Section Five: Regional Information Packages

Kootenay Boundary Region

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This section of *Develop with Care* offers information on some of the issues, species and ecosystems of concern that are priorities in each region. This section is not a stand-alone guide to environmentally sensitive development in each region—reference to other sections of this document is essential for a full understanding of the recommended environmental guidelines.

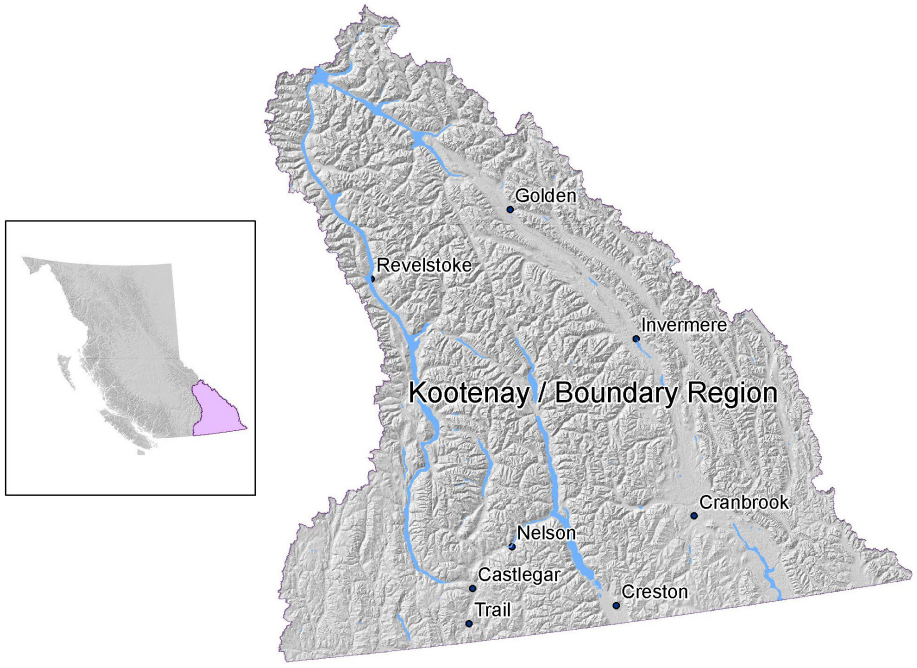
Figure 5.2-1: Ministry of Forests, Lands and Natural Resource Operations Regions

Cover Photos:
Left: Californi Bighorn Sheep. *Photo: Dave Polster*
Centre*:* Bugaboo Spires. *Photo: Mike Knapik*
Right: Columbia Valley: *Photo: Dave Polster*

5.2.1 Kootenay Boundary Region

The Kootenay Boundary Region covers approximately 8,200 km^2 of the southeast corner of British Columbia. The region extends from the West Kettle drainage in the west to the Alberta border in the east, and from the U.S. border in the south to Kinbasket Lake in the north.

Figure 5.2-2: Kootenay Boundary Region



5.2.2 Regional Features

The Kootenay Boundary Region is made up of four geographic areas, all of which are part of the greater Columbia River Basin. The East Kootenay, West Kootenay and Columbia areas are within the immediate Columbia Basin while the Boundary area is within the Kettle River Basin, a major tributary to the Columbia River.

Columbia River Basin

The Columbia River flows 2,000 km from its headwaters at Columbia Lake near Canal Flats, B.C. to the Pacific Ocean at Astoria, Oregon. It is the sixth largest river basin in North America, covering 671,000 km^2 within Canada and the United States.

Fifteen percent of the Columbia Basin lies within Canada. A series of north–south valleys with mountainous ranges dissects the Canadian portion of the Columbia Basin. From east to west, the main valleys are the Elk River Valley immediately adjacent to the Rocky Mountains; the Columbia River trench, which separates the Rockies from the Purcell

Left: Canal Flats in the Columbia Basin: *Photo: Brad Hill picturebc.ca*

Right: Kootenays Mountain Caribou with young. *Photo: Mike Knapik*

Mountain range; Kootenay Lake and the Duncan River, which divide the Purcell range from the Selkirk Mountains; and the Columbia River and Arrow Lakes system, which separates the Selkirks from the Monashee Mountains.

