

Wildlife Habitat Features Summary of Management Guidelines

Northern Interior Forest Region



Ministry of Water, Land and Air Protection
Biodiversity Branch
Victoria, British Columbia

DRAFT

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Executive Summary

The purpose of this report is to provide guidance and recommendations for the identification and management of wildlife habitat features (WHF) applicable to the Northern Interior Forest Region. Provision for the identification and management of WHFs is given by the *Forest and Range Practices Act (FRPA)*, under Section 9 of the *Government Actions Regulation (GAR)*.

For the purposes of this report, a WHF is defined as one of the following types:

- 1) a fisheries sensitive feature
- 2) a significant mineral lick or wallow
- 3) a nest of a bald eagle, osprey, or great blue heron
- 4) any other localized habitat feature that the Minister of Water, Land and Air Protection considers to be a wildlife habitat feature (see list below).

For the purposes of this report, and as defined under the British Columbia *Forest Planning and Practices Regulation*, the term “species at risk” means “a species identified within a category established under the *British Columbia Government Actions Regulation*” (GAR; see URL: <http://www.for.gov.bc.ca/tasb/legsregs/frpa/frparegs/govact/gar.htm>). These will include those species categorized as endangered or threatened (Red-listed), or vulnerable (Blue-listed) by the province of British Columbia. Wildlife habitat features are one of the tools that the province will use to manage residences of species at risk.

Recommended Management Guidelines have been developed in this report for the four WHF types described above, including the localized habitat features listed below; these have been identified in consultation with Ministry of Water, Land and Air Protection staff and forest licensee representatives. For the purposes of this report, a Management Guideline consists of *generally accepted non-mandatory guidance and management recommendations based on the best available data and expert opinion*. Consequently, it is recommended that Management Guidelines for a particular WHF be followed where possible.

- Large stick nests (non-specified species)
- Sharp-tailed Grouse leks
- Ungulate natal areas
- Grizzly bear ground dens
- Black bear den trees
- Snake hibernacula
- Bat hibernacula and maternity roosts
- Hot springs
- Non-classified wetlands and ephemeral ponds

The scope and content of the Management Guidelines associated with each WHF are based on three factors:

- i) the status of the wildlife species (i.e., is it a species at risk);
- ii) the degree of ecological dependence of a particular species on that feature (i.e., can another feature be easily substituted); and
- iii) abundance of the feature in the local area (i.e., is it a species or feature of regional importance; is the feature frequently or regularly used locally, but may be uncommon elsewhere).

The two primary audiences of this report will be those persons working directly in forestry and range management (i.e., licensed forest or range tenure holders), and also those whom the Deputy Minister of Water, Land and Air Protection has delegated authority to review and/or establish WHFs (e.g., Ecosystem Specialists). For both audiences, the recommendations described herein will be especially useful during the **planning phases of operations**, and will help ensure that the procedures related to the identification and implementation of Management Guidelines for WHFs are applied consistently across British Columbia.

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Cover Photo: *Bald Eagle nest* by Mark Nyhof

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1.0 Introduction

The purpose of this report is to provide background information, guidance and Management Guidelines for Wildlife Habitat Features (WHFs) to those persons who are managing forests and range under the *Forest and Range Practices Act* (FRPA) in the Northern Interior Forest Region (Figure 1). Provision for the identification and management of WHFs is given by the *Forest and Range Practices Act* (FRPA), under Section 9 of the *Government Actions Regulation* (GAR). The two primary audiences will be those persons working directly in forestry and range management (i.e., licensed forest or range tenure holders), and also those whom the Deputy Minister of Water, Land and Air Protection has delegated authority to review and/or establish WHFs (e.g., Ecosystem Specialists). For both audiences, the Management Guidelines described herein will be especially useful during the **planning phases of operations**, and will help ensure that the procedures related to the identification and implementation of Management Guidelines for WHFs are applied consistently across British Columbia. For the purposes of this document, a Management Guideline consists of *generally accepted non-mandatory guidance and management recommendations based on the best available data and expert opinion*. Consequently, it is recommended that Management Guidelines for a particular WHF be followed where possible.



Figure 1: BC Ministry of Forest’s Northern Interior Forest Region. (graphic credit: Province of BC)

For the purposes of this report, a WHF is defined as one of the following types:

- 1) a fisheries sensitive feature
- 2) a significant mineral lick or wallow
- 3) a nest of a Bald Eagle, Osprey, or Great Blue Heron
- 4) any other localized habitat feature that the Minister of Water, Land and Air Protection considers to be a wildlife habitat feature (see list below).

For the purposes of this report, and as defined under the British Columbia *Forest Planning and Practices Regulation*, the term “species at risk” means “a species identified within a category established under the *British Columbia Government Actions Regulation*” (GAR; see URL: <http://www.for.gov.bc.ca/tasb/legsregs/frpa/frparegs/govact/gar.htm>). These will include those species categorized as endangered, threatened (Red-listed) or vulnerable (Blue-listed) by the province of British Columbia.

Recommended Management Guidelines have been developed in this report for the four WHF types described above. Localized habitat features which have also been recommended in this report as WHFs are listed below; these have been identified in consultation with Ministry of Water, Land and Air Protection staff and forest licensee representatives:

- Large stick nests (non-specified species)
- Sharp-tailed Grouse leks
- Ungulate natal areas
- Grizzly bear ground dens
- Black bear den trees
- Snake hibernacula
- Bat hibernacula and maternity roosts
- Hot springs
- Non-classified wetlands and ephemeral ponds

The scope and content of the Management Guidelines associated with each WHF are based on three factors:

- i. the status of the wildlife species (i.e., is it a species at risk);
- ii. the degree of ecological dependence of a particular species on that feature (i.e., can another feature be easily substituted); and
- iii. abundance of the feature in the local area (i.e., is it a species or feature of regional importance; or is the feature frequently or regularly used, but may be uncommon elsewhere).

In this report, **Management Guidelines are organized by their significance rating for each WHF**, not necessarily by individual wildlife species. An overview of the general process for identifying and managing WHFs is described in Section 2.0.

Regulatory Framework

The federal *Species at Risk Act* (SARA) came into force in 2003; sections on critical habitats will be proclaimed in 2004, including prohibitions on the destruction of “residences” of species at risk. In SARA, a residence is defined as “a dwelling-place, such as a den, nest or other similar area or place, that is occupied or habitually occupied by one or more individuals, and may include areas or places in proximity to a dwelling-place as prescribed by regulation of the minister for specified species or classes of species” (further information on SARA can be found at URL: <http://www.speciesatrisk.gc.ca/>). Provisions under SARA are intended to work in conjunction with provincial wildlife and habitat protection guidelines for species at risk. In British Columbia, some of these are outlined in the provincial *Identified Wildlife Management Strategy* (IWMS, see URL: <http://wlapwww.gov.bc.ca/wld/identified/> , or <ftp://ftp.env.gov.bc.ca/pub/outgoing/Identified%20Wildlife/>). Wildlife habitat features are one of the tools that the province will use to manage residences of species at risk.

Additional Mechanisms for Managing Wildlife Habitat

The Management Guidelines for WHFs provided in this report are just one tool that can be used to manage habitats and habitat features for wildlife. Other provisions for doing so under the FRPA include old growth management areas (OGMA), ungulate winter ranges (UWR), wildlife habitat areas (WHA), wildlife tree patches (WTP), and riparian management areas (RMA). In general, OGMAs are considered a landscape level strategy, identified in higher level plans (e.g., Land Use Plans, Land and Resource Management Plans, Landscape Unit Plans), which are used to manage specific habitats over larger areas. WHAs, UWRs, RMAs and WTPs are typically stand level strategies for managing specific habitats. WHAs are a provision under the provincial *Identified Wildlife Management Strategy* specifically intended to manage habitats for species at risk.

RMAs and WTPs protect habitat along riparian systems, and/or around significant habitat elements such as wildlife trees. All of these mechanisms or “tools” can work in conjunction to protect habitat for wildlife and are not mutually exclusive. For example, a WTP can include portions of an RMA, thereby providing protection to the riparian area and specific habitat elements within or adjacent to the RMA. At the landscape level, OGMAs may include areas also managed as UWRs. Thus, the dual objectives of providing forested cover for ungulates during winter and maintaining or recruiting old seral forest, are simultaneously achieved. In some situations, specific wildlife habitat features such as a moose wallow or bat maternity roost may require protective measures or practices that are not necessarily captured by other habitat retention mechanisms (e.g., WTPs), nor will they necessarily require as large or extensive levels of protection as those which might be associated with other habitat retention mechanisms (e.g., OGMAs or WHAs). Consequently, WHF-specific practices may be the most appropriate.

2.0 Generic Process for Identification and Management of Wildlife Habitat Features (WHF) Process for Establishment of Wildlife Habitat Features (WHF)

1. A **search/review for existing/previously documented records relative to WHFs** can be conducted for proposed development areas prior to implementing operational plans. Helpful information sources include checking with regional or district MWLAP staff (e.g., Ecosystem Specialists); checking records maintained by the British Columbia Conservation Data Centre (BC CDC; see <http://srmwww.gov.bc.ca/cdc/>), and if possible, should also include any observations from previously funded or concurrent inventory projects conducted within the boundaries of the operational plan.

Determine the likelihood of WHF occurrences within the operational area based on a review of species ranges and habitat requirements as they relate to the operational area. Some species (and their associated WHFs) may be ruled out if they are not known to occur within the particular geographic area defined by the operational plan.

2. **If necessary, surveys may be conducted for WHFs** at the discretion of the licensee. It is expected that in many cases, WHFs will be found opportunistically by other ground crews while working in the field.
3. In the event that a WHF is found, in order to assign the appropriate significance rating (high, medium or low) to the WHF, it is necessary to **attempt to identify the species associated with the WHF** based on a feature/site assessment or direct observation (e.g., visual sightings or sign). Use the species list provided in each WHF account to **determine the significance rating for that feature; implement the appropriate Management Guidelines** (step 4).
4. **Implement Management Guidelines** associated with the WHF based on the significance rating obtained in step 3.
5. **Document the WHF.** This will facilitate future planning and operations in the area of the WHF. Documentation should include a brief description of the feature (e.g., eagle nest in cottonwood on southwest side of Block XXX), along with its location (UTM coordinates). This information should be submitted to the local Ministry of Forests District Manager (as per **FRPA regulation 86 (2)(d) regarding annual reporting**). If the feature is that of a Red- or Blue-listed species, then this information should also be reported to the BC Conservation Data Center (Victoria, BC) for documentation (see Appendix 2 for a blank CDC Animal Observation Form; observation forms are also available from the CDC website URL: <http://srmwww.gov.bc.ca/cdc/>).

2.1 How to Use this Management Guidelines Manual

This page outlines the general layout of the following Wildlife Habitat Feature accounts, and describes what you will find in each section. It also provides instructions on how to use the Management Guidelines as a *quick reference guide*.

Each Wildlife Habitat Feature account is laid out according to the following template:

Name of Feature

- Wildlife Habitat Features (WHFs) are generally feature-specific rather than species-specific, and are named accordingly. The **type or name of the wildlife habitat feature is written in bold red font** at the beginning of each account to help facilitate feature referencing within the document.

Definition

- Describes the habitat feature or features and names the species or group of species likely to use them.

Photograph

- Each WHF account has one or more photographs that illustrate an example of that feature.

Management Objective

- Gives the desired management goals and objectives for the feature(s).

Management Guidelines (quick reference summary)

- Summarizes the key points of the Management Guidelines for the feature(s). **These summaries are highlighted in yellow throughout this document.** This section of the document can be used as a *quick reference guide* simply by referring to the yellow-highlighted sections throughout.
- Refer to the “Management Guidelines (detailed)” section for further information on each WHF.

Management Guidelines (detailed)

- Provides details on how to find and identify the feature(s) described in the account.
- Describes how to decide whether the feature is of high, medium or low significance, and provides details of Management Guidelines for each significance level. Most effort is directed at high or medium significance features.
- Describes how to document the feature(s).
- Significance levels and Management Guidelines are summarized in table form.

Further sources of information

- Useful references related to the feature(s).

Individuals (and Literature) consulted to develop the account

- A complete list of the references used to write the Wildlife Habitat Feature account.

3.0 Wildlife Habitat Features Accounts

3.1 Fisheries Sensitive Features

Wildlife Habitat Feature Account

Definition

Fisheries Sensitive Feature (FSF) – a flooded depression, pond or swamp, that (a) either perennially or seasonally contains water, AND (b) is seasonally occupied by:

- (i) anadromous salmonids, rainbow trout, cutthroat trout, brown trout, bull trout, Dolly Varden char, lake trout, brook trout, kokanee, mountain whitefish, lake whitefish, arctic grayling, burbot, white sturgeon, yellow perch, walleye or northern pike, or
- (ii) identified threatened or endangered fish, and regionally important fish identified by the BC Ministry of Water, Land and Air Protection (MWLAP); (Figure 2).

FSFs are fish habitats that do not meet the *Forest and Range Practices Act* definitions of a classified stream, classified wetland, or classified lake.



Figure 2: Freshwater marsh fisheries sensitive feature. (Photo: Alex Inselberg)

Management Objective

The general objective is to protect fish rearing habitats that occur outside of classified streams, lakes and wetlands. More specifically, the objective is to identify and protect FSFs from harmful habitat alterations and to prevent the deposit of a deleterious substance from entering the FSF.

Management Guidelines (quick reference summary)

- 1.0 Confirm that the feature is a fisheries sensitive feature as defined above.
- 2.0 If necessary, identify the species that is using the FSF.
- 3.0 Determine the significance rating of the FSF.
- 4.0 Take measures to protect the FSF. Implement Management Guidelines based on the significance rating of the FSF.
- 5.0 Document High or Medium significance FSFs.

Management Guidelines (detailed)

1.0 Confirm that the feature is a Fisheries Sensitive Feature as defined.

1.1 Check records for known FSFs in your area of operational concern. Helpful information sources include:

- Research relevant files, data sets and information available at your office.
- Review fisheries studies that may contain observations and locations in your area of operational concern. Also review maps and aerial photographs. FSFs may be difficult to identify, even from large-scale maps and aerial photos, if they are small in area, or located in forested areas. However, maps and photos can be used to identify low-lying floodplain areas that potentially contain FSFs. The presence of FSFs in these areas could then be field-verified during the most appropriate time of year.
- Confirm whether or not any fisheries surveys have been conducted in the area by your office, government agencies, local naturalist or recreation groups, and other NGO's.
- Access Department of Fisheries and Oceans (DFO) and MWLAP staff and records and BC Ministry of Sustainable Resource Management (MSRM) databases for fisheries information or fish and fish habitat inventories in operation area (see Fish Wizard - <http://www.fishwizard.com/>).
- Contact field and forestry workers in your office, as well as local fisheries interest groups who have conducted surveys in the area, or may have local fisheries knowledge.
- Reconnaissance searches for FSFs are best conducted during the preliminary stage of any operational plan (including road, cutblock layout and rangeland visits), so that locations and extent of the FSFs can be identified and mapped to minimize future operational conflicts.
- Some FSFs may be wetted during periods of peak stream flows and/or utilized by fish on a seasonal basis. Understanding the life history of fish species that may be present is advantageous.
- Establish survey times and coordinate with layout or other visits.
- Educate forestry workers and rangeland users on FSF identification, and have them report any occurrences found in the area of interest.

NOTE: Reconnaissance searches for FSFs are best conducted during overview fish and fish habitat inventories. **It is recommended that on-the-ground assessments of FSFs be conducted during operational stream classification activities.** It is also recommended that a qualified fisheries biologist or fisheries technician conduct such surveys.

1.2. What to look for – FSFs

FSFs can be difficult to identify since they may be dry at the time of year that field assessments are usually conducted (i.e., summer). FSFs are usually associated streams, lakes, or wetlands and can be flooded depressions, ponds, flooded woodland areas, valley wall-based tributaries, sloughs, swamps, fens, or other areas that cannot be classified as streams, lakes or wetlands (Figure 3). FSFs can contain water either perennially or seasonally. An FSF may only be seasonally occupied by a species of fish listed in the definition of FSF (see Definition above).



Figure 3: Freshwater fens fisheries sensitive feature. (Photo: Alex Inselberg)

- Operational areas may need to be inspected during the winter, spring, or other times of the year when peak stream flows occur (Figure 4).
- Professional judgement may be required during field evaluation since FSFs may not be accessible to fish every year.



Figure 4: Season channels created by beaver fisheries sensitive feature. (Photo: Alex Inselberg)

2.0 Identify Species that is Using the FSF

The FSF may be sampled for fish to determine what species and age class of fish are present. Fish sampling may not always be possible since fish may be present on a seasonal basis. Alternatively, fish use can be predicted by a professional fisheries biologist or technician, based on knowledge of fish species present in the watershed or adjacent streams, and professional judgement.

Fish sampling techniques should be tailored to the site-specific conditions and the time of year when sampling is proposed. The use of several sampling methods, such as Gee trapping and electrofishing is sometimes desirable when determining species composition. Whatever method is used, consider the implications of low water temperature, low conductivity, the presence of deepwater habitat, etc. Sampling on several occasions and at different times of the year is also recommended depending upon geographic location and species present within the local area.

3.0 Determine the Significance of the FSF

Although the protection of FSFs is required by FRPA and Regulations, and the Federal *Fisheries Act*, Management Guidelines may be implemented to provide additional protection based on the significance of the FSF. **Significance levels for FSFs are summarized in Table 1.** Below is a discussion regarding the determination of FSF significance:

- Is the FSF habitat unique or limited in size? For example, topography of the watershed, or sub-basin, may be relatively steep and the stream channels entrenched or confined with very limited floodplain area. In this kind of watershed, a small or moderate-sized off-channel FSF may be extremely important to overall fish production. An off-channel FSF in this example may represent the most important overwintering habitat for fish in the watershed and therefore may be considered highly significant.
- Is the FSF accessible to fish? In some watersheds, there may be areas of the valley bottom where fish access is limited to certain years depending on stream flows, degree of beaver dam activity, etc. Fish may not be present during field assessment simply because fish could not access the area due to low

flow conditions the previous fall. Professional judgement may be necessary when determining fish accessibility.

- Does the FSF provide year-round fish habitat, or seasonal use? Assessing degree of fish use may also require professional judgement.
- Does the FSF support a species of fish that is “at risk”? View MSRM’s website to determine if a Red- or Blue-listed fish species may be present in your operational area. Additional information may be obtained from <http://smapps.gov.bc.ca/atrisk/index.html>.

Table 1: Significance levels for FSFs.

FSF Habitat Values
High Significance
<ul style="list-style-type: none"> • FSFs that contain a fish species that is Red- or Blue-listed. • FSFs that contain unique habitat, or are located in a temperature sensitive watershed. • FSFs that are large and therefore make up a considerable amount of the available rearing habitat in a watershed or sub-basin. • FSFs that make a substantial contribution to the production of the local fish population.
Medium Significance
<ul style="list-style-type: none"> • FSFs occupied by species of fish that are not threatened, endangered or vulnerable (i.e., not Red- or Blue-listed). • FSFs that are not unique or limited in the watershed.
Low Significance
<ul style="list-style-type: none"> • FSFs that are rarely accessed by fish, or are utilized by few fish for very short periods of time.

4.0 Take Measures to Protect the FSF

Management practices for FSFs as defined by FRPA and Regulations would be sufficient to protect a FSF regardless of its significance or sensitivity in most situations. However, for high significance FSFs, additional protective, or mitigative, management practices may be considered necessary.

FSF Protection under the FRPA and Regulations

FSFs that are located adjacent to S1, S2, and S3 streams are protected from direct physical effects from forest harvesting operations by the Riparian Reserve Zone (RRZ) associated with those classes of streams. For these situations, FRPA and Regulations provide protection to the FSF by:

- prohibiting the felling of timber into FSFs during harvesting;
- prohibiting yarding or skidding timber through or over FSFs during harvesting;
- prohibiting deposits of slash, debris, or erodible soil into FSFs during harvesting, the construction of excavated or bladed trails, road site preparation, construction, or maintenance, and silviculture treatments;
- prohibiting deposits of slash, debris, or erodible soil into a stream or location where the material can be transported into a FSF, or become unstable and result in sedimentation of the FSF during harvesting;
- prohibiting the construction of excavated or bladed trails; or road maintenance, modification, construction and deactivation;

- prohibiting silviculture treatments; and
- stopping or modifying activity in the vicinity of a previously unidentified FSF in order to prevent damage during construction or modification of a road.

4.1 Management Guidelines for HIGH significance FSF

High significance FSFs are those which are utilized by Red- or Blue-listed fish species; are unique; or are located in a temperature sensitive watershed. **The FRPA and Regulations apply to these FSFs and may be adequate protection.** However, the high significance FSF should be assessed on-the-ground to determine if additional protective measures are warranted. Table 2 provides a list of suggested Management Guidelines to consider.

NOTE: This list contains suggested strategies and does not describe all possible management options. Alternative strategies may be more appropriate depending on site-specific conditions.

Table 2: High significance FSFs and associated Management Guidelines.

