%	100.00%
	Community	Carex aperta Herbaceous Vegetation		G1?	8.00%	100.00%
	Community	Betula glandulosa / Carex / Sphagnum		S2Q	8.00%	50.00%
	Vascular Plants	Lathyrus bijugatus	Latah tule pea	G4	8.00%	100.00%
	Aquatic Eos	ENALLAGMA OPTIMOLOCUS	A DAMSELFLY	G2	7.69%	100.00%
	Mammals	Sorex preblei	Preble's Shrew	G4	7.69%	100.00%
	Non-Vascular Plants	Phascum vlassovii		G2?	7.69%	100.00%
	Non-Vascular Plants	Tortula bartramii		G3	7.69%	100.00%
	Non-Vascular Plants	Cladonia norvegica		G3	7.69%	100.00%
	Non-Vascular Plants	Bryoria friabilis		G3	7.69%	100.00%
	Non-Vascular Plants	Dermatocarpon moulinsii	A lichen	G?	7.69%	50.00%
	Non-Vascular Plants	Cladonia merochlorophaea		G2	7.69%	33.33%
	Vascular Plants	Mimulus patulus	Washington Monkeyflower	G2	7.69%	100.00%
	Vascular Plants	Poa laxa ssp. Baniffianna	A bluegrass	G5?T1	7.69%	100.00%
	Aquatic Eos	RHYACOPHILA EBRIA	A CADDISFLY	G1	4.00%	100.00%
	Aquatic Eos	RHYACOPHILA GLACIERI	A RHYACOPHILAN CADDISFLY	G1	4.00%	100.00%
	Aquatic Eos	ACROLOXUS COLORADENSIS	ROCKY MOUNTAIN CAPSHELL	G1	4.00%	33.33%
	Non-Vascular Plants	Collema curtisporum		G3	4.00%	12.50%
	Snails and Slugs	Discus brunsoni	Lake disc	G1	4.00%	100.00%
	Snails and Slugs	Oreohelix alpina	Alpine mountainsnail	G1	4.00%	50.00%
	Vascular Plants	Erigeron Trifidus	Barren ground fleabane	G2G3Q	4.00%	7.69%
	Mapped Veg Type	Montane Spruce	Montane Spruce		97.26%	29.18%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Crown of the Continent (cont'd)	Mapped Veg Type	Aspen Parkland	Aspen Parkland		94.52%	28.35%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		31.04%	9.31%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		27.84%	8.35%
	Mapped Veg Type	Interior Grand Fir Forests	Interior Grand Fir Forests		17.27%	5.18%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		14.36%	4.31%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		12.23%	3.67%
	Mapped Veg Type	Ponderosa Pine Woodland	Ponderosa Pine Woodland		2.45%	0.74%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.15%	0.04%
	Mapped Veg Type	Rough Fescue Prairie	Rough Fescue Prairie		0.12%	0.03%
	Generic Wetlands	Wetlands	Wetlands		21.46%	6.44%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	22.03%	8.81%
	Wide Ranging Species	High Value Gulo gulo luscus RSF	High Value North American wolverine RSF	G4T4	20.19%	8.08%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	19.80%	7.92%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	17.45%	6.98%
	Wide Ranging Species	High Value Martes pennanti RSF	High Value Fisher RSF	G5	2.25%	0.90%
	Aquatic Systems	Clark Fork - Flathead subalpine headwaters	Clark Fork - Flathead subalpine headwaters		333.33%	100.00%
	Aquatic Systems	Milk-Marias-Sun montane small rivers	Milk-Marias-Sun montane small rivers		333.33%	100.00%
	Aquatic Systems	Clark Fork - Flathead montane small rivers	Clark Fork - Flathead montane small rivers		333.33%	100.00%
	Aquatic Systems	Milk-Marias-Sun montane small rivers	Milk-Marias-Sun montane small rivers		333.33%	100.00%
	Aquatic Systems	Clark Fork - Flathead medium rivers	Clark Fork - Flathead medium rivers		333.33%	100.00%
	Aquatic Systems	Milk-Marias-Sun medium rivers	Milk-Marias-Sun medium rivers		333.33%	100.00%
	Aquatic Systems	Clark Fork - Flathead subalpine headwaters	Clark Fork - Flathead subalpine headwaters		324.66%	97.40%
	Aquatic Systems	Clark Fork - Flathead montane small rivers	Clark Fork - Flathead montane small rivers		321.91%	96.57%
	Aquatic Systems	Clark Fork - Flathead subalpine headwaters	Clark Fork - Flathead subalpine headwaters		278.18%	83.45%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Crown of the Continent (cont'd)	Aquatic Systems	Milk-Marias-Sun subalpine headwaters	Milk-Marias-Sun subalpine headwaters		242.80%	72.84%
	Aquatic Systems	Milk-Marias-Sun alpine headwaters	Milk-Marias-Sun alpine headwaters		211.28%	63.38%
	Aquatic Systems	Clark Fork - Flathead subalpine headwaters	Clark Fork - Flathead subalpine headwaters		206.42%	61.93%
	Aquatic Systems	Milk-Marias-Sun subalpine headwaters	Milk-Marias-Sun subalpine headwaters		201.95%	60.59%
	Aquatic Systems	Milk-Marias-Sun alpine headwaters	Milk-Marias-Sun alpine headwaters		182.33%	54.70%
	Aquatic Systems	Milk-Marias-Sun subalpine headwaters	Milk-Marias-Sun subalpine headwaters		177.83%	53.35%
	Aquatic Systems	Upper South Saskatchewan/ Red Deer/ Bow subalpine small river	Upper South Saskatchewan/ Red Deer/ Bow subalpine small river		170.39%	51.12%
	Aquatic Systems	Upper South Saskatchewan/ Red Deer/ Bow alpine headwaters	Upper South Saskatchewan/ Red Deer/ Bow alpine headwaters		152.62%	45.79%
	Aquatic Systems	Milk-Marias-Sun alpine headwaters	Milk-Marias-Sun alpine headwaters		150.10%	45.03%
	Aquatic Systems	Clark Fork - Flathead subalpine headwaters	Clark Fork - Flathead subalpine headwaters		150.08%	45.02%
	Aquatic Systems	Clark Fork - Flathead medium rivers	Clark Fork - Flathead medium rivers		148.19%	44.46%
	Aquatic Systems	Milk-Marias-Sun foothill small rivers	Milk-Marias-Sun foothill small rivers		140.24%	42.07%
	Aquatic Systems	Milk-Marias-Sun subalpine headwaters	Milk-Marias-Sun subalpine headwaters		138.12%	41.44%
	Aquatic Systems	Milk-Marias-Sun foothill tributaries	Milk-Marias-Sun foothill tributaries		123.32%	37.00%
	Aquatic Systems	Milk-Marias-Sun montane small rivers	Milk-Marias-Sun montane small rivers		117.65%	35.29%
	Aquatic Systems	Milk-Marias-Sun foothill tributaries	Milk-Marias-Sun foothill tributaries		112.57%	33.77%
	Aquatic Systems	Clark Fork - Flathead montane small rivers	Clark Fork - Flathead montane small rivers		104.03%	31.21%
	Aquatic Systems	Clark Fork - Flathead subalpine headwaters	Clark Fork - Flathead subalpine headwaters		90.95%	27.29%
	Aquatic Systems	Upper South Saskatchewan/ Red Deer/ Bow montane headwater	Upper South Saskatchewan/ Red Deer/ Bow montane headwater		80.56%	24.17%
	Aquatic Systems	Clark Fork - Flathead montane small rivers	Clark Fork - Flathead montane small rivers		65.06%	19.52%
	Aquatic Systems	Upper Kootenay subalpine headwaters	Upper Kootenay subalpine headwaters		64.81%	19.44%
	Aquatic Systems	Upper Kootenay montane small rivers	Upper Kootenay montane small rivers		34.44%	10.33%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		34.03%	10.21%
	Aquatic Systems	Upper Kootenay montane small rivers	Upper Kootenay montane small rivers		30.74%	9.22%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Crown of the Continent (cont'd)	Aquatic Systems	Upper South Saskatchewan/ Red Deer/ Bow foothill small river	Upper South Saskatchewan/ Red Deer/ Bow foothill small river		18.22%	5.47%
	Aquatic Systems	Upper Kootenay subalpine headwaters	Upper Kootenay subalpine headwaters		15.46%	4.64%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		13.65%	4.10%
	Aquatic Systems	Upper Kootenay medium rivers	Upper Kootenay medium rivers		12.33%	3.70%
	Aquatic Systems	Upper Kootenay montane headwaters	Upper Kootenay montane headwaters		10.93%	3.28%
	Aquatic Systems	Upper Kootenay montane headwaters	Upper Kootenay montane headwaters		8.47%	2.54%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		5.84%	1.75%
	Aquatic Systems	Clark Fork - Flathead subalpine headwaters	Clark Fork - Flathead subalpine headwaters		3.06%	0.92%
	Aquatic Systems	Clark Fork - Flathead large rivers	Clark Fork - Flathead large rivers		2.51%	0.75%
Cusick	Birds	Haliaeetus leucocephalus nest site	Bald Eagle nest site	G4	20.00%	0.65%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.19%	0.06%
	Generic Wetlands	Wetlands	Wetlands		1.86%	0.56%
	Aquatic Systems	Great Lakes large river	Great Lakes large river		4.48%	1.34%
	Aquatic Systems	Great Lakes montane small rivers	Great Lakes montane small rivers		1.10%	0.33%
	Aquatic Systems	Great Lakes montane small rivers	Great Lakes montane small rivers		0.78%	0.23%
	Aquatic Systems	Great Lakes alpine headwaters	Great Lakes alpine headwaters		0.11%	0.03%
	Aquatic Systems	Great Lakes montane headwaters	Great Lakes montane headwaters		0.09%	0.03%
	Aquatic Systems	Great Lakes alpine headwaters	Great Lakes alpine headwaters		0.04%	0.01%
Cyr Culch Bald Eagle Nest EO	Expert Nominated Sites	Montane Riparian Forest	Montane Riparian Forest		14.29%	2.00%
	Expert Nominated Sites	Ponderosa Pine Woodland	Ponderosa Pine Woodland		1.29%	0.39%
	Expert Nominated Sites	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.08%	0.02%
	Birds	Haliaeetus leucocephalus nest site	Bald Eagle nest site	G4	20.00%	0.65%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Cyr Culch Bald Eagle Nest EO (cont'd)	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	0.12%	0.06%
	Mapped Veg Type	Ponderosa Pine Woodland	Ponderosa Pine Woodland		2.43%	0.73%
	Mapped Veg Type	Sagebrush Steppe	Sagebrush Steppe		0.87%	0.26%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.50%	0.15%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.04%	0.01%
	Generic Wetlands	Wetlands	Wetlands		0.06%	0.02%
	Aquatic Systems	Clark Fork - Flathead montane small rivers	Clark Fork - Flathead montane small rivers		22.81%	6.84%
Dayton / Hog Heaven	Vascular Plants	Silene spaldingii	Spalding's campion	G2	8.00%	18.18%
	Vascular Plants	Oxytropis campestris var. columbiana	Columbia crazyweed	G5T3	7.69%	14.29%
	Mapped Veg Type	Sagebrush Steppe	Sagebrush Steppe		7.67%	2.30%
	Mapped Veg Type	Ponderosa Pine Woodland	Ponderosa Pine Woodland		6.47%	1.94%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		3.96%	1.19%
	Mapped Veg Type	Interior Grand Fir Forests	Interior Grand Fir Forests		0.06%	0.02%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.04%	0.01%
	Mapped Veg Type	Montane Spruce	Montane Spruce		0.02%	0.01%
	Generic Wetlands	Wetlands	Wetlands		0.19%	0.06%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.01%	0.00%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.01%	0.00%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		32.88%	9.86%
	Aquatic Systems	Clark Fork - Flathead montane small rivers	Clark Fork - Flathead montane small rivers		11.68%	3.50%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		4.90%	1.47%
Dishman Hills / Mica Peak	Community	Pinus ponderosa / Physocarpus malvaceus Forest		G2	33.33%	33.33%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	0.40%	0.20%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Dishman Hills / Mica Peak (cont'd)	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		2.90%	0.87%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.29%	0.09%
	Mapped Veg Type	Ponderosa Pine Woodland	Ponderosa Pine Woodland		0.00%	0.00%
	Generic Wetlands	Wetlands	Wetlands		1.79%	0.54%
	Aquatic Systems	Clark Fork - Flathead medium rivers	Clark Fork - Flathead medium rivers		333.33%	100.00%
	Aquatic Systems	Clark Fork - Flathead large rivers	Clark Fork - Flathead large rivers		24.41%	7.32%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		15.34%	4.60%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		8.93%	2.68%
East-West Connectivity North	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	2.03%	1.01%
	Wide Ranging Fish	ACIPENSER TRANSMONTANUS POP 2	White Sturgeon	G4T?Q	0.31%	0.31%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	0.31%	0.15%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		4.82%	1.45%
	Mapped Veg Type	Montane Spruce	Montane Spruce		3.99%	1.20%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		2.65%	0.79%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		1.88%	0.56%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.19%	0.06%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.14%	0.04%
	Generic Wetlands	Wetlands	Wetlands		1.31%	0.39%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	1.66%	0.66%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	1.19%	0.48%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	0.73%	0.29%
	Wide Ranging Species	High Value Gulo gulo luscus RSF	High Value North American wolverine RSF	G4T4	0.49%	0.20%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
East-West Connectivity North (cont'd)	Aquatic Systems	Upper Columbia alpine, glacial headwaters	Upper Columbia alpine, glacial headwaters		130.66%	39.20%
	Aquatic Systems	Upper Columbia montane small rivers	Upper Columbia montane small rivers		85.53%	25.66%
	Aquatic Systems	Upper Columbia subalpine headwaters	Upper Columbia subalpine headwaters		46.41%	13.92%
	Aquatic Systems	Upper Columbia montane headwaters	Upper Columbia montane headwaters		18.75%	5.62%
	Aquatic Systems	Great Lakes alpine headwaters	Great Lakes alpine headwaters		8.47%	2.54%
East-West Connectivity South	Expert Identified Sites	Grassland Communities	Grassland Communities		0.61%	0.61%
	Expert Identified Sites	Badger	Badger		0.46%	0.46%
	Expert Identified Sites	Westslope Cutthroat Trout	Westslope Cutthroat Trout		0.23%	0.23%
	Expert Identified Sites	Bull Trout	Bull Trout		0.10%	0.10%
	Birds	Melanerpes lewis	Lewis' woodpecker	G4	40.00%	11.11%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	3.36%	1.68%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	2.56%	1.28%
	Mapped Veg Type	Montane Spruce	Montane Spruce		4.24%	1.27%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		4.16%	1.25%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		4.14%	1.24%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		1.05%	0.31%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.85%	0.25%
	Generic Wetlands	Wetlands	Wetlands		0.63%	0.19%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	3.92%	1.57%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	3.56%	1.42%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.81%	0.32%
	Wide Ranging Species	High Value Gulo gulo luscus RSF	High Value North American wolverine RSF	G4T4	0.36%	0.14%
	Aquatic Systems	Upper Kootenay alpine headwaters	Upper Kootenay alpine headwaters		79.69%	23.91%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
East-West Connectivity South (cont'd)	Aquatic Systems	Great Lakes montane small rivers	Great Lakes montane small rivers		52.88%	15.86%
	Aquatic Systems	Upper Kootenay montane small rivers	Upper Kootenay montane small rivers		42.69%	12.81%
	Aquatic Systems	Great Lakes alpine headwaters	Great Lakes alpine headwaters		16.70%	5.01%
	Aquatic Systems	Upper Columbia alpine, glacial headwaters	Upper Columbia alpine, glacial headwaters		14.38%	4.31%
	Aquatic Systems	Great Lakes montane small rivers	Great Lakes montane small rivers		3.74%	1.12%
	Aquatic Systems	Great Lakes alpine headwaters	Great Lakes alpine headwaters		0.90%	0.27%
Elk River Valley	Expert Nominated Sites	Subalpine Wet Meadow	Subalpine Wet Meadow		14.29%	12.50%
	Expert Nominated Sites	Fen	Fen		14.29%	0.57%
	Expert Identified Sites	Connectivity	Connectivity		5.74%	5.74%
	Expert Identified Sites	Grassland Communities	Grassland Communities		3.18%	3.18%
	Expert Identified Sites	Badger	Badger		1.05%	1.05%
	Expert Identified Sites	Westslope Cutthroat Trout	Westslope Cutthroat Trout		0.42%	0.42%
	Expert Identified Sites	Bull Trout	Bull Trout		0.33%	0.33%
	Amphibians	Ascaphus montanus	Tailed frog	G4	57.14%	6.25%
	Vascular Plants	Erigeron Trifidus	Barren ground fleabane	G2G3Q	8.00%	15.38%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	6.61%	3.31%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	5.66%	2.83%
	Vascular Plants	Erigeron lanatus	Woolly fleabane	G3G4	4.00%	16.67%
	Wide Ranging Fish	ACIPENSER TRANSMONTANUS POP 2	White Sturgeon	G4T?Q	0.00%	0.00%
	Mapped Veg Type	Montane Spruce	Montane Spruce		11.94%	3.58%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		6.79%	2.04%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		5.95%	1.78%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		5.23%	1.57%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		1.96%	0.59%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Elk River Valley	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.29%	0.09%
	Generic Wetlands	Wetlands	Wetlands		0.89%	0.27%
	Wide Ranging Species	High Value Gulo gulo luscus RSF	High Value North American wolverine RSF	G4T4	6.22%	2.49%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	4.51%	1.80%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	2.24%	0.90%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	2.04%	0.82%
	Aquatic Systems	Upper Kootenay medium rivers	Upper Kootenay medium rivers		156.72%	47.02%
	Aquatic Systems	Upper Kootenay montane small rivers	Upper Kootenay montane small rivers		102.58%	30.77%
	Aquatic Systems	Upper Kootenay subalpine headwaters	Upper Kootenay subalpine headwaters		82.40%	24.72%
	Aquatic Systems	Upper Kootenay montane headwaters	Upper Kootenay montane headwaters		19.57%	5.87%
	Aquatic Systems	Upper Columbia alpine, glacial headwaters	Upper Columbia alpine, glacial headwaters		15.15%	4.55%
	Aquatic Systems	Upper Kootenay montane headwaters	Upper Kootenay montane headwaters		2.08%	0.62%
Flathead Lake and Wetlands	Expert Nominated Sites	Fen	Fen		85.71%	3.41%
	Expert Nominated Sites	Montane Wet Meadows	Montane Wet Meadows		57.14%	5.33%
	Expert Nominated Sites	Marsh	Marsh		57.14%	2.82%
	Expert Nominated Sites	Montane Riparian Forest	Montane Riparian Forest		28.57%	4.00%
	Expert Nominated Sites	Montane Riparian Shrubland	Montane Riparian Shrubland		28.57%	1.82%
	Expert Nominated Sites	Conifer Swamp	Conifer Swamp		14.29%	6.25%
	Expert Nominated Sites	Aspen	Aspen		0.71%	0.21%
	Birds	Haliaeetus leucocephalus nest site	Bald Eagle nest site	G4	220.00%	7.10%
	Amphibians	Bufo boreas	Western toad	G4	60.00%	2.00%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Flathead Lake and Wetlands (cont'd)	Amphibians	Rana pipiens	Northern leopard frog	G5	57.14%	20.00%
	Vascular Plants	Oxytropis campestris var. columbiana	Columbia crazyweed	G5T3	30.77%	57.14%
	Aquatic Eos	STAGNICOLA ELRODI	FLATHEAD PONDSNAIL	G1	24.00%	50.00%
	Birds	Asio flammeus	Short-eared Owl	G5	20.00%	14.29%
	Birds	Gavia immer	Common Loon	G5	20.00%	0.94%
	Vascular Plants	Carex stenoptila	Small-winged sedge	G3?	15.38%	100.00%
	Vascular Plants	Nymphaea leibergii	Dwarf water-lily	G5	15.38%	50.00%
	Community	Picea (engelmannii X glauca, engelmannii) / Lysichiton americanus Forest		G2	8.00%	20.00%
	Aquatic Eos	COTTUS CONFUSUS	SHORTHEAD SCULPIN	G5	7.69%	7.14%
	Vascular Plants	Carex comosa	Birstly sedge	G5	7.69%	16.67%
	Vascular Plants	Botrychium montanum	Mountain moonwort	G3	7.69%	1.41%
	Non-Vascular Plants	Grimmia brittoniae		G1	4.00%	16.67%
	Vascular Plants	Silene spaldingii	Spalding's campion	G2	4.00%	9.09%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	1.54%	0.77%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	0.06%	0.03%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		7.51%	2.25%
	Mapped Veg Type	Montane Spruce	Montane Spruce		2.50%	0.75%
	Mapped Veg Type	Ponderosa Pine Woodland	Ponderosa Pine Woodland		2.37%	0.71%
	Mapped Veg Type	Interior Grand Fir Forests	Interior Grand Fir Forests		1.42%	0.43%
	Mapped Veg Type	Rough Fescue Prairie	Rough Fescue Prairie		0.34%	0.10%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.16%	0.05%
	Mapped Veg Type	Sagebrush Steppe	Sagebrush Steppe		0.14%	0.04%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.14%	0.04%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Flathead Lake and Wetlands (cont'd)	Generic Wetlands	Wetlands	Wetlands		6.23%	1.87%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.22%	0.09%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.04%	0.02%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	0.03%	0.01%
	Aquatic Systems	Clark Fork - Flathead medium rivers	Clark Fork - Flathead medium rivers		54.02%	16.21%
	Aquatic Systems	Clark Fork - Flathead montane small rivers	Clark Fork - Flathead montane small rivers		49.88%	14.96%
	Aquatic Systems	Clark Fork - Flathead subalpine headwaters	Clark Fork - Flathead subalpine headwaters		49.32%	14.80%
	Aquatic Systems	Clark Fork - Flathead large rivers	Clark Fork - Flathead large rivers		44.92%	13.48%
	Aquatic Systems	Clark Fork - Flathead subalpine headwaters	Clark Fork - Flathead subalpine headwaters		22.41%	6.72%
	Aquatic Systems	Clark Fork - Flathead montane small rivers	Clark Fork - Flathead montane small rivers		20.50%	6.15%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		7.93%	2.38%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		7.66%	2.30%
Fleabane / Salmon Driven	Vascular Plants	Erigeron Trifidus	Barren ground fleabane	G2G3Q	4.00%	7.69%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	0.25%	0.13%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		0.76%	0.23%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.03%	0.01%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.13%	0.05%
	Wide Ranging Species	High Value Gulo gulo luscus RSF	High Value North American wolverine RSF	G4T4	0.04%	0.01%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	0.01%	0.00%
	Aquatic Systems	Upper Fraser alpine, glacial headwaters	Upper Fraser alpine, glacial headwaters		28.07%	8.42%
Fraser River Headwaters	Expert Nominated Sites	Lodgepole Pine Forest and Woodlands	Lodgepole Pine Forest and Woodlands		84.55%	25.36%
	Expert Identified Sites	Grizzly Bear	Grizzly Bear		1.81%	1.81%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Fraser River Headwaters (cont'd)	Community	Pinus contorta / Vaccinium myrtilloides / Cladonia		S2	4.00%	100.00%
	Wide Ranging Fish	Onchorhynchus tshawytscha	Chinook Salmon		1.40%	0.42%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	0.67%	0.34%
	Mapped Veg Type	Hybrid Spruce Forests	Hybrid Spruce Forests		11.95%	3.58%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.24%	0.07%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.23%	0.07%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		0.11%	0.03%
	Generic Wetlands	Wetlands	Wetlands		0.81%	0.24%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.34%	0.14%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	0.14%	0.06%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.12%	0.05%
	Aquatic Systems	Upper Fraser medium rivers	Upper Fraser medium rivers		241.68%	72.51%
	Aquatic Systems	Upper Fraser montane headwaters	Upper Fraser montane headwaters		165.09%	49.53%
	Aquatic Systems	Upper Fraser alpine, glacial small rivers	Upper Fraser alpine, glacial small rivers		72.92%	21.88%
	Aquatic Systems	Upper Fraser montane headwaters	Upper Fraser montane headwaters		39.02%	11.71%
	Aquatic Systems	Upper Fraser subalpine headwaters	Upper Fraser subalpine headwaters		20.39%	6.12%
	Aquatic Systems	Upper Fraser montane headwaters	Upper Fraser montane headwaters		3.54%	1.06%
	Aquatic Systems	Upper Fraser alpine headwaters	Upper Fraser alpine headwaters		1.00%	0.30%
Granby	Expert Identified Sites	Connectivity	Connectivity		5.57%	5.57%
	Wide Ranging Fish	RHINICHTHYS OSCULUS	SPECKLED DACE	G5	204.89%	61.47%
	Aquatic Eos	RHINICHTHYS OSCULUS	SPECKLED DACE	G5	7.69%	100.00%
	Vascular Plants	Botrychium hesperium	Western moonwort	G3	7.69%	5.56%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	0.33%	0.17%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	0.33%	0.16%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Granby (cont'd)	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		4.44%	1.33%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		3.92%	1.18%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		3.72%	1.11%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		0.49%	0.15%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.49%	0.15%
	Mapped Veg Type	Montane Spruce	Montane Spruce		0.17%	0.05%
	Generic Wetlands	Wetlands	Wetlands		0.75%	0.23%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	3.87%	1.55%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	3.66%	1.46%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	2.97%	1.19%
	Wide Ranging Species	High Value Gulo gulo luscus RSF	High Value North American wolverine RSF	G4T4	0.02%	0.01%
	Aquatic Systems	Okanagan foothill tributaries	Okanagan foothill tributaries		333.33%	100.00%
	Aquatic Systems	Okanagan montane small rivers	Okanagan montane small rivers		318.02%	95.41%
	Aquatic Systems	Okanagan montane small rivers	Okanagan montane small rivers		222.76%	66.83%
	Aquatic Systems	Okanagan montane headwaters	Okanagan montane headwaters		198.94%	59.68%
	Aquatic Systems	Okanagan medium rivers	Okanagan medium rivers		169.57%	50.87%
	Aquatic Systems	Okanagan subalpine headwaters	Okanagan subalpine headwaters		143.79%	43.14%
	Aquatic Systems	Okanagan subalpine headwaters	Okanagan subalpine headwaters		104.14%	31.24%
	Aquatic Systems	Okanagan subalpine headwaters	Okanagan subalpine headwaters		95.85%	28.75%
	Aquatic Systems	Thompson alpine headwaters	Thompson alpine headwaters		32.39%	9.72%
	Aquatic Systems	Great Lakes alpine headwaters	Great Lakes alpine headwaters		20.54%	6.16%
	Aquatic Systems	Thompson alpine headwaters	Thompson alpine headwaters		12.33%	3.70%
	Aquatic Systems	Thompson montane headwaters	Thompson montane headwaters		12.10%	3.63%
	Aquatic Systems	Okanagan montane small rivers	Okanagan montane small rivers		11.25%	3.38%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Granby (cont'd)	Aquatic Systems	Great Lakes montane small rivers	Great Lakes montane small rivers		8.96%	2.69%
	Aquatic Systems	Great Lakes alpine headwaters	Great Lakes alpine headwaters		2.39%	0.72%
	Aquatic Systems	Thompson montane small rivers	Thompson montane small rivers		0.13%	0.04%
Hixon Creek Headwaters	Wide Ranging Fish	Onchorhynchus tshawytscha	Chinook Salmon		0.66%	0.20%
	Mapped Veg Type	Hybrid Spruce Forests	Hybrid Spruce Forests		1.51%	0.45%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.07%	0.02%
	Generic Wetlands	Wetlands	Wetlands		0.00%	0.00%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.27%	0.11%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	0.12%	0.05%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.11%	0.04%
	Aquatic Systems	Middle Fraser subalpine headwaters	Middle Fraser subalpine headwaters		24.79%	7.44%
Hunt Girl Creek	Expert Nominated Sites	Subalpine fir - Mountain Hemlock Woodlands	Subalpine fir - Mountain Hemlock Woodlands		333.26%	99.98%
	Expert Nominated Sites	Engelmannii Spruce Riparian Forests	Engelmannii Spruce Riparian Forests		14.29%	16.67%
	Expert Nominated Sites	Montane Wet Meadows	Montane Wet Meadows		14.29%	1.33%
	Expert Nominated Sites	Fen	Fen		14.29%	0.57%
	Expert Nominated Sites	Lodgepole Pine Forest and Woodlands	Lodgepole Pine Forest and Woodlands		9.58%	2.87%
	Expert Nominated Sites	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		8.34%	2.50%
	Expert Nominated Sites	Engelmann Spruce / Subalpine Fir Dry Forests	Engelmann Spruce / Subalpine Fir Dry Forests		4.21%	1.26%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.14%	0.04%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.05%	0.02%
	Generic Wetlands	Wetlands	Wetlands		0.01%	0.00%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.07%	0.03%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	0.04%	0.02%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Hunt Girl Creek (cont'd)	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.01%	0.01%
	Aquatic Systems	Upper Kootenay montane headwaters	Upper Kootenay montane headwaters		4.64%	1.39%
Jocko River	Amphibians	Bufo boreas	Western toad	G4	80.00%	2.67%
	Birds	Haliaeetus leucocephalus nest site	Bald Eagle nest site	G4	60.00%	1.94%
	Mammals	Corynorhinus townsendii	Townsend's big-eared bat	G4	42.86%	18.75%
	Birds	Otus flammeolus	Flammulated Owl	G4	40.00%	7.14%
	Vascular Plants	Botrychium lineare		G2*	7.69%	25.00%
	Vascular Plants	Cypripedium fasciculatum	Clustered lady's-slipper	G4	7.69%	1.35%
	Aquatic Eos	STAGNICOLA ELRODIANA	LONGMOUTH PONDSNAIL	G1	4.00%	25.00%
	Snails and Slugs	Oreohelix alpina	Alpine mountainsnail	G1	4.00%	50.00%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	0.54%	0.27%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	0.15%	0.08%
	Mapped Veg Type	Rough Fescue Prairie	Rough Fescue Prairie		34.29%	10.29%
	Mapped Veg Type	Sagebrush Steppe	Sagebrush Steppe		23.11%	6.93%
	Mapped Veg Type	Ponderosa Pine Woodland	Ponderosa Pine Woodland		21.18%	6.35%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		6.39%	1.92%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		0.24%	0.07%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.18%	0.05%
	Generic Wetlands	Wetlands	Wetlands		1.54%	0.46%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	0.23%	0.09%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.18%	0.07%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.02%	0.01%
	Aquatic Systems	Clark Fork - Flathead montane small rivers	Clark Fork - Flathead montane small rivers		99.26%	29.78%
	Aquatic Systems	Clark Fork - Flathead subalpine headwaters	Clark Fork - Flathead subalpine headwaters		37.66%	11.30%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		32.87%	9.86%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Jocko River (cont'd)	Aquatic Systems	Clark Fork - Flathead large rivers	Clark Fork - Flathead large rivers		10.53%	3.16%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		5.17%	1.55%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		0.97%	0.29%
Kakwa / Willmore	Expert Identified Sites	Alberta ESA	Alberta ESA		15.13%	15.13%
	Birds	Histrionicus histrionicus	Harlequin Duck	G4	140.00%	6.67%
	Vascular Plants	Salix raupii	A willow	G2	33.33%	100.00%
	Vascular Plants	Draba porsildii	Porsild's whitlow-grass	G3	30.77%	66.67%
	Vascular Plants	Erigeron Trifidus	Barren ground fleabane	G2G3Q	16.00%	30.77%
	Non-Vascular Plants	Bryum knowltonii		G3	7.69%	100.00%
	Non-Vascular Plants	Drepanocladus crassicostatus	Brown moss	G3G5	7.69%	50.00%
	Non-Vascular Plants	Seligeria subimmersa	A moss	G5?	7.69%	50.00%
	Vascular Plants	Malaxis paludosa	Bog adder's-mouth	G4	7.69%	100.00%
	Wide Ranging Fish	Onchorhynchus tshawytscha	Chinook Salmon		1.50%	0.45%
	Mapped Veg Type	Foothills Boreal Forests	Foothills Boreal Forests		63.59%	19.08%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		16.59%	4.98%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		15.08%	4.52%
	Mapped Veg Type	Montane Spruce	Montane Spruce		2.48%	0.74%
	Generic Wetlands	Wetlands	Wetlands		0.51%	0.15%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	17.77%	7.11%
	Wide Ranging Species	High Value Gulo gulo luscus RSF	High Value North American wolverine RSF	G4T4	7.76%	3.10%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	4.08%	1.63%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	3.79%	1.52%
	Aquatic Systems	Smoky - Upper Athabasca medium rivers	Smoky - Upper Athabasca medium rivers		333.33%	100.00%
	Aquatic Systems	Smoky - Upper Athabasca subalpine headwaters	Smoky - Upper Athabasca subalpine headwaters		253.05%	75.92%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Kakwa / Willmore (cont'd)	Aquatic Systems	Smoky - Upper Athabasca alpine headwaters	Smoky - Upper Athabasca alpine headwaters		248.82%	74.65%
	Aquatic Systems	Smoky - Upper Athabasca montane small rivers	Smoky - Upper Athabasca montane small rivers		244.09%	73.23%
	Aquatic Systems	Smoky - Upper Athabasca subalpine small rivers	Smoky - Upper Athabasca subalpine small rivers		239.46%	71.84%
	Aquatic Systems	Smoky - Upper Athabasca alpine headwaters	Smoky - Upper Athabasca alpine headwaters		226.19%	67.86%
	Aquatic Systems	Smoky - Upper Athabasca subalpine headwaters	Smoky - Upper Athabasca subalpine headwaters		222.40%	66.72%
	Aquatic Systems	Smoky - Upper Athabasca medium rivers	Smoky - Upper Athabasca medium rivers		194.88%	58.46%
	Aquatic Systems	Smoky - Upper Athabasca alpine, glacial headwaters	Smoky - Upper Athabasca alpine, glacial headwaters		74.95%	22.49%
	Aquatic Systems	Smoky - Upper Athabasca subalpine, glacial small rivers	Smoky - Upper Athabasca subalpine, glacial small r		45.72%	13.71%
	Aquatic Systems	Smoky - Upper Athabasca subalpine small rivers	Smoky - Upper Athabasca subalpine small rivers		44.39%	13.32%
	Aquatic Systems	Smoky - Upper Athabasca alpine headwaters	Smoky - Upper Athabasca alpine headwaters		33.55%	10.06%
	Aquatic Systems	Upper Fraser alpine headwaters	Upper Fraser alpine headwaters		14.56%	4.37%
	Aquatic Systems	Smoky - Upper Athabasca subalpine headwaters	Smoky - Upper Athabasca subalpine headwaters		9.12%	2.74%
	Aquatic Systems	Upper Fraser subalpine headwaters	Upper Fraser subalpine headwaters		7.38%	2.21%
	Aquatic Systems	Upper Fraser subalpine small rivers	Upper Fraser subalpine small rivers		0.63%	0.19%
Kootenai River	Expert Nominated Sites	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.02%	0.01%
	Expert Nominated Sites	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.00%	0.00%
	Birds	Haliaeetus leucocephalus nest site	Bald Eagle nest site	G4	160.00%	5.16%
	Birds	Otus flammeolus	Flammulated Owl	G4	80.00%	14.29%
	Amphibians	Plethodon idahoensis	Coeur d'Alene salamander	G3	55.56%	4.50%
	Birds	Gavia immer	Common Loon	G5	20.00%	0.94%
	Wide Ranging Fish	ACIPENSER TRANSMONTANUS POP 2	White Sturgeon	G4T?Q	2.74%	2.74%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Kootenai River (cont'd)	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	0.67%	0.34%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		2.84%	0.85%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		2.21%	0.66%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.47%	0.14%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.05%	0.01%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.03%	0.01%
	Aquatic Systems	Upper Kootenay large river	Upper Kootenay large river		67.46%	20.24%
	Aquatic Systems	Upper Kootenay montane headwaters	Upper Kootenay montane headwaters		5.54%	1.66%
Kootenay River A	Expert Nominated Sites	Montane Riparian Shrubland	Montane Riparian Shrubland		114.29%	7.27%
	Expert Nominated Sites	Marsh	Marsh		114.29%	5.63%
	Expert Nominated Sites	Fen	Fen		100.00%	3.98%
	Expert Identified Sites	Leopard Frog	Leopard Frog		50.00%	50.00%
	Expert Identified Sites	Short-eared owl	Short-eared owl		50.00%	50.00%
	Expert Nominated Sites	Montane Riparian Forest	Montane Riparian Forest		42.86%	6.00%
	Expert Identified Sites	Sturgeon	Sturgeon		39.96%	39.96%
	Expert Identified Sites	Coeur d'Alene salamander	Coeur d'Alene salamander		39.34%	39.34%
	Expert Nominated Sites	Sphagnum Bog	Sphagnum Bog		28.57%	7.69%
	Expert Nominated Sites	Montane Wet Meadows	Montane Wet Meadows		28.57%	2.67%
	Expert Identified Sites	Wetlands	Wetlands		5.30%	5.30%
	Expert Nominated Sites	Interior Grand Fir Forests	Interior Grand Fir Forests		4.73%	1.42%
	Expert Nominated Sites	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.82%	0.25%
	Expert Identified Sites	Grizzly Bear	Grizzly Bear		0.76%	0.76%
	Expert Identified Sites	Connectivity	Connectivity		0.38%	0.38%
	Expert Nominated Sites	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.07%	0.02%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Kootenay River A (cont'd)	Birds	Haliaeetus leucocephalus nest site	Bald Eagle nest site	G4	160.00%	5.16%
	Wide Ranging Fish	Lota lota	Burbot	G5	67.36%	67.36%
	Birds	Asio flammeus	Short-eared Owl	G5	40.00%	28.57%
	Amphibians	Rana pipiens	Northern leopard frog	G5	28.57%	10.00%
	Amphibians	Plethodon idahoensis	Coeur d'Alene salamander	G3	22.22%	1.80%
	Birds	Haliaeetus leucocephalus wintering area	Bald Eagle wintering area	G4	20.00%	14.29%
	Birds	Otus flammeolus	Flammulated Owl	G4	20.00%	3.57%
	Birds	Histrionicus histrionicus	Harlequin Duck	G4	20.00%	0.95%
	Vascular Plants	Botrychium ascendens	Upward-lobed moonwort	G3*	15.38%	10.00%
	Vascular Plants	Botrychium montanum	Mountain moonwort	G3	15.38%	2.82%
	Mammals	Corynorhinus townsendii	Townsend's big-eared bat	G4	14.29%	6.25%
	Vascular Plants	Carex comosa	Birstly sedge	G5	7.69%	16.67%
	Vascular Plants	Botrychium paradoxum	Peculiar moonwort	G3*	7.69%	3.85%
	Wide Ranging Fish	ACIPENSER TRANSMONTANUS POP 2	White Sturgeon	G4T?Q	5.92%	5.92%
	Wide Ranging Fish	RHINICHTHYS UMATILLA	UMATILLA DACE	G4	4.17%	1.25%
	Mammals	Thomomys talpoides segregatus	Creston Northern Pocket Gopher	G5T1T3	3.85%	100.00%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	2.73%	1.37%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	1.75%	0.87%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		6.17%	1.85%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		3.98%	1.19%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.49%	0.15%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		0.01%	0.00%
	Generic Wetlands	Wetlands	Wetlands		9.77%	2.93%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.55%	0.22%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Kootenay River A (cont'd)	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.18%	0.07%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	0.08%	0.03%
	Wide Ranging Species	High Value Gulo gulo luscus RSF	High Value North American wolverine RSF	G4T4	0.02%	0.01%
	Aquatic Systems	Upper Kootenay montane small rivers	Upper Kootenay montane small rivers		142.13%	42.64%
	Aquatic Systems	Upper Kootenay medium rivers	Upper Kootenay medium rivers		121.09%	36.33%
	Aquatic Systems	Upper Kootenay large river	Upper Kootenay large river		111.96%	33.59%
	Aquatic Systems	Upper Kootenay montane small rivers	Upper Kootenay montane small rivers		98.56%	29.57%
	Aquatic Systems	Upper Columbia montane headwaters	Upper Columbia montane headwaters		93.18%	27.95%
	Aquatic Systems	Upper Kootenay alpine headwaters	Upper Kootenay alpine headwaters		20.63%	6.19%
	Aquatic Systems	Upper Kootenay montane headwaters	Upper Kootenay montane headwaters		14.03%	4.21%
	Aquatic Systems	Upper Kootenay montane headwaters	Upper Kootenay montane headwaters		5.01%	1.50%
	Aquatic Systems	Upper Kootenay medium rivers	Upper Kootenay medium rivers		4.73%	1.42%
	Aquatic Systems	Upper Columbia subalpine headwaters	Upper Columbia subalpine headwaters		1.91%	0.57%
	Aquatic Systems	Great Lakes large river	Great Lakes large river		1.77%	0.53%
Kootenay River B	Expert Nominated Sites	Marsh	Marsh		28.57%	1.41%
	Expert Nominated Sites	Rock Outcrop / Cliff	Rock Outcrop / Cliff		14.29%	25.00%
	Expert Identified Sites	Connectivity	Connectivity		0.85%	0.85%
	Expert Nominated Sites	Ponderosa Pine Woodland	Ponderosa Pine Woodland		0.67%	0.20%
	Expert Nominated Sites	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.22%	0.06%
	Wide Ranging Fish	RHINICHTHYS UMATILLA	UMATILLA DACE	G4	142.44%	42.73%
	Amphibians	Plethodon idahoensis	Coeur d'Alene salamander	G3	44.44%	3.60%
	Amphibians	Ascaphus montanus	Tailed frog	G4	28.57%	3.13%
	Vascular Plants	Myriophyllum ussuriense	Ussurian water-milfoil	G3	23.08%	100.00%
	Wide Ranging Fish	ACIPENSER TRANSMONTANUS POP 2	White Sturgeon	G4T?Q	13.50%	13.50%
	Non-Vascular Plants	Barbula eustegia		G3?	7.69%	100.00%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Kootenay River B (cont'd)	Non-Vascular Plants	Tetrodontium repandum		G2G3	7.69%	100.00%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	6.16%	3.08%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	5.08%	2.54%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		9.01%	2.70%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		3.89%	1.17%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		1.60%	0.48%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.61%	0.18%
	Generic Wetlands	Wetlands	Wetlands		0.56%	0.17%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	3.19%	1.27%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	2.10%	0.84%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	1.97%	0.79%
	Aquatic Systems	Great Lakes large river	Great Lakes large river		115.77%	34.73%
	Aquatic Systems	Great Lakes medium rivers	Great Lakes medium rivers		67.49%	20.25%
	Aquatic Systems	Great Lakes montane headwaters	Great Lakes montane headwaters		59.96%	17.99%
	Aquatic Systems	Great Lakes montane small rivers	Great Lakes montane small rivers		54.79%	16.44%
	Aquatic Systems	Great Lakes alpine headwaters	Great Lakes alpine headwaters		46.26%	13.88%
	Aquatic Systems	Great Lakes montane headwaters	Great Lakes montane headwaters		26.72%	8.02%
	Aquatic Systems	Great Lakes montane small rivers	Great Lakes montane small rivers		5.99%	1.80%
Kootenay River C	Expert Identified Sites	Burbot	Burbot		48.79%	48.79%
	Expert Identified Sites	Aquatics	Aquatics		15.89%	15.89%
	Expert Nominated Sites	Marsh	Marsh		14.29%	0.70%
	Expert Identified Sites	Riparian Forest	Riparian Forest		11.77%	11.77%
	Expert Identified Sites	Connectivity	Connectivity		2.06%	2.06%
	Wide Ranging Fish	RHINICHTHYS UMATILLA	UMATILLA DACE	G4	46.44%	13.93%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Kootenay River C (cont'd)	Wide Ranging Fish	ACIPENSER TRANSMONTANUS POP 2	White Sturgeon	G4T?Q	7.66%	7.66%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	3.09%	1.54%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	1.36%	0.68%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		4.70%	1.41%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		2.38%	0.71%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		1.68%	0.50%
	Generic Wetlands	Wetlands	Wetlands		1.02%	0.31%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	2.70%	1.08%
	Wide Ranging Species	High Value Gulo gulo luscus RSF	High Value North American wolverine RSF	G4T4	2.05%	0.82%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	1.83%	0.73%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.18%	0.07%
	Aquatic Systems	Great Lakes medium rivers	Great Lakes medium rivers		153.27%	45.98%
	Aquatic Systems	Great Lakes montane small rivers	Great Lakes montane small rivers		94.81%	28.44%
	Aquatic Systems	Great Lakes alpine headwaters	Great Lakes alpine headwaters		16.13%	4.84%
	Aquatic Systems	Great Lakes montane small rivers	Great Lakes montane small rivers		15.38%	4.61%
	Aquatic Systems	Great Lakes alpine headwaters	Great Lakes alpine headwaters		2.64%	0.79%
Lake Pend Oreille	Expert Nominated Sites	Montane Riparian Shrubland	Montane Riparian Shrubland		42.86%	2.73%
	Expert Nominated Sites	Marsh	Marsh		42.86%	2.11%
	Expert Nominated Sites	Fen	Fen		42.86%	1.70%
	Expert Nominated Sites	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		11.29%	3.39%
	Expert Identified Sites	Bull Trout	Bull Trout		0.98%	0.98%
	Birds	Haliaeetus leucocephalus nest site	Bald Eagle nest site	G4	100.00%	3.23%
	Birds	Histrionicus histrionicus	Harlequin Duck	G4	40.00%	1.90%
	Mammals	Corynorhinus townsendii	Townsend's big-eared bat	G4	28.57%	12.50%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Lake Pend Oreille (cont'd)	Birds	Gavia immer	Common Loon	G5	20.00%	0.94%
	Vascular Plants	Carex comosa	Birstly sedge	G5	7.69%	16.67%
	Vascular Plants	Botrychium ascendens	Upward-lobed moonwort	G3*	7.69%	5.00%
	Vascular Plants	Botrychium pedunculosum	Stalked moonwort	G3*	7.69%	3.23%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	0.31%	0.15%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	0.28%	0.14%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		1.82%	0.55%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		1.30%	0.39%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.07%	0.02%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.04%	0.01%
	Generic Wetlands	Wetlands	Wetlands		0.94%	0.28%
	Wide Ranging Species	High Value Martes pennanti RSF	High Value Fisher RSF	G5	0.65%	0.26%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.22%	0.09%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.07%	0.03%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	0.05%	0.02%
	Aquatic Systems	Great Lakes montane headwaters	Great Lakes montane headwaters		67.90%	20.37%
	Aquatic Systems	Great Lakes large river	Great Lakes large river		30.52%	9.16%
	Aquatic Systems	Great Lakes montane small rivers	Great Lakes montane small rivers		29.73%	8.92%
Landslide	Expert Nominated Sites	Disturbed Colluvial / Landslide	Disturbed Colluvial / Landslide		14.29%	10.00%
	Wide Ranging Fish	Onchorhynchus tshawytscha	Chinook Salmon		2.48%	0.75%
	Wide Ranging Fish	ACIPENSER TRANSMONTANUS POP 2	White Sturgeon	G4T?Q	0.10%	0.10%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	0.03%	0.01%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		0.58%	0.17%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.26%	0.08%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Landslide (cont'd)	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.17%	0.05%
	Mapped Veg Type	Hybrid Spruce Forests	Hybrid Spruce Forests		0.01%	0.00%
	Generic Wetlands	Wetlands	Wetlands		0.05%	0.02%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	0.46%	0.18%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.42%	0.17%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.09%	0.03%
	Wide Ranging Species	High Value Gulo gulo luscus RSF	High Value North American wolverine RSF	G4T4	0.07%	0.03%
	Aquatic Systems	Upper Fraser montane headwaters	Upper Fraser montane headwaters		60.32%	18.10%
	Aquatic Systems	Upper Fraser alpine headwaters	Upper Fraser alpine headwaters		12.68%	3.80%
Least (Selkirk) Chipmunk	Mammals	Tamias minimus selkirki	Selkirk Least Chipmunk	G5T1T3	4.00%	100.00%
	Mapped Veg Type	Montane Spruce	Montane Spruce		0.05%	0.02%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.05%	0.01%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.02%	0.01%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		0.01%	0.00%
	Wide Ranging Species	High Value Gulo gulo luscus RSF	High Value North American wolverine RSF	G4T4	0.10%	0.04%
	Aquatic Systems	Upper Columbia subalpine headwaters	Upper Columbia subalpine headwaters		3.43%	1.03%
Little Bitterroot River	Expert Nominated Sites	Disturbed Colluvial / Landslide	Disturbed Colluvial / Landslide		28.57%	20.00%
	Expert Nominated Sites	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.09%	0.03%
	Amphibians	Bufo boreas	Western toad	G4	40.00%	1.33%
	Birds	Haliaeetus leucocephalus nest site	Bald Eagle nest site	G4	40.00%	1.29%
	Vascular Plants	Silene spaldingii	Spalding's campion	G2	16.00%	36.36%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	0.60%	0.30%
	Mapped Veg Type	Sagebrush Steppe	Sagebrush Steppe		33.08%	9.93%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Little Bitterroot River (cont'd)	Mapped Veg Type	Ponderosa Pine Woodland	Ponderosa Pine Woodland		8.51%	2.55%
	Mapped Veg Type	Interior Grand Fir Forests	Interior Grand Fir Forests		7.34%	2.20%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		1.07%	0.32%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.00%	0.00%
	Generic Wetlands	Wetlands	Wetlands		1.59%	0.48%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.00%	0.00%
	Aquatic Systems	Clark Fork - Flathead montane small rivers	Clark Fork - Flathead montane small rivers		120.88%	36.26%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		5.03%	1.51%
Little NF CDA Trib Model Data	Expert Nominated Sites	Interior Grand Fir Forests	Interior Grand Fir Forests		10.31%	3.09%
	Expert Nominated Sites	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		1.78%	0.53%
	Expert Nominated Sites	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.16%	0.05%
	Community	Tsuga heterophylla / Rubus pedatum Forest		G2	14.29%	100.00%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	0.03%	0.02%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.09%	0.03%
	Generic Wetlands	Wetlands	Wetlands		0.01%	0.00%
	Wide Ranging Species	High Value Martes pennanti RSF	High Value Fisher RSF	G5	0.41%	0.16%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		3.89%	1.17%
Lower Coeur d'Alene	Birds	Haliaeetus leucocephalus nest site	Bald Eagle nest site	G4	60.00%	1.94%
	Birds	Haliaeetus leucocephalus wintering area	Bald Eagle wintering area	G4	20.00%	14.29%
	Community	Abies grandis / Taxus brevifolia Forest		G2	14.29%	100.00%
	Vascular Plants	Cephalanthera austiniae	Phantom orchid	G4	7.69%	4.17%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	0.99%	0.50%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Little NF CDA Trib Model Data	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	0.52%	0.26%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		1.84%	0.55%
Lower Coeur d'Alene	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		1.82%	0.54%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.07%	0.02%
	Generic Wetlands	Wetlands	Wetlands		0.06%	0.02%
	Wide Ranging Species	High Value Martes pennanti RSF	High Value Fisher RSF	G5	0.58%	0.23%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.07%	0.03%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	0.03%	0.01%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.02%	0.01%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		49.57%	14.87%
	Aquatic Systems	Clark Fork - Flathead medium rivers	Clark Fork - Flathead medium rivers		46.57%	13.97%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		4.08%	1.23%
Lower Columbia A	Expert Identified Sites	Northern long-eared myotis	Northern long-eared myotis		50.00%	50.00%
	Expert Identified Sites	Fen	Fen		20.42%	20.42%
	Expert Identified Sites	Caribou	Caribou		20.33%	20.33%
	Wide Ranging Fish	ACIPENSER TRANSMONTANUS POP 2	White Sturgeon	G4T?Q	3.96%	3.96%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	2.03%	1.01%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	1.60%	0.80%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		5.19%	1.56%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		2.06%	0.62%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		1.74%	0.52%
	Generic Wetlands	Wetlands	Wetlands		1.14%	0.34%
	Wide Ranging Species	High Value Gulo gulo luscus RSF	High Value North American wolverine RSF	G4T4	6.06%	2.42%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	2.56%	1.03%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Lower Columbia A (cont'd)	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	1.99%	0.80%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.57%	0.23%
	Aquatic Systems	Upper Columbia montane small rivers	Upper Columbia montane small rivers		185.02%	55.51%
	Aquatic Systems	Great Lakes large river	Great Lakes large river		82.35%	24.71%
	Aquatic Systems	Upper Columbia montane, glacial small rivers	Upper Columbia montane, glacial small rivers		43.68%	13.10%
	Aquatic Systems	Upper Columbia alpine, glacial headwaters	Upper Columbia alpine, glacial headwaters		31.96%	9.59%
	Aquatic Systems	Upper Columbia subalpine headwaters	Upper Columbia subalpine headwaters		14.39%	4.32%
	Aquatic Systems	Upper Columbia montane headwaters	Upper Columbia montane headwaters		13.49%	4.05%
Lower Columbia B	Expert Nominated Sites	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		15.85%	4.75%
	Expert Identified Sites	Coeur d'Alene salamander	Coeur d'Alene salamander		10.66%	10.66%
	Expert Nominated Sites	Interior Douglas Fir Forests	Interior Douglas Fir Forests		5.59%	1.68%
	Expert Identified Sites	Caribou	Caribou		2.25%	2.25%
	Expert Identified Sites	Riparian Forest	Riparian Forest		2.00%	2.00%
	Expert Identified Sites	Grizzly Bear	Grizzly Bear		1.36%	1.36%
	Expert Identified Sites	Connectivity	Connectivity		0.35%	0.35%
	Wide Ranging Fish	RHINICHTHYS UMATILLA	UMATILLA DACE	G4	43.34%	13.00%
	Birds	Melanerpes lewis	Lewis' woodpecker	G4	20.00%	5.56%
	Wide Ranging Fish	ACIPENSER TRANSMONTANUS POP 2	White Sturgeon	G4T?Q	19.97%	19.97%
	Aquatic Eos	COTTUS CONFUSUS	SHORTHEAD SCULPIN	G5	7.69%	7.14%
	Vascular Plants	Carex amplifolia	Big-leaf sedge	G4	7.69%	33.33%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	6.39%	3.20%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	5.58%	2.79%
	Community	Pseudotsuga menziesii / Mahonia aquifolium / Cryptogramma		S2?	4.00%	100.00%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		11.63%	3.49%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Lower Columbia B (cont'd)	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		2.68%	0.80%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		1.20%	0.36%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.96%	0.29%
	Generic Wetlands	Wetlands	Wetlands		0.86%	0.26%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	2.90%	1.16%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	2.06%	0.82%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	1.17%	0.47%
	Wide Ranging Species	High Value Gulo gulo luscus RSF	High Value North American wolverine RSF	G4T4	0.11%	0.04%
	Aquatic Systems	Great Lakes medium rivers	Great Lakes medium rivers		333.33%	100.00%
	Aquatic Systems	Great Lakes large river	Great Lakes large river		139.73%	41.92%
	Aquatic Systems	Upper Columbia subalpine headwaters	Upper Columbia subalpine headwaters		52.94%	15.88%
	Aquatic Systems	Upper Columbia medium rivers	Upper Columbia medium rivers		45.45%	13.64%
	Aquatic Systems	Great Lakes alpine headwaters	Great Lakes alpine headwaters		36.41%	10.92%
	Aquatic Systems	Great Lakes montane small rivers	Great Lakes montane small rivers		27.66%	8.30%
	Aquatic Systems	Great Lakes alpine headwaters	Great Lakes alpine headwaters		19.06%	5.72%
	Aquatic Systems	Upper Columbia montane headwaters	Upper Columbia montane headwaters		16.61%	4.98%
	Aquatic Systems	Great Lakes montane small rivers	Great Lakes montane small rivers		16.55%	4.96%
	Aquatic Systems	Great Lakes montane headwaters	Great Lakes montane headwaters		15.87%	4.76%
	Aquatic Systems	Upper Columbia alpine, glacial headwaters	Upper Columbia alpine, glacial headwaters		13.93%	4.18%
	Aquatic Systems	Upper Columbia montane, glacial small rivers	Upper Columbia montane, glacial small rivers		10.98%	3.29%
	Aquatic Systems	Great Lakes montane small rivers	Great Lakes montane small rivers		7.77%	2.33%
	Aquatic Systems	Upper Columbia subalpine headwaters	Upper Columbia subalpine headwaters		5.94%	1.78%
	Aquatic Systems	Great Lakes montane headwaters	Great Lakes montane headwaters		3.73%	1.12%
Lower Columbia C	Expert Nominated Sites	Alpine Cushion Plant	Alpine Cushion Plant		67.00%	20.10%
	Expert Nominated Sites	Alpine Grassland (dry)	Alpine Grassland (dry)		24.65%	7.39%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Lower Columbia C (cont'd)	Expert Nominated Sites	Sparsely vegetated rock & talus	Sparsely vegetated rock & talus		14.29%	50.00%
	Expert Nominated Sites	Dwarf-Shrubland	Dwarf-Shrubland		14.29%	25.00%
	Expert Nominated Sites	Alpine Meadow (wet)	Alpine Meadow (wet)		14.29%	14.29%
	Expert Identified Sites	Sturgeon	Sturgeon		10.04%	10.04%
	Expert Nominated Sites	Interior Douglas Fir Forests	Interior Douglas Fir Forests		2.31%	0.69%
	Expert Identified Sites	Badger	Badger		1.76%	1.76%
	Vascular Plants	Botrychium crenulatum	Crenulate moonwort	G3	107.69%	20.29%
	Birds	Haliaeetus leucocephalus nest site	Bald Eagle nest site	G4	60.00%	1.94%
	Mammals	Corynorhinus townsendii	Townsend's big-eared bat	G4	57.14%	25.00%
	Vascular Plants	Botrychium paradoxum	Peculiar moonwort	G3*	30.77%	15.38%
	Wide Ranging Fish	RHINICHTHYS UMATILLA	UMATILLA DACE	G4	29.93%	8.98%
	Aquatic Eos	COTTUS CONFUSUS	SHORTHEAD SCULPIN	G5	23.08%	21.43%
	Vascular Plants	Botrychium hesperium	Western moonwort	G3	23.08%	16.67%
	Vascular Plants	Botrychium pedunculosum	Stalked moonwort	G3*	23.08%	9.68%
	Birds	Melanerpes lewis	Lewis' woodpecker	G4	20.00%	5.56%
	Vascular Plants	Oxytropis campestris var. columbiana	Columbia crazyweed	G5T3	15.38%	28.57%
	Vascular Plants	Botrychium ascendens	Upward-lobed moonwort	G3*	15.38%	10.00%
	Community	Thuja plicata / Aralia nudicaulis Forest		G2	14.29%	50.00%
	Wide Ranging Fish	ACIPENSER TRANSMONTANUS POP 2	White Sturgeon	G4T?Q	7.77%	7.77%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	0.74%	0.37%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	0.72%	0.36%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		11.82%	3.55%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		5.71%	1.71%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.21%	0.06%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Lower Columbia C (cont'd)	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		0.04%	0.01%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.00%	0.00%
	Generic Wetlands	Wetlands	Wetlands		2.91%	0.87%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.37%	0.15%
	Wide Ranging Species	High Value Martes pennanti RSF	High Value Fisher RSF	G5	0.14%	0.05%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.08%	0.03%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	0.08%	0.03%
	Aquatic Systems	Great Lakes montane small rivers	Great Lakes montane small rivers		333.33%	100.00%
	Aquatic Systems	Okanagan large river	Okanagan large river		322.24%	96.67%
	Aquatic Systems	Okanagan montane headwaters	Okanagan montane headwaters		146.18%	43.85%
	Aquatic Systems	Okanagan montane headwaters	Okanagan montane headwaters		115.97%	34.79%
	Aquatic Systems	Okanagan montane small rivers	Okanagan montane small rivers		111.83%	33.55%
	Aquatic Systems	Okanagan montane headwaters	Okanagan montane headwaters		101.33%	30.40%
	Aquatic Systems	Okanagan montane headwaters	Okanagan montane headwaters		94.61%	28.38%
	Aquatic Systems	Great Lakes large river	Great Lakes large river		44.66%	13.40%
	Aquatic Systems	Great Lakes montane headwaters	Great Lakes montane headwaters		21.31%	6.39%
	Aquatic Systems	Okanagan subalpine headwaters	Okanagan subalpine headwaters		14.56%	4.37%
	Aquatic Systems	Great Lakes montane small rivers	Great Lakes montane small rivers		8.04%	2.41%
	Aquatic Systems	Great Lakes montane headwaters	Great Lakes montane headwaters		3.28%	0.98%
	Aquatic Systems	Great Lakes alpine headwaters	Great Lakes alpine headwaters		3.26%	0.98%
	Aquatic Systems	Great Lakes montane headwaters	Great Lakes montane headwaters		3.20%	0.96%
	Aquatic Systems	Great Lakes alpine headwaters	Great Lakes alpine headwaters		3.20%	0.96%
	Aquatic Systems	Great Lakes medium rivers	Great Lakes medium rivers		2.95%	0.88%
Mabel Lake	Wide Ranging Fish	SOCKEYE SALMON	SOCKEYE SALMON	G5	8.46%	2.54%
	Vascular Plants	Carex amplifolia	Big-leaf sedge	G4	7.69%	33.33%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Mabel Lake (cont'd)	Vascular Plants	Botrychium montanum	Mountain moonwort	G3	7.69%	1.41%
	Wide Ranging Fish	COHO SALMON	COHO SALMON	G4	4.84%	2.42%
	Wide Ranging Fish	Onchorhynchus tshawytscha	Chinook Salmon		4.75%	1.42%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	0.85%	0.42%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		2.02%	0.61%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.11%	0.03%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.00%	0.00%
	Generic Wetlands	Wetlands	Wetlands		0.17%	0.05%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.31%	0.12%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.10%	0.04%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	0.09%	0.04%
	Aquatic Systems	Thompson montane headwaters	Thompson montane headwaters		284.96%	85.49%
	Aquatic Systems	Thompson medium rivers	Thompson medium rivers		52.64%	15.79%
	Aquatic Systems	Thompson alpine headwaters	Thompson alpine headwaters		13.02%	3.91%
	Aquatic Systems	Thompson montane headwaters	Thompson montane headwaters		10.09%	3.03%
Middle Columbia	Expert Identified Sites	Wide Ranging Carnivores	Wide Ranging Carnivores		21.78%	21.78%
	Expert Identified Sites	Caribou	Caribou		19.91%	19.91%
	Expert Nominated Sites	Fen	Fen		14.29%	0.57%
	Expert Identified Sites	Connectivity	Connectivity		2.81%	2.81%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	9.65%	4.82%
	Wide Ranging Fish	SOCKEYE SALMON	SOCKEYE SALMON	G5	8.70%	2.61%
	Wide Ranging Fish	COHO SALMON	COHO SALMON	G4	7.40%	3.70%
	Wide Ranging Fish	Onchorhynchus tshawytscha	Chinook Salmon		4.89%	1.47%
	Wide Ranging Fish	ACIPENSER TRANSMONTANUS POP 2	White Sturgeon	G4T?Q	4.77%	4.77%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	1.17%	0.58%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Middle Columbia (cont'd)	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		16.17%	4.85%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		9.23%	2.77%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		8.98%	2.69%
	Mapped Veg Type	Hybrid Spruce Forests	Hybrid Spruce Forests		6.47%	1.94%
	Generic Wetlands	Wetlands	Wetlands		1.84%	0.55%
	Wide Ranging Species	High Value Gulo gulo luscus RSF	High Value North American wolverine RSF	G4T4	20.32%	8.13%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	13.26%	5.31%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	12.52%	5.01%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	1.42%	0.57%
	Aquatic Systems	Upper Columbia medium rivers	Upper Columbia medium rivers		287.88%	86.36%
	Aquatic Systems	Upper Columbia large river	Upper Columbia large river		286.94%	86.08%
	Aquatic Systems	Upper Columbia medium rivers	Upper Columbia medium rivers		270.82%	81.25%
	Aquatic Systems	Upper Columbia alpine, glacial headwaters	Upper Columbia alpine, glacial headwaters		109.30%	32.79%
	Aquatic Systems	Upper Columbia montane, glacial small rivers	Upper Columbia montane, glacial small rivers		101.37%	30.41%
	Aquatic Systems	Great Lakes large river	Great Lakes large river		99.12%	29.74%
	Aquatic Systems	Thompson alpine headwaters	Thompson alpine headwaters		68.24%	20.47%
	Aquatic Systems	Upper Columbia subalpine headwaters	Upper Columbia subalpine headwaters		60.41%	18.12%
	Aquatic Systems	Upper Columbia montane, glacial small rivers	Upper Columbia montane, glacial small rivers		58.11%	17.43%
	Aquatic Systems	Thompson alpine headwaters	Thompson alpine headwaters		58.08%	17.42%
	Aquatic Systems	Upper Columbia montane headwaters	Upper Columbia montane headwaters		51.92%	15.58%
	Aquatic Systems	Upper Columbia subalpine headwaters	Upper Columbia subalpine headwaters		49.47%	14.84%
	Aquatic Systems	Upper Columbia alpine, glacial headwaters	Upper Columbia alpine, glacial headwaters		44.08%	13.22%
	Aquatic Systems	Upper Columbia montane small rivers	Upper Columbia montane small rivers		37.02%	11.11%
	Aquatic Systems	Thompson montane small rivers	Thompson montane small rivers		26.38%	7.91%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Middle Columbia (cont'd)	Aquatic Systems	Smoky - Upper Athabasca alpine, glacial headwaters	Smoky - Upper Athabasca alpine, glacial headwaters		14.62%	4.39%
	Aquatic Systems	Upper Fraser alpine, glacial headwaters	Upper Fraser alpine, glacial headwaters		7.45%	2.23%
	Aquatic Systems	Upper Kootenay subalpine headwaters	Upper Kootenay subalpine headwaters		0.52%	0.16%
Mission Valley	Birds	Haliaeetus leucocephalus nest site	Bald Eagle nest site	G4	160.00%	5.16%
	Birds	Asio flammeus	Short-eared Owl	G5	60.00%	42.86%
	Birds	Gavia immer	Common Loon	G5	40.00%	1.89%
	Aquatic Eos	STAGNICOLA ELRODI	FLATHEAD PONDSNAIL	G1	8.00%	16.67%
	Vascular Plants	Lilaea scilloides	Flowering quillwort	G5?	7.69%	100.00%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	0.25%	0.12%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	0.02%	0.01%
	Mapped Veg Type	Rough Fescue Prairie	Rough Fescue Prairie		131.48%	39.44%
	Mapped Veg Type	Sagebrush Steppe	Sagebrush Steppe		31.21%	9.36%
	Mapped Veg Type	Ponderosa Pine Woodland	Ponderosa Pine Woodland		14.61%	4.38%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.39%	0.12%
	Generic Wetlands	Wetlands	Wetlands		4.05%	1.21%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.03%	0.01%
	Aquatic Systems	Clark Fork - Flathead montane small rivers	Clark Fork - Flathead montane small rivers		333.33%	100.00%
	Aquatic Systems	Clark Fork - Flathead foothill tributaries	Clark Fork - Flathead foothill tributaries		137.26%	41.18%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		34.43%	10.33%
	Aquatic Systems	Clark Fork - Flathead large rivers	Clark Fork - Flathead large rivers		17.34%	5.20%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		17.31%	5.19%
	Aquatic Systems	Clark Fork - Flathead subalpine headwaters	Clark Fork - Flathead subalpine headwaters		6.55%	1.96%
Moffat Creek	Wide Ranging Fish	SOCKEYE SALMON	SOCKEYE SALMON	G5	1.46%	0.44%
	Wide Ranging Fish	COHO SALMON	COHO SALMON	G4	0.84%	0.42%
	Wide Ranging Fish	Onchorhynchus tshawytscha	Chinook Salmon		0.82%	0.25%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Moffat Creek (cont'd)	Mapped Veg Type	Hybrid Spruce Forests	Hybrid Spruce Forests		333.33%	100.00%
	Mapped Veg Type	Hybrid Spruce Forests	Hybrid Spruce Forests		4.81%	1.44%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.17%	0.05%
	Generic Wetlands	Wetlands	Wetlands		1.47%	0.44%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.74%	0.29%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.30%	0.12%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	0.12%	0.05%
	Aquatic Systems	Middle Fraser montane small rivers	Middle Fraser montane small rivers		126.82%	38.05%
	Aquatic Systems	Middle Fraser montane headwaters	Middle Fraser montane headwaters		14.73%	4.42%
Moody Creek	Expert Nominated Sites	Ponderosa Pine Woodland	Ponderosa Pine Woodland		15.45%	4.63%
	Expert Nominated Sites	Montane Dry Grasslands	Montane Dry Grasslands		0.92%	0.28%
	Wide Ranging Fish	RHINICHTHYS OSCULUS	SPECKLED DACE	G5	1.16%	0.35%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.26%	0.08%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.13%	0.04%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.00%	0.00%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.00%	0.00%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.03%	0.01%
	Aquatic Systems	Okanagan medium rivers	Okanagan medium rivers		16.52%	4.96%
	Aquatic Systems	Okanagan montane headwaters	Okanagan montane headwaters		14.15%	4.25%
Mountain Parks	Expert Nominated Sites	Alpine Grassland (dry)	Alpine Grassland (dry)		210.70%	63.21%
	Expert Nominated Sites	Limber Pine Forests	Limber Pine Forests		92.65%	27.79%
	Expert Nominated Sites	Montane Dry Grasslands	Montane Dry Grasslands		82.50%	24.75%
	Expert Nominated Sites	Interior Douglas Fir Forests	Interior Douglas Fir Forests		74.00%	22.20%
	Expert Identified Sites	Wide Ranging Carnivores	Wide Ranging Carnivores		28.22%	28.22%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Mountain Parks (cont'd)	Expert Identified Sites	Alberta ESA	Alberta ESA		27.60%	27.60%
	Expert Nominated Sites	Subalpine Wet Meadow	Subalpine Wet Meadow		14.29%	12.50%
	Expert Nominated Sites	Subalpine Larch Forests	Subalpine Larch Forests		9.49%	2.85%
	Expert Nominated Sites	Engelmannii Spruce - Subalpine Fir Dry Parklands	Engelmannii Spruce - Subalpine Fir Dry Parklands		8.15%	2.44%
	Expert Identified Sites	Caribou	Caribou		7.51%	7.51%
	Expert Identified Sites	Connectivity	Connectivity		2.61%	2.61%
	Expert Nominated Sites	Engelmann Spruce / Subalpine Fir Dry Forests	Engelmann Spruce / Subalpine Fir Dry Forests		1.60%	0.48%
	Expert Identified Sites	Bull Trout	Bull Trout		0.07%	0.07%
	Birds	Histrionicus histrionicus	Harlequin Duck	G4	260.00%	12.38%
	Community	Picea glauca / Rosa acicularis / Thuidium abietinum		S1	233.33%	100.00%
	Vascular Plants	Botrychium spathulatum	Spoon-leaf moonwort	G3	233.33%	70.00%
	Community	Picea engelmannii-Abies lasiocarpa / Dryas octopetala		S2S3	85.71%	100.00%
	Community	Picea engelmannii - Abies lasiocarpa / Salix vestita / Cassiope tetragona		S2	85.71%	100.00%
	Community	Picea engelmannii / Leymus innovatus		S2	85.71%	100.00%
	Community	Pinus flexilis - Pseudotsuga menziesii / Juniperus spp. / Arctostaphylos uva-ursi		S2	85.71%	75.00%
	Community	Pseudotsuga menziesii - Pinus flexilis / Juniperus communis / Festuca campestris		S2S3	85.71%	66.67%
	Vascular Plants	Pellaea gastonyi		G3	76.92%	66.67%
	Community	Stipa richardsonii - Koeleria macrantha - Antennaria parvifolia		S2S3	71.43%	100.00%
	Community	Pseudoroegneria spicata - Leymus innovatus - Aster conspicuus		SU	71.43%	100.00%
	Community	Picea glauca / Shepherdia canadensis / Thuidium abietinum		S2	66.67%	100.00%
	Community	Picea glauca / Thuidium abietinum		S2S3	66.67%	100.00%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Mountain Parks (cont'd)	Non-Vascular Plants	Cladonia bacilliformis		G3	66.67%	50.00%
	Vascular Plants	Arenaria longipedunculata	Low sandwort	G3Q	66.67%	100.00%
	Vascular Plants	Draba kananaskis	Tundra whitlow-grass	G1Q	66.67%	66.67%
	Vascular Plants	Draba ventosa	Wind River whitlow-grass	G3	53.85%	87.50%
	Birds	Cypseloides niger	Black Swift	G4	42.86%	100.00%
	Community	Betula occidentalis - Amelanchier alnifolia / Artemisia campestris - Elymus lanceolatus (Agropyron dasystachyum)		S1	42.86%	100.00%
	Vascular Plants	Erigeron radicatus	Dwarf fleabane	G3	42.86%	60.00%
	Non-Vascular Plants	Pohlia crudoides		G3	33.33%	100.00%
	Vascular Plants	Carex lenticularis var. dolia	Goose-grass sedge	G5T3Q	30.77%	30.77%
	Community	Elaeagnus commutata		S2	28.57%	100.00%
	Community	Juncus drummondii - Carex saxatilis - Ranunculus nivalis		S1?	28.57%	100.00%
	Vascular Plants	Erigeron Trifidus	Barren ground fleabane	G2G3Q	16.00%	30.77%
	Aquatic Eos	PHYSELLA JOHNSONI	STRIATE PHYSA	G3	15.38%	100.00%
	Non-Vascular Plants	Cladonia merochlorophaea		G2	15.38%	66.67%
	Non-Vascular Plants	Bryum schleicheri	A moss	G5?	15.38%	50.00%
	Vascular Plants	Draba porsildii	Porsild's whitlow-grass	G3	15.38%	33.33%
	Vascular Plants	Botrychium ascendens	Upward-lobed moonwort	G3*	15.38%	10.00%
	Community	Betula papyrifera / Betula occidentalis / Arctostaphylos uva-ursi		S1	14.29%	100.00%
	Community	Populus tremuloides / Menziesia ferruginea		S1	14.29%	100.00%
	Community	Populus tremuloides / Leymus innovatus - Aster conspicuus avalanche community		S2	14.29%	100.00%
	Community	Antennaria lanata - Artemisia norvegica		S1	14.29%	100.00%
	Community	Artemisia norvegica - Mertensia paniculata - Leymus innovatus		S1	14.29%	100.00%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Mountain Parks (cont'd)	Community	Picea engelmannii - Abies lasiocarpa / Salix planifolia / Hylocomium splendens		S1	14.29%	100.00%
	Community	Salix drummondiana - Thalictrum venulosum		S1	14.29%	100.00%
	Vascular Plants	Iris missouriensis	Missouri iris	G5	14.29%	50.00%
	Aquatic Eos	SALMASELLUS STEGANOTHRIX	A CAVE OBLIGATE ISOPOD	G1	8.00%	100.00%
	Aquatic Eos	ACROLOXUS COLORADENSIS	ROCKY MOUNTAIN CAPSHELL	G1	8.00%	66.67%
	Non-Vascular Plants	Mielichhoferia macrocarpa		G2?	8.00%	100.00%
	Vascular Plants	Erigeron lanatus	Woolly fleabane	G3G4	8.00%	33.33%
	Insects	Euphydryas gellettii	Gillette's Checkerspot	G3	7.69%	10.00%
	Non-Vascular Plants	Seligeria subimmersa	A moss	G5?	7.69%	50.00%
	Non-Vascular Plants	Dermatocarpon moulinsii	A lichen	G?	7.69%	50.00%
	Non-Vascular Plants	Bryum calobryoides	A moss	G3	7.69%	25.00%
	Vascular Plants	Botrychium crenulatum	Crenulate moonwort	G3	7.69%	1.45%
	Wide Ranging Fish	Onchorhynchus tshawytscha	Chinook Salmon		4.99%	1.50%
	Vascular Plants	Arnica louiseana	Lake Louise arnica	G3	4.00%	100.00%
	Vascular Plants	Phacelia lyallii	Lyall phacelia	G3	4.00%	7.14%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	3.13%	1.57%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	2.81%	1.40%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		78.69%	23.61%
	Mapped Veg Type	Montane Spruce	Montane Spruce		46.27%	13.88%
	Mapped Veg Type	Foothills Boreal Forests	Foothills Boreal Forests		41.47%	12.44%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		32.56%	9.77%
	Mapped Veg Type	Hybrid Spruce Forests	Hybrid Spruce Forests		15.99%	4.80%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.56%	0.17%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.12%	0.04%