These mountain ranges create an incredible range of ecosystems, including grasslands, wetlands, dry pine forests, interior rainforests, alpine meadows and glaciers. The wetlands, streams, rivers and lakes of the Columbia River system support a rich diversity of species—over 700 species of birds, mammals, fish and reptiles have been documented. The mountain ranges of the Columbia Basin create unique weather patterns with the western slopes typically receiving significantly more precipitation than the eastern slopes.

Mountain features are generally more pronounced in the northern part of the region where world famous mountain groups such as the Bugaboos and Roger's Pass occur. Further south, the valleys become broader, with the Creston and Columbia River trenches reaching their widest point along the border with the United States.

Kettle River Basin

The Kettle River Basin is comprised of three drainages, all of which have their headwater in the Monashee Mountains west of the Arrow Lakes. The easternmost drainage is the Granby River which flows approximately 105 km from its start to where it joins with the Kettle River at Grand Forks. The Kettle mainstem is approximately 280 km in length from its start at Holmes Lake, north of the Kootenay Boundary region, to where it flows into the Columbia River. The West Kettle River runs 122 km from the area of Big White to where it meets the Kettle mainstem at Westbridge.

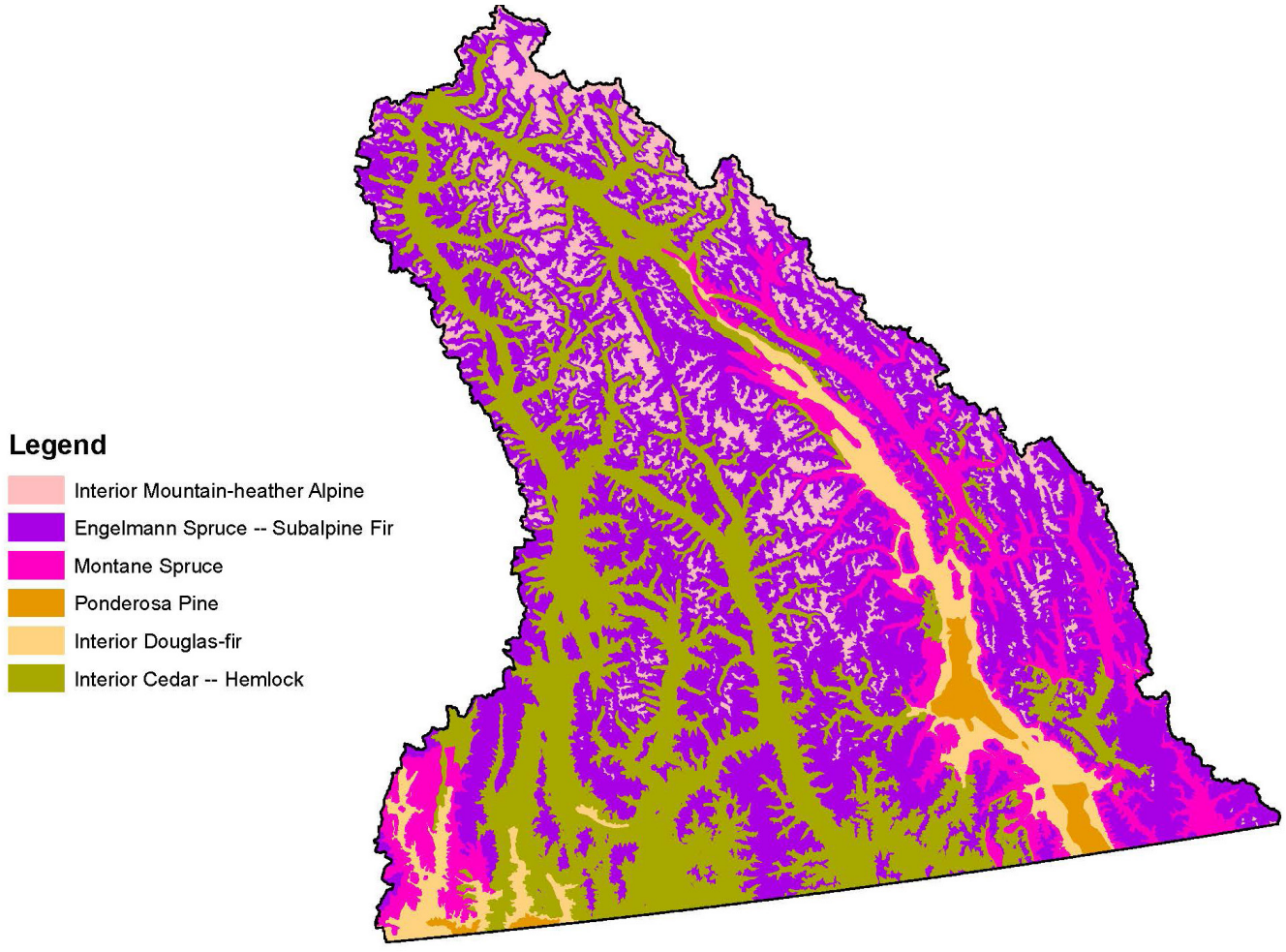
A broad diversity of species and ecosystems occurs across the three primary drainages of the Kettle Basin. In the northern portions of the basin, alpine and subalpine habitats support populations of Grizzly Bear and Mountain Goat; the grasslands and open forests in the southern most portion of the region support rattlesnakes, Lewis's Woodpecker, Big Horn

