



## Section Five: Regional Information Packages

### Northeast 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 5.3-1: Ministry of Forests, Lands and Natural Resource Operations Regions**



Cover Photos:  
 Left: Peace River. *Photo: Val Ultgaren picturebc.ca*  
 Centre: Grazing Elk. *Photo: Dave Polster*  
 Right: Near Fort Nelson. *Photo: Wayne Sawchuck picturebc.ca*



### 5.3.1 Northeast Region

The Northeast (Peace) Region covers approximately 17.2 million hectares in the northeast corner of British Columbia (**Figure 5.3-2**). The region is bounded by the Rocky Mountains in the south and the west, and extends to the Alberta border in the east and the Yukon and Northwest Territory borders in the north. It includes the Forest Districts of Dawson Creek (2.9 million ha), Fort St. John (4.5 million ha) and Fort Nelson (9.8 million ha). The Northeast Region also includes the Muskwa-Kechika Management area (M-KMA). The M-KMA encompasses 157,720 hectares, an area for which pre-tenure planning is required prior to the issuance of oil and gas tenures to encourage and guide environmentally-responsible development.

**Figure 5.3-2: Northeast Region**



The major urban centres are Dawson Creek (population ~11,000), Fort St. John (population 17,500), and Fort Nelson (population 4,500). Smaller communities include the District of Tumbler Ridge (population 2,500), District of Hudson's Hope (population 1,000), the Village of Pouce Coupe (population 750) and Taylor (population 1,400). Traditional territories of the West Moberly First Nations, Saulteau First Nations, Kelly Lake Metis Community, the Halfway River First Nations, the Blueberry First Nations, the Doig River First Nations, the Fort Nelson First Nation, the Prophet River First Nation, the Fort Liard First Nation, the Lower Post First Nation and the Dene Tha First Nation overlap with the Northeast Region.



### Biogeoclimatic Zones

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

The Northeast Region can be classified into four main biogeoclimatic zones based on climate, vegetation and geological features (**Figure 5.3-3**).

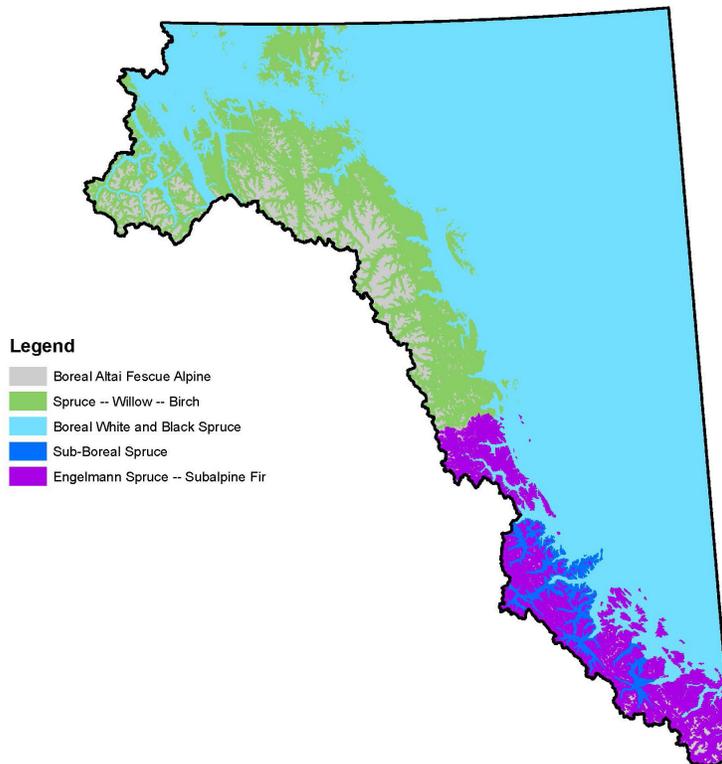
- ◆ The **Boreal White and Black Spruce (BWBS)** Zone covers the majority of the Northeast region and is a matrix of wetlands and muskeg with smooth rolling upland areas dominated by Lodgepole Pine (*Pinus contorta*), White Spruce (*Picea glauca*), Black Spruce (*Picea mariana*) and Trembling Aspen (*Populus tremuloides*) stands. The BWBS zone, with its low to moderate snow accumulation, provides important ungulate wintering habitat.
- ◆ The coniferous forests of the **Engelmann Spruce-Subalpine Fir (ESSF)** Zone are dominated by Engelmann Spruce (*Picea engelmannii*) and Subalpine Fir (*Abies lasiocarpa*), with a lesser component of Lodgepole Pine. The growing season is short and cool, with long cold winters and deep snow depths.
- ◆ The **Spruce-Willow-Birch (SWB)** Zone is found at lower elevations and is forested with White Spruce and Subalpine Fir, with lesser amounts of Lodgepole Pine, Black Spruce and Trembling Aspen. Wetlands are common and are vegetated with White Spruce and Tall Willow (*Salix* spp.) swamps, sedge (*Carex* spp.) fens and marshes.
- ◆ The **Alpine Tundra (AT)** Zone is found above the tree line. It is characterized by short growing seasons and long, cold winters with deep snow. White and Engelmann Spruce and Subalpine Fir are the dominant tree species that generally exhibit a stunted or 'krummholz' growth form. Vegetation consists of shrubs, heathers, herbs, mosses, and lichens.

Northeast Bison Herd.  
Photo: C. Thiessen





**Figure 5.3-3: Biogeoclimatic Zones of the Northeast Region**



### 5.3.2 Regional Features

The Northeast Region is made up of four major geographic areas, all of which are part of the greater MacKenzie River Basin. These include the Peace River Basin, the Boreal Forest, the Liard River Basin, and the Muskwa-Kechika Management Area (M-KMA).

#### *Peace River Basin*

The Peace River Basin covers an area of 323,000 km<sup>2</sup> in British Columbia and Alberta. The Peace River is formed by the confluence of the Finlay and Parsnip Rivers. It is approximately 2,000 km long and flows from the headwaters, across northern Alberta, and into the lowlands of the Peace-Athabasca Delta and Great Slave Lake. The major tributaries within the Peace River Basin in British Columbia include the Pine, Moberly, Sukunka, Murray, Kiskatinaw, Halfway, Graham, and Beatton River systems.

This area is characterized by undulating and rolling plains. The Peace River valley supports a broad diversity of species and ecosystems. The wide, low elevation plain that extends eastward from the Rocky Mountain foothills supports upland coniferous-leading, deciduous-leading, and mixedwood forests. The area includes the only aspen parkland in British Columbia. These plant communities provide habitat for a diverse range of wildlife.



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Boreal grasslands and scrub ecosystems on the steep, south-facing slopes above the Peace, Moberly, and Pine Rivers form important habitat for overwintering ungulates. The milder climate combined with shallower winter snowpacks make forage more accessible to Moose, Mule Deer, White-tailed Deer, and Rocky Mountain Elk. As the narrowest part of the Rocky Mountain range, the area is important for habitat connectivity and populations of Grizzly Bear, Wolverine, and Woodland Caribou, particularly at the western foothills, alpine and subalpine habitats.