	Generic Wetlands	Wetlands	Wetlands		8.50%	2.55%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Mountain Parks (cont'd)	Wide Ranging Species	High Value Gulo gulo luscus RSF	High Value North American wolverine RSF	G4T4	74.90%	29.96%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	23.57%	9.43%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	21.52%	8.61%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	17.84%	7.13%
	Aquatic Systems	Smoky - Upper Athabasca montane headwaters	Smoky - Upper Athabasca montane headwaters		333.33%	100.00%
	Aquatic Systems	Upper North Saskatchewan montane headwaters	Upper North Saskatchewan montane headwaters		333.33%	100.00%
	Aquatic Systems	Upper Fraser subalpine headwaters	Upper Fraser subalpine headwaters		333.33%	100.00%
	Aquatic Systems	Smoky - Upper Athabasca montane small rivers	Smoky - Upper Athabasca montane small rivers		333.33%	100.00%
	Aquatic Systems	Smoky - Upper Athabasca medium rivers	Smoky - Upper Athabasca medium rivers		329.37%	98.81%
	Aquatic Systems	Upper South Saskatchewan/ Red Deer/ Bow subalpine small river	Upper South Saskatchewan/ Red Deer/ Bow subalpine		317.06%	95.12%
	Aquatic Systems	Upper South Saskatchewan/ Red Deer/ Bow foothill tributary	Upper South Saskatchewan/ Red Deer/ Bow foothill		285.04%	85.51%
	Aquatic Systems	Upper North Saskatchewan alpine, glacial headwaters	Upper North Saskatchewan alpine, glacial headwater		283.78%	85.13%
	Aquatic Systems	Upper South Saskatchewan/ Red Deer/ Bow alpine headwaters	Upper South Saskatchewan/ Red Deer/ Bow alpine headwaters		251.72%	75.52%
	Aquatic Systems	Upper North Saskatchewan subalpine small rivers	Upper North Saskatchewan subalpine small rivers		244.55%	73.36%
	Aquatic Systems	Upper South Saskatchewan/ Red Deer/ Bow alpine headwaters	Upper South Saskatchewan/ Red Deer/ Bow alpine headwaters		243.84%	73.15%
	Aquatic Systems	Upper North Saskatchewan alpine headwaters	Upper North Saskatchewan alpine headwaters		223.77%	67.13%
	Aquatic Systems	Upper North Saskatchewan subalpine, glacial small rivers	Upper North Saskatchewan subalpine, glacial small		212.21%	63.66%
	Aquatic Systems	Upper North Saskatchewan medium rivers	Upper North Saskatchewan medium rivers		204.66%	61.40%
	Aquatic Systems	Smoky - Upper Athabasca subalpine headwaters	Smoky - Upper Athabasca subalpine headwaters		202.46%	60.74%
	Aquatic Systems	Upper South Saskatchewan/ Red Deer/ Bow montane small river	Upper South Saskatchewan/ Red Deer/ Bow montane small river		195.30%	58.59%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Mountain Parks (cont'd)	Aquatic Systems	Smoky - Upper Athabasca montane headwaters	Smoky - Upper Athabasca montane headwaters		187.23%	56.17%
	Aquatic Systems	Smoky - Upper Athabasca subalpine small rivers	Smoky - Upper Athabasca subalpine small rivers		181.64%	54.49%
	Aquatic Systems	Upper North Saskatchewan alpine headwaters	Upper North Saskatchewan alpine headwaters		178.01%	53.40%
	Aquatic Systems	Smoky - Upper Athabasca alpine headwaters	Smoky - Upper Athabasca alpine headwaters		156.46%	46.94%
	Aquatic Systems	Smoky - Upper Athabasca alpine headwaters	Smoky - Upper Athabasca alpine headwaters		151.55%	45.47%
	Aquatic Systems	Upper North Saskatchewan alpine, glacial headwaters	Upper North Saskatchewan alpine, glacial headwater		149.96%	44.99%
	Aquatic Systems	Smoky - Upper Athabasca montane headwaters	Smoky - Upper Athabasca montane headwaters		144.52%	43.36%
	Aquatic Systems	Upper Fraser alpine, glacial headwaters	Upper Fraser alpine, glacial headwaters		118.21%	35.46%
	Aquatic Systems	Upper South Saskatchewan/ Red Deer/ Bow montane headwater	Upper South Saskatchewan/ Red Deer/ Bow montane headwater		117.11%	35.13%
	Aquatic Systems	Smoky - Upper Athabasca subalpine headwaters	Smoky - Upper Athabasca subalpine headwaters		116.49%	34.95%
	Aquatic Systems	Upper Fraser alpine, glacial small rivers	Upper Fraser alpine, glacial small rivers		99.36%	29.81%
	Aquatic Systems	Smoky - Upper Athabasca subalpine, glacial small rivers	Smoky - Upper Athabasca subalpine, glacial small r		97.43%	29.23%
	Aquatic Systems	Smoky - Upper Athabasca alpine, glacial headwaters	Smoky - Upper Athabasca alpine, glacial headwaters		85.11%	25.53%
	Aquatic Systems	Upper Fraser subalpine headwaters	Upper Fraser subalpine headwaters		63.81%	19.14%
	Aquatic Systems	Upper North Saskatchewan montane headwaters	Upper North Saskatchewan montane headwaters		52.64%	15.79%
	Aquatic Systems	Upper Columbia montane, glacial small rivers	Upper Columbia montane, glacial small rivers		44.59%	13.38%
	Aquatic Systems	Upper Kootenay montane small rivers	Upper Kootenay montane small rivers		40.43%	12.13%
	Aquatic Systems	Upper Columbia alpine, glacial headwaters	Upper Columbia alpine, glacial headwaters		38.48%	11.54%
	Aquatic Systems	Upper Kootenay subalpine headwaters	Upper Kootenay subalpine headwaters		37.78%	11.33%
	Aquatic Systems	Upper Columbia subalpine headwaters	Upper Columbia subalpine headwaters		29.71%	8.91%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Mountain Parks (cont'd)	Aquatic Systems	Upper Fraser alpine headwaters	Upper Fraser alpine headwaters		27.81%	8.34%
	Aquatic Systems	Upper Columbia montane small rivers	Upper Columbia montane small rivers		3.69%	1.11%
	Aquatic Systems	Upper Kootenay montane headwaters	Upper Kootenay montane headwaters		3.08%	0.92%
	Aquatic Systems	Upper Kootenay montane headwaters	Upper Kootenay montane headwaters		2.57%	0.77%
	Aquatic Systems	Upper Columbia subalpine headwaters	Upper Columbia subalpine headwaters		0.59%	0.18%
Moyie R Headwaters Model Data	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	0.28%	0.14%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	0.20%	0.10%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.36%	0.11%
	Mapped Veg Type	Montane Spruce	Montane Spruce		0.12%	0.04%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		0.05%	0.01%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.44%	0.17%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	0.03%	0.01%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.00%	0.00%
	Aquatic Systems	Upper Kootenay subalpine headwaters	Upper Kootenay subalpine headwaters		7.54%	2.26%
	Aquatic Systems	Upper Kootenay alpine headwaters	Upper Kootenay alpine headwaters		6.12%	1.83%
Murphy Creek Model Data	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.03%	0.01%
	Generic Wetlands	Wetlands	Wetlands		0.00%	0.00%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		333.33%	100.00%
North Thompson River	Wide Ranging Fish	SOCKEYE SALMON	SOCKEYE SALMON	G5	14.71%	4.41%
	Wide Ranging Fish	COHO SALMON	COHO SALMON	G4	9.50%	4.75%
	Wide Ranging Fish	Onchorhynchus tshawytscha	Chinook Salmon		8.26%	2.48%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	1.47%	0.74%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		2.70%	0.81%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
North Thompson River (cont'd)	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		2.41%	0.72%
	Mapped Veg Type	Hybrid Spruce Forests	Hybrid Spruce Forests		1.70%	0.51%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.35%	0.11%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.02%	0.01%
	Generic Wetlands	Wetlands	Wetlands		0.65%	0.20%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.88%	0.35%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.34%	0.13%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	0.30%	0.12%
	Wide Ranging Species	High Value Gulo gulo luscus RSF	High Value North American wolverine RSF	G4T4	0.15%	0.06%
	Aquatic Systems	Thompson medium rivers	Thompson medium rivers		108.69%	32.61%
	Aquatic Systems	Thompson montane small rivers	Thompson montane small rivers		23.53%	7.06%
	Aquatic Systems	Thompson montane headwaters	Thompson montane headwaters		13.70%	4.11%
	Aquatic Systems	Thompson alpine headwaters	Thompson alpine headwaters		5.53%	1.66%
	Aquatic Systems	Thompson montane headwaters	Thompson montane headwaters		3.12%	0.94%
Orofino / Ford Creeks	Expert Nominated Sites	Interior Grand Fir Forests	Interior Grand Fir Forests		12.95%	3.88%
	Expert Nominated Sites	Ponderosa Pine Woodland	Ponderosa Pine Woodland		3.11%	0.93%
	Expert Nominated Sites	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		2.24%	0.67%
	Expert Nominated Sites	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.20%	0.06%
	Community	Thuja plicata / Adiantum pedatum Forest		G2?	28.57%	25.00%
	Vascular Plants	Cypripedium fasciculatum	Clustered lady's-slipper	G4	15.38%	2.70%
	Wide Ranging Fish	Onchorhynchus mykiss	Steelhead		14.67%	4.40%
	Vascular Plants	Dasynotus daubenmirei	Daubenmire's dasynotus	G3	8.00%	100.00%
	Vascular Plants	Synthyris platycarpa	Pennell's kittentail	G3	8.00%	13.33%
	Vascular Plants	Cephalanthera austiniae	Phantom orchid	G4	7.69%	4.17%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Orofino / Ford Creeks (cont'd)	Wide Ranging Fish	Onchorhynchus tshawytscha	Chinook Salmon		2.42%	0.73%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	0.39%	0.19%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	0.22%	0.11%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		3.43%	1.03%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.00%	0.00%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.00%	0.00%
	Wide Ranging Species	High Value Martes pennanti RSF	High Value Fisher RSF	G5	4.74%	1.90%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.04%	0.01%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.02%	0.01%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	0.00%	0.00%
	Aquatic Systems	Clearwater medium rivers	Clearwater medium rivers		284.36%	85.31%
	Aquatic Systems	Clearwater montane headwaters	Clearwater montane headwaters		137.93%	41.38%
	Aquatic Systems	Clearwater montane headwaters	Clearwater montane headwaters		21.23%	6.37%
Palouse	Vascular Plants	Aster jessicae	Jessica's aster	G2	92.00%	85.19%
	Wide Ranging Fish	Onchorhynchus mykiss	Steelhead		90.89%	27.27%
	Vascular Plants	Tauschia tenuissima	Leiberg's tauschia	G3	88.00%	81.48%
	Community	Pinus ponderosa / Physocarpus malvaceus Forest		G2	66.67%	66.67%
	Vascular Plants	Pyrrocoma liatriformis		G2	36.00%	100.00%
	Vascular Plants	Lomatium salmoniflorum	Salmon-flower desert-parsley	G3	33.33%	100.00%
	Vascular Plants	Calochortus nitidus	Broad-fruit mariposa	G3	33.33%	20.00%
	Vascular Plants	Corydalis caseana var. hastata	Case's corydalis	G5T3	28.00%	15.91%
	Amphibians	Dicamptodon aterrimus	Idaho giant salamander	G3	22.22%	66.67%
	Amphibians	Bufo boreas	Western toad	G4	20.00%	0.67%
	Vascular Plants	Grindelia howellii	Howell's gum-weed	G3	15.38%	100.00%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Palouse (cont'd)	Amphibians	Plethodon idahoensis	Coeur d'Alene salamander	G3	11.11%	0.90%
	Non-Vascular Plants	Cladonia imbricarica		G2	7.69%	50.00%
	Vascular Plants	Cephalanthera austiniae	Phantom orchid	G4	7.69%	4.17%
	Vascular Plants	Botrychium montanum	Mountain moonwort	G3	7.69%	1.41%
	Vascular Plants	Cypripedium fasciculatum	Clustered lady's-slipper	G4	7.69%	1.35%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	1.88%	0.94%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	1.79%	0.89%
	Vascular Plants	Howellia aquatilis	Water howellia	G2	1.08%	1.08%
	Wide Ranging Fish	Onchorhynchus tshawytscha	Chinook Salmon		0.45%	0.14%
	Wide Ranging Fish	ACIPENSER TRANSMONTANUS POP 2	White Sturgeon	G4T?Q	0.30%	0.30%
	Mapped Veg Type	Interior Grand Fir Forests	Interior Grand Fir Forests		17.47%	5.24%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		10.76%	3.23%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		5.96%	1.79%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		3.62%	1.09%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.10%	0.03%
	Generic Wetlands	Wetlands	Wetlands		2.39%	0.72%
	Wide Ranging Species	High Value Martes pennanti RSF	High Value Fisher RSF	G5	26.02%	10.41%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	1.35%	0.54%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	0.43%	0.17%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.10%	0.04%
	Aquatic Systems	Clearwater foothill tributaries	Clearwater foothill tributaries		333.33%	100.00%
	Aquatic Systems	Clearwater medium rivers	Clearwater medium rivers		333.33%	100.00%
	Aquatic Systems	Clearwater foothill small rivers	Clearwater foothill small rivers		330.46%	99.14%
	Aquatic Systems	Palouse montane small rivers	Palouse montane small rivers		317.27%	95.18%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Palouse (cont'd)	Aquatic Systems	Clearwater large river	Clearwater large river		315.55%	94.66%
	Aquatic Systems	Clearwater montane headwaters	Clearwater montane headwaters		303.82%	91.15%
	Aquatic Systems	Clearwater montane headwaters	Clearwater montane headwaters		274.74%	82.42%
	Aquatic Systems	Clark Fork - Flathead montane small rivers	Clark Fork - Flathead montane small rivers		209.65%	62.89%
	Aquatic Systems	Clark Fork - Flathead montane small rivers	Clark Fork - Flathead montane small rivers		181.80%	54.54%
	Aquatic Systems	Clearwater subalpine small rivers	Clearwater subalpine small rivers		145.51%	43.65%
	Aquatic Systems	Palouse foothill tributaries	Palouse foothill tributaries		133.86%	40.16%
	Aquatic Systems	Clark Fork - Flathead foothill tributaries	Clark Fork - Flathead foothill tributaries		103.34%	31.00%
	Aquatic Systems	Palouse montane headwaters	Palouse montane headwaters		102.09%	30.63%
	Aquatic Systems	Palouse montane headwaters	Palouse montane headwaters		78.50%	23.55%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		69.85%	20.95%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		59.49%	17.85%
	Aquatic Systems	Clearwater montane small rivers	Clearwater montane small rivers		58.47%	17.54%
	Aquatic Systems	Clearwater subalpine headwaters	Clearwater subalpine headwaters		38.86%	11.66%
	Aquatic Systems	Clearwater montane headwaters	Clearwater montane headwaters		35.32%	10.60%
	Aquatic Systems	Clearwater montane headwaters	Clearwater montane headwaters		21.30%	6.39%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		11.14%	3.34%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		4.60%	1.38%
Pend Oreille River	Expert Nominated Sites	Marsh	Marsh		100.00%	4.93%
	Expert Nominated Sites	Montane Riparian Shrubland	Montane Riparian Shrubland		71.43%	4.55%
	Expert Nominated Sites	Fen	Fen		57.14%	2.27%
	Expert Nominated Sites	Sphagnum Bog	Sphagnum Bog		28.57%	7.69%
	Expert Nominated Sites	Montane Wet Meadows	Montane Wet Meadows		28.57%	2.67%
	Expert Identified Sites	Wetlands	Wetlands		0.45%	0.45%
	Expert Identified Sites	Riparian Forest	Riparian Forest		0.32%	0.32%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Pend Oreille River (cont'd)	Expert Identified Sites	Connectivity	Connectivity		0.06%	0.06%
	Birds	Haliaeetus leucocephalus nest site	Bald Eagle nest site	G4	120.00%	3.87%
	Birds	Haliaeetus leucocephalus wintering area	Bald Eagle wintering area	G4	20.00%	14.29%
	Birds	Gavia immer	Common Loon	G5	20.00%	0.94%
	Vascular Plants	Carex comosa	Birstly sedge	G5	15.38%	33.33%
	Vascular Plants	Botrychium montanum	Mountain moonwort	G3	7.69%	1.41%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	0.23%	0.12%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		4.73%	1.42%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		1.28%	0.38%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		1.15%	0.34%
	Generic Wetlands	Wetlands	Wetlands		12.58%	3.77%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.12%	0.05%
	Wide Ranging Species	High Value Martes pennanti RSF	High Value Fisher RSF	G5	0.03%	0.01%
	Aquatic Systems	Great Lakes large river	Great Lakes large river		47.14%	14.14%
	Aquatic Systems	Great Lakes montane small rivers	Great Lakes montane small rivers		44.08%	13.23%
	Aquatic Systems	Great Lakes montane small rivers	Great Lakes montane small rivers		30.00%	9.00%
	Aquatic Systems	Great Lakes montane headwaters	Great Lakes montane headwaters		13.22%	3.96%
	Aquatic Systems	Great Lakes alpine headwaters	Great Lakes alpine headwaters		7.22%	2.17%
	Aquatic Systems	Great Lakes alpine headwaters	Great Lakes alpine headwaters		0.42%	0.13%
Pleasant Valley	Birds	Gavia immer	Common Loon	G5	60.00%	2.83%
	Birds	Haliaeetus leucocephalus nest site	Bald Eagle nest site	G4	40.00%	1.29%
	Vascular Plants	Botrychium crenulatum	Crenulate moonwort	G3	7.69%	1.45%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	0.68%	0.34%
	Mapped Veg Type	Interior Grand Fir Forests	Interior Grand Fir Forests		19.66%	5.90%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Pleasant Valley (cont'd)	Mapped Veg Type	Montane Spruce	Montane Spruce		0.85%	0.25%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.67%	0.20%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.11%	0.03%
	Generic Wetlands	Wetlands	Wetlands		1.92%	0.58%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.03%	0.01%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.02%	0.01%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	0.00%	0.00%
	Aquatic Systems	Upper Kootenay montane small rivers	Upper Kootenay montane small rivers		51.95%	15.58%
	Aquatic Systems	Clark Fork - Flathead subalpine headwaters	Clark Fork - Flathead subalpine headwaters		30.29%	9.09%
	Aquatic Systems	Clark Fork - Flathead montane small rivers	Clark Fork - Flathead montane small rivers		10.80%	3.24%
Purcell Mountains	Expert Nominated Sites	Fen	Fen		100.00%	3.98%
	Expert Identified Sites	Tailed frog	Tailed frog		50.00%	50.00%
	Expert Nominated Sites	Montane Wet Meadows	Montane Wet Meadows		42.86%	4.00%
	Expert Nominated Sites	Marsh	Marsh		42.86%	2.11%
	Expert Nominated Sites	Engelmannii Spruce Riparian Forests	Engelmannii Spruce Riparian Forests		28.57%	33.33%
	Expert Nominated Sites	Montane Riparian Forest	Montane Riparian Forest		28.57%	4.00%
	Expert Nominated Sites	Montane Riparian Shrubland	Montane Riparian Shrubland		28.57%	1.82%
	Expert Nominated Sites	Subalpine Wet Meadow	Subalpine Wet Meadow		14.29%	12.50%
	Expert Nominated Sites	Conifer Swamp	Conifer Swamp		14.29%	6.25%
	Expert Nominated Sites	Engelmann Spruce / Subalpine Fir Dry Forests	Engelmann Spruce / Subalpine Fir Dry Forests		10.76%	3.23%
	Expert Nominated Sites	Interior Grand Fir Forests	Interior Grand Fir Forests		5.61%	1.68%
	Expert Nominated Sites	Lodgepole Pine Forest and Woodlands	Lodgepole Pine Forest and Woodlands		2.69%	0.81%
	Expert Nominated Sites	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		2.50%	0.75%
	Expert Nominated Sites	Ponderosa Pine Woodland	Ponderosa Pine Woodland		1.35%	0.40%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Purcell Mountains (cont'd)	Expert Identified Sites	Grizzly Bear	Grizzly Bear		1.01%	1.01%
	Expert Nominated Sites	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.52%	0.16%
	Expert Identified Sites	Grassland Communities	Grassland Communities		0.30%	0.30%
	Expert Nominated Sites	Montane Dry Grasslands	Montane Dry Grasslands		0.04%	0.01%
	Vascular Plants	Botrychium montanum	Mountain moonwort	G3	161.54%	29.58%
	Amphibians	Plethodon idahoensis	Coeur d'Alene salamander	G3	122.22%	9.91%
	Birds	Gavia immer	Common Loon	G5	120.00%	5.66%
	Amphibians	Rana pipiens	Northern leopard frog	G5	114.29%	40.00%
	Wide Ranging Fish	Onchorhynchus mykiss gairdneri	Redband Trout	G5T4	106.92%	53.46%
	Amphibians	Ascaphus montanus	Tailed frog	G4	85.71%	9.38%
	Vascular Plants	Botrychium crenulatum	Crenulate moonwort	G3	84.62%	15.94%
	Amphibians	Bufo boreas	Western toad	G4	80.00%	2.67%
	Birds	Otus flammeolus	Flammulated Owl	G4	80.00%	14.29%
	Birds	Haliaeetus leucocephalus nest site	Bald Eagle nest site	G4	80.00%	2.58%
	Amphibians	Ambystoma tigrinum	Tiger salamander	G5	42.86%	42.86%
	Birds	Histrionicus histrionicus	Harlequin Duck	G4	40.00%	1.90%
	Vascular Plants	Botrychium paradoxum	Peculiar moonwort	G3*	38.46%	19.23%
	Vascular Plants	Botrychium pedunculosum	Stalked moonwort	G3*	38.46%	16.13%
	Birds	Lagopus leucurus	White-tailed Ptarmigan	G5	33.33%	2.22%
	Vascular Plants	Botrychium ascendens	Upward-lobed moonwort	G3*	30.77%	20.00%
	Vascular Plants	Botrychium pallidum	Pale moonwort	G2	7.69%	33.33%
	Vascular Plants	Botrychium hesperium	Western moonwort	G3	7.69%	5.56%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	5.85%	2.92%
	Wide Ranging Fish	ACIPENSER TRANSMONTANUS POP 2	White Sturgeon	G4T?Q	4.51%	4.51%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	1.35%	0.67%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Purcell Mountains (cont'd)	Mapped Veg Type	Montane Spruce	Montane Spruce		21.91%	6.57%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		13.35%	4.00%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		6.00%	1.80%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		3.72%	1.12%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		3.35%	1.01%
	Mapped Veg Type	Interior Grand Fir Forests	Interior Grand Fir Forests		2.45%	0.73%
	Mapped Veg Type	Ponderosa Pine Woodland	Ponderosa Pine Woodland		1.78%	0.53%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		0.04%	0.01%
	Generic Wetlands	Wetlands	Wetlands		0.66%	0.20%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	4.46%	1.78%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	1.53%	0.61%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	1.36%	0.54%
	Wide Ranging Species	High Value Gulo gulo luscus RSF	High Value North American wolverine RSF	G4T4	0.02%	0.01%
	Aquatic Systems	Upper Kootenay montane small rivers	Upper Kootenay montane small rivers		314.23%	94.27%
	Aquatic Systems	Upper Columbia subalpine headwaters	Upper Columbia subalpine headwaters		165.55%	49.66%
	Aquatic Systems	Upper Kootenay medium rivers	Upper Kootenay medium rivers		122.04%	36.61%
	Aquatic Systems	Upper Kootenay subalpine headwaters	Upper Kootenay subalpine headwaters		91.51%	27.45%
	Aquatic Systems	Upper Kootenay montane small rivers	Upper Kootenay montane small rivers		84.71%	25.41%
	Aquatic Systems	Upper Kootenay montane small rivers	Upper Kootenay montane small rivers		80.92%	24.28%
	Aquatic Systems	Upper Kootenay montane headwaters	Upper Kootenay montane headwaters		62.49%	18.75%
	Aquatic Systems	Upper Kootenay montane headwaters	Upper Kootenay montane headwaters		60.24%	18.07%
	Aquatic Systems	Upper Kootenay large river	Upper Kootenay large river		59.75%	17.92%
	Aquatic Systems	Upper Kootenay subalpine headwaters	Upper Kootenay subalpine headwaters		57.54%	17.26%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Purcell Mountains (cont'd)	Aquatic Systems	Clark Fork - Flathead subalpine headwaters	Clark Fork - Flathead subalpine headwaters		46.42%	13.93%
Red Cedar Stand on Snowshoe Cr	Aquatic Systems	Upper Kootenay medium rivers	Upper Kootenay medium rivers		12.10%	3.63%
	Expert Identified Sites	Alberta ESA	Alberta ESA		0.00%	0.00%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.00%	0.00%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.01%	0.00%
Rocky Mountain Front	Aquatic Systems	Upper South Saskatchewan/ Red Deer/ Bow alpine headwaters	Upper South Saskatchewan/ Red Deer/ Bow alpine headwaters		0.08%	0.03%
	Expert Nominated Sites	Subalpine Larch Forests	Subalpine Larch Forests		212.14%	63.64%
	Expert Nominated Sites	Engelmannii Spruce - Subalpine Fir Dry Parklands	Engelmannii Spruce - Subalpine Fir Dry Parklands		182.13%	54.64%
	Expert Nominated Sites	Aspen	Aspen		167.93%	50.38%
	Expert Nominated Sites	Limber Pine Forests	Limber Pine Forests		116.15%	34.84%
	Expert Nominated Sites	Interior Douglas Fir Forests	Interior Douglas Fir Forests		112.52%	33.76%
	Expert Nominated Sites	Montane Dry Grasslands	Montane Dry Grasslands		109.25%	32.78%
	Expert Nominated Sites	Montane Riparian Forest	Montane Riparian Forest		28.57%	4.00%
	Expert Nominated Sites	Alpine Meadow (wet)	Alpine Meadow (wet)		14.29%	14.29%
	Expert Identified Sites	Alberta ESA	Alberta ESA		1.46%	1.46%
	Non-Vascular Plants	Cladonia bacilliformis		G3	66.67%	50.00%
	Vascular Plants	Conimitella williamsii	William's conimitella	G3	53.85%	63.64%
	Birds	Histrionicus histrionicus	Harlequin Duck	G4	40.00%	1.90%
	Insects	Euphydryas gellettii	Gillette's Checkerspot	G3	30.77%	40.00%
	Community	Pseudotsuga menziesii - Pinus flexilis / Juniperus communis / Festuca campestris		S2S3	28.57%	22.22%
	Amphibians	Rana pipiens	Northern leopard frog	G5	14.29%	5.00%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Rocky Mountain Front (cont'd)	Community	Larix occidentalis / Calamagrostis rubescens		S1	14.29%	100.00%
	Community	Penstemon ellipticus talus barren		S1?	14.29%	100.00%
	Community	Populus tremuloides / Rubus parviflorus		S2	14.29%	50.00%
	Vascular Plants	Erigeron radicatus	Dwarf fleabane	G3	14.29%	20.00%
	Non-Vascular Plants	Tayloria acuminata	Point-leaf small-kettle moss	G3	7.69%	100.00%
	Non-Vascular Plants	Drepanocladus crassicostatus	Brown moss	G3G5	7.69%	50.00%
	Vascular Plants	Draba ventosa	Wind River whitlow-grass	G3	7.69%	12.50%
	Vascular Plants	Pellaea gastonyi		G3	7.69%	6.67%
	Vascular Plants	Erigeron lanatus	Woolly fleabane	G3G4	4.00%	16.67%
	Vascular Plants	Packera contermina	High alpine butterweed	G3?	4.00%	12.50%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	0.50%	0.25%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	0.24%	0.12%
	Mapped Veg Type	Aspen Parkland	Aspen Parkland		42.58%	12.77%
	Mapped Veg Type	Rough Fescue Prairie	Rough Fescue Prairie		28.63%	8.59%
	Mapped Veg Type	Foothills Boreal Forests	Foothills Boreal Forests		26.48%	7.94%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		14.10%	4.23%
	Mapped Veg Type	Montane Spruce	Montane Spruce		9.36%	2.81%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		4.39%	1.32%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		2.10%	0.63%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	4.92%	1.97%
	Wide Ranging Species	High Value Gulo gulo luscus RSF	High Value North American wolverine RSF	G4T4	2.81%	1.12%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	2.64%	1.06%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	2.26%	0.90%
	Aquatic Systems	Upper South Saskatchewan/ Red Deer/ Bow montane headwater	Upper South Saskatchewan/ Red Deer/ Bow montane headwater		307.73%	92.32%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Rocky Mountain Front (cont'd)	Aquatic Systems	Upper South Saskatchewan/ Red Deer/ Bow medium rivers	Upper South Saskatchewan/ Red Deer/ Bow medium river		219.53%	65.86%
	Aquatic Systems	Upper South Saskatchewan/ Red Deer/ Bow foothill small river	Upper South Saskatchewan/ Red Deer/ Bow foothill small river		202.21%	60.66%
	Aquatic Systems	Upper South Saskatchewan/ Red Deer/ Bow foothill tributary	Upper South Saskatchewan/ Red Deer/Bow foothill		132.16%	39.65%
	Aquatic Systems	Upper South Saskatchewan/ Red Deer/Bow subalpine small river	Upper South Saskatchewan/ Red Deer/Bow subalpine small river		117.27%	35.18%
	Aquatic Systems	Upper South Saskatchewan/ Red Deer/ Bow alpine headwaters	Upper South Saskatchewan/ Red Deer/ Bow alpine headwaters		97.69%	29.31%
	Aquatic Systems	Upper South Saskatchewan/Red Deer/ Bow foothill tributary	Upper South Saskatchewan/Red Deer/ Bow foothill tributary		97.30%	29.19%
	Aquatic Systems	Upper South Saskatchewan / Red Deer / Bow montane headwater	Upper South Saskatchewan /Red Deer/ Bow montane headwater		71.86%	21.56%
	Aquatic Systems	Upper Kootenay subalpine headwaters	Upper Kootenay subalpine headwaters		9.68%	2.90%
	Aquatic Systems	Upper South Saskatchewan/Red Deer/ Bow foothill tributary	Upper South Saskatchewan/ Red Deer/? Bow foothill tributary		2.45%	0.73%
	Aquatic Systems	Upper Kootenay montane small rivers	Upper Kootenay montane small rivers		0.01%	0.00%
Rocky Mountain Trench A	Expert Nominated Sites	Marsh	Marsh		100.00%	4.93%
	Expert Nominated Sites	Fen	Fen		71.43%	2.84%
	Expert Nominated Sites	Montane Riparian Forest	Montane Riparian Forest		57.14%	8.00%
	Expert Nominated Sites	Montane Riparian Shrubland	Montane Riparian Shrubland		14.29%	0.91%
	Expert Identified Sites	Grassland Communities	Grassland Communities		12.87%	12.87%
	Expert Identified Sites	Badger	Badger		9.48%	9.48%
	Expert Nominated Sites	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		6.42%	1.92%
	Expert Nominated Sites	Interior Douglas Fir Forests	Interior Douglas Fir Forests		2.90%	0.87%
	Expert Identified Sites	Connectivity	Connectivity		2.79%	2.79%
	Expert Nominated Sites	Montane Dry Grasslands	Montane Dry Grasslands		2.70%	0.81%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Rocky Mountain Trench A (cont'd)	Expert Nominated Sites	Limber Pine Forests	Limber Pine Forests		2.55%	0.76%
	Expert Identified Sites	Burbot	Burbot		0.72%	0.72%
	Birds	Melanerpes lewis	Lewis' woodpecker	G4	40.00%	11.11%
	Community	Pinus flexilis - Pseudotsuga menziesii / Juniperus spp. / Arctostaphylos uva-ursi		S2	28.57%	25.00%
	Vascular Plants	Pellaea gastonyi		G3	15.38%	13.33%
	Non-Vascular Plants	Tayloria splachnoides		G2G3	7.69%	100.00%
	Vascular Plants	Botrychium ascendens	Upward-lobed moonwort	G3*	7.69%	5.00%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	5.04%	2.52%
	Community	Artemisia tridentata / Elymus spicatus - Balsamorhiza sagittata		S2Q	4.00%	100.00%
	Vascular Plants	Erigeron lanatus	Woolly fleabane	G3G4	4.00%	16.67%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	2.69%	1.34%
	Wide Ranging Fish	ACIPENSER TRANSMONTANUS POP 2	White Sturgeon	G4T?Q	0.44%	0.44%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		15.13%	4.54%
	Mapped Veg Type	Montane Spruce	Montane Spruce		6.23%	1.87%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		3.96%	1.19%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		3.68%	1.10%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		3.01%	0.90%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		2.87%	0.86%
	Generic Wetlands	Wetlands	Wetlands		20.05%	6.02%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	2.42%	0.97%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	2.23%	0.89%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	2.11%	0.84%
	Wide Ranging Species	High Value Gulo gulo luscus RSF	High Value North American wolverine RSF	G4T4	1.45%	0.58%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Rocky Mountain Trench A (cont'd)	Aquatic Systems	Upper Kootenay medium rivers	Upper Kootenay medium rivers		129.67%	38.90%
	Aquatic Systems	Upper Columbia montane headwaters	Upper Columbia montane headwaters		78.67%	23.60%
	Aquatic Systems	Upper Columbia montane headwaters	Upper Columbia montane headwaters		65.67%	19.70%
	Aquatic Systems	Upper Columbia subalpine headwaters	Upper Columbia subalpine headwaters		65.63%	19.69%
	Aquatic Systems	Upper Columbia medium rivers	Upper Columbia medium rivers		62.51%	18.75%
	Aquatic Systems	Upper Columbia montane small rivers	Upper Columbia montane small rivers		54.45%	16.33%
	Aquatic Systems	Upper Columbia montane small rivers	Upper Columbia montane small rivers		49.01%	14.70%
	Aquatic Systems	Upper Columbia large river	Upper Columbia large river		46.40%	13.92%
	Aquatic Systems	Upper Columbia montane, glacial small rivers	Upper Columbia montane, glacial small rivers		46.02%	13.81%
	Aquatic Systems	Upper Columbia montane, glacial small rivers	Upper Columbia montane, glacial small rivers		19.13%	5.74%
	Aquatic Systems	Upper Columbia subalpine headwaters	Upper Columbia subalpine headwaters		10.48%	3.14%
	Aquatic Systems	Great Lakes large river	Great Lakes large river		9.23%	2.77%
	Aquatic Systems	Upper Columbia alpine, glacial headwaters	Upper Columbia alpine, glacial headwaters		6.54%	1.96%
	Aquatic Systems	Upper Kootenay subalpine headwaters	Upper Kootenay subalpine headwaters		2.17%	0.65%
	Aquatic Systems	Great Lakes alpine headwaters	Great Lakes alpine headwaters		1.30%	0.39%
Rocky Mountain Trench B	Expert Nominated Sites	Ponderosa Pine Woodland	Ponderosa Pine Woodland		306.01%	91.80%
	Expert Nominated Sites	Montane Scrub	Montane Scrub		64.38%	19.32%
	Expert Nominated Sites	Montane Riparian Forest	Montane Riparian Forest		42.86%	6.00%
	Expert Identified Sites	Grassland Communities	Grassland Communities		31.68%	31.68%
	Expert Identified Sites	Badger	Badger		23.46%	23.46%
	Expert Nominated Sites	Montane Dry Grasslands	Montane Dry Grasslands		15.91%	4.77%
	Expert Nominated Sites	Interior Douglas Fir Forests	Interior Douglas Fir Forests		7.41%	2.22%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Rocky Mountain Trench B (cont'd)	Expert Nominated Sites	Aspen	Aspen		0.49%	0.15%
	Expert Identified Sites	Westslope Cutthroat Trout	Westslope Cutthroat Trout		0.16%	0.16%
	Expert Identified Sites	Bull Trout	Bull Trout		0.03%	0.03%
	Expert Identified Sites	Connectivity	Connectivity		0.00%	0.00%
	Birds	Melanerpes lewis	Lewis' woodpecker	G4	240.00%	66.67%
	Community	Pinus ponderosa - Populus tremuloides / Rosa woodsii		S2	66.67%	100.00%
	Community	Pinus ponderosa / Elymus spicatus / Lupinus		S2	66.67%	100.00%
	Birds	Gavia immer	Common Loon	G5	60.00%	2.83%
	Amphibians	Ambystoma tigrinum	Tiger salamander	G5	28.57%	28.57%
	Amphibians	Bufo boreas	Western toad	G4	20.00%	0.67%
	Vascular Plants	Silene spaldingii	Spalding's campion	G2	16.00%	36.36%
	Vascular Plants	Glyceria leptostachya	Slim-head manna grass	G3	7.69%	50.00%
	Wide Ranging Fish	ACIPENSER TRANSMONTANUS POP 2	White Sturgeon	G4T?Q	5.97%	5.97%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	4.54%	2.27%
	Community	Purshia tridentata / Elymus spicatus		S2	4.00%	100.00%
	Community	Populus balsamifera ssp. trichocarpa / Cornus stolonifera - Rosa nutkana		S1S2	4.00%	100.00%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	3.96%	1.98%
	Mapped Veg Type	Ponderosa Pine Woodland	Ponderosa Pine Woodland		140.38%	42.11%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		26.63%	7.99%
	Mapped Veg Type	Montane Spruce	Montane Spruce		4.97%	1.49%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.10%	0.03%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		0.00%	0.00%
	Generic Wetlands	Wetlands	Wetlands		3.61%	1.08%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.48%	0.19%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Rocky Mountain Trench B (cont'd)	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	0.33%	0.13%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.14%	0.06%
	Aquatic Systems	Upper Kootenay montane headwaters	Upper Kootenay montane headwaters		135.90%	40.77%
	Aquatic Systems	Upper Kootenay large river	Upper Kootenay large river		83.34%	25.00%
	Aquatic Systems	Upper Kootenay medium rivers	Upper Kootenay medium rivers		60.04%	18.01%
	Aquatic Systems	Upper Kootenay montane small rivers	Upper Kootenay montane small rivers		49.30%	14.79%
	Aquatic Systems	Upper Kootenay medium rivers	Upper Kootenay medium rivers		46.19%	13.86%
	Aquatic Systems	Upper Columbia montane headwaters	Upper Columbia montane headwaters		41.77%	12.53%
	Aquatic Systems	Upper Kootenay montane small rivers	Upper Kootenay montane small rivers		25.80%	7.74%
	Aquatic Systems	Upper Kootenay montane small rivers	Upper Kootenay montane small rivers		19.10%	5.73%
	Aquatic Systems	Upper Kootenay montane small rivers	Upper Kootenay montane small rivers		13.29%	3.99%
	Aquatic Systems	Upper Kootenay montane headwaters	Upper Kootenay montane headwaters		4.44%	1.33%
	Aquatic Systems	Upper Kootenay subalpine headwaters	Upper Kootenay subalpine headwaters		1.29%	0.39%
	Aquatic Systems	Upper Kootenay subalpine headwaters	Upper Kootenay subalpine headwaters		0.62%	0.19%
Salmo / Priest / Selkirks	Expert Nominated Sites	Montane Riparian Shrubland	Montane Riparian Shrubland		257.14%	16.36%
	Expert Nominated Sites	Fen	Fen		228.57%	9.09%
	Expert Nominated Sites	Marsh	Marsh		200.00%	9.86%
	Expert Nominated Sites	Sphagnum Bog	Sphagnum Bog		142.86%	38.46%
	Expert Nominated Sites	Montane Wet Meadows	Montane Wet Meadows		71.43%	6.67%
	Expert Nominated Sites	Interior Grand Fir Forests	Interior Grand Fir Forests		66.25%	19.87%
	Expert Nominated Sites	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		54.37%	16.31%
	Expert Nominated Sites	Montane Riparian Forest	Montane Riparian Forest		42.86%	6.00%
	Expert Nominated Sites	Subalpine Shrublands	Subalpine Shrublands		14.29%	33.33%
	Expert Nominated Sites	Engelmannii Spruce Riparian Forests	Engelmannii Spruce Riparian Forests		14.29%	16.67%
	Expert Nominated Sites	Subalpine Wet Meadow	Subalpine Wet Meadow		14.29%	12.50%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Salmo / Priest / Selkirks (cont'd)	Expert Nominated Sites	Conifer Swamp	Conifer Swamp		14.29%	6.25%
	Expert Nominated Sites	Engelmann Spruce / Subalpine Fir Dry Forests	Engelmann Spruce / Subalpine Fir Dry Forests		6.89%	2.07%
	Expert Nominated Sites	Engelmannii Spruce - Subalpine Fir Dry Parklands	Engelmannii Spruce - Subalpine Fir Dry Parklands		5.57%	1.67%
	Expert Nominated Sites	Subalpine Dry Grassland	Subalpine Dry Grassland		4.14%	1.24%
	Expert Nominated Sites	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.92%	0.28%
	Birds	Histrionicus histrionicus	Harlequin Duck	G4	140.00%	6.67%
	Birds	Gavia immer	Common Loon	G5	60.00%	2.83%
	Birds	Haliaeetus leucocephalus nest site	Bald Eagle nest site	G4	60.00%	1.94%
	Community	Pinus monticola / Clintonia uniflora Forest		G1Q	42.86%	100.00%
	Birds	Otus flammeolus	Flammulated Owl	G4	40.00%	7.14%
	Snails and Slugs	Magnipelta mycophaga	Spotted slug	G2G3	38.46%	71.43%
	Wide Ranging Fish	Lota lota	Burbot	G5	32.64%	32.64%
	Community	Tsuga heterophylla / Menziesia ferruginea Forest		G2	28.57%	100.00%
	Vascular Plants	Botrychium montanum	Mountain moonwort	G3	23.08%	4.23%
	Amphibians	Bufo boreas	Western toad	G4	20.00%	0.67%
	Community	Thuja plicata / Lysichiton americanum / Sphagnum		S2	16.00%	80.00%
	Community	Thuja plicata / Adiantum pedatum Forest		G2?	14.29%	12.50%
	Community	Thuja plicata / Oplopanax horridus		S1S2	12.00%	60.00%
	Non-Vascular Plants	Collema curtisporum		G3	12.00%	37.50%
	Community	Betula glandulosa / Carex / Sphagnum		S2Q	8.00%	50.00%
	Non-Vascular Plants	Cladonia imbricarica		G2	7.69%	50.00%
	Vascular Plants	Carex comosa	Birstly sedge	G5	7.69%	16.67%
	Vascular Plants	Botrychium pedunculosum	Stalked moonwort	G3*	7.69%	3.23%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Salmo / Priest / Selkirks (cont'd)	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	3.26%	1.63%
	Wide Ranging Fish	ACIPENSER TRANSMONTANUS POP 2	White Sturgeon	G4T?Q	2.96%	2.96%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	2.90%	1.45%
	Wide Ranging Fish	RHINICHTHYS UMATILLA	UMATILLA DACE	G4	2.82%	0.85%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		11.06%	3.32%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		1.94%	0.58%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		0.41%	0.12%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.20%	0.06%
	Generic Wetlands	Wetlands	Wetlands		9.57%	2.87%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	3.06%	1.23%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	0.94%	0.37%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.63%	0.25%
	Wide Ranging Species	High Value Gulo gulo luscus RSF	High Value North American wolverine RSF	G4T4	0.38%	0.15%
	Wide Ranging Species	High Value Martes pennanti RSF	High Value Fisher RSF	G5	0.20%	0.08%
	Aquatic Systems	Great Lakes montane small rivers	Great Lakes montane small rivers		200.03%	60.01%
	Aquatic Systems	Upper Kootenay montane small rivers	Upper Kootenay montane small rivers		191.20%	57.36%
	Aquatic Systems	Great Lakes montane headwaters	Great Lakes montane headwaters		148.40%	44.52%
	Aquatic Systems	Upper Columbia subalpine headwaters	Upper Columbia subalpine headwaters		132.14%	39.64%
	Aquatic Systems	Great Lakes montane headwaters	Great Lakes montane headwaters		83.85%	25.15%
	Aquatic Systems	Great Lakes montane small rivers	Great Lakes montane small rivers		64.06%	19.22%
	Aquatic Systems	Great Lakes montane headwaters	Great Lakes montane headwaters		57.58%	17.28%
	Aquatic Systems	Great Lakes alpine headwaters	Great Lakes alpine headwaters		56.60%	16.98%
	Aquatic Systems	Upper Kootenay large river	Upper Kootenay large river		10.83%	3.25%
	Aquatic Systems	Upper Kootenay alpine headwaters	Upper Kootenay alpine headwaters		2.23%	0.67%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Salmo River	Expert Identified Sites	Harlequin Duck	Harlequin Duck		50.00%	50.00%
	Expert Nominated Sites	Fen	Fen		14.29%	0.57%
	Expert Identified Sites	Riparian Forest	Riparian Forest		5.75%	5.75%
	Expert Identified Sites	Bull Trout	Bull Trout		2.65%	2.65%
	Expert Identified Sites	Grizzly Bear	Grizzly Bear		2.01%	2.01%
	Expert Nominated Sites	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.04%	0.01%
	Expert Nominated Sites	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.04%	0.01%
	Amphibians	Ascaphus montanus	Tailed frog	G4	28.57%	3.13%
	Non-Vascular Plants	Hygrohypnum norvegicum		G2	7.69%	100.00%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	0.53%	0.26%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	0.48%	0.24%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		1.88%	0.56%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.07%	0.02%
	Generic Wetlands	Wetlands	Wetlands		0.06%	0.02%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.34%	0.14%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	0.03%	0.01%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.01%	0.00%
	Aquatic Systems	Great Lakes montane small rivers	Great Lakes montane small rivers		60.34%	18.10%
	Aquatic Systems	Great Lakes montane headwaters	Great Lakes montane headwaters		10.56%	3.17%
	Aquatic Systems	Great Lakes alpine headwaters	Great Lakes alpine headwaters		4.80%	1.44%
	Aquatic Systems	Great Lakes medium rivers	Great Lakes medium rivers		1.70%	0.51%
	Aquatic Systems	Great Lakes alpine headwaters	Great Lakes alpine headwaters		0.76%	0.23%
	Aquatic Systems	Great Lakes montane headwaters	Great Lakes montane headwaters		0.72%	0.22%
Scotchman Peak	Expert Nominated Sites	Disturbed Colluvial / Landslide	Disturbed Colluvial / Landslide		14.29%	10.00%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Scotchman Peak (cont'd)	Expert Nominated Sites	Engelmannii Spruce - Subalpine Fir Dry Parklands	Engelmannii Spruce - Subalpine Fir Dry Parklands		12.64%	3.79%
	Expert Nominated Sites	Lodgepole Pine Forest and Woodlands	Lodgepole Pine Forest and Woodlands		5.65%	1.69%
	Expert Nominated Sites	Engelmann Spruce / Subalpine Fir Dry Forests	Engelmann Spruce / Subalpine Fir Dry Forests		2.48%	0.74%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	0.11%	0.06%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.16%	0.05%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.07%	0.02%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		0.03%	0.01%
	Generic Wetlands	Wetlands	Wetlands		0.01%	0.00%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	0.10%	0.04%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.03%	0.01%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.03%	0.01%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		4.46%	1.34%
SF Lolo Creek Model Data	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.77%	0.23%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.13%	0.04%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		0.02%	0.01%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.07%	0.03%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	0.01%	0.00%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.01%	0.00%
Shuswap Highlands	Expert Identified Sites	Fen	Fen		29.58%	29.58%
	Wide Ranging Fish	PINK SALMON	PINK SALMON	G5	177.29%	53.19%
	Wide Ranging Fish	SOCKEYE SALMON	SOCKEYE SALMON	G5	78.15%	23.44%
	Wide Ranging Fish	Onchorhynchus mykiss	Steelhead		47.44%	14.23%
	Wide Ranging Fish	COHO SALMON	COHO SALMON	G4	41.29%	20.64%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Shuswap Highlands (cont'd)	Wide Ranging Fish	Onchorhynchus tshawytscha	Chinook Salmon		33.93%	10.18%
	Vascular Plants	Azolla mexicana	Mexican mosquito-fern	G5	15.38%	100.00%
	Wide Ranging Fish	ACIPENSER TRANSMONTANUS POP 2	White Sturgeon	G4T?Q	5.93%	5.93%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	5.70%	2.85%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	1.26%	0.63%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		12.36%	3.71%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		5.65%	1.69%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		2.74%	0.82%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		1.03%	0.31%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.00%	0.00%
	Generic Wetlands	Wetlands	Wetlands		4.71%	1.41%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	6.95%	2.78%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	5.83%	2.33%
	Wide Ranging Species	High Value Gulo gulo luscus RSF	High Value North American wolverine RSF	G4T4	5.38%	2.15%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	5.30%	2.12%
	Wide Ranging Species	High Value Martes pennanti RSF	High Value Fisher RSF	G5	0.07%	0.03%
	Aquatic Systems	Thompson alpine headwaters	Thompson alpine headwaters		314.89%	94.47%
	Aquatic Systems	Thompson large river	Thompson large river		208.14%	62.44%
	Aquatic Systems	Thompson montane headwaters	Thompson montane headwaters		201.13%	60.34%
	Aquatic Systems	Thompson montane small rivers	Thompson montane small rivers		102.43%	30.73%
	Aquatic Systems	Thompson alpine headwaters	Thompson alpine headwaters		99.76%	29.93%
	Aquatic Systems	Thompson montane small rivers	Thompson montane small rivers		91.39%	27.42%
	Aquatic Systems	Thompson medium rivers	Thompson medium rivers		70.44%	21.13%
	Aquatic Systems	Upper Columbia alpine, glacial headwaters	Upper Columbia alpine, glacial headwaters		13.90%	4.17%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Shuswap Highlands (cont'd)	Aquatic Systems	Upper Columbia montane, glacial small rivers	Upper Columbia montane, glacial small rivers		2.73%	0.82%
	Aquatic Systems	Thompson montane headwaters	Thompson montane headwaters		2.07%	0.62%
Slender-Spike Manna Grass EO	Expert Identified Sites	Westslope Cutthroat Trout	Westslope Cutthroat Trout		0.51%	0.51%
	Vascular Plants	Glyceria leptostachya	Slim-head manna grass	G3	7.69%	50.00%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	0.37%	0.18%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	0.33%	0.16%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.74%	0.22%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.26%	0.08%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.26%	0.08%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.24%	0.07%
	Mapped Veg Type	Montane Spruce	Montane Spruce		0.16%	0.05%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		0.00%	0.00%
	Generic Wetlands	Wetlands	Wetlands		0.13%	0.04%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.10%	0.04%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.05%	0.02%
	Aquatic Systems	Upper Kootenay medium rivers	Upper Kootenay medium rivers		30.72%	9.22%
	Aquatic Systems	Upper Kootenay montane small rivers	Upper Kootenay montane small rivers		13.98%	4.19%
	Aquatic Systems	Upper Kootenay alpine headwaters	Upper Kootenay alpine headwaters		2.79%	0.84%
Slocan River	Expert Identified Sites	Riparian Forest	Riparian Forest		4.87%	4.87%
	Wide Ranging Fish	RHINICHTHYS UMATILLA	UMATILLA DACE	G4	60.71%	18.21%
	Aquatic Eos	COTTUS CONFUSUS	SHORTHEAD SCULPIN	G5	30.77%	28.57%
	Wide Ranging Fish	ACIPENSER TRANSMONTANUS POP 2	White Sturgeon	G4T?Q	5.90%	5.90%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	2.06%	1.03%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Slocan River (cont'd)	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	1.81%	0.90%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		4.35%	1.31%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		1.30%	0.39%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		1.26%	0.38%
	Generic Wetlands	Wetlands	Wetlands		0.38%	0.11%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	1.22%	0.49%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	1.14%	0.46%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.74%	0.30%
	Wide Ranging Species	High Value Gulo gulo luscus RSF	High Value North American wolverine RSF	G4T4	0.11%	0.04%
	Aquatic Systems	Great Lakes medium rivers	Great Lakes medium rivers		112.57%	33.77%
	Aquatic Systems	Great Lakes montane small rivers	Great Lakes montane small rivers		18.66%	5.60%
	Aquatic Systems	Great Lakes large river	Great Lakes large river		16.71%	5.01%
	Aquatic Systems	Great Lakes alpine headwaters	Great Lakes alpine headwaters		16.19%	4.86%
	Aquatic Systems	Great Lakes alpine headwaters	Great Lakes alpine headwaters		5.12%	1.54%
	Aquatic Systems	Great Lakes montane small rivers	Great Lakes montane small rivers		3.30%	0.99%
	Aquatic Systems	Great Lakes montane headwaters	Great Lakes montane headwaters		2.60%	0.78%
	Aquatic Systems	Great Lakes montane headwaters	Great Lakes montane headwaters		0.01%	0.00%
Spirit Lake	Expert Nominated Sites	Sphagnum Bog	Sphagnum Bog		14.29%	3.85%
	Expert Nominated Sites	Marsh	Marsh		14.29%	0.70%
	Expert Nominated Sites	Fen	Fen		14.29%	0.57%
	Birds	Haliaeetus leucocephalus nest site	Bald Eagle nest site	G4	20.00%	0.65%
	Community	Tsuga heterophylla / Xerophyllum tenax Forest		G2	14.29%	100.00%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	0.16%	0.08%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.47%	0.14%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Spirit Lake (cont'd)	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.25%	0.08%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.15%	0.05%
	Generic Wetlands	Wetlands	Wetlands		0.44%	0.13%
	Wide Ranging Species	High Value Martes pennanti RSF	High Value Fisher RSF	G5	0.20%	0.08%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.02%	0.01%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.00%	0.00%
	Aquatic Systems	Clark Fork - Flathead large rivers	Clark Fork - Flathead large rivers		10.98%	3.29%
St. Joe / Clearwater	Expert Nominated Sites	Subalpine Fir - Mountain Hemlock Forests	Subalpine Fir - Mountain Hemlock Forests		139.40%	41.82%
	Expert Nominated Sites	Interior Grand Fir Forests	Interior Grand Fir Forests		133.46%	40.04%
	Expert Nominated Sites	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		58.27%	17.48%
	Expert Nominated Sites	Montane Riparian Forest	Montane Riparian Forest		28.57%	4.00%
	Expert Nominated Sites	Montane Riparian Shrubland	Montane Riparian Shrubland		28.57%	1.82%
	Expert Nominated Sites	Subalpine Shrublands	Subalpine Shrublands		14.29%	33.33%
	Expert Nominated Sites	Dwarf-Shrubland	Dwarf-Shrubland		14.29%	25.00%
	Expert Nominated Sites	Rock Outcrop / Cliff	Rock Outcrop / Cliff		14.29%	25.00%
	Expert Nominated Sites	Engelmannii Spruce Riparian Forests	Engelmannii Spruce Riparian Forests		14.29%	16.67%
	Expert Nominated Sites	Alpine Meadow (wet)	Alpine Meadow (wet)		14.29%	14.29%
	Expert Nominated Sites	Subalpine Wet Meadow	Subalpine Wet Meadow		14.29%	12.50%
	Expert Nominated Sites	Disturbed Colluvial / Landslide	Disturbed Colluvial / Landslide		14.29%	10.00%
	Expert Nominated Sites	Fen	Fen		14.29%	0.57%
	Expert Nominated Sites	Engelmannii Spruce - Subalpine Fir Dry Parklands	Engelmannii Spruce - Subalpine Fir Dry Parklands		4.58%	1.37%
	Expert Nominated Sites	Montane Scrub	Montane Scrub		1.34%	0.40%
	Expert Nominated Sites	Engelmann Spruce / Subalpine Fir Dry Forests	Engelmann Spruce / Subalpine Fir Dry Forests		0.96%	0.29%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
St. Joe / Clearwater (cont'd)	Expert Nominated Sites	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.47%	0.14%
	Expert Nominated Sites	Montane Dry Grasslands	Montane Dry Grasslands		0.09%	0.03%
	Amphibians	Plethodon idahoensis	Coeur d'Alene salamander	G3	322.22%	26.13%
	Vascular Plants	Cypripedium fasciculatum	Clustered lady's-slipper	G4	238.46%	41.89%
	Vascular Plants	Cardamine constancei	Constance's bitter cress	G3	112.00%	68.29%
	Vascular Plants	Calochortus nitidus	Broad-fruit mariposa	G3	100.00%	60.00%
	Vascular Plants	Cephalanthera austiniae	Phantom orchid	G4	92.31%	50.00%
	Birds	Histrionicus histrionicus	Harlequin Duck	G4	80.00%	3.81%
	Vascular Plants	Corydalis caseana var. hastata	Case's corydalis	G5T3	72.00%	40.91%
	Community	Thuja plicata / Adiantum pedatum Forest		G2?	57.14%	50.00%
	Vascular Plants	Synthyris platycarpa	Pennell's kittentail	G3	52.00%	86.67%
	Birds	Haliaeetus leucocephalus wintering area	Bald Eagle wintering area	G4	40.00%	28.57%
	Birds	Otus flammeolus	Flammulated Owl	G4	40.00%	7.14%
	Wide Ranging Fish	Onchorhynchus mykiss	Steelhead		35.84%	10.75%
	Vascular Plants	Mimulus ampliatus	Spacious monkeyflower	G1	33.33%	100.00%
	Vascular Plants	Phlox idahonis	Clearwater phlox	G1	32.00%	100.00%
	Community	Tsuga mertensiana / Streptopus amplexifolius Forest		G2	28.57%	100.00%
	Birds	Haliaeetus leucocephalus nest site	Bald Eagle nest site	G4	20.00%	0.65%
	Community	Thuja plicata / Aralia nudicaulis Forest		G2	14.29%	50.00%
	Vascular Plants	Waldsteinia idahoensis	Idaho strawberry	G3	12.00%	60.00%
	Vascular Plants	Tauschia tenuissima	Leiberg's tauschia	G3	12.00%	11.11%
	Amphibians	Dicamptodon aterrimus	Idaho giant salamander	G3	11.11%	33.33%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	10.76%	5.38%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	9.27%	4.64%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
St. Joe / Clearwater (cont'd)	Vascular Plants	Aster jessicae	Jessica's aster	G2	8.00%	7.41%
	Vascular Plants	Botrychium montanum	Mountain moonwort	G3	7.69%	1.41%
	Wide Ranging Fish	Onchorhynchus tshawytscha	Chinook Salmon		5.61%	1.68%
	Community	Thuja plicata / Lysichiton americanum / Sphagnum		S2	4.00%	20.00%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		53.73%	16.12%
	Mapped Veg Type	Interior Grand Fir Forests	Interior Grand Fir Forests		11.78%	3.53%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		5.83%	1.75%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		5.22%	1.57%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		0.38%	0.11%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.03%	0.01%
	Generic Wetlands	Wetlands	Wetlands		2.09%	0.63%
	Wide Ranging Species	High Value Martes pennanti RSF	High Value Fisher RSF	G5	59.82%	23.93%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	9.17%	3.67%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	6.71%	2.68%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	4.87%	1.95%
	Wide Ranging Species	High Value Gulo gulo luscus RSF	High Value North American wolverine RSF	G4T4	1.03%	0.41%
	Aquatic Systems	Clearwater montane small rivers	Clearwater montane small rivers		333.33%	100.00%
	Aquatic Systems	Clearwater medium rivers	Clearwater medium rivers		333.33%	100.00%
	Aquatic Systems	Clearwater subalpine headwaters	Clearwater subalpine headwaters		294.48%	88.34%
	Aquatic Systems	Clearwater subalpine headwaters	Clearwater subalpine headwaters		253.85%	76.15%
	Aquatic Systems	Clearwater subalpine small rivers	Clearwater subalpine small rivers		234.27%	70.28%
	Aquatic Systems	Clearwater subalpine headwaters	Clearwater subalpine headwaters		218.85%	65.66%
	Aquatic Systems	Clearwater montane small rivers	Clearwater montane small rivers		204.39%	61.32%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
St. Joe / Clearwater (cont'd)	Aquatic Systems	Clearwater montane small rivers	Clearwater montane small rivers		143.07%	42.92%
	Aquatic Systems	Clearwater subalpine small rivers	Clearwater subalpine small rivers		120.71%	36.21%
	Aquatic Systems	Clearwater subalpine headwaters	Clearwater subalpine headwaters		117.87%	35.36%
	Aquatic Systems	Clark Fork - Flathead medium rivers	Clark Fork - Flathead medium rivers		98.84%	29.65%
	Aquatic Systems	Clearwater montane headwaters	Clearwater montane headwaters		97.46%	29.24%
	Aquatic Systems	Clearwater montane headwaters	Clearwater montane headwaters		75.40%	22.62%
	Aquatic Systems	Clearwater montane headwaters	Clearwater montane headwaters		66.28%	19.88%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		64.41%	19.32%
	Aquatic Systems	Clark Fork - Flathead montane small rivers	Clark Fork - Flathead montane small rivers		63.57%	19.07%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		45.41%	13.62%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		34.45%	10.34%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		23.23%	6.97%
	Aquatic Systems	Clark Fork - Flathead montane small rivers	Clark Fork - Flathead montane small rivers		8.92%	2.68%
Swamp Creek	Expert Nominated Sites	Fen	Fen		14.29%	0.57%
	Mapped Veg Type	Interior Grand Fir Forests	Interior Grand Fir Forests		1.14%	0.34%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.55%	0.17%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.09%	0.03%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.03%	0.01%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		0.01%	0.00%
	Aquatic Systems	Upper Kootenay montane headwaters	Upper Kootenay montane headwaters		8.28%	2.48%
Thompson / Lower Clark Fork	Expert Nominated Sites	Subalpine Fir - Mountain Hemlock Forests	Subalpine Fir - Mountain Hemlock Forests		98.69%	29.61%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Thompson / Lower Clark Fork (cont'd)	Expert Nominated Sites	Lodgepole Pine Forest and Woodlands	Lodgepole Pine Forest and Woodlands		1.28%	0.38%
	Expert Nominated Sites	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.87%	0.26%
	Amphibians	Bufo boreas	Western toad	G4	220.00%	7.33%
	Birds	Histrionicus histrionicus	Harlequin Duck	G4	200.00%	9.52%
	Amphibians	Plethodon idahoensis	Coeur d'Alene salamander	G3	111.11%	9.01%
	Birds	Haliaeetus leucocephalus nest site	Bald Eagle nest site	G4	100.00%	3.23%
	Amphibians	Rana pipiens	Northern leopard frog	G5	57.14%	20.00%
	Birds	Otus flammeolus	Flammulated Owl	G4	40.00%	7.14%
	Birds	Gavia immer	Common Loon	G5	40.00%	1.89%
	Non-Vascular Plants	Grimmia brittoniae		G1	20.00%	83.33%
	Non-Vascular Plants	Collema curtisporum		G3	16.00%	50.00%
	Snails and Slugs	Magnipelta mycophaga	Spotted slug	G2G3	15.38%	28.57%
	Vascular Plants	Botrychium crenulatum	Crenulate moonwort	G3	15.38%	2.90%
	Vascular Plants	Carex amplifolia	Big-leaf sedge	G4	7.69%	33.33%
	Vascular Plants	Botrychium pedunculosum	Stalked moonwort	G3*	7.69%	3.23%
	Vascular Plants	Botrychium montanum	Mountain moonwort	G3	7.69%	1.41%
	Vascular Plants	Cypripedium fasciculatum	Clustered lady's-slipper	G4	7.69%	1.35%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	5.16%	2.58%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	1.36%	0.68%
	Mapped Veg Type	Interior Grand Fir Forests	Interior Grand Fir Forests		42.25%	12.68%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		5.86%	1.76%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		4.70%	1.41%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		1.85%	0.56%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Thompson / Lower Clark Fork (cont'd)	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		1.32%	0.40%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		0.18%	0.05%
	Generic Wetlands	Wetlands	Wetlands		0.01%	0.00%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	2.10%	0.84%
	Wide Ranging Species	High Value Martes pennanti RSF	High Value Fisher RSF	G5	1.40%	0.56%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	0.70%	0.28%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.31%	0.12%
	Aquatic Systems	Clark Fork - Flathead montane small rivers	Clark Fork - Flathead montane small rivers		122.91%	36.87%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		110.59%	33.18%
	Aquatic Systems	Clark Fork - Flathead montane small rivers	Clark Fork - Flathead montane small rivers		103.47%	31.04%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		56.73%	17.02%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		56.11%	16.83%
	Aquatic Systems	Clark Fork - Flathead large rivers	Clark Fork - Flathead large rivers		46.67%	14.00%
	Aquatic Systems	Upper Kootenay montane headwaters	Upper Kootenay montane headwaters		12.58%	3.77%
	Aquatic Systems	Upper Kootenay montane headwaters	Upper Kootenay montane headwaters		11.79%	3.54%
Torpy River Model Data	Wide Ranging Fish	Onchorhynchus tshawytscha	Chinook Salmon		0.68%	0.21%
	Wide Ranging Fish	ACIPENSER TRANSMONTANUS POP 2	White Sturgeon	G4T?Q	0.45%	0.45%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	0.12%	0.06%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.15%	0.05%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		0.11%	0.03%
	Wide Ranging Species	High Value Gulo gulo luscus RSF	High Value North American wolverine RSF	G4T4	0.43%	0.17%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	0.16%	0.06%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Torpy River Model Data (cont'd)	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.14%	0.05%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.09%	0.04%
	Aquatic Systems	Upper Fraser alpine, glacial small rivers	Upper Fraser alpine, glacial small rivers		21.69%	6.51%
	Aquatic Systems	Upper Fraser alpine headwaters	Upper Fraser alpine headwaters		2.06%	0.62%
Upper Coeur d'Alene	Expert Nominated Sites	Subalpine Fir - Mountain Hemlock Forests	Subalpine Fir - Mountain Hemlock Forests		31.22%	9.37%
	Expert Nominated Sites	Subalpine Wet Meadow	Subalpine Wet Meadow		14.29%	12.50%
	Expert Nominated Sites	Montane Riparian Forest	Montane Riparian Forest		14.29%	2.00%
	Expert Nominated Sites	Montane Wet Meadows	Montane Wet Meadows		14.29%	1.33%
	Expert Nominated Sites	Montane Riparian Shrubland	Montane Riparian Shrubland		14.29%	0.91%
	Expert Nominated Sites	Marsh	Marsh		14.29%	0.70%
	Expert Nominated Sites	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		11.26%	3.38%
	Expert Nominated Sites	Lodgepole Pine Forest and Woodlands	Lodgepole Pine Forest and Woodlands		1.82%	0.55%
	Amphibians	Plethodon idahoensis	Coeur d'Alene salamander	G3	33.33%	2.70%
	Birds	Histrionicus histrionicus	Harlequin Duck	G4	20.00%	0.95%
	Vascular Plants	Cephalanthera austiniae	Phantom orchid	G4	7.69%	4.17%
	Vascular Plants	Botrychium crenulatum	Crenulate moonwort	G3	7.69%	1.45%
	Vascular Plants	Waldsteinia idahoensis	Idaho strawberry	G3	4.00%	20.00%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	1.29%	0.65%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	0.73%	0.37%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		3.52%	1.06%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.25%	0.07%
	Generic Wetlands	Wetlands	Wetlands		0.24%	0.07%
	Wide Ranging Species	High Value Martes pennanti RSF	High Value Fisher RSF	G5	9.17%	3.67%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Upper Coeur d'Alene (cont'd)	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	0.27%	0.11%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.24%	0.10%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.24%	0.10%
	Aquatic Systems	Clark Fork - Flathead montane small rivers	Clark Fork - Flathead montane small rivers		87.36%	26.21%
	Aquatic Systems	Clark Fork - Flathead montane headwaters	Clark Fork - Flathead montane headwaters		20.58%	6.17%
Wapiabi Cave	Expert Identified Sites	Alberta ESA	Alberta ESA		0.00%	0.00%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		0.00%	0.00%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.00%	0.00%
	Aquatic Systems	Upper North Saskatchewan subalpine small rivers	Upper North Saskatchewan subalpine small rivers		0.22%	0.07%
Weitas Creek	Expert Nominated Sites	Subalpine Fir - Mountain Hemlock Forests	Subalpine Fir - Mountain Hemlock Forests		9.70%	2.91%
	Expert Nominated Sites	Subalpine Dry Grassland	Subalpine Dry Grassland		0.32%	0.10%
	Wide Ranging Fish	Onchorhynchus mykiss	Steelhead		1.50%	0.45%
	Wide Ranging Fish	Onchorhynchus tshawytscha	Chinook Salmon		0.25%	0.07%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	0.04%	0.02%
	Wide Ranging Fish	ONCORHYNCHUS CLARKI LEWISI	Westslope Cutthroat Trout	T3	0.04%	0.02%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		0.05%	0.02%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.05%	0.01%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.06%	0.02%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	0.05%	0.02%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.04%	0.01%
	Aquatic Systems	Clearwater subalpine headwaters	Clearwater subalpine headwaters		4.64%	1.39%
Wells Gray / Bowron	Expert Nominated Sites	Subalpine Dry Grassland	Subalpine Dry Grassland		321.57%	96.47%
	Expert Nominated Sites	Engelmann Spruce / Subalpine Fir Dry Forests	Engelmann Spruce / Subalpine Fir Dry Forests		250.40%	75.12%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Wells Gray / Bowron (cont'd)	Expert Nominated Sites	Alpine Meadow (wet)	Alpine Meadow (wet)		28.57%	28.57%
	Expert Nominated Sites	Rock Outcrop / Cliff	Rock Outcrop / Cliff		14.29%	25.00%
	Expert Nominated Sites	Sphagnum Bog	Sphagnum Bog		14.29%	3.85%
	Expert Nominated Sites	Fen	Fen		14.29%	0.57%
	Wide Ranging Fish	Onchorhynchus tshawytscha	Chinook Salmon		99.50%	29.85%
	Wide Ranging Fish	SOCKEYE SALMON	SOCKEYE SALMON	G5	67.05%	20.12%
	Wide Ranging Fish	COHO SALMON	COHO SALMON	G4	40.69%	20.34%
	Wide Ranging Fish	SALVELINUS CONFLUENTUS	Bull Trout	G3	12.16%	6.08%
	Community	Thuja plicata / Oplopanax horridus		S1S2	8.00%	40.00%
	Vascular Plants	Botrychium hesperium	Western moonwort	G3	7.69%	5.56%
	Vascular Plants	Botrychium pedunculosum	Stalked moonwort	G3*	7.69%	3.23%
	Vascular Plants	Botrychium montanum	Mountain moonwort	G3	7.69%	1.41%
	Wide Ranging Fish	ACIPENSER TRANSMONTANUS POP 2	White Sturgeon	G4T?Q	5.73%	5.73%
	Community	Pinus contorta / Polystichum kruckebergii - Aspidotis densa		S1	4.00%	100.00%
	Vascular Plants	Erigeron Trifidus	Barren ground fleabane	G2G3Q	4.00%	7.69%
	Mapped Veg Type	Hybrid Spruce Forests	Hybrid Spruce Forests		114.72%	34.42%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		24.28%	7.28%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		18.43%	5.53%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		15.64%	4.69%
	Mapped Veg Type	Interior Western Cedar - Hemlock - Douglas Fir Forests	Interior Western Cedar - Hemlock - Douglas Fir Forests		9.78%	2.93%
	Mapped Veg Type	Interior Douglas Fir Forests	Interior Douglas Fir Forests		1.03%	0.31%
	Generic Wetlands	Wetlands	Wetlands		39.86%	11.96%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	33.47%	13.39%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Wells Gray / Bowron (cont'd)	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	28.63%	11.45%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	27.88%	11.15%
	Wide Ranging Species	High Value Gulo gulo luscus RSF	High Value North American wolverine RSF	G4T4	10.37%	4.15%
	Aquatic Systems	Upper Fraser medium rivers	Upper Fraser medium rivers		992.95%	297.88%
	Aquatic Systems	Middle Fraser alpine, glacial small rivers	Middle Fraser alpine, glacial small rivers		651.03%	195.31%
	Aquatic Systems	Upper Fraser large river	Upper Fraser large river		333.33%	100.00%
	Aquatic Systems	Middle Fraser large lake	Middle Fraser large lake		333.33%	100.00%
	Aquatic Systems	Upper Fraser montane small rivers	Upper Fraser montane small rivers		333.33%	100.00%
	Aquatic Systems	Thompson montane small rivers	Thompson montane small rivers		333.33%	100.00%
	Aquatic Systems	Middle Fraser large lake	Middle Fraser large lake		330.85%	99.26%
	Aquatic Systems	Upper Fraser medium rivers	Upper Fraser medium rivers		313.38%	94.01%
	Aquatic Systems	Upper Fraser foothill tributaries	Upper Fraser foothill tributaries		305.95%	91.79%
	Aquatic Systems	Thompson montane small rivers	Thompson montane small rivers		293.33%	88.00%
	Aquatic Systems	Thompson alpine headwaters	Thompson alpine headwaters		279.92%	83.98%
	Aquatic Systems	Middle Fraser alpine, glacial headwaters	Middle Fraser alpine, glacial headwaters		255.14%	76.54%
	Aquatic Systems	Thompson montane headwaters	Thompson montane headwaters		252.42%	75.72%
	Aquatic Systems	Upper Fraser montane headwaters	Upper Fraser montane headwaters		242.54%	72.76%
	Aquatic Systems	Middle Fraser subalpine headwaters	Middle Fraser subalpine headwaters		230.75%	69.22%
	Aquatic Systems	Thompson montane headwaters	Thompson montane headwaters		202.66%	60.80%
	Aquatic Systems	Upper Fraser subalpine small rivers	Upper Fraser subalpine small rivers		184.99%	55.50%
	Aquatic Systems	Thompson montane small rivers	Thompson montane small rivers		182.83%	54.85%
	Aquatic Systems	Middle Fraser subalpine small rivers	Middle Fraser subalpine small rivers		164.23%	49.27%
	Aquatic Systems	Middle Fraser alpine headwaters	Middle Fraser alpine headwaters		159.73%	47.92%
	Aquatic Systems	Upper Fraser subalpine small rivers	Upper Fraser subalpine small rivers		155.97%	46.79%
	Aquatic Systems	Upper Fraser montane headwaters	Upper Fraser montane headwaters		142.71%	42.81%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Wells Gray / Bowron (cont'd)	Aquatic Systems	Thompson medium rivers	Thompson medium rivers		138.41%	41.52%
	Aquatic Systems	Upper Fraser subalpine headwaters	Upper Fraser subalpine headwaters		135.76%	40.73%
	Aquatic Systems	Upper Fraser subalpine small rivers	Upper Fraser subalpine small rivers		126.70%	38.01%
	Aquatic Systems	Middle Fraser subalpine headwaters	Middle Fraser subalpine headwaters		122.49%	36.75%
	Aquatic Systems	Upper Fraser subalpine headwaters	Upper Fraser subalpine headwaters		117.65%	35.29%
	Aquatic Systems	Middle Fraser subalpine headwaters	Middle Fraser subalpine headwaters		116.15%	34.84%
	Aquatic Systems	Upper Fraser subalpine headwaters	Upper Fraser subalpine headwaters		113.55%	34.07%
	Aquatic Systems	Upper Fraser alpine headwaters	Upper Fraser alpine headwaters		111.36%	33.41%
	Aquatic Systems	Upper Fraser subalpine headwaters	Upper Fraser subalpine headwaters		100.33%	30.10%
	Aquatic Systems	Middle Fraser subalpine small rivers	Middle Fraser subalpine small rivers		100.13%	30.04%
	Aquatic Systems	Middle Fraser montane headwaters	Middle Fraser montane headwaters		95.12%	28.54%
	Aquatic Systems	Upper Fraser alpine, glacial headwaters	Upper Fraser alpine, glacial headwaters		92.45%	27.74%
	Aquatic Systems	Upper Fraser montane small rivers	Upper Fraser montane small rivers		83.18%	24.96%
	Aquatic Systems	Upper Fraser montane headwaters	Upper Fraser montane headwaters		80.50%	24.15%
	Aquatic Systems	Upper Fraser subalpine headwaters	Upper Fraser subalpine headwaters		52.98%	15.89%
	Aquatic Systems	Thompson alpine headwaters	Thompson alpine headwaters		43.74%	13.12%
	Aquatic Systems	Smoky - Upper Athabasca alpine, glacial headwaters	Smoky - Upper Athabasca alpine, glacial headwaters		41.92%	12.58%
	Aquatic Systems	Upper Fraser alpine headwaters	Upper Fraser alpine headwaters		41.87%	12.56%
	Aquatic Systems	Upper Fraser montane headwaters	Upper Fraser montane headwaters		38.51%	11.55%
	Aquatic Systems	Thompson montane small rivers	Thompson montane small rivers		32.48%	9.74%
	Aquatic Systems	Thompson montane headwaters	Thompson montane headwaters		28.35%	8.50%
	Aquatic Systems	Thompson montane small rivers	Thompson montane small rivers		5.62%	1.69%
	Aquatic Systems	Thompson montane headwaters	Thompson montane headwaters		0.45%	0.14%
Wolf Creek Model Data	Expert Nominated Sites	Fen	Fen		14.29%	0.57%
	Mapped Veg Type	Interior Grand Fir Forests	Interior Grand Fir Forests		3.79%	1.14%