Management Guidelines
<ul style="list-style-type: none"> • Have a qualified fisheries biologist or fisheries technician conduct a site inspection. • Consider a machine-free zone adjacent to the FSF to prevent ground compaction and other direct damage. • Consider a RRZ to provide shade and cover for fish, particularly in FSFs that provide summer habitat in temperature sensitive watersheds. • Consider fencing to prevent livestock impacts. If damage from livestock is resulting in site disturbance and sedimentation, fencing may be necessary. • Review operational plans to determine nature of any upslope activities, water management strategies, and erosion control measures to assess potential for sediment delivery from upslope, or upstream sources. • Do not concentrate livestock by locating water troughs, feeding sites or salt licks near the FSF. • When locating, designing, constructing, maintaining, or deactivating roads, back spar trails, skid trails, etc., do so in a manner that minimizes sedimentation to the FSF. Consider alternative routes or additional set-backs in areas with moderate or high erosion potential. • Ensure that the FSF is clearly marked on operational maps, and are clearly marked and identified in the field. • Ensure that harvesting and silviculture operations staff, including fallers and machine operators, are aware of the FSF’s location, that it is sensitive, and that it requires special consideration. • Avoid felling trees into the FSF for safety reasons. Instead consider relocating the block boundary or road right-of-way. • Do not restrict or modify natural drainage patterns. • Time operations to minimize the effect on the FSF (e.g., during periods of low water flow). • Do not restrict fish passage in to, or out of, the FSF. • Contact MWLAP for any additional directives if fish present are Red- or Blue-listed or are regionally significant.

4.2 Management Guidelines for MEDIUM significance FSFs

The FRPA and Regulations also apply to medium significance FSFs and in **most cases these will be adequate**. Table 3 provides a list of suggested Management Guidelines to consider.

NOTE: This list contains suggested strategies and does not describe all possible management options. Alternative strategies may be more appropriate depending on site-specific conditions.

Table 3: Medium significance FSFs and associated Management Guidelines.

Management Guidelines
<ul style="list-style-type: none"> • Have a qualified fisheries biologist, or fisheries technician conduct a site inspection. • Consider a machine-free zone or RRZ adjacent to the FSF in areas that contain sensitive soils or have a high erosion potential. • Consider fencing to prevent livestock impacts. If damage from livestock is resulting in site disturbance and sedimentation, fencing may be necessary. • Do not concentrate livestock by locating water troughs, feeding sites or salt licks, near the FSF. • Ensure that the FSF is clearly marked on operational maps and are clearly marked and identified in the field. • Do not restrict or modify natural drainage patterns. • Time operations to minimize the effect on the FSF. • Do not restrict fish passage in to, or out of, the FSF.

4.3 Management Guidelines for LOW significance FSFs

The FRPA and Regulations apply to low significance FSFs and **will provide adequate protection**. Table 4 provides a list of suggested Management Guidelines to consider.

NOTE: This list contains suggested strategies and does not describe all possible management options. Alternative strategies may be more appropriate depending on site-specific conditions.

Table 4: Low significance FSFs and associated Management Guidelines.

Management Guidelines
<ul style="list-style-type: none"> • Consider a machine-free zone or RRZ adjacent to the FSF in areas that contain sensitive soils or have a high erosion potential. • Do not restrict or modify natural drainage patterns. • Time operations to minimize the effect on the FSF. • Do not restrict fish passage in to, or out of, the FSF.

5.0 Document HIGH or MEDIUM Significance FSFs

5.1 Document the High or Medium significance FSF in the field

- Take photos or digital photos of the FSF, date stamp the photos, and briefly describe the physical characteristics of the FSF habitat, the FSF location, and the fish species that use the FSF.
- Accurately map the FSF (attain GPS reading if practical) on an appropriately scaled map (i.e., at 1:10,000 or larger scale).
- Install temperature data loggers if high water temperature is a concern.
- Conduct site inspections during periods of high rainfall, or at other times when impacts have the potential to occur.

5.2 Document the High or Medium significance FSF in the office

- Incorporate location of the FSF into operational plans, short- and long-term forest stewardship plans, and appropriate GIS overlays.
- If the FSF is used by a Red- or Blue-listed species, complete a CDC animal observation form with appropriate information and submit to the CDC office <http://srmwww.gov.bc.ca/cdc/>. (see Appendix 2 for a blank copy of the form).
- If a new FSF was identified during field visits, then forward appropriate descriptive data and location, including UTM coordinates if practical, to DFO and regional MWLAP, as well as the local Ministry of Forests District Manager as part of annual reporting requirements.
- Consider scheduled monitoring of the FSF as part of internal operational plans or local fisheries stewardship programs and initiatives.

Further sources of information:

- BC Conservation Data Centre website: <http://srmwww.gov.bc.ca/cdc/>.
- BC Ministry of Forests website: <http://www.gov.bc.ca/for/> for Forest Practices Code Regulations and Guidebooks.
- Rare Freshwater Fish of British Columbia. BC Environment, Victoria. Feb. 1998

Individuals consulted to develop this account:

Tschaplinski, Peter. A/Manager, Fish-Forestry Interactions and Watershed Research, Ecology and Earth Sciences Section, Research Branch, BC Ministry of Forests, Victoria, BC.

Literature consulted to develop this account

- (CDC) British Columbia Conservation Data Centre. 2003. BC Conservation Data Centre: rare vertebrate animal tracking list. Electronic file from website: <http://srmwww.gov.bc.ca/cdc/>.
- Province of British Columbia. 1998. Fish-stream identification guidebook, second edition. BC Ministry of Forests, Victoria, BC.
- Province of British Columbia. 1995. Riparian management area guidebook. Forest Practices Code of British Columbia, Victoria, BC.

3.2 Mineral Licks and Wallows

Wildlife Habitat Feature Account

Definition

Mineral Lick – an area used by ungulates to obtain dietary *macro* minerals including sodium, calcium and phosphorous as well as *trace* minerals such as manganese, copper and selenium (Figure 5). Three types of mineral licks are generally recognized:

- (i) wet or mucky licks found in seepage areas;
- (ii) dry earth exposures such as clay or lacustrine deposits found above river cutbanks; and
- (iii) rock face licks.

Although mineral licks are typically used by ungulates during the spring and early summer seasonal periods, some ungulates (e.g., mountain goats) may also use mineral licks during the summer and fall months.



Figure 5: Mountain goat kid at mineral lick. (Photo: Alex Inselberg)

Wallow – a shallow depression or pit in the ground created **by ungulates** (moose, bison, elk, mountain goat) **or grizzly bear** through digging, trampling or rolling (Figure 6). Ungulates roll in wallows to cover themselves in mud or dust to provide relief from biting insects. In addition, wallowing may serve a social function during the breeding season where male ungulates (e.g., moose) will urinate in the wallow and roll in it to attract females. Bears will roll in wallows to help cool themselves in summer, and as a method of marking their presence to other bears.



Figure 6: High elevation fen and moose wallow. (Photo: Eliot Terry)

Management Objective

Mineral Lick – Maintain known and potential mineral licks in a natural state and ensure ungulates have access to them during the season when they are used the most (April-October).

Wallow - To avoid and/or reduce human disturbance in areas that contain known wallows, particularly during the ungulate breeding season (September-November).

Management Guidelines (quick reference summary)

- 1.0 Confirm that the feature is a mineral lick or wallow.
- 2.0 If necessary, identify the species using the mineral lick or wallow.
- 3.0 Determine significance rating of the mineral lick (High), and assign a Medium significance to all wallow areas.
- 4.0 Take measures to protect the mineral lick or wallow. Implement Management Guidelines based on the significance rating for the lick or wallow.
- 5.0 Document High significance mineral licks or wallows.

Management Guidelines (detailed)

1.0 Confirm that the feature is a mineral lick or wallow.

1.1 Check records for known mineral licks and wallows in your area of operational concern. Helpful information sources include:

- Determine whether forest cover mapping (1:20,000) has identified any mineral licks as Environmentally Sensitive Areas (ESAs) as well as any local mapping projects such as Terrestrial Ecosystem Mapping (TEM), which may have identified specific ecosystem types or bioterrain features associated with mineral licks or wallows.
- Check for previous records or inventories of known mineral licks or wallows in the geographic area and in your area of operational concern.
- Contact local government agencies (MWLAP) and guide outfitters to determine known locations of mineral licks and wallows and to identify which species are using the feature, when, and the extent of use.
- In areas of known ungulate use of the feature, confirm the following:
 - species (moose, deer, caribou, mountain sheep, mountain goat, etc.);
 - types of surveys used to confirm evidence and extent of use; and
 - seasonal period and frequency of use (if possible).

NOTE: Ungulate use of mineral licks depends on their distribution and availability across the landscape (i.e., identifying potential areas is difficult because the presence of licks is often defined solely by observed ungulate use).

1.1.1 What to look for – mineral licks

- Well-established trails or braided trail systems through forested and non-forested areas, which often lead to mineral lick sites. Although these trails will be used most frequently in the spring and early summer, mountain goats and mountain sheep also visit mineral lick sites during the fall (October-November).
- Look for both dry and wet mineral licks. Seepage areas and hot springs may provide potential mineral licks. In contrast, clay and/or silty lacustrine cutbanks or rock face areas can provide high concentrations of minerals.
- Check for evidence of use at each mineral lick site including teeth marks, pellets, tracks and hair.

1.1.2 What to look for – wallows

- Shallow wet/mucky depressions ranging in size from 2-3 m to several meters wide and typically less than 20 cm deep.
- Disturbed vegetation (grasses/sedges/low shrubs) as a result of pawing digging or rolling, often in a non-forested area for ungulates (e.g., wet meadow). These sites may have a strong odor of urine. Also look for tracks, hair or droppings nearby.
- Grizzly bear wallows are almost always found where there is seepage or the water table is close to the surface (e.g., near skunk cabbage seeps). Typical locations are in or beside shrubby fringes of estuaries and wetlands, in open forests where an underground spring comes to the surface, or in small pockets of imperfect drainage.
- Grizzly bear wallows contain lots of shed hairs and also provide excellent conditions for tracks. The edges of bear wallows may be worn smooth from bears laying and rubbing against them.

Tree branches, roots and duff along the edges usually have an abundance of snagged hairs. The fine bear hairs contrast with the coarse hair of ungulates.

- Grizzly bear wallows are often found in proximity to mark trees, and well-worn bear trails or mark trails may also lead to or skirt around the wallow.

CAUTION: If you suspect you have located a grizzly bear wallow, use caution and “bear awareness” when investigating this feature (see *Further Sources of Information*).

2.0 Identify the Species Using the Mineral Lick or Wallow

2.1 Mineral lick and wallow

- Use species geographic distribution, biogeoclimatic subzone, elevation, tracks and evidence of use (pellets, scats, hair, digging, etc.) to determine species-specific use.

3.0 Determine the Significance of the Mineral Lick and/or Wallow to the Local Population

The significance level of a mineral lick will depend on a number of factors including:

- (i) The extent of use (i.e., number of ungulate species or individuals using it);
- (ii) The relative availability of mineral licks in the surrounding area (i.e., is it the only one within a large geographic area and hence the suspected distance traveled to the lick or wallow from winter/spring ranges is relatively far); and
- (iii) The habitat suitability of the surrounding area, particularly the route(s) and trails leading to the lick.

However, other factors should also be considered including **ungulate species and their status** (i.e., Red- and Blue-listed, IWMS or regionally important species).

Overall, **High significance** mineral licks would include those that are **relatively rare** on the landscape, requiring individuals to travel relatively long distances from traditional escape terrain (> 1 km) and/or be **used annually by multiple species** (> 1 ungulate species), or by **many individuals** within a species.

NOTE: A low significance rating for licks is difficult to define, but would generally be for licks which, because of their size, quality, location or relative abundance, **are not uncommon or are infrequently used**.

Because of their overall habitat value and the subjectivity in determining their significance (i.e., relative abundance, frequency of use), **all confirmed wallows are rated as Medium significance** (Table 5).

Table 5: Significance levels for mineral licks and wallows.

Mineral Lick	
Significance Level	Rationale
<i>High</i>	<ul style="list-style-type: none"> Regionally rare on the landscape; or Used annually by more than one species; or Used by a large proportion of individuals within a species.
Wallows	
Significance Level	Rationale
<i>Medium</i>	<ul style="list-style-type: none"> Default to medium significance; the relative quality and importance of wallows are assumed to be constant.

4.0 Take Measures to Protect the Mineral Lick or Wallow

4.1 Management Guidelines for HIGH significance Mineral Licks

Mineral licks will be considered High significance licks if they are regionally rare and/or used by more than one ungulate species, and/or many individuals within a species. Their associated Management Guidelines should be followed where possible (Table 6).

Table 6: High significance mineral licks and associated Management Guidelines.

Species	Management Guidelines
<i>All Ungulate Species</i>	<ul style="list-style-type: none"> Avoid physical destruction of the mineral lick site (i.e., facility development, road building, etc.). Maintain the integrity of trails between mineral lick sites and seasonal ranges (winter/spring). Avoid locating new roads in close proximity to known mineral lick sites and trails. It is important to NOT ISOLATE the lick from nearby escape cover. If roads are required near mineral licks, implement measures to minimize disturbance to lick trails by minimizing the number of road crossings and by maintaining connectivity to adjacent forested areas. For existing roads near licks, minimize road use and disturbance during critical use periods (May-November: will depend on geographic location and ungulate species). Where roads can be deactivated near licks (i.e., within 100 m of High significance licks), do so as soon as possible and consider ATV restrictions. Also consider reclaiming roads with native vegetation, including seeding some sections to alder (<i>Alnus</i> spp.) or willow (<i>Salix</i> spp.). This will further restrict road access near the lick site. Where harvesting activities occur near lick sites, provide some visual screening (i.e., forested cover) around the lick. This will provide security and escape cover to animals using the lick. Where possible, arrange flight plans for helicopter or fixed wing activity to avoid licks, especially during critical use periods (May-November).

4.2 Management Guidelines for Wallows (Medium Significance)

The quality of wallows is difficult to define, but they are often uncommon and represent a valuable habitat feature. Consequently, all wallows have been assigned a Medium significance rating. The Management Guidelines associated with this rating are described in Table 7.

Table 7: Medium significance wallows and associated Management Guidelines.

Wallows	
Species	Management Guidelines
<i>All Ungulate Species and Grizzly Bear</i>	<ul style="list-style-type: none"> • Avoid destruction of the wallow site. • Where possible, avoid road construction and human disturbances near known wallow areas during the autumn rut for ungulates (September-November). • Where appropriate, incorporate wallows into forested retention areas such as a wildlife tree patch (WTP), riparian reserve zone or other retention area.

4.3 Management Guidelines for Low significance mineral licks

Low significance licks will usually be of poor quality and receive infrequent use, or may be relatively common in the local area. No specific practices are required around these features. However, when discovered they could be incorporated into a WTP or other retention patch.

Note: Medium significance licks are not defined.

5.0 Document HIGH Significance Mineral Licks or Wallows

5.1 Document the High significance mineral lick or wallow in the field

- Take photo or digital photo of the mineral lick or wallow, date stamp the photo, and briefly describe the location, mineral lick type (wet, dry, rock), condition, evidence of use and the ungulate species using the mineral lick or wallow.
- Attain GPS location (UTM co-ordinates) of the mineral lick or wallow and map site and trails on an appropriately scaled map (i.e., at 1:10,000 or larger scale).

5.2 Record the High significance mineral lick or wallow in the office

- Document in office and incorporate location into operational plans, short- and long-term forest stewardship plans, and appropriate GIS overlays.
- Report the location (UTM coordinates) of the mineral lick or wallow to the local Ministry of Forests District Manager as part of annual reporting requirements.
- If the mineral lick is used by a Red-listed species (i.e., woodland caribou), complete a CDC animal observation form with appropriate information and submit to the CDC office <http://srmwww.gov.bc.ca/cdc/>. (see Appendix 2 for a blank copy of the form).

Further sources of information:

- Mineral licks, geophagy, and biogeochemistry of North American ungulates. Robert L. Jones and Harold C. Hanson. The Iowa State University Press. 1985.
- Ungulates of British Columbia. D. Shackleton. 1999.
- Tracking and the art of seeing – how to read animal tracks and sign. Paul Rezendes. 1992.
- Bear aware – a self-guided training kit (with video) # FS 298C. BC Ministry of Forests, Victoria, BC. Dec. 1993.
- BC Conservation Data Centre website: <http://srmwww.gov.bc.ca/cdc/>.
- Identified Wildlife Management Strategy website: <http://wlapwww.gov.bc.ca/wld/identified/> , or <ftp://ftp.env.gov.bc.ca/pub/outgoing/Identified%20Wildlife/> , or <ftp://ftp.env.gov.bc.ca/pub/outgoing/Identified%20Wildlife/>.
- Committee on the Status of Wildlife in Canada website: http://www.cosewic.gc.ca/eng/sct5/index_e.cfm.
- Slocan mountain goat project website: <http://www.slocan.com/irm/projects/goats/index.htm>.

Individuals consulted to develop this account:

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Literature consulted to develop this account:

- (CDC) British Columbia Conservation Data Centre. 2003. BC Conservation Data Centre: rare vertebrate animal tracking list. Electronic file from website: <http://srmwww.gov.bc.ca/cdc/>
- Dormaar, J.F. and B.D. Walker. 1996. Element content of animal licks along the eastern slopes of the Rocky Mountains in southern Alberta, Canada. *Canadian Journal of Soil Science*. 767:509-512.
- Province of British Columbia. 1999. Identified Wildlife Management Strategy, BC Ministry of Environment, Lands and Parks and BC Ministry of Forests, Victoria, BC. <http://wlapwww.gov.bc.ca/wld/identified/> , or <ftp://ftp.env.gov.bc.ca/pub/outgoing/Identified%20Wildlife/>
- (RIC) Resources Inventory Committee. 1998. Ground-based inventory methods for selected ungulates, standards for components of British Columbia's biodiversity #33, ver. 2.0, Mar 1998. BC Ministry of Environment, Lands and Parks, Resources Inventory Branch, Victoria, BC. <http://srmwww.gov.bc.ca/risc/>
- (RIC) Resources Inventory Committee. 1998. Species Inventory Fundamentals. Standards for components of British Columbia's biodiversity No #1 Ver. 2.0, Mar 1998. BC Ministry of Environment, Lands and Parks, Resources Inventory Branch, Victoria, BC. <http://srmwww.gov.bc.ca/risc/>

3.3 Specified Nests

Wildlife Habitat Feature Account

Definition

Specified Nest – a large stick nest belonging to a bird species specified in Section 9 (1)d of the *Government Actions Regulation (GAR)* including Bald Eagle, Osprey and Great Blue Heron (Figure 7).



Figure 7: Great Blue Heron rookery. (Photo: Alex Inselberg)

NOTE: This account is only applicable to bird species at risk that build or use large stick nests. It is not applicable to other bird species at risk that use different types of nest structures for breeding.

Management Objective

To maintain large stick nests used by specified bird species, including Bald Eagle, Osprey, Great Blue Heron and bird species at risk (**NOTE:** in the Northern Interior Forest Region there are no other bird species at risk as defined in GAR Section 9 (1)d which use large stick nests), across the landscape. Specified nests should be well distributed, in suitable condition, and be associated with sufficient breeding and foraging habitat to maintain specified bird species populations dependent on these features.

NOTE: Raptor, heron and corvid (crow and raven family) species that typically nest in large stick nests, along with the corresponding sections in this report that describe their associated Management Guidelines, are listed below in Table 8. Please use this table to locate the appropriate species-specific management section in this report (those species with a HIGH management significance have been shaded for reference purposes).

Table 8: Report sections with Management Guidelines for raptor, heron and corvid species.

Bird Species	Report Section with Management Guidelines
American Crow	Section 3.4.A (Low significance)
Bald Eagle	Section 3.3.A (High significance)
Barred Owl	Section 3.4.A (Medium significance)
Broad-winged Hawk	Section 3.4.A (High significance)
Common Raven	Section 3.4.A (Low significance)
Cooper’s Hawk	Section 3.4.A (Medium significance)
Golden Eagle	Section 3.4.A (Medium significance)
Great Blue Heron (interior subspecies)	Section 3.3.C (High significance)
Great Gray Owl	Section 3.4.A (Medium significance)
Great Horned Owl	Section 3.4.A (Medium significance)
Long-eared Owl	Section 3.4.A (Medium significance)
Merlin	Section 3.4.A (Medium significance)
Northern Goshawk (interior subspecies)	Section 3.4.A (High significance)
Osprey	Section 3.3.B (High significance)
Red-tailed Hawk	Section 3.4.A (Medium significance)
Sharp-shinned Hawk	Section 3.4.A (Medium significance)
Swainson’s Hawk	Section 3.4.A (High significance)

Management Guidelines (quick reference summary)

- 1.0 Confirm that the feature is a large stick nest (in suitable condition) of a specified bird species as defined.
- 2.0 If necessary, identify the bird species that is using the large stick nest.
- 3.0 Determine the significance of the large stick nest.
- 4.0 Take measures to protect the large stick nest. Implement Management Guidelines based on which specified bird species is using the large stick nest.
- 5.0 Document the large stick nest.

Management Guidelines (detailed)

1.0 Confirm that the Feature is a Large Stick Nest of a Specified Bird Species

1.1 Check records for known large stick nests and related wildlife inventory/survey data in your area of operational concern. Helpful information sources include:

- Research relevant files, data sets and information available at your office for large stick nest observations and locations in your area of operational concern.
- Access CDC records and MWLAP for any occurrences or survey results, especially if you suspect that Identified Wildlife Management Strategy (IWMS) species or Red- and Blue-listed raptors or herons may be present (see CDC - <http://srmwww.gov.bc.ca/cdc/>; IWMS - <http://wlapwww.gov.bc.ca/wld/identified/>, or <ftp://ftp.env.gov.bc.ca/pub/outgoing/Identified%20Wildlife/>).
- Check *The Birds of British Columbia, Vols. 1 and 2* for range maps of birds. Check other regional bird reference books for potential of occurrences. The CDC database search tool “*Species and Ecosystems Explorer*” (<http://srmwww.gov.bc.ca/cdc/>) will sort Red and Blue-listed species records and occurrences by Forest District. Reviews of these sources can help reduce the list of possible species for nests of unknown origin.
- Confirm whether any wildlife surveys have been conducted in the area by your office, government agencies, local naturalist or recreation groups, and other NGO’s. Obtain this information, if available.
- Contact field and forestry workers in your office who have conducted surveys in the area, or have local wildlife knowledge.