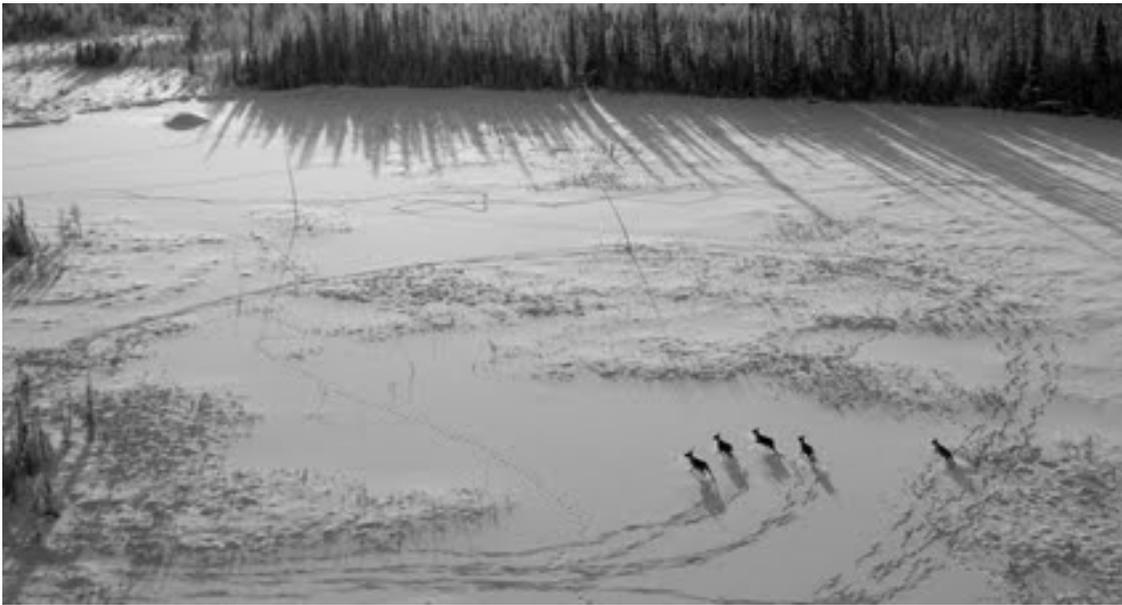
The Peace Lowlands support populations of Black Bear and Grey Wolf. Grizzly Bears are occasionally sighted moving through the Peace River valley. No female Grizzly Bears are known to breed in the area and so the population status within the Peace Lowlands is considered to be extirpated. Large diameter Balsam Poplar, Trembling Aspen, and fallen logs provide habitat for small to mid-sized mammals including Beaver, Marten, Mink, and Fisher. Mature—old lowland riparian forests, with large diameter Balsam Poplar trees and snags, provide roosting and foraging habitat for six species of bats. Rodents such as Deer Mice, Meadow Jumping Mice, Meadow Vole, Red-Backed Voles, and Common Shrews are known to inhabit the river corridor.

The mosaic of shallow lakes and wetlands in the upland plateau areas and the numerous side and backchannels along the Peace River support populations of breeding or migrating waterfowl. Common raptors include the Bald Eagle and Great Horned Owl. Ruffed Grouse and a wide variety of songbirds, including a number of species at risk, are present in the lowland riparian forests and deciduous and mixed upland forests. The Peace River and its tributaries support provincially significant Bull Trout and other sport fish populations.

### ***Boreal Forest***

The boreal forest stretches across northern Canada from Newfoundland to the Yukon. In British Columbia, the boreal forests are classified as the Boreal White and Black Spruce (BWBS) biogeoclimatic zone and contain a mixture of two main ecosystems; upland forests commonly characterized by mixed stands of Trembling Aspen, White Spruce, Lodgepole Pine and Black Spruce, and lowland muskeg. Muskeg is a peatland complex of bogs and nutrient-poor fens that form an extensive network of wetlands across the poorly-drained northeastern lowlands. Common trees in the muskeg include Black Spruce and Tamarack.

The lowland boreal forest is rich in wildlife and provides habitat for common ungulates such as moose and deer as well as Wood Bison and the boreal population of Woodland Caribou, both of which are designated as threatened by COSEWIC. The ecosystem also supports abundant populations of Black Bear and Grey Wolf. Birds and small mammals are common, particularly in the deciduous forests that develop following fire.



Waterfowl inhabit marshes and shallow-lake habitats. Because of the cold climate, the few amphibians and reptiles mainly inhabit the warmer valley bottoms.

Boreal Woodland Caribou.  
*Photo: C. Thiessen*

### ***Liard River Basin***

The Liard River and its tributaries drain an area of approximately 275,000 km<sup>2</sup> of boreal forest and muskeg, making it Canada's ninth largest watershed. The Liard River is approximately 1,100 km long, flowing from the Pelly Mountains in the Yukon, through the Northeast region of British Columbia and then into the Northwest Territories where it drains into the Mackenzie River. The major tributaries of the Liard River include the Fort Nelson, Prophet, Muskwa, Toad, Kechika and Petitot rivers. The Liard River Hotspring and the Grand Canyon of the Liard, a 30 km stretch of the river beginning just east of the hot springs, are well known features in the Liard River basin.

Much of the Liard River basin is covered by a mosaic of poorly drained, organic peatlands, interspersed with deciduous and mixedwood upland and riparian habitats, wetlands and upland boreal forest. The western portion of British Columbia's Liard River basin comprises extensive mountainous areas. The combination of relatively flat plains to the east and mountains and their associated foothills to the west creates an array of habitat types that supports a wide diversity of wildlife.

### ***Muskwa-Kechika Management Area***

The Muskwa-Kechika Management Area (M-KMA) covers 6,400 km<sup>2</sup> in northeastern B.C. It is one of the largest, most diverse wilderness areas in North America, with expansive forests, geological formations, lakes, rivers, waterfalls, hot springs, sub-alpine and alpine areas and major wetlands. The diversity of ecosystems and the lack of significant motorized



access and industrial development have resulted in an area that currently supports one of the largest intact predator-prey systems in North America.

The M-KMA is a special management area with the goal of maintaining, in perpetuity, the wilderness quality, and the diversity and abundance of wildlife and the ecosystems on which they depend. Encouraging sustainable economic development of resources in a manner that respects and maintains the wilderness and wildlife values of the area is a priority for the government of British Columbia. The M-KMA includes parks and protected areas, as well as management zones where resource development and uses such as recreation, hunting, trapping, timber harvesting, mining, and oil and gas activities are allowed. The M-KMA is intended to set a world-class standard that balances environmental values with human activities for resource extraction and recreation on the landscape.

There is little urban and rural development pressure in the M-KMA. For more information see <http://www.muskwa-kechika.com/>.

### 5.3.3 Development Concerns



Oil rig in caribou habitat.  
*Photo: C. Thiessen*

Urban development in the Northeast Region occurs largely in the three main population centres; Dawson Creek, Fort Saint John, and Fort Nelson. The rapid growth in the energy sector has resulted in a substantial increase in the population in these cities. For example, the population of Fort St. John increased by 8.4% from 2001 to 2006, and by another 26.4% between 2006 and 2011. The city has the second youngest median age (29.8 yrs) in the province after Whistler. This ongoing growth and demographic shift to younger families means the communities in the region will continue to see urban and rural growth. The associated increase in services, housing developments, roads, and other linear features encroaches on surrounding forests and agricultural lands, increases the potential for wildlife-human conflicts, creates problems associated with pollution, water treatment and solid waste disposal, and contributes to the cumulative impacts resulting from significant industrial development in the region.

Oil and gas exploration and production is the largest economic sector in the Northeast Region. Over the past two decades, population in the Northeast Region has risen and fallen largely in relation to activity in the energy sector. Other important economic drivers in the region include agriculture, forestry, and extraction of sand, gravel and industrial mineral resources.

Regional environmental and ecosystem concerns occur primarily as a result of this industrial activity. The development of support services,



light industrial, and housing to support these industries can exert significant pressures on urban and rural landscapes. Specifically, oil and gas development requires extensive support from a variety of sectors. Pipelines, rig, and well service companies, and housing and services for employees can all create impacts on urban and rural natural ecosystems. Timber harvesting of aspen and mixedwood stands in the region requires specific processing facilities.

Additionally, the development and maintenance of farm and rangelands throughout the region can have a substantial impact on forest lands, wildlife habitats, and wildlife populations. Furthermore, large-scale agriculture requires a substantial amount of urban and rural infrastructure including roads and rail lines, equipment distributors and servicing companies, grain handling and shipping facilities, and seed and fertilizer sales outlets. Agricultural development exerts significant pressure on the natural ecosystems in the region, particularly in the Peace River lowlands. The high-quality, nutrient-rich soils, and the mild climate, relative to the rest of the Northeast Region, provide for exceptional agricultural land. Development of rural farmlands and ranchlands results in the conversion of forests (wildlife habitat) to croplands, increases the potential of erosion and topsoil loss, and creates the potential for conflicts between wildlife populations and humans.

Finally, while recreation exerts a lesser pressure on ecosystem health and connectivity, human use of wilderness areas for recreation has impacts on the ability of the land base to sustain healthy wildlife populations. For example, due to their large size and ease of access, many of the river systems are used as major recreation corridors in the region. Roads leading to these corridors can increase the spread of invasive species and provide predator access to important ungulate and riparian habitats and can impact the natural predator-prey systems in the region.