APPENDIX 8.1 CONSERVATION AREA (CA) TARGETS

Conservation Area	Target Type	Scientific Name	Common Name	G RANK	Percent of Ecological Goal in CA	Percent of Ecoregional Total in CA
Wolf Creek Model Data (cont'd)	Mapped Veg Type	Montane Spruce	Montane Spruce		0.02%	0.01%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.02%	0.01%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	0.03%	0.01%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.02%	0.01%
	Aquatic Systems	Upper Kootenay montane small rivers	Upper Kootenay montane small rivers		28.37%	8.51%
	Aquatic Systems	Upper Kootenay montane headwaters	Upper Kootenay montane headwaters		4.57%	1.37%
Woolly Daisy EO	Vascular Plants	Erigeron lanatus	Woolly fleabane	G3G4	4.00%	16.67%
	Mapped Veg Type	Interior Alpine Zone	Interior Alpine Zone		0.13%	0.04%
	Mapped Veg Type	Interior Subalpine Forest Zone	Interior Subalpine Forest Zone		0.10%	0.03%
	Mapped Veg Type	Montane Spruce	Montane Spruce		0.04%	0.01%
	Wide Ranging Species	High Value Gulo gulo luscus RSF	High Value North American wolverine RSF	G4T4	0.22%	0.09%
	Wide Ranging Species	High Value Canis lupus RSF	High Value Gray wolf RSF	G4	0.10%	0.04%
	Wide Ranging Species	High Value Ursus arctos horribilis RSF	High Value Grizzly bear RSF	G4T4	0.04%	0.01%
	Wide Ranging Species	High Value Lynx canadensis RSF	High Value Canada lynx RSF	G5	0.01%	0.00%
	Aquatic Systems	Upper Columbia subalpine headwaters	Upper Columbia subalpine headwaters		9.34%	2.80%

APPENDIX 8.2 CONSERVATION AREA LAND OWNERSHIP

CONSERVATION AREA	STATE / PROV.	MAJOR OWNER	SUB OWNER	ACRES	HECTARES	% of CA
Adams River	BC	Private	Other Private	1,202	486	0.9%
	BC	Province of British Columbia	BC Ministry of Water, Land and Air Protection	13,506	5,466	10.6%
	BC	Province of British Columbia	Crown Land	112,273	45,435	88.4%
Ahbou Lake	BC	Province of British Columbia	Tree Farm License	4,544	1,839	100.0%
Bitterroot Mountain Snail EO	MT	Federal - US	USDA Forest Service	3,753	1,519	27.0%
	MT	Private	Other Private	10,126	4,098	72.8%
	MT	State of Montana	Montana Department of Fish, Wildlife and Parks	19	8	0.1%
	MT	Water	Water	6	3	0.0%
Bitterroot Range (Middle Clark Fork)	ID	Federal - US	USDA Forest Service	1,801	729	0.4%
	ID	Private	Other Private	243	98	0.1%
	MT	Federal - US	USDA Forest Service	345,893	139,978	72.6%
	MT	Private	Other Private	107,641	43,561	22.6%
	MT	State of Montana	Montana Department of Fish, Wildlife and Parks	68	28	0.0%
	MT	State of Montana	Montana Department of Natural Resources and Conservation	17,077	6,911	3.6%
	MT	State of Montana	Montana Department of Transportation	166	67	0.0%
	MT	Water	Water	3,820	1,546	0.8%
Bull River / Cabinet (Bull Lake/East Cabinets)	MT	Federal - US	USDA Forest Service	74,560	30,174	75.8%
	MT	Private	Other Private	20,029	8,105	20.4%
	MT	State of Montana	Montana Department of Natural Resources and Conservation	3,019	1,222	3.1%
	MT	Water	Water	795	322	0.8%
Bull Trout Spawning Site	BC	Private	Other Private	257	104	18.0%
	BC	Province of British Columbia	Crown Land	1,168	473	82.0%
Burbot Spawning Site	BC	Private	Other Private	664	269	67.6%
	BC	Province of British Columbia	Crown Land	318	129	32.4%
Camas Prairie	MT	Federal - US	USDA Forest Service	57	23	0.3%
	MT	Federal - US	USDI Bureau of Indian Affairs Trust or Tribal Land	4,125	1,669	21.7%
	MT	Private	Other Private	13,844	5,602	72.8%
	MT	State of Montana	Montana Department of Natural Resources and Conservation	959	388	5.0%
	MT	Water	Water	23	9	0.1%

APPENDIX 8.2 CONSERVATION AREAS LAND OWNERSHIP

CONSERVATION AREA	STATE / PROV.	MAJOR OWNER	SUB OWNER	ACRES	HECTARES	% of CA
Cougar Bay	ID	Private	Non-Governmental Organization	108	44	0.8%
	ID	Private	Other Private	12,360	5,002	93.1%
	ID	State of Idaho	Idaho Department of Lands	423	171	3.2%
	ID	Water	Water	379	153	2.9%
Crown of the Continent	AB	Federal - CA	Parks Canada	121,668	49,237	2.8%
	AB	Mixed Ownership	Mixed Ownership	4,378	1,772	0.1%
	AB	Private	Other Private	101,685	41,150	2.4%
	AB	Province of Alberta	Alberta Community Development	2,492	1,009	0.1%
	AB	Province of Alberta	Crown Land	225,173	91,124	5.3%
	BC	Private	Non-Governmental Organization	15,500	6,273	0.4%
	BC	Private	Other Private	20,024	8,104	0.5%
	BC	Province of British Columbia	BC Ministry of Water, Land and Air Protection	26,563	10,750	0.6%
	BC	Province of British Columbia	Crown Land	487,729	197,377	11.4%
	MT	Federal - US	USDA Forest Service	1,843,095	745,874	43.0%
	MT	Federal - US	USDI Bureau of Indian Affairs Trust or Tribal Land	161,558	65,380	3.8%
	MT	Federal - US	USDI Bureau of Land Management	6,400	2,590	0.1%
	MT	Federal - US	USDI Bureau of Reclamation	6,896	2,791	0.2%
	MT	Federal - US	USDI Fish and Wildlife Service	1,784	722	0.0%
	MT	Federal - US	USDI National Park Service	755,243	305,636	17.6%
	MT	Private	Non-Governmental Organization	4,311	1,745	0.1%
	MT	Private	Other Private	264,167	106,904	6.2%
	MT	State of Montana	Montana Department of Fish, Wildlife and Parks	10,910	4,415	0.3%
	MT	State of Montana	Montana Department of Natural Resources and Conservation	154,749	62,625	3.6%
	MT	State of Montana	Montana Department of Transportation	19	8	0.0%
	MT	State of Montana	Montana Other Agencies	64	26	0.0%
	MT	Water	Water	73,865	29,892	1.7%
Cusick	WA	Federal - US	USDA Forest Service	298	121	3.6%
	WA	Federal - US	USDI Bureau of Indian Affairs Trust or Tribal Land	413	167	4.9%
	WA	Federal - US	USDI Bureau of Land Management	11	4	0.1%
	WA	Private	Other Private	6,006	2,431	71.7%
	WA	State of Washington	Washington Department of Fish and Wildlife	177	72	2.1%

APPENDIX 8.2 CONSERVATION AREAS LAND OWNERSHIP

CONSERVATION AREA	STATE / PROV.	MAJOR OWNER	SUB OWNER	ACRES	HECTARES	% of CA
Cusick (cont'd)	WA	State of Washington	Washington State Department of Natural Resources	1,474	597	17.6%
Cyr Culch Bald Eagle Nest EO	MT	Federal - US	USDA Forest Service	2,049	829	15.1%
	MT	Private	Other Private	11,083	4,485	81.7%
	MT	State of Montana	Montana Department of Fish, Wildlife and Parks	61	25	35.3%
	MT	State of Montana	Montana Department of Natural Resources and Conservation	181	73	1.3%
	MT	Water	Water	198	80	1.5%
Dayton / Hog Heaven	MT	Federal - US	USDA Forest Service	3,658	1,480	6.1%
	MT	Federal - US	USDI Bureau of Indian Affairs Trust or Tribal Land	17,347	7,020	28.9%
	MT	Private	Other Private	35,801	14,488	59.6%
	MT	State of Montana	Montana Department of Fish, Wildlife and Parks	82	33	0.1%
	MT	State of Montana	Montana Department of Natural Resources and Conservation	2,662	1,077	4.4%
	MT	Water	Water	549	222	0.9%
Dishman Hills / Mica Peak	ID	Federal - US	USDI Bureau of Land Management	160	65	0.3%
	ID	Private	Other Private	6,678	2,702	11.3%
	ID	State of Idaho	Idaho Department of Lands	562	228	1.0%
	WA	Local Government	Local Government	2,691	1,089	4.6%
	WA	Mixed Ownership	Mixed Ownership	112	45	0.2%
	WA	Private	Other Private	47,724	19,313	80.8%
	WA	State of Washington	Washington State Department of Natural Resources	1,156	468	2.0%
East-West Connectivity North	BC	Private	Other Private	2,931	1,186	0.7%
	BC	Province of British Columbia	BC Ministry of Water, Land and Air Protection	34,065	13,786	8.1%
	BC	Province of British Columbia	Crown Land	224,295	90,769	53.2%
	BC	Province of British Columbia	Tree Farm License	159,950	64,730	38.0%
East-West Connectivity South	BC	Private	Other Private	2,382	964	0.4%
	BC	Province of British Columbia	BC Ministry of Water, Land and Air Protection	299,641	121,260	54.8%
	BC	Province of British Columbia	Crown Land	244,285	98,858	44.7%
Elk River Valley	AB	Province of Alberta	Alberta Community Development	344	139	0.0%
	BC	Private	Non-Governmental Organization	5,040	2,040	0.6%
	BC	Private	Other Private	96,828	39,185	11.2%
	BC	Province of British Columbia	BC Ministry of Water, Land and Air Protection	89,170	36,086	10.3%

APPENDIX 8.2 CONSERVATION AREAS LAND OWNERSHIP

CONSERVATION AREA	STATE / PROV.	MAJOR OWNER	SUB OWNER	ACRES	HECTARES	% of CA
Elk River Valley (cont'd)	BC	Province of British Columbia	Crown Land	675,815	273,493	77.9%
Flathead Lake and Wetlands	MT	Federal - US	USDA Forest Service	30,862	12,489	12.5%
	MT	Federal - US	USDI Bureau of Indian Affairs Trust or Tribal Land	17	7	0.0%
	MT	Federal - US	USDI Fish and Wildlife Service	1,877	760	0.8%
	MT	Local Government	Local Government	133	54	0.1%
	MT	Private	Non-Governmental Organization	8	3	0.0%
	MT	Private	Other Private	131,697	53,296	53.5%
	MT	State of Montana	Montana Department of Fish, Wildlife and Parks	2,695	1,091	1.1%
	MT	State of Montana	Montana Department of Natural Resources and Conservation	4,450	1,801	1.8%
	MT	State of Montana	Montana Other Agencies	4	2	0.0%
	MT	Water	Water	74,631	30,202	30.3%
Fleabane / Salmon Driven	AB	Federal - CA	Parks Canada	990	401	3.9%
	BC	Province of British Columbia	BC Ministry of Water, Land and Air Protection	24,612	9,960	96.1%
	BC	Province of British Columbia	Crown Land	7	3	0.0%
Fraser River Headwaters	BC	Private	Non-Governmental Organization	677	274	0.8%
	BC	Private	Other Private	23,451	9,490	28.2%
	BC	Province of British Columbia	BC Ministry of Water, Land and Air Protection	1,090	441	1.3%
	BC	Province of British Columbia	Crown Land	57,907	23,434	69.7%
Granby	BC	Private	Other Private	3,116	1,261	0.6%
	BC	Province of British Columbia	BC Ministry of Water, Land and Air Protection	101,416	41,042	19.3%
	BC	Province of British Columbia	Crown Land	358,845	145,219	68.2%
	BC	Province of British Columbia	Tree Farm License	62,467	25,279	11.9%
Hixon Creek Headwaters	BC	Province of British Columbia	Crown Land	11,487	4,648	95.9%
	BC	Province of British Columbia	Tree Farm License	497	201	4.1%
Hunt Girl Creek	ID	Federal - US	USDA Forest Service	9,541	3,861	100.0%
Jocko River	MT	Federal - US	USDA Forest Service	513	208	0.3%
	MT	Federal - US	USDI Bureau of Indian Affairs Trust or Tribal Land	95,559	38,671	61.0%
	MT	Federal - US	USDI Fish and Wildlife Service	10,078	4,078	6.4%
	MT	Private	Other Private	45,245	18,310	28.9%
	MT	State of Montana	Montana Department of Fish, Wildlife and Parks	87	35	0.1%

APPENDIX 8.2 CONSERVATION AREAS LAND OWNERSHIP

CONSERVATION AREA	STATE / PROV.	MAJOR OWNER	SUB OWNER	ACRES	HECTARES	% of CA
Jocko River (cont'd)	MT	State of Montana	Montana Department of Natural Resources and Conservation	3,789	1,533	2.4%
	MT	Water	Water	1,454	588	0.9%
Kakwa / Willmore	AB	Federal - CA	Parks Canada	5,543	2,243	0.3%
	AB	Mixed Ownership	Mixed Ownership	10,589	4,285	0.6%
	AB	Private	Other Private	159	64	0.0%
	AB	Province of Alberta	Alberta Community Development	1,103,660	446,636	60.4%
	AB	Province of Alberta	Crown Land	521,914	211,211	28.6%
	BC	Province of British Columbia	BC Ministry of Water, Land and Air Protection	91,428	36,999	5.0%
	BC	Province of British Columbia	Crown Land	94,341	38,178	5.2%
	MT	State of Montana	Montana Department of Natural Resources and Conservation	1,649	667	1.9%
	MT	Water	Water	5,820	2,355	6.7%
Kootenai River	MT	Federal - US	US Department of Defense	1,051	425	1.2%
	MT	Federal - US	USDA Forest Service	49,589	20,068	57.0%
	MT	Private	Other Private	28,726	11,625	33.0%
	MT	State of Montana	Montana Department of Fish, Wildlife and Parks	171	69	0.2%
	MT	State of Montana	Montana Department of Natural Resources and Conservation	1,649	667	1.9%
	MT	Water	Water	5,820	2,355	6.7%
Kootenay River A	BC	Federal - CA	First Nations Reserve	4,364	1,766	1.2%
	BC	Private	Other Private	35,018	14,171	9.8%
	BC	Province of British Columbia	BC Ministry of Water, Land and Air Protection	20	8	0.0%
	BC	Province of British Columbia	Crown Land	75,157	30,415	21.0%
	ID	Federal - US	USDA Forest Service	73,042	29,559	20.4%
	ID	Federal - US	USDI Bureau of Land Management	2,684	1,086	0.8%
	ID	Federal - US	USDI Fish and Wildlife Service	2,324	941	0.7%
	ID	Private	Non-Governmental Organization	2,686	1,087	0.8%
	ID	Private	Other Private	121,315	49,094	34.0%
	ID	State of Idaho	Idaho Department of Fish and Game	1,113	450	0.3%
	ID	State of Idaho	Idaho Department of Lands	4,255	1,722	1.2%
	ID	Water	Water	4,639	1,877	1.3%
	MT	Federal - US	USDA Forest Service	25,217	10,205	7.1%
	MT	Private	Other Private	5,108	2,067	1.4%

APPENDIX 8.2 CONSERVATION AREAS LAND OWNERSHIP

CONSERVATION AREA	STATE / PROV.	MAJOR OWNER	SUB OWNER	ACRES	HECTARES	% of CA
Kootenay River A (cont'd)	MT	Water	Water	290	118	0.1%
Kootenay River B	BC	Private	Non-Governmental Organization	8	3	0.0%
	BC	Private	Other Private	120,618	48,812	14.8%
	BC	Province of British Columbia	BC Ministry of Water, Land and Air Protection	136,952	55,422	16.8%
	BC	Province of British Columbia	Crown Land	559,102	226,260	68.5%
Kootenay River C	BC	Private	Non-Governmental Organization	314	127	0.1%
	BC	Private	Other Private	17,858	7,227	4.4%
	BC	Province of British Columbia	BC Ministry of Water, Land and Air Protection	13,318	5,389	3.3%
	BC	Province of British Columbia	Crown Land	366,248	148,215	91.0%
	BC	Province of British Columbia	Tree Farm License	4,548	1,840	1.1%
Lake Pend Oreille	ID	Federal - US	USDA Forest Service	53,546	21,669	36.8%
	ID	Federal - US	USDI Bureau of Land Management	1,992	806	1.4%
	ID	Private	Non-Governmental Organization	52	21	0.0%
	ID	Private	Other Private	28,040	11,347	19.3%
	ID	State of Idaho	Idaho Department of Fish and Game	1,815	735	1.2%
	ID	State of Idaho	Idaho Department of Lands	3,278	1,326	2.3%
	ID	State of Idaho	Idaho Department of Parks and Recreation	2,299	930	1.6%
	ID	Water	Water	54,338	21,990	37.4%
Landslide	BC	Private	Other Private	789	319	1.8%
	BC	Province of British Columbia	Crown Land	44,074	17,836	98.2%
Least (Selkirk) Chipmunk	BC	Private	Other Private	1,489	603	32.4%
	BC	Province of British Columbia	Crown Land	3,106	1,257	67.6%
Little Bitterroot River	MT	Federal - US	USDA Forest Service	463	187	0.6%
	MT	Federal - US	USDI Bureau of Indian Affairs Trust or Tribal Land	30,886	12,499	41.3%
	MT	Federal - US	USDI Bureau of Reclamation	116	47	0.2%
	MT	Private	Other Private	39,826	16,117	53.3%
	MT	State of Montana	Montana Department of Natural Resources and Conservation	2,907	1,176	3.9%
	MT	Water	Water	544	220	0.7%
Little NF CDA Trib	ID	Federal - US	USDA Forest Service	3,437	1,391	100.0%

APPENDIX 8.2 CONSERVATION AREAS LAND OWNERSHIP

CONSERVATION AREA	STATE / PROV.	MAJOR OWNER	SUB OWNER	ACRES	HECTARES	% of CA
Lower Coeur d'Alene	ID	Federal - US	USDA Forest Service	13,263	5,367	11.9%
	ID	Federal - US	USDI Bureau of Indian Affairs Trust or Tribal Land	4,045	1,637	3.6%
	ID	Federal - US	USDI Bureau of Land Management	10,042	4,064	9.0%
	ID	Private	Other Private	62,660	25,358	56.2%
	ID	State of Idaho	Idaho Department of Fish and Game	2,621	1,061	2.3%
	ID	State of Idaho	Idaho Department of Lands	13,492	5,460	12.1%
	ID	State of Idaho	Idaho Department of Parks and Recreation	296	120	0.3%
	ID	Water	Water	5,121	2,072	4.6%
Lower Columbia A	BC	Federal - CA	Parks Canada	3,569	1,444	0.9%
	BC	Private	Other Private	31,479	12,739	8.0%
	BC	Province of British Columbia	BC Ministry of Water, Land and Air Protection	117	48	0.0%
	BC	Province of British Columbia	Crown Land	214,475	86,795	54.2%
	BC	Province of British Columbia	Tree Farm License	145,965	59,070	36.9%
Lower Columbia B	BC	Federal - CA	Parks Canada	6,419	2,598	0.8%
	BC	Private	Other Private	76,700	31,039	9.5%
	BC	Province of British Columbia	BC Ministry of Water, Land and Air Protection	13,083	5,295	1.6%
	BC	Province of British Columbia	Crown Land	415,026	167,955	51.2%
	BC	Province of British Columbia	Tree Farm License	299,390	121,159	36.9%
Lower Columbia C	BC	Private	Other Private	59,154	23,939	14.8%
	BC	Province of British Columbia	BC Ministry of Water, Land and Air Protection	159	64	0.0%
	BC	Province of British Columbia	Crown Land	84,574	34,226	21.1%
	WA	Federal - US	USDA Forest Service	64,868	26,251	16.2%
	WA	Federal - US	USDI Bureau of Land Management	9,910	4,010	2.5%
	WA	Federal - US	USDI Bureau of Reclamation	500	202	0.1%
	WA	Federal - US	USDI Fish and Wildlife Service	13,065	5,287	3.3%
	WA	Private	Other Private	136,984	55,435	34.2%
	WA	State of Washington	Washington State Department of Natural Resources	31,129	12,598	7.8%
Mabel Lake	BC	Private	Other Private	15,368	6,219	15.3%
	BC	Province of British Columbia	BC Ministry of Water, Land and Air Protection	3	1	0.0%
	BC	Province of British Columbia	Crown Land	85,188	34,474	84.7%

APPENDIX 8.2 CONSERVATION AREAS LAND OWNERSHIP

CONSERVATION AREA	STATE / PROV.	MAJOR OWNER	SUB OWNER	ACRES	HECTARES	% of CA
Middle Columbia	AB	Federal - CA	Parks Canada	18,794	7,606	1.1%
	BC	Private	Other Private	8,550	3,460	0.5%
	BC	Province of British Columbia	BC Ministry of Water, Land and Air Protection	19,369	7,838	1.1%
	BC	Province of British Columbia	Crown Land	1,639,693	663,560	97.2%
	BC	Province of British Columbia	Tree Farm License	788	319	0.0%
Mission Valley	MT	Federal - US	USDI Bureau of Indian Affairs Trust or Tribal Land	36,213	14,655	25.9%
	MT	Federal - US	USDI Fish and Wildlife Service	2,818	1,141	2.0%
	MT	Private	Non-Governmental Organization	93	38	0.1%
	MT	Private	Other Private	91,227	36,918	65.3%
	MT	State of Montana	Montana Department of Fish, Wildlife and Parks	3,591	1,453	2.6%
	MT	State of Montana	Montana Department of Natural Resources and Conservation	991	401	0.7%
	MT	State of Montana	Montana Department of Transportation	3	1	0.0%
	MT	Water	Water	4,829	1,954	3.5%
Moffat Creek	BC	Province of British Columbia	Crown Land	32,868	13,301	100.0%
Moody Creek	BC	Private	Other Private	1,107	448	12.3%
	BC	Province of British Columbia	BC Ministry of Water, Land and Air Protection	3	1	0.0%
	BC	Province of British Columbia	Crown Land	7,884	3,191	87.7%
Mountain Parks	AB	Federal - CA	Parks Canada	2,803,305	1,134,457	50.7%
	AB	Mixed Ownership	Mixed Ownership	25,811	10,445	0.5%
	AB	Private	Other Private	12,913	5,226	0.2%
	AB	Province of Alberta	Alberta Community Development	725,304	293,520	13.1%
	AB	Province of Alberta	Crown Land	1,195,528	483,813	21.6%
	AB	Water	Water	1,136	460	0.0%
	BC	Federal - CA	Parks Canada	203,953	82,537	3.7%
	BC	Private	Other Private	342	138	0.0%
	BC	Province of British Columbia	BC Ministry of Water, Land and Air Protection	324,744	131,419	5.9%
	BC	Province of British Columbia	Crown Land	234,814	95,026	4.2%

APPENDIX 8.2 CONSERVATION AREAS LAND OWNERSHIP

CONSERVATION AREA	STATE / PROV.	MAJOR OWNER	SUB OWNER	ACRES	HECTARES	% of CA
Moyie R Headwaters	BC	Province of British Columbia	Crown Land	31,330	12,679	100.0%
Murphy Creek	ID	Private	Other Private	12	5	0.4%
	WA	Private	Other Private	2,939	1,189	99.6%
North Thompson River	BC	Private	Other Private	20,940	8,474	12.4%
	BC	Province of British Columbia	BC Ministry of Water, Land and Air Protection	874	354	0.5%
	BC	Province of British Columbia	Crown Land	146,377	59,237	87.0%
Orofino / Ford Creeks	ID	Federal - US	USDA Forest Service	37,530	15,188	83.6%
	ID	Federal - US	USDI Bureau of Land Management	283	114	0.6%
	ID	Private	Other Private	4,050	1,639	9.0%
	ID	State of Idaho	Idaho Department of Lands	3,014	1,220	6.7%
Palouse	ID	Federal - US	USDA Forest Service	111,308	45,045	17.6%
	ID	Federal - US	USDI Bureau of Indian Affairs Trust or Tribal Land	971	393	0.2%
	ID	Federal - US	USDI Bureau of Land Management	3,644	1,475	0.6%
	ID	Private	Other Private	432,309	174,949	68.5%
	ID	State of Idaho	Idaho Department of Fish and Game	4,693	1,899	0.7%
	ID	State of Idaho	Idaho Department of Lands	41,869	16,944	6.6%
	ID	State of Idaho	Idaho Department of Parks and Recreation	2,421	980	0.4%
	ID	Water	Water	63	25	0.0%
	WA	Federal - US	USDI Bureau of Land Management	49	20	0.0%
	WA	Private	Other Private	33,263	13,461	5.3%
	WA	State of Washington	Washington State Department of Natural Resources	488	197	0.1%
Pend Oreille River	ID	Federal - US	USDA Forest Service	10,457	4,232	7.7%
	ID	Federal - US	USDI Bureau of Land Management	1,494	605	1.1%
	ID	Private	Other Private	68,237	27,615	50.1%
	ID	State of Idaho	Idaho Department of Fish and Game	409	165	0.3%
	ID	State of Idaho	Idaho Department of Lands	6,900	2,792	5.1%
	ID	Water	Water	3,428	1,387	2.5%
	WA	Federal - US	USDA Forest Service	9,266	3,750	6.8%
	WA	Federal - US	USDI Bureau of Land Management	38	15	0.0%
	WA	Private	Other Private	34,535	13,976	25.4%

APPENDIX 8.2 CONSERVATION AREAS LAND OWNERSHIP

CONSERVATION AREA	STATE / PROV.	MAJOR OWNER	SUB OWNER	ACRES	HECTARES	% of CA
Pend Oreille River (cont'd)	WA	State of Washington	Washington State Department of Natural Resources	1,464	592	1.1%
Pleasant Valley	MT	Federal - US	USDA Forest Service	7,411	2,999	7.7%
	MT	Federal - US	USDI Fish and Wildlife Service	5,327	2,156	5.5%
	MT	Private	Other Private	74,436	30,123	77.4%
	MT	State of Montana	Montana Department of Natural Resources and Conservation	5,511	2,230	5.7%
	MT	State of Montana	Montana Department of Transportation	23	9	0.0%
	MT	Water	Water	3,443	1,393	3.6%
Purcell Mountains	BC	Private	Other Private	5,075	2,054	0.6%
	BC	Province of British Columbia	BC Ministry of Water, Land and Air Protection	7,097	2,872	0.8%
	BC	Province of British Columbia	Crown Land	192,241	77,797	21.5%
	ID	Federal - US	USDA Forest Service	4	2	0.0%
	MT	Federal - US	US Department of Defense	12	5	0.0%
	MT	Federal - US	USDA Forest Service	610,921	247,231	68.4%
	MT	Private	Other Private	54,531	22,068	6.1%
	MT	State of Montana	Montana Department of Fish, Wildlife and Parks	1,004	406	0.1%
	MT	State of Montana	Montana Department of Natural Resources and Conservation	4,268	1,727	0.5%
	MT	Water	Water	18,446	7,465	2.1%
Red Cedar Stand on Snowshoe Cr	AB	Province of Alberta	Crown Land	267	108	100.0%
Rocky Mountain Front	AB	Mixed Ownership	Mixed Ownership	10,923	4,420	1.4%
	AB	Private	Other Private	70,307	28,452	9.2%
	AB	Province of Alberta	Alberta Community Development	100,392	40,627	13.2%
	AB	Province of Alberta	Crown Land	522,181	211,319	68.5%
	BC	Private	Other Private	5,162	2,089	0.7%
	BC	Province of British Columbia	BC Ministry of Water, Land and Air Protection	122	49	0.0%
	BC	Province of British Columbia	Crown Land	52,723	21,336	6.9%
Rocky Mountain Trench A	BC	Federal - CA	Canadian Wildlife Service	2,429	983	0.3%
	BC	Federal - CA	First Nations Reserve	10,035	4,061	1.3%
	BC	Federal - CA	Parks Canada	171,218	69,289	22.7%
	BC	Private	Non-Governmental Organization	115	47	0.0%
	BC	Private	Other Private	113,010	45,734	15.0%

APPENDIX 8.2 CONSERVATION AREAS LAND OWNERSHIP

CONSERVATION AREA	STATE / PROV.	MAJOR OWNER	SUB OWNER	ACRES	HECTARES	% of CA
Rocky Mountain Trench A (cont'd)	BC	Province of British Columbia	BC Ministry of Water, Land and Air Protection	40,113	16,233	5.3%
	BC	Province of British Columbia	Crown Land	396,405	160,420	52.5%
	BC	Province of British Columbia	Tree Farm License	21,334	8,634	2.8%
Rocky Mountain Trench B	BC	Federal - CA	First Nations Reserve	28,632	11,587	5.2%
	BC	Private	Non-Governmental Organization	176	71	0.0%
	BC	Private	Other Private	180,074	72,873	33.0%
	BC	Province of British Columbia	BC Ministry of Water, Land and Air Protection	3,958	1,602	0.7%
	BC	Province of British Columbia	Crown Land	286,928	116,116	52.6%
	MT	Federal - US	USDA Forest Service	5,045	2,042	0.9%
	MT	Private	Non-Governmental Organization	677	274	0.1%
	MT	Private	Other Private	32,930	13,326	6.0%
	MT	State of Montana	Montana Department of Fish, Wildlife and Parks	1,158	469	0.2%
	MT	State of Montana	Montana Department of Natural Resources and Conservation	1,641	664	0.3%
	MT	Water	Water	4,428	1,792	0.8%
SF Lolo Creek	MT	Federal - US	USDA Forest Service	12,597	5,098	65.3%
	MT	Private	Other Private	6,252	2,530	32.4%
	MT	State of Montana	Montana Department of Natural Resources and Conservation	446	180	2.3%
Salmo / Priest / Selkirks	BC	Private	Other Private	1,094	443	0.2%
	BC	Province of British Columbia	Crown Land	22,007	8,906	3.6%
	ID	Federal - US	USDA Forest Service	234,331	94,830	38.4%
	ID	Federal - US	USDI Bureau of Land Management	3,028	1,225	0.5%
	ID	Private	Non-Governmental Organization	65	26	0.0%
	ID	Private	Other Private	48,016	19,431	7.9%
	ID	State of Idaho	Idaho Department of Fish and Game	1,701	688	0.3%
	ID	State of Idaho	Idaho Department of Lands	117,026	47,359	19.2%
	ID	State of Idaho	Idaho Department of Parks and Recreation	460	186	0.1%
	ID	Water	Water	14,161	5,731	2.3%
	WA	Federal - US	USDA Forest Service	155,026	62,737	25.4%
	WA	Private	Other Private	12,561	5,083	2.1%
Salmo River	BC	Private	Other Private	52,893	21,405	65.1%
	BC	Province of British Columbia	BC Ministry of Water, Land and Air Protection	35	14	0.0%

APPENDIX 8.2 CONSERVATION AREAS LAND OWNERSHIP

CONSERVATION AREA	STATE / PROV.	MAJOR OWNER	SUB OWNER	ACRES	HECTARES	% of CA
Salmo River (cont'd)	BC	Province of British Columbia	Crown Land	28,367	11,480	34.9%
Scotchman Peak	ID	Federal - US	USDA Forest Service	7,364	2,980	57.3%
	MT	Federal - US	USDA Forest Service	5,478	2,217	42.7%
Shuswap Highlands	BC	Federal - CA	First Nations Reserve	73	30	0.0%
	BC	Private	Other Private	56,215	22,749	5.2%
	BC	Province of British Columbia	BC Ministry of Water, Land and Air Protection	8,473	3,429	0.8%
	BC	Province of British Columbia	Crown Land	987,764	399,734	91.3%
	BC	Province of British Columbia	Tree Farm License	29,944	12,118	68.9%
Slender-Spike Manna Grass EO	BC	Private	Other Private	4,830	1,955	11.1%
	BC	Province of British Columbia	Crown Land	38,660	15,645	88.9%
Slocan River	BC	Private	Non-Governmental Organization	136	55	0.0%
	BC	Private	Other Private	38,633	15,634	11.9%
	BC	Province of British Columbia	BC Ministry of Water, Land and Air Protection	124,463	50,368	38.3%
	BC	Province of British Columbia	Crown Land	159,810	64,673	49.2%
	BC	Province of British Columbia	Tree Farm License	1,872	758	0.6%
Spirit Lake	ID	Federal - US	USDA Forest Service	10	4	0.1%
	ID	Private	Other Private	12,945	5,239	73.0%
	ID	State of Idaho	Idaho Department of Lands	2,395	969	13.5%
	ID	Water	Water	534	216	3.0%
	WA	Private	Other Private	948	384	5.3%
	WA	State of Washington	Washington State Parks and Recreation Commission	906	367	5.1%
St. Joe / Clearwater	ID	Federal - US	US Department of Defense	887	359	0.1%
	ID	Federal - US	USDA Forest Service	915,354	370,430	63.9%
	ID	Federal - US	USDI Bureau of Indian Affairs Trust or Tribal Land	3,533	1,430	0.2%
	ID	Federal - US	USDI Bureau of Land Management	11,804	4,777	0.8%
	ID	Federal - US	USDI Bureau of Reclamation	23,484	9,504	1.6%
	ID	Private	Other Private	328,419	132,906	22.9%
	ID	State of Idaho	Idaho Department of Fish and Game	36,835	14,907	2.6%
	ID	State of Idaho	Idaho Department of Lands	96,726	39,144	6.8%
	ID	State of Idaho	Idaho Department of Parks and Recreation	15	6	0.0%
	ID	Water	Water	14,738	5,964	1.0%

APPENDIX 8.2 CONSERVATION AREAS LAND OWNERSHIP

CONSERVATION AREA	STATE / PROV.	MAJOR OWNER	SUB OWNER	ACRES	HECTARES	% of CA
St. Joe / Clearwater (cont'd)	MT	Federal - US	USDA Forest Service	296	120	0.0%
	MT	Private	Other Private	3	1	0.0%
Swamp Creek	MT	Federal - US	USDA Forest Service	12,355	5,000	71.4%
	MT	Private	Other Private	4,875	1,973	28.2%
	MT	State of Montana	Montana Department of Natural Resources and Conservation	58	24	0.3%
	MT	Water	Water	8	3	0.0%
Thompson / Lower Clark Fork	ID	Federal - US	USDA Forest Service	5,769	2,334	1.0%
	ID	Private	Other Private	8	3	0.0%
	MT	Federal - US	USDA Forest Service	447,929	181,270	74.7%
	MT	Private	Other Private	125,646	50,847	21.0%
	MT	State of Montana	Montana Department of Fish, Wildlife and Parks	159	64	0.0%
	MT	State of Montana	Montana Department of Natural Resources and Conservation	10,876	4,401	1.8%
	MT	Water	Water	9,199	3,723	1.5%
Torpy River	BC	Province of British Columbia	Crown Land	16,219	6,564	100.0%
Upper Coeur d'Alene	ID	Federal - US	USDA Forest Service	150,827	61,037	99.7%
	ID	Private	Other Private	513	208	0.3%
	MT	Federal - US	USDA Forest Service	1	0	0.0%
Wapiabi Cave	AB	Province of Alberta	Crown Land	178	72	100.0%
Weitas Creek	ID	Federal - US	USDA Forest Service	4,462	1,806	100.0%
Wells Gray / Bowron	AB	Federal - CA	Parks Canada	13,645	5,522	0.4%
	AB	Province of Alberta	Alberta Community Development	2,172	879	0.1%
	BC	Private	Other Private	72,690	29,417	2.0%
	BC	Province of British Columbia	BC Ministry of Water, Land and Air Protection	1,008,719	408,214	27.8%
	BC	Province of British Columbia	Crown Land	2,202,536	891,334	60.7%
	BC	Province of British Columbia	Tree Farm License	328,220	132,826	9.0%
Wolf Creek	MT	Federal - US	USDA Forest Service	4,723	1,911	19.0%
	MT	Private	Other Private	17,747	7,182	71.4%
	MT	State of Montana	Montana Department of Natural Resources and Conservation	2,402	972	9.7%

APPENDIX 8.2 CONSERVATION AREAS LAND OWNERSHIP

CONSERVATION AREA	STATE / PROV.	MAJOR OWNER	SUB OWNER	ACRES	HECTARES	% of CA
Woolly Daisy EO	BC	Province of British Columbia	BC Ministry of Water, Land and Air Protection	3	1	0.0%
	BC	Province of British Columbia	Crown Land	12,509	5,062	100.0%

APPENDIX 8.3 PORTFOLIO ACREAGE BY CONSERVATION AREA

CONSERVATION AREA	NUMBER OF WATERSHEDS	ACRES	HECTARES
Wapiabi Cave	1	178	72
Red Cedar Stand on Snowshoe Cr	1	267	108
Burbot Spawning Site	7	981	397
Bull Trout Spawning Site	10	1,425	577
Murphy Creek	3	2,956	1,196
Little NF CDA Trib	2	3,437	1,391
Weitas Creek	2	4,462	1,806
Ahbou Lake	2	4,544	1,839
Least (Selkirk) Chipmunk	3	4,596	1,860
Cusick	50	8,379	3,391
Moody Creek	12	8,994	3,640
Hunt Girl Creek	2	9,541	3,861
Hixon Creek Headwaters	2	11,983	4,850
Woolly Daisy EO	2	12,512	5,063
Scotchman Peak	4	12,843	5,197
Cougar Bay	9	13,269	5,370
Cyr Culch Bald Eagle Nest EO	39	13,572	5,492
Bitterroot Mountain Snail EO	11	13,904	5,627
Torpy River	2	16,219	6,564
Swamp Creek	21	17,297	7,000
Spirit Lake	18	17,738	7,178
Camas Prairie	23	19,007	7,692
SF Lolo Creek	20	19,295	7,808
Wolf Creek	43	24,872	10,065
Fleabane / Salmon Driven	41	25,609	10,364
Moyie R Headwaters	2	31,330	12,679
Moffat Creek	2	32,868	13,301
Slender-Spike Manna Grass EO	22	43,490	17,600
Landslide	9	44,863	18,155
Orofino / Ford Creeks	31	44,876	18,161
Dishman Hills / Mica Peak	20	59,083	23,910
Dayton / Hog Heaven	115	60,098	24,321
Little Bitterroot River	96	74,742	30,247
Salmo River	62	81,295	32,899
Fraser River Headwaters	102	83,125	33,639
Kootenai River	268	87,006	35,210
Pleasant Valley	148	96,151	38,911
Bull River / Cabinet (Bull Lake/East Cabinets)	153	98,403	39,822
Mabel Lake	42	100,559	40,695
Lower Coeur d'Alene	247	111,541	45,139
Adams River	57	126,981	51,387

APPENDIX 8.3 PORTFOLIO ACREAGE BY CONSERVATION AREA

CONSERVATION AREA	NUMBER OF WATERSHEDS	ACRES	HECTARES
Pend Oreille River	220	136,227	55,129
Mission Valley	464	139,766	56,561
Lake Pend Oreille	623	145,359	58,825
Upper Coeur d'Alene	26	151,341	61,246
Jocko River	316	156,725	63,424
North Thompson River	107	168,190	68,064
Flathead Lake and Wetlands	767	246,375	99,704
Slocan River	239	324,914	131,488
Kootenay River A	600	357,607	144,718
Lower Columbia A	178	395,606	160,096
Lower Columbia C	512	400,356	162,018
Kootenay River C	180	402,285	162,799
East-West Connectivity North	118	421,241	170,470
Bitterroot Range (Middle Clark Fork)	837	476,853	192,976
Granby	401	525,843	212,801
Rocky Mountain Trench B	759	545,683	220,830
East-West Connectivity South	143	546,308	221,083
Thompson / Lower Clark Fork	649	599,790	242,726
Salmo / Priest / Selkirks	594	609,519	246,663
Palouse	459	631,257	255,460
Rocky Mountain Trench A	1402	754,659	305,400
Rocky Mountain Front	796	762,796	308,693
Lower Columbia B	616	810,619	328,046
Kootenay River B	540	816,679	330,498
Elk River Valley	380	867,198	350,942
Purcell Mountains	533	893,610	361,631
Shuswap Highlands	304	1,082,469	438,060
St. Joe / Clearwater	1566	1,432,181	579,583
Middle Columbia	501	1,687,193	682,783
Kakwa / Willmore	1086	1,827,635	739,617
Wells Gray / Bowron	1459	3,627,983	1,468,192
Crown of the Continent	4766	4,288,539	1,735,510
Mountain Parks	5335	5,527,850	2,237,041

APPENDIX 8.4 PROTECTED STATUS OF CONSERVATION AREAS

0 = No Protection
1 = Highest Protection
2 = Medium Protection
3 = Low Protection

CONSERVATION AREA	PROTECTION STATUS	ACRES	HECTARES	PERCENT
Adams River	0	113,475	45,922	89.36%
	1	13,506	5,466	10.64%
Ahbou Lake	0	4,544	1,839	100.00%
Bitterroot Mountain Snail EO	0	13,775	5,575	99.07%
	1	129	52	0.93%
Bitterroot Range (Middle Clark Fork)	0	475,869	192,577	99.79%
	1	984	398	0.21%
Bull River / Cabinet (Bull Lake/East Cabinets)	0	63,195	25,574	64.22%
	1	1,356	549	1.38%
	2	33,852	13,700	34.40%
Bull Trout Spawning Site	0	1,425	577	100.00%
Burbot Spawning Site	0	981	397	100.00%
Camas Prairie	0	18,448	7,465	97.06%
	2	559	226	2.94%
Cougar Bay	0	13,161	5,326	99.19%
	1	108	44	0.81%
Crown of the Continent	0	2,589,190	1,047,808	60.37%
	1	29,536	11,953	0.69%
	2	1,635,686	661,939	38.14%
	3	34,128	13,811	0.80%
Cusick	0	8,202	3,319	97.89%
	3	177	72	2.11%
Cyr Culch Bald Eagle Nest EO	0	13,346	5,401	98.33%
	1	159	64	1.17%
	3	67	27	0.50%
Dayton / Hog Heaven	0	60,031	24,294	99.89%
	3	67	27	0.11%
Dishman Hills / Mica Peak	0	58,971	23,865	99.81%
	1	112	45	0.19%
East-West Connectivity North	0	387,176	156,685	91.91%
	1	34,065	13,786	8.09%
East-West Connectivity South	0	246,666	99,822	45.15%
	1	299,642	121,261	54.85%

APPENDIX 8.4 PROTECTED STATUS OF CONSERVATION AREAS

CONSERVATION AREA	PROTECTION STATUS	ACRES	HECTARES	PERCENT
Elk River Valley	0	772,643	312,678	89.10%
	1	93,393	37,795	10.77%
	2	523	212	0.06%
	3	639	259	0.07%
Flathead Lake and Wetlands	0	241,298	97,650	97.94%
	1	8	3	0.00%
	2	1,668	675	0.68%
	3	3,402	1,377	1.38%
Fleabane / Salmon Driven	2	25,609	10,364	100.00%
Fraser River Headwaters	0	81,358	32,924	97.87%
	1	15	6	0.02%
	2	962	389	1.16%
	3	790	320	0.95%
Granby	0	424,427	171,760	80.71%
	2	101,415	41,041	19.29%
Hixon Creek Headwaters	0	11,983	4,850	100.00%
Hunt Girl Creek	0	8,118	3,285	85.08%
	1	1,423	576	14.92%
Jocko River	0	146,192	59,162	93.28%
	2	10,533	4,263	6.72%
Kakwa / Willmore	0	628,222	254,232	34.35%
	2	1,200,632	485,878	65.65%
Kootenai River	0	85,850	34,742	98.67%
	1	310	125	0.36%
	2	846	342	0.97%
Kootenay River A	0	350,404	141,803	97.99%
	1	2,914	1,179	0.81%
	2	167	67	0.05%
	3	4,123	1,669	1.15%
Kootenay River B	0	679,721	275,073	83.23%
	1	10,483	4,242	1.28%
	2	124,006	50,183	15.18%
	3	2,471	1,000	0.30%
Kootenay River C	0	388,652	157,282	96.61%
	1	13,319	5,390	3.31%
	3	314	127	0.08%
Lake Pend Oreille	0	140,842	56,997	96.89%
	1	52	21	0.04%
	2	351	142	0.24%
	3	4,114	1,665	2.83%
Landslide	0	44,863	18,155	100.00%

APPENDIX 8.4 PROTECTED STATUS OF CONSERVATION AREAS

CONSERVATION AREA	PROTECTION STATUS	ACRES	HECTARES	PERCENT
Least (Selkirk) Chipmunk	0	4,596	1,860	100.00%
Little Bitterroot River	0	74,541	30,166	99.73%
	1	201	81	0.27%
	1	304	123	8.85%
Lower Coeur d'Alene	0	102,740	41,577	92.11%
	3	8,801	3,562	7.89%
Lower Columbia A	0	391,919	158,604	99.07%
	2	3,569	1,444	0.90%
	3	117	48	0.03%
Lower Columbia B	0	789,449	319,479	97.39%
	2	8,087	3,273	1.00%
	3	13,083	5,295	1.61%
Lower Columbia C	0	386,870	156,561	96.63%
	1	264	107	0.07%
	3	13,223	5,351	3.30%
Mabel Lake	0	100,556	40,694	100.00%
	3	3	1	0.00%
Middle Columbia	0	1,649,004	667,328	97.74%
	1	17,761	7,188	1.05%
	2	20,428	8,267	1.21%
Mission Valley	0	129,810	52,532	92.88%
	1	93	38	0.07%
	2	274	111	0.20%
	3	9,589	3,880	6.86%
Moffat Creek	0	32,868	13,301	100.00%
Moody Creek	0	8,991	3,639	99.96%
	3	3	1	0.04%
Mountain Parks	0	1,458,593	590,272	26.39%
	1	96,254	38,953	1.74%
	2	3,907,691	1,581,386	70.69%
	3	65,312	26,431	1.18%
Moyie R Headwaters	0	31,330	12,679	100.00%
Murphy Creek	0	2,956	1,196	100.00%
North Thompson River	0	167,316	67,711	99.48%
	1	874	354	0.52%
Orofino / Ford Creeks	0	43,811	17,730	97.63%
	1	527	213	1.17%
	3	538	218	1.20%
Palouse	0	623,779	252,435	98.82%
	2	116	47	0.02%
	3	7,361	2,979	1.17%

APPENDIX 8.4 PROTECTED STATUS OF CONSERVATION AREAS

CONSERVATION AREA	PROTECTION STATUS	ACRES	HECTARES	PERCENT
Pend Oreille River	0	135,800	54,956	99.69%
	3	428	173	0.31%
Pleasant Valley	0	89,607	36,263	93.19%
	2	128	52	0.13%
	3	6,417	2,597	6.67%
Purcell Mountains	0	877,805	355,235	98.23%
	1	14,710	5,953	1.65%
	2	1,095	443	0.12%
Red Cedar Stand on Snowshoe Cr	0	267	108	100.00%
Rocky Mountain Front	0	661,668	267,768	86.74%
	1	3,780	1,530	0.50%
	2	96,921	39,223	12.71%
	3	427	173	0.06%
Rocky Mountain Trench A	0	539,938	218,505	71.55%
	1	1,073	434	0.14%
	2	172,303	69,729	22.83%
	3	41,346	16,732	5.48%
Rocky Mountain Trench B	0	539,727	218,420	98.91%
	1	678	274	0.12%
	3	5,278	2,136	0.97%
SF Lolo Creek	0	19,295	7,808	100.00%
Salmo / Priest / Selkirks	0	525,412	212,627	86.20%
	1	44,742	18,106	7.34%
	2	36,533	14,784	5.99%
	3	2,832	1,146	0.46%
Salmo River	0	81,260	32,885	99.96%
	2	35	14	0.04%
Scotchman Peak	0	12,004	4,858	93.46%
	1	840	340	6.54%
Shuswap Highlands	0	1,074,023	434,642	99.22%
	1	39	16	0.00%
	2	8,398	3,399	0.78%
	3	9	4	0.00%
Slender-Spike Manna Grass EO	0	43,490	17,600	100.00%
Slocan River	0	200,315	81,065	61.65%
	1	116,471	47,134	35.85%
	2	7,584	3,069	2.33%
	3	543	220	0.17%
Spirit Lake	0	16,822	6,808	94.84%
	3	916	371	5.16%

APPENDIX 8.4 PROTECTED STATUS OF CONSERVATION AREAS

CONSERVATION AREA	PROTECTION STATUS	ACRES	HECTARES	PERCENT
St. Joe / Clearwater	0	1,336,953	541,046	93.35%
	1	36,038	14,584	2.52%
	2	52,639	21,302	3.68%
	3	6,551	2,651	0.46%
Swamp Creek	0	17,297	7,000	100.00%
Thompson / Lower Clark Fork	0	582,622	235,779	97.14%
	1	1,836	743	0.31%
	2	15,332	6,205	2.56%
Torpy River	0	16,219	6,564	100.00%
Upper Coeur d'Alene	0	149,419	60,468	98.73%
	1	1,922	778	1.27%
Wapiabi Cave	0	178	72	100.00%
Weitas Creek	0	4,378	1,772	98.12%
	1	84	34	1.88%
Wells Gray / Bowron	0	2,603,447	1,053,578	71.76%
	1	1,254	508	0.03%
	2	1,023,199	414,074	28.20%
	3	82	33	0.00%
Wolf Creek	0	24,872	10,065	100.00%
Woolly Daisy EO	0	12,509	5,062	99.98%
	1	3	1	0.02%

APPENDIX 9.0 RESULTS OF THREATS ASSESSMENT

APPENDIX 9.0 RESULTS OF THREATS ASSESSMENT

Conservation Landscape	Threat	Severity*	Urgency*	Comments
Adams River	Over fishing	Medium	Medium	Canada/US - salmon allocation
	Parasites/pathogens	High	High	Forest health
	Channelization of rivers or streams	High	High	
	Dam construction or operation of dams	High	High	
	Ditches, dikes, drainages and diversions	High	High	
	Forestry practices	High	Medium	
	Poaching or commercial collecting	Medium	Medium	Off shore fishing
Bull Lake / East Cabinets	Parasites/pathogens	Medium	Medium	
	Fire management	High	High	USFS Region 1 Fire Condition Class map; more critical in lower elevations
	Forestry practices	Medium	Medium	Low elevation industrial forest management practices extensive
	Landownership patterns	High	High	Plum Creek blocks on the market
	Residential development	High	High	Bull Lake area and Lake Creek are being subdivided
	Mining practices	Medium	Medium	Troy mine closed but some question on buried toxic waste
Bull Trout Spawning Site	Forestry practices	Medium	Medium	
	Small population size and distribution	Medium	Medium	
Burbot Spawning Site	Channelization of rivers or streams	Medium	Medium	
	Forestry practices	Medium	Medium	
	Ditches, dikes, drainages and diversions			
Camas Prairie	Grazing practices	Medium	Medium	Overgrazing of grasslands and riparian areas
	Ditches, dikes, drainages and diversions	Medium	Medium	
	Streambank/Shoreline stabilization	Medium	Medium	
	Residential development	Medium	Low	
	Invasive species - animals	Medium	Medium	Non-native trout species
	Invasive species - plants	High	High	USFS Region 1 Cohesive Strategy Invasive Plant Risk Assessment

** See Appendix 9.1 for definition

APPENDIX 9.0 RESULTS OF THREATS ASSESSMENT

Conservation Landscape	Threat	Severity*	Urgency*	Comments
Cougar Bay	Road Density	Medium	Low	
	Residential development	High	Medium	
	Point/non-point sources of pollution	Low	Low	
	Invasive species - plants	Low	High	Terrestrial and aquatic weeds
	Recreational infrastructure development	High	Low	
	Invasive species - animals	High	Medium	Aquatic animals-pike
	Recreational use	Low	Low	
	Dam construction or operation of dams	Medium	Medium	
	Fire management	Low	Low	
	Forestry practices	Low	Low	
	Residential development	Medium	High	
	Point/non-point sources of pollution	Medium	Low	
	Stream sedimentation	Medium	Low	
Crown of the Continent	Parasites/pathogens	Medium	Medium	
	Fire management	High	Low	Fire regime condition class low departure class
	Landownership patterns	Medium	Medium	Checkerboard patterns affect management
	Mining practices	High	High	Coal Mining potential in North Fork
	Multi-jurisdictional policies don't match	Medium	Low	Grizzly-wolf management not complimentary; fire management differ
	Oil or gas drilling	Medium	High	Coal Bed Methane in North Fork? Gas and Oil drilling in East Front
	Recreational use	Medium	Medium	Increased snowmobile and 4 wheel use
	Residential development	High	High	High development occurring in critical low elevation valleys
	Road/utility corridors	High	High	Highway 2 (MT) proposed 4 lane; Highway 3 (Canada)
	Forestry practices	Medium	Medium	Over harvest in Swan Valley, especially Plum Creek lands
	Road Density	Medium	Medium	Swan Valley high road density
Cusick	Crop production practices	Medium	Low	The loss of riparian habitats as a result of grass farming
	Invasive species - plants	Medium	Low	European milfoil in the Pend Oreille river.