1.2 If necessary, search for large stick nests of specified bird species

NOTE: Surveys for large stick nests can be conducted in order to minimize potential conflicts with operational planning and future forestry or range activities. This information will aid planning by operational staff. **However, whether to conduct stick nest surveys is left to the discretion of the licensed forest tenure holder.** Refer to Appendix 3 for details of survey methods for large stick nests.

- In many cases, large stick nests will be found opportunistically during operational visits by forestry workers, as opposed to dedicated wildlife surveys that are conducted during plan preparation.
- Reconnaissance searches for large stick nests are best conducted during the planning phase (including road and cutblock layout), so that locations of significant habitat features can be identified and mapped to minimize operational conflicts.
- Determine the raptor breeding season for your area, typically, March through August, to coordinate optimal times for surveys.
- Establish survey times and if possible coordinate these with other surveys or site visits.
- Educate forestry workers on raptor and large stick nest identification, and have them report any occurrences found in the operational area of interest.

2.0 Identify the Species that is Using the Large Stick Nest

Generally, the most certain way to determine which species is using the large stick nest is to observe an adult bird at the nest site. The best opportunity for this is during the breeding season, typically March through August. Identification of raptors can be difficult and may require professional help or the aid of a local naturalist or birder. Quality binoculars and a good field guide are important assets (some recommended field guides are listed below in “Further Sources of Information”).

3.0 Determine the Significance of the Large Stick Nest

Large stick nests of specified bird species listed under GAR 9 (1)d (i.e., Bald Eagle, Osprey and Great Blue Heron) are given a HIGH significance level, but each may have different associated Management Guidelines depending on their regional importance and general abundance. Once a specified species nest has been confirmed, see Section 4.0 for Management Guidelines for each bird species.

4.0 Take Measures to Protect the Large Stick Nest

Large stick nests of specified bird species are all given a HIGH significance level. High significance Management Guidelines **should be applied when:** i) the stick nest is determined to be that of one of the species listed in GAR 9 (1)d; OR ii) where the licensed tenure holder chooses NOT to identify the bird species using the stick nest **AND it is likely (based on geographic location and habitat suitability) that it is a nest of one of the species listed under GAR 9 (1)d.** Management Guidelines for High significance species, (i.e., Bald Eagle, Osprey and Great Blue Heron) are provided in the **following sections** (3.3.A–3.3.C).

3.3.A Bald Eagle



Figure 8: Immature Bald Eagle at nest. (Photo: Mark Nyhof)

Bald Eagle – Management Guidelines

- If the nest is intact, the tree is protected under Section 34 of the *Wildlife Act*.
- If possible, avoid High impact activities (see Table 9), including road construction, blasting or low altitude helicopter fly-overs between **March 1 and August 15**, within a 200 m radius of the nest tree.
- Where possible, locate all new roads >100 m from eagle nest trees.
- Establish a **2 tree length radius** (or equivalent area) forested buffer (i.e., WTP or other retention patch) around the nest tree. Tree length should be considered the dominant tree height for the leading tree species in that stand. Part of the function of the WTP or other retention patch is to provide perching and roosting opportunities near the nest site, and some security cover.

3.3.B Osprey



Figure 9: Osprey nest. (Photo: Mark Nyhof)

Osprey – Management Guidelines

- If the nest is intact, the tree is protected under Section 34 of the *Wildlife Act*.
- If possible, avoid High impact activities (see Table 9), including road construction, blasting or low altitude helicopter fly-overs between **March 1 and August 15**, within a 200 m radius of the nest tree.
- Where possible, locate all new roads >100 m from nest tree.
- Establish a **1 tree length radius** (or equivalent area) forested buffer (i.e., WTP or other retention patch) around the nest tree. Tree length should be considered the dominant tree height for the leading tree species in that stand. Part of the function of the WTP or other retention patch is to provide perching and roosting opportunities near the nest site, and some security cover.

3.3.C Great Blue Heron



Figure 10: Great Blue Heron nesting colony. (Photo: John Wanderer)

Great Blue Heron (coastal and interior subspecies) – Management Guidelines

Great Blue Heron is Blue-listed and an IWMS species. The coastal subspecies (*Ardea herodias fannini*) is nationally a species of “Special Concern”. The interior subspecies (*A. herodias*) is not listed nationally.

- If the nest(s) is intact, the tree (or trees containing nests if part of a nesting colony) is protected under Section 34 of the *Wildlife Act*. **Nest colonies** will have multiple nests located in the same tree or in adjacent or nearby trees.
- Where possible, avoid disturbance within 200 m of nests and nest colonies during the breeding season (**15 February to 31 August**). Minimize access on existing roads and trails (i.e., within 200 m of nests) during this period (types and levels of use should not exceed levels that customarily occur).
- Where possible, establish a forested buffer (WTP or other retention patch) with a **radius of 200 m** (approximately 12 ha equivalent area) **around confirmed nest colonies**. Ideally, the colony should be roughly centred within this forested patch. However, if location or orientation of the patch in this manner is not possible for operational or other reasons, then locate the patch so that the nest trees are connected to adjacent forested habitat.
- Within retention patches established around nest colonies, do not develop new roads, recreation trails, structures or facilities.
- Consult the IWMS guidelines for additional information on the management of Great Blue Heron habitat (i.e., whether to consider establishment of a WHA), especially **where large heron colonies are encountered**, or in areas where colonies may be **isolated geographically or have previously had little exposure to human disturbance or development** (i.e., “wilderness” colonies). IWMS guidelines are available at <ftp://ftp.env.gov.bc.ca/pub/outgoing/Identified%20Wildlife/>.

4.1 Disturbance and activity impacts

In general, raptors and herons have low to moderate thresholds for new human disturbance, particularly during the breeding season. Unaccustomed levels of noise or human activity near the nest tree can cause some species to abandon their nest. Some individuals of particular species (such as Osprey) become habituated to nesting in close proximity to human activity, provided that the activity came first and birds subsequently moved in.

During the early part of the nesting season (i.e., before June), incubating adults are more prone to abandoning their nests when sufficiently disturbed. Later in the breeding season (i.e., after the beginning of June), adults tend to be less susceptible to disturbance as they have invested more time and energy into rearing their young and their parental bond with their chicks is stronger. Birds that nest in close association with humans may still be negatively affected by high impact activities, but are generally more tolerant of most medium impact activities. See Table 9 for **examples of activity impacts on large stick nests, and suggestions for reducing these impacts.**

Table 9: Examples of activity impacts on large stick nests.

Activity	Suggested Lower Impact Alternatives
High Impact	
Blasting	Delay or reschedule until after breeding season (~15 August)
Road Construction	Delay or reschedule until after breeding season (~15 August).
Falling and Yarding	Delay or reschedule until after breeding season (~15 August).
Pile Burning	Minimize pile burning during the breeding season (1 March to 15 Aug.). Try to burn piles in January-February and/or under conditions which will ensure rapid dispersion of smoke.
Low Altitude Helicopter Activity	Plan and reroute flight paths to at least 500 m from known nest trees during the breeding season (1 March to 15 Aug.); fly at higher altitudes near nest sites during this period.
Medium Impact	
Vehicle Traffic (on existing roads within 200 m of nest trees)	During the breeding season, if possible minimize the number of traffic passes.
Brushing and Thinning	Delay or reschedule until after the breeding season (~15 August).
Low Impact	
Block Layout, Surveys, Timber Cruising	Minimize loud voices or shouting, try to remain at least 50 m away from active nest sites and minimize time spent in the area.

5.0 Document the Large Stick Nest

5.1 Document the large stick nest in the field

- Flag, paint or mark the nest tree in the field so that it is conspicuous to workers, but not to the general public.
- Take a photograph or digital photo of the nest, date stamp the photo, and briefly describe the nest tree location, the nest condition, and the bird species that was using the nest.
- Attain GPS reading of the nest tree and map on an appropriately scaled map (i.e., at 1:10,000 or larger scale).

5.2 Document the large stick nest in the office

- Document in office and incorporate location into operational plans, short- and long-term forest stewardship plans, and appropriate GIS overlays. Update records of the large stick nest regularly for planning and monitoring and to minimize data loss during staff changes.
- Where appropriate, consider scheduling monitoring of the large stick nest as part of internal operational plans or wildlife stewardship programs and initiatives.
- Forward a brief description of the feature and its location (UTM coordinates) to the local Ministry of Forests District Manager as part of annual reporting requirements.
- Complete a CDC animal observation form with appropriate information and submit to the CDC office <http://srmwww.gov.bc.ca/cdc/> (see Appendix 2 for a blank copy of the form).

Further sources of information

- A Field Guide to Species at Risk in the Coast Forest Region of British Columbia. 2003. G. Proulx, D. Bernier, J. Heron and K. Paige. International Forest Products and Min. Water, Land and Air Protection, Victoria, B.C.
- Birds of British Columbia – Volumes 2 (Birds of Prey). Royal BC Museum and UBC Press
- Rare Birds of British Columbia. Min. Environ., Lands and Parks. Victoria, B.C. March 1999
- RISC – Inventory Methods for Raptors (see <http://srmwww.gov.bc.ca/risc/>).
- A Field Guide to the Birds of North America (National Geographic)
- Peterson's Field Guides – Western Birds
- BC Conservation Data Centre website: <http://srmwww.gov.bc.ca/cdc/>.
- Resource Information Standards Committee website: <http://srmwww.gov.bc.ca/risc/>.
- Identified Wildlife Management Strategy website: <http://wlapwww.gov.bc.ca/wld/identified/>, or <ftp://ftp.env.gov.bc.ca/pub/outgoing/Identified%20Wildlife/>
- Committee on the Status of Wildlife in Canada website: http://www.cosewic.gc.ca/eng/sct5/index_e.cfm.

Literature consulted to develop this account:

(CDC) British Columbia Conservation Data Centre. 2003. BC Conservation Data Centre: rare vertebrate animal tracking list. Electronic file from website: <http://srmwww.gov.bc.ca/cdc/>.

Fraser, D.F., W.L. Harper, S.G. Cannings and J.M. Cooper. 1999. Rare birds of British Columbia. Wildlife Branch and Resource Inventory Branch, BC Ministry of Environment, Lands and Parks, Victoria, BC. 244 pp.

Province of British Columbia. 1999. Identified Wildlife Management Strategy, BC Ministry of Environment, Lands and Parks and BC Ministry of Forests, Victoria, BC. <http://wlapwww.gov.bc.ca/wld/identified/>, or <ftp://ftp.env.gov.bc.ca/pub/outgoing/identified%20Wildlife/>.

(RISC) Resources Information Standards Committee. 2001. Inventory methods for raptors standards for components of British Columbia's biodiversity #11, ver. 2.0, Oct 2001. BC Ministry of Sustainable Resource Management, Victoria, BC. <http://srmwww.gov.bc.ca/risc/>.

3.4 Localized Wildlife Habitat Features

3.4.A Large Stick Nests (non-specified species)

Wildlife Habitat Feature Account

Definition

Large Stick Nest – a large (>30 cm in diameter) nest built of sticks and branches, typically made in a mature tree by a large bird of prey (raptor), and **in suitable condition for reuse** (Figure 11). **Non-specified species include Northern Goshawk** (yellow-listed; regionally important), **Broad-winged Hawk** (Blue-listed), and **Swainson’s Hawk** (Red-listed).

NOTE: Please refer to Section 3.3 for Management Guidelines for large stick nests of bird species specified in Section 9 1(d) of the *Forest and Range Practices Act GAR*, including Bald Eagle, Osprey and Great Blue Heron.



Figure 11: Northern Goshawk nest. (Photo: Bill Jex)

Management Objective

To maintain large stick nests used by various wildlife species, such as raptors, across the landscape. Large stick nests should be well distributed, in suitable condition for reuse, and associated with sufficient breeding and foraging habitat to maintain local wildlife populations dependent on these features.

Management Guidelines (quick reference summary)

- 1.0 Confirm that the feature is a large stick nest as defined.
- 2.0 If necessary, identify the species that is using the large stick nest.
- 3.0 Determine the significance of the large stick nest.
NOTE: If the licensed tenure holder chooses not to confirm the identity of the species using the large stick nest, then it is recommended they default to a High significance rating for the habitat feature (see sec. 4.1 for details).
- 4.0 Take measures to protect the large stick nest. Implement Management Guidelines based on the significance rating for the large stick nest.
- 5.0 Document High significance large stick nests.

Management Guidelines (detailed)

1.0 Confirm that the feature is a large stick nest as defined.

1.1 Check records for known large stick nests and related wildlife inventory/survey data in your area of operational concern. Helpful information sources include:

- Research relevant files, data sets and information available at your office for large stick nest observations and locations in your area of operational concern.
- Access CDC records and MWLAP for any occurrences or survey results, especially if you suspect that Identified Wildlife Management Strategy (IWMS) species or Red- and Blue-listed raptors or herons may be present (see CDC - <http://srmwww.gov.bc.ca/cdc/>; IWMS - <http://wlapwww.gov.bc.ca/wld/identified/> , or <ftp://ftp.env.gov.bc.ca/pub/outgoing/Identified%20Wildlife/>)
- Check *The Birds of British Columbia, Vols. 1 and 2* for range maps of birds. Check other regional bird reference books for potential of occurrences. The CDC database search tool “*Species and Ecosystems Explorer*” (<http://srmwww.gov.bc.ca/cdc/>) will sort Red and Blue-listed species records and occurrences by Forest District. Reviews of these sources can help reduce the list of possible species for nests of unknown origin.
- Confirm whether any wildlife surveys have been conducted in the area by your office, government agencies, local naturalist or recreation groups, and other NGO’s. Obtain this information, if available.
- Contact field and forestry workers in your office who have conducted surveys in the area, or have local wildlife knowledge.
- Interview local naturalists and others who may frequent the area for additional observations or information.

1.2 Search for large stick nests

NOTE: Surveys for large stick nests can be conducted in order to minimize potential conflicts with operational planning and future forestry or range activities. This information and knowledge is important for effective planning by operational staff. However, whether to conduct these surveys is **left to the discretion of the licensed forest and range tenure holder**. See Appendix 3 for details on how to survey for large stick nests.

- In many cases, large stick nests will be found opportunistically during operational visits by forestry workers, as opposed to dedicated wildlife surveys that are conducted during plan preparation.
- Reconnaissance searches for large stick nests are best conducted during the planning phase (including road, cutblock layout and rangeland visits), so that locations of significant habitat features can be identified and mapped to minimize future operational conflicts. However, whenever tenure holders or their employees are in the tenure areas, they should be encouraged to make observations of WHFs and to document these for planning purposes.
- Determine the raptor breeding season for your area, typically February through August, to coordinate optimal times for surveys.
- Establish survey times and coordinate with other surveys or site visits.
- Educate forestry workers on raptor and large stick nest identification, and have them report any occurrences found in the area of interest.

2.0 If Necessary, Identify the Species that is Using the Large Stick Nest

Generally, the most certain way to determine what species is using the large stick nest is to observe an adult bird at the nest area. The best opportunity for this is during the breeding season, typically February through August. Identification of raptors can be difficult and may require professional help or the aid of a local naturalist or birder. Quality binoculars, spotting scope and a good field guide are important assets (some recommended field guides are listed below in “Further Sources of Information”).

3.0 Determine the Significance of the Large Stick Nest

NOTE: If a large stick nest is found and the **identity of the species using the feature is unknown or uncertain** (in many cases nests will be unoccupied), then the licensed tenure holder should consider the following two options:

- i) default to a High significance rating for the large stick nest and suspected nesting species, and implement associated Management Guidelines. In this case, the identity of the suspected species using the stick nest can be based on habitat suitability AND its likelihood of occurrence and other records for that species in the geographic area; **OR**
- ii) delay operations until the identity of the bird species is confirmed and a corresponding significance rating is determined. Then implement appropriate Management Guidelines for the stick nest based on its significance level.

NOTE: The significance level of a large stick nest will depend on what species of bird is currently using (or has recently used) the nest (raptors often re-use nest trees). **Nests of non-specified species include regionally important raptor species** (interior subspecies of Northern Goshawk) **and raptor species with a provincial conservation status** (Broad-winged Hawk and Swainson’s Hawk); **these 3 species are rated as High significance** (Table 10). **All other raptor nests are given a Medium** significance rating. Corvid nests are given a Low significance.

Table 10: Significance levels for large stick nests of non-specified bird species.

High Significance Large Stick Nests
<ul style="list-style-type: none"> • Northern Goshawk (interior mainland subspecies) (Yellow-listed; Regionally Important) • Broad-winged Hawk (Blue-listed) • Swainson’s Hawk (Red-listed)
Medium Significance Large Stick Nests – Other Raptors
<ul style="list-style-type: none"> • Sharp-shinned Hawk • Cooper’s Hawk • Red-tailed Hawk • Golden Eagle • Merlin • Great Horned Owl • Barred Owl • Great Gray Owl
Low Significance Large Stick Nests - Corvids
<ul style="list-style-type: none"> • American Crow • Common Raven

4.0 Take Measures to Protect the Large Stick Nest

The significance level of the large stick nest will determine what actions should be taken to maintain and protect the large stick nest.

4.1 Management Guidelines for HIGH significance large stick nests – non-specified raptor species

Large stick nests of the interior subspecies of Northern Goshawk, as well as Broad-winged Hawk (Blue-listed) and Swainson’s Hawk (Red-listed), are given a **HIGH significance rating in the Northern Interior Forest Region** due to their regional significance and provincial conservation status. Their associated Management Guidelines are described below.

Northern Goshawk (interior subspecies) – Management Guidelines

If the nest is intact:

- Establish a **forested buffer of approximately 24 ha** (i.e., WTP or other retention patch with ~275 m radius or equivalent area) around the nest tree. Ideally, the nest tree should be roughly centred within this forested patch; the patch should be connected to adjacent contiguous mature timber where possible. This will help protect the integrity of the nesting area (i.e., including the current nest tree, alternate nest trees, and perch trees).
- Where possible, avoid High impact activities (see Table 9), including road construction, blasting or low altitude helicopter fly-overs between **March 1 and August 15**, within a 500 m radius of the tree.
- Where possible, locate all new roads >200 m from the nest tree.
- Contact MWLAP for additional direction as this species is regionally important.

Broad-winged Hawk and Swainson’s Hawk – Management Guidelines

- Establish a **forested buffer of approximately 3 ha** (i.e., WTP or other retention area with ~100 m radius or equivalent area) around the nest tree.
- Where possible, avoid High impact activities (see Table 9), including road construction, blasting or low altitude helicopter fly-overs between **March 1 and August 15**, within a 500 m radius of the tree.
- Where possible, locate all new roads >100 m from the nest tree.
- Where possible, avoid the use of pesticides and rodenticides; spot treatments with herbicides to control noxious plants may be used.

4.2 Management Guidelines for MEDIUM significance large stick nests

Medium significance large stick nests apply to other raptor species as listed in Table 10. Management Guidelines for Medium significance stick nests are described in Table 11.

Table 11: Medium significance large stick nests and associated Management Guidelines.

Bird Species	Management Guidelines
<ul style="list-style-type: none"> • Sharp-shinned Hawk • Cooper’s Hawk • Red-tailed Hawk • Merlin • Great Horned Owl • Barred Owl • Great Gray Owl • Long-eared Owl • Golden Eagle (<i>prefers to nest on cliffs but may use large stick nests in trees when suitable cliff sites are unavailable</i>) 	<ul style="list-style-type: none"> • If the nest is occupied, the tree is protected under Section 34 of the <i>Wildlife Act</i> while occupied. • If the nest is occupied, where possible, avoid High impact activities including road construction, blasting or low altitude helicopter fly-overs between March 1 and August 15, within a 100 m radius of the tree. • Consider establishing a WTP or other retention patch, or leaving non-merchantable or advance regeneration around the nest tree.

4.3 Management Guidelines for LOW significance large stick nests

Low significance large stick nests are those which are associated with corvid species. Management guidelines for Low significance large stick nests are left at the discretion of the resource user. However, because abandoned corvid nests are often used by other stick-nesting birds such as raptors, consider incorporating corvid nests into WTPs or other retention patches. This can be as part of wildlife tree and biodiversity objectives at the stand level. Also, when corvid nests are occupied, the tree is protected under Section 34 of the *Wildlife Act* while occupied.

5.0 Document High Significance Large Stick Nests

5.1 Document High significance large stick nests in the field

- Flag, paint or mark the nest tree in the field so that it is conspicuous to workers, but not to the general public.
- Take a photograph or digital photo of the nest, date stamp the photo, and briefly describe the nest tree location, the nest condition, and the bird species that was using the nest.
- Attain GPS reading of the nest tree and map on an appropriately scaled map (i.e., at 1:10,000 or larger scale).

5.2 Document High significance large stick nests in the office

- Document in office and incorporate location into operational plans, short- and long-term forest stewardship plans, and appropriate GIS overlays. Update records of the large stick nest regularly for planning and monitoring and to minimize data loss during staff changes.
- If the nest is a High significance large stick nest, forward a brief description of the feature and its location (UTM coordinates) to the local Ministry of Forests District Manager as part of annual reporting requirements.
- Consider scheduling annual monitoring of High significance large stick nests as part of internal operational plans or wildlife stewardship programs and initiatives.