Consider the following guidelines for development in addition to those in Sections 2–4 of [Develop with Care](#):

- Consider the potential for wildfire occurrences when selecting locations for new developments. Pine Bark Beetle attacks have left (and will continue to leave) large areas prone to wildfire.
- Provide zoning for oil and gas services in areas that are well away from environmentally sensitive areas. Require developers to protect groundwater sources from contamination by materials associated with oil and gas services.
- Retain natural vegetation that will shelter development sites from winter storms and cold winds. This will also help retain wildlife habitat.



- ☑ Protect groundwater reservoirs from contamination during development, especially where oil and gas service facilities are concerned.
- ☑ Locate urban and rural developments, including commercial recreation, away from winter ranges and other critical wildlife habitats.

### **Development Near Aquatic Resources**

Regional urban and rural developments are typically located in close proximity to aquatic resources—rivers, lakes, streams and wetlands. As in other regions, rivers and lakes provide picturesque views, water for domestic and industrial purposes, and recreation and economic opportunities. The largest water body in the region is the Peace Arm of Williston Lake. Other notable lakes include Moberly Lake, Gwillim Lake, Swan Lake, Wapiti Lake, Hook Lake, Monkman Lake, Charlie Lake, and Redfern Lake. Many of these waterbodies have either residential or recreational developments along the lakeshores. Lakes in the Fort Nelson area tend to be smaller and shallower with low to moderate productivity.

#### ***Shoreline Development***

Developments along shorelines can have significant impacts to habitat and species. For example

- ◆ loss of, and cumulative impacts on, shore spawning and littoral/riparian vegetation through infills, and construction and maintenance of shoreline developments;
- ◆ modification of shoreline habitats, erosion, and sedimentation from construction and maintenance of boat docking and launching facilities;
- ◆ trampling of sensitive habitats, spread of invasive species, and increased predator access to riparian habitats due to increased access to rivers and lakeshores; and
- ◆ disturbance of waterfowl during wintering, nesting, and breeding seasons.

In response to growing pressures for development around lakeshore areas in the region, the Peace River Regional District developed the Peace River Regional District [\*Lakeshore Development Guidelines\*](#). The document outlines policies and guidelines pertaining to development on private lands located within 300 m of the high water mark on lakes in the regional district. The document provides the public with background information on lakeshore ecological and development issues, provides developers with conservation guidelines for projects in close proximity to aquatic resources, and provides information to Regional District Development



Services staff to aid in decision making with regard to future development proposals. The Guidelines are available at [http://prrd.bc.ca/services/development/documents/lakeshore\\_development.pdf](http://prrd.bc.ca/services/development/documents/lakeshore_development.pdf)

The Wetland Stewardship Partnership (WSP) developed *Wetland Ways: Interim Guidelines for Wetland Protection and Conservation in British Columbia*, a series of guidelines and best practices to help build a comprehensive model for wetland conservation in B.C, and to provide guidance to avoid and minimize impacts on wetlands on both private and public lands. The document provides general and sector-specific guidelines for wetland protection addressing the unique needs and impacts, as well as management and regulatory considerations, of various industries and groups. More details and links to the document are available at [http://www.env.gov.bc.ca/wld/documents/bmp/wetlandways2009/wetlandways\\_docintro.html](http://www.env.gov.bc.ca/wld/documents/bmp/wetlandways2009/wetlandways_docintro.html).

The Charlie Lake Conservation Society is a group of volunteers who are interested in the conservation and remediation of the ecosystem of the Charlie Lake watershed. The Society's concerns include impacts to water quality through eutrophication and the resulting blooms of algae and cyanobacteria and management of lakeshore developments. More information available at <http://www.charlielakeconservationsociety.ca/>

Ducks Unlimited (DU) has undertaken a number of regional projects to maintain and enhance regional waterfowl habitat primarily via the conservation, restoration and management of wetland habitat. More information available at <http://www.ducks.ca/>.

Provincial Species at Risk (SAR) information including guidelines for managing associated habitat available at <http://www.env.gov.bc.ca/wld/frpa/iwms/index.html>.

### ***Riverside Developments, In-Stream Activities and Surface Water Withdrawals***

River valleys can be more biologically diverse than other habitats and alterations to the land adjacent or proximal to flowing water can fragment important connectivity corridors and disrupt species interactions and movement patterns. Developments in and along rivers and streams can impact habitat and species. For example

- ♦ drainage or disturbance of slow-moving-river margins, oxbows, backchannels can impact habitat and nest sites for breeding bird (e.g., Trumpeter Swan);



Liard hotsprings  
Photo: C. Thiessen.



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- ◆ removal of riparian vegetation (shrubs), drainage of wetlands or alteration of hydrology can impact birds that nest on floating emergent vegetation mats in shallow water (e.g., Sandhill Crane), or remove important breeding habitat for marsh-dependent birds (e.g., Nelson's Sharp-tailed Sparrow, American Bittern, Yellow Rail and Le Conte's Sparrow); and
- ◆ drainage, disturbance or surface-removal of water from rivers and streams can impact fish and fish habitat.

Proposed developmental activities in and around watercourses (e.g., wetlands, seasonal or dry creeks, streams, rivers, lakes) or applications for surface-water withdrawals must comply with all applicable federal, provincial and municipal enactments. Prior to commencing work, it is the developer's responsibility to determine whether the federal Department of Fisheries and Oceans (DFO) must be consulted regarding a potential Habitat Alteration, Disturbance or Destruction (HADD).

Further, activities in and around streams must also adhere to the requirements of the provincial Water Act. Information to determine what works require a Water Act Notification or application for an Approval is available at: [http://www.env.gov.bc.ca/wsd/water\\_rights/licence\\_application/section9/index.html](http://www.env.gov.bc.ca/wsd/water_rights/licence_application/section9/index.html).

The Ministry of Forests, Lands and Natural Resource Operations Water Stewardship Division (<http://www.env.gov.bc.ca/wsd/>) provides *Standards and Best Management Practices for Instream Works* (<http://www.env.gov.bc.ca/wld/documents/bmp/iswstdsbpsmarch2004.pdf>).

### Wildfire

Wildfire is most common in forest ecosystems within the "Natural Disturbance Type 3". These ecosystems historically experienced frequent wildfires, ranging in size from small spot fires to fires covering tens of thousands of hectares. In the Boreal White and Black Spruce biogeoclimatic zone, average fire size was likely 300 ha to as large as 6,000 ha in areas where topographic features did not limit fire spread. The mean fire-return interval for the deciduous-leading BWBS ecosystems is about 100 years. For stands where coniferous species are more prominent, the mean fire-return interval is approximately 125 years.

The susceptibility of these ecosystems to fire has implications for adjacent urban and rural developments. Provincial fire-smart and fire-proofing programs are available on the Wildfire Management Branch website (<http://bcwildfire.ca/Prevention/firesmart.htm>).

One of the most important pieces of legislation regarding the conservation and protection of fish and fish habitat in Canada is the federal Fisheries Act. Section 35(1) of the subject act is the main provision concerning fish habitat and states: "No person shall carry on any work or undertaking that results in the harmful alteration, disruption or destruction [HADD] of fish habitat". To assist complying with Section 35(1) of the Fisheries Act, the federal Department of Fisheries and Oceans (DFO) have developed a series of operational statements available at: [http://www-heb.pac.dfo-mpo.gc.ca/decisionsupport/os/operational\\_statements\\_e.htm](http://www-heb.pac.dfo-mpo.gc.ca/decisionsupport/os/operational_statements_e.htm)



### Wildlife-human Interactions

Large mammals (e.g., caribou, moose, elk, deer, sheep, bears, cougars, wolves) can create problems in urban and rural areas. Many wildlife species have adapted to living in or near urban and rural environments. Species such as coyote, deer, bear, moose, and elk can be attracted to fruit trees, pet food, BBQs, poorly managed garbage, hay bales, and vegetable gardens. Habituated wildlife can become a nuisance or a safety threat and will often end up being killed as 'problem wildlife'. Expansion of urban and rural developments can impact wildlife and their habitats directly (habitat loss, alteration, fragmentation), or indirectly, through sensory disturbance or changes to features that influence predation risk.