Sheep and healthy deer populations. Rainbow Trout are found in all three main drainages as well as in many of the smaller tributary streams. Lush cedar forests, floodplain flats and small wetlands can also be found in the Kettle Basin.

Biogeoclimatic Zones

For information on biogeoclimatic classification (BEC) see Biogeoclimatic Zones and the BEC website: http://www.for.gov.bc.ca/hre/becweb/.

Figure 5.2-2: Biogeoclimatic zones of the Kootenay Boundary Region



5.2.3 Development Concerns

Urban and Rural Development

Throughout the Kootenay Boundary, populations are projected to grow by 10-20% from 2011 to 2036 with an increase in the proportion of the population over the age of 65 (BC Statistics 2011). This ongoing growth means that communities will continue to see urban, rural, and resort development.

Urban development occurs primarily in the valleys and is often confined between the watercourses (rivers or lakes) and the steep mountain slopes. The steep slopes in the region create areas of instability, which can cause significant problems for urban and rural developments. Clearing of slopes can create landslides, and irrigation of sensitive silt deposits can cause erosion and sedimentation. Developments often occur on the fans of streams and rivers in valley bottoms. These fans are prone to natural channel migration which results in efforts to control the channel through diking, channelization, and armouring, all of which contribute to habitat degradation.

Golf course, Kimberly.
Photo: William Pitcher picturebc.ca

All-season resort developments (notably ski areas and golf courses) have significant impacts on wildlife. Ski hills and golf courses occupy large tracks of land, altering their availability and quality for resident species that require larger ranges or specific habitat features. Species most commonly experiencing landscape level impacts from these operations are Mountain Caribou, Grizzly Bears, Mountain Goats, and Wolverines as well as ungulate winter range in general. Localized facilities, such as roads, ski runs, hiking trails, buildings, and parking lots, can have significant site level impacts affecting species such as Fisher, Martin, Northern Goshawk, Harlequin Duck, and rare plants. Additionally, roads leading to these resorts can be associated with high wildlife mortality—a concern for both driver safety and wildlife populations.

Recreation

With increased urban and rural development comes an increase in recreation demands. Recreational activities continue to expand and intensify in both the front and back country. These activities can and do have minor to major impacts on wildlife and their habitats. Proper planning and implementation is required to ensure these impacts are minimized. Whether it involves choosing a previously impacted site for the development of fields and courts or properly planning routes for multi-use trails, these activities should ensure that impacts on wildlife and habitat are reduced.

Associated with recreation is the impact from mechanized transportation. There are nearly 100,000 km of roads and trails in the Kootenay Boundary Region that are accessed by all forms of transportation. Trucks, ATVs, dirt bikes and mountain bikes can all be found utilizing road and trail networks, undertaking activities which can result in impacts to fish and wildlife and their habitats such as destruction of spawning beds in streams, the spread of invasive species or displacement of wildlife from critical habitats.