Further sources of information:

- Identified Wildlife Management Strategy
- Birds of British Columbia – Volumes 1-3. Royal BC Museum and UBC Press
- Rare Birds of British Columbia. Min. Environ., Lands and Parks. Victoria, B.C. March 1999
- RISC – Inventory Methods for Raptors
- A Field Guide to the Birds of North America (National Geographic)
- Peterson's Field Guides – Western Birds
- BC Conservation Data Centre website: <http://srmwww.gov.bc.ca/cdc/>.
- Resource Information Standards Committee website: <http://srmwww.gov.bc.ca/risc/>.
- Identified Wildlife Management Strategy website: <http://wlapwww.gov.bc.ca/wld/identified/> , or <ftp://ftp.env.gov.bc.ca/pub/outgoing/identified%20Wildlife/>
- Committee on the Status of Wildlife in Canada website: http://www.cosewic.gc.ca/eng/sct5/index_e.cfm.
- MWLAP Standards and guidelines (in progress) for species.

Literature consulted to develop this account:

(CDC) British Columbia Conservation Data Centre. 2003. BC Conservation Data Centre: rare vertebrate animal tracking list. Electronic file from website: <http://srmwww.gov.bc.ca/cdc/> .

Fraser, D.F., W.L. Harper, S.G. Cannings and J.M. Cooper. 1999. Rare birds of British Columbia. Wildlife Branch and Resource Inventory Branch, BC Ministry of Environment, Lands and Parks, Victoria, BC. 244 pp.

Mahon, T. and F. Doyle. 2003. Northern goshawks in the Morice and Lakes Forest Districts. 5-year project summary. Wildfor Consultants Ltd., Telkwa, BC. IFPA Project No. 431.02.

Province of British Columbia. 1999. Identified Wildlife Management Strategy, BC Ministry of Environment, Lands and Parks and BC Ministry of Forests, Victoria, BC. <http://wlapwww.gov.bc.ca/wld/identified/> , or <ftp://ftp.env.gov.bc.ca/pub/outgoing/identified%20Wildlife/>.

(RISC) Resources Information Standards Committee. 2001. Inventory methods for raptors standards for components of British Columbia's biodiversity #11, ver. 2.0, Oct 2001. BC Ministry of Sustainable Resource Management, Victoria, BC. <http://srmwww.gov.bc.ca/risc/>.

3.4.B Sharp-tailed Grouse Leks

Wildlife Habitat Feature Account

Definition

Lek – an area where male and female grouse gather to mate in spring (Figure 12). Males congregate at “dancing grounds”, or leks, establish small territories within the lek, fight among one another for dominance, and display for females. Females visit the lek, mate with one or more males, then disperse to nesting areas to lay eggs. Grouse may visit leks at any time of year, but most activity occurs in the spring, with some activity in fall. Leks are used year after year if grouse are not disturbed and vegetation characteristics remain suitable.



Figure 12: Sharp-tailed Grouse lek. (Photo: Doug Jury)

Management Objective

To maintain leks and associated nesting habitat across the landscape within the range of Sharp-tailed Grouse.

Management Guidelines (quick reference summary)

- 1.0 Confirm that the feature is a Sharp-tailed Grouse lek as defined.
- 2.0 Compare lek location to the known range of Sharp-tailed Grouse.
- 3.0 Take measures to protect the lek and surrounding nesting habitat from damage or disturbance by implementing Management Guidelines.
- 4.0 Document the lek.

Management Guidelines (detailed)

1.0 Confirm that the feature is a Sharp-tailed Grouse Lek as defined.

1.1 Check records for known leks in your area of operational concern

- Research all relevant files, data sets and information available at your office for lek observations and locations in your area of operational concern.
- Confirm whether or not any wildlife surveys have been conducted in the area by your office, government agencies, local naturalist or recreation groups, and other NGO's.
- Access CDC records and regional MWLAP for any breeding occurrences or survey results, especially if you suspect that Sharp-tailed Grouse occur in your area (see CDC – <http://srmwww.gov.bc.ca/cdc/>).

NOTE: Because of the sensitivity of birds to disturbance while at leks (and potential vulnerability), the exact location of leks (UTM coordinates) is confidential. Resource tenure holders should contact regional MWLAP staff if they require detailed location information.

- The CDC database search tool “*Species and Ecosystems Explorer*” will sort species records and occurrences by Forest District. This tool can be used to determine if a particular wildlife species is found in the area (see <http://srmwww.gov.bc.ca/cdc/>).
- Contact field workers in your office who have conducted surveys in the area, or have local wildlife knowledge.
- Interview local naturalists, sportsmen and others who may frequent the area for additional observations or information.

1.2 If Necessary, Search for Leks

NOTE: Reconnaissance searches for leks are recommended in order to minimize potential conflicts with operational planning and future forestry or range activities, especially in grassland areas within the range of the *columbianus* subspecies (see section 2.0). However, *whether to conduct lek searches is left at the discretion of the resource user.*

- Reconnaissance searches for leks are best conducted during the preliminary stage of operational plans (including road surveys in open areas, silvicultural assessments and rangeland visits), so that locations of significant habitat areas can be identified and mapped to minimize future operational conflicts.
- Expect grouse to be on leks in early morning in the spring, March-May, but also in September and early October.
- Establish survey times and coordinate with layout or other visits.

1.2.1 What to look for

- Leks are in open spaces such as grasslands, meadows, burned areas, and in recently-logged clearcuts where vegetation is short enough (25-35 cm high) to allow visibility for the grouse, but heavy enough to provide some cover.
- Leks are usually on the top of rises or ridges, although not always on the highest point of land.
- **Leks are relatively small, often 100-1000 m²** and may have a trampled appearance from “dancing” grouse (Figure 13).

- In grasslands, leks likely have sparser vegetation with denser cover surrounding. In clearcuts, leks occur in early seral stages < 20 years old, where regeneration is minimal.
- Grouse on leks in open habitats can be sometimes heard from distances of up to 1 km. Dancing males can be observed through binoculars from several hundred metres.
- If you find an open area in the spring during early morning hours with several or more Sharp-tailed Grouse present, it is likely a lek.
- Loose feathers caught on vegetation and abundant fecal droppings are often present at leks.
- Educate forestry workers and rangeland users on Sharp-tailed Grouse and lek identification, and have them report any occurrences found in their area of interest.



Figure 13: Male Sharp-tailed Grouse dancing at lek. (Photo: Jared Hobbs)

1.2.2 Confirm the identification of Sharp-tailed Grouse at Leks

The Sharp-tailed Grouse is a medium-sized grouse, measuring about 45 cm in length and weighing 600-1000 g. Males and females have similar cryptic-coloured brown plumage. The head, neck and back are heavily barred with darker brown, black and buff. The tail is wedge-shaped with the two middle tail feathers (rectrices) extending beyond the other tail feathers, hence the name “sharp-tailed”. Rectrices are white-tipped. Males have pink air sacs (cervical apteria) on the sides of the neck, and yellow-to-orange superciliary combs above the eyes, which are exposed when males display.

Sharp-tailed Grouse may be confused with Ruffed Grouse, which have a similar size and colouration, but generally frequent forested habitats. Blue Grouse, which occur in Sharp-tailed Grouse habitat, are much larger and darker in colour. Spruce Grouse are smaller, darker and frequent dense conifer forests. Consult bird field guides for further identification information.

2.0 Compare Lek Location to the Known Range of Sharp-tailed Grouse

Three subspecies of Sharp-tailed Grouse occur in British Columbia. The “Columbian” Sharp-tailed Grouse (*Tympanuchus phasianellus columbianus*) occurs approximately from Merritt north to Vanderhoof, east to the Cariboo Mountains and west to the Coast Range. This subspecies is typically associated with grasslands or clearcuts in drier forests. This subspecies is Blue-listed due to the contraction of its range and reduced numbers. Populations in the Okanagan and East Kootenay Trench are thought to be nearly extirpated. There are recent confirmed sightings in the East Kootenay Trench that suggest some persistence of the species. These birds may be individuals from reintroduction attempts in Montana that have dispersed northward (Figure 14).

Sharp-tailed Grouse in the Peace Lowland and adjacent regions of northeastern British Columbia are probably of the subspecies *T. p. jamesi* that occurs in much of Alberta, Saskatchewan, southwestern Manitoba, and north-central USA. Sharp-tailed Grouse that occur along the Liard River and adjacent areas in northernmost British Columbia are likely of the subspecies *T. p. caurus*. These two subspecies are both Yellow-listed.

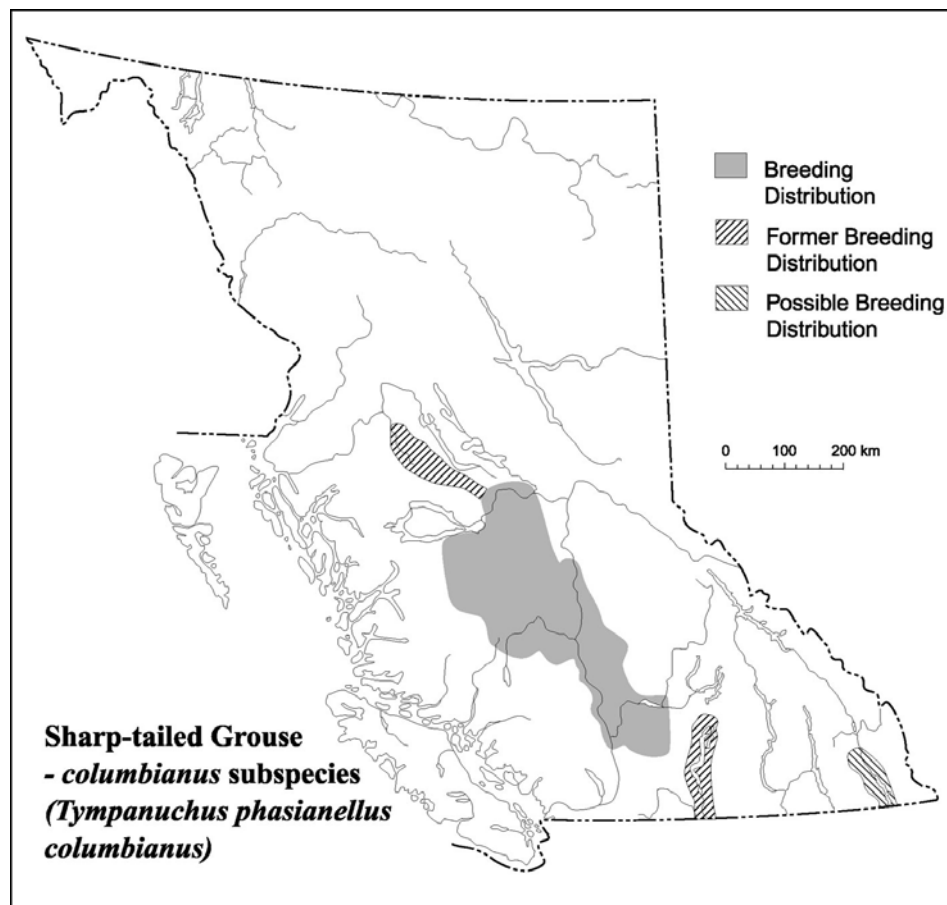


Figure 14: Sharp-tailed Grouse (*columbianus*) range in British Columbia. (Graphic: Province of British Columbia)

3.0 Take Measures to Protect the Lek

3.1 Management Guidelines for HIGH significance Sharp-tailed Grouse leks.

Columbian Sharp-tailed Grouse are Blue-listed in British Columbia and are designated as *Identified Wildlife* under the Identified Wildlife Management Strategy (IWMS, version 2). Where establishment of a WHA around grassland leks is not possible, then the lek can be designated as a WHF. Consequently, Columbian Sharp-tailed Grouse **leks in grasslands have a High significance WHF** rating. Management Guidelines for High significance grassland leks are described in Table 12. It is not necessary to establish WHAs for leks found in clearcuts, as clearcuts provide only temporary habitat until forest re-growth precludes continued use by Sharp-tailed Grouse, but these leks should be reported to MWLAP. Further habitat management information for Sharp-tailed Grouse can be found in the species accounts of the IWMS available at <ftp://ftp.env.gov.bc.ca/pub/outgoing/identified%20Wildlife/>.

Table 12: High significance Columbian Sharp-tailed Grouse leks in grasslands, and associated Management Guidelines.

Management Guidelines – Columbian Sharp-tailed Grouse Leks in Grasslands
<ul style="list-style-type: none"> • Establish a 400 m radius buffer zone (~ 50 ha equivalent area) roughly centred on the lek. • For purposes of the following guidelines, the lek includes the 400 m buffer zone described above. • Where possible, include nearby riparian areas, deciduous copses, shrub patches, and tall grass areas within the lek. • Where possible, close access roads (or restrict access) within 100 m of the lek from 1 April to 31 May, when females and males congregate at the lek to mate. • Restrict livestock grazing within the lek from 1 April to 31 May. • Do not hay or mow within the lek until 15 August. • Do not provide salt or other livestock attractants within 400 m of a lek unless used as a tool to manage grazing. • Do not build fences within 400 m line of sight of a lek (to minimize perch sites for predatory raptors). • Do not burn within leks without prior consultation with MWLAP staff. • Consider controlling forest encroachment adjacent to leks by conducting prescribed burns, mowing, or manual removal of seedling and saplings, outside of the breeding season (April to 1 June), and in consultation with MWLAP staff.

NOTE: Most known grassland leks are located on private land. Stewardship of habitat on private land is important for maintaining populations of Sharp-tailed Grouse.

3.2 Management Guidelines for MEDIUM significance Sharp-tailed Grouse leks.

WHAs are not required for Sharp-tailed Grouse leks in clearcuts. However, all leks are very important wildlife habitat features since almost all members of a local population will predictably congregate at them during the breeding season. Consequently, **leks for Sharp-tailed Grouse NOT in grassland habitats have a Medium significance** WHF rating. Management Guidelines for Medium significance leks are described in Table 13.

Table 13: Medium significance Sharp-tailed Grouse leks and associated Management Guidelines.

Management Guidelines – Sharp-tailed Grouse Leks NOT in Grasslands
<ul style="list-style-type: none">• Where possible, minimize use of roads or access within 100 m of leks from 1 April to 31 May, when females and males congregate at the lek to mate.• Restrict livestock grazing within the lek from 1 April to 31 May.• Maintain natural openings and continued supply of early seral habitat in areas near the lek.• Maintain deciduous shrub and tree components in nearby riparian areas and when thinning.• Consider controlling forest encroachment adjacent to leks by using prescribed burning.

NOTE: Because of their importance as habitat features, there are NO low significance leks, regardless of their geographic location in British Columbia or the subspecies involved.

4.0 Document the Lek

NOTE: Sharp-tailed Grouse leks in grassland areas may be monitored regularly by MWLAP staff due to decreasing population trends and the continued loss or vacancy of historically active grassland leks. Yearly lek counts and lek densities for grassland populations can be used to estimate Sharp-tailed Grouse populations and population trends.

4.1 Document the lek in the field

- Take photos or digital images of the lek (close-ups and broad view), date stamp the photos, and briefly describe the lek location, habitat type, habitat condition, and the number of birds noted.
- Obtain a GPS reading of the lek and map on an appropriately scaled map (i.e., at 1:10,000 or larger scale).

4.2 Document the lek in the office

- Document the lek in the office and incorporate known lek occurrences into operational plans, short- and long-term forest development plans, and appropriate GIS overlays.
- Forward locations of all leks or observations of Sharp-tailed Grouse to the CDC by completing an animal observation form with appropriate information and submit to the CDC office <http://srmwww.gov.bc.ca/cdc/>. (see Appendix 2 for a blank copy of the form).
- Forward a brief description of the lek(s) and its location (UTM coordinates) to the local Ministry of Forests District Manager as part of annual reporting requirements.
- Consider developing a management strategy for maintaining, conserving and/or enhancing critical Sharp-tailed Grouse habitat including leks, winter, nesting, and brood rearing habitats.
- Because of their sensitivity to disturbance, annual monitoring of leks may be conducted by MWLAP staff.

Further sources of information:

- Birds of British Columbia – Volume 2. Royal BC Museum Press
- BC Ministry of Environment, Lands and Parks, Status of the Sharp-tailed Grouse – *columbianus* subspecies in British Columbia
- Rare Birds of British Columbia. Min. Environ., Lands and Parks. Victoria, B.C. March 1999
- A Field Guide to the Birds of North America (National Geographic)
- Peterson's Field Guides – Western Birds
- BC Conservation Data Centre website: <http://srmwww.gov.bc.ca/cdc/>.
- Identified Wildlife Management Strategy website: <http://wlapwww.gov.bc.ca/wld/identified/>, or <ftp://ftp.env.gov.bc.ca/pub/outgoing/identified%20Wildlife/>.

Individuals consulted to develop this account:

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Ernest Leupin, Wildlife Biologist, Ecoscape Biological Consulting, Kamloops, BC.

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3.4.C Ungulate Natal Areas

Wildlife Habitat Feature Account

Definition

Natal Area – specific topographic habitat features (Figure 15) used by ungulates during the birthing period (early May-early June) and imprinting phase of mother-young social development. Natal areas are often secluded and isolated areas that provide reduced risk of predation and allow critical initial development of mother-young bonds. These areas typically include cliffs used by mountain sheep and mountain goats where mother and offspring are temporarily isolated from social groups or bands for approximately one week, after which they group together to form nursery bands (3-4 weeks) before moving to summer ranges.

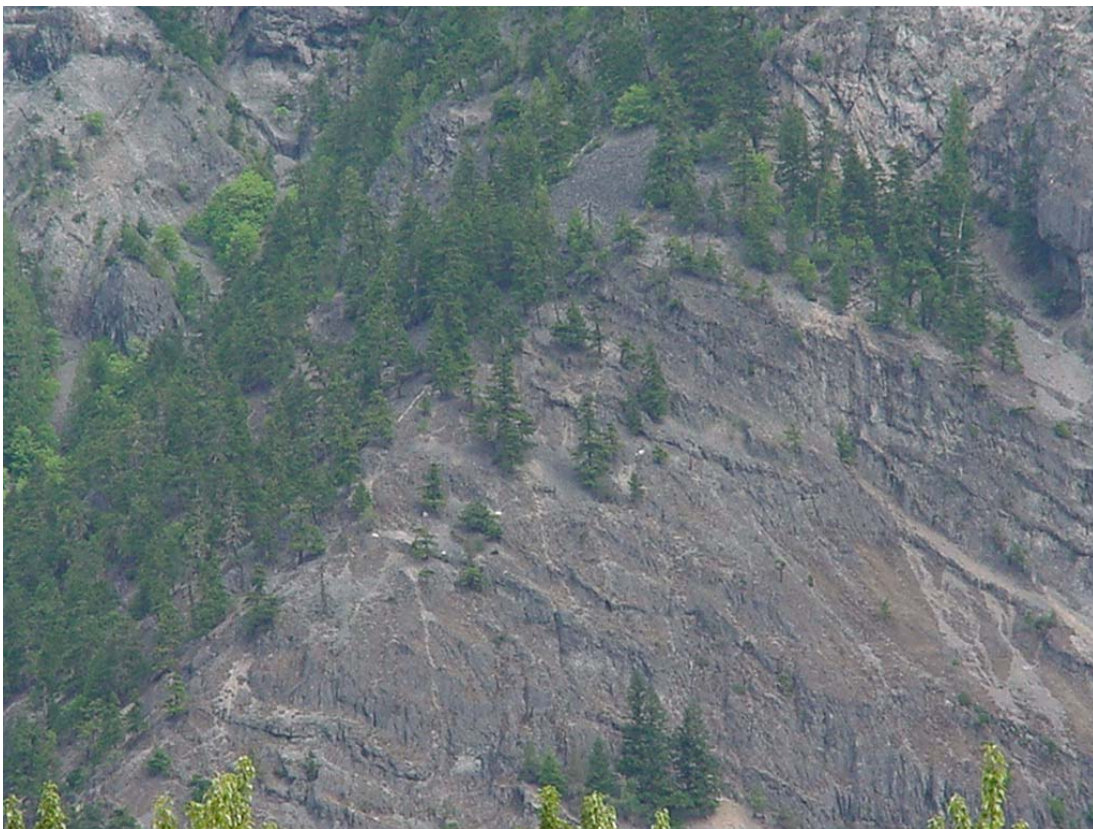


Figure 15: High elevation mountain goat natal area (cliffs & gully). (Photo: Bill Jex)

NOTE: Many ungulate species (e.g., moose, deer and elk) use a “hiding” strategy during the birthing period where dense vegetation (trees/shrubs/grasses/sedges) provides security and thermal cover to reduce the risk of predation and potential hypothermia. Other ungulates such as woodland caribou spatially separate themselves from predators by spacing out, usually at higher elevations, during the calving period. All of these ungulate species are widely dispersed during this period and select ‘natal areas’ within a larger seasonal calving or summer range (e.g., low elevation riparian areas, wetlands, and subalpine parkland).

Although the calving or summer range may be spatially delineated on a map, ungulates vary in their birthing strategies and types of natal areas used. Predicting specific micro-sites used as natal areas is difficult, with the exception of ungulates that use islands as predator refugia to calve.

The Management Guidelines discussed in this WHF account refer to those natal areas that are associated with **unique** (e.g., islands) or **specific topographic habitat features** (e.g., cliffs and gullies) that can be spatially identified as WHFs, and preferably have known evidence of use (see Table 14). Consequently, **all natal areas described in this account are defined as HIGH significance and are applicable to mountain sheep, mountain goat, caribou and elk.**

Natal areas for moose and deer are difficult to identify and predict, and often vary from year to year. As such, natal areas for these species are not described in this account. Habitat suitability mapping should be used as a tool to help manage moose and deer summer range where desired.