Wildlife within urban and rural areas are at risk for collisions with vehicles and trains. Resource extraction in the Northeast Region frequently includes development of various types of linear corridors (e.g., roads, seismic lines, pipelines right-of-ways). Residents and visitors enjoy wilderness recreation in this largely rural region using linear corridors for recreation and access. Populations of ungulates (moose, deer, elk) and bison, coupled with the increasing vehicle traffic largely from oil and gas activities in the region, has created a human safety issue due to wildlife vehicle collisions.

The Province maintains a database of wildlife mortalities resulting from road collisions. Information on the Wildlife Accident Reporting System (WARS) is available at [http://www.th.gov.bc.ca/publications/eng\\_publications/environment/WARS\\_reports.htm](http://www.th.gov.bc.ca/publications/eng_publications/environment/WARS_reports.htm). It also provides a Wildlife Roadkill Identification Guide (WRIG) at [http://www.th.gov.bc.ca/publications/eng\\_publications/environment/WRIG/index.htm](http://www.th.gov.bc.ca/publications/eng_publications/environment/WRIG/index.htm)

Poaching is a significant problem in some areas of the Northeast Region. Active recreational activities such as off road all-terrain vehicle (ATV) use, snowmobiling, and four-wheel drive travel can disrupt wildlife (e.g., moose and caribou calving grounds and wintering habitats) and may result in increased disturbance and mortality of wildlife. Management of these activities is an important aspect of rural planning.

#### **Managing Wildlife-Human Interactions**

- ◆ **Regional Problem Wildlife Management Committee:** The Peace River Regional District leads a regional team to identify and address areas of overlap between wildlife populations and agricultural development. The Regional Problem Wildlife Management Committee is mandated to reduce conflicts between wildlife and crops. For more information on this initiative, contact the Peace River Regional District at: <http://prrd.bc.ca/home.php>.



Kiskatinaw curved bridge.  
Photo: C. Thiessen.



Halfway River from Pink Mountain .  
*Photo: C. Thiessen.*

- ◆ **Provincial Agriculture Zone Wildlife Program:** The “Provincial Agriculture Zone Wildlife Program” (PAZWP) is a Provincial initiative established by the Fish, Wildlife and Habitat Branch of the Ministry of Forests, Lands and Natural Resource Operations. It has been developed out of the recognition by the B.C. government that agricultural zones throughout the province are subject to special objectives and hold special opportunities for hunters. PAZWP helps coordinate crop damage prevention, mitigation and compensation strategies, by increasing hunting opportunities in lower elevation agricultural/winter range zones and promoting stable and healthy hunter-landowner relationships. More information on the province-wide initiative can be found at <http://www.env.gov.bc.ca/kootenay/wld/pazwp.html>.
- ◆ **Private Landowners and Hunting Coordination:** A private-land and hunting coordination website was developed by the B.C. Agriculture Council (ARDCorp) with assistance from the Ministry of Forests, Lands and Natural Resource Operations and other organizations such as the BC Wildlife Federation and the Kootenay Livestock Association. The website was established to connect private landowners and hunters to target area-specific agriculture/wildlife conflicts. The website and program addressed landowner concerns regarding hunts on their private land (such things as safety, liabilities, workloads and privacy). More information on this program can be found at <http://hunterlandownerlink.com/>

Other useful information on these and other initiatives are found in the following related links:

- ◆ Hunting & Trapping Regulations: <http://www.env.gov.bc.ca/fw/wildlife/hunting/regulations/>
- ◆ Urban Ungulate Conflict Analysis: [http://www.env.gov.bc.ca/cos/info/wildlife\\_human\\_interaction/UrbanUngulates.html](http://www.env.gov.bc.ca/cos/info/wildlife_human_interaction/UrbanUngulates.html)
- ◆ Agriculture Wildlife Program: <http://www.al.gov.bc.ca/awp/index.htm>

### ***Bear Aware***

The British Columbia Conservation Foundation leads the provincial Bear Aware program. This initiative is an educational program designed to prevent and reduce conflicts between people and bears in British Columbian communities. More information is available at <http://www.bearaware.bc.ca/>. The Ministry of Environment’s Conservation Officer Service website also offers information on a variety of simple actions that can be taken to reduce conflicts with wildlife [http://www.env.gov.bc.ca/cos/info/wildlife\\_human\\_interaction/index.html](http://www.env.gov.bc.ca/cos/info/wildlife_human_interaction/index.html).



### ***Beaver and Beaver Dam Management***

Beaver impoundments often create flooding and other drainage related problems on adjacent lands, especially during fall, winter, and spring. This can be a cause for concern, particularly at road and rail stream crossings and on agricultural lands.

While the flooding caused by beaver dams can be problematic, beavers play an important role in supporting ecological diversity by creating off-channel ponds, initiating successional changes within streams, renewing flood-reliant riparian vegetation, replenishing rich organic soils, and contributing to watershed health and biodiversity.

To disturb, molest or destroy a beaver house, den or dam is an offence under Section 9 of both the Wildlife Act and the Water Act. Alteration or removal of a dam is permitted under the Wildlife Act “to provide irrigation or drainage under lawful authority for the protection of property” and under the Water Act for drainage purposes with specific restrictions. Beaver dam removal requires the permission of the landowner and authorization from the Ministry of Forests, Lands and Natural Resource Operations. For more information on Beaver Dams see *Standards and Best Practices for Instream Works* at <http://www.env.gov.bc.ca/wld/documents/bmp/iswstdsbpsmarch2004.pdf>

### **Dam Impacts**

The development of hydro-electric dams has had a profound impact on the aquatic and terrestrial ecosystems and the culture of the Northeast Region. The Peace River has two major power generating stations; the W.A.C. Bennett dam, which created the Williston reservoir, and the Peace Canyon Generating Station located 23 km downstream. Williston Lake covers nearly 175,000 ha and is the largest lake in British Columbia and



WAC Bennet Dam.  
*Photo: Val Ultgaren picturebc.ca*



the seventh largest reservoir in the world. Impacts of these developments include the interruption of natural migration patterns to both aquatic and terrestrial species, depletion of downstream nutrient inputs, effects on water temperatures, groundwater, and shoreline erosion, reduction in fish populations, loss of riverine and riparian habitats flooded by reservoirs and the substantial fluctuations in water levels. Indeed, the continuous drawdown and refilling of the Williston reservoir prevents the establishment of productive riparian areas and zones where aquatic or terrestrial plant species could stabilize slopes and contribute to productivity. Further impacts associated with transmission lines can also create issues for species that are sensitive to anthropogenic disturbances.

A potential third dam on the Peace River is currently proposed at Site C, just downstream of the Moberly River confluence and approximately 7 km southwest of Fort St. John. If approved, this development will flood over 5,300 hectares of terrestrial habitat, including productive agricultural lands, extensive mature to old riparian forests, and several islands along the Peace River. The associated infrastructure and development will have significant environmental, social, and economic consequences for the region, and directly affect urban and rural developments in the area.

### 5.3.4 Regionally Significant Species

There are many species within the Northeast Region that are of particular interest during development because of their endangered status, conservation ranking or regional significance. Species information and best management practices included below are extensively adapted from *Best Management Practices for Species at Risk in the Fort Saint John Timber Supply Area* (Manning and Cooper 2003). More information on Species at Risk in the Northeast region is available at [http://cooperbeauchesne.com/upload/images/publications\\_1061912243.pdf](http://cooperbeauchesne.com/upload/images/publications_1061912243.pdf). Additional recommendations on Species at Risk can be found in the Identified Wildlife Management Strategy (<http://www.env.gov.bc.ca/wld/frpa/iwms/iwms.html>).

A useful decision support tool to assist with mitigating or avoiding impacts to environmental values is the provincial government's Conservation Framework. More information available at: <http://www.env.gov.bc.ca/conservationframework/>. Additional information on Species at Risk in the Northeast region can also be found on the BC Species and Ecosystems Explorer website [www.env.gov.bc.ca/atrisk/toolintro.html](http://www.env.gov.bc.ca/atrisk/toolintro.html).

During activities in urban or rural environments, planners or developers should give consideration to the status of the species that use the feature (e.g., species at risk), the degree of ecological dependence of a particular species on the feature, and the abundance of the feature in the local area.