** See Appendix 9.1 for definition

APPENDIX 9.0 RESULTS OF THREATS ASSESSMENT

Conservation Landscape	Threat	Severity*	Urgency*	Comments
Cusick (cont'd)	Grazing practices	Medium	Low	
	Dam construction or operation of dams	Medium	Low	Altered hydrology and loss of riparian habitats as a result, especially cottonwood groves.
Dayton Creek / Hog Heaven	Parasites/pathogens	High	High	
	Conversion to agriculture or silviculture	Medium	Medium	New vineyard; some hay development
	Ditches, dikes, drainages and diversions	High	Medium	Irrigation causing dewatering
	Fire management	High	High	USFS Fire Condition Class High
	Forestry practices	High	High	Industrial forest harvests extensive
	Grazing practices	Medium	Medium	Riparian areas overgrazed
	Residential development	High	Medium	Ranch conversion to subdivision
	Streambank/Shoreline stabilization	Medium	Medium	
	Road Density	Medium	Medium	High road density on Plum Creek lands
	Invasive species - plants	High	High	USFS Region 1 Weed Risk Assessment
	Invasive species - animals	Medium	Medium	Non-native trout hybridization and competition
Dishman Hills / Mica Peak	Residential development	High	Medium	Residential development threatens to cut off existing habitat corridors and connectivity.
	Road/utility corridors	Medium	Medium	Road construction is inviting additional development and is associated with areas being developed.
East-West Connectivity North	Parasites/pathogens	High	High	Forest health
	Crop production practices	Low	Low	
East-West Connectivity South	Parasites/pathogens	High	High	Increased commercial recreation
Elk River Valley	Dam construction or operation of dams	High	High	
	Road Density	Medium	Medium	Flathead as well
	Point/non-point sources of pollution	High	High	Coal
	Parasites/pathogens	High	High	Forest health
	Landownership patterns	High	High	
	Fire management	High	Medium	

** See Appendix 9.1 for definition

APPENDIX 9.0 RESULTS OF THREATS ASSESSMENT

Conservation Landscape	Threat	Severity*	Urgency*	Comments
Elk River Valley (cont'd)	Management of/for certain species	High	High	
	Road/utility corridors	High	High	
	Channelization of rivers or streams	High	Medium	Increased industrial development associated with Coal and Coal-bed methane. Increased commercial tourism enterprise.
	Forestry practices	High	Medium	
	Mining practices	High	Medium	
	Recreational infrastructure development	High	High	Specifically in Fernie area
	Recreational use	High	High	
	Residential development	High	High	Residential development in conjunction with commercial recreation development.
	Invasive species - plants	High	High	
	Over fishing	High	High	Bull trout
	Forestry practices	High	High	Increased commercial recreation pressure on Crown Land
	Parasites/pathogens	High	High	Forest health
Jocko River	Conversion to agriculture or silviculture	Medium	Low	Most agr lands already created
	Ditches, dikes, drainages and diversions	Medium	Medium	Some good and bad values assoc. with diversions and native fish
	Fire management	Medium	Medium	Fire Regime Condition Class Moderate for grass and shrub component
	Grazing practices	Medium	High	
	Multi-jurisdictional policies don't match	Medium	Low	Tribal State policy disagreements
	Residential development	High	High	High pressure along Highway 93 corridor
Kakwa / Wilmore	Road Density	Medium	Medium	
	Parasites/pathogens	High	High	Predominantly Oil and Gas Exploration
	Forestry practices	High	Medium	
	Oil or gas drilling	High	High	
	Recreational vehicles	High	Medium	
	Road/utility corridors	High	High	

** See Appendix 9.1 for definition

APPENDIX 9.0 RESULTS OF THREATS ASSESSMENT

Conservation Landscape	Threat	Severity*	Urgency*	Comments
Kootenai River	Fire management	High	High	USFS Fire Regime Condition Class - high and low
	Point/non-point sources of pollution	Medium	Low	Alleged toxic spills from mine
	Mining practices	Medium	Low	Troy mine impacts - habitat degradation, toxic landfill
	Forestry practices	Medium	Medium	
	Small population size and distribution	Medium	Medium	Redband trout genetically pure population isolated and small pop
	Over fishing	Medium	Medium	Over fishing
	Dam construction or operation of dams	High	High	Operation of Libby Dam impacts on flows
	Invasive species - animals	High	High	Hybridization with coastal rainbow trout
Kootenay River A	Parasites/pathogens	High	High	
	Forestry practices	High	High	
	Fire management	High	Medium	
	Landownership patterns	Medium	Medium	
	Ditches, dikes, drainages and diversions	High	High	
	Grazing practices	Medium	Medium	
	Invasive species - plants	High	High	
	Residential development	Medium	Medium	
	Small population size and distribution	High	High	Burbot, white sturgeon
	Channelization of rivers or streams	High	High	
	Conversion to agriculture or silviculture	High	High	
	Crop production practices	Low	Low	
	Dam construction or operation of dams	High	High	
Kootenay River B	Management of/for certain species	Medium	Medium	Caribou
	Road Density	Medium	Medium	
	Parasites/pathogens	High	Medium	Forest health
	Landownership patterns	High	Medium	Very narrow, low elevation private lands. Increasing subdivision resulting in fragmentation
	Recreational infrastructure development	High	High	
	Recreational use	High	Medium	
	Residential development	High	Medium	

** See Appendix 9.1 for definition

APPENDIX 9.0 RESULTS OF THREATS ASSESSMENT

Conservation Landscape	Threat	Severity*	Urgency*	Comments
Kootenay River C	Parasites/pathogens	Medium	Medium	Forest health
	Mining practices	Medium	Medium	
Little Bitterroot River	Parasites/pathogens	Medium	Medium	
	Fire management	High	High	USFS Fire Regime condition class high in forested habitats and moderate in grass/shrub
	Forestry practices	High	Low	Corporate timber lands extensively harvested; species composition altered
	Invasive species - plants	High	High	Status of weed level uncertain but suspect issue with extensive timber/roads
	Invasive species - animals	High	High	Non-native fish competition and hybridization
	Grazing practices	Medium	Medium	Overgrazing on private and corporate timber lands; riparian degradation
	Residential development	High	Medium	Private lands being subdivided as rural developments outside Kalispell expand
Lower Coeur d'Alene	Point/non-point sources of pollution	High	High	
	Forestry practices	Medium	Medium	
	Recreational vehicles	Medium	Medium	Motor boat use
	Residential development	Medium	Medium	
	Recreational infrastructure development	Medium	Medium	
	Invasive species - plants	High	High	Terrestrial and aquatic weeds
	Conversion to agriculture or silviculture	Medium	Low	
	Grazing practices	Medium	Medium	
	Mining practices	High	High	
	Parasites/pathogens	High	Medium	
	Fire management	Medium	Medium	
	Point/non-point sources of pollution	High	High	Release of toxic materials
	Streambank/Shoreline stabilization	High	High	
Lower Columbia A	Dam construction or operation of dams	High	High	
	Parasites/pathogens	Medium	Medium	Forest health

** See Appendix 9.1 for definition

APPENDIX 9.0 RESULTS OF THREATS ASSESSMENT

Conservation Landscape	Threat	Severity*	Urgency*	Comments
Lower Columbia A (cont'd)	Forestry practices	Medium	Medium	
	Recreational infrastructure development	Medium	Medium	
	Recreational use	Medium	Medium	
Lower Columbia B	Dam construction or operation of dams	High	High	
	Parasites/pathogens	Medium	Medium	Forest health
	Forestry practices	Medium	Medium	
	Recreational use	Medium	Medium	
	Recreational infrastructure development	Medium	Medium	
Lower Columbia C	Point/non-point sources of pollution	High	High	Release of toxic materials
	Road/utility corridors	High	Medium	
	Wastewater treatment	High	High	
	Commercial/industrial development	High	High	Tech Cominco/Celgar
	Ditches, dikes, drainages and diversions	High	Medium	
	Mining practices	High	High	
	Dam construction or operation of dams	Medium	Medium	The threat entry would not except the full entry listed so I had to reduce it to "operations of dams and reservoirs
	Point/non-point sources of pollution	High	High	Chemical discharge (point source pollution) from the Tech Cominco smelting plant and from the Celgar Pulp and Paper mill. We need to confirm the severity and urgency rankings with BC folks.
	Fire management	Medium	Medium	Fire suppression and management for closed forest stands increases risk of catastrophic fire
	Forestry practices	Medium	Low	In particular forest practices that remove large snags and fail to recruit large snags in managed stands. This limits habitat availability for large-snag cavity creators (Pileated woodpeckers) and users.
	Invasive species - plants	Medium	Low	Knapweed
	Grazing practices	Low	Low	
Middle Clark Fork	Fire management	High	High	USFS Region- Fire Regime Condition Class map 2002
	Forestry practices	High	High	
	Grazing practices	Medium	Medium	

** See Appendix 9.1 for definition

APPENDIX 9.0 RESULTS OF THREATS ASSESSMENT

Conservation Landscape	Threat	Severity*	Urgency*	Comments
Middle Clark Fork (cont'd)	Point/non-point sources of pollution	Medium	Medium	Mill Town Dam releases upstream
	Recreational use	Low	Low	Snowmobile use increases?
	Road Density	Medium	Medium	Increased road density on NF lands impacts wildlife security; stream sedimentation
Middle Columbia	Channelization of rivers or streams	High	Medium	
	Dam construction or operation of dams	High	High	
	Forestry practices	High	High	
	Recreational infrastructure development	High	High	
	Recreational use	High	Medium	
	Road/utility corridors	Medium	High	
Mission Valley	Management of/for certain species	Medium	Low	Waterfowl and upland game bird focus
	Ditches, dikes, drainages and diversions	Medium	Low	Low urgency because no new proposals?
	Conversion to agriculture or silviculture	High	High	Very little native prairie remains; conversion to crops or hay
	Road/utility corridors	High	High	Proposed Highway 93 expansion; wildlife mortality increases
	Residential development	High	High	Rapid development occurring; commutable distance to Missoula; second homes
	Grazing practices	Medium	Medium	Overgrazing on private and tribal lands
	Channelization of rivers or streams	Medium	Low	Extensive irrigation systems
	Invasive species - animals	Medium	Medium	Skunk, fox, non-native trout species
	Invasive species - plants	High	High	Both terrestrial and aquatic non-native plants
Mountain Parks	Fire management	High	High	
	Road Density	Medium	Medium	
	Commercial/industrial development	High	Medium	Mining/Oil/Gas
	Parasites/pathogens	High	High	Forest health
	Forestry practices	High	Medium	
	Grazing practices	Medium	Medium	
	Mining practices	Medium	Medium	
	Multi-jurisdictional policies don't match	Medium	Medium	Federal and Provincial jurisdictions
	Oil or gas drilling	High	High	
	Landownership patterns	Medium	Medium	
	Recreational infrastructure development	High	High	

** See Appendix 9.1 for definition

APPENDIX 9.0 RESULTS OF THREATS ASSESSMENT

Conservation Landscape	Threat	Severity*	Urgency*	Comments
Mountain Parks (cont'd)	Recreational vehicles	High	Medium	
	Residential development	High	High	
	Road/utility corridors	High	High	
	Channelization of rivers or streams	Medium	Medium	
North Thompson River	Over fishing	Medium	Medium	Canada/US - salmon allocation
	Poaching or commercial collecting	Medium	Medium	Off shore fishing
Orofino / Ford Creeks	Point/non-point sources of pollution	Medium	Low	
	Invasive species - plants	Medium	Medium	Terrestrial weeds
	Road Density	Medium	Medium	
	Forestry practices	High	High	
	Stream sedimentation	High	Low	
Palouse	Small population size and distribution	High	High	Native grassland
	Road Density	Medium	Medium	
	Point/non-point sources of pollution	High	High	
	Conversion to agriculture or silviculture	High	High	
	Streambank/Shoreline stabilization	High	High	
	Invasive species - plants	Medium	Medium	Terrestrial weeds
	Residential development	High	High	
	Road/utility corridors	High	High	
	Crop production practices	Medium	Medium	
	Stream sedimentation	High	High	
Pend Oreille Lake	Point/non-point sources of pollution	Medium	High	
	Residential development	Medium	Medium	
	Invasive species - plants	High	High	Terrestrial and aquatic weeds
	Invasive species - animals	High	High	Aquatic animals-lake trout
	Over fishing	Medium	Medium	Bull trout, westslope cutthroat
	Forestry practices	Low	Low	
	Dam construction or operation of dams	High	High	
	Mining practices	Low	Low	

** See Appendix 9.1 for definition

APPENDIX 9.0 RESULTS OF THREATS ASSESSMENT

Conservation Landscape	Threat	Severity*	Urgency*	Comments
Pend Oreille River	Conversion to agriculture or silviculture	Medium	Low	
	Invasive species - plants	High	High	Aquatic weeds and algae
	Invasive species - animals	High	High	Aquatic animals-lake trout
	Ditches, dikes, drainages and diversions	Medium	High	
	Forestry practices	Medium	Medium	
	Residential development	Medium	High	
	Dam construction or operation of dams	High	High	
	Grazing practices	Medium	High	
Pleasant Valley	Fire management	High	High	USFS Fire Regime Condition Class - High Departure
	Forestry practices	High	Medium	Extensive corporate logging and large clearcuts; species altered
	Ditches, dikes, drainages and diversions	High	Medium	Wetlands drained
	Residential development	High	Medium	Ranches being sold
	Livestock production practices	Medium	Medium	Wolf damage kill permits due to livestock
	Grazing practices	Medium	Low	Overgrazing on private ranches and corporate timber leases
	Invasive species - plants	Medium	Medium	Status of weeds unknown but suspect knapweed, leafy spurge?
Purcell Mountains	Parasites/pathogens	High	High	White pine blister rust, bark beetle
	Fire management	High	High	USFS Region 1 Fire Condition Class - High and moderate departures
	Forestry practices	High	Medium	Very productive forests, extensive harvests and roads, altered species composition
	Residential development	Medium	Medium	Small amount of private, valley bottoms, moderate level of rural development
	Invasive species - plants	Medium	Low	Weed invasives level unknown
	Invasive species - animals	High	Medium	Non-native trout competition with inland Redband trout
	Small population size and distribution	High	High	Very isolate population of Redband trout
	Road Density	Medium	Medium	High road densities from logging activities

** See Appendix 9.1 for definition

APPENDIX 9.0 RESULTS OF THREATS ASSESSMENT

Conservation Landscape	Threat	Severity*	Urgency*	Comments
Rocky Mountain Front	Road Density	Medium	Medium	
	Commercial/industrial development	High	High	Oil/Gas
	Conversion to agriculture or silviculture	Medium	Medium	
	Crop production practices	Medium	Medium	
	Fire management	Medium	Medium	
	Forestry practices	Medium	Medium	
	Livestock production practices	Medium	Medium	
	Oil or gas drilling	High	High	
	Landownership patterns	High	High	
	Recreational infrastructure development	High	High	
	Recreational use	High	High	
	Recreational vehicles	Medium	Medium	
	Residential development	High	High	
	Road/utility corridors	High	Medium	
Rocky Mountain Trench A	Livestock production practices	Medium	Medium	
	Point/non-point sources of pollution	High	High	Agricultural
	Crop production practices	Medium	Medium	Fertilizers on farms adding nitrates
	Grazing practices	High	High	
	Residential development	High	High	
	Landownership patterns	High	High	
	Parasites/pathogens	High	High	Forest health
	Road/utility corridors	High	High	
	Small population size and distribution	High	High	Northern extent of temperate grassland. Extreme of range for many rare/endangered plants and animals
	Recreational infrastructure development	Medium	Medium	Increased commercial recreation pressures
	Fire management	High	High	Altered fire regime specifically fire suppression has led to forest in-growth and encroachment on historic grasslands
	Commercial/industrial development	Medium	Medium	
	Recreational use	High	Medium	
	Recreational vehicles	Medium	Medium	
	Invasive species - plants	High	High	

** See Appendix 9.1 for definition

APPENDIX 9.0 RESULTS OF THREATS ASSESSMENT

Conservation Landscape	Threat	Severity*	Urgency*	Comments
Rocky Mountain Trench A (cont'd)	Over fishing	High	High	Bull trout
Rocky Mountain Trench B	Crop production practices	Medium	Medium	Fertilizers on farms adding nitrates
	Dam construction or operation of dams	High	High	
	Fire management	High	High	
	Grazing practices	High	High	
	Invasive species - animals	Medium	Medium	Trout
	Livestock production practices	Medium	Medium	
	Parasites/pathogens	High	High	Forest health
	Recreational vehicles	Medium	Medium	
	Point/non-point sources of pollution	High	High	Skookumchuck Pulp Mill
	Point/non-point sources of pollution	High	High	Agricultural
	Channelization of rivers or streams	High	Medium	Hydroelectric development - Kookanusa Reservoir.
	Invasive species - plants	High	High	
	Over fishing	High	High	Bull trout
Salmo / Priest / Selkirks	Small population size and distribution	High	High	Caribou
	Forestry practices	High	High	
	Parasites/pathogens	High	High	
	Multi-jurisdictional policies don't match	Medium	High	Grizzly management in US and Canada differ
	Road Density	Low	High	
	Invasive species - plants	High	High	Terrestrial weeds
	Fire management	High	High	
Salmo River	Channelization of rivers or streams	Medium	Medium	
	Conversion to agriculture or silviculture	High	Medium	
	Dam construction or operation of dams	Medium	Medium	
	Forestry practices	High	High	
	Road/utility corridors	High	Medium	
	Ditches, dikes, drainages and diversions	Medium	Medium	
Scotchman Peak	Invasive species - plants	High	Low	Terrestrial weeds
	Parasites/pathogens	Low	Low	

** See Appendix 9.1 for definition

APPENDIX 9.0 RESULTS OF THREATS ASSESSMENT

Conservation Landscape	Threat	Severity*	Urgency*	Comments
Scotchman Peak (cont'd)	Forestry practices	Medium	Low	
	Fire management	High	Low	
Shuswap Highlands	Channelization of rivers or streams	High	Medium	
	Commercial/industrial development	High	High	
	Conversion to agriculture or silviculture	High	High	
	Crop production practices	High	Medium	
	Forestry practices	High	High	
	Landownership patterns	High	High	
	Recreational infrastructure development	High	High	
	Recreational use	High	High	
	Recreational vehicles	High	Medium	
	Residential development	High	High	
Slocan River	Channelization of rivers or streams	Medium	Medium	
	Commercial/industrial development	Medium	Medium	
	Conversion to agriculture or silviculture	Medium	Medium	
	Crop production practices	Medium	Medium	
	Dam construction or operation of dams	High	High	
	Forestry practices	High	Medium	
	Landownership patterns	High	Medium	
	Recreational infrastructure development	Medium	Medium	
	Recreational use	Medium	Medium	
	Residential development	Medium	Medium	
	Invasive species - plants	High	High	
	Invasive species - plants	High	High	Terrestrial and aquatic weeds
	Fire management	High	Low	
Spirit Lake	Recreational infrastructure development	High	Medium	
	Conversion to agriculture or silviculture	Medium	High	
	Ditches, dikes, drainages and diversions	High	Medium	
	Forestry practices	High	High	

** See Appendix 9.1 for definition

APPENDIX 9.0 RESULTS OF THREATS ASSESSMENT

Conservation Landscape	Threat	Severity*	Urgency*	Comments
Spirit Lake (cont'd)	Grazing practices	Medium	Medium	
	Parasites/pathogens	Medium	Low	
	Recreational vehicles	High	High	
	Stream sedimentation	Medium	Medium	
	Point/non-point sources of pollution	Low	Low	
St. Joe / Clearwater	Road Density	High	High	
	Forestry practices	High	High	
	Recreational vehicles	High	Medium	
	Invasive species - plants	Medium	Medium	Terrestrial plants
	Recreational use	Medium	Low	
	Over fishing	High	Medium	Bull trout
	Dam construction or operation of dams	Medium	Medium	
	Fire management	High	High	
	Parasites/pathogens	Medium	Low	
	Stream sedimentation	Medium	Medium	
Thompson / Lower Clark Fork/ Bull Rivers	Parasites/pathogens	Medium	Medium	
	Dam construction or operation of dams	Medium	Low	Three run-of-the- river dams, fishery impacts.
	Residential development	Medium	Medium	Lower Bull and Clark Fork rural development increasing but not as bad as other areas
	Mining practices	High	High	Proposed Rock Creek mine pending, water quality impacts, habitat loss
	Fire management	High	High	Portions of conservation area have high departure from fire regime. Other areas low departure
	Forestry practices	Medium	Medium	Over-harvest in Thompson River
	Invasive species - animals	Medium	Medium	Non-native trout species
	Invasive species - plants	Medium	Low	Spotted knapweed pervasive in disturbed areas
	Road/utility corridors	High	Medium	Proposed Highway 200 expansion; fracture carnivore connectivity
	Invasive species - plants	High	Medium	Terrestrial plants
Upper Coeur d'Alene	Road Density	High	High	
	Point/non-point sources of pollution	Medium	Medium	
	Channelization of rivers or streams	High	Medium	

** See Appendix 9.1 for definition

APPENDIX 9.0 RESULTS OF THREATS ASSESSMENT

Conservation Landscape	Threat	Severity*	Urgency*	Comments
Upper Coeur d'Alene (cont'd)	Fire management	High	High	
	Forestry practices	High	High	
	Parasites/pathogens	High	Medium	
	Recreational use	Medium	Low	
	Stream sedimentation	Medium	Medium	
Weitas Creek	Invasive species - plants	High	High	Terrestrial plants
	Fire management	Medium	Low	
	Forestry practices	High	Medium	
	Parasites/pathogens	Medium	Medium	
	Recreational vehicles	Medium	High	
Wells Gray / Bowman	Road Density	Medium	Medium	
	Forestry practices	High	High	
	Oil or gas drilling	Medium	Medium	
	Recreational infrastructure development	High	High	
	Recreational use	High	High	
	Recreational vehicles	High	Medium	
	Mining practices	High	High	

** See Appendix 9.1 for definition

APPENDIX 9.1 DEFINITIONS: SEVERITY AND URGENCY

Degree of threat was considered to be a function of the severity and urgency of the threat to the conservation targets at conservation areas. Using the best available information, the core team identified and refined the key threats to each conservation area (where known) and ranked them according to their severity and urgency. The team did not rank the degree of threats to individual conservation targets but developed ranks for the conservation areas with the primary targets in mind. Definitions and ranks are provided below.

Severity: What level of damage to the primary target(s) at a conservation area can be expected within 10 years under current circumstances?

- High: stress is likely to seriously degrade, destroy or eliminate the target(s) over some portion of the targets' occurrence at the site
- Medium: stress is likely to moderately degrade the conservation target(s) over some portion of the targets' occurrence at the site
- Low: stress is likely to slightly impair the conservation target(s) over some portion of the targets' occurrence at the site

Urgency: How urgent is the threat within the conservation area or portion of area.

- High: threat exists now or is likely to exist within next 2-4 years
- Medium: threat is likely to exist within 5-10 years
- Low: threat is not likely to exist within 10 years.

APPENDIX 10.0 EXPERT WORKSHOP PARTICIPANTS

VEGETATION REVIEW

Victoria, BC (February 27, 2001)

Peter Achuff, Conservation Biologist, Parks Canada, Jasper National Park
Lorna Allen, Community Ecologist, Alberta Natural Heritage Information Centre
Tom Braumandl, Research Ecologist, BC Ministry of Forests, Nelson Region
Adolf Ceska, Ecologist, BC Conservation Data Centre
Steve Cooper, Vegetation Ecologist, Montana Natural Heritage Program
Rex Crawford, Vegetation Ecologist, Washington Department of Natural Resources
Dennis Demarchi, (retired) Ecosystems Specialist, BC Ministry of Forests
Samantha Flynn, Assistant Ecologist, BC Conservation Data Center
Mable Jankovsky-Jones, Wetland Ecologist, Idaho Natural Heritage Program
Maureen Ketcheson, Principal, JMJ Holdings Inc.
Ted Lea, Provincial Ecology Correlator, BC Ministry of Environment Lands & Parks
Del Meidinger, Research Ecologist, BC Ministry of Forests
Greg Utzig, Kutenai Nature Investigations
Scott Smith
Terry Wood

FORMATIVE REVIEW

Canmore, AB (September 12, 2001)

Jon Jorgenson, Wildlife Biologist, Canmore, AB
Jim Pissot, Yellowstone to Yukon Initiative (Y2Y), Canmore, AB

Coeur d'Alene, ID (November 6, 2001)

Robert Matt, Wildlife Manager, Coeur d'Alene Tribe, Plummer, ID
Marsha Gilbert, Conservation Planner, Inland Northwest Land Trust, Sandpoint, ID
Steve Binnall, Wildlife Technician, Kootenai Tribe of Idaho, Bonners Ferry, ID
Jeff McCreary, Regional Biologist, Ducks Unlimited, Salt Lake City, UT
Mary Terra-Burns, Mitigation Staff Biologist, Idaho Fish and Game, Coeur d'Alene, ID
Bob Ralphs, Wildlife Biologist, United States Forest Service, Coeur d'Alene, ID
Gerald Greene, Wildlife Mitigation Biologist, Coeur d'Alene Tribe, Plummer, ID
David Leptich, Regional Habitat Biologist, Idaho Fish and Game, Coeur d'Alene, ID

Radium, BC (November 22, 2001)

Alan Dibb, Wildlife Biologist Parks Canada, Kootenay National Park, Radium Hot Springs, BC
Craig Dodds, Habitat Biologist, BC Ministry of Water, Land and Air Protection, Golden, BC

Radium, BC (November 22, 2001) cont'd

Dave Gilbride, GIS Specialist, Parks Canada, Kootenay National Park Radium Hot Springs, BC
Larry Halverson, Chief Naturalist, Kootenay National Park, Radium Hot Springs, BC
Meredith Hamstead, Coordinator, Columbia River Greenways Alliance, Invermere, BC
Larry Ingham, Wildlife Biologist, Columbia Basin Fish & Wildlife Compensation Program, Invermere, BC
Trevor Kinley, Wildlife Biologist, Sylvan Consulting, Invermere, BC
Darcy Monchak, Planning Forester, BC Ministry of Sustainable Resource Management, Golden, BC
Nancy Newhouse, Wildlife Biologist, Sylvan Consulting, Invermere, BC
Gary Tipper, Land Management Biologist, BC Ministry of Water, Land and Air Protection, Cranbrook, BC
Wayne Tucker, Backcountry Specialist, Parks Canada, Revelstoke, BC
Gerry Wilke, East Kootenay Environmental Society, Edgewater, BC
Dave Zehnder, Board member of The Land Conservancy of BC and landholder interests, Invermere, BC

Cranbrook, BC (November 23, 2001)

Gail Berg, Range Ecologist, BC Ministry of Forests, Invermere, BC
John Bissett, Fisheries Biologist, Westslope Fisheries, Wasa, BC
Paul Galbraith, Manager, Intergovernmental Affairs, Parks Canada, Radium Hot Springs, BC
Bob Jamieson, Wildlife Biologist, BioQuest Consulting, TaTa Creek, BC
Dave Phelps, (retired) Habitat Biologist, BC Ministry of Environment, Lands & Parks, Cranbrook, BC
Kathleen Shepherd, Manager, Kootenay Office, The Land Conservancy of BC, Kimberley, BC
Anne Skinner, Agrologist, BC Ministry of Forests, Cranbrook, BC
Craig Smith, (retired) Registered Professional Forester, Jaffray, BC
Kari Stewart, Ecosystems Specialist, Tembec Industries Inc., Cranbrook, BC
Tom Volkers, Senior Planner, East Kootenays, BC Ministry of Sustainable Resource Management, Cranbrook, BC
Kevin Weaver, Regional Manager, Tourism & Development, BC Ministry of Sustainable Resource Management, Cranbrook, BC

Nelson, BC (November 24, 2001)

Ted Antifeau, Regional Rare & Endangered Species Manager, BC Ministry of Water, Land & Air Protection, Nelson, BC
Cameron Carlisle, Assistant Coordinator, Wetland Education Programs BC Wildlife Federation, Nelson, BC
John Krebs, Senior Wildlife Biologist, Columbia Basin Fish & Wildlife Compensation Program, Nelson, BC
Garth Mowat, Wildlife Biologist, Aurora Wildlife Research, Nelson, BC

Nelson, BC (November 24, 2001) cont'd

Guy Woods, Senior Wildlife Biologist, BC Ministry of Water, Land & Air Protection, Nelson, BC

Canmore, AB (December 12, 2001)

Ed Abbott, Parks Canada, Lake Louise, Alberta
Ray Andrews, Regional Manager, Canmore, Alberta Parks & Protected Areas, Canmore, Alberta
Dave Dahlman, Ecosystem Secretariat, Parks Canada, Banff, Alberta
Steve Donelon, Planner, Community Development, Alberta Parks & Protected Areas, Canmore, Alberta
Bob Forbes, Wildlife Biologist, Ministry of Water, Land & Air Protection, Cranbrook, BC
Paul Galbraith, Manager, Intergovernmental Affairs, Parks Canada, Radium Hot Springs, BC
Darcy Monchak, Planning Forester, BC Ministry of Sustainable Resource Management, Golden, BC
Rob Neil, Wildlife Biologist, BC Ministry of Sustainable Resource Management, Cranbrook, BC
Jan Simonson, Land & Forest Division, Alberta Ministry of Sustainable Resource Development, Calgary, Alberta
Jim Skrenek, Director of Wildlife, Alberta Ministry of Sustainable Resource Development, Edmonton, Alberta
Ian Syme, Parks Canada, Banff, Alberta
Wayne Stetski, Regional Manager, BC Ministry of Water, Land & Air Protection, Cranbrook, BC
Rob Walker, Fire Maintained Ecosystem Specialist, Parks Canada, Kootenay National Park, Radium Hot Springs, BC

Waterton Park (February 15, 2002)

Peter Achuff, Conservation Biologist, Parks Canada, Jasper National Park
Bill Dolan, Manager, Warden and Ecosystem Services, Parks Canada, Waterton Lakes National Park
Cyndi Smith, Conservation Biologist, Parks Canada, Waterton Lakes National Park
Rob Watt, Wildlife/Fisheries/Cultural Coordinator, Parks Canada, Waterton Lakes National Park

Glacier National Park (February 25, 2002)

Bill Browne, Superintendent, Glacier National Park, Parks Canada
Dr. John Woods, Biologist, Glacier National Park, Parks Canada
Murray Peterson, Fire and Vegetation Specialist, Glacier National Park, Parks Canada

Ktunaxa-Kinbasket First Nation, BC (March 23, 2002)

Thomas Munson - Ktunaxa-Kinbasket First Nation, BC
Vic Clement - Ktunaxa-Kinbasket First Nation, BC

Heather Mountain Lodge, BC (June 20, 2002)

Paul Sihler, Program Manager, Heart of the Rockies Initiative, Helena, MT
Darrell Smith, Program Manager, East Kootenay Conservation Program, Invermere, BC
Jim Thorsell, Senior World Heritage Advisor, World Conservation Union (IUCN), Wilmer, BC

ONE-ON-ONE MEETINGS

Project overview and review:
Marcy Mahr, Yellowstone to Yukon Initiative, (February 2001; January 2003).
Steve Gniadek, Jack Potter, Leo Marnell, Brace Hayden, Glacier National Park, (February 2002).
Regional Staff, US Forest Service, Missoula, MT, (February 2002).
Dale Becker, Wildlife Program manager, Confederated Salish and Kootenai Tribes, (March 2002).
Upper Missouri/Yellowstone/Columbia Ecoteam, US Fish and Wildlife Service, (June 2002).
Lynn Ducharme (Confederated Salish and Kootenai Tribes) and David Rockwell (consultant), BPA Sub-Basin Planning Team, (September 2002).
Gael Bissell, Jim Williams, Alan Wood, Tim Thier, Jeff Hutton, Mark Delaray, Montana Department Fish, Wildlife and Parks, (June 2002).
George Wilhere, Jeff Lewis, Kevin Robinette, Dinah Dembers, Jeff Azerrod, Howard Ferguson, David Vuber, Alan Palmanter, Washington Department Fish and Wildlife, (April 2002).

Staff review:
Bee Hall, Jamie Williams, Brian Martin, Dave Carr, Joe Moll, Montana Chapter, The Nature Conservancy, (November 2001).

Critical Review:
Dr. John Weaver, Wildlife Conservation Society, (February 2002).
Lewis Young, Flathead National Forest Biologist, (February 2002).
Liz Hill, Flathead National Forest Hydrologist, (March 2002).

APPENDIX 11.0 CANADIAN ROCKY MOUNTAINS ECOREGION TEAM

David Hillary,
Canadian Rocky Mountains Program Manager, NCC, British Columbia
121 - 7 Ave.,
Invermere, BC, V0A 1K0
[250] 342-5521
Email: David.Hillary@natureconservancy.ca

Marilyn Wood,
NW Program Director, TNC, Montana
The Nature Conservancy
P.O. Box 1139
Bigfork, Montana, 59911
[406] 837-0909
Email: Marilyn_Wood@tnc.org

KJ Torgerson,
Inland Northwest Manager, TNC, Idaho
505 Front Ave, Suite 305
Coeur d'Alene, ID 83814
[208] 676-8176
Email: ktorgerson@tnc.org

Rick Rowell,
Land Conservation Representative, Rocky Mountain Front, NCC, Alberta
2413-18th St,
Nanton, Alberta T0L 1R0
[403] 646-3783
Email: Rick.Rowell@natureconservancy.ca

Margaret Green,
Director of Land Conservation, NCC, Alberta
Email: Margaret.Green@natureconservancy.ca

Chuck Rumsey,
Director of Conservation Programs, NCC, British Columbia
202-26 Bastion Square,
Victoria, BC, V8W1H9
[250] 479-3191
Email: Chuck.Rumsey@natureconservancy.ca

Pierre Iachetti,
Conservation Planner, NCC, British Columbia
202-26 Bastion Square,
Victoria, BC, V8W1H9
[250] 479-3191
Email: Pierre.Iachetti@natureconservancy.ca

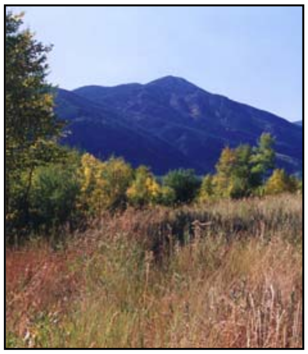
Jeff Lewis,
Wildlife Biologist, Washington Department of Fish & Wildlife
Olympia, WA
Email: LEWISJCL@dfw.wa.gov

Gwen Kittel,
Terrestrial Ecologist, TNC, Western Resource Office
Boulder, CO
(Now with Natureserve)
Email: gwen_kittel@NatureServe.org

Mark Bryer,
Aquatic Ecologist, TNC, Freshwater Initiative
The Nature Conservancy,
4245 N. Fairfax Dr.,
Arlington, VA 22203
Email: mbryer@tnc.org

Bart Butterfield,
Consultant, GIS and Data Management
Boise, ID
Email: bbutterfield@cableone.net

Carlos Carroll,
Wide-ranging carnivore research, Oregon State University and Klamath Center for Conservation Research
PO Box 104
Orleans, CA
Email: carlos@sisqtel.net




CANADIAN ROCKY MOUNTAINS ECOREGIONAL ASSESSMENT

Volume Three: Conservation Area Descriptions

(Revised May 2004)




British Columbia

Conservation Data Centre

TABLE OF CONTENTS

CONSERVATION AREA SUMMARIES

Adams River – Adams River Salmon Society

Adams River.

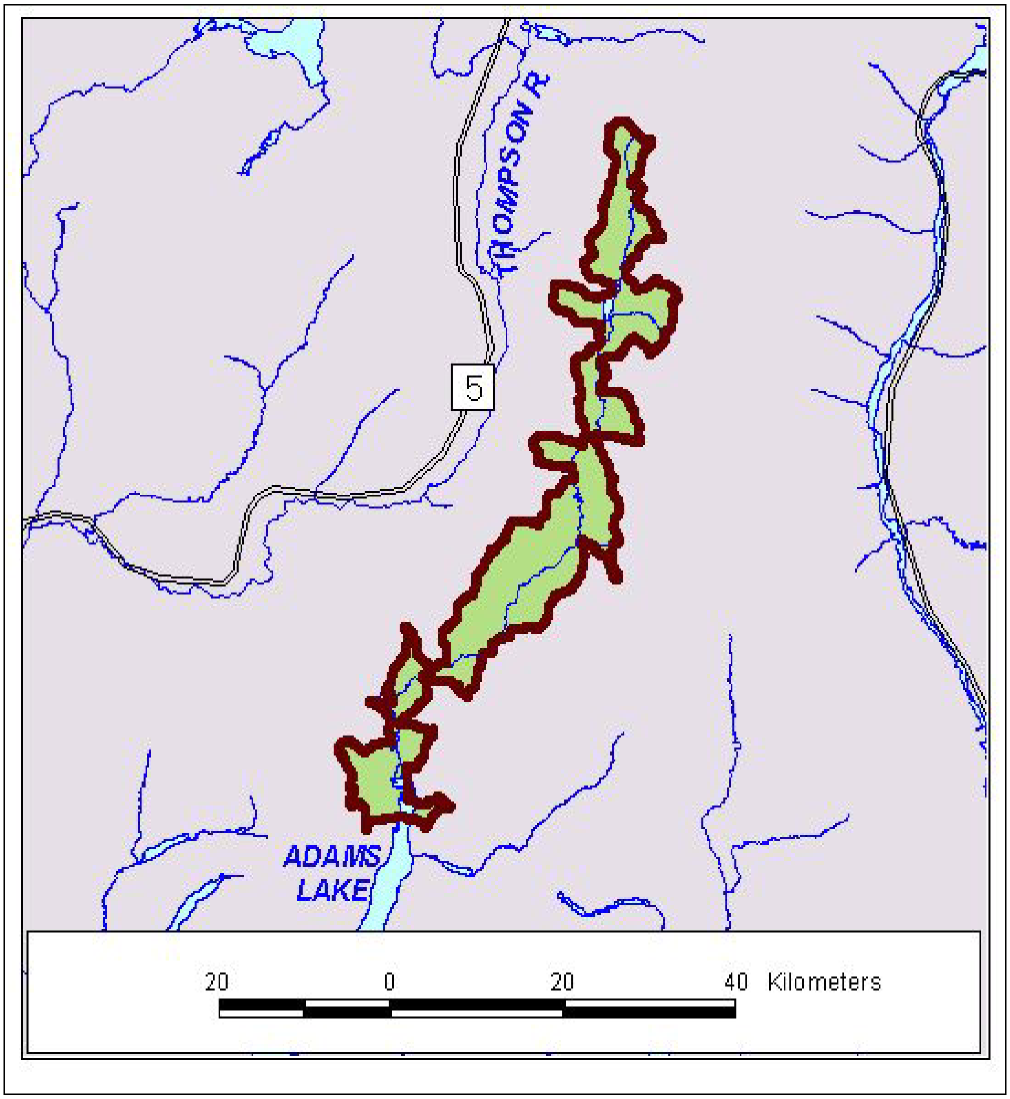
Size: 131,524 acres/53,267 hectares.
Irreplaceability Score (Mean): **3.1**
Vulnerability Score (Mean): **1.8**
Combined Score: 4.9

Conservation Area Description: This conservation area is located in the northeast corner of the ecoregion, north of the Shuswap Lake area. It was primarily selected for the aquatic systems and salmon populations in the Adams River.

Principle Targets: Aquatic species include pink salmon (*Onchorhynchus gorbuscha)*, coho salmon (*Onchorhynchus kisutch*), sockeye salmon (*Onchorhynchus nerka)*, Chinook salmon (*Onchorhynchus tshawytscha),* and bull trout (*Salvelinus confluentus)*.

Ownership: Ownership within this conservation area is 85% BC provincial Crown land, 10% BC Provincial Parks, 4% BC provincial Crown land held under Tree Farm License (TFL) and 1% privately owned.

Threats and Management Issues: Degradation of aquatic habitat including, but not limited to, incompatible forestry practices along streams and rivers, point source pollution, diversion and water allocation and the construction of barriers to fish movement. Allocation of the fisheries resource in Canada and the US also critical to long-term viability of salmon stocks.


THOMPSON R
5
ADAMS LAKE
20 0 20 40 Kilometers

Clark Fork – Marilyn Wood

Bitterroot.

Size: 476,707 acres/19,066 hectares.
Irreplaceability Score (Mean)**: 3.6**
Vulnerability Score (Mean)**: 1.6**
Combined Score: 5.3

Conservation Area Description: This conservation area is located in west central Montana along the Idaho border. The mountains here are steep and rugged with narrow drainages that flow into the Clark Fork River. The predominant geology is quartzite and argillite with elevations ranging from 701 to 2286 m (2300 to 7500 ft). Mean annual precipitation is from 64 to 203 cm (25 to 80 inches). Near and in the valley floor, dominant trees are ponderosa pine and Douglas-fir and western larch, giving way to subalpine fir and Engelmann spruce at the higher elevations. The area is the northern boundary the Selway/ Bitterroot Wilderness; one of the largest wilderness areas in the United States. The primary disturbance process is fire, flooding, insects and disease, and flooding. The size and integrity of this area and its connection to large roadless areas in Idaho make this conservation area important for connectivity values. It has been proposed to reintroduce grizzly bears into this ecosystem.

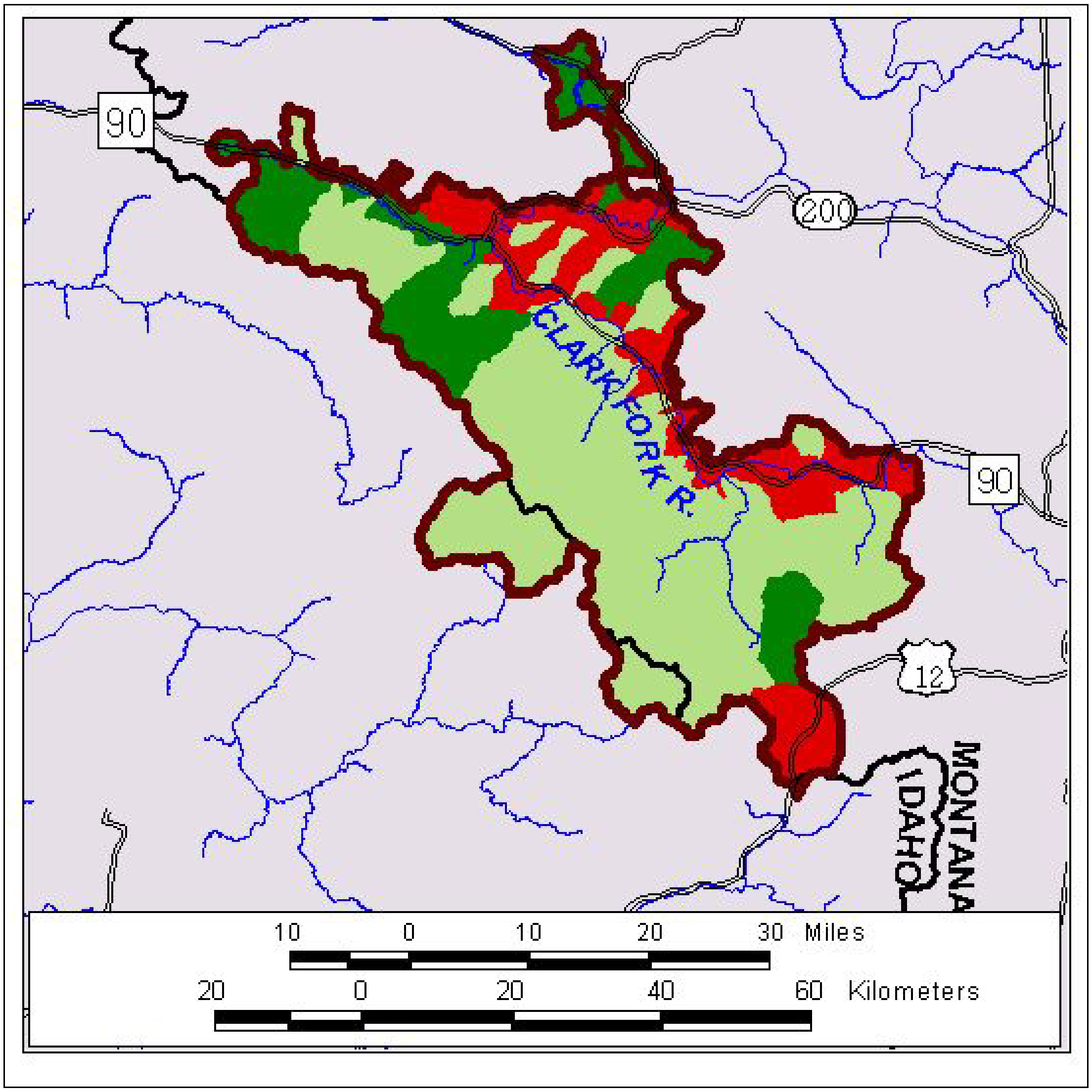
Principal Targets: Terrestrial targets include habitat for fisher (*Martes pennanti*), wolverine (*Gulo gulo luscus*), lynx (*Lynx canadensis*), wolf (*Canis lupus*) and grizzly bear (*Ursus arctos horribilis*). Aquatic targets include the westslope cutthroat trout (*Onchorhynchus clarki lewisi*) and bull trout (*Salvelinus confluentus*). Rare plant and plant community conservation targets include clustered lady's slipper (*Cypripedium fasciculatum*), and Idaho Strawberry (*Waldsteinia idahoensis*).

Ownership: Ownership within the conservation area is 73% Federal, 4% the State of Montana, and 23% privately owned.

Threats and Management Issues: Primary issues are altered fire regime, timber harvest, mining, grazing, and recreation uses.

Opportunities: US Fish and Wildlife Service Critical Carnivore Linkage project; conservation easements of private lands.

Stakeholders: Lolo National Forest, Montana Department Fish, Wildlife and Parks, US Fish and Wildlife Service, community of St. Regis, Clark Fork Coalition.


90
200
CLARK FORK R.
90
12
MONTANA
IDAHO
10 0 10 20 30 Miles
20 0 20 40 60 Kilometers

Bull Lake/East Cabinet.

Bull Valley – Marilyn Wood

Size: 98,403 acres/39,853 hectares.
Irreplaceability Score (Mean)**: 4.2**
Vulnerability Score (Mean)**: 1.5**
Combined Score: 5.8

Conservation Area Description: This conservation area is located in north-western Montana, just south of the town of Libby. The area includes the northern portion of the East Cabinet Mountain Range and the portion of the Bull Valley, which contains Bull Lake and Lake Creek. Bull Lake sits in the middle of the valley and is the origin of Lake Creek, which runs north eventually draining into the Kootenai River near the town of Troy, Montana. Predominant geology is glaciated argillite, siltite, quartzite, and dolomite. Volcanic ash deposits occur throughout the area. Vegetation is lush, dense, and highly productive due to the Pacific Maritime climate where annual precipitation ranges from 64cm (25 inches) in the valleys to up to 254 cm (100 inches) in the mountains. Some of the largest western redcedar trees in Montana can be found in this area. Forest habitat type series are western redcedar, Engelmann spruce, and western hemlock in the warmer valley floors, and mountain hemlock and subalpine fir in the cooler upper elevations. The steep, extremely rugged terrain of the Cabinet Mountains and heavy snowfall set the scene for frequent avalanche activity. The resulting avalanche chutes are dense with Sitka alder and mountain ash, along with a high diversity of other moist site shrubs, forbs, sedges and grasses. The Cabinet Mountains Wilderness defines the crest of the East Cabinet Mountain Range. The primary natural disturbance processes are fire and insect epidemics.

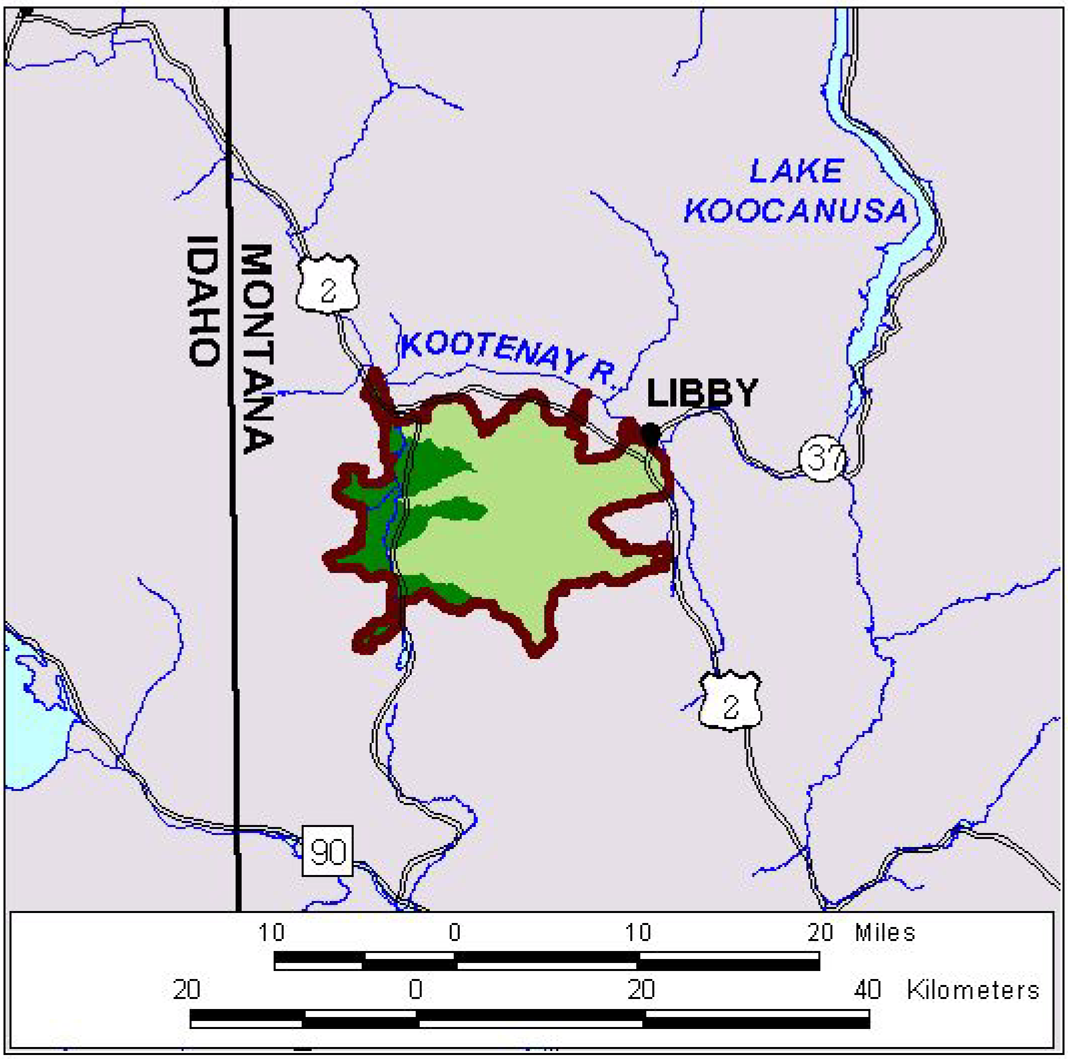
Principal Targets: Terrestrial targets include habitat for fisher (*Martes pennanti*), wolverine (*Gulo gulo luscus*), lynx (*Lynx canadensis*), Townsend's big-eared bat (*Corynorhinus townsendii*), bald eagle (*Haliaeetus leucocephalus*) nests and the dwindling Cabinet Yaak grizzly bear (*Ursus arctos horribilis*) population. Aquatic targets include the westslope cutthroat trout (*Onchorhynchus clarki lewisi*), bull trout (*Salvelinus confluentus*), and the white sturgeon (*Acipenser transmontanus*) in the Kootenai River system. Among plant conservation targets are the rare moonworts, particularly mountain moonwort (*Botrychium montanum*), which is restricted to old-growth western redcedar forests.

Ownership: Ownership within the conservation area is 76% Federal 76%, 3% the State of Montana, and 21% privately owned.

Threats and Management Issues: Land use is predominantly timber harvest, mining and recreation. Threats to natural systems and native species include improper timber harvest techniques, mine development, damming of rivers, exotic species, and altered fire regimes. Although fire return intervals are long in the stand replacement fire regimes found in this conservation area, there have been no significant fires in the area for nearly 70 years as a result of aggressive fire suppression.

Opportunities: Provide input into the Forest Plan revision currently in development; pursue land trades between USFS and Plum Creek on important parcels; provide conservation area and targets information for the Sub Basin Plans (NWPPC); BPA fisheries mitigation plan; participate in USFWS critical linkage area conservation planning (determine endangered species funding for acquisitions or easements possibilities).

Stakeholders: Kootenai National Forest; Bull Lake homeowners; Troy municipality; Plum Creek Timber Company; Cabinets Natural Resource Council; Northwest Power Planning Council (NWPPC); Bonneville Power Administration (BPA); US Fish and Wildlife Service.



Camas Prairie Ripple Marks/Mark Alan Wilson

Camas Prairie.

Size: 19,007 acres/7,698 hectares.
Irreplaceability Score (Mean)**: 3.9**
Vulnerability Score (Mean)**: 1.9**
Combined Score: 5.9

Conservation Area Description: Camas Prairie is situated between the towns of Perma and Hot Springs, Montana. The Camas watershed includes three small perennial tributaries: Camas Creek, Cottonwood Creek, and Clear Creek. The Camas Prairie ripple marks were formed as the deep and swift flowing water from Glacial Lake Missoula raced through the failed ice dam at speeds up to 81 km/hr (50mph). In the swales between giant ripple marks, vernal wetlands formed which now provide habitat for two rare plant species: the Dwarf woolly-head and the Columbia onion. Due to low precipitation in the area, and because valley geology is well-drained gravels and alluvium, the ridges of the ripple marks are quite dry. The presence of vernal pools in the grasslands gives the area higher than usual biodiversity value. As Camas and Cottonwood Creeks emerge from coniferous forestlands onto the valley floor of Camas Prairie, their channel patterns have been severely disrupted by agricultural practices. Downstream from Camas Prairie, the channel is well defined, but generally incised. Forest habitats dominate the riparian zone in the upper reaches of the stream, that later grade into mixed forest and shrub-dominated habitats at lower elevations. Beyond the riparian zone, the watershed is largely grassland and is used for livestock grazing and other agricultural practices. Within the watershed two isolated populations of pure-strain westslope cutthroat persist. This system is unique in that the fish barriers protecting these tributary populations have been created by the tendency of these streams to submerge as they reach the alley floor then re-emerge down valley in the mainstem Camas Creek.

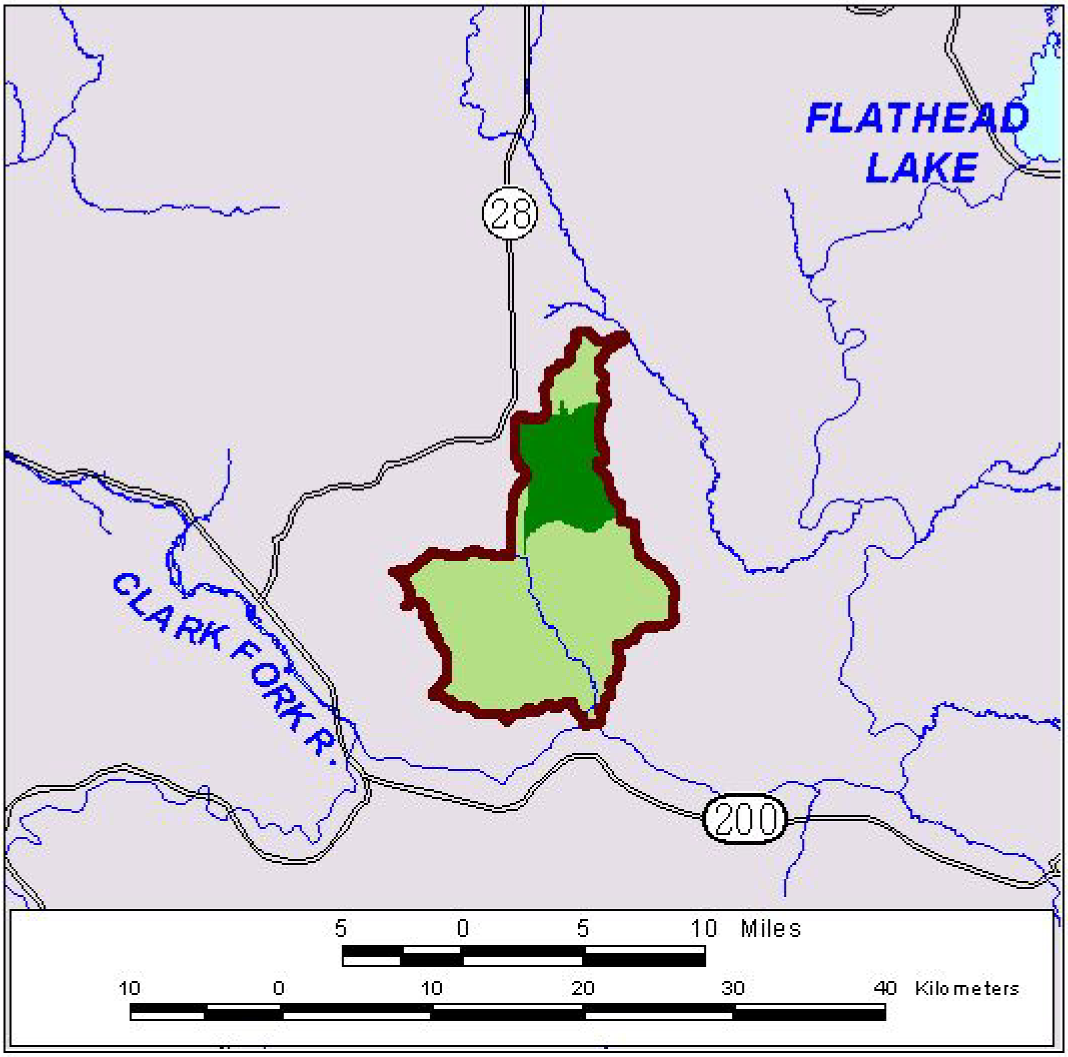
Principle Targets: Conservation targets include wolf (*Canis lupus*), westslope cutthroat trout (*Onchorhynchus clarki lewisi*), and two rare vascular plants: Dwarf woolly-head (*Psilocarphus brevissimus* var. *brevissimus*), and Columbia onion (*Allium columbianum*).

Ownership: Ownership within the conservation area is 22% Federal Tribal land, 5% by the State of Montana, and 73% privately owned.

Threats and Management Issues: Exotic species, agriculture and inappropriate grazing techniques are the dominant threats. Non-native fish species, timber harvest practices, riparian degradation also threaten biodiversity.

Opportunities: Camas Prairie has been identified as a priority area for acquisitions and watershed restoration by Confederated Salish and Kootenai Tribes; potential cooperative projects with CSKT on private land conservation through easements and acquisitions; riparian and grassland restoration projects needed.

Stakeholders: Confederated Salish and Kootenai Tribes (CSKT), Hot Springs municipality, Camas Elementary school, local landowners.



Cougar Bay – KJ Torgerson

Cougar Bay.

Size: 13,269 acres/5,374 hectares.
Irreplaceability Score (Mean)**: 2.7**
Vulnerability Score (Mean)**: 3.4**
Combined Score: 6.2

Conservation Area Description: This conservation area lies within a mosaic landscape of mixed coniferous forests, meadows, mountain lakes and streams. Cougar Bay itself lies at an elevation of 651 m (2,136 feet) on the north-western end of Lake Coeur d'Alene, Idaho. It exists as one of the last undeveloped bays on the lake. Key habitat features include 5 distinct habitat types: aquatic, wetlands (including a vernal pond), shoreline, edge, and forested upland. The historic expanse of the wetland was much greater than today. Over time, significant portions of the wetland have been drained or altered for agriculture and development of county roads and US Hwy. 95. Cougar Bay is supported by the Cougar Creek watershed, which drains northeast from Blossom Mountain 1344m (4408 feet), Shasta Butte 1479m (4852 feet) and Mica Peak 1598m (5241 feet).

The bay itself is protected from log booms at the mouth that serve to reduce wave action. The log booms have for decades stored logs at the confluence of Cougar Bay and the Spokane River for various timber companies before the logs are transported to the mills downstream. Historically, timber companies have transported their logs from their company lands to the mill through Lake Coeur d'Alene. Tugboats are used to haul large packs of logs north across the lake to the storage area located at the mouth of the Spokane River. From here, logs were then sorted and transported to one of two mills along the river. Today, only one mill still accepts logs by water. The booms used to store the logs serve to protect the bay from wave action and boating activities. As a result, the wetlands have expanded and flourished since the booms were installed.

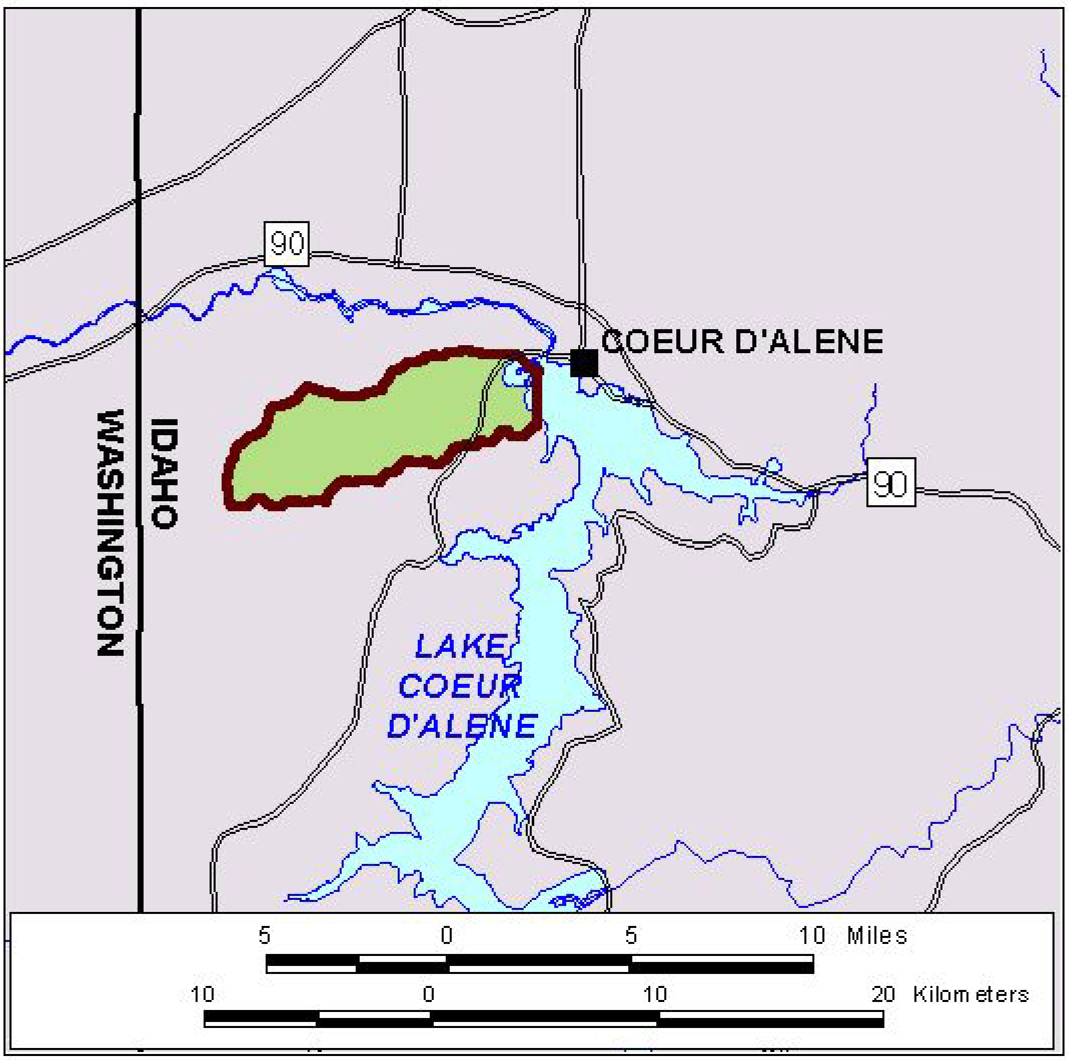
Ownership: Ownership within the conservation area is 94% private, 3.2% state (IDL), 2.8% water.

Principal Targets: Terrestrial targets include habitat for wolf (*Canis lupus*), grizzly bear (*Ursus arctos horribilis*), fisher (*Martes pennanti*), wolverine (*Gulo gulo luscus*), lynx (*Lynx canadensis*), bald eagle (*Haliaeetus leucocephalus).* Aquatic targets include westslope cutthroat trout (*Onchorhynchus clarki lewisi*) and one important aquatic system.

Threats and Management Issues: Non-compatible recreational activities (i.e. increased motor boat activities); invasives; (particularly knapweed and Eurasian water milfoil); diminished water quality through elevated sources of heavy metals associated with upstream mining activities; point and non-point sources of pollution; incompatible timber harvest practices in the watershed, rural residential development; sedimentation associated with increased road densities, development and timber harvest; altered fire regimes due to rural development; downstream hydropower operations (Post Fall Dam) impact the bay elevations and thus wetland habitat.

Opportunities: 1) Work with Forest Capital Partners to restrict development on their lands in this conservation area, 2) Facilitate the implementation of the Lake Management Plan, and 3) assist fee/conservation easement/ development right acquisition of associated properties.

Stakeholders: The Nature Conservancy; city and county governments; BLM, Forest Capital Partners, Idaho Department of Lands; Coeur d'Alene Tribe of Indians; Coeur d'Alene Lakeshore Owners Association, Sportsman's groups, EPA.



Glacier Park – Marilyn Wood

Crown of the Continent.

Size: 4,266,640 acres/1,727,989 hectares.
Irreplaceability Score (Mean)**: 4.7**
Vulnerability Score (Mean): **1.2**
Combined Score: **5.8**

Conservation Area Description: The Crown of the Continent Conservation Area (CoC) was defined as such a large area because of the importance of connectivity and ecosystem integrity. The CoC is located at the narrowest point along the Rocky Mountain corridor in north-western Montana, southwestern Alberta, and south-eastern British Columbia. Thrust faulted mountains formed from argillite, siltite, and dolomite and were strongly shaped by alpine glaciations. Glacial till covers much of the landscape. Elevation range from 975 to 3079m (3,200 to 10,100 ft). Mean annual precipitation ranges from 51 to 279 cm (20 to 110 inches), about 80 % falling as snow. Lakes occur in glacial cirques and in glacial valleys. The CoC shares common geological, climatic and biological characteristics and is located at a point of continental convergence. The Great Plains run abruptly into the Rocky Mountain Cordillera. This continental convergence results in a tremendous orthographic variation over a relatively short distance with resultant broad species diversity. The CoC is the source headwaters of three major water systems of North America (the Columbia, the Missouri/Mississippi, and Saskatchewan/Nelson). At the core of the Conservation Area lies Glacier-Waterton International Peace Park (a UNESCO World Heritage Site) and the Bob Marshall-Great Bear-Scapegoat Wilderness complex. Fire is the most important natural disturbance in the region. Other common natural disturbances include avalanches, landslides, tree fall, windstorms, floods, and epidemics such as bark beetle infestations. The CoC is particularly rich in community diversity because of the contrast in climates between the east and west side of the Continental Divide, the large amount of topographic relief, and the presence of both calcareous and non-calcareous soils. Species from five major floristic provinces meet here. The region's significance to biodiversity goes beyond it complex floristic component to one of international significance for it role as source populations of carnivores and as the most vital connection between populations to the north and south. Land use outside the protected parks and wilderness include timber harvest, ranching, rural development, and transportation corridors. The CoC provides core habitat for populations of grizzly bears, wolves, wolverine, lynx, and fisher.

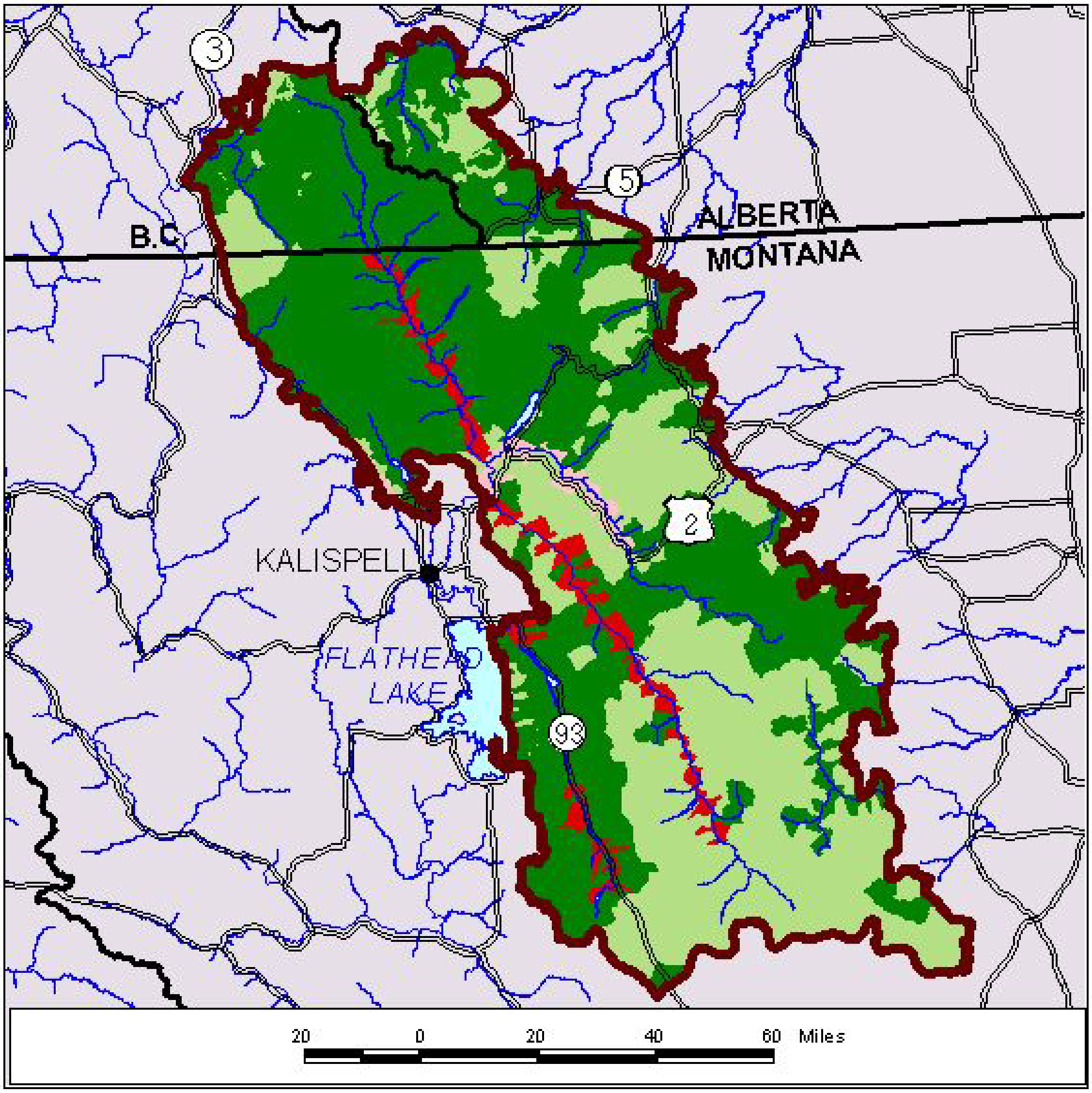
Principal Targets: Terrestrial targets includes habitat for all wide ranging carnivores, harlequin duck (*Histrionicus histrionicus*), northern leopard frog (*Rana pipiens*), Flammulated owl (*Otus flammeolus*), trumpeter swan (*Cygnus buccinator*), Gillette's Checkerspot butterfly (*Euphydryas gellettii*), white tailed ptarmigan (*Lagopus leucurus*); Also found in the conservation area are numerous rare plants including wetland and high alpine species.

Ownership: Ownership within the conservation area is Alberta (Federal 3%, Province 2%, Private 5%), British Columbia (Federal 11%, Province 1%, Private 1%), Montana (Federal 61%, Tribal 3%, Private 6%, State 4%).

Threats and Management Issues: Steadily rising human population growth and continuing fragmentation of lands due to recreational and residential development are key factors that are having pronounced effects on the ecology of the region. The western portion of the conservation area has some of the highest population growth in Montana. While the core of the CoC receives some of the highest protection, the surrounding low elevation habitats, which are integral to ecological completeness, are threatened by increasing residential development pressures and increased highway development. Land use changes from large ranching to rural development communities on the east side of the CoC are increasing. This region will face increasing development pressures in the next 10 years. While habitat loss and fragmentation are primary threats, other issues also risk the region's integrity. Jurisdictional complexity is a barrier to managing natural resources to support ecological integrity. Several US and Canadian government agencies (Federal, State/Provincial, and Local), and First Nations all have differing resource goals. Management of grizzlies and wolves differ between US and Canada. One major landowner in the Swan Valley portion (Plum Creek) is proposing to dispose of large holdings within the CoC. Major transportation corridors located north (Highway 3-Crowsnest Pass) and through the heart of the CoC (Highway 2-Marias Pass) contribute to wildlife mortality, increased development, and risk of hazardous material spills. Gas/oil exploration and development are significant issues as well as potential coal development. Altered fire regime, incompatible timber harvests and non-native species introductions are other major management issues.