Shoreline Development

Across the Kootenay Boundary, development is often located around aquatic resources—rivers, lakes, streams and wetlands. Rivers and lakes provide picturesque views, drinking water, access to recreation, and economic benefits. Developments along shorelines can have significant impacts to habitat and species. For example

- loss of riparian vegetation from construction and maintenance of shoreline developments;
- modification of shoreline habitats from construction and maintenance of boat docking and launching facilities, groins, and infills;
- changes in longshore drift, erosion and sedimentation patterns due to shoreline developments such as boat docking and launching facilities, groins and infills;
- cumulative effects on shore spawning, and littoral/riparian habitats from construction and maintenance of shoreline developments;
- trampling of sensitive habitats and spread of invasive species due to increased access; and
- disturbance of waterfowl during wintering, nesting, and breeding seasons.

Lakeshore development, Nelson.
Photo: Phil Best picturebc.ca

Regional approaches to managing shoreline development and impacts have been implemented.

In the East Kootenay, the East Kootenay Integrated Lake Management Partnership (EKILMP) has developed a series of reports based on the Sensitive Habitat Inventory and Mapping (SHIM) protocols. Three reports are generally completed for each lake: Foreshore Inventory and Mapping (FIM), Fish and Wildlife Habitat Assessment and Shoreline Management Guidelines.

The *Shoreline Management Guidelines* are intended to be used as an initial step when reviewing, planning for, or prescribing alterations along the shoreline. The Guidelines are developed based on the information contained within the FIM and Fish and Wildlife Habitat Assessment reports for each lake. The Guidelines identify shoreline colour zones, activity risk analysis and the process of proceeding with applications for works along the shoreline. The Guidelines are intended to result in cooperative management between all levels of government who have responsibility for approvals and permits and to provide direction to applicants when considering development along the foreshore.

In the Columbia area (Columbia Shuswap Regional District) the provincial Riparian Areas Regulation (RAR) applies to all developments proposed within 30 m of the high water mark of a stream, river, lake, wetland or other water body that contains or is connected to, fish bearing waters. The purpose of RAR is to protect the features, functions and conditions that are vital in the natural maintenance of stream health and productivity. See Section 4.3.2 for more information on RAR and the protection of aquatic and riparian areas.

In the West Kootenay, progressive shoreline development planning is in the early stages. The Kootenay Lake Partnership, a collaborative multi-agency group, is working on combining existing requirements, regional

Moose.
Photo: Mike Knapik

guidelines and terms and conditions with current, scientifically defensible data. Existing terms and conditions and timing windows can be found at www.env.gov.bc.ca/wsd/regions/kor/wateract/terms_conditions.html.

Within the Boundary there are shoreline development guidelines in place for Christina Lake under the Okanagan Large Lakes Foreshore Protocol. The Protocol elaborates on the strategic direction provided of the Okanagan Shuswap Land and Resource Management Plan (OSLRMP), and provides a forum for continuous improvements to fish and species at risk habitat information and the management of risks to those habitats. This is intended to assist provincial and federal agencies, local governments, and the general public during the planning of developments, lower level planning (e.g., zoning) and/or the adjudication of applications for specific development activities (e.g., applications for foreshore leases for docks, boat launches or marinas).

The Protocol is to be followed for all proposals for works below the high water mark on Christina Lake. It provides foreshore sensitivity maps, risk ratings for specific development activities, and preferred procedures and practices. The combined use of this information will help to maintain important foreshore habitats. The Protocol and associated maps are available online at www.env.gov.bc.ca/okanagan/esd/ollp/ollp.html.

Urban Wildlife

Many wildlife species have adapted to living in or near urban and rural environments. Species such as coyote, deer, Black Bear, racoon and skunks can provide exciting wildlife viewing opportunities, but as human populations increase, passive viewing frequently shifts to direct conflict. Black Bears, coyote, racoons and skunks are often attracted to fruit trees, pet food, BBQs and poorly managed garbage. Although racoons and skunks are relatively harmless to humans, habituated bear and coyote are often considered a safety threat and will often end up killed as 'problem' wildlife. Deer may be harassed by dogs or, as is happening in several Kootenay Boundary communities, deer are becoming aggressive and are causing harm to pets and humans as well as damaging property.

Cranbrook, Kimberly and Grand Forks have established multi-stakeholder groups to provide advice on the management of urban deer in their communities. Management plans are being developed which include monitoring of deer populations, outreach and education for community residents, and the implementation of a range of population management methods including exclusion (e.g., through fencing), relocation, changes to provincial hunting regulations and culls. For information on dealing with wildlife conflicts, see Section 2.8.4 and Section 3.9.2.