An appropriately qualified professional can assist with determination of the relative importance of a feature and ways to avoid damaging or rendering the feature ineffective.

### Timing Windows

To reduce the risk of adverse impacts your activity may have on fish and wildlife species during sensitive life requisite periods (e.g., waterfowl nesting, fish spawning, caribou calving) and to avoid contraventions under relevant pieces of provincial and/or federal legislation (e.g., provincial Wildlife and Water Acts, federal Fisheries Act.), conducting activities within the appropriate least risk window is an important project planning consideration.

Specific least risk windows for terrestrial and aquatic species at risk for the Northeast Region and the associated biological rationale (Timing Windows Rationale) are available at: [http://www.env.gov.bc.ca/esd/distdata/Peace\\_Region\\_Wildlife\\_Values/Industrial\\_Sectors/Best\\_Management\\_Practices/](http://www.env.gov.bc.ca/esd/distdata/Peace_Region_Wildlife_Values/Industrial_Sectors/Best_Management_Practices/).

Vegetation removal, if occurring during a critical window, can negatively impact a number of fish and wildlife species. It is an offence under the provincial Wildlife Act (Section 34) to disturb birds, nests and eggs. In the event that working within a critical window is unavoidable, the proponent should contact an appropriately qualified professional to discuss alternatives, potential mitigation and monitoring plans.

### Special Habitat Features

Special habitat features are specific components or localized elements of a species' environment that are required to meet one or more of their life requisites (e.g., breeding, feeding, over-wintering). Maintaining the integrity of special habitat features is accomplished by not damaging them directly; or rendering them ineffective by removing or disturbing associated or adjacent habitat.

Some regional special habitat features that may be present within urban or rural environments and are recommended for protection during development and associated planning, include

- ◆ hibernacula (snake, bats);
- ◆ cutbanks or cliffs (swallows, kingfishers, beaver);
- ◆ river backchannels (waterfowl, fish, amphibians);
- ◆ gravel and sand bars (shorebirds, invertebrates);
- ◆ tufa seeps (rare plant species);



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- ◆ springs (rare plant species), groundwater upwellings (bull trout spawning areas);
- ◆ large stick nests (e.g., Bald Eagle, Osprey, Great Blue Heron);
- ◆ snags (wildlife trees);
- ◆ coarse or downed woody debris;
- ◆ mineral licks or wallows (ungulates);
- ◆ rock or talus slopes (especially on warm aspect slopes (Garter Snakes));
- ◆ animal burrows (rodents) or denning sites (bears, snakes);
- ◆ Witches' Broom (fisher);
- ◆ grouse leks (Sharp-tailed Grouse);
- ◆ wetlands (variety of species).

Information and recommended best management practices to avoid damaging or rendering ineffective a wildlife habitat feature are being developed by the province, and will be available at their provincial website in the near future: <http://www.env.gov.bc.ca/wld/frpa/habitatfeatures.html>

### Fish

#### ***Bull Trout***

Bull Trout (*Salvelinus confluentus*) are **Blue-listed** in British Columbia (Conservation Framework priority 2). They are strongly influenced by hydrological and channel stability and require large deep pools in the river channel, with coarse woody debris or other large cover objects. Clean gravel and cobble beds in flowing water are also required for spawning habitat.

Various landscape level forest management strategies will, by default, protect Bull Trout habitat. However, additional stand-level guidelines and associated best management practices are recommended for riparian areas adjacent to high suitability Bull Trout habitat. These include:

- Retain the natural tree and shrub species composition (including range of species, ages and decay classes) in riparian management zones. This will help ensure long-term recruitment of large woody debris to the riparian system, provide overhanging vegetation (i.e., shade and nutrient input), and buffer runoff and potential sediment or pollutant input;



- Minimize road length and the number of stream crossings. Where stream crossings are required, use clear span structures if feasible. Where culverts are required, use open-bottom structures;
- Ensure culverts or other instream structures are adequately sized and placed (i.e., not perched) to handle seasonal water flows;
- Conduct Watershed Assessments in watersheds as required.

### Birds

Information about bird occurrences, including species at risk, can be found at <http://www.env.gov.bc.ca/atrisk/toolintro.html>, B.C. Breeding Bird Atlas (<http://www.birdatlas.bc.ca/english/index.jsp>), and South Peace Bird Atlas (<http://www.pris.bc.ca/spbas/>) projects.

Important Bird Areas (IBAs) have been designated at Cecil Lake and Kotcho Lake because these sites supported significant numbers of waterbirds and waterfowl. 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](http://www.ibacanada.ca).

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](http://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.

#### ***Upland Sandpiper***

The Upland Sandpiper (*Bartramia longicauda*) is [Red-listed](#) in B.C. (Conservation Framework, priority 1). It breeds in grasslands, tundra, and meadows in North America and winters in grasslands of South America. It is a very rare migrant and summer breeder in the Peace River lowlands near Dawson Creek, where it occurs in fallow fields, clearcuts, recently burned or cleared forest, bogs, flood plains, wet pastures, golf courses, meadows, lawns, and along dirt roads. Nests are built on the ground and so nesting habitats include open, grassy fallow fields and rangelands.

- Do not fill, or build new roads or infrastructure through grasslands;
- In grassland areas, do not plant seedlings on grasslands or encourage forest encroachment;
- Do not drain grassland and meadow areas to encourage tree growth;
- Consider burning logged areas to promote temporary habitat;



- ☑ If burning logged areas that have regenerated grass cover, burn after 1st August to protect nests and young.

### **Great Blue Heron**

The Great Blue Heron (*Ardea herodias herodias*) is a [Blue-listed](#) species (Conservation Framework priority 2) that both breeds and over-winters in British Columbia. There are a few records of adult and juvenile Great Blue Herons in the Northeast between March and August, but breeding in the area has not been confirmed. Anecdotal information and sightings indicate the historical presence of Great Blue Heron colonies along the Peace River. Herons build stick nests primarily in large white spruce or balsam poplar trees in undisturbed riparian habitats along the margins of lakes, slow-moving rivers, sloughs, or marshy lakes and wetlands. The species nests in colonies known as rookeries and are known to repeatedly return to the same nest site over many years.



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).

### **Sandhill Crane**

The Sandhill Crane (*Grus Canadensis*) is Yellow-listed in B.C. (Conservation Framework, priority 5). It is widespread in undisturbed bogs, marshes and wet meadows with a high proportion of emergent vegetation. Most nest sites are located near forests, as forest edges are important for escape cover. Nests consist of a mat of vegetation and may be situated on the ground, attached to emergent vegetation, or floating over water.

- ☑ If cranes are present during the breeding season, nesting can likely be assumed, although non-breeders may occur at some sites. Nesting wetlands are often reused from year to year so protection of a wetland will have long term positive consequences for cranes;
- ☒ Avoid disturbances around the perimeter of wetlands used for nesting during the breeding season;
- ☑ Maintain a forest buffer as best as possible around nesting wetlands to act as a visual screen from human activities;
- ☒ Avoid building roads and infrastructure along edges of nesting wetlands or within view where possible.

Sandhill Crane.

Photo: Ian Gould picturebc.ca



### **Trumpeter Swan**

The Trumpeter Swan (*Cygnus buccinators*) is Yellow-listed in B.C (Conservation Framework, priority 5). The breeding population in British Columbia and across Canada continues to increase, and large numbers overwinter on the B.C. coast. In the Northeast region, the Trumpeter Swan breeds along the Peace River in secluded wetlands, islands, or vegetation platforms adjacent to forested habitat. Swans tend to avoid wetlands where human disturbance occurs.

- If a pair of swans is present during the breeding season, assume they are breeding;
- Avoid removing forest cover in stands adjacent to nesting wetlands during the breeding season (April-August);
- Maintain a vegetated buffer as best as possible around nesting wetlands to act as a visual screen from human activities. This can consist of a combination of trees, shrubs and emergent aquatic vegetation;
- Avoid building roads or infrastructure along edges of nesting wetlands or within view where possible.