Opportunities: Collaborate with existing conservation efforts in the Swan Valley and Middle Fork (GNESA and Swan Valley Ad Hoc Committee); participate in the Crown of the Continent Managers Forum; provide leadership for the integration of watershed management of the North Fork through the Flathead Basin Commission; continue conservation of private ranch lands on the east front; provide data/conservation values to the Southern Rockies Management Plan process; conservation easements on corporate timber lands (Tembec); provide data/conservation values to Flathead National Forest plan revisions.

Stakeholders: Glacier National Park, Flathead National Forest, Lewis and Clark National Forest, Blackfeet Indian Reservation, Ministry of the Environment (BC and Alberta), Montana Department of Transportation, US Fish and Wildlife Service, Plum Creek Timber Company, Tembec Timber Company, Montana Department of Natural Resources, Montana Department Fish, Wildlife and Parks, Great Northern Environmental Stewardship Area, Swan Valley Ad Hoc Committee, Flathead Land Trust, Trust For Public Lands, Montana Land Reliance, Southern Alberta Land Trust, University of Montana Biological Station, and several municipalities.


3
5
B.C.
ALBERTA
MONTANA
2
KALISPELL
FLATHEAD
LAKE
93
20
0
20
40
60
Miles


Cusick – Bob Rowen (Progressive Image)

Cusick.

Size: 8,413 acres/3,407 hectares.
Irreplaceability Score (Mean)**: 1.4**
Vulnerability Score (Mean)**: 3.5**
Combined Score: 4.9

Conservation Area Description: This conservation area consists of two relatively small areas that include aquatic, riparian and floodplain habitats at 600-700 m (1800-2100 ft) elevation in the Pend Oreille River Basin. The area encompasses the cottonwood groves and riparian habitats at the confluence of Tacoma Creek, which is located on the western boundary of the Kalispell Indian Reservation. The northern area is approximately 5 km (3 mi) downstream from the Reservation and encompasses a portion of the Pend Oreille River containing the confluence with LeClerc Creek. The Pend Oreille River, grass farming, and cattle grazing dominate the landscape. The Pend Oreille River is impounded throughout the conservation are as a result of Box Canyon Dam, which is located 27 km (17 mi) downstream near the town of Ione. At first, the northern area was thought to be important ecologically. We subsequently found out however that it was nominated more as an opportunity for acquisition to consolidate state ownerships for habitat restoration. Consequently, the northern area should not be considered a priority site for conservation.

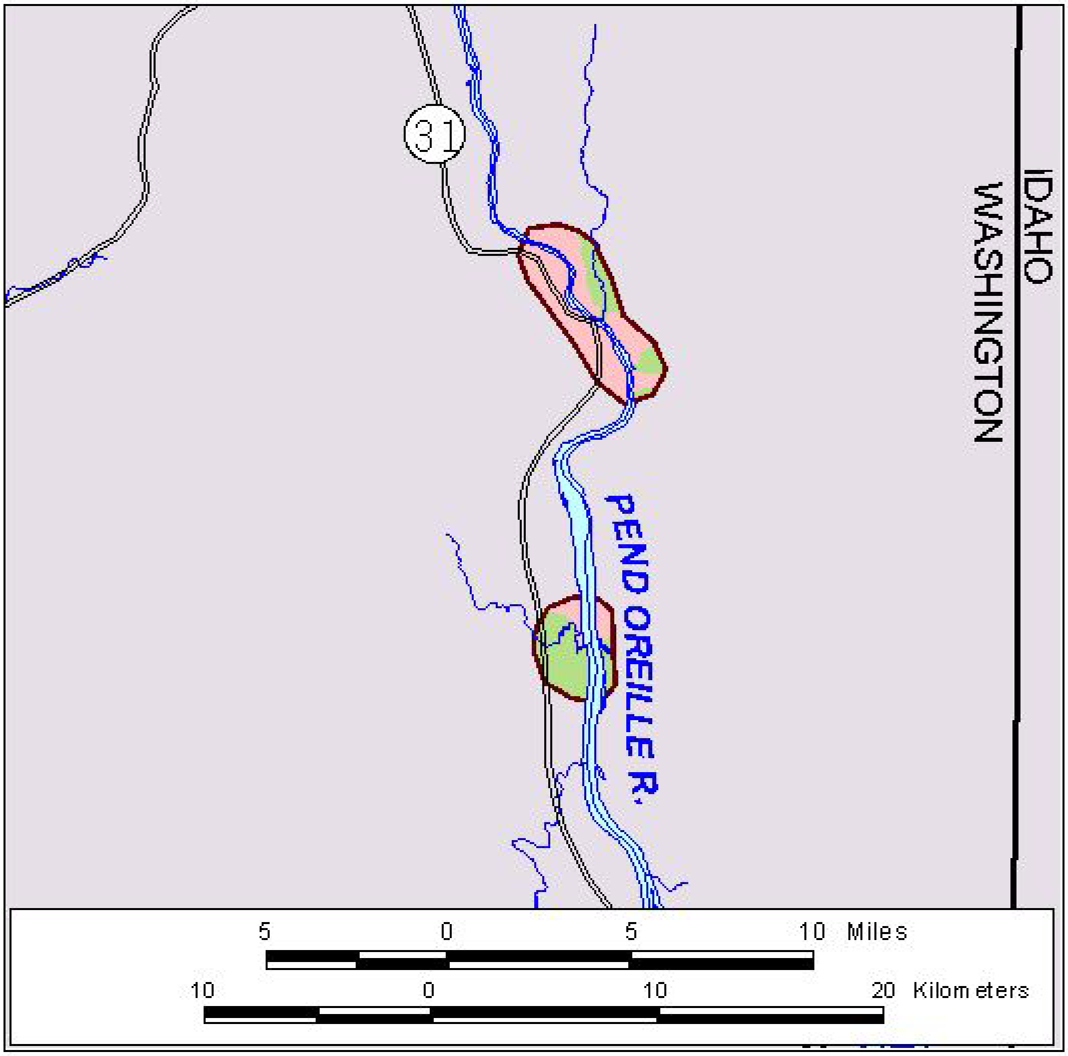
Principal Targets: Terrestrial species include the bald eagle (*Haliaeetus leucocephalus*) and the crenulate moonwort (*Botrychium crenulatum*). Targets also include habitat and connectivity values for the gray wolf (*Canis lupus*), grizzly bear (*Ursus arctos horribilis*), fisher (*Martes pennanti*), wolverine (*Gulo gulo*), and lynx (*lynx canadensis*).

Ownership: Ownership of the conservation area is 71% private, 18% WDNR, 5% USDI Bureau of Indian Affairs Trust or Tribes, 4% USFS, and 2% WDFW.

Threats and Management Issues: Altered flow regimes and altered aquatic habitats as a result of the Box Canyon Dam are major conservation issues. Continued loss of riparian habitats to first and second home development is a significant issue; especially cottonwood groves that provide habitat for raptors and neotropical birds. Other issues include incompatible grazing and agriculture, and invasive plants (European milfoil).

Opportunities: Box Canyon Dam re-licensing and NWPPC's sub-basin planning offer important opportunities for conservation actions within the conservation area. Acquisition or protection of cottonwood groves and islands within the river channel would an important management objective during re-licensing and sub-basin planning.

Stakeholders: USFS, DNR, WDFW, USFWS, Kalispell Indian Tribe, Pend Oreille PUD, USDI BLM, grass farmers, private land owners, Boise Cascade Corporation, US Army Corp of Engineers, Inland Northwest Wildlife Council, Stimson Timber Company.



Dayton Creek /Hog Heaven.

Size: 60,098 acres/24,342 hectares.
Irreplaceability Score (Mean): **5.4**
Vulnerability Score (Mean): **3.0**
Combined Score: 8.4

Conservation Area Description: The Hog Heaven Range, a sub-range of the Salish Mountains, is made up of glaciated argillite, siltite, quartzite, and dolomite. Mean annual precipitation ranges from 51 to 127 cm (20 to 50 inches). The dominant vegetation at the lower elevations of the Hog Heaven Range is coniferous forest comprised of Douglas-fir and Lodgepole pine on the south slopes, and western larch and grand fir on the north slopes. Higher in the mountains, the forests are dominated by subalpine fir and spruce. The foothills of the range give way to Ponderosa pine woodlands, shrub-steppe and remnants of rough fescue grasslands. On the rocky outcrops some of the driest vegetation types in western Montana occur, where cactus (brittle cholla) and bitterbrush can be found. The Dayton Creek watershed comprises almost 18,211 ha (45,000 acres) with 68km (42 miles) of perennial streams and 134 km (83.5 miles) of intermittent streams within the watershed boundary. Dayton Creek crosses the boundary of the Flathead Indian Reservation and is joined by Ronan Creek where it eventually enters Flathead Lake just south of the town of Dayton. Ronan Creek flows from the southeast corner of Lake Mary Ronan, a large lake west of Flathead Lake. Dayton Creek is considered important in replacing lost spawning habitat to the Flathead Lake ecosystem as a result of Hungry Horse Dam. Primary natural disturbance processes are fire, insects and disease.

Principal Targets: Principal conservation targets in this area are the Flathead Pondsnail (*Stagnicola elrodi*), and the federally Threatened Spalding's catchfly (or Spalding's campion) (*Silene spaldingii*) where a number of tiny populations occur. Animal conservation targets include wolf (*Canis lupus*), and fisher (*Martes pennanti*).

Ownership: Ownership within the conservation area is Federal 6%, Federal (Tribal) 29%, State (MT) 6%, and Private 60%.

Threats and Management Issues: Principal land use is heavy timber harvest, grazing and agriculture. Residential development is a major threat on the shores of Flathead Lake. Inappropriate grazing in the drier plant communities has encouraged the invasion of exotic species and erosion.

Opportunities: Provide input into the Forest Plan revision process; Dayton Creek has been identified by the Tribes and EPA as an important restoration watershed, collaborative projects on private land.

Stakeholders: Flathead National Forest; Plum Creek Timber Company; Confederated Salish and Kootenai Tribes, US Environmental Protection Agency; Montana Department Fish, Wildlife and Parks, Montana Department of Natural Resources, University of Montana Riparian and Wetland Research Program, University of Montana Biological

Station, US Bureau of Reclamation, the Flathead Basin Commission, Flathead Lakers and landowners.

Spokane – Howard Ferguson (WDFW)

Dishman Hills/Mica Peak.

Size: 59,083 acres/23,932 hectares.
Irreplaceability Score (Mean)**: 4.8**
Vulnerability Score (Mean)**: 3.5**
Combined Score: 8.3

Conservation Area Description: This is a relatively small conservation area that is located directly adjacent to the City of Spokane on its southern and south-eastern sides. It extends several kilometres into Idaho just east of Liberty Lake. The conservation area ranges from 600m (1969 ft) elevation near Liberty Lake and the Spokane River to 1586 m (5203 ft) elevation at Mica Peak. Dishman Hills and Mica Peak form a small range of hills that extend west from Idaho. Douglas-fir and grand fir forest occur on north-facing slopes and in drainages, whereas ponderosa pine forests occur on the south-facing slopes and drier sites. Remnants of steppe habitats are scattered within the conservation areas as well. A number of parks and protected areas are located within the conservation area. That include: Liberty Lake County Park, Iller Creek Conservation Area, Dishman Hills Natural Resources Conservation Area, and Morrow Conservation Area. Dishman Hills is named after a relatively undeveloped, higher elevation site in eastern side of the conservation area. This location (Dishman Hills proper) is almost entirely surrounded by urban and suburban development, with little habitat connectivity remaining to nearby undeveloped areas. Conversely, Mica Peak is much less developed and has substantial connectivity to habitats to the east in Idaho and to the south in Washington.

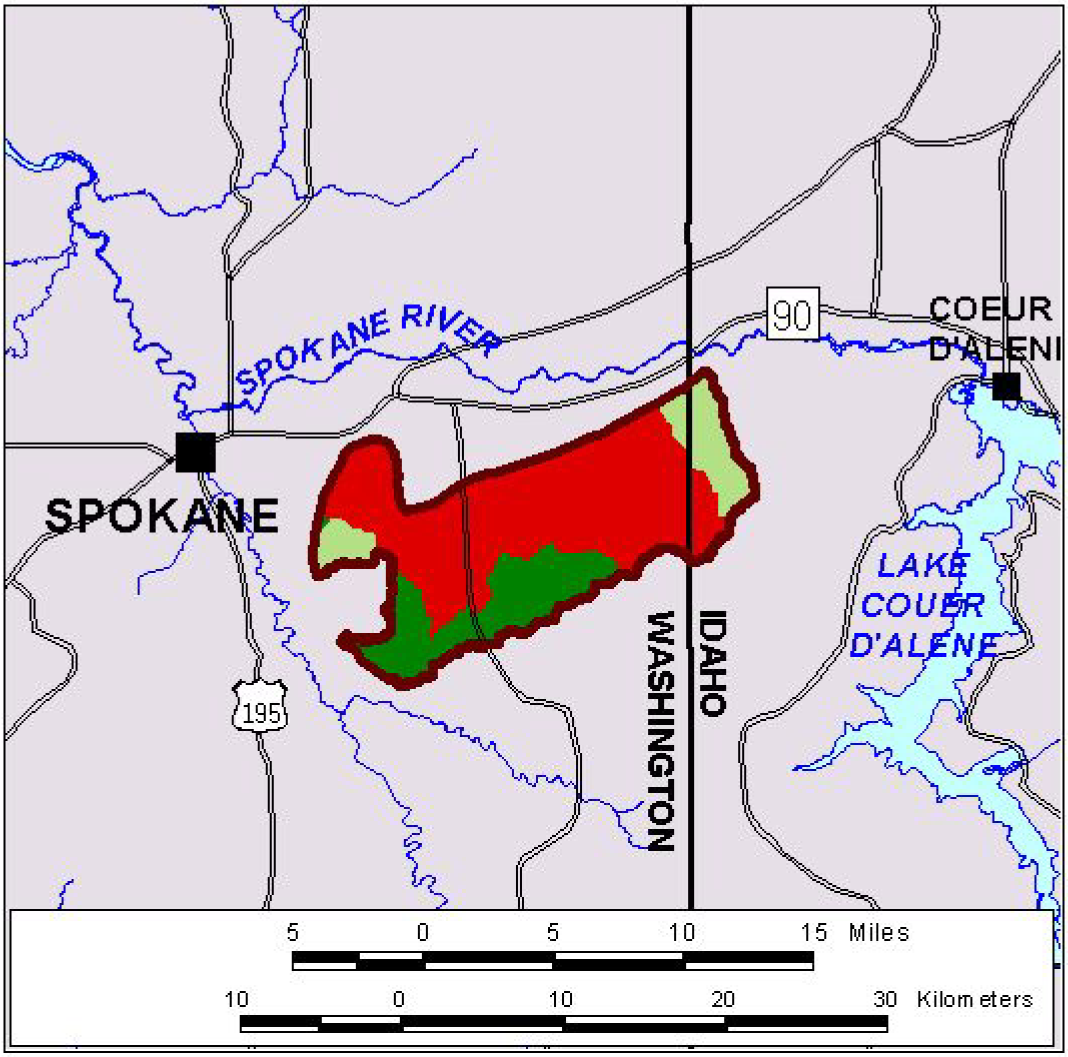
Principal Targets: Aquatic targets within the conservation area include the west-slope cutthroat trout (*Onchorhynchus clarki lewis*i), as well as a number of aquatic systems. Ponderosa pine communities are terrestrial targets as well as habitat and connectivity values for the gray wolf (*Canis lupus*), grizzly bear (*Ursus arctos horribilis*), fisher (*Martes pennanti*), wolverine (*Gulo gulo*), and lynx (*Lynx canadensis*).

Ownership: Ownership within the conservation area is 92% private, 5% local governments (Spokane County and City of Spokane), 2% WDNR, and 1% IDL.

Threats and Management Issues: Development and road building are the major threats in this conservation area. Development threatens to completely surround the central, higher elevation landscapes with continuous suburban development as a perimeter, eliminating existing habitat corridors and connectivity to the Mica Peak area and habitats to the south.

Opportunities: Protecting and maintaining habitat corridors through acquisitions or easements is essential for the Dishman Hills area. Measures to manage or limit growth in this area may also act to protect the perimeter of the protected areas and the corridors needed for connectivity.

Stakeholders: WDNR, Spokane County, City of Spokane, WDFW, IDL, TNC, Dishman Hills Natural Association, Inland Northwest Wildlife Council, Sierra Club, Friends of Centennial Trail, The Lands Council, Spokane Audubon.



Bugaboo Glacier – Dave Hillary

East-West Connectivity North.

Size: 421,239 acres/170,602 hectares.
Irreplaceability Score (Mean)**: 4.3**
Vulnerability Score (Mean)**: 1.3**
Combined Score: 5.6

Conservation Area Description: The Bugaboo conservation area is located in the Purcell Mountains mid way between the Rocky Mountain Trench on the east and the Duncan River on the west and halfway between Golden, BC and Radium Hot Springs, BC.

The conservation area is within the North Columbian Mountain and East Purcell Mountain ecosections. The topography of the area is extremely rugged with sculpted granite masses uplifting into spectacular spires, some of which exceed 3000 meters (9843 ft). Although the high elevation zone is well represented in the existing protected areas network, this area offers the best representation of warm, wet variants of the Englemann Spruce-Subalpine Fir biogeoclimatic subzone. The area also contains the Alpine Tundra zone, which consists of alpine heath and sedge, mosses and lichens. Woodland riparian vegetation can also be found in the Vowell Creek marshes and wetlands. The area contains habitat for a wide diversity of species including mountain goat, grizzly bear, wolverine, and fisher. The headwaters of Bugaboo, Vowell and Malloy Creeks as well as numerous high alpine lakes are found here. This conservation area provides a key connector between the Rocky Mountain Trench and the Duncan River. Bugaboo Provincial Park is 13,646 ha and is located in the Conservation Area and is essentially unroaded.

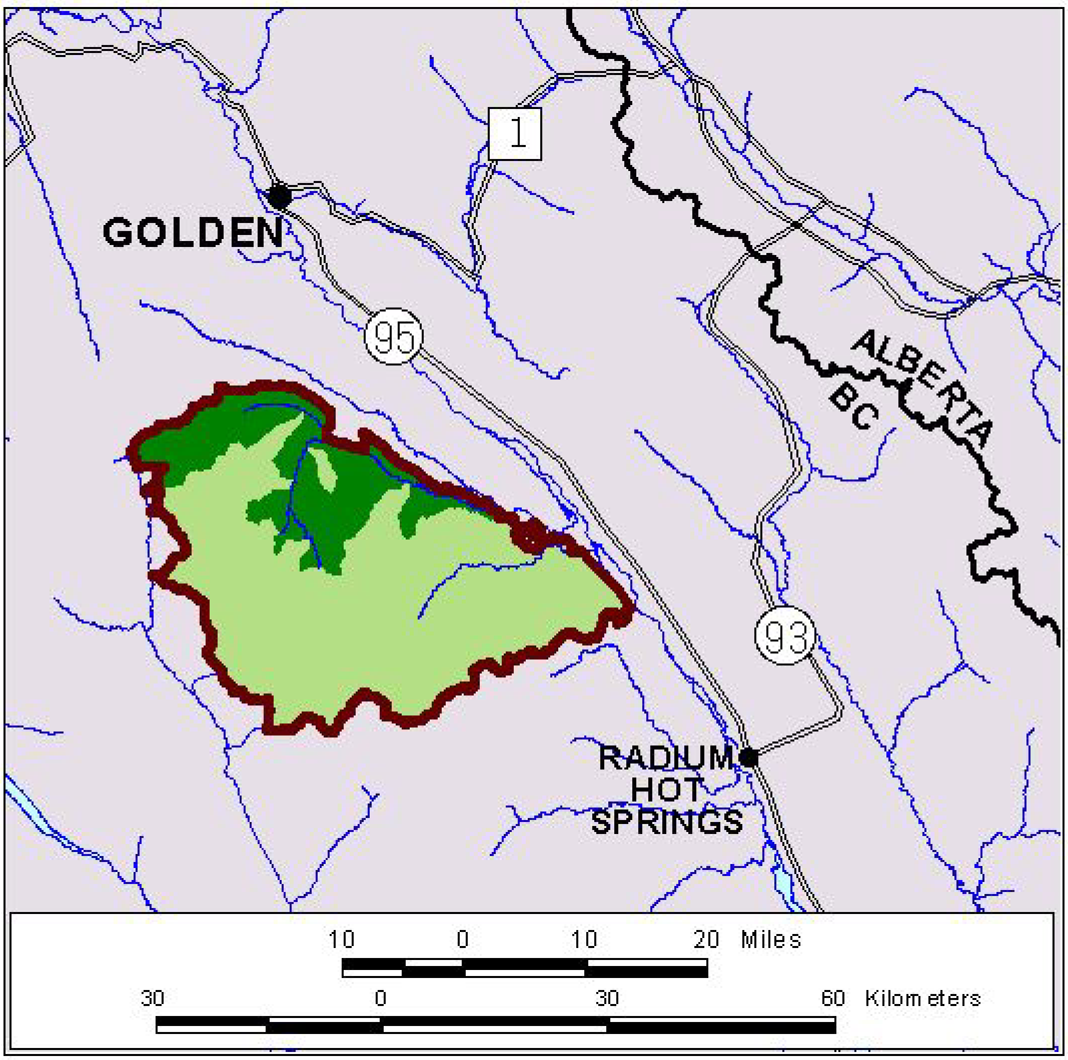
Principle Targets: Terrestrial targets include grizzly bear (*Ursus arctos horribilis*), wolverine (*gulo gulo luscus*), wolf (*Canis lupus*), lynx (*Lynx canadensis*), and fisher (*Martes pennanti*). Aquatic species include bull trout (*Salvelinus confluentus*), and westslope cutthroat trout (*Onchorhynchus clarki lewisi*). A number of significant aquatic systems also occur in the conservation area.

Ownership: Ownership within the conservation area is 53% BC provincial Crown land, 38% BC provincial Crown land held under Tree Farm License (TFL), 8% BC provincial Crown land managed by Water, Land and Air Protection and less than 1% privately owned.

Threats and Management Issues: Although forestry and mining are dominant land uses, the recent land use planning process has reflected public appreciation and concern for protected areas. The result has been the protection of 18.5% of the East Kootenay area. The Bugaboos were the birthplace of helicopter skiing in Canada and the area has become a worldwide destination for this activity. The area is also internationally renowned for rock climbing and mountaineering activities, all of which pose a threat to biodiversity conservation.

Opportunities: Actions to reduce commercial tenures on crown land are viewed as important in this area. Improve forest practices especially along important riparian areas.

Stakeholders: Ktunaxa-Kinbasket Tribal Council, Nature Conservancy of Canada, BC Ministry of Water, Land and Air Protection, BC Ministry of Sustainable Resource Management, BC Ministry of Forests, Regional District of East Kootenay, East Kootenay Environmental Society, East Kootenay Conservation Program, Invermere and Golden Rod and Gun Club, Columbia Basin Trust, Columbia Basin Fish and Wildlife Compensation Program, Slocan Forest Products, Tembec Industries Inc., Canadian Mountain Holidays (CMH).



Alpine Meadow (Purcells) – Dave Hillary

East-West Connectivity South.

Size: 546,306 acres/221,254 hectares.
Irreplaceability Score (Mean)**: 4.3**
Vulnerability Score (Mean)**: 1.1**
Combined Score: 5.3

Conservation Area Description: The East Purcell area is located in the Purcell Mountains, bordered on the east by the Rocky Mountain Trench and on the west by Kootenay Lake. This virtually undisturbed area contains grasslands, high mountains, alpine lakes and provides habitat for grizzly bear, mountain goats, west slope cutthroat trout and mountain caribou. This area also contains one of the largest provincial protected areas in the region - the Purcell Wilderness Conservancy at 106,290 ha (262648 acres). The area includes the unroaded middle portions of the drainages of Findley Creek, Dutch Creek and Toby Creek. The size, location and lack of roads create very high values for biodiversity conservation. It contains provincially significant biogeoclimatic subzone/variant Kootenay Dry Mild Interior Douglas-fir and contributes to the gap in the Dry Cool Montane Spruce subzone within the East Purcell Mountains Ecosection.

Principal Targets: Terrestrial targets include grizzly bear (*Ursus arctos horribilis*), wolverine (*Gulo gulo luscus*), wolf (*Canis lupus*), lynx (*Lynx canadensis*), fisher (*Martes pennanti*), and badger (*Taxidea taxus jeffersoni*). Aquatic targets include bull trout (*Salvelinus confluentus*), and westslope cutthroat trout (*Onchorhynchus clarki lewisi*). A number of significant aquatic and temperate grassland communities also occur in the conservation area.

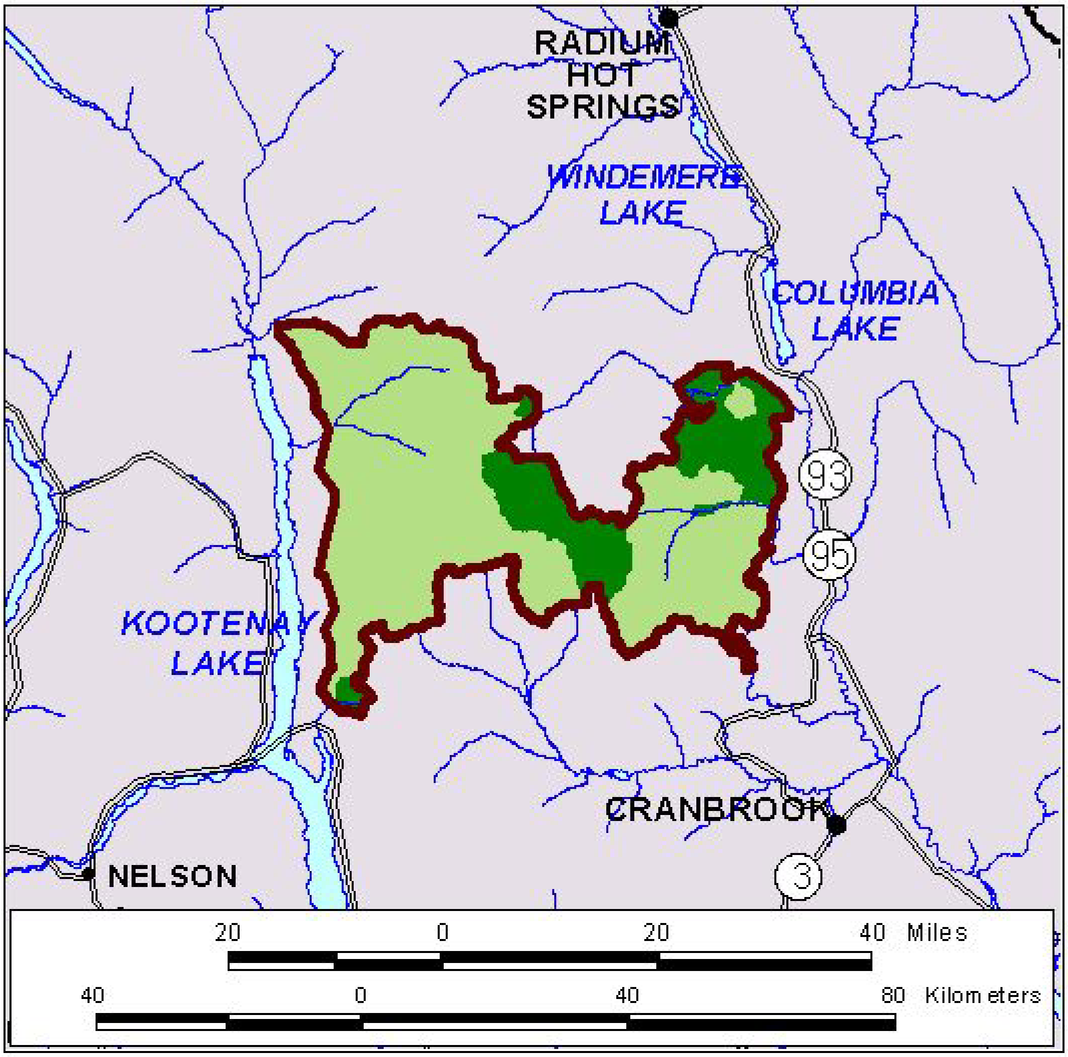
Ownership: Ownership within the conservation area is 55% BC Ministry of Water, Land and Air Protection (provincial park), 44% BC provincial crown land, and 1% privately held.

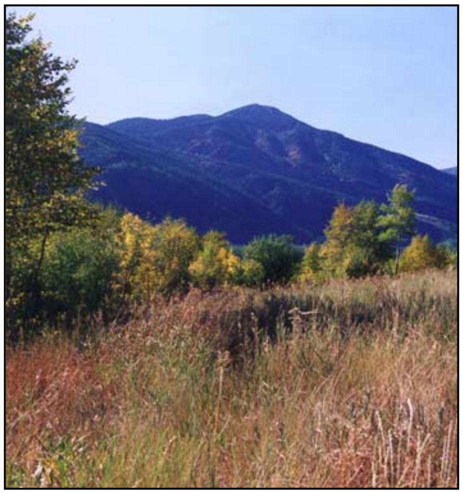
Threats and Management Issues: Current use in the area includes commercial heli-skiing and guiding, along with trapping. The Ktunaxa/Kinbasket and Shuswap First Nations have included the area within their asserted traditional territory and as such have a vested interest in use and development. New threats to this area include a proposed glacier skiing operation and increased interest in mining.

Opportunities: Actions to limit new tenure on crown land. Actions to limit new commercial recreational developments.

Stakeholders: Ktunaxa-Kinbasket Tribal Council, Nature Conservancy of Canada, BC Ministry of Water, Land and Air Protection, BC Ministry of Sustainable Resource Management, BC Ministry of Forests, Regional District of East Kootenay, East Kootenay

Environmental Society, East Kootenay Conservation Program, Invermere and Golden Rod and Gun Club, Columbia Basin Trust, Columbia Basin Fish and Wildlife Compensation Program.





Elk River Valley – Dave Hillary

Elk River Valley.

Size: 867,194 acres/351,214 hectares.
Irreplaceability Score (Mean)**: 4.7**
Vulnerability Score (Mean)**: 1.2**
Combined Score: 5.9

Conservation Area Description: This conservation area is located in the south-eastern corner of British Columbia and extends from Elk Lakes Provincial Park (north of Elkford) south-westerly to the Rocky Mountain Trench near Elko. The conservation area includes low elevation deciduous riparian areas along the Elk River to mountains in excess of 2286m (7500 feet). Included in the area is the Nature Conservancy of Canada's Mt. Broadwood Heritage Conservation Area - a 8903 ha (22,000 acre) parcel donated by Shell Canada Ltd. in 1992. The Elk River runs from north to south through the area and contains significant populations of bull trout and west slope cutthroat trout. Streams in the area include the Bull River, White River, Morrisey Creek and Lizard Creek. The area supports populations of grizzly bear, Rocky Mountain bighorn sheep and also includes some of the highest value deer, elk and sheep winter range in the Province.

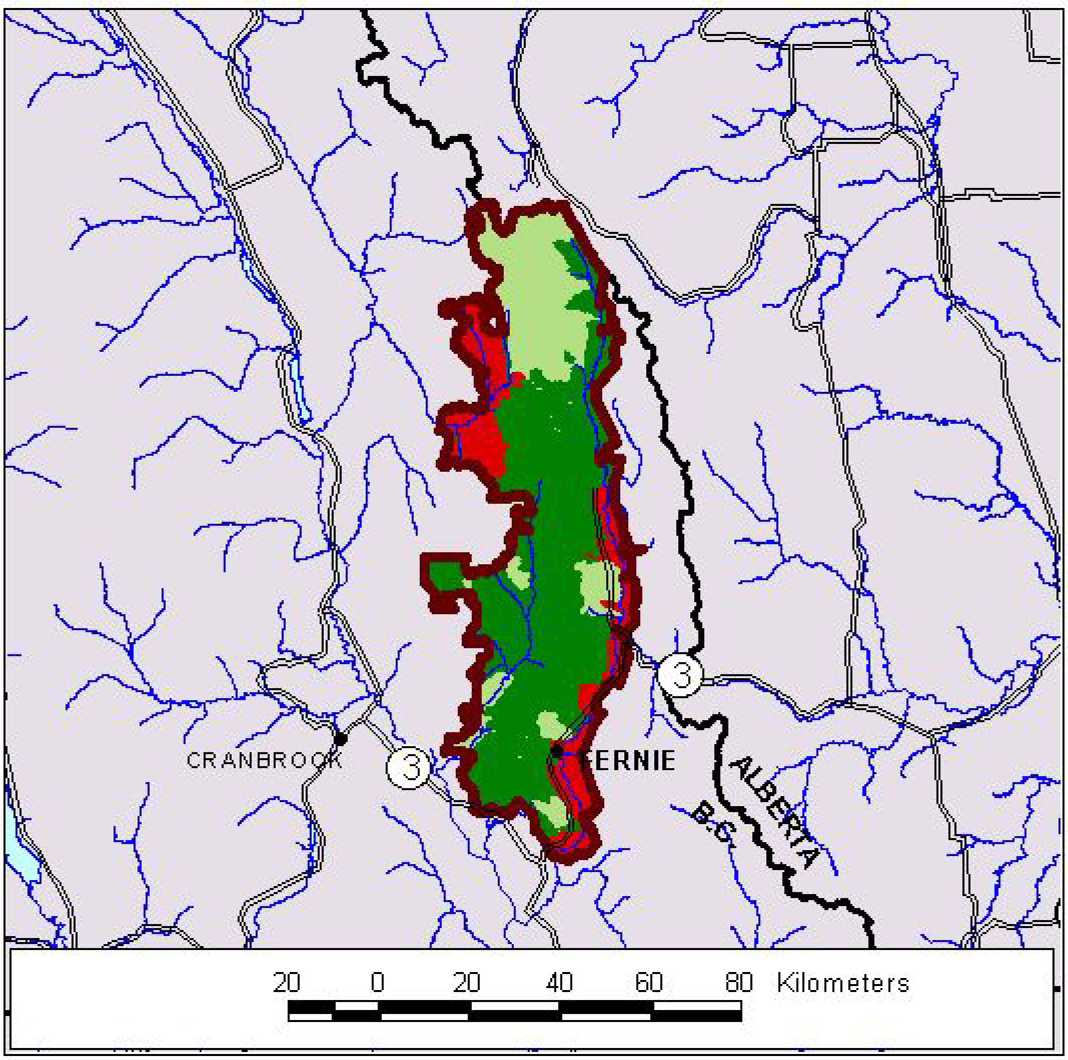
Principal Targets: Aquatic Targets within the conservation area include white sturgeon (*Acipenser transmontanus*), westslope cutthroat trout (*Onchorhynchus clarki lewisi*), bull trout (*Salvelinus confluentus*), and tailed frog (*Ascaphus truei*). Terrestrial targets include badger (*Taxidea taxus*), habitat and connectivity values for fisher (*Martes pennanti*), grizzly bear (*Ursus arctos horribilis*), wolverine (*Gulo gulo luscus*) and gray wolf (*Canis lupus*); plant species include barren ground fleabane (*Erigeron trifidus*) and woolly fleabane (*Erigeron lanatus*). Community targets include subalpine wet meadow, grasslands, subalpine riparian, montane riparian, montane spruce, interior Douglas-fir forests, interior western redcedar – hemlock forests and interior subalpine forests.

Ownership: The majority of the Elk River Valley Conservation Area is managed by the Province of British Columbia with provincial Crown Land constituting 78% of the landscape, private land accounting for 12% and provincial Protected Areas contributing 10%.

Threats and Management Issues: The valley bottoms in the area are increasingly being developed for commercial recreation and residential (second home) development. This development, when combined with linear corridors has fragmented a significant amount of the remaining natural landscape. Opportunities still exist to maintain these connectors. Industrial logging and mining (mainly coal) have traditionally been viewed as the major influences on the conservation area; these influences have now been superseded by recreation/residential development.

Opportunities: Maintenance and/or enhancement of north-south connectivity for wide ranging carnivores is critically important in this area. There are a number of significant low-elevation private holding that need to be secured. Expansion and increased management on Mt. Broadwood is also necessary to maintain ecological integrity. Partner with other organizations to maintain aquatic integrity of the Elk River.

Stakeholders: Ktunaxa-Kinbasket Tribal Council, Nature Conservancy of Canada, BC Ministry of Water, Land and Air Protection, BC Ministry of Sustainable Resource Management, BC Ministry of Forests, City's of Fernie, Sparwood and Elkford, Tembec Industries Inc., Galloway Lumber, Fording Coal, Regional District of East Kootenay, East Kootenay Environmental Society, East Kootenay Conservation Program, Fernie and Elkford Rod and Gun clubs, Columbia Basin Trust, Columbia Basin Fish and Wildlife Compensation Program.



Flathead Lake – Marilyn Wood

Flathead Lake and Wetlands.

Size: 246,374 acres/99,781 hectares.
Irreplaceability Score (Mean)**: 4.3**
Vulnerability Score (Mean)**: 3.3**
Combined Score: 7.6

Conservation Area Description: The Flathead Valley is an intermontane basin formed of alluvium, glacial outwash, and lacustrine sediments. Elevations range from 701 to 1006 m (2,300 to 3,300 ft). Mean annual precipitation ranges from 36 to 64 cm (14 to 25 inches), about 50% falling as snow. Flathead Lake was formed when a large terminal moraine blocked the Flathead River Drainage, forming one of the largest glacial lakes in the western United States. Potential natural vegetation of the conservation area is foothills prairie and western ponderosa pine at the southern end of the Flathead Valley, becoming more mesic coniferous forest on the north end. Interspersed throughout the area is a diverse array of wetlands. Slow gradient, meandering streams, oxbows, major river systems and low lying spots are locations where many wetland community types can be found. The most rare of these are fens, a type of peat land where numerous rare plants occur. Key conservation concerns are native trout habitat, very diverse wetland components, and the relatively intact, low elevation riparian habitat associated with the 3 main tributaries. Primary natural disturbances are fire and flooding. Land uses include agriculture and residential development.

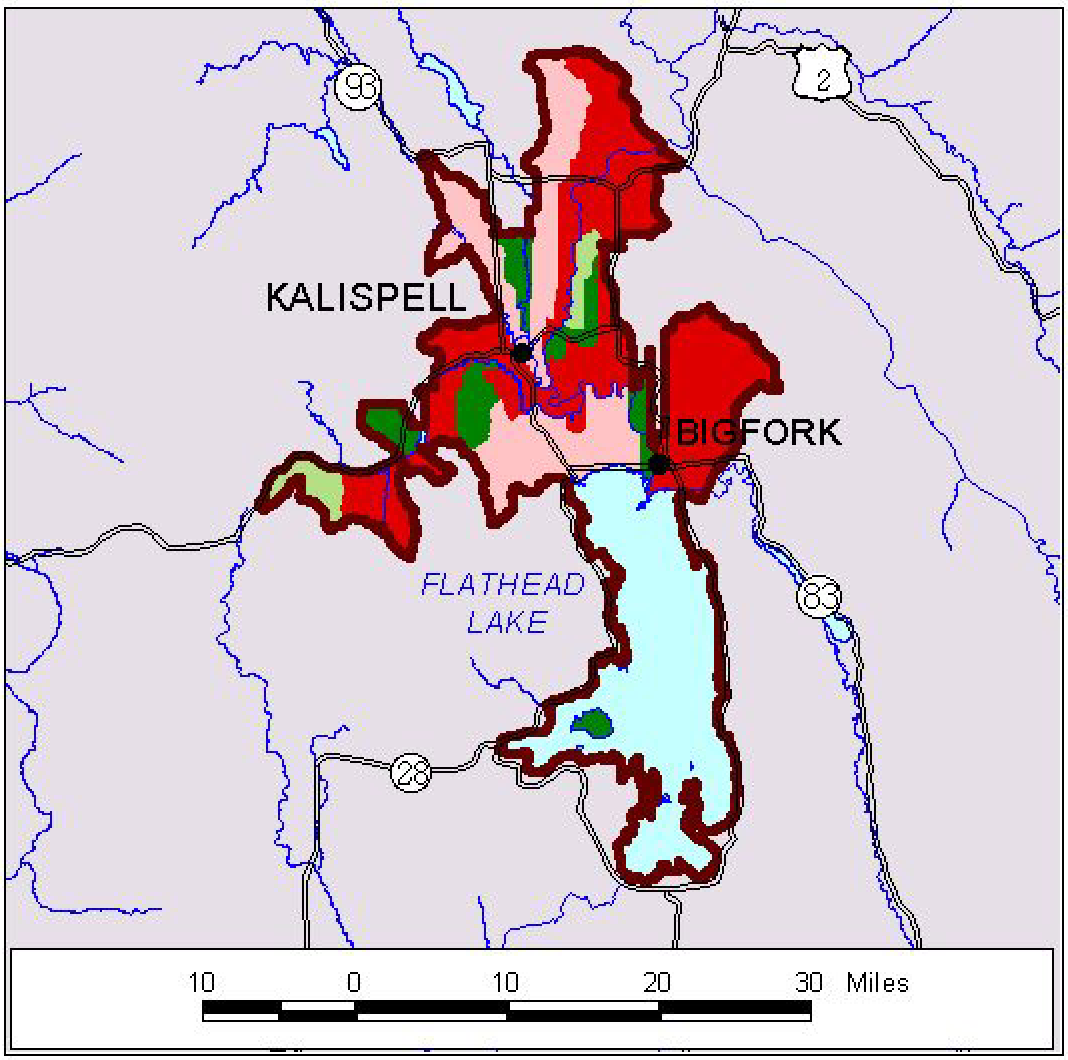
Principal Targets: Terrestrial targets include bald eagle (*Haliaeetus leucocephalus*), western toad (*Bufo boreas*), northern leopard frog (*Rana pipiens*). Aquatic targets include short head sculpin (*Cottus confusus*), longmouth pondsnail (*Stagnicola elrodiana*), bull trout (*Salvelinus confluentus*), westslope cutthroat trout (*Onchorhynchus clarki lewisi*), Numerous rare plants including Spalding's catchfly (*Silene spaldingii*), small winged sedge (*Carex stenoptila*), dwarf water lily (*Nymphaea leibergii*), and moonworts; and many natural communities such as fen, montane riparian forest, marsh, conifer swamp also occur in the conservation area.

Ownership: Ownership within the conservation area is Federal 13%; State (MT) 2%; Private 53%; Water 30%.

Threats and Management Issues: Land use is predominantly agriculture, rural/suburban development, and some timber harvest. Flathead Valley is one of the fastest growing counties in Montana. Extensive research indicates decline in water quality since 1977. Nutrients, siltation, flow alteration, invasive exotic aquatic plants threaten water and wetland ecosystems here. Introductions of non-native aquatic animals species have impacted the native trout populations.

Opportunities: Many agencies and NGO's are working to protect water quality and open space values in the Flathead Valley; evaluate potential for public funding of conservation projects; provide data/conservation values to land use-planning efforts; collaborate with the Flathead Lakers Critical Lands Project.

Stakeholders: Flathead National Forest, Plum Creek Timber Company, Confederated Salish and Kootenai Tribes, US Environmental Protection Agency, Montana Department Fish, Wildlife and Parks, University of Montana Biological Station, US Bureau of Reclamation, US Fish and Wildlife Refuge, the Flathead Basin Commission, Flathead Lakers, Flathead Land Trust, Montana Land Reliance.



Mt. Robson – Dave Hillary

Fraser River Headwaters.

Size: 83,125 acres/33,666 hectares.
Irreplaceability Score (Mean)**: 5.3**
Vulnerability Score (Mean)**: 1.6**
Combined Score: 6.9

Conservation Area Description: This conservation area is located at the north end of the Rocky Mountain Trench between the Rocky Mountains and the Cariboo Mountains, and is the headwaters for the mighty Fraser River. Located along the continental divide this conservation area is the birthplace of one of British Columbia's most important salmon bearing rivers - the Fraser. From its source in Mt. Robson Provincial Park, the Fraser flows north on its way to Prince George, where it heads south to the Pacific Ocean – a total distance of 1,500 kilometres (932 mi). Many other rivers originate in, or adjacent to the conservation area. These include the North Thompson, Canoe, Kakwa and a major fork of the Columbia.

The area supports a wide array of vegetation types and is also key habitat for wide ranging mammals including the grizzly bear, wolverine, and mountain caribou.

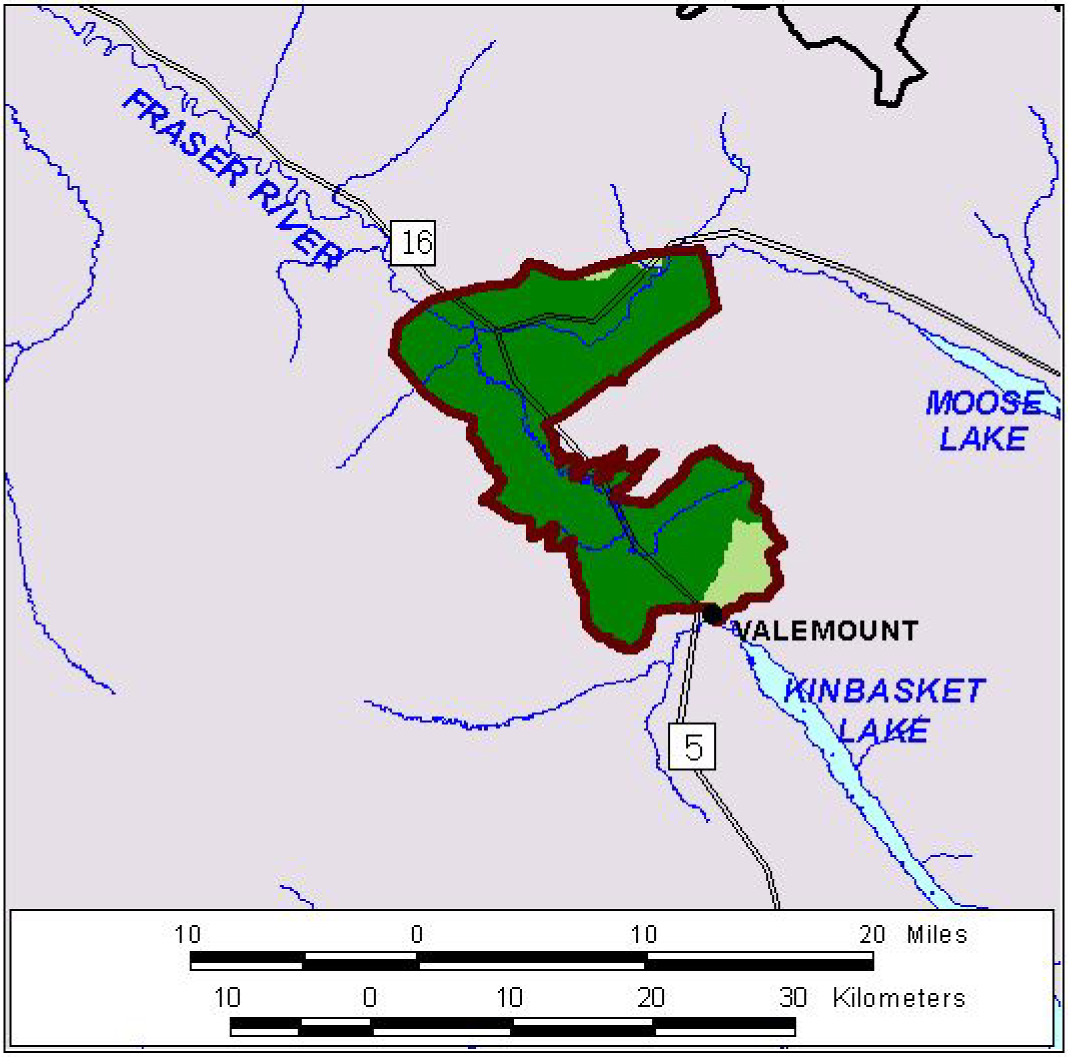
Principle Targets: Terrestrial targets include habitat for grizzly bear (*Ursus arctos horribilis*) and to a lesser extent the entire suite of wide ranging carnivores. Aquatic targets include Chinook salmon (*Onchorhynchus tshawytscha*), and bull trout (*Salvelinus confluentus*). Seven significant aquatic systems also occur in the conservation area along with Lodgepole Pine Forest and Woodlands.

Ownership: Ownership within the conservation area is 70% BC provincial crown land, 28% privately owned, 1% BC provincial park and 1%ENGO.

Threats and Management Issues: Connectivity between Kakwa and Bowron Lake Provincial Parks. Logging in the Goat River watershed.

Opportunities: Enhance logging practices.

Stakeholders: Fraser Headwaters Alliance, BC Ministry of Water, Land and Air Protection, BC Ministry of Sustainable Resource Management, McBride Forest Industries, CN Rail, Lheidli, Lhatako, North Thompson First Nations.


FRASER RIVER
16
MOOSE LAKE
VALEMOUNT
KINBASKET LAKE
5
10 0 10 20 Miles
10 0 10 20 30 Kilometers

Granby.

Size: 525,641 acres/212,885 hectares.
Irreplaceability Score (Mean)**: 4.6**
Vulnerability Score (Mean)**: 1.2**
Combined Score: 5.8

Granby River – Granby Wilderness Society

Conservation Area Description: Found at the extreme eastern edge of the ecoregion, this conservation area is located north of Grand Forks, BC and south of the Shuswap area. It lies within the Selkirk Foothills ecosection in the southern Monashee Mountains This area includes the headwaters of the Granby River; a tributary to the Columbia River system along with Traverse, Burrell, Goatskin, Arthur and Galloping Creek. The area is bisected by Highway #6, which runs from Cherryville to Needles and currently has limited use. The area contains the 40,845 ha (100,930 acres) Granby Provincial Park, a pristine park that encompasses the headwaters of the Granby River; one of the few large, undisturbed watersheds in the Okanagan-Boundary area. Lower elevation areas contain old-growth stands of cedar and hemlock forests, while extensive rolling alpine and sub alpine grassland meadows occur at higher elevations. The site supports populations of grizzly bears, mountain goats and speckled dace as well as the nettle-leafed giant-hyssop (red-listed in BC).

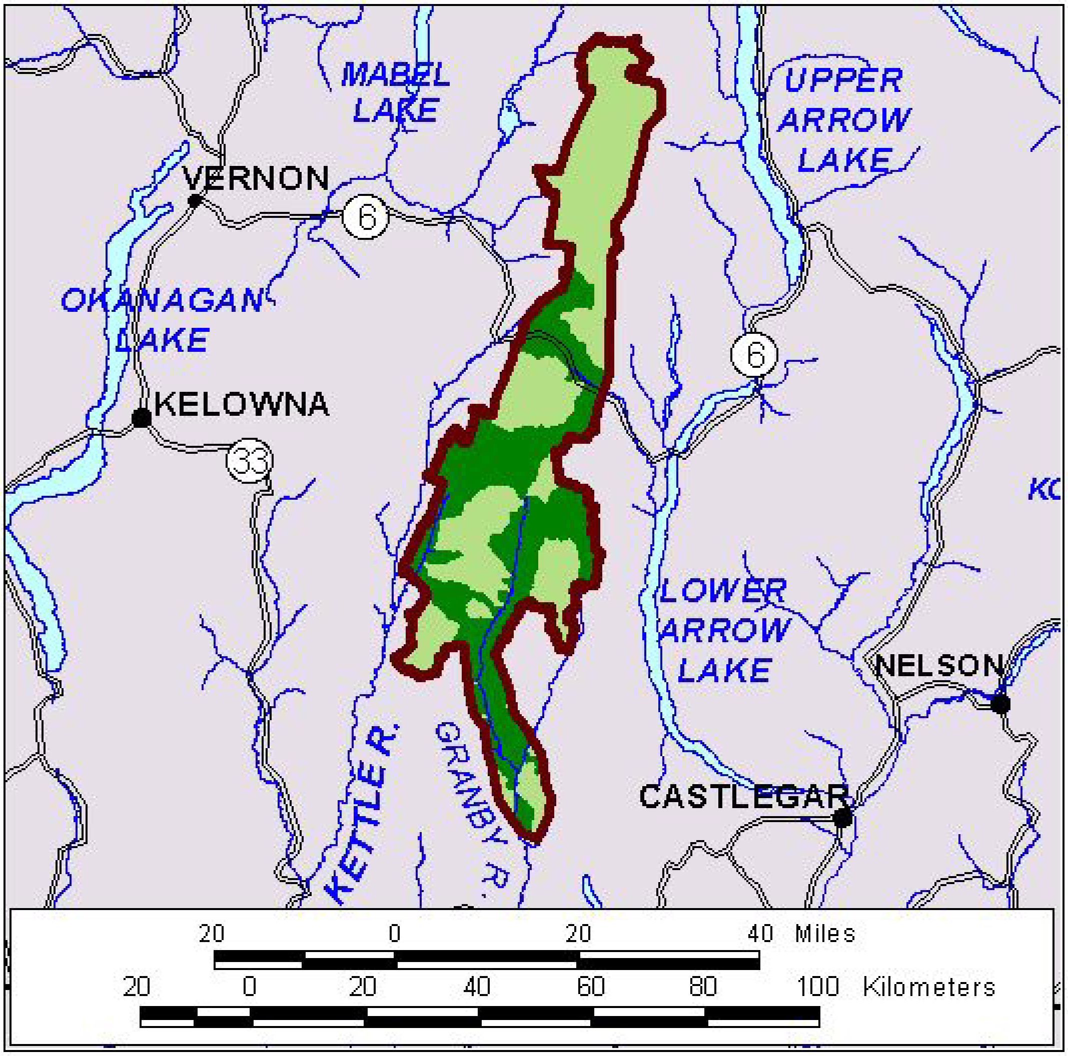
Principal Targets: Terrestrial targets include western moonwort (*Botrychium hesperium*), grizzly bear (*Ursus arctos horribilis*), and important connectivity corridors. Aquatic targets include bull trout (*Salvelinus confluentus*), westslope cutthroat trout (*Onchorhynchus clarki lewisi*), and speckled dace (*Rhinichthys osculus*). Fifteen important aquatic systems are also found in the conservation area.

Ownership: Ownership within the conservation area is 68% BC provincial Crown land, 19% BC provincial park (administered by the Ministry of Water, Land and Air Protection), 12% BC provincial crown land held under tree farm license and 1% privately held.

Threats and Management Issues: Current use in the area includes industrial logging (Pope & Talbot), commercial guiding, trap lines and mineral tenures. The Sinixt Nation also uses the area. Future threats include continued logging of old growth forests and increased crown tenure relative to tourism.

Opportunities: Limit tenure on crown land. Minimize logging in old growth and riparian areas.

Stakeholders: Sinixt First Nation, Pope and Talbot, BC Ministry of Water, Land and Air Protection, BC Ministry of Sustainable Resource Management, Columbia Basin Trust, Columbia Basin Fish and Wildlife Conservation Program, Granby Wilderness Society.



Jocko River.

Size: 156,724 acres/63,473 hectares.
Irreplaceability Score (Mean)**: 4.9**
Vulnerability Score (Mean)**: 1.6**
Combined Score: 6.5

Conservation Area Description: The Jocko River conservation area is located north of Missoula near Arlee, Montana and lies entirely within the Flathead Indian Reservation. The watershed includes three forks of the Jocko River as well as two large tributaries – Finley Creek and Valley Creek. Jocko Spring Creek is a large tributary that is entirely supported by ground water discharge. The South Fork of the Jocko lies within the Jocko Primitive Area and the headwaters for the North Fork issue from the Mission Mountains Wilderness area. The Jocko watershed is predominantly a forested watershed. Forested tributaries range from steep cascades to moderately sinuous, step-pool streams. On the valley floor, the Jocko River is a moderately sinuous gravel-bedded river. In places, the river passes between high terraces or canyon walls and the meanders of the river are constrained. There are large sections of the river with significant upwellings of groundwater. They produce diverse floodplain habitats and the largest patches of wetlands in the Jocko Watershed. The Jocko River and its tributaries have the most significant native trout populations on the Flathead Indian Reservations. Irrigation canals and diversions function as fish barriers keeping the tributaries free of rainbow trout. Thus the area remains a strong hold for pure-strain westslope cutthroat trout. Bull trout have been documented in the watershed as well. The Jocko River is designated a bull trout recovery area. The Jocko watershed and its location near Evaro Pass provide a critical linkage area between the Bob Marshall complex and the Selway/ Bitterroot road less areas for wide-ranging species.

Principle Targets: Terrestrial targets include bald eagle (*Haliaeetus leucocephalus*) nest site, Flammulated owl (*Otus flammeolus*), Townsend's bat (*Corynorhinus townsendii*), west slope cutthroat trout (*Oncorhynchus clarki lewisi*), bull trout (*Salvelinus confluentus*), western toad (*Bufo boreas*); Plant targets include linear leaf moonwort (*Botrychium lineare*), clustered lady's slipper (*Cypripedium fasciculatum*). Alpine mountainsnail (*Oreohelix alpina*) also occur in the conservation area.

Ownership: Ownership in the conservation area is Federal (U.S. FWS) 6.5%, (Tribal) 61%, State 3.4%, and Private 29%.

Threats and Management Issues: Since the1990's population growth has been high along the U.S. Highway 93 corridor, and in many of the rural areas of the watershed. Non-native fish species are found in much of the watershed. Habitat restoration of riparian areas is an issue, as well as screening diversion structures to limit non-native fish species. The Salish and Kootenai Tribe have instituted a number of actions to restore bull trout populations.

Opportunities: Watershed, especially riparian restoration projects; more information on status of rare plants and natural communities needed; collaborative projects with the Tribes; Native American Land Trust potential.

Stakeholders: Confederated Salish and Kootenai Tribes, US Fish and Wildlife Service, Montana Department of Transportation, Montana Department of Fish, Wildlife and Parks, Lolo National Forest, community of Arlee.

Kakwa – Willmore.

Size: 1,827,627 acres/740,189 hectares.
Irreplaceability Score (Mean)**: 4.2**
Vulnerability Score (Mean)**: 0.9**
Combined Score: 5.1

Conservation Area Description: Situated in the Canadian Rocky Mountains, just north of Jasper National Park, this conservation area includes representative samples of montane, subalpine and alpine ecosystems.

Kakwa – Dave Hillary

Running along the continental divide, this rugged region is still relatively inaccessible and contains the 476,558 ha (1,177,601 acres) Willmore Wilderness Park. The climate can be described as continental with temperatures ranging from 35 C (95 F) in the summer to -40 C (–40 F) in the winter. Average annual precipitation is 61 cm (24 inches).

The montane region occupies the river valley floor and provides excellent winter range for elk, deer and Rocky Mountain bighorn sheep. The subalpine region runs from the montane to the alpine and supports wildlife such as mountain caribou, wolf, grizzly bear, lynx and cougar. The alpine region (above tree line) supports populations of goats, ptarmigan, and pika.

Industry in the conservation area includes timber harvesting, oil and gas exploration and increasingly tourism. Human population is minimal as are roads.

Principal Targets: Terrestrial targets include habitat for grizzly bear (*Ursus arctos horribilis*), wolf (*Canis lupus*), and lynx (*Lynx canadensis*); barren ground fleabane (*Erigeron trifidus*), Porsild's whitlow-grass (*Draba porsildii*), bog adder's-mouth (*Malaxis paludosa*), brown moss (*Drepanocladus crassicostatus*), moss (*Seligeria subimmersa*) and harlequin duck (*Histrionicus histrionicus*). Aquatic targets include Chinook salmon (*Onchorhynchus tshawytscha*) and several important aquatic systems.

Ownership: Ownership within the conservation area is 60%Alberta provincial park, 29% Alberta provincial crown land, 5% BC provincial park, 5% BC provincial crown land, and less than 1% held by Parks Canada and other private interests.

Threats and Management Issues: Oil and gas exploration and forestry. Road density issues.

Opportunities: Work with oil and gas companies and logging companies to limit public access to area.

Stakeholders: BC Ministry of Water, Land and Air Protection, BC Ministry of Forests, BC Ministry of Sustainable Resource Management, Alberta Ministry of Environment, Alberta Ministry of Community Development, Alberta Ministry of Sustainable Resource Development, Alberta Wilderness Association, Alberta Fish and Game Association, Oil and Gas exploration companies, logging companies, Parks Canada.

Kootenai River – Marilyn Wood

Kootenai River.

Size: 74,741 acres/30,270 hectares.
Irreplaceability Score (Mean)**: 5.2**
Vulnerability Score (Mean)**: 4.2**
Combined Score: 9.4

Conservation Area Description: The Kootenai (Kootenay) watershed is an international watershed and is the second largest tributary to the Columbia River. The conservation area includes that segment of the Kootenai River below Libby Dam in Montana to the Idaho border. Libby Dam is located 27 km (17 miles) upstream from the town of Libby and creates the 145 km (90mile) long Lake Kookanusa. From Libby Dam, the river turns west and flows through a gap between the Cabinet Mountains to the south and Purcell Mountains to the north. The river valley is relatively narrow and confined until it reaches the Idaho border where broad bench landform exits. At this point the river exits Montana at the lowest elevation (568m/1862 ft) found within the state. Climate is described as “modified” pacific maritime influenced. Artic air masses contribute to the broad temperature variations. This segment of the river is considered the canyon portion and has a limited floodplain due to the closeness of the mountains. Substrate consists of large cobble and gravel. The uplands are heavily forested with Douglas-fir and western spruce-fir. The Kootenai river population of white sturgeon was listed as endangered in 1994, and has been isolated since the last glacial age, 10,000 years ago. The burbot population found in the Idaho segment has been petitioned for listing. Landownership includes public lands in the uplands and mixed private ownership along portions of the valley floor. Corporate timberlands are included in the private ownership. Primary land use includes intensive timber harvest, two towns, and rural subdivision.

Principle Targets: Terrestrial targets include common loon (*Gavia immer*), bald eagle (*Haliaeetus leucocephalus*) nest site, Flammulated owl (Otus *flammeolus*), Coeur d’Alene Salamander (*Plethodon idahoensis*), habitat for grizzly bear (*Ursus arctos horribilis*), and lynx (*Lynx canadensis*). Aquatic targets include westslope cutthroat trout (*Onchorhynchus clarki lewisi*), and white sturgeon (*Acipenser transmontanus*). Natural communities include Interior Douglas-fir forest and interior western cedar/hemlock forests

Ownership: Ownership within the conservation area is Federal (USDA, USDOD) 58%, State (Mt) 2%, Private 33%.

Threats and Management Issues: The operation of Libby Dam for hydropower operations has drastically altered the hydrograph, thermograph, and the downstream nutrient loading rates in the Kootenai River. Associated impacts include reduced bank stability, loss of riparian habitat and species composition. Decline of white sturgeon productivity has been attributed to altered flow regimes. Conflicting resource needs for native fish species and downstream salmon flow requirements are caught up in multi-jurisdiction regulations.

Opportunities: Sub-basin planning efforts by NWPPC; Kootenai National Forest Plan revisions.

Stakeholders: Kootenai National Forest, US Fish and Wildlife Service, US Bureau of Reclamation (Libby Dam), Bonneville Power Administration, Northwest Power Planning Council, Montana Department Fish, Wildlife and Parks, communities of Troy and Libby, Trout Unlimited, Kootenai Tribe, Plum Creek Timber Company.

KJ Hackworthy

Kootenay River A (Libby Dam to Kootenay Lake).

Size: 357,229 acres/144,569 hectares
Irreplaceability Score (Mean)**: 5.2**
Vulnerability Score (Mean)**: 2.0**
Combined Score: 7.2

Conservation Area Description: This conservation area is part of the greater Kootenai River Sub-basin, which is an international watershed, including parts of British Columbia, Montana and Idaho. The headwaters of the Kootenai River originate in Kootenay National Park, B.C. From there, the river flows south within the Rocky Mountain Trench into the reservoir created by Libby Dam, located near Libby, Montana, then west to Idaho, and then loops north within the Purcell Trench to Kootenay Lake, B.C. The Kootenai River is the second largest Columbia River tributary in terms of runoff volume. It is the third largest in terms of watershed area, encompassing 45,584 km^2 or 1,13 million acres (Knudson 1994).

Synder and Minshall (l996) identified three different geomorphic reaches, *canyon*, *braided* and *meander*, of the Kootenai River. The canyon reach extends from Libby Dam to the Moyie River (92 km/57 miles) flowing through canyon in places, and otherwise has a limited flood plain due to the closeness of the mountains. The substrate consists of large cobble and gravel. The braided reach extends from the Moyie River to the town of Bonners Ferry (7.5 km/5 miles). This reach is extensively braided with depths typically less than 9 m, and substrate consisting of gravels. The meander reach extends from just below the town of Bonners Ferry to the confluence of the Kootenay Lake (82.5 km/51 miles) where the average gradient slows to 0.02 m/km (0.07 ft/mile), deepens. The meandering section through the Kootenai Valley is characterized water depths of up to 12 meters (39 ft) deep in runs and up to 30 meters (98 ft) in pools.

The meander reach of the Kootenai River has a fairly low channel gradient. Flooding and the river reworking its floodplain formed an extensive network of marshes, tributary side channels, and sloughs. In the last century 95% of seasonal, semi-permanent, and riparian wetlands through the meander reach have been lost. During the 1920's, the Kootenai River was tamed through the construction of 129 km (80 miles) of levees and the Libby Dam in Montana in 1975 to provide flood control and power generation. Hydrologic alteration in the project area through construction of the Libby Dam and river levees, stream channelization, and the establishment of 16 agricultural drainage districts has eliminated seasonal flooding, lowered groundwater levels, and furthered the degradation of wetland habitats.

Once the river bottomlands were protected from flooding, the cottonwood forests were removed and the wetlands were drained or levelled and planted with crops. Approximately 12,545 ha (31,000 acres) of wildlife habitat were converted in the US portion of the meander reach, including 6880 ha (17,000) acres of wetlands.

Principal targets: Habitat for the suite wide-ranging carnivores- gray wolf (*Canis lupus*), grizzly bear (*Ursus arctos horribilis*), fisher (*Martes pennanti*), wolverine (*Gulo gulo luscus*), and lynx (*Lynx canadensis*). Mammal- Townsend big-eared bat (*Corynorhinus townsendii*), northern pocket gopher (*Thomomys talpoides segregatus*). Avian- bald eagle (*Histrionicus histrionicus*), Flammulated owl (*Otus flammeolus*), short-eared owl (*Asio flammeus*). Fish- white sturgeon (*Acipenser transmontanus*), westslope cutthroat trout (*Onchorhynchus clarki lewisi*), bull trout (*Salvelinus confluentus*), Umatilla dace (*Rhinichthys umatilla*), burbot (*Lota lota*). Amphibian- Coeur d'Alene salamander (*Plethodon idahoensis)*, northern leopard frog (*Rana pipiens)*. Vascular plants- *Carex comosa, Botrychium paradoxum, Botrychium montanum, Botrychium ascendens*. Expert nominated- fen, montane riparian forests, marsh, sphagnum bog, montane wet meadows, interior western cedar/hemlock/Douglas fir forests. 11 Aquatic systems.

Ownership: 1% Federal CA (First Nations Reserve), 29% Federal US (United States Forest Service, Bureau of Land Management, US Fish and Wildlife Service), 2% State (Idaho Department of Fish and Game, Idaho Department of Lands), 21% Provincial (BC Ministry of Water, Land and Air Protection, Crown Land), 46% Private (NGO's etc.), 1% Water

Threats and Management Issues: The operation of Libby Dam for hydropower operations has drastically altered the hydrograph, thermograph, and the downstream nutrient loading rates in the Kootenai River. Hydropower-related discharge has resulted in a wider varial zone and rapid fluctuations in dam discharges have increased bank instability. Moreover, hydropower facilities have reversed discharge patterns and altered seasonal and daily flow patterns, reducing riparian diversity and cottonwood recruitment and increasing sedimentation from dike sloughing. River diking, bank stabilization and tributary channelization have eliminated side channel sloughs habitat, reduced the natural source of river nutrient inputs, and eliminated virtually all low velocity, backwater and side-channel habitat, and converted a large segment of the river from a lotic to lentic environment. Subdivision of bottomlands has resulted in 90% of private landowners being located along low-elevation riverine systems. Agricultural practices have resulted in the draining and conversion of wetlands, loss of riparian habitat, loss of aspen and cottonwood galleries, and introduction of herbicide and pesticide contaminants into the watershed. Historic forestry practices have cleared large areas of interior western cedar forest in the floodplain. Fire suppression over the past 50 years has permitted remaining deciduous stands to be crowded out by competing conifers and put aspen stands at high risk of being lost from the landscape. Introduction of non-native plant species has resulted in the invasion of noxious weeds, habitat degradation, the reduction and/or loss of native plant species and plant communities, and the reduction of plant diversity and richness. Introductions of non-native fish species have set up negative inter-species competition with native fish. Brown trout, brook trout, Kamloops and coastal rainbow, northern pike, largemouth bass, small mouth bass, bluegill, and yellow perch have been introduced into the sub-basin.

Stakeholders: BC Ministry of Water, Land and Air Protection, IDFG, USFWS, BLM, IDL, Private Timber Companies (Forest Capital, Louisiana Pacific), NGO's (Nature Conservancy Canada, The Nature Conservancy, Ducks Unlimited, Vital Ground, Idaho Conservation League, Lands Council, The Owens Foundation for Wildlife), County and Municipal Government, Bonneville Power Administration, Kootenai Tribe of Idaho, First Nations Reserve.

Opportunities: 1) watershed-based habitat enhancement and fish recovery actions to mitigate the losses caused by hydropower operations in the Kootenai Sub basin, i.e. a-Work with ACOE on Libby Dam flows to meet the needs of burbot, sturgeon, salmon and bull trout, b- protect, enhance and restore critical stream and upland habitat lost or affected by the construction and operation of the Federal power system, 2) reconnection of artificially fragmented habitats and re-establishment of valley floodplain, 3) Large scale wetland restoration, 4) Land acquisition and conservation easements of critical bottomlands, 5) water quality enhancement (develop TMDL's, reduce sedimentation, etc), 6) cottonwood gallery protection and restoration, 7) compatible economic development (alternative sources of income- "eco-dollars"), 8) Sub-basin Planning (Kootenai Tribe of Idaho is the lead) and BPA projects, 9) Selkirk Cooperative Weed Management Agreement- utilize this resource to develop early detection and invasion control programs, 10) build public involvement and interagency/NGO cooperation for ecosystem-wide habitat restoration.