Agriculture

Agriculture is common in the Boundary, Cranbrook, Creston, and Slocan areas. The rezoning and subsequent subdivision of agricultural lands is an ongoing concern. It reduces the amount of agricultural lands available for food production, and causes further encroachment on wildlife. Although farmland is not a native ecosystem, these areas still allow for wildlife migrations and can provide opportunities for foraging and cover in undeveloped portions. The proliferation of wildlife exclusion fencing in recent years has further reduced the area available to wildlife.

Wildfire

Increasing potential for catastrophic wildfire events is an ongoing problem across the region. Effective fire suppression over the past 50 years has allowed dense young coniferous forests to grow in areas where natural low-intensity fires would have removed them, leaving only mature trees that are adapted to fire. The Columbia River Trench on the eastern side of the region and the grasslands and open forests of the Boundary have been particularly affected by fire suppression; dense stands of Douglas-fir now occur where open Ponderosa Pine forests once dominated. Restoration efforts are seeking to address this problem.

In an effort to 'fireproof' their homes, people may clear out vegetation in a much larger area than needed, destroying wildlife habitat in the process. For information on reducing wildfire hazards, see Section 2.8.3. The Province has produced a pamphlet for homeowners that outlines steps which can be taken to create defensible space around a home to reduce an approaching wildfire's volatility (http://bcwildfire.ca/Prevention/firesmart.htm).

Agriculture in Creston Valley.
Photo: Phil Best picturebc.ca

Columbia Spotted Frog.
Photo: Jennifer Heron

Dam Impacts

The development of hydro-electric and other dams has had a profound impact on aquatic and terrestrial ecosystems in the Kootenay Boundary Region. The Columbia and Kootenay Rivers each have several major hydro-electric facilities. Impacts from these facilities include the interruption of natural migration patterns to both aquatic and terrestrial species, depletion of nutrient inputs downstream of dams, effects on water temperatures, reductions in fish populations due to entrainment, and the loss of riverine and riparian habitats that are flooded by reservoirs, whether permanently or seasonally. The continuous drawdown and refilling of major reservoirs prevents the establishment of productive riparian areas and zones within reservoirs where aquatic plant species could contribute to productivity. There are also impacts from transmission lines, significant alterations to natural flow regimes (e.g. timing, duration, and intensity), interruption to natural sediment transportation/ distribution, erosion patterns, and water supersaturation.

5.2.4 Regionally Significant Species

There are a number of species within the Kootenay Boundary that are of particular interest during development because of their endangered status, conservation ranking or regional significance. A few of these species are listed below, see the Conservation Data Centre for the most current and comprehensive list.

Birds

Important Bird Areas (IBAs) have been designated within the Kootenay region, one at Creston Valley and another at Skookumchuk Prairie. These

sites support species such as American Coot, Black Tern, Great Blue Heron, Long-billed Curlew, waterfowl and other regionally significant species. To find the locations of IBAs and access site information (e.g., bird species abundance, habitat description, and conservation issues), search the online Map Viewer or Site Directory at www.ibacanada.ca. (Note that the online site summaries for each IBA are under review and the information is being updated.)

Information from several bird monitoring programs coordinated by Bird Studies Canada is also available through a searchable online data warehouse, Nature Counts (www.naturecounts.ca). Information available includes species presence, seasonal abundance, breeding species and other information. See Appendix D: Sources for Environmental Mapping and Inventory for more details.

Great Blue Heron

The Great Blue Heron (*Ardea herodias herodias*) is a Blue-listed species (Conservation Framework priority 2) that breeds and over-winters in B.C. Populations over-winter in the Okanagan and lower Fraser valleys, while breeding populations can be found across the Kootenay Boundary region. Heron in this region nest primarily in Black Cottonwood trees in riparian habitats along the margins of lakes, slow-moving rivers, sloughs, or marshy lakes and wetlands. The species nests in colonies known as rookeries.

The Great Blue Heron is threatened by direct habitat loss from development. Increasing urbanisation within some of the best nesting and foraging habitats in the province is resulting in the loss of critical nesting trees and rookeries. For more information and guidelines for protection, see the Fact Sheet on Herons (Appendix G).