### **Raptors**

*Guidelines for Raptor Conservation during Urban and Rural Land Development in British Columbia (2013)* provides general material on raptors, including life history and habitat requirements, for 25 species whose ranges overlap with urban and rural development, and provides best management practices guidelines for activities undertaken in those ranges. It is available online at [http://www.env.gov.bc.ca/wld/documents/bmp/raptor\\_conservation\\_guidelines\\_2013.pdf](http://www.env.gov.bc.ca/wld/documents/bmp/raptor_conservation_guidelines_2013.pdf).

### **Short-eared Owl**

The Short-eared Owl (*Asio flammeus*) is Blue-listed (Conservation Framework, priority 2) and is considered a species of special concern by COSEWIC. The Short-eared Owl is a nomadic, widely but sparsely distributed owl that frequents open habitats throughout British Columbia. In northeastern British Columbia it occurs mainly in the farming areas of the Peace Lowland. The Short-eared Owl frequents grasslands, farm fields, wet meadows, marshes, bogs, open areas along highway and seismic corridors, shrubby logged areas, flood plains and alpine areas where voles and mice are in plentiful supply. Nesting habitats include shrub thickets, hedgerows, vegetated road banks or dikes, and clumps of trees in open areas.



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- Where grasslands, meadows, rangelands, or open wetland edges occur, do not fill, or develop roads or infrastructure;
- Maintain grass and shrub structural integrity in open areas;
- Maximize retention of shelterbelts, hedgerows, brushy thickets and old field habitat;
- To protect eggs and young do not burn meadows or fields until after August 1st;
- Protect known nest sites or communal roosts;
- Avoid disturbance at nesting areas and roosts.

### Broad-winged Hawk

The Broad-winged Hawk (*Buteo platypterus*) is [Blue-listed](#) in B.C. (Conservation Framework, priority 4). Most breeding records for the species are in the Northeast and Omineca regions, selecting large patches of undisturbed deciduous or mixed forests. Habitat loss or fragmentation through conversion of forest to agricultural lands is a threat to this species. Broad-winged Hawks may also overlap with urban/rural environments in their use of foraging habitat, which can include open meadows or fields.

- Provide reserves of deciduous and mixed woods across the landscape;
- If an active nest is found, suspend activities within 100 m of the nest tree, at least through the nesting season (~ May through mid-August; nests with young and recently fledged young seen in early August);
- Where nesting is confirmed, consider establishment of a reserve area, especially if the nest site is used repeatedly and/or there is evidence of multiple/alternate nests in the stand.

### Northern Goshawk

The Northern Goshawk (*Accipiter gentilis*) is [Yellow-listed](#) in B.C. (Conservation Framework, priority 3). It is sparsely distributed, but widespread species, and breeds throughout most of B.C. Goshawks typically select breeding territories within large patches of mature forests. Reproduction is influenced by prey availability and so an adequate prey base is necessary. Areas with an abundance of squirrels, ermine, grouse, woodpeckers, medium sized song-birds and other prey, plus trees with suitable characteristics for nesting have a high suitability. Goshawks may nest or forage on the periphery of rural areas provided large tracts of mature forest are nearby.

- Maintain large patches of mature and old seral forested habitat across the landscape;



- ☑ Provide connectivity between stands of old and mature forest across the landscape;
- ☑ Minimize disturbance around known breeding territories;
- ☑ Protect known active nests and link to adjacent mature forest.

### **Northeast Warblers**

The Bay-breasted Warbler (*Dendroica castanea*), Cape May Warbler (*Dendroica tigrina*), and Connecticut Warbler (*Oporornis agilis*) are [Red-listed](#) in B.C. and are a priority 2 on the Conservation Framework. The Black-throated Green Warbler (*Dendroica virens*), Canada Warbler (*Wilsonia canadensis*) are [Blue-listed](#) and are priority 1 and priority 2, respectively, on the Conservation Framework. With the exception of the Canada Warbler, each of these forest dwelling neotropical migrants occur at the periphery of their range in northeast B.C.

There are few records of Bay-breasted and Cape May warblers in this region, but breeding abundances appear to be linked to spruce budworm outbreaks. Common characteristics of breeding habitat include a high proportion of declining spruce with dead lower branches, a relatively closed upper canopy, open patches in mid-canopy, and an understory dominated by Highbush-cranberry, Paper Birch, Dogwood, or Sitka Alder.

The Black-throated Green Warbler typically frequents old forest and breeding habitats are in coniferous or mixed stands. In northeastern British Columbia, mature, low elevation (below 1,200 m) mixedwood forests, particularly with trembling aspen and large white spruce, are the most important breeding habitats.

Connecticut warblers use old to immature deciduous or mixedwood forests in British Columbia. Pure stands of Trembling Aspen are most commonly used, although mixed stands of aspen or Balsam Poplar and White Spruce are also used. Habitat patch size seems critical as Connecticut Warblers are not found in aspen groves of less than four hectares. In northeastern British Columbia, suitable habitat <5 ha may be used if it is within a larger forested area.

The Canada Warbler was discovered in the province as late as 1974. In northeastern British Columbia, Canada Warblers are usually found on wet, steep, unstable hillsides, from the lower slope through to mid-slope. They are primarily found in deciduous forests, but may also frequent mixed wood stands. A dense shrub layer is a common feature in Canada Warbler breeding habitat. Young Birch and Red-osier Dogwood are frequent components of the shrub layer.

Mature to old coniferous or mixedwood forests dominated by white spruce (*Picea glauca*) represent highly suitable breeding habitat for



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Bay-breasted Warblers and Cape May Warblers, but are commercially valuable and targeted for harvest. In addition, harvesting of mature to old mixedwood and mature deciduous forests that comprise breeding habitat for Black-throated Green Warblers and Connecticut Warblers, respectively, is accelerating in the northeast and can be expected to increase to accommodate hardwood production demands of facilities in Fort St. John and Dawson Creek. Habitat loss through conversion of mixed woods to pure deciduous or coniferous stands and forested habitats to agricultural areas as well as dramatic increases in industrial exploration, development, and access also represent a threat to these passerines and their breeding habitat. Habitat loss, isolation, fragmentation, linear developments and the associated creation of edge habitats and loss of interior forest conditions have been linked to increased depredation and parasitism rates and declines in passerine populations.

The effects of abiotic and biotic edge effects on forest songbird communities have been well documented. Abiotic edge effects include changes in microclimate, which may extend into stands 100 m or more, and impact habitat attributes important for shelter, feeding or nesting. Biotic edge effects generally decrease beyond 50 m from the edge, but may include changes in vegetation, food resources, increased competition from generalist or edge-adapted species, crowding in residual forests following harvest, and increased rates of brood parasitism and nest depredation. Depending on stand characteristics, the type of edge, proximity to agricultural areas, and species/density of avian and terrestrial nest predators, areas subjected to edge effects may reduce songbird breeding success, survival and recruitment and consequently reduce habitat effectiveness for forest interior species.

- Maintain interior forest conditions by maximizing the size of forested patches and avoiding creation of edge;
- Minimize or reduce disturbance during the breeding season (May through July);
- Do not use pesticides, except for the application of herbicides (using spot treatments and outside of the breeding season) to control invasive plants or noxious weeds;
- Minimize use of areas by livestock. For example, do not place or construct livestock attractants in important warbler habitats, do not drive or herd livestock through these areas, restrict livestock grazing (timing and browse utilization) during the breeding season;
- Maintain the desired plant community, including the herbaceous and shrub layers, within these areas.



### **Northeast Marsh Birds**

The Nelson's Sharp-tailed Sparrow (*Ammodramus nelson*) and Yellow Rail are [Red-listed](#) in B.C. and are priority 2 and 1, respectively on the Conservation Framework. Le Conte's Sparrow (*Ammodramus leconteii*) and American Bittern are [Blue-listed](#) and are priority 4 and 2 on the Conservation Framework.

These marsh birds are amongst the rarest breeding birds in northeast British Columbia. Breeding populations of Nelson's Sharp-tailed Sparrow are restricted to a small area along the B.C.-Alberta border in the Peace Lowland and Kiskatinaw Plateau. The Yellow Rail reaches the northern edge of its range in British Columbia. It breeds in scattered locations in Eastern Canada and the northern USA, and was considered 'accidental' in British Columbia, with one known record near Boundary Lake. This elusive species has recently been spotted more frequently in the Peace Lowland area. The American Bittern is widely but sparsely distributed in southern and central interior British Columbia, reaching the northwestern edge of its range in northeastern British Columbia.