Northern Leopard Frog – CVWMA

Kootenay River B.

Size: 816,676 acres/330,754 hectares.
Irreplaceability Score (Mean)**: 5.0**
Vulnerability Score (Mean)**: 1.7**
Combined Score: 6.7

Conservation Area Description: This conservation area is part of the greater Kootenai River Sub-basin, which is part of an international watershed, including parts of British Columbia, Idaho and Montana. The southern extent of the conservation area is located just north of the international boundary near Creston, British Columbia and continues north to the northern most tip of Kootenay Lake. The conservation area falls within the West Kootenay region of British Columbia and south, north and west arms of Kootenay Lake. The area is bordered on the east by the Purcell Mountains and on the west by the Selkirk Mountains. The area is highly representative of the Southern Columbia Mountains (SCM) Ecosection owing to inclusion of several drainages, lakeshore to mountain top elevation range and diversity of vegetation and wildlife. The area supports Selkirk Wet Cold Engelmann Spruce-Subalpine Fir subzone, Alpine Tundra, Columbia-Shuswap Moist Warm Interior Cedar-Hemlock subzone, and provincially significant Dry Warm Interior Cedar-Hemlock subzone. Old-growth stands of Engelmann Spruce/Subalpine Fir can be found in various locations.

Conservation values are very high in this conservation area and it is internationally significant for old-growth habitats, grizzly bear, wolverine, mountain caribou and westslope cutthroat trout. Mineral exploration, timber harvesting, residential use (along the lake) and increasingly commercial recreation activities all have impacts on the ecological significance of the area. Two large provincial parks can be found within the conservation area: Kokanee Glacier provincial Park and West Arm Provincial Park.

Principal Targets: Terrestrial targets include rare plants - Ussurian water-milfoil (*Myriophyllum ussuriense*), (*Barbula eustegia*), (*Tetrodontium repandum*); an amphibian - Coeur d'Alene salamander (*Plethodon idahoensis*); rare plant communities - Interior Douglas-fir Forest, Ponderosa Pine Woodland and Marsh. Aquatic targets include white sturgeon (*Acipenser transmontanus*), bull trout (*Salvelinus confluentus*), westslope cutthroat trout (*Onchorhynchus clarki lewisi*), Umatilla dace (*Rhinichthys umatilla*) and 9 significant aquatic systems.

Ownership: Ownership within the conservation area is 68% BC provincial crown land, 17% BC provincial park (administered by the Ministry of Water, Land and Air Protection), 15% privately held.

Threats and Management Issues: Of paramount importance in this conservation area is its contribution to both mountain caribou and grizzly bear habitat. Inappropriate forestry practices and increased tourism pressure are the most significant threats to the area.

Opportunities: Private forestry companies hold significant large blocks of land. Acquisition and/or the purchase of conservation covenants on these lands provide the best opportunity to maintain ecological integrity. Support on-going recovery efforts relative to mountain caribou. Enhance public education and strengthen legislation as it relates to foreshore development along Kootenay Lake.

Stakeholders: Ktunaxa-Kinbasket tribal council, Columbia Basin Trust, Mountain caribou Recovery Team, Darkwoods Forestry, BC Ministry of Water, Land and Air Protection, BC Ministry of Sustainable Resource Management, Columbia Basin Fish and Wildlife Compensation Program, BC Hydro, Wynndel Lumber, City of Nelson.

Lardeau River – BC Parks

Kootenay River C.

Size: 402,284 acres/162,925 hectares.
Irreplaceability Score (Mean)**: 4.9**
Vulnerability Score (Mean)**: 1.0**
Combined Score: 5.9

Conservation Area Description: This conservation area is located in the West Kootenay region of south-eastern British Columbia. The area runs generally north-south from the north end of Kootenay Lake to the headwaters of the Duncan River and is located within the Selkirk Mountains. Duncan, Lardeau and Howser Rivers are tributaries to the Kootenay River and are all located within the conservation area. This conservation area is quite remote, with a very small human population. Traditional logging and mining are the major economic drivers in the area.

Principal Targets: Terrestrial targets include riparian forests, marsh and habitat for the entire suite of wide-ranging carnivore species. Aquatic targets include white sturgeon (*Acipenser transmontanus*), bull trout (*Salvelinus confluentus*), westslope cutthroat trout (*Onchorhynchus clarki lewisi*), burbot (*Lota* lota) and Umatilla dace (*Rhinichthys umatilla*). 7 important aquatic systems are also found in the conservation area.

Ownership: Ownership within the conservation area is 91% BC provincial crown land, 4% privately held, 3% BC provincial park (administered by the Ministry of Water, Land and Air Protection), 1% BC Crown land held under tree farm license, and 1% ENGO.

Threats and Management Issues: Connectivity between the Purcell Wilderness Conservancy to the east and Goat Range Provincial Park to the west. Inappropriate logging practices that result in increased road density.

Opportunities: Unknown.

Stakeholders: BC Ministry of Forests, BC Ministry of Water, Land and Air Protection, BC Ministry of Sustainable Resource Management, Columbia Basin Trust, Columbia Basin Fish and Wildlife Compensation Program, Columbia-Kootenay Fisheries Renewal Partnership.

Lake Pend Oreille – KJ Torgerson.

Lake Pend Oreille.

Size: 145,359 acres/58,870 hectares.
Irreplaceability Score (Mean)**: 3.2**
Vulnerability Score (Mean)**: 3.1**
Combined Score: 6.3

Conservation Area Description: The Lake Pend Oreille conservation area extends through Washington, Idaho, Montana and British Columbia. Lake Pend Oreille is the largest in Idaho, with an area of 466 km^2 (180 mi^2), and deepest (353m/1,158 feet deep), there are only four deeper lakes in the nation. It is 105 km (65 miles) long, 24 km (15 miles) wide at its greatest width, and has 179 km (111 miles) of shoreline. The Clark Fork River begins along the west slopes of the Continental Divide near Butte and drains most of western Montana before entering Idaho's Pend Oreille Lake, and supplies 85% of the total water flow.

Historically, the lake was home for the Kalispell Tribe of Indians for thousands of years until displaced by white settlers and relocated to reservations in Montana and Washington in the 1880s. Around Sandpoint, logged timberlands were then sold to settlers for home sites and farms. Commercial fishing for Kokanee salmon and whitefish flourished from 1945 until 1973 when it was banned. The lake and its trophy-size trout still draw recreational fisherman.

At the tip of the lake's south arm is Bayview. In 1942, the U.S. Navy built the second-largest naval training center in the world on this site 1679 ha (4,000 acres). Over a period of 15 months, 293,381 sailors received basic training at Farragut Naval Training Station. The Navy still has a research station in Bayview where it underwater tests sonar. Most of the base has been turned over to the State of Idaho, and is now Farragut State Park. Farragut State Park is currently planning an ecosystem restoration project as part of its Natural Resource Plan.

Dams were built in 1951 at Cabinet Gorge near Heron, MT (upstream from the lake), and at Albeni Falls near Newport (downstream from the lake). In the 1950s, the Army Corps of Engineers built the Albeni Falls Dam on the Pend Oreille River, the outlet of the lake. The Noxon Rapids Dam (upstream) was added in 1960. Today, lake levels are controlled by operations of the Albeni Falls dam, with levels fluctuating from a low of 625 m (2,051 feet) above sea level to a typical high summer pool of 628 m (2,061 feet). At the current time, lake communities are advocating a change in dam operations that will permit a more stable lake level year-round, which would reduce the impacts to the spawning habitat for the lake's trout, char and Kokanee.

As a result of citizen concerns about increased aquatic weeds and algae in the Clark Fork River and Pend Oreille Lake, language was added to the 1987 Clean Water Act that directed the EPA to study the sources of pollution in the watershed. A comprehensive 3-year study led to the development of the Clark Fork- Pend Oreille Management Plan, which was finalized in early 1993 and designed to protect and restore water quality in the watershed from nutrient pollution. The Tri-State Water Quality Council is responsible for implementing numerous specific actions to achieve these objectives.

Principal Targets: Terrestrial targets include habitat for wolf (*Canis lupus*), grizzly bear (*Ursus arctos horribilis*), wolverine (*Gulo gulo luscus*), lynx (*Lynx canadensis*), and fisher (*Martes pennanti*); Townsend big-eared bat (*Corynorhinus townsendii*), common loon (*Gavia immer*); rare plants - Birstly sedge (*Carex comosa*), and upward-lobed moonwort (*Botrychium ascendens*). Aquatic targets include bull trout (*Salvelinus confluentus*) and westslope cutthroat trout (*Onchorhynchus clarki lewisi*). Also identified within the conservation area are ecosystem targets - fen, marsh, interior western red cedar/hemlock/Douglas Fir, and montane riparian shrubland.

Ownership: Ownership within the conservation area is 38% federal (USFS, BLM), 19% private, 5% state, 38% water.

Threats and Management Issues: Elevated nutrients from sources including irrigated agriculture, septic tanks, and municipal and industrial wastewater discharges. Heavy metals from active and inactive mining and smelting activities. Operations from hydropower have altered the hydrograph, thermograph, and the downstream nutrient loading rates. Surrounding forestry practices have increased the sedimentation rates. Aquatic weeds and algae are prevalent problems. Invasive species (particularly lake trout) that prey on native species have resulted in the opening of a commercial fishery season to reduce their populations. Water quality suffers from both nutrient loading from the Clark Fork River and Pend Oreille River, resulting in near shore eutrophication in some areas, and poor macrophyte management and non-point sources of pollution.

Opportunities*:* 1) Work with partners on hydropower issues. 2) Encourage partners to establish and maintain a basin wide water quality-monitoring network to assess effectiveness and trends and to better identify sources of pollutants.

Stakeholders: Conservationists, Developers and Builders, Forestry, Government, Mining, Municipalities, Recreation, Lakeshore Property Owner Association. Kalispel Tribe of Indians, Tri- State Water Quality Council, NRCS, University of Idaho College of Natural Resources, Clark Fork Coalition, Idaho State Parks and Recreation, U.S. Geological Survey, Panhandle Health District, Eastern Washington University, Bonner County Planning and Development Department, Idaho Department of Environmental Quality, Idaho Department of Fish and Game, EPA.


Little Bitterroot River – Marilyn Wood

Little Bitterroot River.

Size: 74,741 acres/30,270 hectares.
Irreplaceability Score (Mean)**: 5.1**
Vulnerability Score (Mean)**: 3.0**
Combined Score: 8.0

Conservation Area Description: The Little Bitterroot River is a moderately sinuous silt or gravel-bedded river. The watershed is located west of Kalispell and extends south until it reaches the confluence with the Flathead River near Moise. Nearly half of the watershed lies within the Flathead Indian Reservation (Salish and Kootenai Tribes). Hubbart Dam/reservoir is located in the upper section of the watershed. The riparian zone of the upper portion is characterized by diverse deciduous and coniferous forest habitats. Portions of the floodplain contain excellent wetland and wet meadow habitats. Adjacent uplands are largely used for agriculture, primarily pasture and hay production. The lower part of the drainage encompasses scattered shrub-dominated sites and is bordered by irrigated agricultural lands. Certain agricultural practices have significantly impacted the lower portion of the river. Pure-strain westslope cutthroat trout have been identified in 4 sub-basins of this watershed. Land uses include ranching and timber harvest. This is a relatively dry site with sagebrush and Ponderosa Pine component. It also is characterized by rather unique geology with deep canyons and isolated lakes. The area is important for furbearers, particularly bobcats. Dispersing wolves from the nearby Pleasant Valley conservation area are known to travel through this area.

Principle Targets: Terrestrial targets include a bald eagle (*Haliaeetus leucocephalus*) nest site, western toad (*Bufo boreas*), and a rare plant - Spalding's catchfly (*Silene spaldingii*). Aquatic targets include westslope cutthroat trout (*Onchorhynchus clarki lewisi*).

Ownership: Federal (Tribal) 41%, State (MT) 4%, and Private 53%

Threats and Management Issues: Overgrazing, riparian degradation, timber harvest, and rural residential development are the key issues in this conservation area.

Opportunities: Identification of critical lands for watershed restoration needed; potential watershed restoration collaborative group; pursue riparian restoration projects and funding through Montana Department of Environmental Quality.

Stakeholders: Flathead National Forest, Confederated Salish and Kootenai Tribes, Plum Creek Timber Company, Montana Department of Natural Resources, Montana Department of Fish, Wildlife and Parks, local communities of Hot springs and Lone Pine, Eastern Sanders County Conservation District, Montana Department of Environmental

Quality, US Natural Resource Conservation.

Coeur d'Alene Range – KJ Torgerson

Lower Coeur d'Alene.

Size: 111,540 acres/45,174 hectares.
Irreplaceability Score (Mean)**: 4.5**
Vulnerability Score (Mean)**: 3.4**
Combined Score: 7.9

Conservation Area Description: The Coeur d'Alene range is a triangular group of mountains, made up of Belt Series sedimentary rocks, stretching from Lake Pend Oreille in the north to Lake Coeur d'Alene in the south, to Kellogg, Idaho in the east. The range is bounded by the Bitterroot Mountains in the east, the St. Joe Mountains in the south and Coeur d'Alene Lake and the Purcell Trench in the west. This conservation area is located within the southern part of this range; south of Interstate 90 includes the area known as the chain of lakes. The majority of these lakes exist as wetlands and associated wetland habitat linked to the Coeur d'Alene River.

The conservation area is predominantly managed as public and private forestland, with the majority of the area owned by USFS, BLM, and BIA. Historically, mining was a major component of the area's economy. Mining activities over the last 100 years in the conservation area have significantly impacted the Chain of Lakes in terms of water quality and concentrations of lead, zinc, and cadmium in the water and soil. These problems have led to a portion of the watershed upstream from this area being designated a Superfund site. Although most mines in the area have closed, efforts to lessen the impacts of heavy metals contamination continues throughout the area. Tourism has become a major industry, with small communities attempting to draw visitors to offset the impacts of mine closure. Overcoming the perception of mining contamination continues to be an issue for the tourism industry.

Principal Targets: Terrestrial targets include habitat for gray wolf (*Canis lupus*), grizzly bear (*Ursus arctos horribilis*), fisher (*Martes pennanti*), wolverine (*Gulo gulo luscus*), and lynx (*Lynx canadensis*); bald eagle (*Haliaeetus leucocephalus*), and Coeur d'Alene salamander (*Plethodon idahoensis*). Aquatic targets include westslope cutthroat trout (*Onchorhynchus clarki lewisi)*, bull trout (*Salvelinus* confluentus), and three important aquatic systems. The conservation area also includes interior western cedar/hemlock/Douglas fir forests, montane wet meadows, subalpine wet meadow, montane riparian forest, and sub-alpine fir/mountain hemlock forest.

Ownership: Ownership within the conservation area is 24.5% federal (USFS, BIA, BLM), 56.2% private, 14.7% state, 4/6% water.

Threats and Management Issues: Mining activities over the last 100 years in the CA have significantly reduced the water quality through heavy metal contaminations resulting from increased concentrations of lead, zinc, and cadmium in the water and soil.

Changes in stream bank and shoreline stabilization are of great threat of release heavy metals into the water column that are currently stored in the soil. Forest fragmentation resulting from increased road densities, and loss of seral species (particularly white pine) has resulted from historic logging practices. Increased catastrophic pathogen invasions (particularly bark beetle), invasives (particularly knapweed and larkspur), altered fire regimes. In the Chain of Lakes area, draining and conversion of the wetlands to agriculture has occurred resulting in increased residential development and incompatible grazing practices as well.

Opportunities: 1) The Idaho Panhandle National Forest Plan is currently going under revision with a schedule completion date of April 2005. 2) The BLM Resource Management Plan is being revised with a completion date of 2006.

Stakeholders: USFWS, IDFG, USFS, BLM, Recreational Groups (hunter and fisherman groups, boaters), County and Municipal Government, Coeur d'Alene Tribe of Indians, NGO's.

Lake Revelstoke – Dave Hillary

Lower Columbia A.

Size: 395,604 acres/160,219 hectares.
Irreplaceability Score (Mean)**: 4.9**
Vulnerability Score (Mean)**: 0.9**
Combined Score: 5.9

Conservation Area Description: This conservation area follows the Columbia River from Mica Creek (outlet at Kinbasket Lake) south to Revelstoke, British Columbia. The conservation area falls within the Columbia Mountain ranges (Purcells, Selkirks, Cariboos, Monashees) that form the first mountain barrier east of the Coastal Mountains. The Columbia Mountains intercept wet, mild westerly air masses, creating an area known as the interior wet belt. This area is world renowned for high annual precipitation, deep snow accumulations and relatively moderate winter temperatures. It is also world renowned for helicopter skiing.

The conservation area contains the alpine tundra ecoregion with productive meadows of sedge and heather along with lichen, bare rock and glacial moraine. It also contains the Interior Sub-alpine ecoregion dominated by Engelmann spruce, subalpine fir and hemlock at lower elevations and alpine meadows at higher elevations. The dense vegetation of the valley bottom Interior Cedar Hemlock ecoregion is a result of tremendous precipitation and is characterized by thick forests of western red cedar, western hemlock, western white pine and associated shrubs such as devil's club.

These ecoregions collectively support populations of mountain caribou, grizzly bear, fisher, lynx white-tailed ptarmigan and a variety of neotropical migrant birds.

Principal Targets: Terrestrial targets include woodland caribou (*Rangifer tarandus caribou*), habitat for grizzly bear (*Ursus arctos horribilis*), wolverine (*Gulo gulo luscus*), and marten (*Martes pennanti*) and an ecosystem target - fens. Aquatic targets include white sturgeon (*Acipenser transmontanus*), bull trout (*Salvelinus confluentus*) and 6 important aquatic systems.

Ownership: Ownership within the conservation area is 54% BC provincial Crown land, 37% BC provincial Crown land held under Tree Farm License (TFL), 8% privately held, and 1% Parks Canada.

Threats and Management Issues: Hydroelectric development and the construction of associated dams have had a severe impact of lower elevation riparian areas. Logging of old-growth areas will likely increase in coming years as a result of recent provincial government decisions. The most significant disturbance agent in these wet forests though is insects and disease.

Opportunities: unknown

Stakeholders: Parks Canada, Columbia Basin Trust, BC Hydro, Columbia Basin Fish and Wildlife Compensation Program, City of Revelstoke, Regional District of Central Kootenay.

Arrow Lake – Dave Hillary

Lower Columbia B.

Size: 810,616 acres/328,299 hectares.
Irreplaceability Score (Mean)**: 4.8**
Vulnerability Score (Mean)**: 1.0**
Combined Score: 5.8

Conservation Area Description: This conservation area is located in the West Kootenay region of south-eastern British Columbia between the City of Revelstoke at the north and the City of Castlegar at the south. Generally, the conservation area follows the mainstem of the Columbia River and includes Revelstoke Lake, Upper Arrow Lake and Lower Arrow lake. These lakes are actually reservoirs created during hydroelectric developments on the Columbia system in the 1960's and 1970's. The result of this development was devastating on the ecosystem and also on the human population of the area. Permanent loss of both deciduous and coniferous riparian habitats, along with the severe alteration of fish habitat is typical throughout the conservation area.

Principal Targets: Terrestrial targets include ecosystems - Interior Douglas Fir Forest, Interior western redcedar/hemlock/Douglas-fir Forest, Riparian Forest; a rare plant - big-leaf sedge (*Carex amplifolia*); Lewis' woodpecker (*Melanerpes lewis*); habitat for grizzly bear (*Ursus arctos horribilis*); and the Coeur d'Alene salamander (*Plethodon idahoensis*). Aquatic targets include white sturgeon (*Acipenser transmontanus*), bull trout (*Salvelinus confluentus*), Umatilla dace (*Rhinichthys umatilla*) and 16 important aquatic systems.

Ownership: Ownership within the conservation area is 51% BC provincial crown land, 37% BC provincial crown land held under tree farm license, 9% privately held, 2% BC provincial park (administered by the Ministry of Water, Land and Air Protection), and 1% Parks Canada.

Threats and Management Issues: Habitat alteration has resulted in significant climatic change in the conservation area. Altered flow regime has led to severe degradation of fish habitat.

Opportunities: Participate in renegotiation of Columbia Basin Treaty when renewed.

Stakeholders: BC Ministry of Water, Land and Air Protection, BC Ministry of Sustainable Resource Management, Private Timber Companies, NGO's (The Nature Conservancy, Ducks Unlimited), Regional and Municipal Government, Bonneville

Power Administration, Regional District of West Kootenay, Columbia Basin Trust, Columbia basin Fish and Wildlife Compensation Program, BC Hydro.

Pend Oreille – Roger Hansen, Friends of the Little Pend Oreille NWR

Lower Columbia C.

Size: 400,341 acres/162,138 hectares.
Irreplaceability Score (Mean)**:4.6**
Vulnerability Score (Mean)**:2.4**
Combined Score: 7.0

Conservation Area Description: This conservation area is located in the Selkirk Mountains and straddles the U.S.-Canadian border in north-eastern Washington and south-eastern British Columbia. It extends from the confluence of the Kootenay and Columbia Rivers just north of Castlegar, BC south to Chewelah, WA. The Kettle and Colville Rivers bound it to the west and the Pend Oreille River to the east. The conservation area is bisected by Lake Roosevelt (WA) at its lowest elevation (393 m/1289 ft) and rises to its highest point at Old Glory Mountain (BC; 2376 m/7795 ft). In the southern portion of the area, grasslands and cliff habitats are found along Lake Roosevelt, which transition to landscapes dominated by ponderosa pine forests at lower elevations, to western larch - Douglas-fir - Grand fir forests at mid elevations, and ultimately to lodgepole pine-subalpine fir forests at the higher elevations. Moist interior cedar-hemlock forests occur in the wetter areas and valleys in much of the conservation area, especially in the northern portion.

Champion Lakes Provincial Park, King George VII Provincial Park, Little Pend Oreille National Wildlife Refuge, and Little Pend Oreille River Natural Area Preserve are protected landscapes within the conservation area. The area also includes a portion of Lake Roosevelt National Recreation Area, which includes a 209 km (130 mile) long impoundment of the Columbia River that was formed by the construction of Grand Coulee Dam in 1941. Other dams in the conservation area include the Hugh Keenlyside dam on the Columbia River upstream from Lake Roosevelt and the Brilliant dam on the Kootenay River just upstream from its confluence with the Columbia River. Other rivers and streams in the area include the Little Pend Oreille River, Mill Creek, Sheep Creek, and Deep Creek. The conservation area has a relatively high road density, particularly in British Columbia (Highways 22, 3, 22A, and 3B). The cities of Trail, Castlegar and Rossland, BC are the only urban centers within the conservation area.

Principal Targets: Aquatic species include white sturgeon (*Acipenser transmontanus*), westslope cutthroat trout (*Onchorhynchus clarki lewisi*), bull trout (*Salvelinus confluentus*), Shorthead sculpin (*Cottus confusus*), and Umatilla dace (*Rhinichthys umatilla*). Terrestrial targets include badger (*Taxidea taxus*), Townsend's big-eared bat (*Corynorhinus townsendii*), Lewis' woodpecker (*Melanerpes lewis*), bald eagle

(*Haliaeetus leucocephalus*) nest sites, and habitat and connectivity values for fisher (*Martes pennanti*), grizzly bear (*Ursus arctos horribilis*), wolverine (*Gulo gulo luscus*) and gray wolf (*Canis lupus*); plant species include stalked moonwort (*Botrychium penduncolosum*), upward-lobed moonwort (*Botrychium ascendens*), Crenulate moonwort (*Botrychium crenulatum*), western moonwort (*Botrychium hesperium*), peculiar moonwort (*Botrychium paradoxum*), and Columbia River crazyweed (*Oxytropsis campestris* var. *columbiana*). Community targets include western red cedar/wild sarsaparilla forests, alpine wet meadow, alpine grassland (dry), interior Douglas-fir forests, sparsely vegetated rock and talus, alpine cushion plant, and dwarf-shrubland.

Ownership: Ownership within the conservation areas is 49% private (BC and WA), 21% provincial (BC Crown Lands), 16% USFS, 8% WDNR, 3% USDI Fish and Wildlife Service, and 2% USDI Bureau of Land Management. Boise Cascade Corporation and Stimson Timber Company are major private landowners in Washington.

Threats and Management Issues: Loss or alteration of natural hydrologic function and riparian habitats are significant issues as a result of the Brilliant, Hugh Keenlyside, and Grand Coulee dams. Point source pollution from Celgar Pulp Mill in Castlegar, BC and Tech Cominco (smelting) in Trail, BC are significant concerns for downstream environments and biota within and outside the conservation area. Fire suppression, invasive/exotic plants (e.g., knapweed), incompatible forestry, and incompatible grazing practices are additional threats and management concerns within the conservation area. Loss of large snag habitat and lack of snag habitat recruitment across the conservation area are more specific forestry issues.

Opportunities: Actions to reduce and remove contamination and restore contaminated sites. Opportunities to improve flow regimes and to restore riparian habitats should be investigated. Little Pend Oreille National Wildlife Refuge has used mechanical management and prescribed fire to reduce fuel loads to address fire suppression issues, especially in historically, open forest types. Work with NW Power Planning Council's sub-basin planning process to protect sites important for both planning efforts. Opportunities to acquire habitats and landscapes of importance are also available through the Washington Wildlife and Recreation Program (WWRP).

Stakeholders: USFS, Fisheries and Oceans Canada, USFWS, BC Ministry of Water, Land and Air Protection, BC Ministry of Sustainable Resource Management, BC Ministry of Forests, WDFW, WDNR, BC Hydro, Celgar Pulp and Paper, Columbia Power Corp., Tech Cominco, Columbia Basin Trust, Boise-Cascade Corporation, Stimson Timber Company, Inland Northwest Wildlife Council, TNC, NCC, Canadian Parks and Wilderness Society, Bonneville Power Administration, USDI Bureau of Reclamation, Columbia Basin Fish and Wildlife Compensation Program, Colville Confederated Tribe, private land owners, and Lake Roosevelt National Recreation Area (USDI NPS).

Kinbasket Peak – Dave Hillary

Middle Columbia.

Size: 1,687,186 acres/683,310 hectares.
Irreplaceability Score (Mean)**: 4.4**
Vulnerability Score (Mean)**: 0.9**
Combined Score: 5.3

Conservation Area Description: The Middle Columbia conservation area is located in the Canadian Rocky Mountains of south-eastern British Columbia and includes Kinbasket Reservoir.

The area is found within the Central Park Ranges, the Northern Park Ranges and the Big Bend Trench Ecosections. Bordered on the east by both Jasper and Banff National Parks, this area contributes not only source habitats for a wide array of species, but also contributes greatly to east-west connectivity to and from existing protected areas.

The Kinbasket Reservoir, a result of hydroelectric development on the Columbia River, flooded much of the historic riparian habitat. The reservoir, and Columbia River system is fed by a number of creeks and rivers within the conservation area including the Beaver, Sullivan, Cummins and Wood. Clemenceau Icefield is also within the area as is Cummins Lake Provincial Park (21,000 ha/51,892 acres). This park protects one of the last unharvested and unroaded watersheds in the area.

The area includes Engelmann Spruce Subalpine Fir forest, valley bottom habitats (meadows, marsh), as well as habitats for grizzly bear, caribou and mountain goat. There is considerable backcountry use of this area including commercial heli-skiing, cat-skiing and hiking, but limited access across Kinbasket Reservoir and from Jasper National Park.

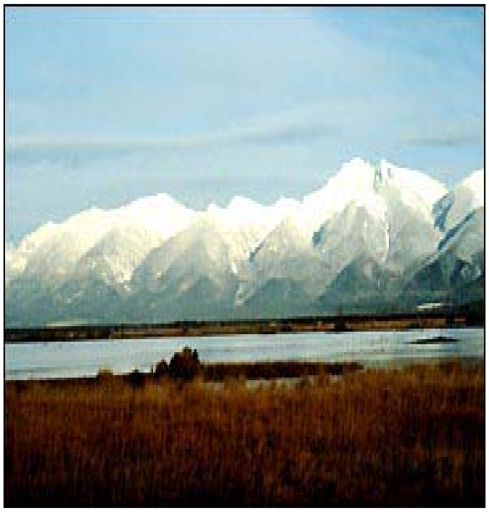
Principal Targets: Terrestrial targets include habitat for caribou (*Rangifer tarandus caribou*), grizzly bear (*Ursus arctos horribilis*), wolverine (*Gulo gulo luscus*), wolf (*Canis lupus*), and lynx (*Lynx canadensis*); and an ecosystems - fens. Aquatic targets include coho salmon (*Onchorhynchus kisutch*), sockeye salmon (*Onchorhynchus nerka*), Chinook salmon (*Onchorhynchus tshawytscha*) and bull trout (*Salvelinus confluentus*). In addition, 18 important aquatic systems are found within the conservation area.

Ownership: Ownership within the conservation area is 97% BC provincial crown land, 1% BC provincial park (administered by the Ministry of Water, Land and Air Protection), 1% Parks Canada and 1% privately held.

Threats and Management Issues: Access management is critical to the long-term viability of many species within the conservation area. Increasing human use (recreational) and road infrastructure need to be mitigated. Loss of riparian habitat resulting from the flooding of Kinbasket Reservoir necessitates the protection of remaining riparian areas. Seasonal water level fluctuations in the reservoir and river have also degraded fish habitat.

Opportunities: Secure by purchase and/or covenant key riparian areas. Partner with BC Ministry of Sustainable Resource Management to develop and implement an effective access management plan. Limit new provincial crown tenures within the area. Protect small pockets of old growth forest.

Stakeholders: Parks Canada (Jasper, Banff, Glacier), BC Ministry of Forests, BC Ministry of Water, Land and Air Protection, BC Ministry of Sustainable Resource Management, East Kootenay Environmental Society, Columbia Basin Trust, Columbia Basin Fish and Wildlife Compensation Program, Ktunaxa-Kinbasket First Nations, Alpine Club of Canada, Louisiana Pacific Forest Products, BC Hydro, Canadian Mountain Holidays, Great Canadian Heli-skiing, towns of Valemont and Golden



Mission Valley.

Size: 161,383 acres/65,360 hectares.
Irreplaceability Score (Mean)**: 5.0**
Vulnerability Score (Mean)**: 3.1**
Combined Score: 8.2

Mission Valley – Marilyn Wood

Conservation Area Description: The Mission Valley is a glacially carved intermountain basin located in Lake County. The northern boundary of this conservation area is Flathead Lake and the southern boundary is the National Bison Range (USFWS) near Moise, Montana. The mainstem Flathead River forms the western boundary with the eastern boundary located at the edge of the Mission Mountains. Extensive glacial formed potholes, spring creeks, forest stands, and small remnants of native prairie characterize the area. Ownership is a checkerboard of private lands, Tribal trust parcel, state owned wildlife management areas, and federally owned waterfowl production areas and wildlife refuges. Land uses include agriculture (pasture, hay production), residential development, and wildlife management. The complex wetlands and upland habitat contribute to making the Mission Valley the most productive site for migratory bird nesting in the lower 48 states. It also has the highest density within the lower 48 states of rough-legged hawks (*Buteo lagopus*). The area also supports large communal roost sites with over 300 individual raptors observed. Grizzly bear sighting are increasingly common along the riparian stringers in the valley floor.

Principle Targets: Terrestrial targets include common loon (*Gavia immer*), bald eagle (*Haliaeetus leucephalus*) nest sites, short-eared owl (*Asio flammeus*), western toad (*Bufo boreas*), and habitat for grizzly bear (*Ursus arctos horribilis*).

Ownership: Ownership within the conservation area is Federal (Tribal) 35%, State 3%, Private 57%.

Threats and Management Issues: Habitat fragmentation and habitat degradation are the primary threats in this conservation area. Spring creeks and streams have been overgrazed, channelized, diverted and dewatered. Invasive species are expanding rapidly. Single species management has reduced full native species potential. The area is rapidly developing with both residential and second home development.

Opportunities: Potential for Native American Land Trust; Highway mitigation funds, identification of critical lands for protection.

Stakeholders: Confederated Salish and Kootenai Tribes, US Fish and Wildlife Service, Montana Department of Transportation, Montana Department Fish, Wildlife and Parks, communities of Charlo, Polson, and Moise.

Moraine Lake – Dave Hillary

Mountain Parks.

Portfolio Area: 5,527,826 acres/2,238,769 hectares.
Irreplaceability Score (Mean)**: 4.2**
Vulnerability Score (Mean)**: 1.0**
Combined Score: 5.1

Conservation Area Description: This conservation area is located in the Canadian Rocky Mountains and straddles the Alberta – British Columbia border. It extends from the Kananaskis country area in the south to Jasper National Park in the north and is bounded on the west by the Rocky Mountain Trench and on the east by the foothills and grasslands of Alberta. The conservation area contains the headwaters of the Athabasca, Red Deer, Kootenay and Bow Rivers and is the largest conservation area in the portfolio. Included in the conservation area are Banff National Park, Jasper National Park and part of Kootenay National Park. Also included in the area are a number of smaller provincial parks in both Alberta and British Columbia. Considered the "backbone" of conservation, this area provides both source habitat for a wide variety of species, and of equal importance, connectivity (both north-south, and east-west). The conservation area is bisected by the TransCanada highway, which runs through Banff National Park and by the Yellowhead highway, which runs through Jasper National Park. Tourism development in the conservation area is concentrated along both highways and includes the towns of Canmore, Banff and Jasper: this development has resulted in two very distinct fracture zones. Additional development along the east slopes of the Rockies (agriculture and oil/gas exploration) has resulted in land conversion and increased road densities.

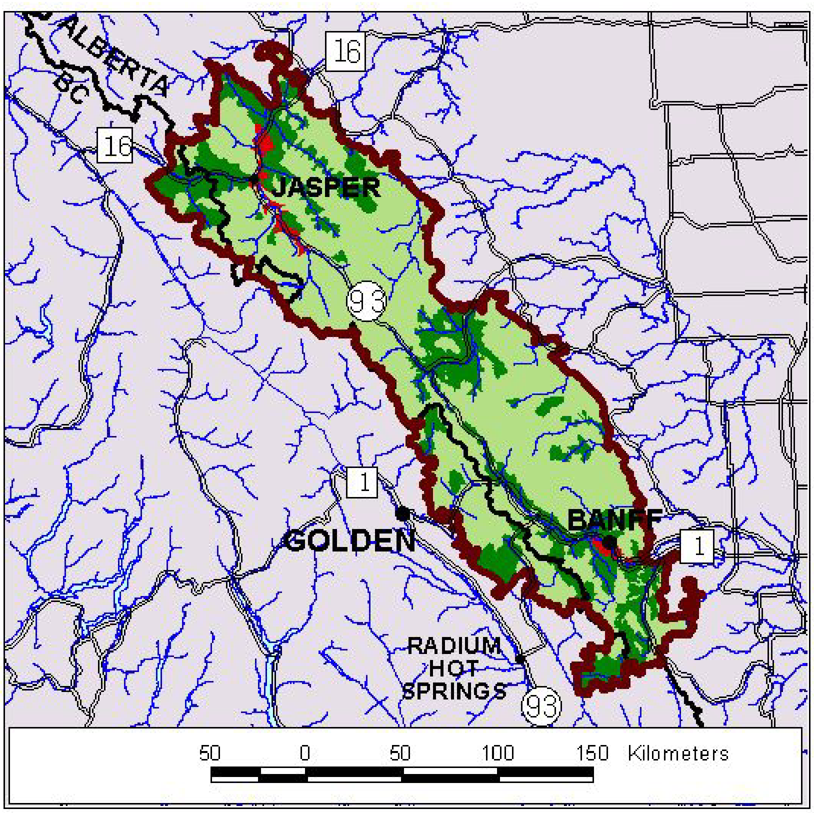
Principle Targets: Terrestrial targets include habitat and connectivity values for caribou (*Rangifer tarandus caribou*), grizzly bear (*Ursus arctos horribilis*), wolf (*Canis lupus*), and wolverine (*Gulo gulo*); rare plants - barren ground fleabane (*Erigeron trifidus*), tundra whitlow-grass (*Draba kananaskis*), Wind River whitlow grass (*Draba ventosa*), low sandwort (*Arenaria longipedunculata*), and a moss (*Cladonia bacilliformis*). A very significant number or rare plant communities also occur in the conservation area including both forest and grassland communities. Aquatic targets include bull trout (*Salvelinus confluentus*) and westslope cutthroat trout (*Onchorhynchus tshawytscha*) and 28 aquatic systems.

Ownership: Ownership within the conservation area is 51% Parks Canada, 22% Alberta provincial Crown land, 13% Alberta Provincial Park, 10% BC Crown land. Private lands make up less than 1% of the conservation area.

Threats and Management Issues: Increasingly, commercial and residential developments along the TransCanada and Yellowhead highways are leading to habitat fragmentation. In addition, this development has resulted in a dramatic population increase throughout the area (both permanent and seasonal) adding additional recreational pressure on the National Parks and surrounding areas. This is particularly true in the Banff/Canmore area. Commercial recreational development (ski hills, backcountry lodges) is exacerbating this problem. Oil and gas exploration along the east slopes has led to increased road densities and human access. This condition, in conjunction with a rapidly expanding human population, has led to serious impacts at the extent of many species range. Incompatible forestry, invasive species and an altered fire regime are additional threats and management concerns within. Due to the fact that over 50% of the land base is within National Parks, it is also important to develop complimentary legal and policy frameworks with the provinces of Alberta and British Columbia.

Opportunities: Acquisition of key lands on the east slopes of the Rocky Mountains. Donation and/or purchase of conservation easements on agricultural lands. Purchase of sub surface exploration rights. Maintain north-south connectivity along fragmentation areas.

Stakeholders: Parks Canada, BC provincial ministries, Alberta provincial ministries, University of Calgary, Alberta Wilderness Society, Canadian Parks and Wilderness Society, oil and gas exploration companies, timber companies, agricultural producers.



North Thompson River.

Size: 168,190 acres/68,117 hectares.
Irreplaceability Score (Mean)**: 4.3**
Vulnerability Score (Mean)**: 2.3**
Combined Score: 6.6

Conservation Area Description: This conservation area is located in the northwest corner of the ecoregion and includes the North Thompson River and several small tributaries. This conservation area was selected for its contribution to aquatic and salmonids goals.

North Thompson River – BC Parks

The area contains rich oxbow, marsh and wetland habitat. The Yellowhead highway also bisects the area.

Principal Targets: Aquatic targets for this conservation area include coho salmon (*Onchorhynchus kisutch*), sockeye salmon (*Onchorhynchus nerka*), Chinook salmon (*Onchorhynchus tshawytscha*) and bull trout (*Salvelinus confluentus).*

Ownership: Ownership within the conservation area is 87% BC provincial crown land, 12% privately held, and 1% BC provincial park (administered by the Ministry of Water, Land and Air Protection).

Threats and Management Issues: Degradation of aquatic habitat including, but not limited to, incompatible forestry practices along streams and rivers, water allocation and the construction of barriers to fish movement. Vegetation management in riparian areas.

Opportunities: Vegetation management – protection of riparian areas for shade and food supply for salmonids; insect and disease control; fire management.

Stakeholders: BC Ministry of Water, Land and Air Protection, BC Ministry of Sustainable Resource Management, BC Ministry of Forests, Shuswap First Nations, Department of Fisheries and Oceans, BC Ministry of Transportation

Fishing Orofino Creek. Courtesy of Orofino Museum, ID.

Orofino – Ford Creeks.

Size: 44,976 acres/18,215 hectares.
Irreplaceability Score (Mean)**: 6.2**
Vulnerability Score (Mean)**: 1.3**
Combined Score: 7.5

Conservation Area Description: Orofino and Jim Ford Creeks are both headwaters of the Clearwater River. In 1860, gold was first discovered in Idaho on Orofino Creek which led to the establishment of Idaho's oldest mining town, Pierce, named after Captain ED Pierce. “Oro Fino” means fine gold.

Orofino Creek, more northerly and Jim Ford Creek, to the south are located due east of Orofino, ID and southeast of Dworshak reservoir and the Clearwater River. The Forest administers a small portion of the headwaters of the Orofino Creek drainage, upstream of the town of Pierce, Idaho. Private lands are intermingled with the USFS lands, especially as one proceeds downstream. Historic mining and past and on ongoing timber harvest are evident in the drainage**.**

The Orofino Creek Bank Stabilization Project was a flood mitigation project brought about by the 96 floods. The project consisted of removing earth and rock material deposited by the 96 floods (22,500 CY), excavating a toe trench and placing manufactured 3’ riprap (28,000 tons). Restoration of disturbed vegetation included planting of more than 5,000 Coyote Willows.

Ownership: Ownership within the conservation area is 84% federal (USFS, BLM), 9% private, 7% state (IDL).

Principle Targets: Includes habitat and connectivity values for wide-ranging carnivores - gray wolf (*Canis lupus*), grizzly bear (*Ursus arctos horribilis*), fisher (*Martes pennanti*), wolverine (*Gulo gulo luscus*), and lynx (*Lynx canadensis).* Aquatic target include Chinook salmon (*Onchorhynchus tshawytscha*), westslope cutthroat trout (*Onchorhynchus clarki lewisi*), rainbow trout, (*Onchorhynchus mykiss*), bull trout (*Salvelinus confluentus*). Rare plants include- Daubenmire’s dasynotus (*Dasynotus daubenmirei),* Pennell’s kittentail *(Synthyris platycarpa),* Phantom orchid *(Cephalanthera austiniae),* Clustered lady’s slipper *(Cypripedium fasciculatum)*. Also included are an Expert nominated site- Interior western redcedar/maidenhair fern forest *(Thuja plicata/Adiantum pedatum)* forest, Interior Douglas-fir forests, Interior grand fir forests, Interior western redcedar/hemlock/Douglas-fir forests, ponderosa pine woodland; and 3 aquatic systems.

Management Issues: Both watersheds suffer from increased road densities and sedimentation associated with historic timber harvest. Jim Creek is also known to have water quality problems associated with sedimentation, nutrients, pathogens, temperature, dissolved oxygen, flow alteration and habitat alteration. Invasives are also prevalent.

Opportunities: unknown

Stakeholders: Nez Perce Tribe, USFS, Recreational groups, Timber Companies.

KJ Torgerson

Palouse Prairie.

Size: 631,074 acres/255,585 hectares (33,800 acres/13,700 hectares WA)
Irreplaceability Score (Mean)**: 5.0**
Vulnerability Score (Mean)**: 2.8**
Combined Score: 7.7

Site Description: This conservation area extends roughly south from the St. Maries River to the Clearwater canyon near it confluence with the Snake River, encompassing the Potlatch River. Underlying the area are Columbia River basalt flows that form a gently undulating surface over which episodic deposition of loess has occurred (with soil depths up to 31m (100 feet) characteristic), interspersed by large steptoes, undulating plateaus, scattered coulees and deeply incised major drainages. Mountains occur in the southeast part of the CA. Elevation ranges from 366 to 1,830 m (1,200 to 6,000 ft), averaging at 762m (2,500 feet). Palouse Grassland (bluebunch wheatgrass - Idaho fescue) and meadow-steppe vegetation (Idaho fescue - Nootka rose/ common strawberry) are the prototypical climatic vegetation. Woodlands and forests occur in the eastern portion of the CA on hills and low mountains. Most of this grassland and meadow-steppe has been converted to cropland. Ponderosa pine woodlands and forests form the lower timberline in the eastern portion of the CA. Dry farming and livestock grazing occurs on about 90 percent of the area. The CA includes the 519 ha (1,282 acre) Lyon's Ferry State Park and 1416 ha (3,500 acre) McCrosky State Park. Palouse grasslands are one of the most endangered ecosystems in the US, with estimations of only 0.1% remaining in a natural state (Noss 1995).

Principal targets: Includes habitat and connectivity values for wide-ranging carnivores- gray wolf (*Canis lupus*), grizzly bear (*Ursus arctos horribilis*), fisher (*Martes pennanti*), wolverine (*Gulo gulo luscus*), and lynx (*Lynx canadensis*); amphibians- Idaho giant salamander (*Dicamptodon aterrimus*), western toad (*Bufo boreas*); aquatics- white sturgeon (*Acipenser transmontanus*), king salmon (*Onchorhynchus tshawytscha),* westslope cutthroat trout (*Onchorhynchus clarki lewisi*), rainbow trout, (*Onchorhynchus mykiss)*, bull trout (*Salvelinus confluentus)*; *r*are plants – Water howellia (*Howellia aquatilis),*Mountain moonwort *(Botrychium montanum),* Salmon-flower desert-parsley *(Lomatium salmoniflorum),* Leiberg's tauschia *(Tauschia tenuissima),* Jesssica's aster *(Aster jessicae),* Howell's gum-weed (*Grindelia howellii), Pyrrocoma liatriformis,* Case's corydalis (*Corydalis caseana var. hastata),* Broad-fruit mariposa (*Calochortus* *nitidus),* Phantom orchid (*Cephalanthera austiniae),* Clustered lady's slipper (*Cypripedium fasciculatum);* and 20 aquatic systems.

Ownership: 18% federal (United States Forest Service, Bureau of Land Management, Bureau of Indian Affairs, USDI Bureau of Land Management), 74% private, 8% state (Idaho Department of Fish and Game, Idaho Department of Lands, Idaho Department of Parks and Recreation, Washington State Department of Natural Resources)

Threats and Management Issues: Wind is the principal source of natural disturbance. Conversion to agriculture (mostly farming, but some grazing) has resulted in a severe loss of grassland remnants and native plant species, increased invasives, shrub encroachment, increased erosion and stream sedimentation, increased susceptibility to disturbance by wind, prairie habitat fragmentation, loss of the transition zone between prairie and forest, non-point pollution in the form of agricultural runoff. Subdivision for home site development is on the rise resulting in loss of remnant populations, increased road densities,

Stakeholders: BLM, NRCS, NGO's (Palouse Land Trust, Palouse Clearwater Environmental Institute, Palouse Prairie Foundation, Palouse Water Conservation Network, Idaho and Washington Native Plant Societies as well as numerous other plant conservation organizations and universities), County and Municipal Government, Coeur d'Alene Tribe of Indians, Nez Perce Tribe

Opportunities: 1) As this site lies at the eastern fringe of the Columbia Basin Palouse habitat, there needs to be further research into the viability of this area and the importance of this sites remnant Palouse habitat as part of the greater Columbia Plateau. 2) For the past two years, the Palouse Land Trust has been partnering with the BLM in a project addressing the need for private conservation agreements to protect remnants of Palouse Prairie and Canyon Grasslands. 3) Numerous non-profits and universities have mapped and prioritized remnant grassland/prairie habitat. 4) A portion of McCrosky State Park that contains remnant Palouse Grassland has been proposed for National Natural Landmark designation. 5) During a 1996 study by TNC/CDC 13 Palouse Grassland remnants with significant conservation value were identified, most of which are in provide ownership. 5) Work with ITD to minimize/limit the impact of construction projects on remnant Palouse habitat.

Pend Oreille River.

Size: 136,227 acres/55,172 hectares.

Irreplaceability Score (Mean)**: 3.8**
Vulnerability Score (Mean)**: 2.8**
Combined Score: 6.6

Conservation Area Description: After draining Lake Pend Oreille, the Pend Oreille River enters Washington, journeys north into Canada and returns to the U.S. before joining with the Columbia River. One of the only north-flowing rivers in the world, the Pend Oreille River contributes about 10% of the water in the Columbia River. Water leaving the lake forms the Pend Oreille River, which flows across the Idaho Panhandle and Washington's north-eastern corner before draining into the Columbia River just past the Canadian border. Stream flow in the main stem is heavily dependent on precipitation and reservoir storage conditions upstream.

Early white settlers came to the Pend Oreille Valley during the early 1880s for its abundant resources: minerals and precious metals, timber and tall grasslands. The initial settlement centered in the Kalispel Basin where the grasslands supported livestock and the river provided easy access. Agricultural operations are still located within the river corridor.

Over 200 logging and lumber companies operated in the Pend Oreille Valley between the early 1900s and late 20s. When the mills started closing in the 1930's the population peaked at around 2,000. Today the region's beauty, including the North Pend Oreille Scenic Byway, and natural resources lure vacationers and urban refugees.

Principal Targets: Terrestrial targets include habitat and connectivity values for gray wolf (*Canis lupus*), grizzly bear (*Ursus arctos horribilis*), fisher (*Martes pennanti*), wolverine (*Gulo gulo luscus*), and lynx (*Lynx canadensis*); Townsend big-eared bat (*Corynorhinus townsendii*), common loon (*Gavia immer*), and bald eagle nest site (*Haliaeetus leucocephalus*); rare plants - Bristly sedge (*Carex comosa*), and mountain moonwort (*Botrychium montanum*). Aquatic targets include westslope cutthroat trout (*Onchorhynchus clarki lewisi*). Also identified in the conservation area are fen, marsh, sphagnum bog, riparian shrubland, montane wet meadow and riparian forest.

Ownership: Ownership within the conservation area is 75% private, 16% federal (USFS, BLM), 6% state, 3% water.

Threats and Management Issues: Elevated nutrients from sources including irrigated agriculture, septic tanks, and municipal and industrial wastewater discharges. Heavy metals from active and inactive mining and smelting activities. Operations from hydropower have altered the hydrograph, thermograph, and the downstream nutrient loading rates. Surrounding forestry practices have increased the sedimentation rates. Aquatic weeds and algae are prevalent problems. Invasive species (particularly lake trout, Eurasian water milfoil) that prey on native species have resulted in the opening of a commercial fishery season to reduce their populations. Continued loss of riparian habitats is a significant issue. First and second home development along the river is responsible for the loss of some of this habitat. Incompatible grazing, dikes, and expansive agriculture are other management issues in the conservation area.

Opportunities: 1) Work with partners to stop the spread of Eurasian water milfoil. 2) Encourage partners to establish and maintain a basin wide water quality-monitoring network to assess effectiveness and trends and to better identify sources of pollutants. 3) Box Canyon Dam re-licensing and NWPPC's sub-basin planning offer important opportunities for conservation actions regarding hydropower operations. 4) Acquisition or protection of cottonwood groves and islands within the river channel would an important management objective during re-licensing and sub-basin planning.

Stakeholders: Developers and Builders, Mining, Municipalities, Recreation, Kalispel Tribe of Indians, Washington Department of Ecology, Washington Department of Environmental Quality, Washington Department of Fish and Wildlife, Clark Fork Pend Oreille Coalition, Idaho County Commissions, Idaho Department of Environmental Quality, Idaho Department of Fish and Game, Intermountain Forest Industry Association, Pend Oreille Conservation District, Natural Resources Conservation Service, U.S. Environmental Protection Agency, U.S. Forest Service, University of Idaho, Avista, Department of Natural Resources, USFWS, Pend Oreille PUD, BLM, private land owners, Boise Cascade Corporation, US Army Corp of Engineers, Inland Northwest Wildlife Council, Stimson Timber Company.

Pleasant Valley – Marilyn Wood

Pleasant Valley.

Size: 96,151 acres/38,941 hectares.
Irreplaceability Score (Mean)**:4.4**
Vulnerability Score (Mean)**: 5.1**
Combined Score: 9.5

Conservation Area Description: This conservation area is located approximately 40 km (25 miles) west of Kalispell, Montana. The valley was formed during the Pleistocene Period by glacial and sedimentation activity.

The glacial deposits sit on top of the older Belt Rock formation, which in turn has faulted over younger Palaeozoic rocks, which are thought to contain oil and gas. The valley has exceptional diversity of palustrine wetlands and sloping upland areas dominated by timber. Drainage ditches and water impoundments have altered many of the wetlands. The timbered uplands include larch, subalpine fire, Douglas-fir, grand fir, spruce, cedar, aspen, and ponderosa pine. Mean annual precipitation ranges from 51 to 127 cm (20 to 50 inches). Elevations range from 1067 to 1402 m (3,500 to 4,600 feet). The habitat supports a wide variety of wildlife species including many migratory waterfowl and shorebirds. Wildlife species of special concern known to occupy the area include bald eagle, loon, grizzly bear and gray wolf. Land uses are primarily timber harvest and agriculture. Landownership includes a recently acquired U.S. Fish and Wildlife Refuge (Lost Trail), U.S. Forest Service, Plum Creek Timber Company, and several private ranches. A new population of federally listed rare plant, Spalding's catchfly, was recently discovered on the refuge. It is believed that this population is the largest in existence.

Principal Targets: Terrestrial targets include common loon (*Gavia immer*), short-eared owl (*Asio flammeus*), and habitat for wolf (*Canis lupus*), grizzly bear (*Ursus arctos horribilis*), and lynx (*Lynx canadensis*); rare plants - small winged sedge (*Carex stenoptila*), Crenulate moonwort (*Botrychium crenulatum*). Fen, marsh, and montane wet meadows communities also occur within the conservation area.

Ownership: Ownership within the conservation area is Federal (U.S.) 13.3%; State (Mt) 5.8%; Private 77%.

Threats and Management Issues: Alteration of wetlands and stream courses has reduced the amount of natural wetland complexes. Single species or species group management may limit full biodiversity expression. Timber management practices over many years have altered the forest structure. Ranches are being sold and subdivided. Conflicts between wolves and livestock have occurred.

Opportunities: Watershed conservation and restoration involving all stakeholders; determine suite of conservation values needed for protection; Refuge Management Planning process; Forest Plan revisions.

Stakeholders: US Fish and Wildlife Service, Flathead National Forest, Montana Department Fish, Wildlife and Parks, private ranchlands.

Gilnockie Park – BC Parks

Purcell Mountains.

Size: 893,596 acres/361,906 hectares.
Irreplaceability Score (Mean)**:4.5**
Vulnerability Score (Mean)**: 2.2**
Combined Score: 6.7

Conservation Area Description: The Purcell Mountain conservation area includes a large mountainous area in north-western Montana west of the continental divide range. The Purcell ranges parallel the Selkirk range to the west and are part of the Kootenai River watershed. The mountain range is closely spaced with restricted valleys including the Yaak River, and the upper watershed of the Tobacco River. Elevations range from 549 to 2347 m (1,800 to 7,700ft). This conservation area exhibits effects from orthographic uplift making the windward side (west) of the range one of the wetter areas while the leeward side (east) and is significantly influenced by rain shadow effect. While areas in the extreme northwest portion have rugged mountains and moist site vegetation, less dramatic low elevation dry forests with a long history of human activities, including extensive timber harvest and roading, characterize much of the conservation area. Historically the Purcell Mountains support the highest timber production in Montana. Land uses include timber harvest, recreation, and rural subdivision in the valley bottoms. The Kootenai River drainage population of Redband trout is Montana's only native rainbow trout and represents the furthest inland penetration of Redband trout in the Columbia River Basin. Historically Redband trout were native to low gradient valley bottoms but now genetically pure strains of Redband trout are found only in the headwaters of a few tributaries of the Yaak River. Wolves have recently reoccupied the Purcell Mountains both by natural dispersal from other populations in the Whitefish Range and translocation efforts in the Yaak. The northwest corner of the Purcells also supports a strong lynx population. A small number of grizzly bears are found in the Yaak (Cabinet-Yaak Recovery area) as well as isolated observations in the eastern part of this Conservation Area. The Purcell area is important for connectivity between the Whitefish Range and the Selkirk mountains.

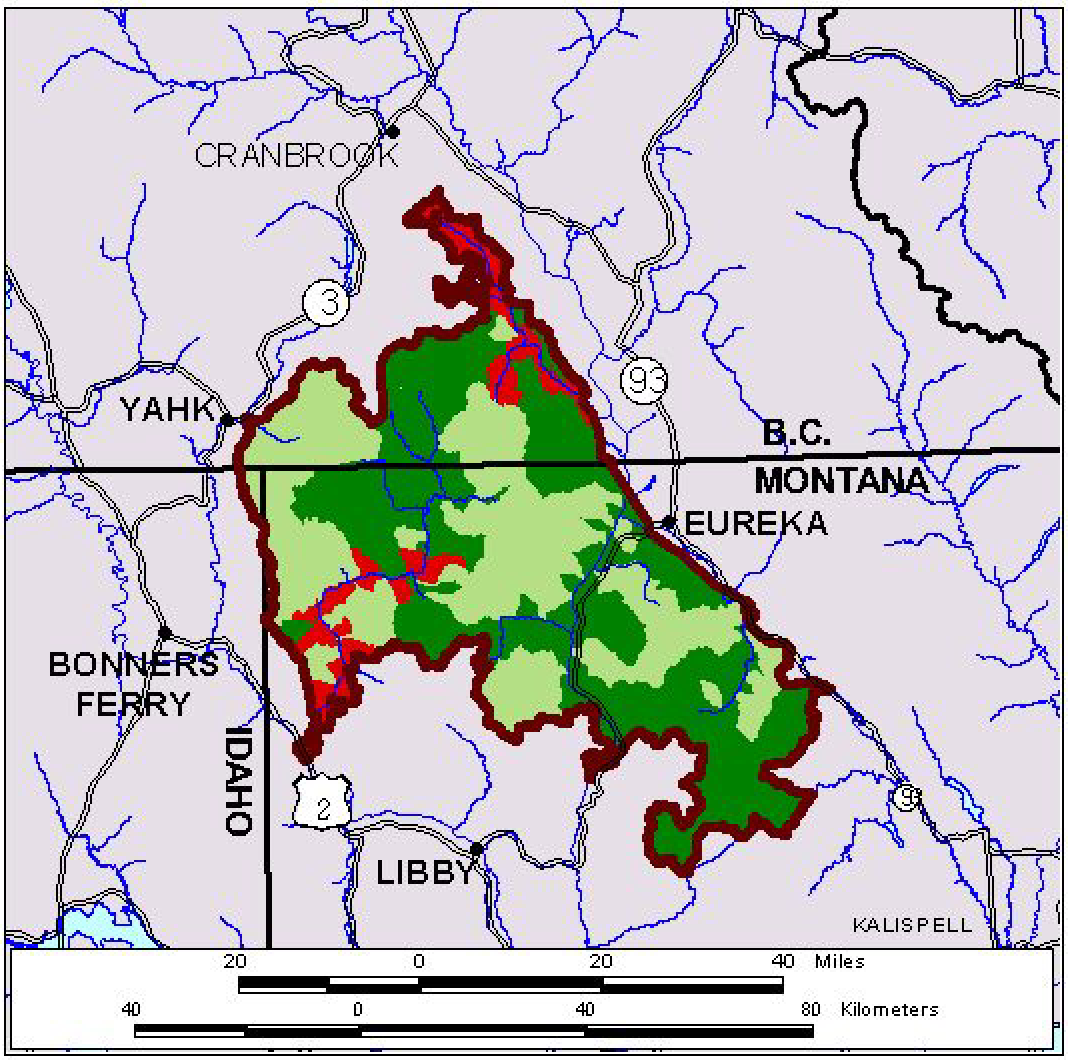
Principal Targets: Terrestrial targets include common loon (*Gavia immer*), white-tailed ptarmigan (*Lagopus leucurus*), Flammulated owl (*Otus flammeolus*), several moonworts, including peculiar moonwort (*Botrychium paradoxum*), and western moonwort (*Botrychium* hesperium) and habitat and connectivity values for all wide-ranging carnivores. Aquatic targets include the northern leopard frog (*Rana pipiens*) and tailed frog (*Ascaphus montanus*), bull trout (*Salvelinus confluentus*), and Inland Redband trout (*Oncorhynchus mykiss gairdneri*).

Ownership: Ownership within the conservation area is Federal (Canada) 22%, Federal (US) 68%, Private 7%.

Threats and Management Issues: Timber harvest practices, altered fire regime, road density, invasive species (weeds), mining, hybridization, over harvest, and competition.

Opportunities: USFS is currently revising the Forest Plan; USFWS has identified the upper Kootenai watershed, including tributaries to Tobacco River as one of twelve restoration watersheds for bull trout restoration, as well as a focus area for Partners for Wildlife Program; Yaak Forest Council community forest restoration projects.

Stakeholders: Kootenai National Forest, US Fish and Wildlife Service, Montana Department Fish, Wildlife and Parks, Montana Department of Natural Resources, Owens and Hurst Timber Company, Plum Creek Timber Company, Yaak Forest Council, communities of Yaak, Eureka, Trego.



Whaleback – Rick Rowell

Rocky Mountain Front.

Size: 761,805 acres/308,531 hectares.
Irreplaceability Score (Mean)**:4.2**
Vulnerability Score (Mean)**: 1.5**
Combined Score: 5.7

Conservation Area Description: This area encompasses portions of the Porcupine Hills, a slightly disjunct portion of the montane habitats east of the front ranges of the Rocky Mountains, the Whaleback area of south-western Alberta known for its large expanses of foothills fescue grasslands, and the Crowsnest Pass – a low elevation pass into the Rockies. The significance of this region includes the Crowsnest River, an internationally significant river for fishing and winter habitat for ungulates. The Whaleback region and surrounding heritage ranch lands are among the last relatively untouched fescue grasslands in Alberta and critical winter range for ungulates.

Principal Targets: Principal conservation targets include: several rare plants – a woolly fleabane (*Erigeron lanatus*), dwarf fleabane (*Erigeron radicatus*), point leaf small kettle moss (*Tayloria acuminata*); an amphibian – northern leopard frog (*Rana pipiens*); and several natural communities – Penstemon - talus, Western mountain larch - Pine grass, Aspen, Montane dry grasslands

Ownership: Ownership within the conservation area is 68% Alberta Crown lands; 13% Alberta community development; 9% private; 7% BC Crown lands.

Threats and Management Issues: Steadily rising human population growth in and around the Calgary and continuing fragmentation of land due to recreational and residential development are major factors having effects on the ecology of the region. While ranching has been the staple agricultural activity for the last century, increasing land pressures are resulting in the fragmentation of the landscape. This trend will continue. In addition technologies such as coal bed methane extraction will have cumulative impacts on the region. Habitat connectivity issues are already being identified in the Crowsnest region of Alberta that could have significant effects on wide ranging species.

Opportunities: Acquisition of key properties. Purchase and/or donation of conservation easements on key agricultural lands. Purchase of sub surface mineral rights.

Stakeholders: Alberta government ministries, Municipality of Crowsnest Pass, Alberta Wilderness Association, Southern Alberta Land Trust, agricultural producers, timber companies, oil and gas exploration companies.

Columbia River Wetlands – Dave Hillary

Rocky Mountain Trench A.

Size: 754,656 acres/305,636 hectares.
Irreplaceability Score (Mean)**: 4.5**
Vulnerability Score (Mean)**: 1.4**
Combined Score: 5.9

Conservation Area Description: This Conservation area is located in the Rocky Mountain Trench bordered on the east by the Rocky Mountains and on the west by the Purcell Mountains. The southern extent of this conservation area is at Canal Flats; where the mighty Columbia River originates and flows north from Canal Flats to the Kinbasket Reservoir. The Kinbasket reservoir was created when the first hydroelectric dam was built on the Columbia River in 1965. The Columbia River Wetland (between Canal Flats and Kinbasket Reservoir) is the longest uninterrupted wetland in western North America, and the only piece of the Columbia left in an unaltered state. It supports a wide variety of migratory waterfowl and a very diverse aquatic environment. The site also contains the northern most extent of grassland and open forest communities in the region. These communities support both biological richness and rarity and contain significant rare and endangered population. Badger, Grizzly Bear, Rocky Mountain Bighorn sheep, Lewis' Woodpecker, Flammulated Owl, Burbot and the Southern Maiden Hair Fern occur here. The Rocky Mountain Trench is currently under represented in the existing protected areas network – less than 0.8% of the land base is protected.

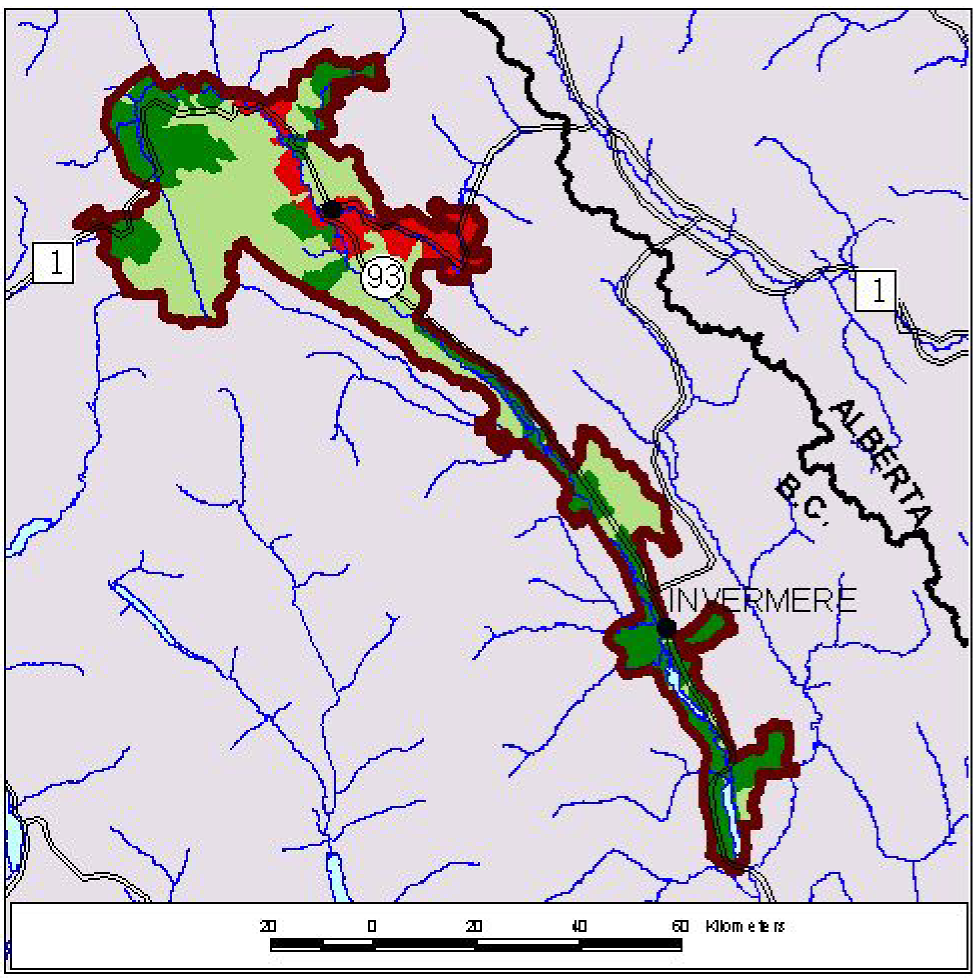
Principal Targets: Principal species include two rare vascular plants – woolly fleabane (*Erigeron lanatus*), ascending moonwort (*Botrychium ascendens*); a moss – point-leaf small kettle-moss (*Tayloria splachnoides*)*;* a toad – western toad *(Bufo boreas*); a bird – Lewis woodpecker (*Melanerpes lewis*)*;* a mammal - Jefferson's badger (*Taxidea taxus jeffersonii*); habitat and connectivity values for gray wolf (*Canus lupus*), grizzly bear (*Ursus arctos horribilis*); and three natural communities – sagebrush/ bluebunch wheatgrass/ balsamroot, montane riparian forest, and montane dry grasslands.

Ownership: Ownership within the conservation area is 52% BC provincial crown land; 23% Parks Canada; 15% Private; 5% BC WALP (in a wildlife management area).

Threats and Management Issues: Threats to this ecosystem include forest in growth and encroachment on the grassland community. This threat is as a result of an altered fire regime – historically high frequency low intensity fires occurred at regular intervals. Fire suppression, beginning in the later part of the 19th century, has altered the natural state of the grassland community putting many associated species at risk. Increasingly residential (second home) development is fragmenting the habitat in this area. Invasive Species and water quality degradation are also important issues in this conservation area.

Opportunities: Acquisition of wetland and grassland properties. Purchase and/or donation of conservation covenants on key agricultural lands. Support existing programs to re-introduce fire to the ecosystem. Support existing programs to mitigate impacts of noxious weeds. Support existing recovery efforts for rare species.

Stakeholders: Parks Canada, Ktunaxa-Kinbasket Tribal Council, The Nature Conservancy of Canada, The Land Conservancy of BC, The Nature Trust of BC, BC Ministry of Water, Land and Air Protection, BC Ministry of Sustainable Resource Management, BC Ministry of Forests, Municipal governments, Tembec Industries Inc., Slocan Forest Products, Regional District of East Kootenay, East Kootenay Environmental Society, East Kootenay Conservation Program, Windermere Valley Rod and Gun Club, Columbia Basin Trust, Columbia Basin Fish and Wildlife Compensation Program, Kootenay Livestock Association, Trench Restoration Society, Bighorn in Our Backyard, Fairmont Hot Springs Resort, Columbia-Kootenay Fisheries Renewal Partnership, Upper Columbia Watershed Council



Kootenay River – Dave Hillary

Rocky Mountain Trench B.

Size: 545,643 acres/220,985 hectares.
Irreplaceability Score (Mean)**:5.1**
Vulnerability Score (Mean)**: 1.8**
Combined Score: 6.8

Conservation Area Description: This conservation area is located in south-eastern British Columbia and runs from the Canadian – US border in the south to the headwaters of the Columbia River at Canal Flats in the north. The Conservation Area contains the middle reach of the Kootenay River, and the Elk, Wigwam, St. Mary's and Skookumchuck Rivers. Low elevation grasslands and open forests dominate the site – examples of these are the St. Mary's prairie and Skookumchuck Prairie. Habitats support a variety of endangered species including badger, Flammulated owl, Rocky Mountain bighorn sheep, curlew, bull trout and west slope cutthroat trout. The Wigwam River contains the largest bull trout runs in the region. Lake Kookanusa, a lake created after the establishment of the Libby dam in 1965, had a devastating effect on both riparian areas along the Kootenay River and the species that depend on this ecosystem to survive.