Management Objective

To avoid and/or reduce human disturbance in close proximity to natal areas (April to July).

Management Guidelines (quick reference summary)

- 1.0 Confirm that the feature is an ungulate natal area as defined.
- 2.0 Identify the species using the natal area.
- 3.0 Determine the significance of the natal area (confirmed ungulate natal areas default to High significance rating).
- 4.0 Take measures to protect the natal area. Implement Management Guidelines based on the significance rating of the natal area.
- 5.0 Document the natal area.

Management Guidelines (detailed)

1.0 Confirm that the Feature is an Ungulate Natal Area

1.1 Check records for known ungulate natal areas in your area of operational concern. Helpful information sources include:

- Determine whether forest cover mapping (1:20,000) has identified any known natal areas as Environmentally Sensitive Areas (ESAs) as well as any local mapping projects such as Terrestrial Ecosystem Mapping (TEM) or Predictive Ecosystem Mapping (PEM), which may have identified specific ecosystem types or bioterrain features associated with natal or security areas (e.g., lambing/kidding cliffs).
- Access CDC records for Red- and Blue-listed ungulate species (e.g., woodland caribou) occurrences or survey results (see CDC – <http://srmwww.gov.bc.ca/cdc/>).
- The CDC database search tool “*Species and Ecosystems Explorer*” (<http://srmwww.gov.bc.ca/cdc/>) will sort species records and occurrences by Forest District. This tool can be used to determine if a particular wildlife species is found in the area.

- Contact local government agencies (MWLAP) and guide outfitters to determine locations of known natal areas in your area of operational concern.
- Check for previous records, local mapping projects or inventories of known ungulate natal areas in the geographic area.

2.0 Identify the Species that is Using the Natal Area

In areas of known ungulate use confirm:

- species (mountain sheep, mountain goat, elk, caribou); and
- types of surveys used to confirm evidence and extent of use.

2.1 What to look for – natal areas

Table 14: Description of topographic and habitat features of natal areas.

Species	Topographic or Habitat Feature
Mountain Goat	<ul style="list-style-type: none"> • High suitability escape terrain consisting of steep (45-65 degree) slopes, rocky outcrops and cliffs, or steep rocky gullies. Complexes of cliffs and vegetated (treed and/or shrubs) areas are preferred.
Mountain Sheep (Bighorn, Stone, and Dall)	<ul style="list-style-type: none"> • High suitability escape terrain consisting of rocky escarpments, steep broken cliffs, talus or scree slopes (27-85°). Warmer, south-facing aspects tend to be preferred.
Caribou and Elk	<ul style="list-style-type: none"> • Where present, calving islands situated on large lakes or river systems (<i>island natal areas must have known evidence of use</i>). • In the Omineca Region, caribou calving sites are characterized by high elevation old growth ESSF forests. These are often scrubby, with rocky outcrops and on north slopes.

NOTE: Check for evidence of use at each natal area including direct sightings, pellets, tracks and hair.

3.0 Determine the Significance of the Natal Area

If use of a natal area is confirmed, then **default to a HIGH significance rating** for this feature.

In situations where existing terrain or habitat features indicate potential natal habitat, **but evidence of use is lacking**, assess and evaluate the habitat suitability and quality of the natal area and surrounding habitat. Contact MWLAP wildlife staff and consider site visitation to confirm evidence of use. Use geographic distribution, biogeoclimatic subzone, elevation, habitat suitability, tracks and evidence of use (pellets, hair, etc.) to determine species-specific use as a natal area. **A High significance rating can then be assigned on the basis of this information.**

4.0 Take Measures to Protect the Natal Area

4.1 Management Guidelines for HIGH significance natal areas

NOTE: It should be emphasized that because most natal areas as defined in this account are associated with cliffs, gullies, islands or other higher elevation topographic features, conflicts related to forest management practices, including road development, will often be minimal. However, Management Guidelines are outlined in Table 15 to address instances where there may be forestry conflicts as well as other potential human-related disturbances (e.g., petroleum, recreation). Cross-reference to Table 14 for a description of the natal area characteristics.

The Management Guidelines recommended for High significance natal areas should be adhered to where possible and are **applicable during critical natal periods**. This varies by species, but typically extends from **April to July**.

Table 15: High significance natal areas and associated Management Guidelines.

Species	Management Guidelines
Mountain Goat Mountain Sheep Caribou Elk (calving islands only)	<ul style="list-style-type: none"> • Avoid locating helicopter landing areas (e.g., heli-ports or heli-pads) within 2 km of confirmed natal areas. • Avoid low altitude flights during the critical natal period (April – July). Where possible, plan and reroute flight paths to at least 500 m or greater from known natal areas during this period; fly at higher altitudes during this period. • Develop and implement access management plans for new roads. Include road location and density criteria in access management plans. New roads should not isolate or fragment natal areas, nor increase access to the natal area by humans or predators. In general, new roads should be located at least 500 m or greater from confirmed natal areas. • Minimize operating motorized vehicles (including ATVs) on existing roads in close proximity to natal areas between April – July. • Include road deactivation recommendations (e.g., deactivation scheduling; reclamation of roads with native plant species) in access management plans. • If forest harvesting is planned adjacent to natal areas, this should be scheduled to minimize disturbance during the critical lambing/calving period (April – July). Ideally, schedule harvesting in the early winter period to minimize disturbance. Maintain a forested buffer adjacent to natal sites (e.g., vegetated areas associated with cliffs and gullies) to provide security cover for animals. • Develop a recreation access management plan that minimizes recreational activities/access near natal areas, especially from April to July. • Avoid facility development near natal areas (i.e., within 2 km of confirmed natal areas). • All non-motorized access trails (e.g., hiking or mountain bikes) and wildlife viewing areas should be located at least 200 m away from natal areas.

NOTE: For additional species-specific (i.e., mountain goat, woodland caribou, bighorn sheep) habitat management information, also refer to IWMS Volume I and IWMS Version 2 (<http://wlapwww.gov.bc.ca/wld/identified/> , or <ftp://ftp.env.gov.bc.ca/pub/outgoing/identified%20Wildlife/>).

5.0 Document the Natal Area

5.1 Document the natal area in the field

- Take a photograph or digital photo of the natal area, date stamp the photo, and briefly describe the location, evidence of use and ungulate species.
- Attain GPS location (UTM co-ordinates) of the natal area and map the site on an appropriately scaled map (i.e., at 1:10,000 or larger scale).

5.2 Document the natal area in the office

- Document in the office and incorporate location into operational plans, short- and long-term forest stewardship plans, and appropriate GIS overlays.
- Consider scheduling appropriate monitoring of the natal area(s) as part of internal operational plans or wildlife stewardship programs and initiatives (i.e., during the period of operations in the area).
- If the natal area was confirmed through field investigation, forward a brief description of the feature and its location (UTM coordinates) to the local Ministry of Forests District Manager as part of annual reporting requirements.

Further sources of information:

- Identified Wildlife Management Strategy website: <http://wlapwww.gov.bc.ca/wld/identified/> , or <ftp://ftp.env.gov.bc.ca/pub/outgoing/identified%20Wildlife/>.
- Hoofed mammals of British Columbia. D. Shackleton. 1999.
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- BC Conservation Data Centre website: <http://srmwww.gov.bc.ca/cdc/>.
- Committee on the Status of Wildlife in Canada website: http://www.cosewic.gc.ca/eng/sct5/index_e.cfm.

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Jim Young, Wildlife Biologist, BC Ministry of Forests, Williams Lake, BC.

Harold Armleder, Wildlife Habitat Ecologist, BC Ministry of Forests, Williams Lake, BC.

Literature consulted to develop this account:

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3.4.D Grizzly Bear Ground Dens

Wildlife Habitat Feature Account

Definition

Grizzly Bear Ground Den – an excavated hole that descends below ground and is inhabited by grizzly bear (Figure 16).



Figure 16: Grizzly bear ground den in alpine. (Photo: Stephan Himmer)

Management Objective

To maintain ground dens used by grizzly bears across the landscape. Where available, dens should be in suitable condition and associated with sufficient foraging habitat to maintain individuals dependent on them for denning, shelter or hibernation.

Management Guidelines (quick reference summary)

- 1.0 Confirm that the feature is a ground den of a grizzly bear as defined.
- 2.0 Take measures to protect the ground den. Implement Management Guidelines based on the significance rating of the ground den.
- 3.0 Document the ground den.

Management Guidelines (detailed)

1.0 Confirm that the feature is a ground den as defined. Helpful information sources include:

1.1 Check records for known ground dens in your area of operational concern

- Research relevant files, data sets and information available for ground den observations and locations in your area of operational concern.
- Confirm whether or not any wildlife surveys have been conducted in the area by your office, government agencies, local naturalist or recreation groups, and other NGO's.
- Access MWLAP records for any breeding occurrences or survey results, especially if you suspect that a ground den is used by a grizzly bear.
- The CDC database search tool "*Species and Ecosystems Explorer*" will sort species records and occurrences by Forest District. This tool can be used to determine if a particular wildlife species is found in the area (see CDC - <http://srmwww.gov.bc.ca/cdc/>).
- Contact field and forestry workers in your office who have conducted surveys in the area, or have local wildlife knowledge.
- Interview local naturalists and others who may frequent the area for additional observations or information.

1.2 Where appropriate search for ground dens

NOTE: Whether to conduct den searches is left to the discretion of the resource user.

- Reconnaissance searches for ground dens are best conducted during the preliminary stage of any operational plan (including road and cutblock layout), so that locations of significant habitat features can be identified and mapped to minimize operational conflicts.
- It is expected that most ground dens will be found opportunistically, concurrent with other work activities such as cutblock layout.
- Educate forestry workers on ground den identification, and have them report any occurrences found in the area of operations.

1.2.1 What to look for – ground dens

- Mounds of dirt or rocks at the entrance of ground dens may be conspicuous and seen from a considerable distance. This is particularly true at spring snow melt when soil from the den gets tracked onto the surrounding snow, thereby enhancing melting immediately around the den (i.e., the den area becomes more visible).
- In flat topography, check high spots or small knolls as the sides of these features provide easier digging conditions and, as a result, may be preferred for ground dens.
- Tracks in the snow leading to or from the den.

2.0 Identify Species that is Using the Ground Den

2.1 Bears

Bear dens usually have larger entrances and larger inside chambers than dens of wolves or other Canids (dog family). Typically, grizzly bear dens are located on moderate to steep mountain slopes, in alpine, subalpine or montane environments (Figure 17). Large piles of earth or rocks may be visible just downslope of the den entrance. On the other hand, black bear dens are usually found in valley bottom environments on the forest floor, often underneath root mats and fallen logs, or in hollow tree cavities (see Section 3.4.E for more information on black bear den trees). However, black bears will excavate ground dens in suitable substrates. See Table 16 for descriptions of differences between grizzly and black bear ground dens.



Figure 17: Interior of grizzly bear ground den. (Photo: Stephan Himmer)

Table 16: Grizzly and black bear ground den descriptions.

Species	Ground Den Description
Grizzly Bear	<ul style="list-style-type: none"> • Grizzly bear ground den entrances are usually about 75 cm in diameter. • Den chambers may be 150-225 cm in diameter with a height of ~125 cm. • Dens will usually be lined with shrub branches, tree boughs, duff or grass. However, some dens may be unlined. • Because of their long front claws and powerful shoulder muscles adapted for digging, many grizzly dens are excavated. In these cases, large piles of soil, rocks or wood (called a “porch”) are found downslope of the den entrance. • Fresh material with little or no vegetation growing on the debris pile may indicate a freshly dug den. • Hair is often visible at the den entrance and in bedding material. • Excavated grizzly dens are usually found on moderately-steep to steep slopes (approximately 40-90%). • Grizzly dens can also be found under the root wads of large trees and occasionally in sheltered, dry caves or rock cavities. • In some locations, especially where soil, digging, drainage and shelter conditions are optimum (i.e., slope, soil texture, aspect, snow cover, security), more than one den site can be found in a relatively small area (1-2 ha). These sites can be used year after year as hibernation sites by bears.
Black Bear	<ul style="list-style-type: none"> • Black bear ground dens are usually found under the roots of trees or beneath large pieces of coarse woody debris, but may be excavated in softer substrates (e.g., sandy loams). • Claw marks and hair are usually visible at the den entrance. • Dens are often lined with grasses, moss, leaves and fine branches. • Den entrances are smaller than grizzly dens, typically 25-45 cm in diameter. • Black bear dens are normally located near valley bottoms on the forest floor, as opposed to mountain side slopes for grizzly bear.

3.0 Determine the Significance of the Ground Den

Grizzly bear dens are rated as HIGH significance (Table 17).

Table 17: Significance levels for grizzly bear ground dens.

Species	IWMS Species	Provincial Status (BC CDC)	National Status (COSEWIC)
High Significance Dens			
Grizzly Bear	Yes	Blue-list	Special Concern

4.0 Take Measures to Protect the Ground Den

4.1 Management Guidelines for High significance ground dens

Management guidelines for grizzly bear dens are summarized in Table 18.

Table 18: High significance grizzly bear ground dens and associated Management Guidelines.

Species	Management Guidelines
Grizzly Bear	<ul style="list-style-type: none"> • Because grizzly dens are often located in alpine and subalpine habitats, there may be few trees immediately around the den. If the den appears to be recently used (i.e., excavated soil or rocks below the entrance and little or no vegetation growing on the debris pile), then establish a 60 m radius buffer around the den (approximately 1.1 ha). Bears can reuse suitable den sites, or excavate new dens in the same vicinity. • Resource activities (e.g., forestry, mining, helicopter landing pads) should be restricted to outside the 60 m buffer described above. • If a recently used grizzly den is discovered in a forested area, where possible establish a 1.0 ha wildlife tree patch (WTP) or other retention patch around the den. • Develop access management plans to minimize potential disturbance to den areas. • If more than one confirmed den site is found in a relatively small area (1-2 ha), then it is possible that bears are regularly using this area for winter denning. For sites with multiple dens, consider establishing a Wildlife Habitat Area (WHA). In this case, refer to the IWMS recommendations for grizzly bear (see sec. 4.1.1 below).

4.1.1 Grizzly Bear – IWMS Management Guidelines

- In known winter denning areas (i.e., areas with multiple dens), consider establishing a WHA.
- WHAs can range in size from 1.0 to 500 ha, but the size will depend on the intensity of bear use in this area, availability of similar habitats nearby, and extent and proximity of seasonal habitats. Consult MWLAP biologists for additional advice in this context.
- Further details on grizzly bear habitat management can be found in the IWMS species accounts available at <http://wlapwww.gov.bc.ca/wld/identified/> , or <ftp://ftp.env.gov.bc.ca/pub/outgoing/Identified%20Wildlife/> .

5.0 Document the Ground Den

5.1 Document the ground den in the field

- Take photograph or digital photo of the ground den, date stamp the photo, and briefly describe the den location, condition, and the wildlife species that was using the den.
- Take a GPS reading (UTM coordinates) of the den and map on an appropriately scaled map (i.e., at 1:10,000 or larger scale).

5.2 Document the ground den in the office

- Document in office and incorporate location into operational plans, short- and long-term forest stewardship plans, and appropriate GIS overlays.
- Forward a brief description of the den feature and its location (UTM coordinates) to the local Ministry of Forests District Manager as part of annual reporting requirements.
- For grizzly bear, complete a CDC animal observation form with appropriate information and submit to the CDC office <http://srmwww.gov.bc.ca/cdc/> . See Appendix 2 for a blank copy of this form.

Further sources of information:

- BC Conservation Data Centre website: <http://srmwww.gov.bc.ca/cdc/>.
- Identified Wildlife Management Strategy website: <http://wlapwww.gov.bc.ca/wld/identified/> , or <ftp://ftp.env.gov.bc.ca/pub/outgoing/Identified%20Wildlife/>.
- Resources Inventory Committee (RIC): Wildlife Interpretations Subcommittee. 1999. British Columbia wildlife habitat rating standards, ver. 2.0. BC. Min. Environ., Lands and Parks, Victoria, BC.
- Committee on the Status of Wildlife in Canada website: http://www.cosewic.gc.ca/eng/sct5/index_e.cfm.

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Literature consulted to develop this account:

(CDC) British Columbia Conservation Data Centre. 2003. BC Conservation Data Centre: rare vertebrate animal tracking list. Electronic file from website: <http://srmwww.gov.bc.ca/cdc/>.

Province of British Columbia. 1999. Identified Wildlife Management Strategy, BC Ministry of Environment, Lands and Parks and BC Ministry of Forests, Victoria, BC. <http://wlapwww.gov.bc.ca/wld/identified/> , or <ftp://ftp.env.gov.bc.ca/pub/outgoing/Identified%20Wildlife/>.

3.4.E Black Bear Den Trees

Wildlife Habitat Feature Account

Definition

Black Bear Den Tree – a tree that has natural cavities or hollows suitable for denning by black bear. Dens which are located above-ground (i.e., not at the tree base) are referred to as arboreal tree dens.

NOTE: This account is mainly applicable to black bear dens that are located in large diameter cedar or western hemlock trees where these tree species occur (mostly in the Interior Cedar Hemlock (ICH) biogeoclimatic zone). However, if bear dens are found in other large diameter trees, then use the same management guidelines as described for cedar and hemlock (see sec. 3.1 below).

Management Objective

To maintain den trees across the landscape. Den trees should be well distributed, in suitable condition and associated with sufficient foraging habitat to maintain local wildlife populations that are dependent on them.

Management Guidelines (quick reference summary)

- 1.0 Confirm that the feature is a black bear den tree as defined.
- 2.0 Determine the significance of the den tree. Has the tree been used recently (past 1-3 years).
- 3.0 Take measures to protect the den tree. Implement Management Guidelines.
- 4.0 Document the den tree.

Management Guidelines (detailed)

- 1.0 Confirm that the feature is a black bear den tree.** See reference section for helpful information sources for bear den tree identification.
 - 1.1 Check records for known bear den trees in your area of operational concern**
 - Review relevant files, data sets and information available at your office for any den tree locations in your area of operational concern.
 - Confirm whether or not any wildlife surveys have been conducted in the area by your office, government agencies, local naturalist or recreation groups, and other NGOs.
 - Contact field and forestry workers in your office who have conducted surveys in the area, or have local wildlife knowledge.

1.2 If necessary, search for bear den trees

NOTE: Reconnaissance searches for den trees are recommended in order to minimize potential conflicts with operational planning and future forestry activities. However, the decision to do so is left at the discretion of the licensee or resource user.

Reconnaissance searches for den trees are best conducted during the preliminary stage of any operational plan (including road and cutblock layout), so that locations of den trees can be identified and mapped to minimize operational conflicts.

Good quality bear den trees have some or all of the following features:

- Den tree cavities are created by tree damage (e.g., scarring), stem breakage or cracking, or loss of large diameter limbs, followed by internal tree decay. In some cases, basal dens can be found under the roots of a large tree where the roots are “propped”, thereby creating a sheltered hollow beneath the tree.
- Internal cavity size can vary widely, but smaller volumetric dens provide more thermal protection. Den entrance dimensions are variable, however, smaller den entrances are preferred to minimize heat loss and provide more security. Entrance sizes ranging from 25-45 cm wide x 30-60 cm high may be optimal.
- Large diameter trees (i.e., generally >100 cm dbh), particularly cedars, western hemlock, and grand fir where they occur, with basal cavities or above-ground hollow stems (i.e., arboreal entrance dens) are preferred as winter hibernation dens in coastal forests (Figure 18 and Figure 19). Both den types are the result of heartwood decay within the tree. For basal dens this is often initially the result of an old mechanical wound (e.g., another tree falling against/scuffing the bole), which in turn introduces wood decay fungi. Over time, tree decay (and in some cases associated insect damage), creates a hollow cavity. Fire damage is another wounding agent that can introduce tree decay and create cavities and hollows.
- Above-ground arboreal tree dens usually occur in large diameter trees with broken tops, large limb scars (i.e., where a large diameter limb has broken away leaving a scarred and decayed area), or abundant internal heart rot pathogens. In some cases, bears will enlarge (by biting the wood) small natural openings in the tree trunk where they detect a larger hollow within the stem at that point. Arboreal den trees can be difficult to detect in the field, but are very valuable ecologically, perhaps especially so to female bears who desire more protection from predators (i.e., while they have young cubs).
- The ability of the den to keep an occupying bear dry, relatively buffered thermally, and secure from potential disturbance/predators, are crucial qualities of a good den. Trees with hollow cavities but which cannot meet these functions, will be low suitability den sites. Consequently, trees with large basal or above-ground openings, or those which cannot remain dry and sheltered from the elements (i.e., rain, snow, melt water or wind can get into the den cavity), are poor den sites.



Figure 18: Arboreal bear den cavity in yellow-cedar. (Photo: Bill Jex)



Figure 19: Bear den cavity at base of western redcedar. (Photo: Todd Manning)

1.2.1 Recently used dens

At times it may be difficult to determine if a den has been recently used, however, the following observations should be made to help estimate recency of use.

- For basal tree dens, the base of the tree should be inspected for animal hair, fresh trails, tracks or trampled vegetation nearby, and claw or bite marks on the tree (especially near the entrance). For recently used dens, these signs will “look fresh”, and there will usually be fresh bedding material (moss, needles, fine branches/twigs) inside the den.
- For arboreal dens, look for claw marks from a bear climbing up to the den cavity. For recently used dens, the climb marks will appear fresh (i.e., the claw marks in the wood will still appear light coloured, and there may be fresh sap running down the trunk near the claw marks). Bite marks and hair may also be visible at the den entrance.
- Dens which have been recently used (i.e., within the past 1-3 years) will usually exhibit the above characteristics. Signs of use may not be visible at older or unused den sites.