These marsh birds typically inhabit wet grasslands, sedge meadows, and marshes at low elevations (400–700 m). Although all of these species are wetland associated, suitable breeding habitat characteristics show some species-specific differences. Le Conte's Sparrow nests in a variety of wetlands (e.g., muskeg, bogs, marshes) or damp areas dominated by tall grasses and sedges. This species may overlap with agricultural environments, including flooded land, drier fields with patches of willows, or grassy, wet margins of agricultural fields. Nelson's Sharp-tailed Sparrow breeding habitat includes wetlands (marshes, fens, peatlands, lake margins, wet meadows) with periphery of dense vegetated cover, including grasses, sedges, emergent cattails, and shrubs (e.g., willows). Yellow Rail nests in large, wet areas, generally devoid of shrubs or trees, with dense, low aquatic vegetation (e.g., sedge-dominated meadows), and shallow or no standing water. Yellow Rail nests are at or near the ground or water level, and are usually well concealed by old, dead vegetation and surrounded by very shallow water. Suitable breeding habitat for American Bittern typically includes large, shallow (< 10 cm water) wetlands (marshes, lakes) edged by tall, dense emergent vegetation (cattails, bulrushes, grasses). Nests are built just above the water level in heavy stands of emergent vegetation. Migratory habitats of all four marshland species may include any wetland edge with vegetative cover including river channels, ditches, sewage lagoons, and wet margins of fields

Habitat threats are significant within sensitive wetland habitats used by these species at risk.



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Existing agriculture and increasing industrial pressures may compromise wetland habitat through draining, filling, direct physical disturbance, or changes to hydrology affecting water levels.

- Do not damage the integrity of wetlands, meadows, or ditches with grassy or sedge edges with road or infrastructure development.
  - ▲ Maintain integrity of wetlands and shrubby riparian edge habitat for Le Conte's and Nelson's sharp-tailed sparrow habitat;
  - ▲ Maintain structural integrity of sedge, cattail or bulrush vegetation in wetlands for Yellow Rail and American Bittern habitat;
  - ▲ Do not burn wetland edges.
- To protect eggs and young do not hay wet meadows until after August 1st.
- Prevent spills of noxious materials into wetlands and do not apply herbicide near wetland edges.
- Protect breeding localities within a 1 – 5 ha patch (depending on size of the wetland).
- Avoid flooding known habitat (e.g., during road construction).
- Maintain water levels through breeding season.

### 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.

The BC Frogwatch program collects information on amphibians in British Columbia. For more information, or to submit records, go to <http://www.env.gov.bc.ca/wld/frogwatch/>.

#### **Western Toad**

The Western Toad (*Anaxyrus boreas*) is a [Blue-listed](#) species (Conservation Framework priority 2) provincially, and is considered a species of special concern by COSEWIC. It is found throughout most of B.C., with the eastern slope of the Rocky Mountains and the Peace River lowlands as the eastern and northern extent of its range. Western Toad habitat includes damp forest and grassland environments with large amounts of coarse woody



debris and layered understorey vegetation.

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, or during migration. Without proper planning, new roads may be located between aquatic and upland habitat resulting in mortality during migration or a complete barrier to migration.

For more information and guidelines, see the [Fact Sheet on Western Toad](#) (Appendix G).

### ***Terrestrial Garter Snake and Common Garter Snake***

The Terrestrial Garter Snake and Common Garter Snake (*Thamnophis sirtalis*) are both at the most northerly extent of their range in B.C. Both garter snakes are Yellow-listed in B.C. (conservation framework, priority 5). Little is known about overwintering strategies or locations in the Northeast Region, although regional occurrences of large females suggest local breeding. Suitable habitats occur within low elevation areas (e.g., river valleys), which is also where human developments are concentrated.

These two garter snakes are found in a wide variety of riparian and upland habitats, including warm aspect slopes used as basking, hibernation or nursery sites. In general, garter snakes hibernate communally in northern environments; however, garter snakes have been documented overwintering in smaller groups or individually in the Peace Lowlands. Threats include direct persecution, road kills, barriers to movement, and habitat loss, alteration or fragmentation from industrial or urban/rural development.

The following best management practices for garter snakes are recommended.

- Protect known hibernacula or typical garter snake denning sites (e.g., south-facing, rocky slopes) or rock outcrops used as basking, hibernation, or nursery sites.
- Protect sufficient terrestrial foraging habitat peripheral to denning sites.
- Retain talus (layers of weathered rock, often at the base of slopes), rock outcrops with fissures, and coarse woody debris, which provide shelter for reptiles.
- Provide access to wetland foraging areas for garter snakes.
- Mitigate road mortality of garter snakes that undertake seasonal migrations (e.g., avoid land developments that intersect seasonal travel routes or occur adjacent to snake hibernacula).



### Mammals

#### Bats

The Northern Long-eared Myotis (*Myotis septentrionalis*) is [Blue-listed](#) in B.C. and is a priority 2 on the Conservation Framework. This bat species is generally associated with riparian areas in the boreal forest and depends on forest stands with large-diameter hollow trees, particularly Balsam Poplar (*Populus balsamifera* spp. *trichocarpa*). Although it is one of the rarest bats in the province, maternity roosts have been found in an old building and in a hollow tree cavity (trembling aspen) in northeastern B.C. The Northern Long-eared Myotis hibernates alone or in small clusters, selecting tight crevices or drill holes where temperatures are cool. No winter hibernacula have been found in B.C. This bat emerges at dusk to hunt for insects over small ponds and clearings under the forest canopy.

Many people are afraid of bats because of a perceived common association with rabies; however, bats are generally harmless. This species is often directly 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.

- Where present, retain large diameter trees with evidence of internal decay, stem cracks, broken tops and/or thick bark with cracks and fissures. Trees in this condition, especially poplars located within 1 km of foraging areas (e.g. riparian areas), provide potential roosting sites for bats.
- Avoid disturbance of maternity roosts or hibernacula.
- Avoid disturbance around known bat habitat features (e.g., large diameter trees).
- Gate known or suspected roost or hibernation sites in caves or mines to control or eliminate human access.
- Do not use pesticides to control insect pests. If necessary, use biological (e.g., pheromonal) or mechanical pest control practices.
- Consult local Ministry of Forests, Lands, and Natural Resource Operations staff concerning specific management recommendations for known bat roosts and hibernacula as these are considered sensitive wildlife habitat features.

More information on bat species in British Columbia can be found at E-Fauna BC [www.geog.ubc.ca/biodiversity/efauna/BatsofBritishColumbia.html](http://www.geog.ubc.ca/biodiversity/efauna/BatsofBritishColumbia.html). The Ministry of Environment also provides information for homeowners on how to deal with problem bats <http://www.env.gov.bc.ca/epd/ipmp/publications/brochures/bats.htm>



### **Fisher**

Fisher (*Martes pennanti*) is [Blue-listed](#) in British Columbia and is a priority 2 species in the Conservation Framework. Fishers frequently depend on structures such as large-diameter Balsam Poplar and Trembling Aspen, and large course/downed woody debris (CWD) for denning and thermal cover, respectively. Large diameter White Spruce with large witches' broom structures (caused by broom rusts) are often used as day beds (resting platforms). Such structures typically result from the natural processes of disease and decay and are generally restricted to mature forests. A variety of habitats are used for summer foraging, although most forage area are strongly associated with CWD and understory shrub cover. Most winter habitat is in dense older coniferous or mixedwood habitats. Fisher use snow-covered CWD for rest and shelter during the winter, especially when temperatures are below -15°C. Branches and cavities are used for resting or shelter during the remainder of the year and/or during warmer periods.

- ☒ Do not isolate riparian areas from upland habitats. Try to connect at least one side of a riparian management area to an adjacent forested stand.
- ☑ Where available, maintain mature or old forest with >30% canopy closure, CWD, well developed shrub layer, some large diameter deciduous trees (especially Balsam Poplar >75 cm dbh<sup>1</sup>) and conifers (especially white spruce >45 cm dbh).
- ☑ Where present, maintain large diameter trees with evidence of internal decay, or trees with broom rust or witches' broom branch structures. These trees will function as potential denning and resting sites, and a future source of CWD.
- ☑ Where present, retain some larger, elevated pieces of CWD (>30 cm diameter).
- ☑ Areas managed for Fisher should contain targets of 30–45% mature and old forest, and patches skewed toward small (0–50 ha) and large patch sizes (1001 ha+).
- ☑ Patches which include wetter moisture regimes and forested riparian areas (i.e., containing large spruce or Balsam Poplar) are higher priority. Fisher habitat of this description can be recruited by managing patch size and forest age target objectives across landscapes.