Principal Targets: Terrestrial targets include rare plants - Spalding's campion (*Silene spaldingii*), Slim-head manna grass (*Glyceria leptostachya*); birds - common loon (*Gavia immer*), Lewis' woodpecker (*Melanerpes lewis*); amphibians - Tiger salamander (*Ambystoma tigrinum*), Western Toad (*Bufo boreas*); habitat for gray wolf (*Canis lupus*); ecosystems - ponderosa pine, grassland, montane scrub and montane riparian forest. Aquatic targets include white sturgeon (*Acipenser transmontanus*), bull trout (*Salvelinus confluentus*), and westslope cutthroat trout (*Onchorhynchus clarki lewisi*). 12 aquatic systems are also found in this conservation area.

Ownership: Ownership within the conservation area is 52% BC provincial crown land, 33% privately held, 6% ENGO (other), 5% First Nations Reserve and 4% various US agencies.

Threats and Management Issues: Hydroelectric development in the US has had devastating and long-term impacts on this site. Altered fire regimes have lead to forest in-growth and encroachment of the grassland communities and hence have limited the quality and quantity of range and forage available to ungulate populations. Invasive species (noxious weeds) like spotted knapweed, hounds tongue and leafy spurge exacerbate this loss of range. Inappropriate grazing practices and the alienation of agricultural lands to residential and recreation developments is increasing as well. Restoration is necessary to return the area to a dynamic/productive environment.

Opportunities: Acquisition of key lands. Purchase and/or donation of key agricultural lands. Support ongoing restoration initiatives. Support ongoing noxious weed control programs. Support efforts to mitigate negative impacts associated with the construction of the Libby dam in the Lake Kookanusa area. Support initiatives to re introduce fire to the ecosystem.

Stakeholders: Ktunaxa-Kinbasket Tribal Council, The Nature Conservancy of Canada, The Land Conservancy of BC, The Nature Trust of BC, BC Ministry of Water, Land and Air Protection, BC Ministry of Sustainable Resource Management, BC Ministry of Forests, Municipal governments, Tembec Industries Inc., Regional District of East Kootenay, East Kootenay Environmental Society, East Kootenay Conservation Program, Cranbrook/Kimberley Rod and Gun Club, Columbia Basin Trust, Columbia Basin Fish and Wildlife Compensation Program, Kootenay Livestock Association, Trench Restoration Society, Columbia-Kootenay Fisheries Renewal Partnership.

Ralph Maughan (with permission)

Salmo-Priest-Selkirks.

Size: 609,474 acres (23,100 BC; 157,586 WA)-
Irreplaceability Score (Mean)**: 3.9**
Vulnerability Score (Mean)**: 2.3**
Combined Score: 6.2

Site Description: The Lower Selkirks Conservation Area extends through Washington, Idaho and British Columbia and in many places rises abruptly more than 2,400 m (8,000 ft). This conservation area maintains several protected areas including the 20.540 ha (50,755 acre) Salmo-Priest Wilderness Area (designated in 1984), the road less Selkirk Crest Management Area, the road less Upper Priest Lake Scenic Area, 6 RNA's (Research Natural Areas) and 4 pRNA's, Lionhead and Priest Lake state parks, and the Priest River Experimental Forest. The area typically consists of parallel, north-south running ridges formed of granite from the Kaniksu Batholith and Spokane Dome that are interspersed by glacial cirques and gem-like lakes high above timberline. Streams have cut deep drainages into the ridges, which flow to multiple watersheds consisting of inland rain forests maintaining western red cedar, western hemlock, Douglas fir, grand fir, and larch. The name "Kaniksu Range" is sometimes used to identify the mountains west of the Priest Lakes; the central crest is sometimes known as the "Priest Range." Rare plants include at least 30 S1 or S2 species. Rare animals include at least 5 S1 or S2 mammals and 5 S1 or S2 birds.

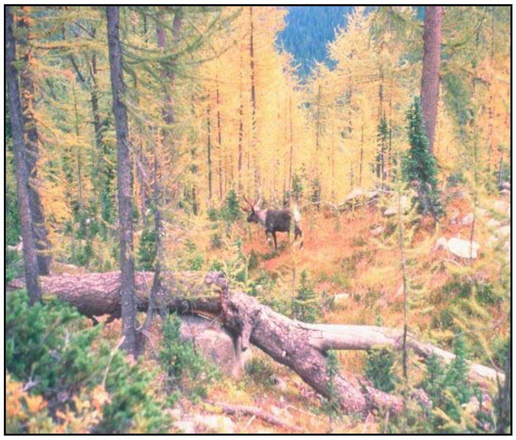
Principal targets: Includes habitat and connectivity values for wide-ranging carnivores - gray wolf (*Canis lupus*), grizzly bear (*Ursus arctos horribilis*), fisher (*Martes pennanti*), wolverine (*Gulo gulo luscus*), and lynx (*Lynx canadensis*); birds- Common Loon (*Gavia immer*), Harlequin Duck (*Histrionicus histrionicus*), Bald Eagle (*Haliaeetus leucocephalus*), and Flammulated Owl (*Otus flammeolus*); a mollusk- spotted slug (*Magnipelta mycophaga)*; an amphibian- western toad (*Bufo boreas).* Aquatic targets include - white sturgeon (*Acipenser transmontanus*), westslope cutthroat trout (*Onchorhynchus clarki lewisi*), bull trout (*Salvelinus confluentus*), Umatilla dace (*Rhinichthys umatilla*), and burbot (*Lota lota*). Community targets include Scrub birch/sedge/sphagnum (*Betula glandulosa / Carex / Sphagnum)*, Interior western redcedar/skunk cabbage/sphagnum (*Thuja plicata / Lysichiton americanum/Sphagnum)*, Interior western redcedar/devil's club (*Thuja plicata / Oplopanax horridus)*, Western white pine/Queen's cup forest (*Pinus monticola / Clintonia uniflora Forest)*, Western redcedar/maidenhair fern (*Thuja plicata / Adiantum pedatum Forest)*, Western hemlock/false azalea forest (*Tsuga heterophylla / Menziesia ferruginea Forest)*. Rare plants include Birstly sedge *(Carex comosa)*, mountain moonwort (*Botrychium* *montanum*), stalked moonwort (*Botrychium pendunculosum*). Expert nominated sites include montane wet meadows, conifer swamp, sphagnum bog, and subalpine wet meadow. There are also 9 aquatic systems in this conservation area.

Ownership: 64% federal (United States Forest Service, Bureau of Land Management), 19.5% state (Idaho Department of Fish and Game, Idaho Department of Lands, Idaho Department of Parks and Recreation), 10% private (Private and NGO's), 3.5% provincial (Crown Land), 3% water

Threats and Management Issues: This CA is predominantly managed as public forestland. The majority of the CA is owned by the USFS, Idaho Department of Lands, or BLM. Historic logging practices have resulted in the loss of seral species (particularly white pine), increased catastrophic pathogen invasions (particularly bark beetle), invasives (particularly knapweed, hawkweed), forest fragmentation resulting from increased road densities, and altered fire regimes.

Stakeholders: USFS, IDL, BLM, Private Timber Companies (Forest Capital, Louisiana Pacific), NGO's (Selkirk Coalition, Priest Basin Association, Rocky Mountain Elk Foundation, Nature Conservancy Canada, The Nature Conservancy, Inland Northwest Land Trust, Vital Ground, Idaho Conservation League), County and Municipal Government, Bonneville Power Administration, Kootenai Tribe of Idaho, Kalispell Tribe of Indians.

Opportunities: 1) The Upper Priest River is currently being proposed as a Wild and Scenic River. 2) Long Canyon is currently being considered for proposal as a Wilderness Area. It is an18-mile long road less drainage that has not been logged and exists as a corridor from the broad and low elevation Kootenay Valley (Purcell Trench) though a verdant old growth forest, onto the granite ridges of the Selkirk's crest. This area maintains 24 sub-alpine lakes and a rare interior rain forest. 3) Idaho contains more land in roadless areas (8 million acres) than any other state in the nation, except Alaska, with a large portion of that located in the Priest and Selkirk ranges. 4) The Idaho Panhandle National Forest Plan is currently going under revision with a schedule completion date of April 2005.



Mountain Caribou – Trevor Kinley

Salmo River.

Size: 81,294 acres/32,924 hectares.
Irreplaceability Score (Mean)**: 4.9**
Vulnerability Score (Mean)**: 1.5**
Combined Score: 6.4

Conservation Area Description: The Salmo River conservation area is located in the West Kootenay region of south-eastern British Columbia. It runs generally north-south along the Salmo River from just north of the Canada/US border to Nelson, British Columbia.

Included in the Conservation Area are the Salmo and South Salmo Rivers, along with Clearwater, Sheep, Erie and Wallack Creeks; these rivers and creeks are all tributaries to the Pend Oreille River, which in turn feeds the Columbia River. Low elevation deciduous riparian habitat dominates the area and this habitat is bisected by highway 3/6; a major highway connecting the BC interior with the west coast.

The towns of Salmon Siding (now Salmo), Ymir and Erie are all located within the conservation area and grew up along the historic Nelson/Ft. Sheppard railway. These towns and the railway serviced a growing mining industry (placer and hard rock) from the late 1800's to the early 1940's. Mining still occurs in the area today for gold, silver, zinc, lead and tungsten.

Prior to the construction of dams on the Columbia River, salmon were common in the rivers and streams of this conservation area. The Salmo River was originally named the Salmon River, attesting to this fact. Bull trout and rainbow trout are now the dominant species in the area.

Principal Targets: Terrestrial targets include Interior Douglas-fir Forest, Interior Western redcedar/hemlock/Douglas-fir Forest, Fen, Riparian Forest, a moss (*Hygrohypnum norvegicum*), tailed frog (*Ascaphus montanus*), harlequin duck (*Histrionicus histrionicus*), and habitat for grizzly bear (*Ursus arctos horribilis*). Aquatic targets include bull trout (*Salvelinus confluentus*) and westslope cutthroat trout (*Onchorhynchus clarki lewisi*). 6 aquatic systems occur in the conservation area.

Ownership: Ownership within the conservation area is 65% privately held and 35% BC provincial crown land.

Threats and Management Issues: Aquatic issues dominate in this area. Non point source pollution from mining along with the conversion of deciduous riparian areas for agriculture use have led to the alteration and degradation of fish habitat, including sedimentation, erosion and the deposition of potentially toxic substances.

Opportunities: Secure by purchase and/or covenant key deciduous riparian areas. Assist local groups and organizations with aquatic restoration and conservation projects.

Stakeholders: Columbia-Kootenay Fisheries Renewal Partnership, Columbia Basin Trust, Columbia Basin Fish and Wildlife Compensation Program, BC Ministry of Water, Land and Air Protection, BC Ministry of Sustainable Resource Management, Salmo River Protection Society, Salmo Watershed Steamkeepers Society, Department of Fisheries and Oceans, logging companies.

Scotchman Peak – KJ Torgerson

Scotchman Peak.

Size: 12,842 acres/5,201 hectares.
Irreplaceability Score (Mean)**: 5.8**
Vulnerability Score (Mean)**: 1.8**
Combined Score: 7.6

Conservation Area Description: This relatively pristine conservation area is part of the greater Scotchman Peak roadless area located within Idaho and Montana. Although Scotchman Peak itself is in Idaho, most of this 36,422 ha (90,000 acres) road less area is in Montana and exists as part of the Cabinet-Yaak ecosystem. The Forest Service has recommended 55% of this for wilderness protection by Congress. Scotchman Peak extends to 2136 m (7,009 feet), making it the 5th highest peak in Idaho, and towers 1524 m (5,000 feet) over Lake Pend Oreille. The road less area, in several places, extends from the valley floor to the rugged, glaciated peaks far above. A notable feature in the Montana portion of the Ross Creek Cedar Grove contains impressive 500-year old western red cedar.

Ownership: Ownership within the conservation area is 100% federal (USFS).

Principal Targets: Aquatic target - westslope cutthroat trout (*Onchorhynchus clarki lewisi*), and one important aquatic system. Expert Nominated Site- disturbed colluvial landslide, Engelmann spruce/subalpine fir dry forest, Engelmann spruce/ subalpine fir dry parklands, lodgepole pine forest and woodlands.

Management Issues: Area is currently designated as road less area, a designation that could change. If the road less designation were eliminated, the area would potentially be managed for timber harvest and at risk for incompatible forest practices. Other threats include invasives, forest pathogens and altered fire regimes.

Opportunities: Support efforts to include this area as part of the Cabinet Mountain Wilderness Area.

Stakeholders: U.S. Forest Service, University of Idaho, and Montana Wilderness Association.

Shuswap Lake – Dave Hillary

Shuswap Highlands.

Size: 1,082, 465 acres/438,398 hectares.
Irreplaceability Score (Mean)**: 4.1**
Vulnerability Score (Mean)**: 1.6**
Combined Score: 5.7

Conservation Area Description: This conservation area is south central British Columbia in the Thompson-Okanagan region. The area is dominated by Shuswap Lake, which is bisected by the TransCanada Highway. The unusual pattern of the lake is caused by several intersecting valleys formed by the movement of ancient glaciers in the Shuswap Highlands. Forest cover is greatly affected by the diverse moisture patterns so tree species vary from cedar, hemlock, spruce, white pine, Douglas fir and Ponderosa Pine.

Recreational development around Shuswap Lake has been occurring for the past 30 years. This trend has been accelerated in the past 7 years, with increasing demands from urban dwellers looking for second/vacation homes.

Principle Targets: Terrestrial targets include Mexican mosquito fern (*Azolla mexicana*), and fens. Aquatic targets include white sturgeon (*Acipenser transmontanus*), pink salmon (*Onchorhynchus gorbuscha*), coho salmon (*Onchorhynchus kisutch*), sockeye salmon (*Onchorhynchus nerka*), inland Redband trout (*Onchorhynchus mykiss gairdneri*), and chinook salmon (*Onchorhynchus tshawytscha)* In addition, 13 important aquatic systems occur within this conservation area.

Ownership: Ownership within the conservation area is 91% BC provincial crown land, 5% privately owned, 3% BC crown land under Christmas tree licence, and less than 1% under the management and control of BC provincial parks and First Nations.

Threats and Management Issues: The entire Shuswap area is influenced by high recreational use and increasingly by second home development. This increased recreational and residential development has resulted in increased non-point pollution particularly domestic waste and pesticides. Linear corridors in conjunction with the topography of the area have led to habitat fragmentation as well.

Opportunities: Development of watershed councils dealing with domestic sewage, water quality monitoring, and public education could be one potential way of mitigating the effects of pollution in the area. The land ownership pattern in the conservation area would suggest that partnerships are necessary between the provincial government and other levels of government and NGO's.

Stakeholders: Federal Department of Fisheries and Oceans, BC Ministry of Water, Land and Air Protection, BC Ministry of Sustainable Resource Management, BC Ministry of Forests, BC Ministry of Transportation, Shuswap First Nations, Several Regional Districts and Municipalities, timber companies specifically Co-op Canoe operations.

Slocan River – Dave Hillary

Slocan River.

Size: 324,912 acres/131,589 hectares.
Irreplaceability Score (Mean)**: 5.0**
Vulnerability Score (Mean)**: 1.2**
Combined Score: 6.2

Conservation Area Description: This conservation area generally follows the Slocan River watershed in the West Kootenay region of south-eastern British Columbia between the City of Castlegar and the village of Hills, at the north end of Slocan Lake. The conservation area is found within the Selkirk Mountains within what is known as the interior wet belt. The dominant feature of the Slocan Valley landscape is steep terrain. The main valley and tributaries are characterized by flat, narrow valley bottoms, which change abruptly to steep mountainous terrain. These dramatic changes in topography have a distinct effect on climate, soils, and vegetation and aquatic systems. Climate can be described as continental with warm summers and cold winters annual precipitation is approximately 76 cm (30 inches).

Upper elevations within the conservation area are dominated by Engelmann spruce and subalpine fir. Middle and lower elevations contain both Douglas fire and Ponderosa pine. At one time, large western red cedar and hemlock stands dominated the riparian areas; virtually all of these stands have been cleared for settlement.

Valhalla Provincial Park at 49,893 ha (123,288 acres), is the largest protected area within the Conservation Area. The park was established to protect the diverse topography, majestic peaks and unique vegetation typical of the Selkirk Mountains (BC Parks). Mining, industrial logging and settlement are all prevalent throughout the area.

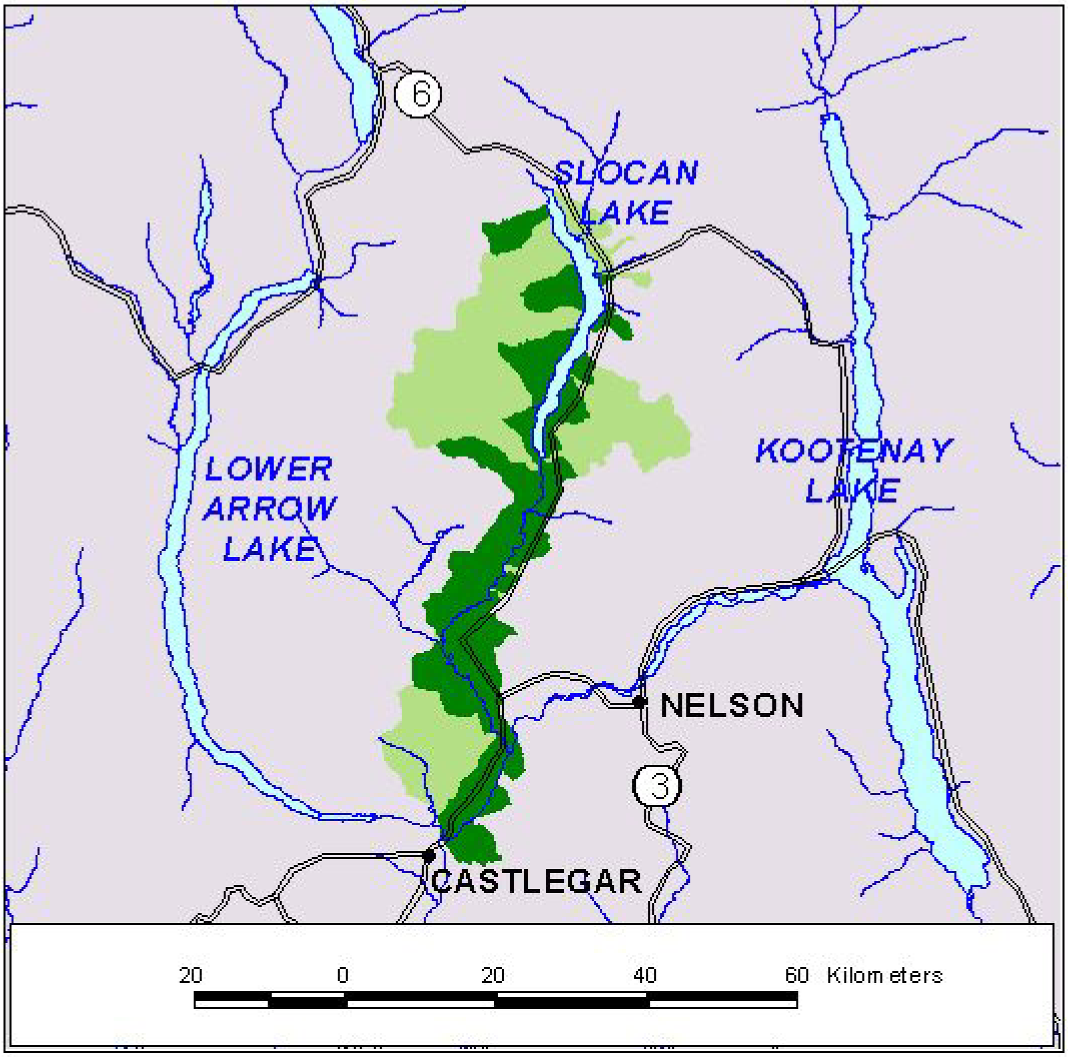
Principal Targets: Terrestrial targets include Riparian Forests. Aquatic targets include white sturgeon (*Acipenser transmontanus*), bull trout (*Salvelinus confluentus*), westslope cutthroat trout (*Onchorhynchus clarki lewisi*), Umatilla dace (*Rhinichthys umatilla*), and Shorthead sculpin (Cottus confusus). Nine important aquatic systems are also found within this conservation area.

Ownership: Ownership within the conservation area is 49% BC provincial crown land, 38% provincial park (administered by the Ministry of Water, Land and Air Protection), 12% private, and 1% ENGO.

Threats and Management Issues: Issues within the conservation area include water allocation (as it relates to water temperature), and the construction of in-stream barriers to fish movement. Also important is forest pathogens including insects and disease.

Opportunities: In-stream habitat enhancement. Restoration of altered fire regime. Maintain remnants of old-growth forest.

Stakeholders: BC Ministry of Water, Land and Air Protection, BC Ministry of Sustainable Resource Management, Columbia Basin Trust, Columbia Basin Fish and Wildlife Compensation Program, Valhalla Wilderness Society.



Spirit Lake – KJ Torgerson

Spirit Lake.

Size: 17,738 acres/7,184 hectares.
Irreplaceability Score (Mean)**: 7.0**
Vulnerability Score (Mean)**: 3.9**
Combined Score: 10.9

Conservation Area Description: Kootenay (Water People) Indians who lived on the shores of the lake name the lake "Tesemini" or "Lake of the Spirits." Spirit Lake became a resort town around 1910. City population was 900 in 1989, but seasonal residents boost the population to nearly triple that number. The lake itself measures more than 7 km (4.5 miles) long, is over 1.6 km (1 mile) across at the widest point, maintains a surface area of 585 ha (1,445 acres), and has 19 km (12 miles) of shoreline. Spirit Lake is reputed to be one of only two lakes in the world with a sealed bottom - this seal has been leaking for the past ten years. In 2002, through a state funded project, part of the lake was drained, the seal repaired and the water returned. The western end of the lake maintains a large wetland complex

Part of the conservation area includes Mount Spokane State Park which is 5633 ha (13,919 acres) directly west and upstream of Spirit Lake. The mountain peaks at 1793 m (5,883 feet) elevation, feature stands of old-growth timber and granite rock outcroppings, and receives 762 cm (300 inches) of snow in the winter. The park features 25 kms (16 miles) of groomed Nordic ski trails, extensive ski areas including five chair lifts, a 610 m (2,000 feet) ski hill, and groomed trails for snowmobiling. All land within the boundaries of Mt. Spokane State Park, except for the area immediately west of the alpine ski area, was classified in 1999 using the Park Commission's 1995 guidelines. As a result, about 58% of Mt. Spokane State Park is now classified as Resource Recreation, 10% Recreation, 22% Natural Forest Area, 4% Natural Area Preserve, and 1% Heritage. The conservation area has a history of logging and is currently managed as timberlands.

Principal Targets: Terrestrial targets include habitat and connectivity values for gray wolf (*Canis lupus*), grizzly bear (*Ursus arctos horribilis*), fisher (*Martes pennanti*), wolverine (*Gulo gulo luscus*), and lynx (*Lynx canadensis*); and bald eagle (*Haliaeetus leucocephalus*). Community targets include Western hemlock/bear grass forest (*Tsuga heterophylla/Xerophyllum tenax forest)*. Expert nominated sites- fen, marsh, and sphagnum bog. Also included is 1 aquatic system.

Ownership: Ownership within the conservation area is 67% federal (US Dept of Defense, Bureau of Indian Affairs, Bureau of Recreation), 23% private, 9% state (Idaho

Dept of Fish of Game, Idaho Department of Lands, Idaho Department of Recreation), 1% water.

Threats and Management Issues: The main sources of revenue within the conservation area are from recreation and timber production. This conservation area is predominantly managed for public recreation and private forestland. Historic and current forestry practices have resulted in the loss of seral species (particularly white pine), catastrophic pathogen invasions (particularly bark beetle), invasives, and forest habitat fragmentation resulting from increased road densities and altered fire regimes have resulted in negative impacts. The wetlands at the west end of the lake are at risk of further rural development that could result in habitat degradation and fragmentation, increased stream sedimentation, and non-point sources of pollution to the wetlands and lake. Currently, part of the wetlands have been drained and converted to agriculture, and experience incompatible grazing practices. Associated with the recreational facilities nearby and the high increase roads densities are increased recreational vehicles.

Opportunities: 1) The Idaho Panhandle National Forest Plan is currently going under revision with a schedule completion date of April 2005. 2) The Forestry Department at IEP manages 46,539 ha (115,000 acres) of company-owned timberland in north-eastern Washington and northern Idaho, 24,281 ha (60,000 acres) of which encompasses this CA. The IEP forestry mission is to produce a continuous supply of high quality saw logs to area sawmills while securing a stable wood fibre supply for the paper mill.

Stakeholders: US Dept of Defense, BIA, Bureau of Recreation, Washington State Parks and Recreation, Inland Empire Paper, Outfitters, NGO's (Inland Northwest Land Trust), County and Municipal Government, Idaho Department of Fish and Game, Idaho Department of Lands, Idaho Department of Recreation, private developers.

Clearwater - USFS

St. Joe-Clearwater

Size: 1,432,089 acres/579,996 hectares
Irreplaceability Score (Mean)**: 5.2**
Vulnerability Score (Mean)**: 1.7**
Combined Score: 6.9

Conservation Area Description: This conservation area, which includes parts of both the St. Joe and Clearwater watersheds, extends through the St. Joe Mountains to the Bitterroot Mountains in the east and through the Clearwater Mountains to the Clearwater River area in the south. The Saint Joe Mountains, made up of Belt Series sedimentary rocks, form a high ridgeline that runs 72 km (45 miles) east to west between the Saint Joe and the Coeur d'Alene rivers. The range reaches its highest point northeast of Saint Maries at Latour Peak 1953 m (6,408 feet). Much of the Saint Joes' crest line is barren of trees due to both elevation and a 1,214,057 ha (3,000,000 acres) forest fire in 1910. The upper St. Joe River Basin includes four roadless areas. The St. Joe River, with an altitude of 649m (2,128 feet) at its lower reaches, lies between the St. Joe and Clearwater ranges. Of the 107 km (66.3 miles) of river, 43 km (26.6 miles) were designated Wild and Scenic River in 1978. The lower stretch is an uninterrupted, nearly continuous cottonwood corridor interspersed with islands and cobble bars.

The Clearwater Basin is formed mostly of Idaho Batholith granite. During the Pleistocene ice age alpine glaciers carved cirques and lake basins into the sides of higher Clearwater peaks. The Clearwater River drains 27,000 km^2 (10,425 mi^2) and eventually joins the Snake River near Lewistown, Idaho. The highest point is about 2,745 m (9,000 ft). The Clearwater range includes the Selway- Bitterroot Wilderness (designated in 1964), and the Middle Fork of the Clearwater, which was designated Wild and Scenic in 1968. The landscape of this conservation area is dominated by western red cedar, western white pine, grand fir, western larch and western hemlock. In lower elevations, ponderosa pine and bluebunch wheatgrass exist as the predominant vegetation types. The upper basin, specifically the Selway, Lochsa and North Fork canyons, is home to low-elevation, warm, moist canyons that serve as refugia for a globally unique forest ecosystem that harbors 40 plant species with coastal affinities. Researchers agree this ecosystem is a relict leftover from more widespread conditions that occurred during the Miocene and Pliocene.

Several hydroelectric dams were built and removed along the system over the years. Currently, Dworshak dam on the North Fork of the Clearwater, completed in 1973, and remains as a complete block to anadromous and resident fish passage, as well as 22 more dams on tributaries of the Clearwater, which are used for agricultural purposes (reduce spawning habitat). Dworshak reservoir is 85 km (53 miles) long and has a surface area of

8023 ha (19,824 acres) with 12519 ha (30,935 acres) of adjacent "project lands". The Dworshak Hatchery is the largest steelhead hatchery in the world, and is operated by the U.S. Fish and Wildlife Service.

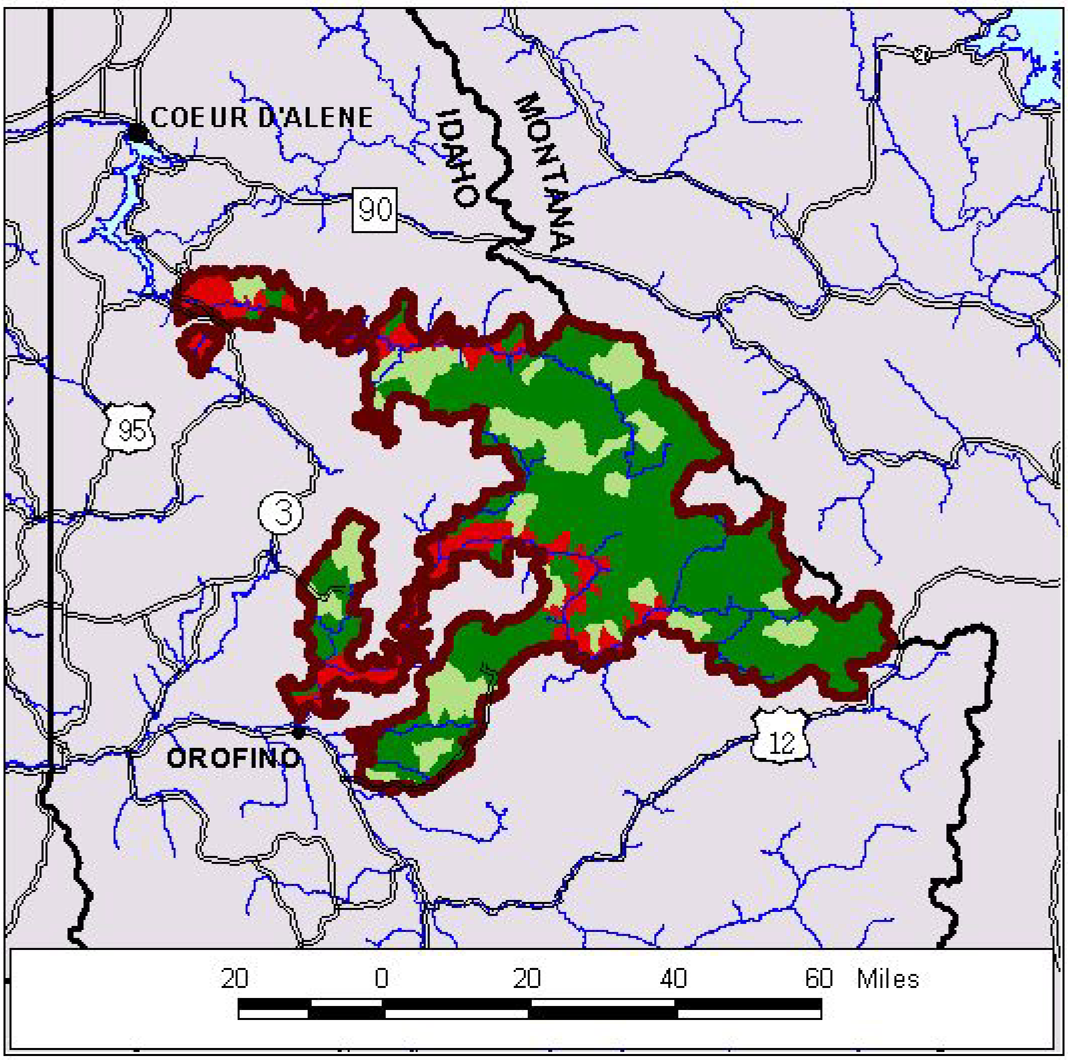
Principle Targets: Terrestrial targets include habitat and connectivity values for gray wolf (*Canis lupus*), grizzly bear (*Ursus arctos horribilis*), fisher (*Martes pennanti*), wolverine (*Gulo gulo luscus*), and lynx (*Lynx canadensis*); harlequin duck (*Histrionicus histrionicus*), bald eagle (*Haliaeetus leucocephalus*) wintering area, and Flammulated owl (*Otus flammeolus*). Amphibian targets include Coeur d'Alene salamander (*Plethodon idahoensis*), and the Idaho giant salamander (*Dicamptodon aterrimus*). Aquatic targets include Chinook salmon (*Onchorhynchus tshawytscha*), westslope cutthroat trout (*Onchorhynchus clarki lewisi*), rainbow trout (*Onchorhynchus mykiss*), bull trout (*Salvelinus* confluentus), and 17 important aquatic systems. Community targets include Interior western redcedar/skunk cabbage/sphagnum forest (*Thuja plicata / Lysichiton americanum / Sphagnum)*, Interior western redcedar/maidenhair fern forest (*Thuja plicata / Adiantum pedatum Forest)*, Interior western redcedar/wild sarsaparilla forest (*Thuja plicata / Aralia nudicaulis Forest)*, Mountain hemlock/clasping twisted stalk forest (*Tsuga mertensiana / Streptopus amplexifolius Forest).* Rare plants include Case's corydalis (*Corydalis caseana var. hastata)*, Clearwater phlox (*Phlox idahonis),* Constance's bitter cress *(Cardamine constancei),* Idaho strawberry *(Waldsteinia idahoensis),* spacious monkeyflower *(Mimulus ampliatus),* Pennell's kittentail *(Synthyris platycarpa),* Broad-fruit mariposa (*Calochortus nitidus),* Phantom orchid (*Cephalanthera austiniae),* clustered lady's slipper (*Cypripedium fasciculatum),* Mountain moonwort *(Botrychium montanum)*. Expert nominated sites include alpine meadow, fen, interior grand fir forests, montane riparian shrubland, subalpine wet meadow, rock outcrop/cliff, montane riparian forest, and dwarf-shrubland.

Ownership: Ownership within the conservation area is 67% federal (US Dept of Defense, Bureau of Indian Affairs, Bureau of Recreation), 23% private, 9% state (Idaho Dept of Fish of Game, Idaho Department of Lands, Idaho Department of Recreation) 1% water.

Threats and Management Issues: The main source of revenue within the conservation area is from timber production. This area is predominantly managed as public and private forestland with the USFS, BLM and private timber companies owning the majority of the land. Threats include loss of seral species (particularly white pine), forest fragmentation, and increased road densities associated with historic logging practices; catastrophic pathogen invasions (particularly bark beetle); invasives; altered fire regimes; altered hydrograph, thermograph and downstream nutrient loading rates associated with hydropower operations; and a high number of landslides resulting in stream sediment loading. The high amount of recreational use has significantly increased the trail system as well as number of ORV's.

Opportunities: 1) The Idaho Panhandle National Forest Plan is currently going under revision with a schedule completion date of April 2005. 2) Potlatch owns approximately 675,000 acres of timberland in northern Idaho, most in this conservation area. About onefourth of the acreage Potlatch harvests annually is clear-cut. Potlatch uses GIS in its efforts to develop a "landscape" approach to managing its Idaho forests and hopes in the future that “forestry activities can be balanced to maintain water quality and wildlife habitats.” Potlatch is currently actively seeking opportunities to consolidate is lands as well as acquire dollars for conservation projects.

Stakeholders: USFWS, IDFG, USFS, IDL, BLM, Private Timber Companies (Forest Capital, Potlatch), Outfitters, NGO’s (Rocky Mountain Elk Foundation, The Nature Conservancy, Idaho Conservation League, Palouse Clearwater Environmental Institute), County and Municipal Government, Nez Perce Tribe.



Thompson- Lower Clark Fork (Idaho-Montana).

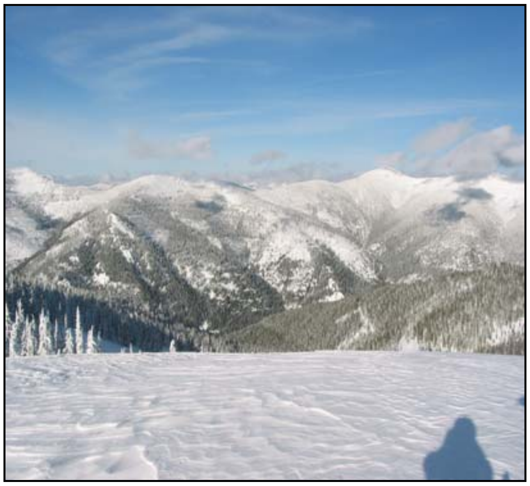
Size: 599,583 acres/242,648 hectares
Irreplaceability Score (Mean)**: 5.1**
Vulnerability Score (Mean)**: 1.3**
Combined Score: 6.4

Conservation Area Description: This conservation area is located in northwestern Montana. Three main rivers: the Clark Fork, Thompson, and Bull Rivers are included. Waters from the northern extent of the Bitterroot Mountains and the southern extent of the East Cabinet Mountains drain into to the lower Clark Fork River System. Two dams here, the Noxon Rapids Dam, and the Cabinet Gorge Dam, impede the flow of the lower Clark Fork shortly before the river leaves the state of Montana. Backed up river waters span as wide as two miles just behind the Noxon Rapids dam. Predominant geology is glaciated argillite and quartzite, with alluvium in the valley floor. The Bitterroot Range also has intrusions of granite near the Idaho batholith. Mean annual precipitation varies significantly from the west to the east within this area, as the Bitterroot Mountains form a rain shadow that makes the vegetation in the area near Plains, Montana, and in the Thompson River are much drier (ponderosa pine and Douglas-fir) as opposed to what is found at the same elevations in the Bull River Valley. The lower Bull River is a low gradient meandering stream with many S-curves and oxbows. The wetlands along the river are extensive, and vegetation is lush with numerous sedge marshes and Douglas-spirea riparian shrublands. The diverse and highly productive vegetation is due to the Pacific Maritime climate where annual precipitation ranges from 64 cm (25 inches) in the valleys to up to 254 cm (100 inches) in the mountains. Forest habitat type series are western red cedar, Engelmann spruce, and western hemlock in the warmer valley floors, and mountain hemlock and subalpine fir in the cooler upper elevations. The conservation area could serve as a key corridor between the Cabinet/Yaak and the Selway/Bitterroot grizzly bear populations. The primary natural disturbance processes are fire, flooding, disease and insect epidemics.

Principal Targets: Includes habitat and connectivity values for fisher (*Martes pennanti)*, wolverine (*Gulo gulo luscus*), grizzly bear (*Ursus arctos horribilis*), and lynx (*Lynx canadensis*); amphibians - western toad (*Bufo boreas*), Coeur d'Alene Salamander (*Plethodon idahoensis*); and a bird - Flammulated owl (*Otus flammeolus*). Fish targets are the westslope cutthroat trout (*Onchorhynchus clarki lewisi*) and bull trout (*Sylvelinus confluentus*). Rare plant conservation targets include clustered lady's slipper (*Cypripedium fasciculatum*), mountain moonwort (*Botrychium montanum*), and the rare moss *Grimmia brittoniae*.

Ownership: Federal 76%, State (Mt) 3%, and Private 21%

Threats and Management Issues: Land use is predominantly timber harvest, mining, limited grazing, and recreation. The area has been heavily logged in the past. Threats to natural systems and native species include improper timber harvest techniques, mining, damming of rivers, exotic species, and altered fire regimes.



Upper Coeur d'Alene.

Size: 151,340 acres/61,292 hectares.
Irreplaceability Score (Mean)**: 4.1**
Vulnerability Score (Mean)**: 2.4**
Combined Score: 6.6

Conservation Area Description: The Coeur d'Alene range is a triangular group of mountains, made up of Belt Series sedimentary rocks, stretching from Lake Pend Oreille in the north to Lake Coeur d'Alene in the south, to Kellogg, Idaho in the east.

Upper Coeur d"Alene – KJ Torgerson

The range is bounded by the Bitterroot Mountains in the east, the St. Joe Mountains in the south and Coeur D'Alene Lake and the Purcell Trench in the west. The Upper Coeur d'Alene conservation area within this range is located in the north-eastern part along the ID-MT border (continental divide) and includes the entire watershed upstream from Prichard, ID. The tallest peak in the CA is Hullman Peak, rising 1703 m (5,586 ft). The CA encompasses the headwaters of the Coeur D'Alene River and includes TeePee, Independence and Shoshone creeks. The North Fork of the Coeur D'Alene River lies to the southwest and is not located in the CA.

In fall of 2001, the Coeur d'Alene River Ranger District completed the construction of a comprehensive watershed restoration project. The assessment identified the TeePee Creek watershed as "functioning-at-risk" due to high sediment levels introduced by past riparian impacts, and of the highest priority for aquatic restoration and net road reduction. As a result of the subsequent restoration project, the Coeur d'Alene River Ranger District of the USFS Idaho Panhandle National Forest were the 2002 winners of the Award of Excellence in Riparian Management for their work on the Teepee Creek. The problems of high sedimentation and habitat alteration on TeePee Creek are characteristic of problems throughout the CA. The CA has a long history timber harvesting and associated road building. As a result, the area is highly roaded and maintains stream sedimentation problems, and thus is a focus area of the USFS to reduce road densities and restore watersheds. To date, over 81 km (50 miles) of old logging roads that were laced with 78 stream crossings have been treated.

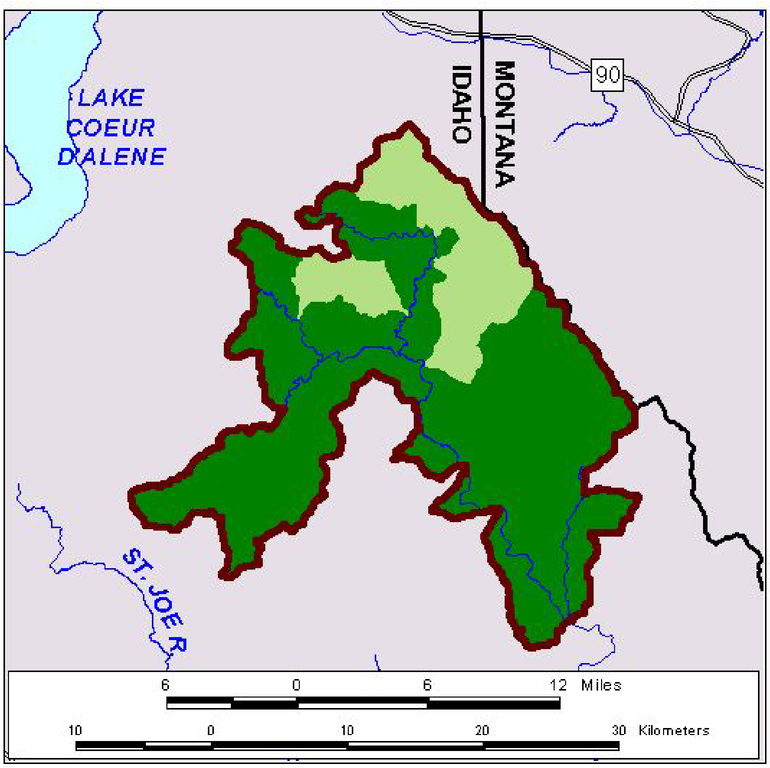
Principle Targets: Includes habitat and connectivity values for wide-ranging carnivores- gray wolf (*Canis lupus*), grizzly bear (*Ursus arctos horribilis*), fisher (*Martes pennanti*), wolverine (*Gulo gulo luscus*), and lynx (*Lynx canadensis*); a bird – Harlequin duck (*Histrionicus histrionicus);* an amphibian- Coeur d'Alene salamander (*Plethodon idahoensis)*. Aquatic targets include westslope cutthroat trout (*Onchorhynchus clarki lewisi)*, and bull trout (*Salvelinus confluentus)*. Rare plants include Idaho strawberry (*Waldsteinia idahoensis),* Phantom orchid *(Cephalanthera austiniae),* Crenulate moonwort *(Botrychium crenulatum).* Expert nominated site- interior western cedar/hemlock/Douglas fir forests, montane wet meadows, subalpine wet meadow, montane riparian forest, sub-alpine fir/mountain hemlock forest. 2 aquatic systems.

Ownership: Ownership within the conservation area is 99.9% federal (US Forest Service), <1% private.

Threats and Management Issues: This conservation area is predominantly managed as public forestland with the USFS owning the majority of the land. Most of the CA has been heavily harvested resulting in the water quality degradation from high systemic sedimentation rates, loss of seral species (particularly white pine), increased catastrophic pathogen invasions (particularly bark beetle), invasives (particularly knapweed), forest fragmentation resulting from increased road densities, and altered fire regimes. Channel straightening has occurred in efforts to control while pine blister rust (dozer piling operation), increase hay production for livestock, and install small sawmills. High recreational use has impacted areas along roads and riparian areas.

Opportunities: 1) The Idaho Panhandle National Forest Plan is currently going under revision with a schedule completion date of April 2005.

Stakeholders: USFS, BLM, Recreational groups (fishing and hunting user groups, ORV's), County Government, Coeur d'Alene Tribe of Indians, NGO's.



Weitas Creek – KJ Torgerson

Weitas Creek.

Size: 4,462 acres/1,807 hectares.
Irreplaceability Score (Mean)**: 6.0**
Vulnerability Score (Mean)**: 0.7**
Combined Score: 6.6

Conservation Area Description: The over 200,000-acre Bighorn/Weitas roadless area is located in the northern part of the Clearwater Mountains. It lies just to the south of Mallard-Larkins and west of the Great Burn and straddles the east-to-west-running divide between the Clearwater River drainage to the south and the St. Joe to the north. Weitas Creek is a large stream and blue ribbon trout fishery. Idaho conservationists proposed about 89,031 ha (220,000 acres) of wilderness. The Forest Service has since recommended about 60,703 ha (150,000 acres) as designated wilderness.

Ownership: Ownership within the conservation area is 100% federal (USFS).

Principle Targets: Terrestrial targets include habitat and connectivity values for gray wolf (*Canis lupus*), grizzly bear (*Ursus arctos horribilis*), fisher (*Martes pennanti*), wolverine (*Gulo gulo luscus*), and lynx (*Lynx canadensis*); subalpine fir/mountain hemlock forest, and subalpine dry grassland. Aquatic targets include Chinook salmon (*Onchorhynchus tshawytscha),* westslope cutthroat trout (*Onchorhynchus clarki lewisi*), rainbow trout, (*Onchorhynchus mykiss*), bull trout (*Salvelinus confluentus*), and one important aquatic system.

Management Issues: Incompatible timber harvest, incompatible off-road vehicle use (there is a plan to turn the Weitas Creek trail into an all terrain vehicle track), forest pathogens (particularly root rot), altered fire regimes, and invasives.

Opportunities: Support the wilderness designation.

Stakeholders: Unknown.

Wells Gray/Bowron.

Size: 3,627,967 acres/1,469,327 hectares.
Irreplaceability Score (Mean)**: 4.2**
Vulnerability Score (Mean)**: 1.3**
Combined Score: 5.5

Green Mountain Lookout – Dave Hillary

Conservation Area Description: The Wells Gray/Bowron conservation area is located south of Prince George, BC and northeast of Kamloops, BC in both the Caribou Mountains and Quesnel Highlands. It includes the Fraser, Clearwater, Caribou, and Rausch rivers along with Mahood, Quesnel, Clearwater and Canim Lakes. Topography is diverse ranging from rugged mountains in the Caribou range to the rounded hilltops of the Quesnel Highlands. Two Provincial protected areas are located in the conservation area: Wells Gray Provincial Park at 540,000 ha (1,334,369 acres), and Bowron Lake Provincial Park at 149,207 ha (368,699 acres). Alpine Tundra, Engelmann Spruce-Subalpine fir, Interior Cedar-Hemlock and Sub-boreal spruce can all be found in the area. It supports a diverse population of fish and wildlife species including white sturgeon and bull trout along with grizzly bear, mountain caribou, American bittern and wolverine. The area is also a prime connection to the larger mountain parks to the east.

Principal Targets: Terrestrial targets include habitat and connectivity values for grizzly bear (*Ursus arctos horribilis*), wolf (*Canis lupus*), wolverine (*Gulo gulo luscus*), and lynx (*Lynx canadensis*); ecosystems - alpine wet meadow, fen, sphagnum bog, subalpine dry grassland and rock outcrop/cliff. Aquatic targets include white sturgeon (*Acipenser transmontanus*), Chinook salmon (*Onchorhynchus tshawytscha*), coho salmon (*Onchorhynchus kisutch*) and sockeye salmon (*Onchorhynchus nerka*). 42 important aquatic systems are found in this conservation area; the highest number in any single area.

Ownership: Ownership within the conservation area is 61% BC provincial crown land, 28% BC provincial park (administered by the Ministry of Water, Land and Air Protection), 9% BC provincial crown land held under tree farm license, and 2% privately held.

Threats and Management Issues: Industrial logging and oil and gas exploration are the most significant threats to conservation efforts in the area.

Opportunities: unknown

Stakeholders: BC Ministry of Water, Land and Air Protection, BC Ministry of Sustainable Resource Management, Federal Department of Fisheries and Oceans.

Ahbou Lake

Size: 4,544 acres/1,839 hectares
Irreplaceability Score (Mean)**: 5.3**
Vulnerability Score (Mean)**: 1.0**
Combined Score: 6.3
Description: This conservation area contains an important aquatic system and Chinook salmon (*Oncorhynchus tshawytscha*).

Bitterroot Mountainsnail EO

Size: 13,904 acres/5,627 hectares
Irreplaceability Score (Mean)**: 7.7**
Vulnerability Score (Mean)**: 3.9**
Combined Score: 11.6
Description: This conservation area is located in west-central Montana near the Idaho border. It contains a Bitterroot mountainsnail (*Oreohelix amariradix*) occurrence and an important terrestrial system – Subalpine Larch forests. Ownership is 73% private and 27% USDA Forest Service.

Bull Trout Spawning Area.

Size: 1,425 acres/577 hectares.
Irreplaceability Score (Mean)**: 4.4**
Vulnerability Score (Mean)**: 1.0**
Combined Score: 5.4
Description: This conservation area contains important bull trout (*Salvelinus confluentus*) spawning habitat. Westslope cutthroat trout (*Onchorhynchus clarki lewisi*) and two important aquatic systems also occur here. 82% BC provincial crown land, 18% privately held.

Burbot Spawning Area.

Size: 982 acres/398 hectares.
Irreplaceability Score (Mean)**: 5.1**
Vulnerability Score (Mean)**: 1.2**
Combined Score: 6.2
Description: This conservation area contains important burbot (*Lota lota*) spawning habitat. Westslope cutthroat trout (*Onchorhynchus clarki lewisi*), bull trout (*Salvelinus confluentus*) and two important aquatic systems also occur here. 68% of land is held privately, 32% BC provincial crown land.

Cyr Culch Bald Eagle Nest EO.

Size: 13,572 acres/5,496 hectares.
Irreplaceability Score (Mean)**: 6.5**
Vulnerability Score (Mean)**: 3.6**
Combined Score: 10.0
Description: This conservation area contains an important bald eagle (*Haliaeetus leucocephalus*) nest site. Other terrestrial targets include Montane Riparian Forest, Ponderosa Pine Woodland, and Interior Douglas Fir Forest. Aquatic targets include Westslope cutthroat trout (*Onchorhynchus clarki lewisi*) and one important aquatic system. Ownership is 82% privately held, 15% USDA Forest Service and 3% other.

Fleabane/Salmon Driven.

Size: 25,609 acres/10,372 hectares.
Irreplaceability Score (Mean)**: 5.5**
Vulnerability Score (Mean)**: 1.0**
Combined Score: 6.5
Description: This conservation area contains barren ground fleabane (*Erigeron trifidus*), bull trout (*Salvelinus confluentus*) and one important aquatic system. Ownership is 96% BC provincial protected area and 4% National Park.

Hixon Creek Headwaters.

Size: 11,983 acres/4,853 hectares.
Irreplaceability Score (Mean)**: 3.2**
Vulnerability Score (Mean)**: 2.0**
Combined Score: 5.2
Description: This conservation area contains Chinook salmon (*Onchorhynchus tshawytscha*) and one important aquatic system. 96% of the area is BC provincial crown land, and 4% is BC provincial crown land held under tree farm license.

Hunt Girl Creek.

Size: 9,541 acres/3,864 hectares.
Irreplaceability Score (Mean)**: 6.1**
Vulnerability Score (Mean)**: 1.8**
Combined Score: 7.9
Description: This conservation area contains Interior Western Cedar Hemlock Forest, Montane Wet Meadow, Englemann Spruce Subalpine Fir Dry Forest, Subalpine Fir Mountain Hemlock Woodlands and Fen. One important aquatic system also occurs in the conservation area. 100% is in USDA Forest Service.

Landslide.

Size: 44,863 acres/18,169 hectares.
Irreplaceability Score (Mean)**: 3.2**
Vulnerability Score (Mean)**: 3.1**
Combined Score: 6.3
Description: This conservation area contains disturbed colluvial landslide. Aquatic targets include white sturgeon (*Acipenser transmontanus*), bull trout (*Salvelinus confluentus*), Chinook salmon (*Onchorhynchus tshawytscha*) and two important aquatic systems. 98% is BC provincial crown land and 2% is privately held.

Least (Selkirk) Chipmunk

Size: 4,596 acres/1,861 hectares.
Irreplaceability Score (Mean)**: 7.2**
Vulnerability Score (Mean)**: 1.8**
Combined Score: 9.0
Description: This conservation area contains Least (Selkirk) Chipmunk (*Tamias minimus selkirki*), and one important aquatic system. 68% is BC provincial crown land and 32% is privately held.

Little NF CDA Trib.

Size: 3,437 acres/1,392 hectares.
Irreplaceability Score (Mean)**: 6.9**
Vulnerability Score (Mean)**: 2.4**
Combined Score: 9.2
Description: This conservation area contains Western Hemlock/False azalea Forest, Interior Douglas Fir Forest and Interior Grand Fir Forest. Aquatic targets include westslope cutthroat trout (*Onchorhynchus clarki lewisi*) and one important aquatic system. Ownership is 100% USDA Forest Service.

Mabel Lake.

Size: 100,558 acres/40,726 hectares.
Irreplaceability Score (Mean)**: 4.9**
Vulnerability Score (Mean)**: 2.3**
Combined Score: 7.2
Description: This conservation area contains Chinook salmon (*Onchorhynchus tshawytscha*), coho salmon (*Onchorhynchus kisutch*), sockeye salmon (*Onchorhynchus nerka*), bull trout (*Salvelinus confluentus*), and one important aquatic system. 85% is BC provincial crown land and 15% is held privately.

Moffat Creek.

Size: 32,868 acres/13,312 hectares.
Irreplaceability Score (Mean)**: 6.3**
Vulnerability Score (Mean)**: 2.1**
Combined Score: 8.4
Description: This conservation area contains Chinook salmon (*Onchorhynchus tshawytscha*), coho salmon (*Onchorhynchus kisutch*), sockeye salmon (*Onchorhynchus*

nerka), and two important aquatic systems. Ownership is 100% BC provincial crown land.

Moody Creek.

Size: 8,994 acres/3,643 hectares.
Irreplaceability Score (Mean)**: 3.8**
Vulnerability Score (Mean)**: 1.5**
Combined Score: 5.3
Description: This conservation area contains Montane Dry Grassland and Ponderosa Pine Woodland. Aquatic targets include speckled dace (*Rhinichthys osculus*) and two important aquatic systems. Ownership is 88% BC provincial crown land and 12% privately held.

Moyie River Headwaters.

Size: 31,330 acres/12,689 hectares.
Irreplaceability Score (Mean)**: 4.3**
Vulnerability Score (Mean)**: 2.7**
Combined Score: 7.0
Description: This conservation area contains modeled data for wide ranging carnivores. Aquatic targets include bull trout (*Salvelinus confluentus*), westslope cutthroat trout (*Onchorhynchus clarki lewisi*), and two important aquatic systems. Ownership is 100% BC provincial crown land.

Murphy Creek.

Size: 2,951 acres/1,195 hectares.
Irreplaceability Score (Mean)**: 5.7**
Vulnerability Score (Mean)**: 2.0**
Combined Score: 7.6
Description: This conservation area contains modeled data for wide ranging carnivores and one important aquatic system. Ownership is 100% privately held.

Red Cedar Stand on Snowshoe Creek.

Size: 267 acres/108 hectares.
Irreplaceability Score (Mean)**: 4.0**
Vulnerability Score (Mean)**: 1.1**
Combined Score: 5.1
Description: This conservation area is a result of an Alberta ESA. Ownership is 100% Alberta provincial crown land.

SF Lolo Creek.

Size: 19,295 acres/7,814 hectares.
Irreplaceability Score (Mean)**: 4.3**
Vulnerability Score (Mean)**: 3.4**
Combined Score: 7.7
Description: This conservation area contains modeled data for wide ranging carnivores. Ownership is 65% USDA Forest Service, 32% privately held and 3% Montana Department of Natural Resources and Conservation.

Slender-Spike Manna Grass EO.

Size: 43,490 acres/17,613 hectares.
Irreplaceability Score (Mean)**: 5.1**
Vulnerability Score (Mean)**: 1.7**
Combined Score: 6.8
Description: This conservation area contains Slender-spike manna grass (*Glyceria leptostachya*), and modeled data for wide ranging carnivores. Aquatic targets include westslope cutthroat trout (*Onchorhynchus clarki lewisi*), bull trout (*Salvelinus confluentus*), and three important aquatic systems. Ownership is 89% BC provincial crown land and 11% privately held.

Swamp Creek.

Size: 17,297 acres/7,005 hectares.
Irreplaceability Score (Mean)**: 5.4**
Vulnerability Score (Mean)**: 4.3**
Combined Score: 9.6
Description: This conservation area contains a fen, modeled data for wide-ranging carnivores and one important aquatic system. Ownership is 71% USDA Forest Service, 28% privately held and 1% other.

Torpy River.

Size: 16,219 acres/6,569 hectares.
Irreplaceability Score (Mean)**: 4.1**
Vulnerability Score (Mean)**: 0.7**
Combined Score: 4.8
Description: This conservation area contains white sturgeon (*Acipenser transmontanus*), Chinook salmon (*Onchorhynchus tshawytscha*), bull trout (*Salvelinus confluentus*), two important aquatic systems and modeled data for wide ranging carnivores. Ownership is 100% BC provincial crown land.

Wapiabi Cave.

Size: 178 acres/72 hectares.
Irreplaceability Score (Mean)**: 4.0**
Vulnerability Score (Mean)**: 0.8**
Combined Score: 4.8
Description: This conservation area was a result of an Alberta ESA and includes one important aquatic system. Ownership is 100% Alberta provincial crown land.

Wolf Creek.

Size: 24,872 acres/10,073 hectares.
Irreplaceability Score (Mean)**: 4.3**
Vulnerability Score (Mean)**: 2.7**
Combined Score: 7.0
Description: This conservation area contains a fen, modeled data for wide-ranging carnivores and two important aquatic systems. Ownership is 71% privately held, 19% USDA Forest Service and 10% Montana Department of Natural Resources and Conservation.

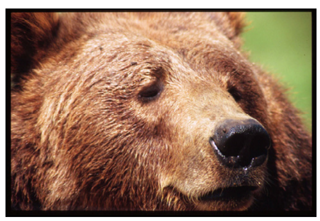
Woolly Daisy EO.

Size: 12,512 acres/5,067 hectares
Irreplaceability Score (Mean)**: 6.1**
Vulnerability Score (Mean)**: 0.9**
Combined Score: 7.0
Description: This conservation area contains woolly daisy (*Erigeron lanatus*), modeled data for wide-ranging carnivores and one important aquatic system. Ownership is 100% BC provincial crown land.




CANADIAN ROCKY MOUNTAINS ECOREGIONAL ASSESSMENT

Volume Four: Maps

The Nature Conservancy®
Saving the Last Great Places

Nature Conservancy Canada

Conservation de la Nature Canada

FWI
FRESHWATER INITIATIVE

Montana Natural Heritage Program

British Columbia
Conservation Data Centre

Washington State Department of Natural Resources

Washington Department of Fish and Wildlife

Natural Heritage Information Centre
Alberta

Idaho Conservation Data Center

Citation:
Rumsey, C., M. Wood, B. Butterfield, P. Comer, D. Hillary, M. Bryer, C. Carroll, K.J. Torgerson, C. Jean, R. Mullen, G. Kittel, P. Iachetti, and J. Lewis. 2003. *Canadian Rocky Mountains Ecoregional Assessment: Volume Four,Maps*. Prepared for The Nature Conservancy and the Nature Conservancy of Canada.

Cover page photo credits:

Top, *left to right*:
The Nature Conservancy of Canada's Mount Broadwood Conservation Area (*Dave Hillary*); Water howellia (*howellia aquatilis*); Grizzly bear (*Ursus arctos horribilis*) (*Dave Fraser*); Northern Leopard Frog (*rana pipiens*), Columbia Valley Wildlife Management Area (*Dave Hillary*); Maligne Lake, Jasper National Park (*Pierre Iachetti*)

Bottom, *left to right*:
Mission Valley, Montana (*Marilyn Wood*); Palouse Prairie, Idaho (*KJ Torgerson*); Harlequin duck (*histrionicus histrionicus*)

MAPS

CANADIAN ROCKY MOUNTAINS ECOREGION:

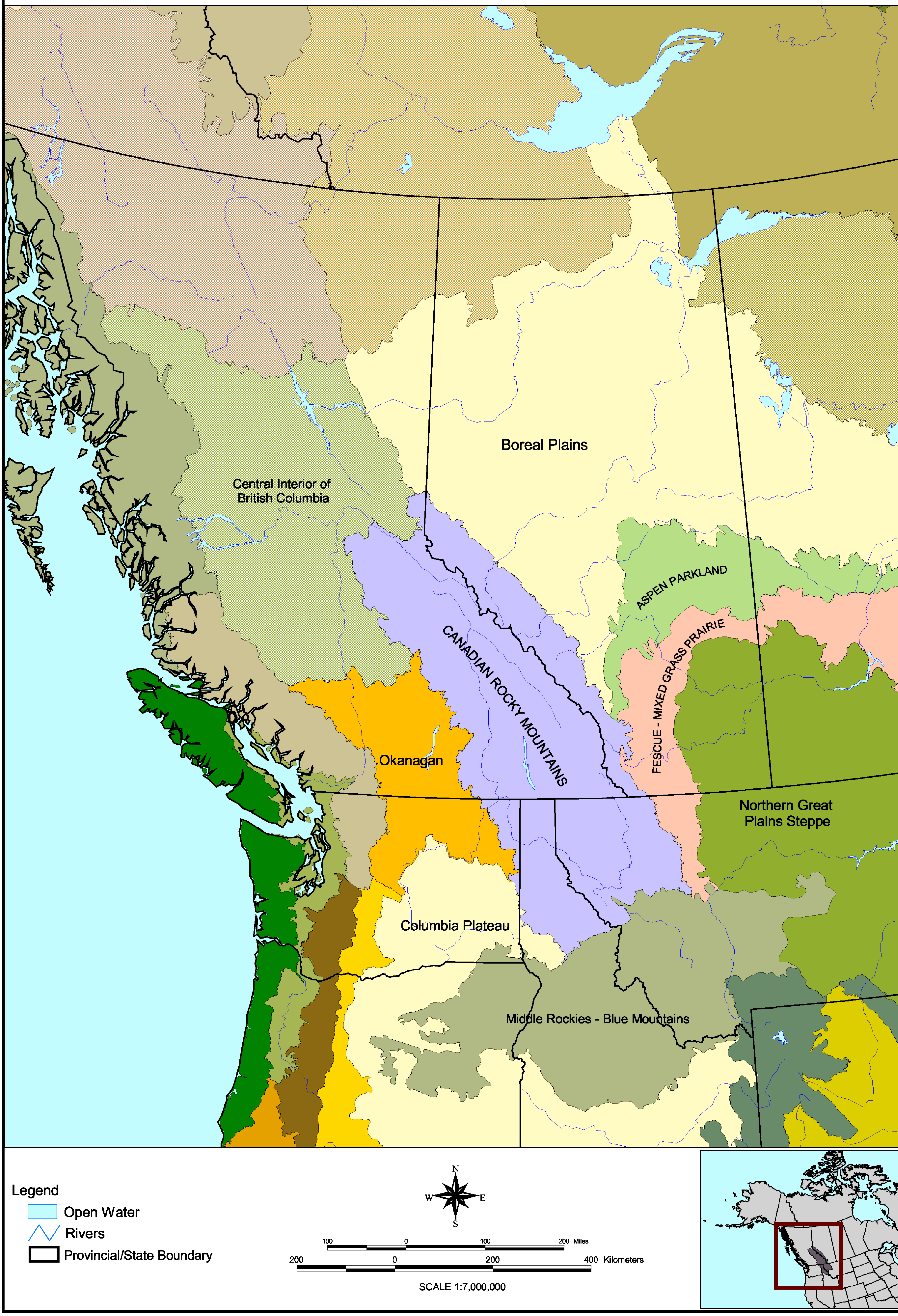
1. CANADIAN ROCKY MOUNTAINS and SURROUNDING ECOREGIONS
2. CANADIAN ROCKY MOUNTAINS ECOREGION
3. ELEVATION GRADIENT
4. ECOSECTIONS
5. ECLOGICAL DRAINAGE UNITS
6. BIOGEOCLIMATIC ZONES
7. TARGET ELEMENT OCCURRENCES
8. EXPERT IDENTIFIED OCCURRENCES AND SITES
9. LAND OWNERSHIP and MANAGEMENT
10. WIDE RANGING CARNIVORES RESOURCE SELECTION FUNCTIONS (RSF), Grizzly Bear
11. WIDE RANGING CARNIVORES RESOURCE SELECTION FUNCTIONS (RSF), North American Wolverine and Canada Lynx
12. WIDE RANGING CARNIVORES RESOURCE SELECTION FUNCTIONS (RSF), Fisher and Gray wolf

CANADIAN ROCKY MOUNTAINS ECOREGIONAL PORTFOLIO:

13. CANADIAN ROCKY MOUNTAINS ECOREGIONAL PORTFOLIO
14. CONSERVATION AREAS
15. VULNERABILITY INDEX
16. CONSERVATION VALUE INDEX
17. CONSERVATION AREA TIER RANKINGS
18. CONSERVATION AREA WATERSHED TIERS
19. TIER 1 AND 2 WATERSHEDS

MAP 1.

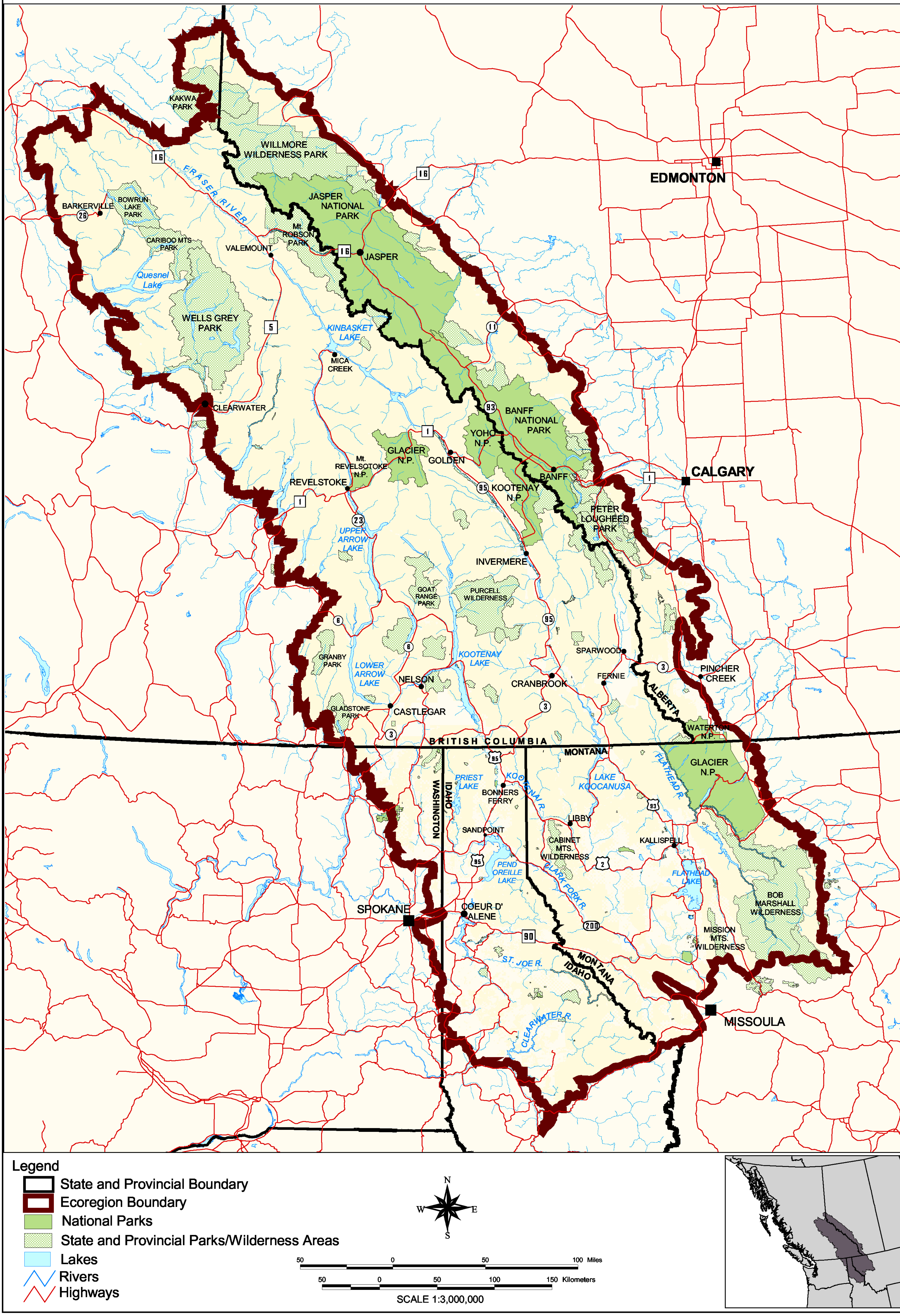
CANADIAN ROCKY MOUNTAINS and SURROUNDING ECOREGIONS



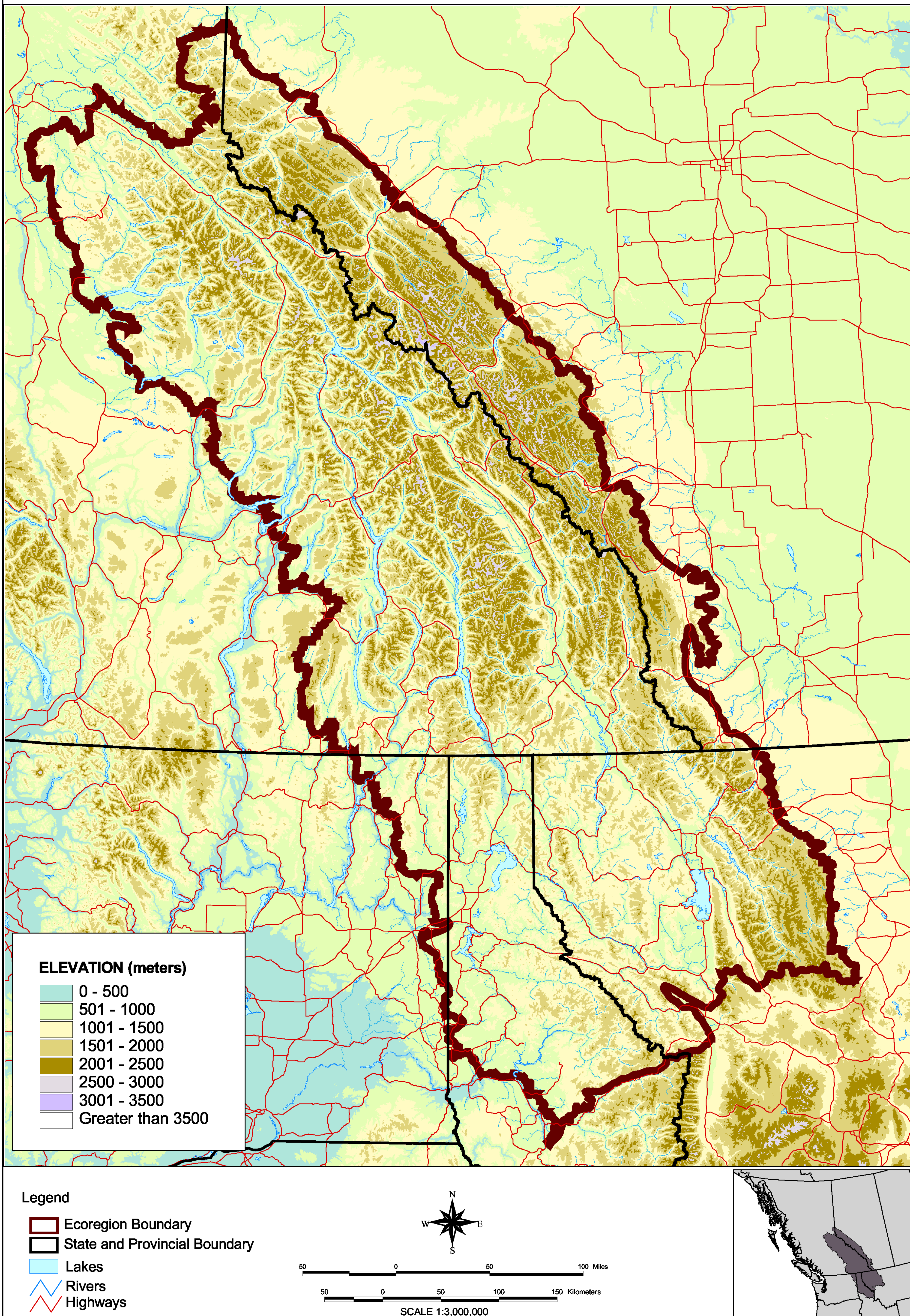
Legend
Open Water
Rivers
Provincial/State Boundary

MAP 2.