2.0 Determine the Significance of the Den Tree

Tree dens that have **some or all of the characteristics described in section 1.2** are rated a **Medium significance**. Recently used dens and arboreal dens are especially valuable habitat features. Associated Management Guidelines for these trees are described in Table 19.

Trees with inadequate den structure (i.e., do not have the characteristics described in sec. 1.2 – for example, entrances and internal cavities are too large or do not stay dry) are rated as **Low significance**. There are no specific management guidelines for Low significance den trees. These trees are managed at the discretion of the licensee or resource user. However, Low significance trees may be retained singly (where safe to do so), or preferably retained as a wildlife tree within a WTP or other retention area, as part of meeting objectives for wildlife and biodiversity at the stand level (Forest Planning and Practices Reg. section 9(2)).

3.0 Take Measures to Protect the Den Tree

3.1 Management Guidelines for MEDIUM significance den trees

Management Guidelines for Medium significance den trees are summarized in Table 19, and apply most frequently to cedars and hemlock found in the Interior Cedar Hemlock (ICH) biogeoclimatic zone. However, if bear dens are found in other large diameter trees and/or zones, then also use the management guidelines described below.

Table 19: Medium significance den trees and associated Management Guidelines.

Management Guidelines
<ul style="list-style-type: none"> • Where possible, establish a 1 tree length radius (or equivalent area) forested buffer (e.g., WTP or other retention patch) around the den tree, which will be maintained for at least one rotation. Tree length is based on the average height of the main tree canopy layer for the surrounding stand. Retaining a forested patch around the den tree has the benefit of providing additional thermal protection (shade and rain interception), and important climbing/escape trees for cubs recently out of the den. • Where available, WTPs or retention patches should contain large live trees, especially cedars (>80 cm dbh) as future recruitment den trees. Trees of this size that have basal or stem wounds, or multiple tops, are good candidates for internal decay and potential den site initiation. • For operational reasons, if the den tree cannot be retained within a WTP or retention patch, and it has been assessed as “safe” for single tree retention by a qualified person, then retain the tree as a single tree for at least one rotation. In this case, try to maintain some advance regeneration, non-merchantable timber, or avoid brushing around the tree to provide additional visual cover. Also try to establish a WTP or other retention area (e.g., RMA) nearby which contains large live cedars as future recruitment den trees. • More effort should be made to maintain a windfirm forested buffer around the den tree (as opposed to single tree retention) in areas with low habitat supply (i.e., there is relatively little high suitability denning habitat in the watershed), or where a number of den trees have been identified in the same localized setting (e.g., proposed cutblock). • Educate forestry workers on den tree identification, especially the characteristics of a good quality den tree, and how to recognize recently used dens. Have workers report any den trees found in their area of operations.

3.2 Management Guidelines for LOW significance den trees

There are no specific management guidelines for Low significance den trees. These trees are managed at the discretion of the licensee or resource user. However, Low significance trees can be retained singly (where safe to do so) or preferably as a wildlife tree within a WTP, other retention patch or RMA, **as part of meeting wildlife and biodiversity objectives at the stand level.**

4.0 Document the Den Tree

4.1 Document the Medium significance den tree in the field

- Flag, paint or mark the den tree in the field so that it is conspicuous to workers, but not to the general public.
- Attach a WLT plaque or tree tag on the base of the tree trunk.
- Take photograph or digital photo of the tree, date stamp the photo, and briefly describe the tree location, the tree species and condition, the attributes or characteristics of the tree that make it of value as a bear den (e.g., basal den, arboreal den with estimated height to den entrance).
- Take GPS reading (UTM coordinates) of the tree and map on an appropriately scaled map (i.e., at 1:10,000 or larger scale).

4.2 Document the Medium significance den tree in the office

- Document in office and incorporate location into operational plans, short- and long-term forest stewardship plans and/or other operational plans, and appropriate GIS overlays.
- Submit brief description of den tree (e.g., tree species and type of den (basal or arboreal) and its location (block number, UTM coordinates) to the local Ministry of Forests District Manager as part of annual reporting requirements.
- Consider occasional monitoring of the tree (or retention strategy for the tree) as part of internal operational plans or wildlife stewardship programs and initiatives (e.g., is the tree being reused as a den tree; has the tree blown down).

Further sources of information:

- Tracking and the art of seeing – how to read animal tracks and sign. Paul Rezendes. 1992.
- Animal Tracks of the Rockies, Lone Pine Publishers, Ian Sheldon.
- BC Conservation Data Centre website: <http://srmwww.gov.bc.ca/cdc/>.
- BC Ministry of Forests, Wildlife Tree Committee homepage: <http://www.for.gov.bc.ca/hfp/wlt/index.htm>.

Individuals consulted to develop this account:

Tony Hamilton. Wildlife Biologist, Ministry of Water, Land and Air Protection, Biodiversity Branch, Victoria, B.C.

Literature consulted to develop this account:

Davis, H. 1996. Characteristics and selection of winter dens by black bears in coastal British Columbia. MSc. Thesis, Simon Fraser Univ., Burnaby, B.C. Dec. 1996. 150 pp.

Manning, E.T. and S.M. Beauchesne. 2003. 2002 black bear winter den inventory – TFL 37, N. Vancouver Island, B.C. Report prep. for Canadian Forest Products Ltd., Woss, B.C. Feb. 2003.

North Coast LRMP. 2003. Black bears in the North Coast – Information Circular, Nov. 5, 2003.

3.4.F Snake Hibernacula

Wildlife Habitat Feature Account

Definition

Snake Hibernaculum – a site or feature where snakes can go underground below the frost line to successfully over winter (Figure 20). A hibernaculum (plural: hibernacula) may consist of fissures or crevices in cliff or rock faces, a deep talus slope, other similar rocky structures, rodent or other mammalian burrows, under coarse woody debris (CWD), or in porous soils.



Figure 20: Rock outcropping used as a hibernaculum by garter snakes. (Photo: Jared Hobbs)

Management Objective

To maintain important snake hibernacula used by rare snake species or numerous snakes across the landscape. Snake hibernacula should be in suitable condition and connected to sufficient foraging habitat to maintain local snake populations.

Management Guidelines (quick reference summary)

- 1.0 Confirm that the feature is a snake hibernaculum as defined.
- 2.0 If necessary, identify snake species using the hibernaculum.
- 3.0 Determine the significance of the snake hibernaculum.
- 4.0 Take measures to protect the snake hibernaculum. Implement Management Guidelines based on the significance rating of the snake hibernaculum.
- 5.0 Document the snake hibernaculum.

Management Guidelines (detailed)

1.0 Confirm that the Feature is a Snake Hibernaculum as defined.

1.1 Check records for known snake hibernacula in your area of operational concern. Helpful information sources include:

- Research all relevant files, maps, data sets and information available at your office for snake hibernaculum observations and locations in your area of operational concern.
- Confirm whether or not any wildlife surveys have been conducted in the area by your office, government agencies, local naturalist or recreation groups, and other NGO's.
- Access CDC records and MWLAP for any survey results, especially if you suspect that Identified Wildlife Management Strategy (IWMS) or Red- and Blue-listed species may be present (see CDC - <http://srmwww.gov.bc.ca/cdc/>; IWMS - <http://wlapwww.gov.bc.ca/wld/identified/> , or <ftp://ftp.env.gov.bc.ca/pub/outgoing/identified%20Wildlife/>)
- The CDC database search tool “*Species and Ecosystems Explorer*” will sort species records and occurrences by Forest District. This tool can be used to determine if a particular wildlife species is found in the area.
- Contact field and forestry workers in your office who have conducted surveys in the area, or have local wildlife knowledge.
- Interview local naturalists and others who may frequent the area for additional observations or information. Confirm information with local experts, if they are available.

1.2 Search for snake hibernacula

NOTE: Reconnaissance searches for snake hibernacula can be conducted in order to minimize potential conflicts with operational planning and future forestry activities. However, *whether to conduct these searches is left to the discretion of the resource user.*

- Reconnaissance searches for snake hibernacula are best conducted during the preliminary phase of any operational plan (including road and cutblock layout), so that locations of significant habitat features can be identified and mapped to minimize future operational conflicts.
- Determine the spring emergence or fall return seasons for your area (typically around April for emergence and September for return), to coordinate optimal times for snake surveys.
- Establish survey times and coordinate with other surveys or site visits.
- Request that workers report any occurrences found in their area of interest.

1.2.1 What to look for – snake hibernacula

- Rock outcrops, cliffs with deep fractures and talus or vegetative cover.
- Hibernacula often have a sunny south/southwest aspect.
- Hibernacula are often located on steep slopes or exposed ridge tops.
- Deep talus at the base of cliffs may be suitable hibernaculum sites.
- Occasionally building foundations or old road beds are used as hibernacula.
- Shed snake skins, snake tracks, or congregations of snakes in the spring or fall.
- Educate forestry workers and rangeland users on the identification of snakes and snake hibernacula.

NOTE: Have workers collect any shed snake skin that is found as the species of snake can often be determined by such samples.

1.2.2 How to search for snake hibernacula

Searches for snake hibernacula should be conducted in spring and fall as these are there periods when snakes are present at hibernacula. Generally, field workers should look for rock outcrops, cliff faces or other structures that look like they might provide access underground (e.g., old building foundations, road beds, coarse woody debris, etc.). Potential hibernacula, as determined by assessment of surface features, should be searched for signs of use, such as shed skins, snake tracks, snake trails, or for the presence of snakes (Figure 21).



Figure 21: Snake tracks and trails at entrance of hibernaculum. (Photo: Jared Hobbs)

2.0 If Necessary, Identify Species Using the Snake Hibernaculum

There are only two species of snakes known to occur in the Northern Interior Forest Region: Common Garter Snake and Western Terrestrial Garter Snake.

2.1 Common Garter Snake

Lives in a wide variety of environments throughout the province; they have been found as far as 180 km north of Prince Rupert and along the Peace River. In the northern parts of its range they will hibernate in large numbers, often with other snake species where ranges overlap. Diet includes earthworms and amphibians. This species is Yellow-listed in British Columbia and not listed nationally.

2.2 Western Terrestrial Garter Snake

Occurs throughout the southern half of the province and locally along the Peace River in the northeast, and along the Nass and Skeena Rivers in the northwest. Mainly associated with water habitats and in open meadows and estuaries. It hibernates in rocky hibernacula with other species of snakes. This species is Yellow-listed in British Columbia and not listed nationally.

3.0 Determine the Significance of the Snake Hibernaculum

The significance of a hibernaculum will depend on the number of snakes that are present, and on the degree of isolation from other hibernacula. Most snakes use the same hibernaculum year after year, consequently, if a hibernaculum is disturbed, snakes are forced to find another site, which may not be available or as suitable. Consequently, in the Northern Interior Forest Region, **all garter snake hibernacula are given a MEDIUM significance rating** as a WHF.

4.0 Take Measures to Protect the Snake Hibernacula

4.1 Management Guidelines for MEDIUM significance snake hibernacula

Associated Management Guidelines for common and western terrestrial garter snake hibernacula are provided below.

- Establish a WTP or other retention patch of minimum 30 m radius (approximately 0.3 ha or equivalent area) roughly centered around the hibernaculum; the actual size will depend on suitable habitat and proximity to foraging areas.
- Do not remove or disturb rock or talus in the WTP or retention patch.
- Do not harvest or salvage in the WTP or retention patch. Forest harvesting adjacent to this 30 m buffer should occur between November and March to minimize disturbance.
- Control livestock grazing in the WTP or retention patch to prevent trampling and maintain vegetative cover, and avoid soil compaction.

5.0 Document the Snake Hibernaculum

5.1 Document the snake hibernaculum in the field

- Discretely flag, paint or mark a perimeter (15 m) around the hibernaculum in the field so that it is conspicuous to workers, but not to the general public. Avoid touching or interfering with the den.
- Take photo or digital photo of the hibernaculum, date stamp the photo, and briefly describe the location, condition, and species that were using the hibernaculum.
- Attain GPS reading of the hibernaculum and accurately map on an appropriately scaled map (i.e., at 1:10,000 or larger scale).

5.2 Document the snake hibernaculum in the office

- Document in office and incorporate location into operational plans, short- and long-term forest development plans or range use plans, and appropriate GIS overlays.
- Forward a brief description of the feature and its location (UTM coordinates) to the local Ministry of Forests District Manager as part of annual reporting requirements.
- Consider developing a management strategy for maintaining, conserving and/or enhancing the hibernaculum and surrounding habitat. This may include monitoring to determine the activity status of the feature.

Further sources of information:

- BC Conservation Data Centre website: <http://srmwww.gov.bc.ca/cdc/>.
- Resource Information Standards Committee website: <http://srmwww.gov.bc.ca/risc/>.
- Identified Wildlife Management Strategy website: <http://wlapwww.gov.bc.ca/wld/identified/> , or <ftp://ftp.env.gov.bc.ca/pub/outgoing/identified%20Wildlife/>.
- Rare Amphibians, Reptiles, and Mammals of British Columbia. BC Min. Environ., Lands and Parks, Victoria. March 1999.
- Committee on the Status of Wildlife in Canada website: http://www.cosewic.gc.ca/eng/sct5/index_e.cfm.

Literature consulted to develop this account:

Cannings, S.G., L.R. Ramsay, D.F. Fraser and M.A. Fraker. 1999. Rare amphibians, reptiles and mammals of British Columbia. Min. Environ., Lands and Parks. Victoria, B.C. March 1999. 190 pp.

(CDC) British Columbia Conservation Data Centre. 2003. BC Conservation Data Centre: rare vertebrate animal tracking list. Electronic file from website: <http://srmwww.gov.bc.ca/cdc/>.

Gregory, P.T. and R.W. Campbell. 1984. The reptiles of British Columbia. Royal BC Museum, Victoria BC.

Province of British Columbia. 1999. Identified Wildlife Management Strategy, BC Ministry of Environment, Lands and Parks and BC Ministry of Forests, Victoria, BC. <http://wlapwww.gov.bc.ca/wld/identified/> , or <ftp://ftp.env.gov.bc.ca/pub/outgoing/identified%20Wildlife/>.

(RISC) Resources Information Standards Committee. 1998. Inventory methods for snakes: standards for components of British Columbia's biodiversity #38, ver. 2.0, March 1998. BC Ministry of Sustainable Resource Management, Victoria, BC. <http://srmwww.gov.bc.ca/risc/>.

3.4.G Bat Hibernacula and Maternity Roosts

Wildlife Habitat Feature Account

Definition

Hibernaculum – a site (feature) where bat winter hibernation occurs (Figure 22). Depending on the bat species, hibernaculum (plural: hibernacula) can be found in tree cavities, caves, rock crevices, mine tunnels, buildings and tree cavities.



Figure 22: Bat hibernaculum in cliff cave. (Photo: Anna Roberts)

Maternity Roost – a site (feature) that “houses” an aggregation of female bats and their young (Figure 23). Many bat species rear their young colonially, and consequently numerous individuals can be found at a single feature during the summer birthing and nursing period. Locations for maternity roosts include trees, rock crevices and buildings; caves and mine tunnels are rarely used as maturity roosts in British Columbia.



Figure 23: Western redcedar bat maternity roost. (Photo: Province of British Columbia)

Management Objective

To maintain sites used as hibernacula and maternity roosts by various species of bats, across the landscape. Where available, hibernacula and/or maternity roosts should be in suitable condition and associated with sufficient breeding and foraging habitat to maintain local populations that are dependent on them for roosting.

Management Guidelines (quick reference summary)

- 1.0 Confirm that the feature is a bat hibernacula or maternity roost as defined.
- 2.0 Determine the significance of the hibernaculum or maternity roost. Identification of bat species is often difficult in the field. If species' identification is not possible (or if the resource manager chooses not to proceed with species' identification), then default to a High significance rating for the hibernaculum or maternity roost.
- 3.0 Take measures to protect the hibernaculum or maternity roost. Implement Management Guidelines based on the significance rating of the hibernaculum or maternity roost.
- 4.0 Document the hibernaculum or maternity roost.

Management Guidelines (detailed)

1.0 Confirm that the Feature is a Bat Hibernacula or Maternity Roost as defined. Helpful information sources include:

1.1 Check records for known hibernacula and maternity roosts in your area of operational concern

- Research relevant files, data sets and information available at your office for hibernaculum and roost observations and locations in your area of operational concern.
- Consult the range maps in the species' accounts of *An Identification Manual to the Small Mammals of British Columbia* for a general indication of the bat species in the area (wlapwww.gov.bc.ca/wld/documents/techpub/id_keys_s.pdf).
- Determine whether or not any wildlife surveys have been conducted in the area by your office, government agencies, local naturalist or recreation groups, and other NGO's.
- Access CDC records and the regional MWLAP office for any breeding occurrences or survey results (see CDC - <http://srmwww.gov.bc.ca/cdc/>).
- The CDC database search tool "*Species and Ecosystems Explorer*" will sort species records and occurrences by Forest District. This tool can be used to determine if a particular wildlife species is found in the area.
- Contact field, forestry and rangeland workers in your office who have conducted surveys in the area, or have local wildlife knowledge.
- Interview local naturalists, cavers and others who may frequent the area for additional observations or information.
- Contact the Mines Branch of the Ministry of Energy and Mines or local mining experts with knowledge of abandoned mine tunnels.

1.2 Search for hibernacula and maternity roosts

NOTE: Reconnaissance searches for hibernacula and roosts can be conducted in order to minimize potential conflicts with operational planning and future forestry activities. However, *whether to conduct these searches is left to the discretion of the resource user.*

- Reconnaissance searches for hibernacula and roosts are best conducted during the preliminary stage of any operational plan (including road or cutblock layout), so that locations of significant habitat features can be identified and mapped to minimize operational conflicts.
- The breeding period varies geographically and from year-to-year in the same area. However, female bats typically give birth and nurse young in their maternity colonies from **June through August**. This is the optimal time for reconnaissance searches.

NOTE: Unless information gathered from Sec. 1.1 has **produced some leads** (i.e., a known tree roost or a cave or building with bats, etc.), **doing searches is probably not practical**. It would require capturing and radio-tracking bats or doing a systematic inventory of wildlife trees or other potential maternity roost sites.

- The hibernation period for bats typically extends from October to May. However, reconnaissance searches should generally NOT be done when bats are hibernating because of the serious impacts of arousing hibernating bats. Searches should be limited to potential hibernaculum in summer months. However, if an active hibernaculum is discovered and you wish to determine the identity of the bat species, see the **Caution** note below.

CAUTION: Hibernating bats are extremely vulnerable to disturbance. Even the presence of humans in a cave or mine will arouse bats from hibernation because of slight temperature changes. If aroused from hibernation, bats may use up their winter fat reserves. Only small

groups (2-3) of individuals should enter a potential hibernaculum. Avoid talking or creating any disturbance that may arouse bats. If bats are discovered, note their location in the hibernaculum and their approximate numbers, then immediately leave the site. The hibernaculum should then be visited in winter by a qualified bat expert to assess the species present and significance of the site.

- Educate forestry workers on hibernaculum and maternity roost identification, and have them report any occurrences found in their area of operational interest.

1.2.1 What to look for – hibernacula

Most of the known hibernacula in British Columbia are in caves, cliff crevices or horizontal mine tunnels (Figure 24). **Karst landscapes with their many caves and sink holes, are especially significant areas for bat hibernacula** (consult the Karst management handbook for more detailed information on karst features; URL: http://www.for.gov.bc.ca/hfp/fordev/karst_course). A few species, such as the Silver-haired Bat, may also hibernate in tree cavities or under the bark of trees. The temperature and humidity range used for hibernation varies with the species, but in general bats select areas with high humidity and cool (1-8 °C) temperatures that vary little throughout winter. Other features of hibernacula are that they are dark and secluded with little disturbance from human activity.



Figure 24: Bat hibernaculum in cliff crevices. (Photo: Province of British Columbia)

1.2.2 What to look for – maternity roosts

Maternity roosts are usually located in natural sites such as trees and rock crevices, and occasionally in man-made structures such as the attics of buildings. In British Columbia, most caves and mine tunnels are too cool for use as maternity roosts. Temperature requirements vary with the bat species, but in general female bats select sites with warm temperatures that promote rapid growth of the young.

Bats using tree roosts prefer to roost in older forests where they select wildlife trees with a moderate decay stage (tree classes 2-6), large diameter and height, and with much of their bark remaining. The maternity roost may be located in hollow cavities or in large stem cracks (Figure 25, 26). Loose bark is also used for smaller numbers of bats (Figure 26). Rock crevices used for maternity sites are usually in warm, inaccessible sites on south-facing aspects.

Educate forestry workers on hibernaculum and maternity roost identification, and have them report any occurrences found in their area of operational interest.



Figure 25: Inside a western redcedar bat roost. (Photo: Suzanne Beauchesne)



Figure 26: Bat roosts in large stem cracks in trembling aspen (at left and center photos), and under loose sloughing bark in pine (right photo). (Photos: Jennifer Psyllakis)

2.0 Identify Species that is Using the Hibernaculum or Maternity Roost

Identification of most bats is difficult (see *An Identification Manual to the Small Mammals of British Columbia*; wlapwww.gov.bc.ca/wld/documents/techpub/id_keys_s.pdf). Most bat species require handling and examination by an expert to identify the species. Because of the risk of rabies and injuring bats from handling, bats should only be handled by a qualified expert. Roosting bats can be photographed for possible identification.