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1 Diameter Breast Height



Moose and Elk.  
Photo: Wayne Sawchuck  
picturebc.ca

### ***Ungulates***

Ungulates in the Northeast Region particularly relevant to urban or rural developments include Moose, Mule Deer, White-tailed Deer, and Rocky Mountain Elk. These species are not deemed to be at risk in B.C., with a Conservation Framework ranking of 5 (elk) or 6 (moose, deer).

Some ungulate species (e.g., caribou) are sensitive to human disturbances and are no longer found in areas affected by urban and rural developments. Other ungulates (such as moose, deer and elk) which use young forest habitats tend to inhabit areas and graze or browse on forage species that are commonly utilized by livestock. For example, south-facing grassy slopes and shrub communities are easily trampled and destroyed by domestic livestock, degrading the quality of the winter range for many ungulate species. These species are thus highly impacted by development and frequently are part of wildlife-human conflicts.

Identifying key winter ranges and connecting corridors for ungulate species is essential to the maintenance of ungulate populations in the Northeast region. Moose and elk have less stringent winter requirements than deer, but also require connected winter ranges to ensure the persistence of viable populations. Given the overlap in forage preference between livestock and many northeast ungulate species, managing population numbers to match the carrying capacity of the resource base is a critical step in solving the land use conflict. Setting measures and objectives for livestock use will ensure that ungulate winter needs are managed.



### Moose

The general winter habitat used by Moose within the Northeast Region is young to second-growth forests, with an abundance of available browse species in low to mid-elevations. Preferred areas include riparian and alluvial habitats, burns, cut blocks and wetland complexes. Moose browse on shrubs and trees including willow, Red Osier Dogwood (*Cornus stolonifera*), Paper Birch (*Betula papyrifera*), cottonwood, aspen, Subalpine Fir, and High Bush Cranberry (*Viburnum edule*). Moose will move seasonally between winter/spring ranges and summer ranges. Winter/spring ranges are generally lower elevation or lower snowfall areas; however, moose have capacity to forage in fairly deep snow and therefore may stay at mid elevations during lower snowfall winters.

### Mule Deer

Winter is a limiting season to deer populations within the Northeast Region because of cold temperatures and snow depths that limit movement and forage. Mule Deer (*Odocoileus hemionus*) require the combination of steep, south aspect slopes, low snow depths and adjacent cover for suitable winter range. Unlike moose, deer are affected to a greater degree by increased snow depths, and habitat use is largely influenced by snow depths. The winter diet of Mule Deer is dependent on its specific habitat, but often includes Douglas-fir (*Pseudotsuga menziesii*), Lodgepole Pine, Juniper (*Juniperus*), Aspen, Red Osier Dogwood, Willow, Western Red Cedar (*Thuja plicata*), Saskatoon Berry (*Amelanchier alnifolia*), and Subalpine Fir.

### White-tailed Deer

Very little is known about winter range habitat of White-tailed Deer within the Northeast Region. Similar to Mule Deer, White-tailed Deer (*Odocoileus virginianus*) are limited by snow depths that influence movement, forage availability and thus habitat selection. White-tailed Deer have a higher requirement for thermal cover than Mule Deer, and this is a determining factor for habitat selection and use. White-tailed Deer use large patches of forested area, often grazing on forage species in forest openings. Mixedwood cover provides the best combination of thermal protection and forage supply, and has greater cover value for winter range.

### Rocky Mountain Elk

Winter range areas for Rocky Mountain Elk (*Cervus canadensis*) include low elevation valley bottoms and south and south-western slopes where snow levels are reduced. Winter foraging habitat for elk is generally in open canopy forest areas including fir, pine and aspen stands where they have thermal cover, and in open windblown grassland areas where shrubs



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and dry bunchgrasses predominate. Elk, primarily grazers, generally consume a higher proportion of grasses and forbs than shrubs however they are able to shift their diet between plant groups depending on location, depth of snow and availability of forage species. Many traditional elk winter ranges have been settled by humans and grazed by livestock. This creates conflicts as elk rely on these areas for winter survival.

- Retain forest cover such that at least 20% of the winter range is mature/old, coniferous forests with canopy closure of at least 40%.
- Where possible, set aside coniferous stands to meet future age and canopy closure requirements.
- Avoid construction of permanent access roads, and deactivate roads where possible in high quality ungulate habitat.
- Do not create disturbances (e.g., snowmobile access) to wintering ungulate populations during the critical winter months of November through April.
- Maintain forage for elk.

More information, including maps and supporting information for ungulate winter ranges in the Northeast Region, can be found at <http://www.env.gov.bc.ca/wld/frpa/uwr/index.html> and [http://www.env.gov.bc.ca/wld/frpa/uwr/approved\\_uwr.html](http://www.env.gov.bc.ca/wld/frpa/uwr/approved_uwr.html). For information on the unique grassland regions present in the Northeast Region, see <http://www.bcgrasslands.org/component/content/article/8-learn-more/148-boreal-and-taiga-plains>.

### Plants

Consult the [Conservation Data Centre](#) for occurrences of rare and endangered plants and/or ecosystems in your area of interest. If activities overlap with a rare or endangered plant occurrence, it is recommended that an appropriately qualified professional undertake appropriate field studies prior to commencement of on-the-ground activities, to confirm their occurrence, abundance and distribution and if necessary develop mitigation plans to avoid/minimize impacts to the plants.



## 5.3.5 Useful Sources

### *General information*

Ministry of Forests, Lands and Natural Resource Operations  
Northeast Office  
400 10003 110th Avenue  
Fort Saint John, British Columbia  
V1J 6M7  
(250) 787-3411  
Fax: (250) 787-3490  
<http://www.env.gov.bc.ca/peace/>

### *Regional Resources*

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

Land and Resource Management Plans are available at:

- ◆ Dawson Creek: [http://ilmbwww.gov.bc.ca/slrp/lrmp/fortstjohn/dawson\\_creek/index.html](http://ilmbwww.gov.bc.ca/slrp/lrmp/fortstjohn/dawson_creek/index.html)
- ◆ Fort Saint John: [http://ilmbwww.gov.bc.ca/slrp/lrmp/fortstjohn/fort\\_stjohn/index.html](http://ilmbwww.gov.bc.ca/slrp/lrmp/fortstjohn/fort_stjohn/index.html)
- ◆ Fort Nelson: [http://archive.ilmb.gov.bc.ca/slrp/lrmp/fortstjohn/fort\\_nelson/plan/files/fort\\_nelson\\_lrmp.pdf](http://archive.ilmb.gov.bc.ca/slrp/lrmp/fortstjohn/fort_nelson/plan/files/fort_nelson_lrmp.pdf)

In addition to regional Guideline and Best Management Practice documents referenced in this section, the following may be pertinent to urban or rural activities or developments, and are available at: [http://www.env.gov.bc.ca/esd/distdata/Peace\\_Region\\_Wildlife\\_Values/Industrial\\_Sectors/Best\\_Management\\_Practices](http://www.env.gov.bc.ca/esd/distdata/Peace_Region_Wildlife_Values/Industrial_Sectors/Best_Management_Practices). Note that this site is routinely updated. Prior to commencing work, check to see if relevant Guideline or BMP document(s) have been revised or added.

1. Aircraft use:
  - a. [Peace Region Guidelines for Aircraft Operations/ Wildlife Interactions](#)
  - b. [Wildlife and Aircraft Operations](#)
2. Works adjacent to parks and protected areas:
  - a. [Best Management Practices for Activities Adjacent to Parks and Protected Areas](#)



## Section 5.3: Northeast Region

3. Linear corridor development/maintenance:
  - a. [Best Management Practices for Bridge, Ditch and Road Maintenance Activities](#)
  - b. [Best Management Practices for Linear Developments](#)

### ***Climate Change Impacts***

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