Great Blue Heron, Canal Flats.
Photo: Brad Hill picturebc.ca

Western Screech-owl.
Photo: Ministry of Environment

Western Screech-Owl

The "Interior" Western Screech-Owl (*Otus kennicottii macfarlanei*) is a Red-listed species (Conservation Framework priority 1) that has been documented breeding in the Boundary, West Kootenay and East Kootenay. Breeding territories are closely associated with riparian habitats, particularly those dominated by Black Cottonwood, Trembling Aspen, and Water Birch. The birds nest and roost in existing tree cavities in large diameter trees and will also roost in dense vegetation and thickets.

Western Screech-owl habitat occurs along streams, rivers and lakes where urban and agriculture development are often concentrated resulting in loss of cottonwood, birch, and aspen woodlands. Habitat is degraded through the removal of the mature trees that are required by the owls for roosting and nesting. Older cottonwoods and birches in residential and park areas are often removed or drastically cut back to reduce the hazard of falling trunks and branches. Removal of the rich shrub and forb understoreys of riparian woodlands for gardens, golf courses, and agriculture also compromises screech-owl habitat by removing hiding cover and potential forage.

For more information and guidelines for protection, see the Fact Sheet on Western Screech-Owl (Appendix G).

Amphibians and Reptiles

Guidelines for Amphibian and Reptile Conservation during Urban and Rural Land Development in British Columbia (2014) is a comprehensive information source and guide which outlines best practices designed to help maintain the viability of native amphibian and reptile populations in urban and rural areas of British Columbia subject to land development activities.

Western Toad.
Photo: Zsolt Sary

Western Toad

The Western Toad (*Anaxyrus boreas*) is a Blue-listed species (Conservation Framework priority 2) that can be found across the Kootenay Boundary region from the Rocky Mountain trench, to Golden and Rock Creek at elevations up to 3,660 m. Western Toads breed in a variety of natural and artificial aquatic habitats including ponds, stream edges, or the shallow margins of lakes as well as in ditches and road ruts.

The greatest threats to Western Toad come from urban development. Wetland infilling results in direct loss of habitat. Newly emerged toadlets can be easily crushed or injured when they congregate in riparian areas and shorelines - areas frequently used for recreation and access. Without proper planning, new roads can segregate aquatic and upland habitat, resulting in mortality during migration or be a complete barrier to migration.

For more information and guidelines for protection, see the Fact Sheet on Western Toad (Appendix G).

Western Painted Turtle

Western Painted Turtle (*Chrysemys picta*) is a Red-listed species (Conservation Framework priority 2) found throughout the southern interior as far north as Golden. The Western Painted Turtle is considered to be at the northern extent of its North American range in B.C. and is the only native freshwater turtle in the province. They require wetlands, ponds or small lakes for hiding cover and foraging which are adjacent to upland areas with dry, light textured soils for nesting.

The Western Painted Turtle is considered vulnerable to habitat loss, and susceptible to human and natural disturbances. Habitat is being lost because of pollution and waterway interference due to damming, agriculture, urbanization of waterfronts, recreation and the introduction of aquatic invasive species.

Western Skink

Western Skink (*Eumeces skiltonianus*) is a Blue-listed species (Conservation Framework priority 1) which inhabits Ponderosa Pine and Interior Douglas-fir Biogeoclimatic Zones in the Boundary and East Kootenay, and the Engelmann Spruce-Subalpine Fir Zone and the moister Cedar Hemlock Zone in the West Kootenay. This small smooth-scaled lizard utilizes a variety of habitat features in woodland, grassland, and forested areas. Some of the most important habitat features include rocks and downed logs for shelter, herbaceous vegetation for avoiding predators and foraging, and south-facing open rock outcrops and talus slopes for nesting.

The population and distribution of this species is not well known but the most immediate threat is considered to be habitat fragmentation and alteration from residential development, road construction, and the removal of rock and talus as a result of increasing human population.

Mammals

Bats

There are a number of bat species documented within the Kootenay Boundary region. The Townsend's Big-eared Bat (*Corynorhinus townsendii*, Blue-listed, Conservation Framework priority 2) occurs in the East and West Kootenay and Boundary. The Fringed Myotis (*Myotis thysanodes*, Blue-listed, Conservation Framework priority 3) occurs in the West Kootenay and Boundary. The Northern Myotis (*Myotis septentrionalis*, Blue-listed, Conservation Framework priority 2) occurs in the East Kootenay and Columbia.