NOTE: A summary of hibernacula and roost descriptions for bat species of the Northern Interior Forest Region is provided in Table 20. Keen’s long-eared myotis is also known to occur in northwestern British Columbia, however, it is not included in this account. Please refer to *Wildlife Habitat Features Summary of Management Guidelines for the Coast Forest Region (2004)* for management guidelines for this species.

Table 20: Bat hibernaculum or maternity roost descriptions.

Species	Hibernaculum or Maternity Roost Description
Big Brown Bat	Hibernaculum: in BC, mostly buildings, rarely caves and mines. Maternity Roost: buildings, tree cavities and rock crevices.
Little Brown Myotis	Hibernaculum: caves and mines. Maternity Roost: buildings, tree cavities, rock crevices and caves.
Long-legged Myotis	Hibernaculum: none known in BC, uses caves or mines in Alberta. Maternity Roost: buildings, ground fissures, and under tree bark.
Northern Long-eared Myotis	Hibernaculum: none known in BC, uses caves or mines in Alberta. Maternity Roost: tree cavities.
Silver-haired Bat	Hibernaculum: trees (possibly for some coastal populations). Maternity Roost: tree cavities.
Western Long-eared Myotis	Hibernaculum: none known in BC. Maternity Roost: usually in buildings; may roost in caves or tree cavities.

3.0 Determine the Significance of the Hibernaculum or Maternity Roost

NOTE: If it is not possible to identify the species of bat using the wildlife habitat feature, or if the resource manager chooses not to proceed with species identification, then the **hibernaculum or roost site should be assigned a High significance rating** (see Sec. 4.0 below for appropriate Management Guidelines).

The significance level of a hibernaculum or maternity roost will depend on whether it is being used by a Red- or Blue-listed species, the size of the colony (i.e., number of individuals), and/or the relative abundance of these features in the surrounding landscape and area of operational concern. In the Northern Interior Forest District, only Northern Long-eared Myotis is Blue-listed, there are no Red-listed bats species in northern British Columbia (Table 21). Unlike some species in the southern interior that migrate in winter, all of the bat species that occur in the Northern Interior Forest Region are thought to hibernate locally.

Table 21: Significance levels for hibernacula and maternity roosts.

Species	IWMS Species	Provincial Status (BC CDC)	National Status (COSEWIC)
High Significance			
Northern Long-eared Myotis	No	Blue-list	Not Designated
Medium Significance			
Big Brown Bat (Yellow-listed in B.C.)			
Little Brown Myotis (Yellow-listed in B.C.)			
Long-legged Myotis (Yellow-listed in B.C.)			
Silver-haired Bat (Yellow-listed in B.C.)			
Western Long-eared Myotis (Yellow-listed in B.C.)			

4.0 Take Measures to Protect the Hibernaculum or Maternity Roost

4.1 Management Guidelines for HIGH significance hibernacula and roosts

High significance hibernacula and roosts are associated with Red- and Blue-listed species. Table 22 provides Management Guidelines for these species (Northern Long-eared Myotis).

Table 22: High significance bat hibernacula and maternity roosts and associated Management Guidelines.

Species	Management Guidelines
Northern Long-eared Myotis	<ul style="list-style-type: none"> • The B.C. <i>Wildlife Act</i> prohibits the harassment, capture or killing of this species. • The size of WTPs or other retention patches around hibernacula or maternity roosts should be a minimum of 5.0 ha (approximately 125 m radius or equivalent area roughly centred on the habitat feature), but could be larger depending on other site factors (e.g., presence of nearby wetlands, lakes or streams as foraging habitat; presence of potential movement corridors for feeding and dispersal to alternate roosts). Ideally this retention patch should be connected to nearby foraging areas where present, such as streams, wetlands or open meadows. • Do not blast, remove rock or talus, or construct new roads within the WTP or retention patch surrounding the hibernaculum or roost unless there is no other practical option. Consult with MWLAP staff in this situation. • Do not harvest or salvage trees within the WTP or retention patch. • When harvesting in areas adjacent to the WTP or retention patch, encourage a relatively open residual stand structure by using partial harvesting systems that maintain >50% basal area. Retention strategies for this area include: <ul style="list-style-type: none"> ▪ Where possible, retain some large diameter (generally > 70 cm dbh) defective trees. Ideally these will be trees with hollows, stem cracks, broken tops, or loose bark; ▪ Retain veteran trees, especially those which extend above the main canopy height; and ▪ In general, western redcedar, Douglas-fir, western hemlock and white spruce are preferred as potential roost trees. • If the area of operations includes sites with cliffs or rock outcroppings which have openings or crevices (especially those which have sunny aspects), then these sites should be considered for incorporation into wildlife tree patches (WTPs) where possible, or some other retention strategy which preserves the integrity of the site (in many cases these will be “inoperable” locations). The most suitable habitat cliff/outcrop sites will usually be at lower elevations, especially in the ICH biogeoclimatic zone. • Minimize disturbance during critical times (generally May to September for maternity roosts; generally October to May for hibernacula).

4.2 Management Guidelines for MEDIUM significance hibernacula and maternity roosts

Medium significance hibernacula and maternity roosts are given for the Big Brown Bat, Little Brown Myotis, Long-legged Myotis, Western Long-eared Myotis and Silver-haired bat. Management Guidelines for Medium significance features are described in Table 23.

Table 23: Medium significance bat hibernacula and maternity roosts and associated Management Guidelines.

Species	Management Guidelines
Big Brown Bat Little Brown Myotis Long-legged Myotis Western Long-eared Myotis Silver-haired Bat	<ul style="list-style-type: none"> • The B.C. <i>Wildlife Act</i> prohibits the harassment, capture or killing of these species. • Incorporate the hibernaculum or maternity roost tree into a WTP or other retention patch. • The size of WTPs or other retention patches around hibernaculum or maternity roosts should be a minimum of 0.8 ha (approximately 50 m radius core area roughly centred on the habitat feature), but could be larger depending on other site factors (e.g., presence of nearby wetlands, lakes or streams as foraging habitat; presence of potential movement corridors for feeding and dispersal to alternate roosts). Where available, retention patches should be connected to nearby foraging areas such as streams, wetlands or open meadows. • Do not harvest or salvage trees within the WTP. • Minimize disturbance during critical times (generally May to September for maternity roosts; generally October to May for hibernacula).

NOTE: Because of the ecological importance (and in some cases rarity) of suitable sites for bat hibernacula and maternity roosts, only High and Medium significance ratings are applied to these features. **Low significance ratings are not applicable.**

5.0 Document the Bat Hibernaculum or Maternity Roost

5.1 Document the hibernaculum or maternity roost in the field

- Take photograph or digital photo of the hibernaculum or maternity roost, date stamp the photo, and briefly describe its location, condition, and the wildlife species that was using the hibernaculum or roost.
- Obtain GPS reading (UTM coordinates) of the hibernaculum or maternity roost, and map on an appropriately scaled map (i.e., at 1:10,000 or larger scale).

5.2 Document the hibernaculum or maternity roost in the office

- Document in office and incorporate location into operational plans, short- and long-term forest stewardship plans, and appropriate GIS overlays.
- Forward a brief description of the hibernaculum or roost and its location (UTM coordinates), to the local Ministry of Forests District Manager as part of annual reporting requirements.
- If the hibernaculum or roost is used by a Red- or Blue-listed species (Northern Long-eared Myotis), complete a CDC animal observation form with appropriate information and submit to the CDC office <http://srmwww.gov.bc.ca/cdc/> (see Appendix 2 for a blank copy of the form).
- Consider developing a management strategy for maintaining, conserving and/or enhancing the hibernaculum or roost area and surrounding habitat. This may include monitoring to determine the activity status of the feature.

Further sources of information:

- Bats of British Columbia. Royal British Columbia Museum Handbook, UBC Press, Vancouver, BC. 164 pp.
- An identification manual to the small mammals of British Columbia. Ministry of Sustainable Resource Management; Ministry of Water, Land, and Air Protection and Royal British Columbia Museum, 153 pp. Website: http://wlapwww.gov.bc.ca/wld/documents/techpub/id_keys_s.pdf.
- BC Ministry of Environment, Lands and Parks, Wildlife at Risk in British Columbia – Bats in British Columbia Brochure. Website: <http://wlapwww.gov.bc.ca/wld/documents/bats.pdf>.
- Karst management handbook for British Columbia. BC Ministry of Forests, Forest Practices Br., Victoria, BC. March 2003.

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Nagorsen, David. Zoological Consultant, Victoria, BC.

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3.4.H Hot Springs

Wildlife Habitat Feature Account

Definition

Hot Spring – a source of water that is heated geothermally and comes to the surface (Figure 27). There is no defined minimum temperature for this heated water.



Figure 27: Hot spring. (Photo: Hans Roemer)

Management Objective

To protect hot springs and to avoid damage to riparian vegetation and associated species surrounding them.

Management Guidelines (quick reference summary)

- 1.0 Confirm that the feature is a hot spring. Determine where and how the water gets to the surface.
- 2.0 If necessary, identify any rare or unique plant species, plant communities or wildlife species within the immediate vicinity that are associated with the hot spring.
- 3.0 Determine the significance rating of the hot spring.
- 4.0 Take measures to protect the hot spring. Implement Management Guidelines based on the significance rating of the hot spring.
- 5.0 Document HIGH significance hot springs and attendant populations of rare species (if present).

Management Guidelines (detailed)

1.0 Confirm that the feature is a Hot Spring as defined.

1.1 Check records for known hot springs in your area of operational concern. Helpful information sources include:

- Research relevant files, data sets and information available at your office for observations and locations of hot springs in your area of operational concern.
- Access CDC records and MWLAP for any element occurrences of Red- or Blue-listed species that might be associated with the hot springs, or related survey results (see CDC - <http://srmwww.gov.bc.ca/cdc/>). Rare plants are often associated with hot springs.
- The CDC database search tool “*Species and Ecosystems Explorer*” will sort species records (plants, plant communities, or animals) and occurrences by Forest District. This tool can be used to determine if a particular species or plant community is found in the area. (see URL: <http://srmwww.gov.bc.ca/atrisk/toolintro.html>)
- Consult plant field guides for information about rare plant species distribution and identification.
- Contact field and forestry workers in your office who have conducted surveys in the area, or have knowledge of the local area.
- Reference geological or geothermal maps for the area that may show potential hot springs (see Geothermal map of British Columbia. URL: <http://www.canmap.com/geo.htm>).
- The locations of hot springs may be found opportunistically by workers conducting other work or surveys in the area.
- Reconnaissance searches for hot springs can be conducted in order to minimize potential conflicts with operational planning and future forestry or range activities.
These searches are best conducted during the preliminary stage of any operational plan (including road, cutblock layout and rangeland visits), so that locations of significant habitat features can be identified and mapped to minimize operational conflicts. Hot springs tend to be more obvious in late summer when many other water bodies are dry.
- Consult local naturalists and others who may frequent the area for additional observations or information about the locations of hot springs.

1.2. What to look for – hot springs

- The riparian vegetation surrounding a hot spring may be conspicuously different from other vegetation in the vicinity.
- Where riparian vegetation is noted, check for the source of the water supply (if visible and not subsurface).
- Reports of hot springs in the area should be investigated and confirmed.

2.0 Identify any Rare Plant Species, Rare Plant Communities and Wildlife Species that are Associated with the Hot Spring

2.1 Riparian Plants

In areas adjacent to hot springs, look for any uncommon or Red- or Blue-listed plants or plant communities that are associated with the feature.

2.2 Animal Species

The riparian area surrounding a hot spring may provide important habitat for some species of animals. Animals or animal signs (e.g., tracks, scat, nests, dens, evidence of feeding, etc.) may be observed at or near the spring, and should be noted.

3.0 Determine the Significance Rating of the Hot Spring

The significance rating of a hot spring will depend on the size of the water body and the quality and/or identity of the surrounding vegetation.

3.1 High Significance Hot Springs

Hot springs with one or more of the following characteristics are considered HIGH significance:

- Large, relatively undisturbed geothermal pools (>100 m² in area) with an intact vegetated riparian buffer.
- Any hot spring that supports a rare plant species, rare plant community, or rare animal (often an invertebrate species).
- Any hot spring that is unique to the area of operations (i.e., there are none or very few known hot springs in the local area).

3.2 Medium Significance Hot Springs

Any hot springs that do not meet the above criteria for a High significance spring will be rated as Medium significance. These are generally small in size and are more common in the local area, and do not support a rare plant or rare plant community.

NOTE: Because of their relative rarity and uncommon geologic and/or biotic associations, there are **no Low significance hot springs**.

4.0 Take Measures to Protect the Hot Spring

4.1 Management Guidelines for HIGH significance hot springs

High significance hot springs are most often associated with locally uncommon or Red- or Blue-listed plant species, plant communities, or animals. Management guidelines for High significance hot springs are shown in Table 24.

Table 24: High significance hot springs and associated Management Guidelines.

Species or Feature	Management Guidelines
<p>Red- or Blue-listed plant species or plant communities (associations).</p> <p>Hot springs with large (>100 m²) intact geothermal pools and undisturbed surrounding riparian vegetation.</p> <p>Hot springs which are unique or uncommon locally.</p>	<ul style="list-style-type: none"> • Retain a 30 m radius (or equivalent area) vegetated buffer around the hot spring. This buffer will consist of the native vegetation (e.g., trees, shrubs, herbs or bryophytes) occurring at the site at the time. However, the size of this buffer may have to be larger (i.e., site specific) if there are any rare plants present that extend beyond 30 m from the edge of the hot spring. • Restrict all resource management activities (e.g., forestry, range, mining, etc.) within this 30 m buffer zone. • If visible, determine the source of the water feeding the hot spring. Do not restrict water flow by road construction or other activities. Use appropriate crossing structures if necessary. • In areas where cattle are grazed, do not place feed or salt blocks near hot springs. Exclusion fencing may be required in some areas to prevent cattle from damaging the riparian zone adjacent to hot springs.
<p>Red- or Blue-listed animal species present</p>	<ul style="list-style-type: none"> • Report occurrences of any Red- or Blue-listed animal species to local MSRM or MWLAP offices, and to the CDC (see Appendix 2 for animal observation forms). • Refer to the IWMS strategy for additional guidance concerning the management of Red- or Blue-listed animals that are confirmed to be associated with the hot spring (see http://wlapwww.gov.bc.ca/wld/identified/ , or ftp://ftp.env.gov.bc.ca/pub/outgoing/Identified%20Wildlife/).

4.2 Management Guidelines for MEDIUM significance hot springs

Medium significance hot springs are smaller hot springs and/or may be more common in the local area. They are not associated with any rare or Red- or Blue-listed plant species and plant communities. The Management Guidelines for Medium significance springs are generally less rigorous than those for High significance (Table 25).

Table 25: Medium significance hot springs and associated Management Guidelines.

Species or Feature	Management Guidelines
<p>Hot springs that are smaller in size (<100 m² pool area).</p> <p>More common in the local area.</p> <p>Not associated with rare plants, rare plant communities, or rare animal species.</p>	<ul style="list-style-type: none"> • Retain a 10 m radius vegetated buffer around the hot spring. This buffer will consist of the native vegetation (e.g., trees, shrubs or herbs) occurring at the site at the time. • Restrict all resource management activities (e.g., forestry, range, mining, etc.) within this 10 m buffer zone. • In areas where cattle are grazed, do not place feed or salt blocks near hot springs. Exclusion fencing may be required in some areas to prevent cattle from damaging the riparian zone adjacent to hot springs.

5.0 Document HIGH significance Hot Springs

5.1 Document the hot spring in the field

- Take a photograph or digital photo of the hot spring and any associated uncommon or rare plants; date stamp the photo and briefly describe the location and the plant association found around the spring.
- Take a GPS reading (UTM coordinates) of the spring and map on an appropriately scaled map (i.e., at 1:10,000 or larger scale).

5.2 Document the hot spring in the office

- Document the location and description of the hot spring in office. Incorporate location information into operational plans, short- and long-term forest stewardship plans or range use plans, and appropriate GIS overlays.
- If the hot spring is a High significance site, forward a brief description of the feature and its location (UTM coordinates) to the local Ministry of Forests District Manager as part of annual reporting requirements.
- If the hot spring is associated with a Red- or Blue-listed plant species, plant community, or animal; complete a CDC observation form with appropriate information and submit to the CDC office <http://srmwww.gov.bc.ca/cdc/> . (see Appendix 2 for a blank copy of the animal, plant, or plant association observation forms).

Further sources of information:

- BC Conservation Data Centre website: <http://srmwww.gov.bc.ca/cdc/> .
- Identified Wildlife Management Strategy website: <http://wlapwww.gov.bc.ca/wld/identified/> , or <ftp://ftp.env.gov.bc.ca/pub/outgoing/identified%20Wildlife/> .
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- Plants of Coastal British Columbia. 1994. Lone Pine Publishing, Edmonton, AB. 527 pp.
- Plants of Southern Interior British Columbia. 1996. Lone Pine Publishing, Edmonton, AB. 463 pp.
- Plants of Northern British Columbia. 1992. Lone Pine Publishing, Edmonton, AB. 351 pp.
- Geothermal map of British Columbia. URL: <http://www.canmap.com/geo.htm> .
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Individuals consulted to develop this account:

Hans Roemer, Plant Ecologist, Consultant, Victoria, BC.

Literature consulted to develop this account:

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3.4.I Non-classified Wetlands and Ephemeral Ponds

Wildlife Habitat Feature Account

Definition

Non-classified Wetlands – in the Northern Interior Forest Region, wetlands that are <1 ha in size and not classified under the FRPA (Figure 28).

Ephemeral Ponds – seasonal wetlands that are filled with spring meltwater or seasonal rains and are typically dry by mid-summer.

NOTE: Management Guidelines described herein only apply to those non-classified wetlands or ephemeral ponds that have been **rated as a High or Medium significance WHFs** (i.e., those that are associated with wildlife species at risk or regionally important wildlife species).

NOTE: Management Guidelines for classified wetlands (W1–W5), (i.e., wetlands that are >1 ha in size) and lakes, can be found in the *Riparian Management Area Guidebook* (Province of British Columbia 1995). However, **where species at risk or regionally important wildlife** (e.g., Eared Grebe breeding colonies) **occur at classified wetlands and lakes**, then additional specific habitat management guidelines are provided for these situations (see Tables 29 and 30).



Figure 28: Small wetland with emergent shoreline vegetation. (Photo: Jared Hobbs)

Management Objective

To protect non-classified wetlands, ephemeral ponds (and in some cases classified wetlands and lakes) and their adjacent habitats, where a wildlife species at risk or regionally important wildlife species is known or suspected to occur.

Management Guidelines (quick reference summary)

- 1.0 Confirm that the feature is a non-classified wetland or ephemeral pond as defined.
- 2.0 Determine if any wildlife species at risk or regionally important wildlife species occur, or have a high likelihood of occurring, at the non-classified wetland or ephemeral pond.
- 3.0 Determine the significance rating of the non-classified wetland or ephemeral pond.
- 4.0 Take measures to protect the non-classified wetland or ephemeral pond based on its significance rating.
- 5.0 Document High significance non-classified wetlands or ephemeral ponds.

Management Guidelines (detailed)

1.0 Confirm that the Feature is a Non-Classified Wetland or Ephemeral Pond as defined.

1.1 Check maps and records for known wetlands in your area of operational concern. Helpful information sources include:

- Research relevant files, data sets and information available at your office for locations of wetlands in your area of operational concern.
- Access CDC records and MWLAP for any element occurrences of Red- or Blue-listed wildlife species that might be associated with wetlands, or related survey results (see CDC - <http://srmwww.gov.bc.ca/cdc/>).
- The CDC database search tool “*Species and Ecosystems Explorer*” will sort wildlife species records and occurrences by Forest District. This tool can be used to determine if a particular wildlife species is found in the area. (see URL: <http://srmwww.gov.bc.ca/atrisk/toolintro.html>)
- Consult field guides for information about wildlife species at risk and regionally important wildlife species distribution and identification.
- Reference TRIM, geological, topographic, or forest cover maps for the area that may identify wetland areas.
- Contact field and forestry workers in your office who have conducted surveys in the area, or have knowledge of the local area.
- Consult local naturalists and others who may frequent the area for additional observations or information about wetlands and any observations of wildlife species of risk and regionally important wildlife species that may be associated with them.

1.2. What to look for – non-classified wetlands and ephemeral ponds

- Non-classified wetlands and ephemeral ponds are small wetlands that may have variable water levels depending on seasonal precipitation and snow runoff levels.
- At any time of the year, particularly during the height of summer, these wetlands can become completely dry and easily overlooked. Some ephemeral ponds may remain dry for several years during periods of elongated drought.

- Check for flat, hardpan soils that have become dry and, at times, deeply cracked when seasonal waters evaporate.
- Check for riparian vegetation and plant species (e.g., rushes, sedges) that are typically associated with wetlands, around the perimeter of flat open areas that may have once been covered in water.
- Check for salt, alkaline or other mineral deposits that rim flat depressions or expanses, left behind by evaporating waters.

Wetlands, including non-classified wetlands and ephemeral ponds, are classified into five categories in British Columbia, and include shallow open water, swamps, marshes, fens, and bogs. See Table 26 for descriptions of these wetland categories.