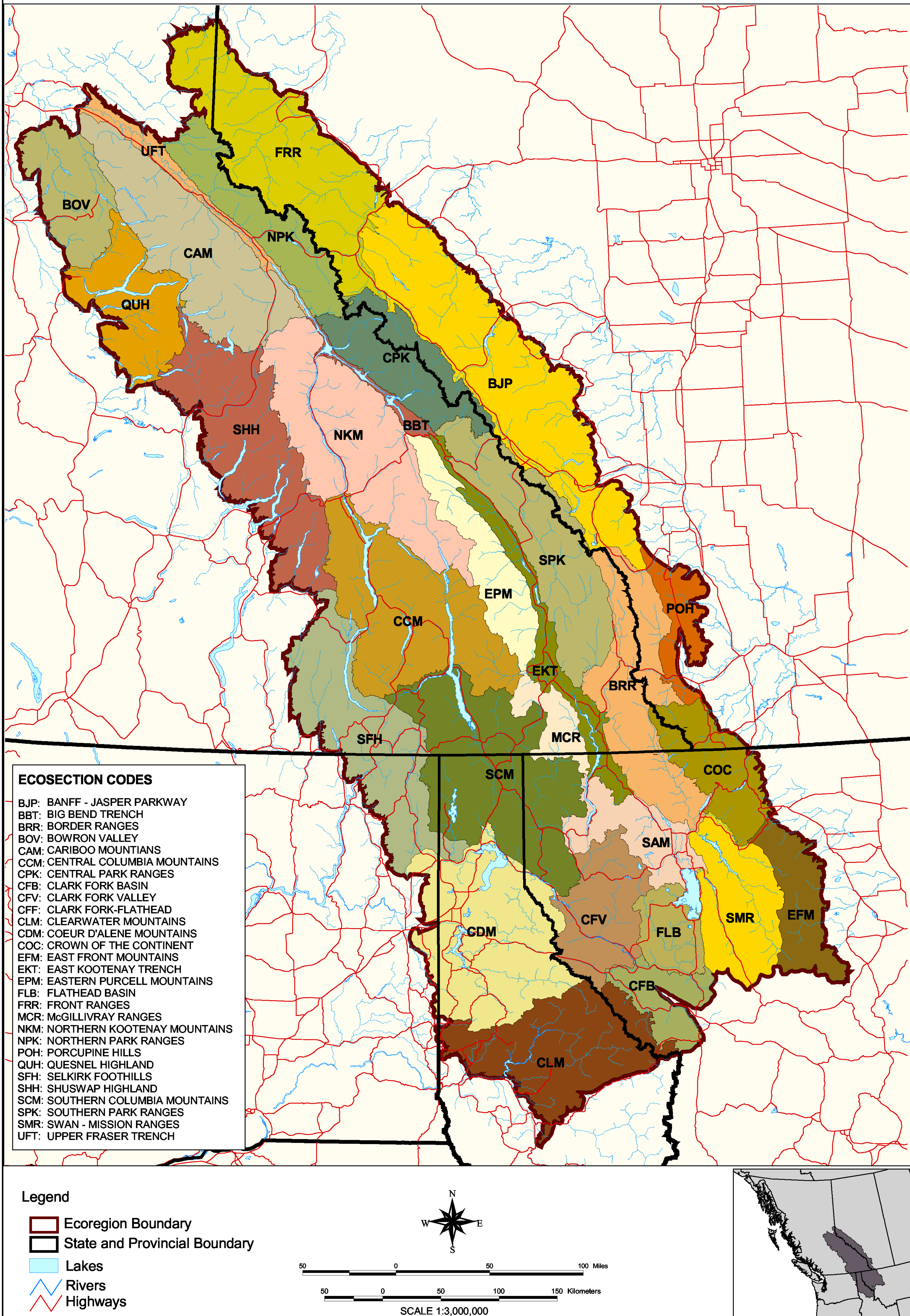
CANADIAN ROCKY MOUNTAINS ECOREGION



MAP 3. CANADIAN ROCKY MOUNTAINS ECOREGION: ELEVATION GRADIENT

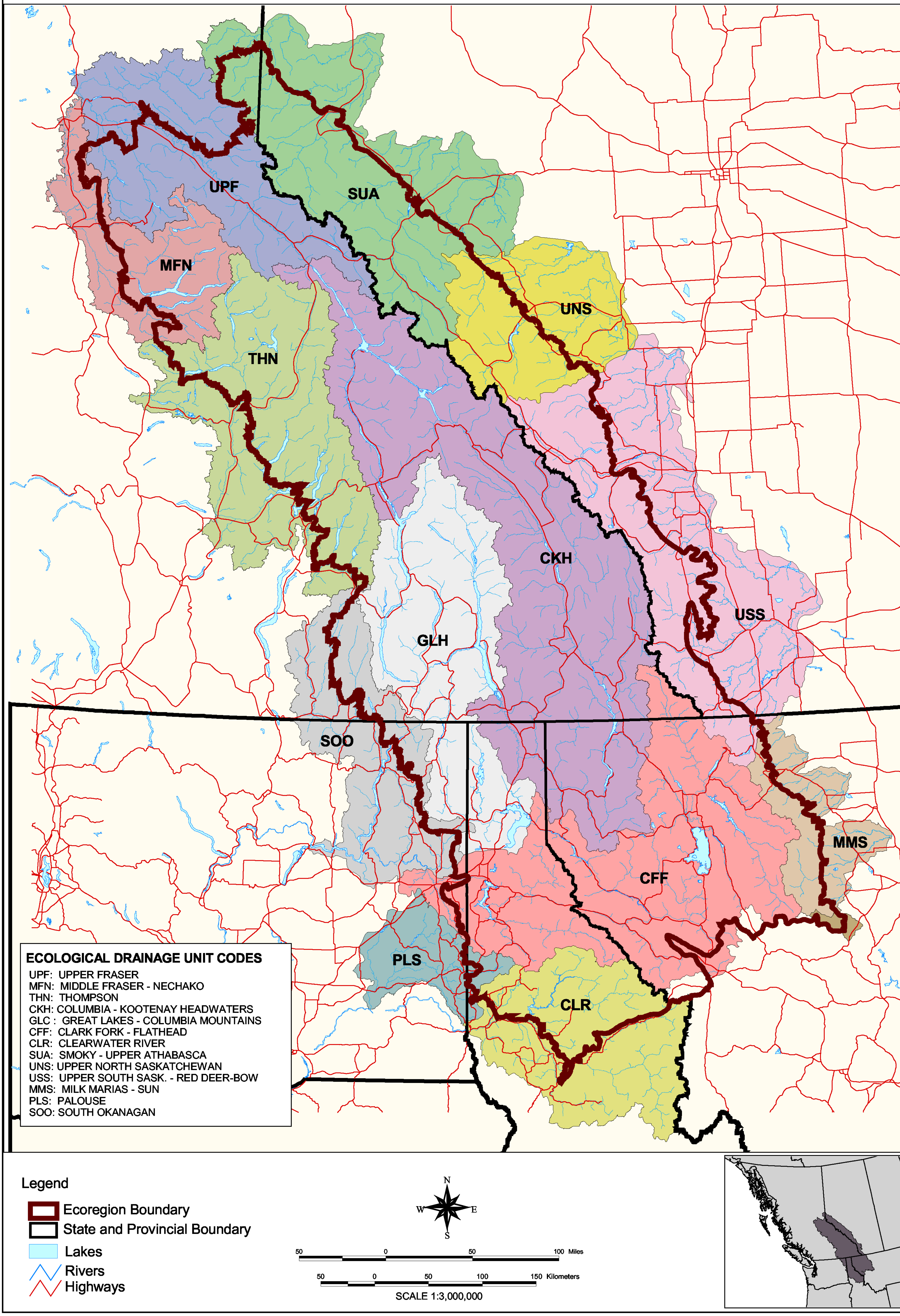


MAP 4. **CANADIAN ROCKY MOUNTAINS ECOREGION: ECOSECTIONS**



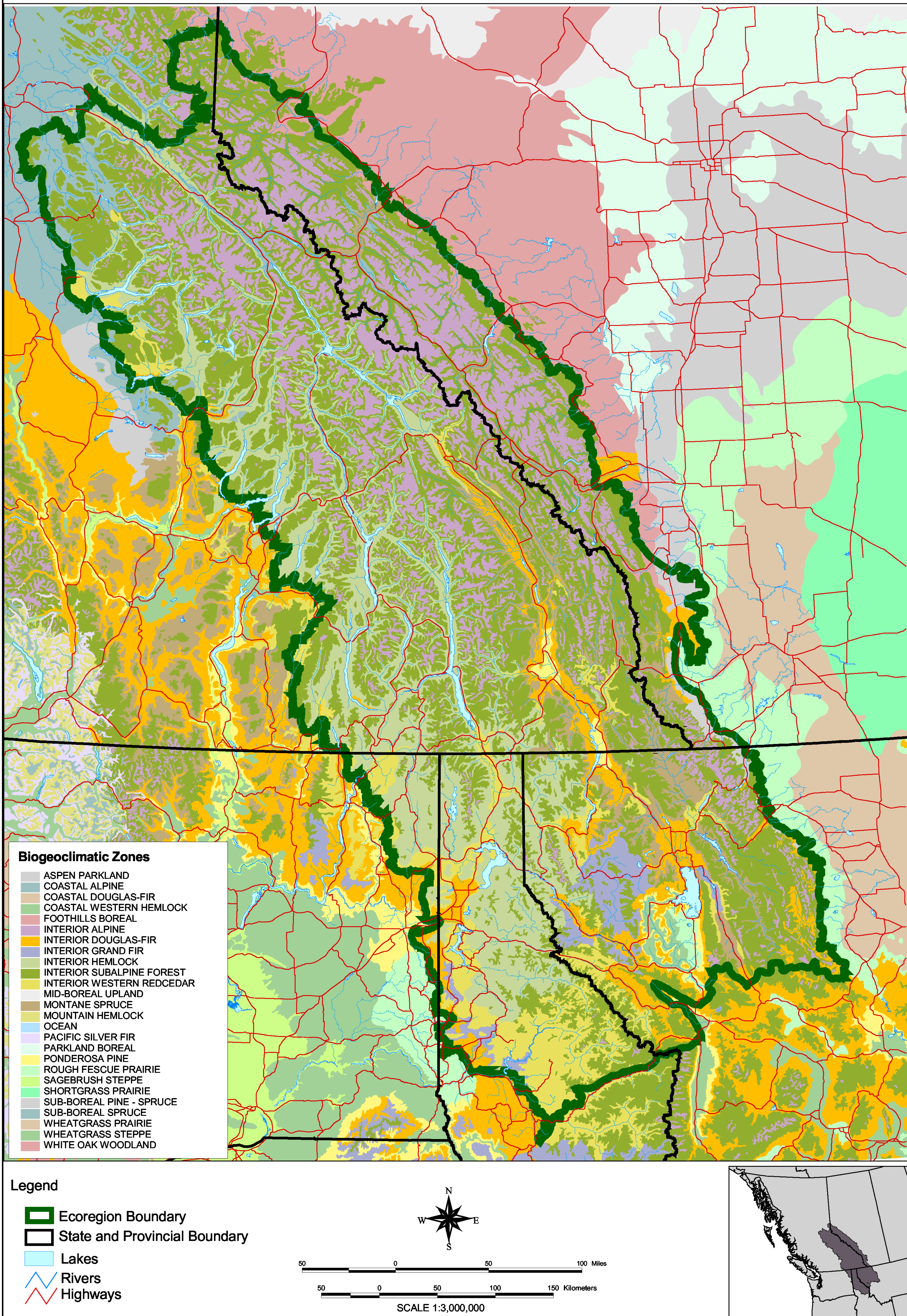
MAP 5.

CANADIAN ROCKY MOUNTAINS ECOREGION: ECOLOGICAL DRAINAGE UNITS



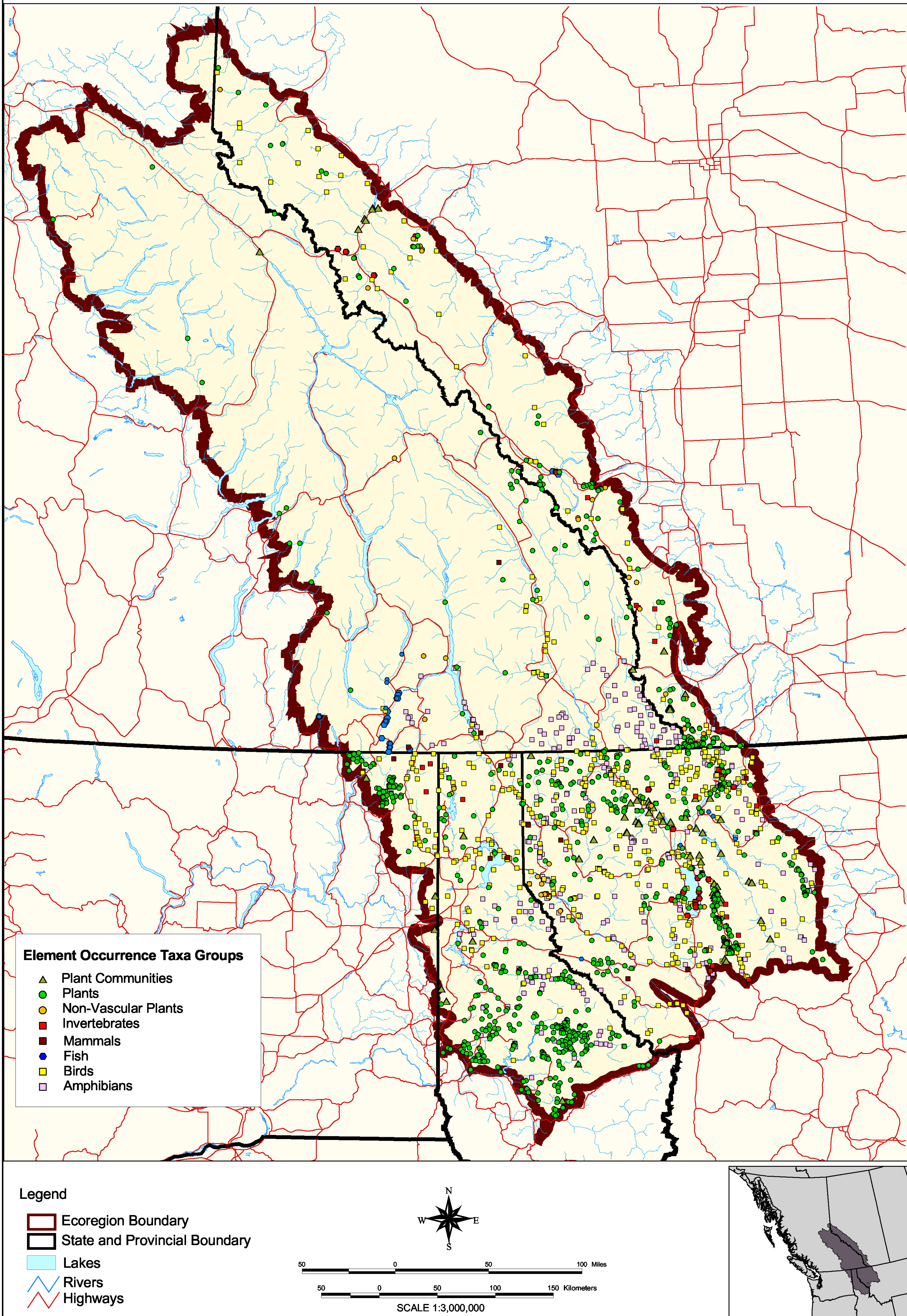
MAP 6.

CANADIAN ROCKY MOUNTAINS ECOREGION: BIOGEOCLIMATIC ZONES



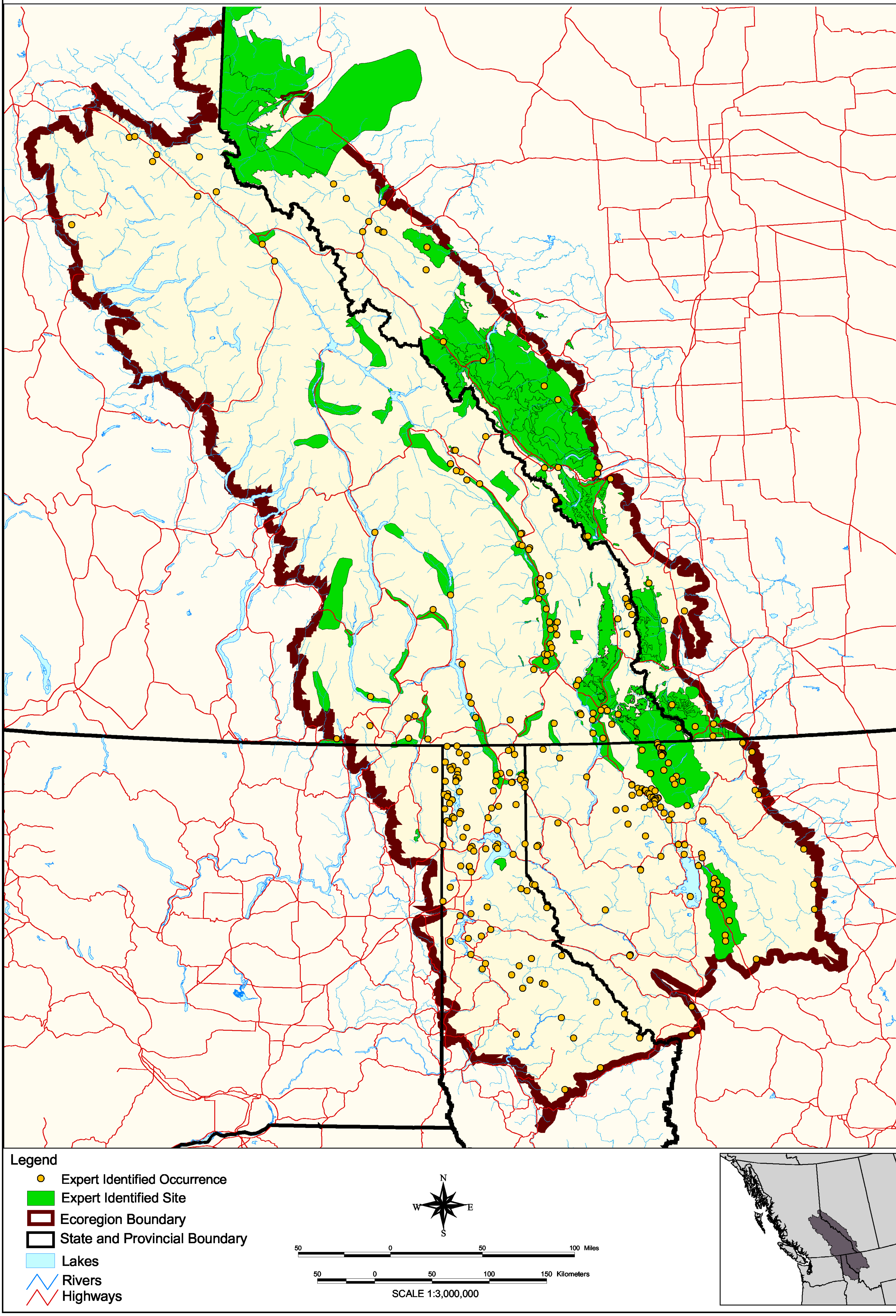
MAP 7.

CANADIAN ROCKY MOUNTAINS ECOREGION: TARGET ELEMENT OCCURRENCE RECORDS



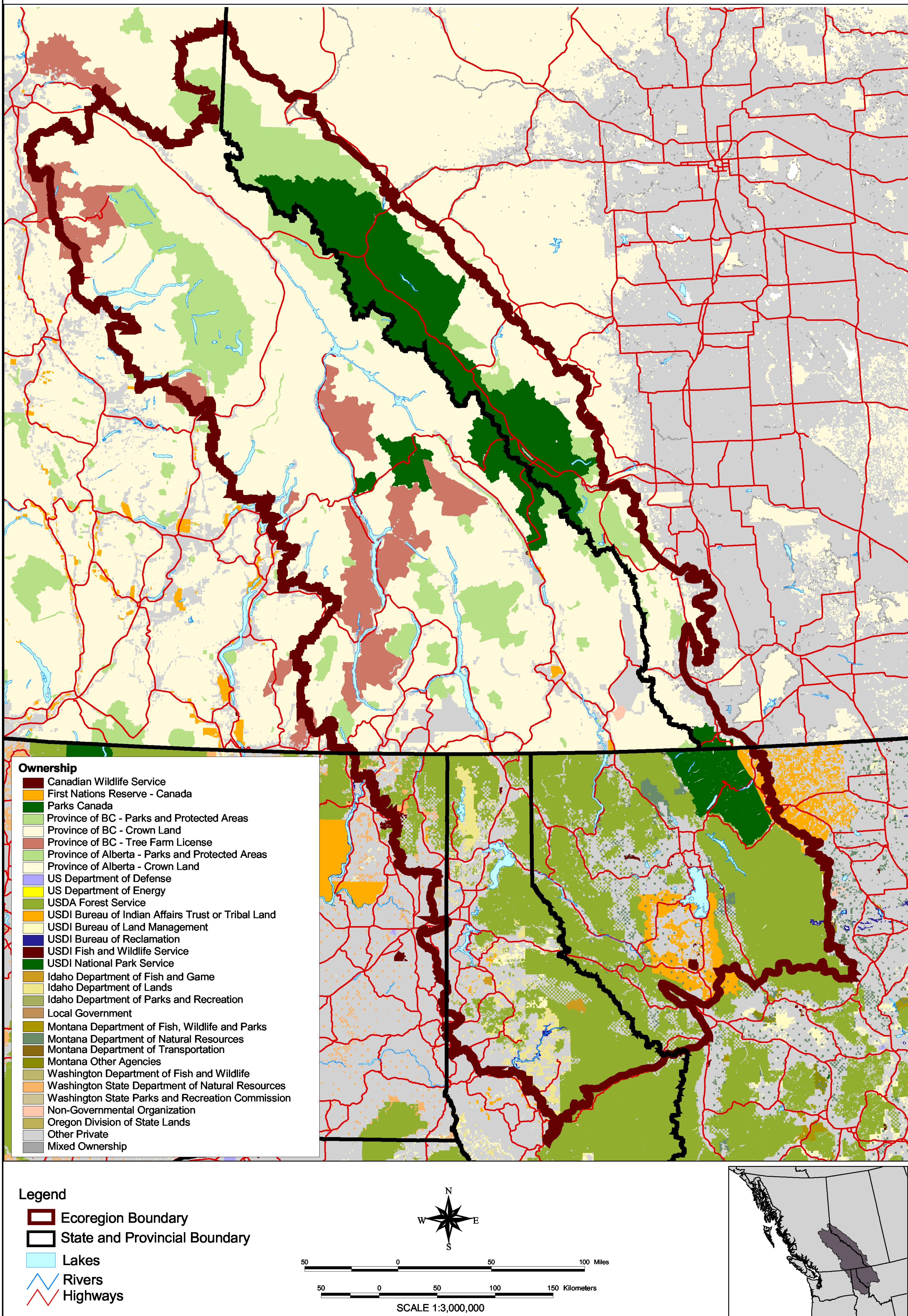
MAP 8.

CANADIAN ROCKY MOUNTAINS ECOREGION: EXPERT IDENTIFIED OCCURRENCES AND SITES



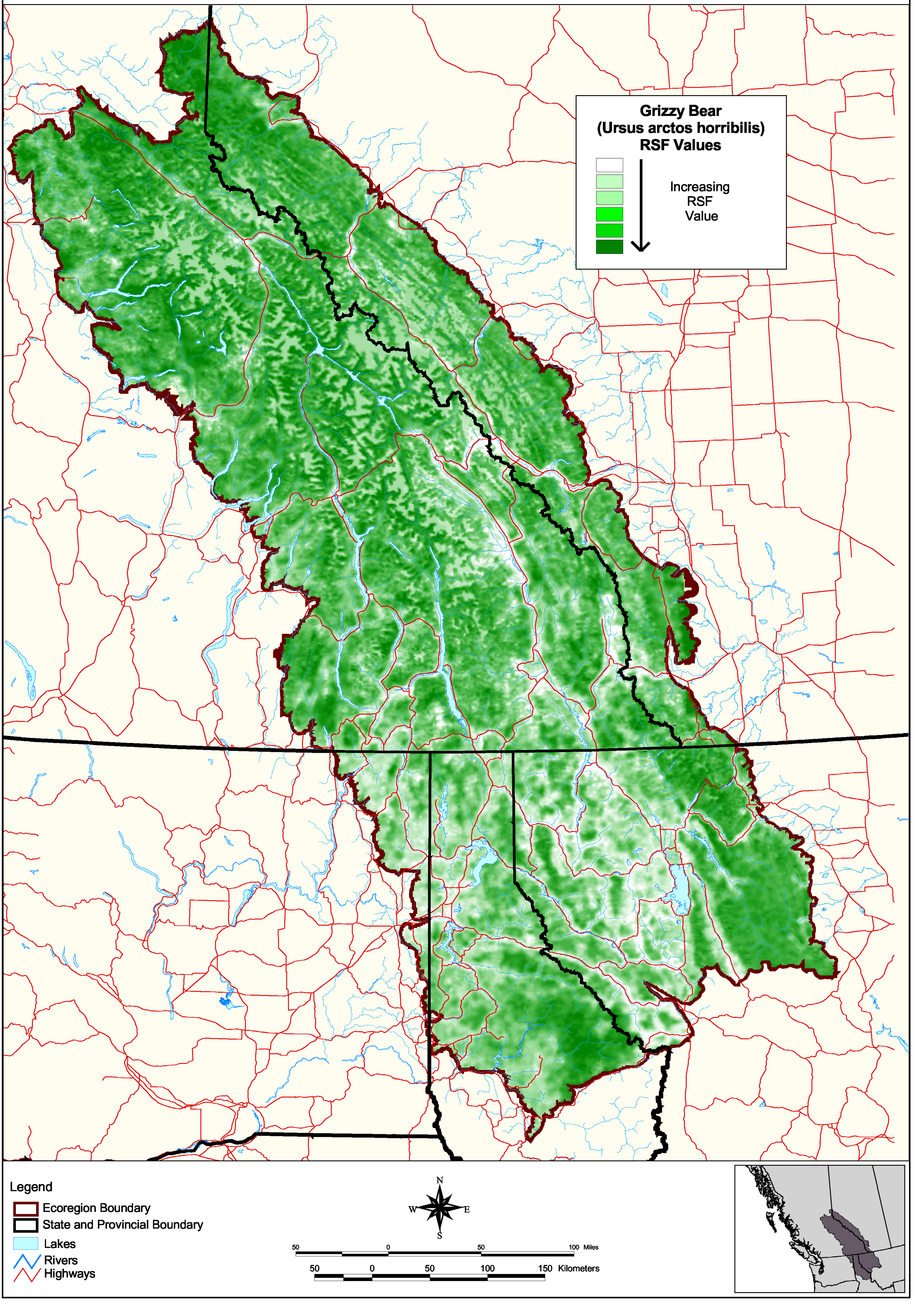
MAP 9.

CANADIAN ROCKY MOUNTAINS ECOREGION: LAND OWNERSHIP and MANAGEMENT



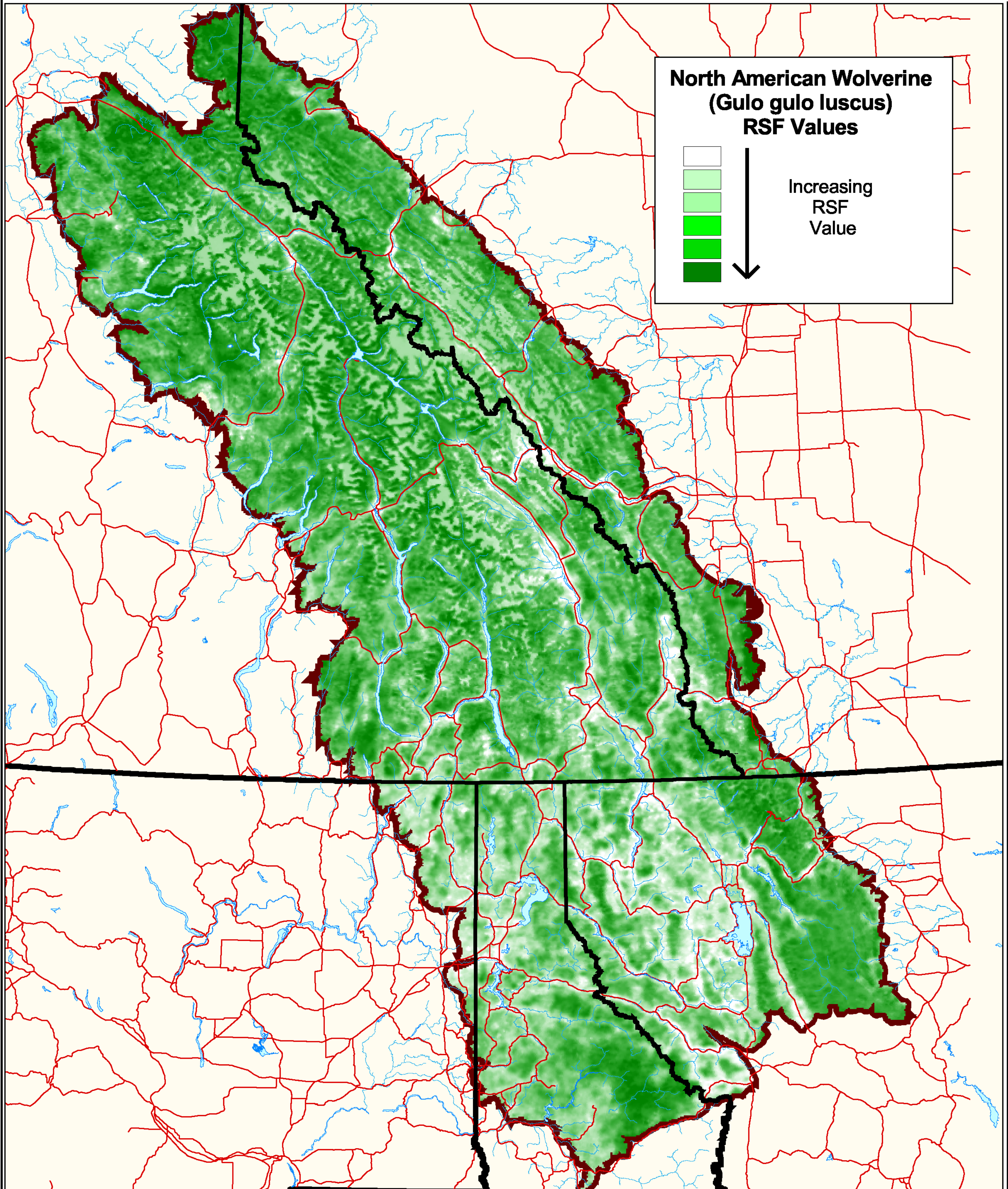
MAP 10.

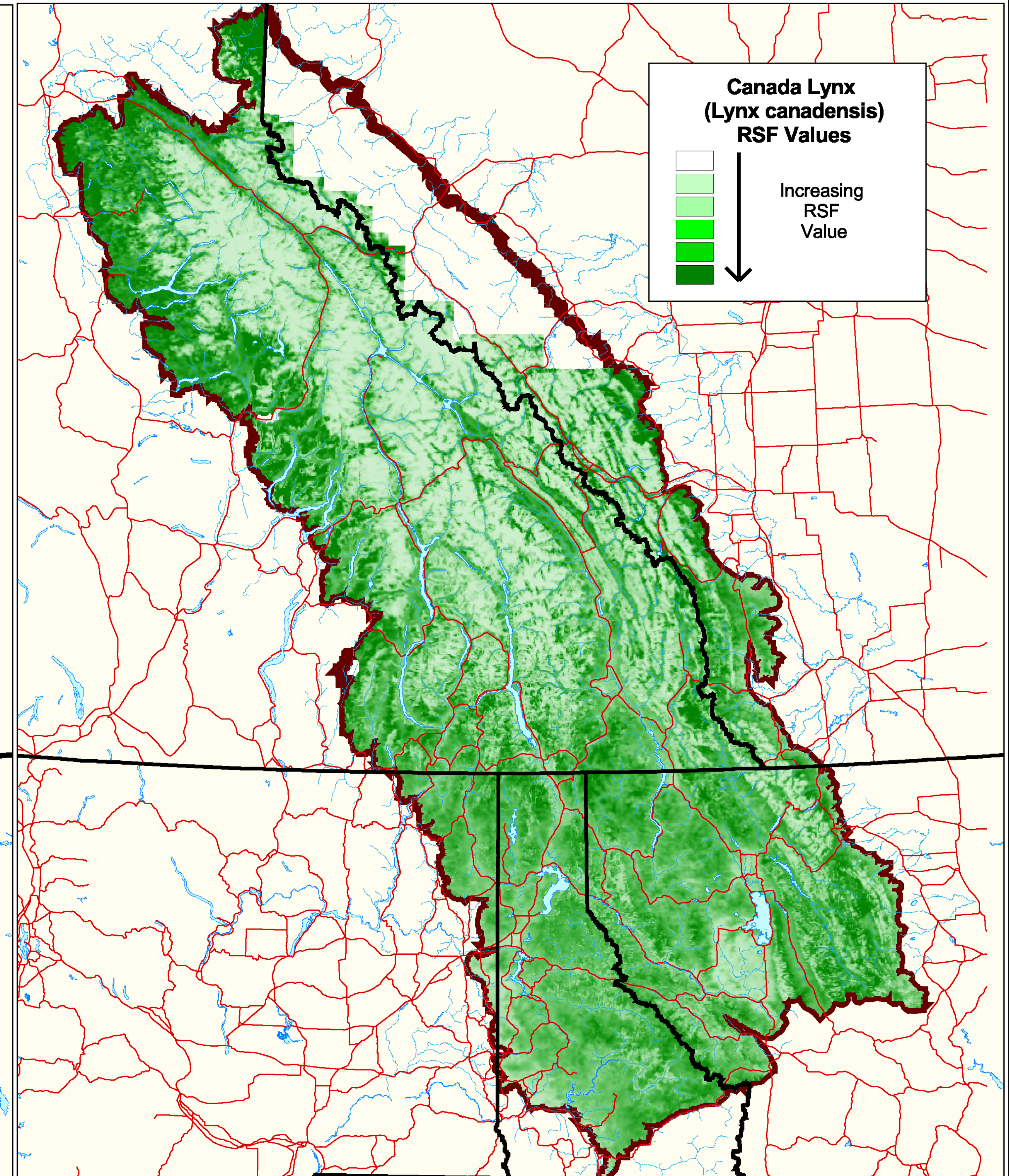
CANADIAN ROCKY MOUNTAINS ECOREGION: WIDE RANGING CARNIVORE RESOURCE SELECTION FUNCTIONS (RSF)



CANADIAN ROCKY MOUNTAINS ECOREGION: WIDE RANGING CARNIVORE RESOURCE SELECTION FUNCTIONS (RSF)

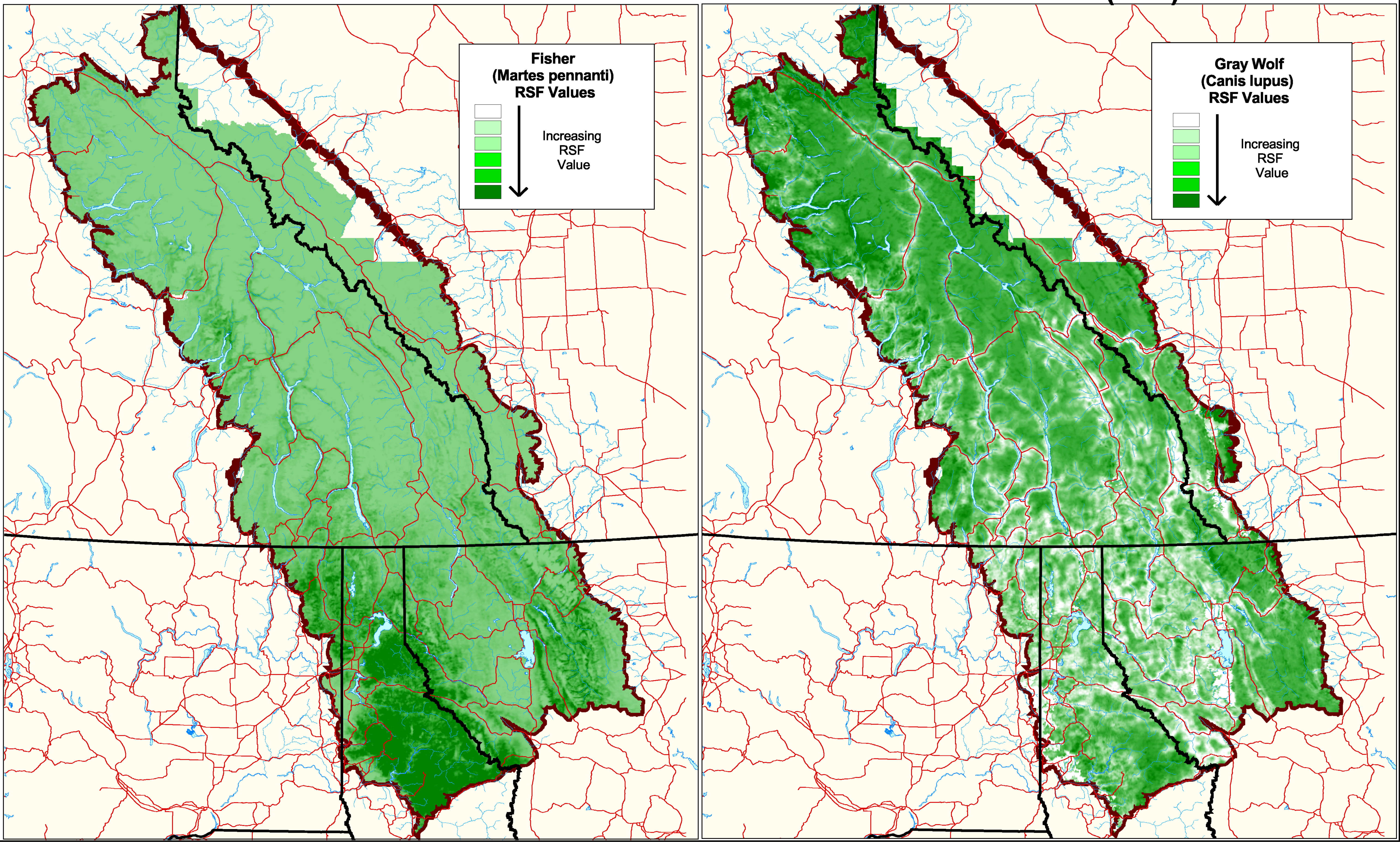
MAP 11.





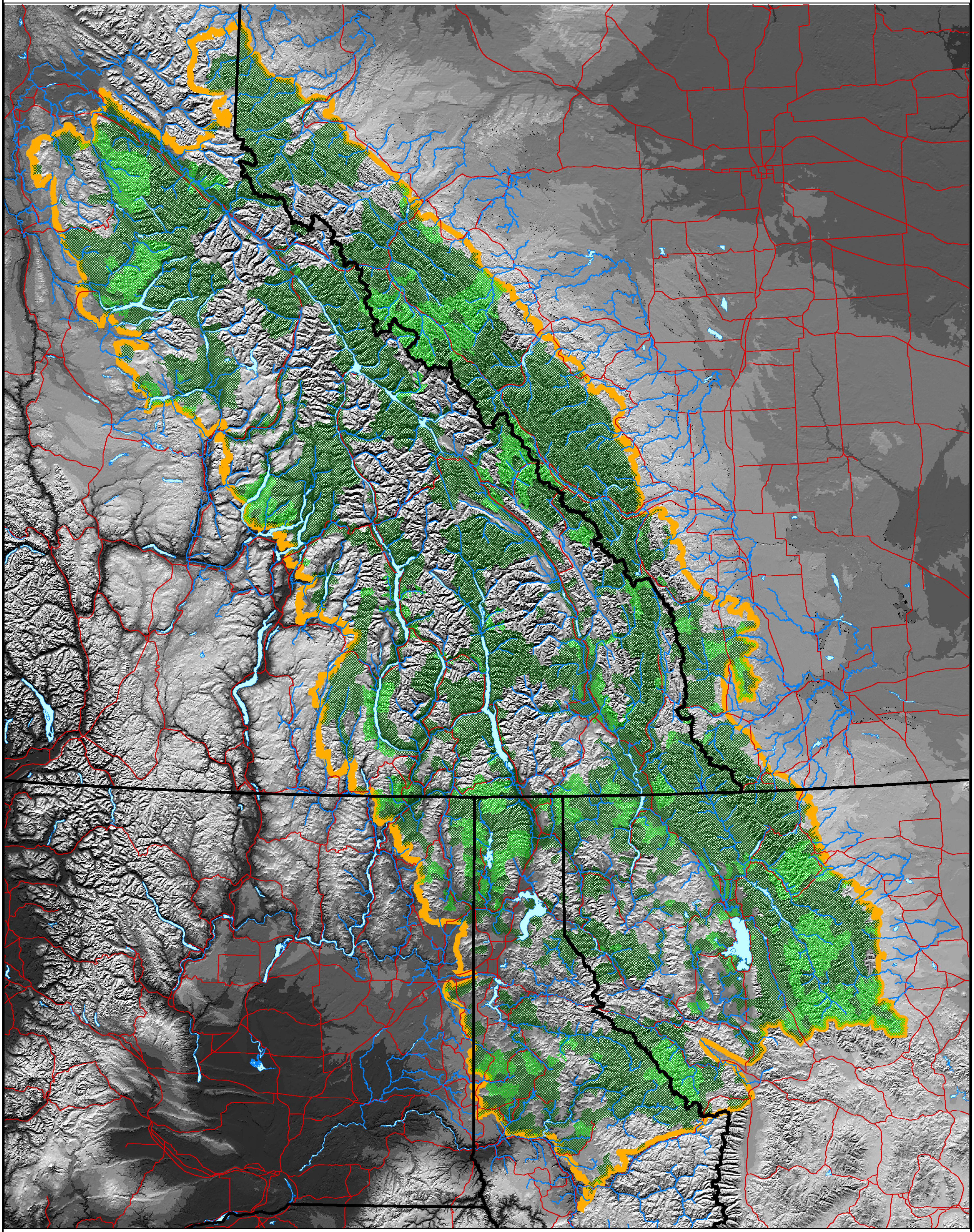
CANADIAN ROCKY MOUNTAINS ECOREGION: WIDE RANGING CARNIVORE RESOURCE SELECTION FUNCTIONS (RSF)

MAP 12.



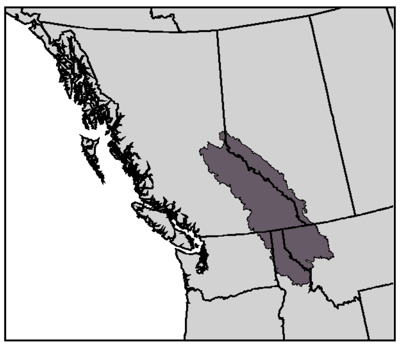
MAP 13.

CANADIAN ROCKY MOUNTAINS ECOREGIONAL PORTFOLIO



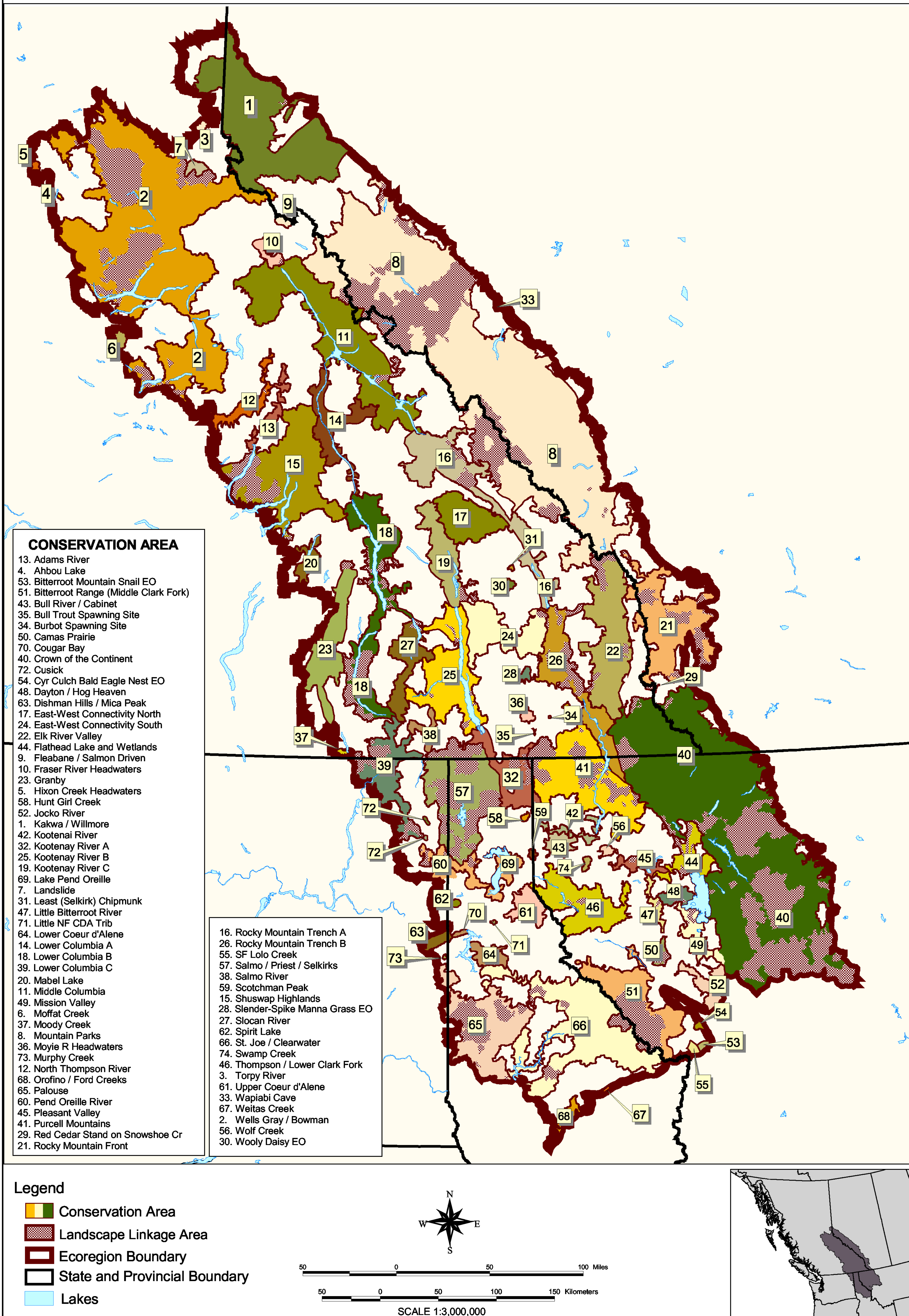
Legend

- Portfolio Watershed
- Landscape Linkage Area
- Ecoregion Boundary
- State and Provincial Boundary
- Lakes
- Rivers
- Highways



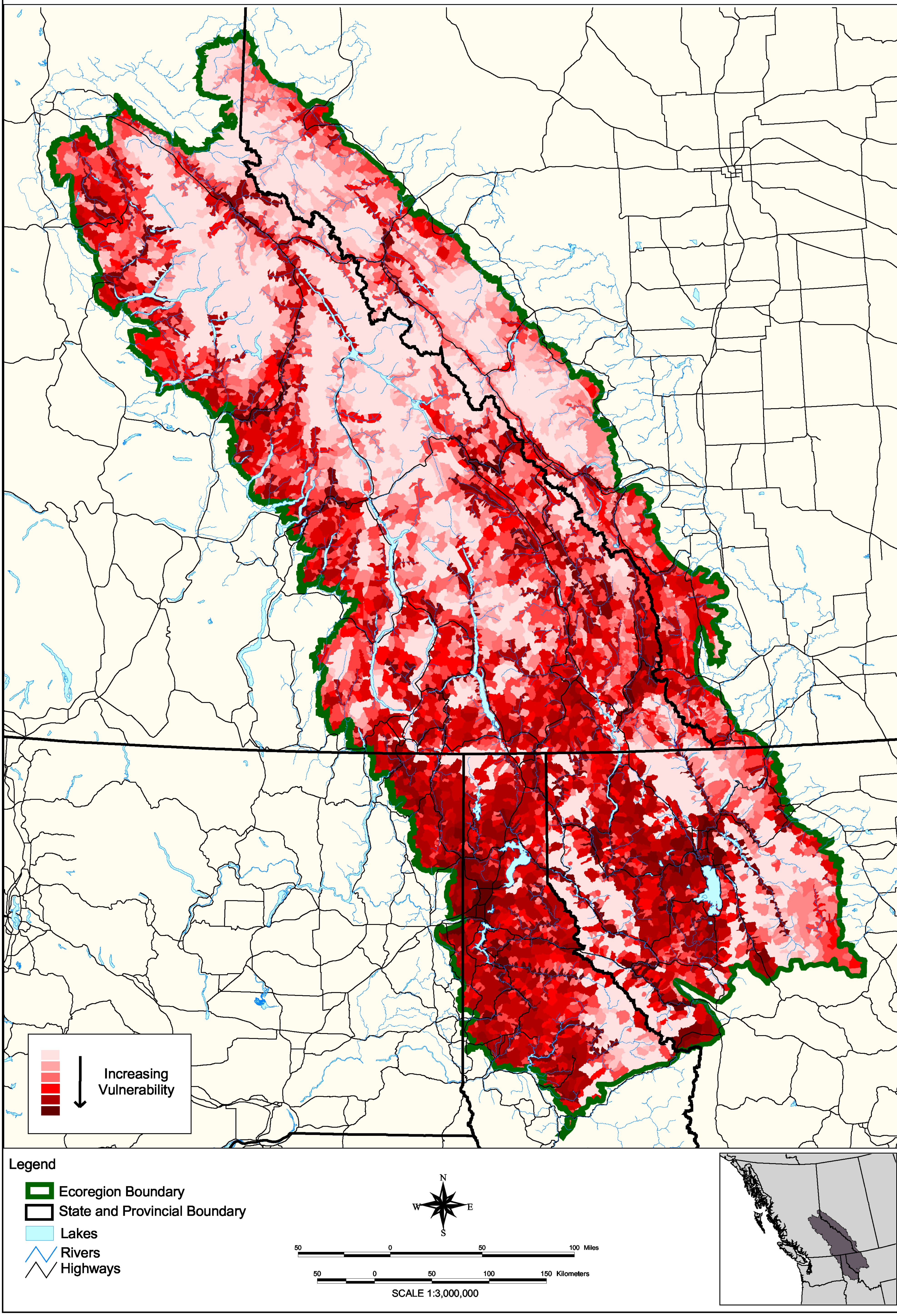
MAP 14.

CANADIAN ROCKY MOUNTAINS ECOREGIONAL PORTFOLIO: CONSERVATION AREAS

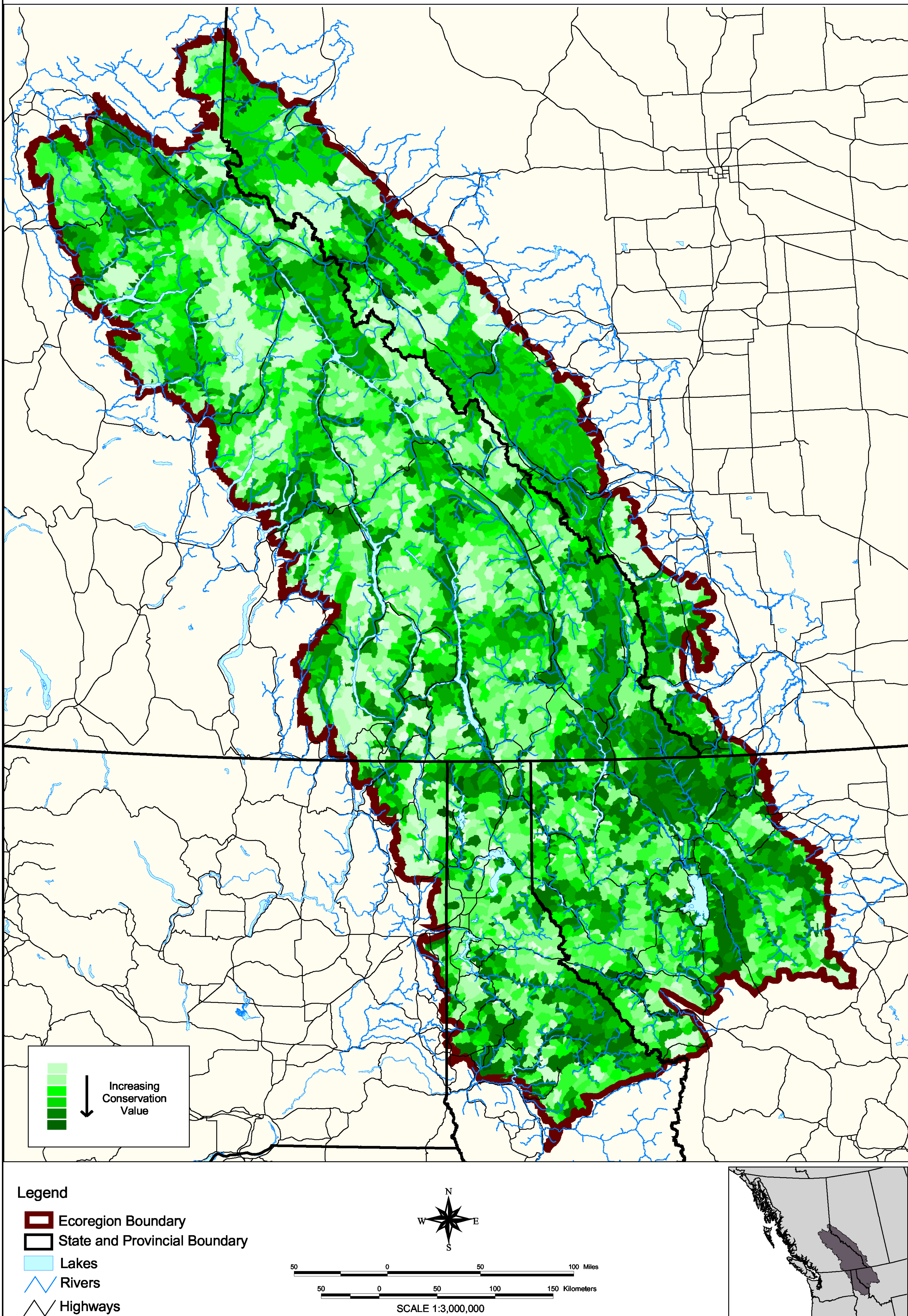


MAP 15.

CANADIAN ROCKY MOUNTAINS ECOREGION: VULNERABILITY INDEX

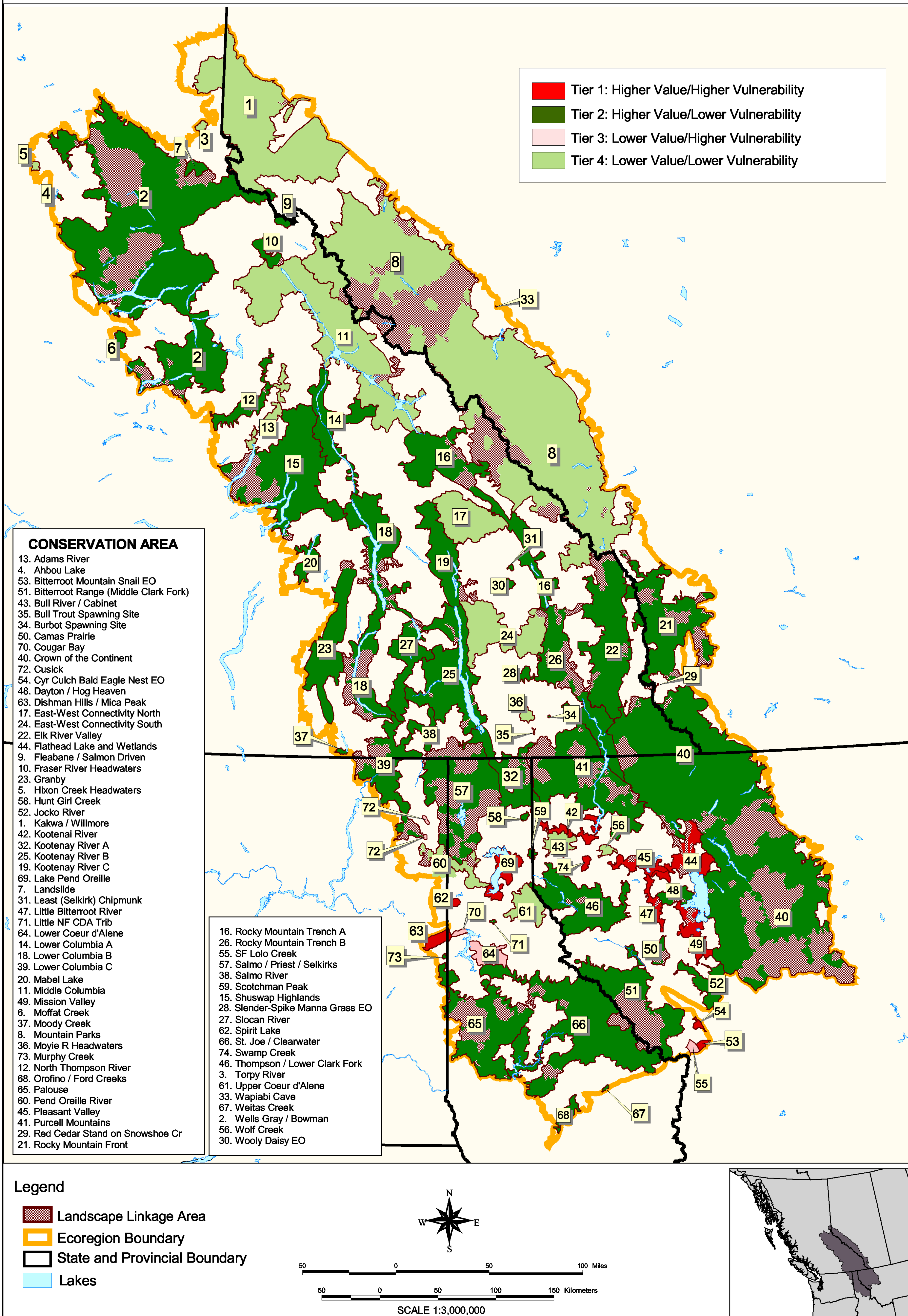


MAP 16. CANADIAN ROCKY MOUNTAINS ECOREGIONAL PLAN: CONSERVATION VALUE INDEX



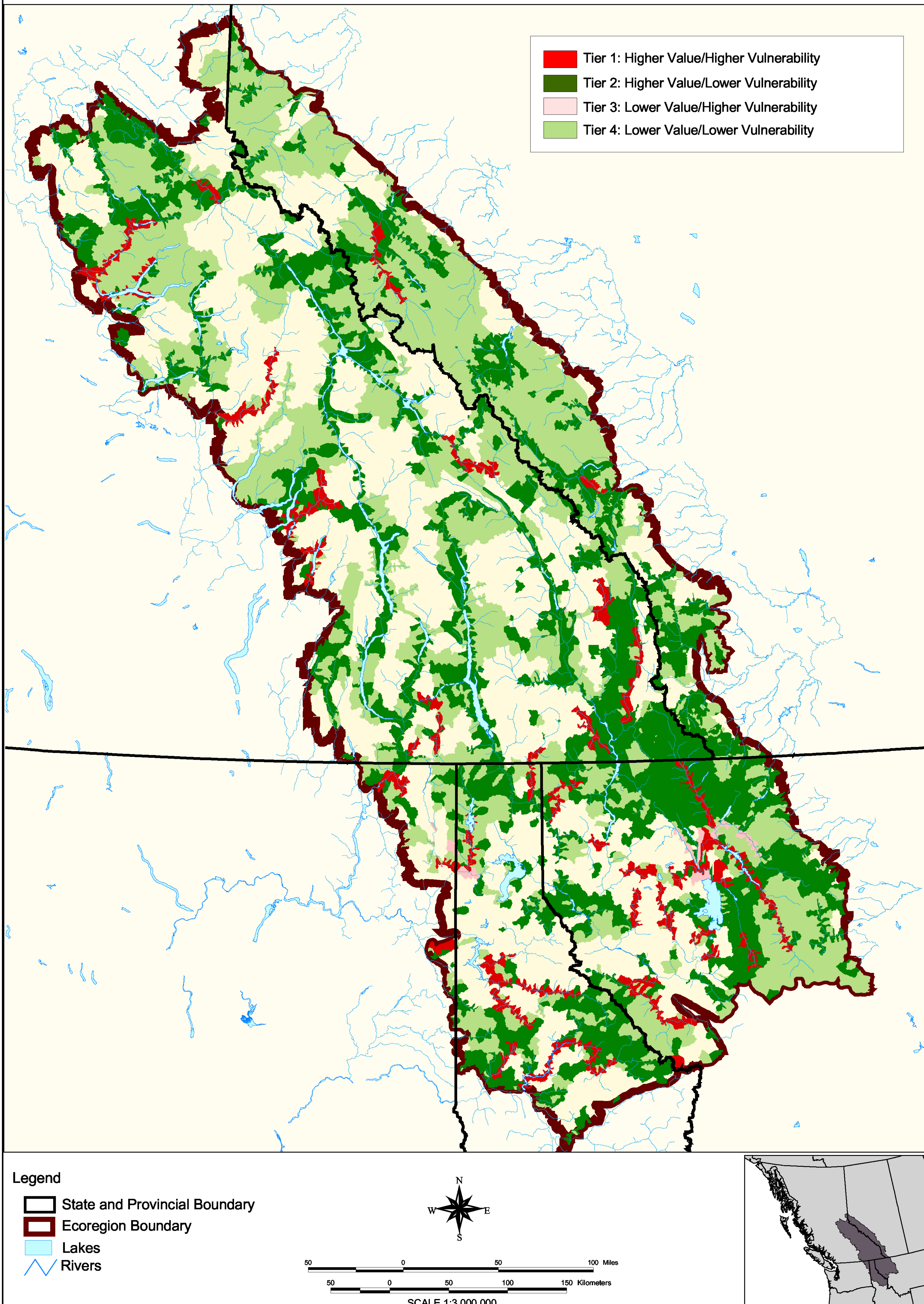
MAP 17

CANADIAN ROCKY MOUNTAINS ECOREGIONAL PORTFOLIO: CONSERVATION AREA TIER RANKINGS



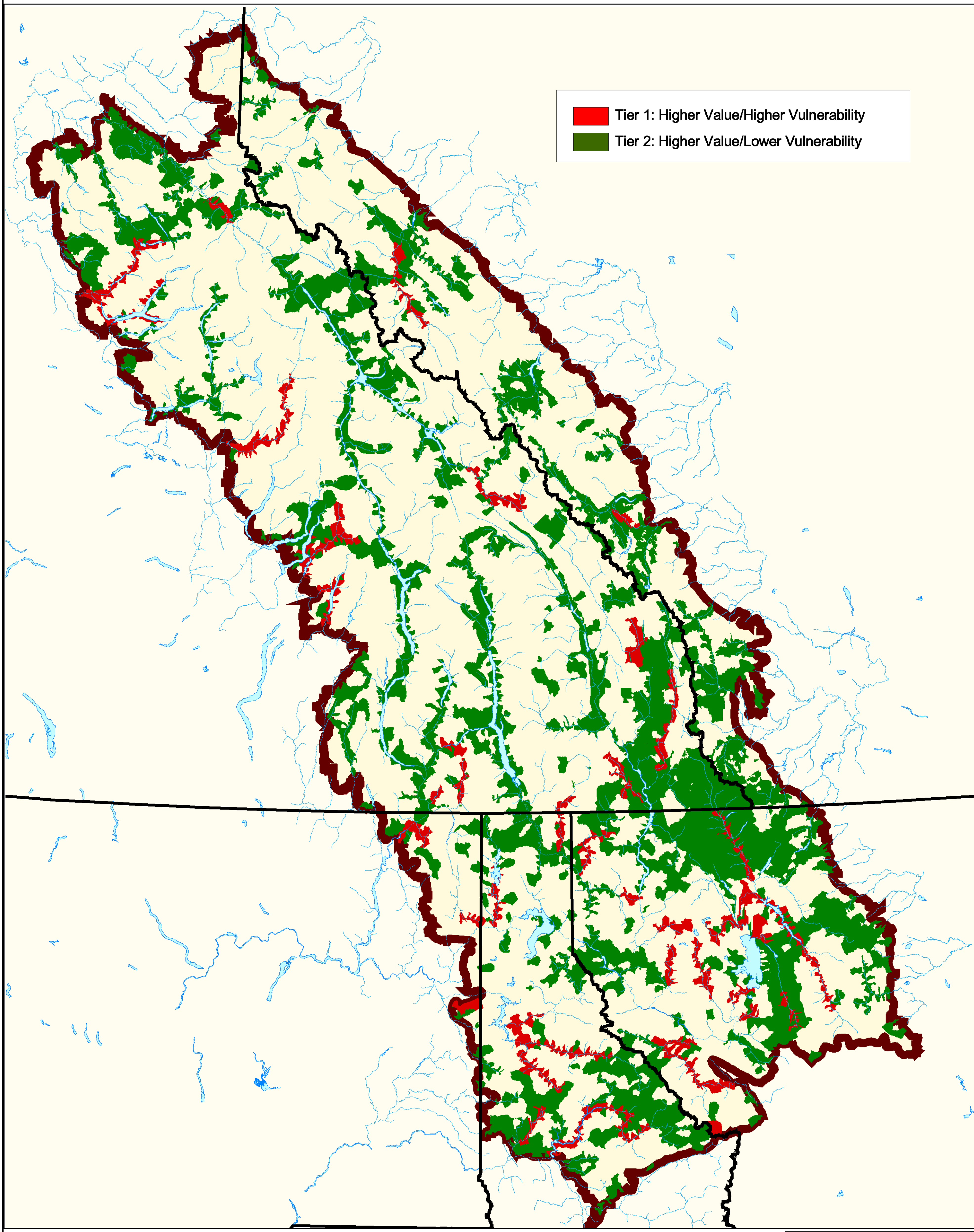
MAP 18.

CANADIAN ROCKY MOUNTAINS ECOREGIONAL PORTFOLIO: CONSERVATION AREA WATERSHED RANKINGS BY TIER



MAP 19.

CANADIAN ROCKY MOUNTAINS ECOREGIONAL PORTFOLIO: TIER 1 AND 2 WATERSHEDS



Legend

- State and Provincial Boundary
- Ecoregion Boundary
- Lakes
- Rivers

N
W E
S

50 0 50 100 Miles

50 0 50 100 150 Kilometers

SCALE 1:3,000,000