All of these species roost and hibernate in a variety of locations including caves, rock crevices, mine tunnels, and buildings; however, when roosting in these sites Townsend's Big-eared Bats do not hide in crevices like many bats do. Townsend's Big-eared Bat and the Fringed Myotis are associated with arid grassland and Ponderosa Pine–Douglas-fir forests, foraging in insect-rich riparian zones, as well as around wetlands, forest edges and open woodland. The Northern Myotis is associated with Interior Cedar-Hemlock forests, foraging along forest edges, over forest clearings, and occasionally over ponds.

Many people are afraid of bats because of a perceived common association with rabies, however bats are generally harmless. These species are often persecuted as a result of this perception; extermination or removal of structures being used for roosting and hibernating has a significant impact on bat populations. Bat species are also impacted by urban development which can reduce or destroy foraging habitats.

A good source of information on B.C.'s bat species is E-Fauna BC www.geog.ubc.ca/biodiversity/efauna/BatsofBritishColumbia.html.

Badgers

The "American" Badger (*Taxidea taxus*) is a Red-listed species (Conservation Framework priority 1) that inhabits the drier valley bottoms of the Kootenays and Boundary. Badgers are a wide ranging species with home ranges of up to 450 km^2 for males. They will utilize a variety of habitats but are most commonly found in open forests and grasslands where they hunt for small mammals such as Columbian Ground Squirrel and Yellow Bellied Marmots.

Badgers have been documented using abandoned buildings and roadsides for denning but the mortality risks associated with the use of these locations is probably greater than their value. Harassment from humans and dogs is another risk associated with the use of these locations. Urban expansion, resort development and agricultural land conversion reduces habitat and prey sources for the Badger, significantly impacting their ability to survive.

Additional information on Badger can be found on the BC Species and Ecosystems Explorer website www.env.gov.bc.ca/atrisk/toolintro.html.

American Badger.
Photo: Ministry of Environment.

Plants

As of Spring 2012, there are eight COSEWIC and SARA-listed vascular and non-vascular plant species plus an additional 22 Priority 1 plant species (Conservation Framework) in the Kootenay Region. Two species are highlighted below.

Spalding's Campion

Spalding's Campion is found in southern B.C. near Rooseville where this species is at the northern extent of its range in North America. This is a Red-listed species (Conservation Framework Priority 1) that occurs in the dry hot subzone of the Ponderosa Pine BEC zone. It is found in the bottoms of shallow swales and cool north slopes in deep, infertile glacial soils. Some of the threats to this species include invasive alien species, habitat fragmentation, urban and residential development, and potentially livestock use.

Southern Maiden-hair Fern

Southern Maiden-hair Fern exists only at only one location in Canada, at Fairmont Hotsprings where there is one population of only a few individuals in any given year. This disjunct location is greater than 1,000 km north of its main range in North America. Southern Maiden-hair Fern is a Red-listed species (Conservation Framework Priority 1) that requires tufa rock faces near hot mineral water flows. Any disruption of water flow or water temperature will affect this species. Recreational activities and development are threats to this species at risk.

5.2.5 Useful Sources

General information

Ministry of Forests, Lands and Natural Resource Operations,
Kootenay Boundary Office
205 Industrial Rd. G
Cranbrook, BC V1C 7G5
Phone: (250) 489-8540
http://www.for.gov.bc.ca/mof/regdis.htm or
http://www.env.gov.bc.ca/kootenay/

Regional Resources

Access to many sources of inventory information can be found through CLIR (Cross-Linked Information Resources) website http://www.env.gov.bc.ca/clir/

Kootenay Boundary Higher Level Plan (land use planning) http://archive.ilmb.gov.bc.ca/slrp/lrmp/cranbrook/kootenay/legaldocuments/index.html

Fisheries information http://www.env.gov.bc.ca/kootenay/fsh/main/mainfish.htm

Shoreline Management Guidelines www.rdek.bc.ca/east_kootenay_integrated_lake_ma.htm

The Water Act http://www.env.gov.bc.ca/wsd/regions/kor/wateract/terms_conditions.html

Climate Change

For information on regional projections for climate change see the Pacific Climate Impacts Consortium's Plan2Adapt tool http://pacificclimate.org/tools-and-data/plan2adapt