Table 26: Wetland categories and descriptions (taken from Bond et al. 1992)

Wetland Category	Description
Shallow Open Water	Shallow open waters include potholes, sloughs or ponds as well as waters along river, coast and lakeshore areas. They are usually relatively small bodies of standing or flowing water that are <2 m deep. The surface waters appear open, generally free of emergent vegetation.
Swamps	Swamps are wetlands where standing or gently moving water occurs seasonally or persists for long periods, leaving the subsurface continuously waterlogged. The water table may seasonally drop below the rooting zone of vegetation, creating aerated conditions at the surface.
Marshes	Marshes are wetlands that are periodically or permanently inundated by standing or slowly moving water and as a result are rich in nutrients. Marshes are mainly wet, mineral soil areas. They are subject to a gravitational water table, but water remains within the rooting zone of plants for most of the growing season.
Fens	Fens are peatlands characterized by a high water table, with slow internal drainage by seepage down in low gradients. They may exhibit low to moderate nutrient content and may contain shrubs, trees, or neither.
Bogs	Bogs are peat covered wetlands in which the vegetation shows the effects of a high water table and a general lack of nutrients. The surface waters of bogs are strongly acidic. They exhibit cushion forming sphagnum mosses and heath shrub vegetation, both with and without trees.

2.0 Determine if any Wildlife Species at Risk or Regionally Important Wildlife Species Occur, or Have a High Likelihood of Occurring, at the Wetland

Reconnaissance surveys at wetlands for the occurrence, or suspected occurrence, of wildlife species at risk or regionally important wildlife species, can be conducted in order to minimize potential conflicts with operational planning and future forestry or range activities. **However, whether to conduct wildlife species surveys is left to the discretion of the licensed forest or range tenure holder.** These searches are best conducted during the preliminary stage of any operational plan (including road, cutblock layout and rangeland visits), so that locations of significant habitat features can be identified and mapped to minimize operational conflicts.

NOTE: Due to the large number of wildlife species at risk and regionally important wildlife species that may be associated with wetlands, a qualified biologist or wildlife technician may have to be consulted to determine if any wildlife species at risk (including rare plants and insects) are present at the wetland of concern.

Examples of wildlife species at risk (Table 27) and regionally important wildlife species (Table 28) that may be associated with non-classified wetlands and ephemeral ponds in the Northern Interior Forest Region are found below. *Please note that due to the variety of habitat requirements for certain species, that this is not an exhaustive list.*

Table 27: Wildlife species at risk that may be associated with non-classified wetlands or ephemeral ponds (Northern Interior Forest Region).

Wildlife Species at Risk Associated with Non-classified Wetlands and Ephemeral Ponds
Mammals
<ul style="list-style-type: none"> • None
Birds
<ul style="list-style-type: none"> • Nelson’s Sharp-tailed Sparrow • Sandhill Crane • Short-eared Owl
Amphibians
<ul style="list-style-type: none"> • None
Reptiles
<ul style="list-style-type: none"> • None
Insects
<ul style="list-style-type: none"> • Dragonflies (Order <i>Odonata</i>)**

** Refer to the Min. of Sustainable Resource Management website “BC Species and Ecosystems Explorer” (<http://srmwww.gov.bc.ca/atrisk/toolintro.html>) for a list of dragonfly species at risk in the Northern Interior Forest Region.

Table 28: Regionally important wildlife species that may be associated with non-classified wetlands or ephemeral ponds (Northern Interior Forest Region).

Regionally Important Wildlife Species Associated with Non-classified Wetlands and Ephemeral Ponds
Mammals
<ul style="list-style-type: none"> • None
Birds
<ul style="list-style-type: none"> • Trumpeter Swan • Eared Grebe • American Bittern • Pacific Loon • Red-throated Loon • Eared grebe • Horned Grebe • Red-necked Grebe • Upland Sandpiper • Black Tern
Amphibians
<ul style="list-style-type: none"> • Spotted Frog • Western Toad
Reptiles
<ul style="list-style-type: none"> • None

3.0 Determine the Significance Rating of the Non-classified Wetland or Ephemeral Pond

The significance rating of a non-classified wetland or ephemeral pond will depend on the wildlife species that are associated with the feature. If a **wildlife species at risk occurs** at the non-classified wetland or ephemeral pond, then the wetland is given a **HIGH significance rating**. If a **regionally important wildlife species occurs** at the non-classified wetland or ephemeral pond, then the wetland is given a **MEDIUM significance rating**. **Other non-classified wetlands or ephemeral ponds are given a Low significance rating**; there are no Management Guidelines associated with Low significance wetlands.

NOTE: If the licensed tenure holder chooses NOT to identify the wildlife species using the non-classified wetland or ephemeral pond, AND there is a high likelihood that a wildlife species of risk or regionally important wildlife species occurs at the wetland, then they can **choose to default to a High Significance rating** for the WHF, and implement the appropriate Management Guidelines (proceed to Sec. 4.0, Table 29).

4.0 Take Measures to Protect the Non-classified Wetland or Ephemeral Pond

4.1 Management Guidelines for HIGH significance non-classified wetlands or ephemeral ponds

High significance non-classified wetlands or ephemeral ponds are **associated with the occurrence of wildlife species at risk**. Management guidelines for High significance non-classified wetlands or ephemeral ponds are shown in Table 29.

Table 29: High significance non-classified wetlands or ephemeral ponds and associated Management Guidelines.

Management Guidelines
<ul style="list-style-type: none"> • Do not disturb or alter habitat that is within 30 m of the wetland's high water mark. • Do not situate salt licks, water troughs or other livestock attractants within 30 m of the wetland's high water mark. • Discourage livestock from drinking or grazing within 30 m of the wetland's high water mark by placing alternative water troughs or feeding areas at least 100 m from the wetland. In some cases, fencing may be required to restrict livestock access. • Do not cultivate, hay or mow habitat within 30 m of the wetland's high water mark. • Do not harvest or fell trees within 30 m of the wetland's high water mark. • Do not disturb/remove coarse woody debris, rocks, gravels or soils within 30 m of the wetland's high water mark. • Except during winter months (i.e., when the ground is frozen and snow-covered), restrict use of mechanized machinery, vehicles, or ATV traffic within 30 m of the wetland's high water mark. • Do not construct new roads or trails within 30 m of the wetland's high water mark. • Do not locate recreational areas or facilities within 100 m of the wetland's high water mark. • Where possible, avoid High impact activities including road construction, blasting, or low altitude helicopter fly-overs between May 1 and August 30 (i.e., breeding season), within 100 m of the shoreline. For larger classified wetlands (> 1 ha in size) and lakes, this seasonal buffer distance need not apply to the whole wetland or lake, but would extend perpendicularly for 100 m from the shoreline beginning at the point of an occupied nest or nests (i.e., a 100 m radius circle, ~1/2 of which will include the aquatic or island portions of the wetland/lake).

4.1 Management Guidelines for MEDIUM significance non-classified wetlands or ephemeral ponds

Medium significance non-classified wetlands or ephemeral ponds are **associated with the occurrence of regionally important wildlife species**. Management guidelines for Medium significance non-classified wetlands or ephemeral ponds are shown in Table 30.

Table 30: Medium significance non-classified wetlands or ephemeral ponds and associated Management Guidelines.

Management Guidelines
<ul style="list-style-type: none"> • Do not disturb or alter habitat that is within 20 m of the wetland's high water mark. • Do not situate salt licks, water troughs or other livestock attractants within 15 m of the wetland's high water mark. • Discourage livestock from drinking or grazing within 20 m of the wetland's high water mark by placing alternative water troughs and feeding areas at least 100 m from the wetland. In some cases, fencing may be required to restrict livestock access. • Do not cultivate, hay or mow habitat within 20 m of the wetland's high water mark. • Do not harvest or fell trees within 20 m of the wetland's high water mark. • Do not disturb/remove coarse woody debris, rocks, gravels or soils within 15 m of the wetland's high water mark. • Except during winter months (i.e., when the ground is frozen and snow-covered), restrict use of mechanized machinery, vehicles, or ATV traffic within 20 m of the wetland's high water mark. • Do not construct new roads within 30 m of the wetland's high water mark. • Do not locate recreational areas or facilities within 100 m of the wetland's high water mark. • Where possible, avoid High impact activities including road construction, blasting, or low altitude helicopter fly-overs between May 1 and August 30 (i.e., breeding season), within 100 m of the shoreline. For larger classified wetlands (> 1 ha in size) and lakes, this seasonal buffer distance need not apply to the whole wetland or lake, but would extend perpendicularly for 100 m from the shoreline beginning at the point of an occupied nest or nests (i.e., a 100 m radius circle, ~1/2 of which will include the aquatic or island portions of the wetland/lake).

5.0 Document HIGH Significance Non-classified Wetlands or Ephemeral Ponds

5.1 Document the non-classified wetland or ephemeral pond in the field

- Take a photograph or digital photo of the non-classified wetland or ephemeral pond, and any associated habitat of wildlife species at risk which are present (or are suspected to be present); date stamp the photo and briefly describe the location and the area where the wildlife species at risk occurs.
- Take a GPS reading (UTM coordinates) of the non-classified wetland or ephemeral pond and/or the breeding area of the wildlife species at risk, and map on an appropriately scaled map (i.e., at 1:10,000 or larger scale).

5.2 Document the non-classified wetland or ephemeral pond in the office

- Document the location and description of the non-classified wetland or ephemeral pond in office, as well as the wildlife species at risk that is associated with the feature. Incorporate location information into operational plans, short- and long-term forest stewardship plans or range use plans, and appropriate GIS overlays.
- Forward a brief description of the High significance feature and its location (UTM coordinates), and the wildlife species at risk that is associated with the feature, to the local Ministry of Forests District Manager as part of annual reporting requirements.

- If the wildlife species at risk has been observed, complete a CDC animal observation form with appropriate information and submit to the CDC office <http://srmwww.gov.bc.ca/cdc/> (see Appendix 2 for a blank copy of the form).

Further sources of information:

- BC Conservation Data Centre website: <http://srmwww.gov.bc.ca/cdc/>.
- Identified Wildlife Management Strategy website: <http://wlapwww.gov.bc.ca/wld/identified/> , or <ftp://ftp.env.gov.bc.ca/pub/outgoing/identified%20Wildlife/>.
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Individuals consulted to develop this account:

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Glossary of Terms

Alternate Nest: An additional nest or nest tree located within the nest stand.

Arboreal: Located or living in a tree.

Bank Burrow: An excavated hole that extends laterally into a side embankment and is inhabited by a wildlife species.

BC CDC (British Columbia Conservation Data Centre): Part of the Registries and Resource Information Division in the B.C. Ministry of Sustainable Resource Management that collects and disseminates information on rare and endangered plants, animals and plant communities of British Columbia.

Bird of Prey: A family of birds that mostly preys upon other animals or birds for sustenance.

Blue-list: Any indigenous species or subspecies (taxa) considered to be Vulnerable in British Columbia. Blue-listed taxa are at a lower level of risk than Red-listed taxa.

Bole: The trunk of a tree.

Breeding Season: The period of the year that most mammals and bird species rear their young, generally April through August in British Columbia.

Call Playbacks: A survey technique that elicits a wildlife species to respond to a broadcast recording of their own or another wildlife species' call or vocalization.

Canid: Belonging to the dog family.

Cavity Tree: A tree that is generally larger and older, and that has holes, hollows or cavities along its trunk or main limbs that is used by wildlife species for foraging, roosting, nesting and/or denning.

Coniferous Tree: A cone-bearing tree that has needles or scale-like leaves and is typically evergreen.

Copse: A thicket of small trees or shrubs.

Corvids: A family of birds that includes ravens, crows and jays.

COSEWIC (Committee on the Status of Endangered Wildlife in Canada): A committee of experts that assesses and designates the national status of wildlife species, subspecies and separate populations suspected of being at risk in Canada.

Cut Bank: An excavated bank from a ditch line to the top of the undisturbed slope of a road.

CWD (Coarse Woody Debris): Sound and rotting logs, stumps or larger branches that provide habitat for plants, animals, and insects and a source of nutrients for soil development.

CWD Decay Classes: A five-category system that describes the amount of decay that is present on a downed piece of wood >7.5 cm in diameter (e.g., class 1 is intact, hard and elevated above ground; class 5 is decayed into many small pieces with soft portions that is partly sunken into the ground).

Danger Tree (Hazard Tree): A live or dead tree whose trunk, root system or branches have deteriorated or have been damaged to such an extent as to be a potential danger to human safety.

DBH (Diameter at Breast Height): The stem diameter of a tree measured at breast height (i.e., 1.3 metres above the ground).

Deciduous Tree: A tree that is typically broad-leafed and normally leafless for some time during the year.

Deleterious Substance: Any substance that, if added to water, would degrade or alter the quality of the water so that it becomes deleterious to fish or fish habitat, or becomes unsuitable for human consumption or any other purpose for which it is legally licensed.

GIS (Geographic Information System): A computer system designed to allow users to collect, manage and analyze large volumes of spatially referenced information and associated attribute data.

GPS (Global Positioning System): A satellite system that provides accurate spatial locations of receivers anywhere on the globe.

Ground Burrow: An excavated hole that descends below ground and is inhabited by a wildlife species.

Identified Wildlife: Those species at risk or regionally important that the Deputy Minister of Water, Land and Air Protection or a person authorized by that deputy minister, agree will be managed through a higher level plan, wildlife habitat area, or general wildlife measure.

Incipient: Beginning to appear or exist.

IWMS (Identified Wildlife Management Strategy): A management strategy of the *Forest and Range Practices Act* intended to minimize the effects of forestry and range practices on a selected list of “Identified Wildlife” species that occur on Crown land and private land that is subject to tree farm or woodlot licenses.

Karst: An area of irregular limestone in which erosion has produced fissures, sinkholes, underground streams, and caverns.

Keystone Species: A species that plays an important ecological role in determining the overall structure and dynamic relationships within a biotic community.

Kits: A generic term for the young of certain mammal species, including Badger.

Lacustrine: Soil types previously formed by or associated with lakes or large waterbodies.

Landscape Level: The level of forest management at which ecosystem processes, habitat types and seral stage distribution are managed for large, geographically separate areas.

Leave Trees: All trees, regardless of species, age, or size, remaining on a harvested area as a result of a predetermined silviculture prescription to address a possible range of silviculture or resource needs.

Lek: An area in a large opening where birds (e.g., grouse) gather to court, display and mate.

Littoral Zone: The shore zone between the high and low water mark.

Management Guideline: Generally accepted non-mandatory guidance and management recommendations based on the best available data and expert opinion.

Mustelid: Belonging to the family Mustelidae, i.e., weasels, skunks and allies.

Natal Den: A den or burrow used by a mammal species to rear its young.

NGOs (Non-governmental Organizations): An advocate organization that is not directly affiliated with government or a government agency, usually referring to a non-profit group.

OGMA (Old Growth Management Area): An area that contains, or is managed to replace specific structural old-growth attributes, and is mapped and treated as a special management area.

Old Forest: Over-mature, structurally complex stands consisting of live and dead trees of various sizes, species, composition, and age class structure.

Pellets: Regurgitated castings of indigestible parts of prey, typically feathers, fur and bones.

Perch Tree: A tree that is used by a variety of bird species to provide a visual vantage point to hunt from or to sing from and announce their territory.

Plucking Posts: A location where raptors pluck their prey before taking it back to the nest; generally these locations are stumps, snags, large branches, root wads, ridge crests, or dirt mounts that are in visual distance of the nest.

Prey Remains: Any discarded part of the prey, including feathers, fur tufts, bones, intestines, entire skeletons or carcasses.

Raptor: A synonym for “bird of prey”; (i.e.) a family of birds including eagles, hawks and owls that preys mostly upon other animals or birds for sustenance.

Reconnaissance Searches: Preliminary and informal surveys for wildlife species or habitat features conducted in a specified area of interest.

Record Tree: The 10 largest known individual trees of each native tree species in British Columbia.

Red-list: Any indigenous species or subspecies (taxa) considered to be Extirpated, Endangered, or Threatened in British Columbia. Extirpated taxa no longer exist in the wild in British Columbia, but do occur elsewhere. Endangered taxa are facing imminent extirpation or extinction. Threatened taxa are likely to become endangered if limiting factors are not reversed.

Regionally Important Wildlife: Native, regularly occurring wildlife species that are not considered at risk provincially, but are affected by forest and range practices and require habitat management in order to maintain regional populations.

Residence: A dwelling-place, such as a den, nest or other similar area or place, that is occupied or habitually occupied by one or more individuals, and may include areas or places in proximity to a dwelling-place as prescribed by regulation of the minister for specified species or classes of species.

RIC (Resources Inventory Committee): The former name of RISC (Resources Information Standards Committee).

RISC (Resources Information Standards Committee): A provincial committee that is responsible for establishing standards for natural and cultural resources inventories, including collection, storage, analysis, interpretation and reporting of inventory data.

RMA (Riparian Management Area): An area of width (as determined in accordance with standards described in the Government Actions Regulation) that is adjacent to a stream, wetland or lake. Management Guidelines applicable to RMAs are established according to the riparian class (and associated attributes) of the stream, wetland or lake. Attributes include channel width, size (area) of the wetland, presence of fish, domestic water use, and gully status (stream gradient and sidewall slope).

Roost Tree: A tree used by either a mammal or bird species that provides a resting area, protection from the elements, or security from predators.

Rotation Period: The planned number of years between the formation or regeneration of a tree crop or stand and its final cutting at a specified stage of maturity.

Scree: Loose rock or stone debris covering a slope or hillside.

Snag: A standing dead tree.

Species at Risk: Species classified in Canada by COSEWIC (Committee on the Status of Endangered Wildlife in Canada) as: i) Extinct or Extirpated; ii) Endangered (facing imminent extirpation or extinction); iii) Threatened (species likely to become endangered if nothing is done to reverse factors leading to its extirpation or extinction); or iv) Special Concern (species that may become threatened or endangered because of biological characteristics or sensitivity to identified threats). In British Columbia, Endangered or Threatened species are designated *Red-listed*. COSEWIC classification of *Special Concern* is generally equivalent to *Blue-listed* designation in B.C.

Tree Classes: A nine-category system that describes the condition of a standing tree. For example, class 1 is a live tree with no defects or decay present; class 2 is a live tree with visible external defects such as a dead or broken top, stem scars or cracks, or evidence of internal decay or root disease; class 3 is a recently dead tree with fine twigs remaining, and its wood is usually hard and undecayed; class 6 is dead and the original top 1/3 of its height has broken away, and its wood is soft and decayed; while class 9 is a fully decayed stump/fallen log, partially incorporated into the forest floor.

Stub Tree: An artificially created wildlife tree, mechanically cut from a class 1, 2 or 3 tree.

Talus: A sloping mass of rock debris at the base of a cliff.

Ungulate: A hoofed mammal. In British Columbia, these would include goats, sheep, and members of the deer family.

UWR (Ungulate Winter Range): Habitat that is important for providing forage, security and thermal protection for ungulate species during winter.

Veteran Tree (Vet): A tree that is significantly older than the trees of the main forest canopy (usually greater than 150 years of age). Veteran trees may have survived one or more fires as evidenced by fire scars, and are usually isolated in distribution and often extend well above the main tree canopy. Because of their large size, they usually provide valuable wildlife tree habitat for many decades.

WHA (Wildlife Habitat Area): A unit of habitat recommended for the maintenance, enhancement, or restoration of Red-listed wildlife, threatened, and endangered habitats, and those species identified as being regionally important.

WHF (Wildlife Habitat Feature): The residence of a species at risk (this includes the COSEWIC classifications of Endangered, Threatened or Special Concern, as well as the British Columbia designations of *Red-listed* or *Blue-listed*); OR additional significant local habitat features as identified by the Ministry of Water, Land and Air Protection.

Whitewash: Bird feces that is white or gray in colour and is usually found at the base of a nest or perch, on the ground, or on the foliage of low shrubs and herbs.

Wildlife Tree: A tree or group of trees that provide wildlife habitat, and assist in the conservation of stand level biodiversity.

Wolf Tree: A dominant tree that is often a remnant from a previous stand that has a broad crown and many limbs.

WTP (Wildlife Tree Patch): An area specifically identified for the retention and recruitment of suitable wildlife trees that is reserved from harvest for at least 1 rotation length.

Yellow-list: Any indigenous vertebrate species or subspecies (taxa) that is not at risk in British Columbia.

Appendix 1. List of Scientific and Common Names

Common Name	Scientific Name
Birds	
American Bittern	<i>Botaurus lentiginosus</i>
American Crow	<i>Corvus brachyrhynchos</i>
Arctic Tern	<i>Sterna paradisaea</i>
Bald Eagle	<i>Haliaeetus leucocephalus</i>
Bank Swallow	<i>Riparia riparia</i>
Barred Owl	<i>Strix varia</i>
Belted Kingfisher	<i>Ceryle alcyon</i>
Black Tern	<i>Chlidonias niger</i>
Blue Grouse	<i>Dendragapus obscurus</i>
Broad-winged Hawk	<i>Buteo platypterus</i>
Common Raven	<i>Corvus corax</i>
Cooper's Hawk	<i>Accipiter cooperii</i>
Eared Grebe	<i>Podiceps nigricollis</i>
Golden Eagle	<i>Aquila chrysaetos</i>
Great Blue Heron (coastal subspecies)	<i>Ardea herodias fannini</i>
Great Blue Heron (interior subspecies)	<i>Ardea herodias herodias</i>
Great Gray Owl	<i>Strix nebulosa</i>
Great Horned Owl	<i>Bubo virginianus</i>
Horned Grebe	<i>Podiceps auritus</i>
Long-eared Owl	<i>Asio otus</i>
Merlin	<i>Falco columbarius</i>
Nelson's Sharp-tailed Sparrow	<i>Ammodramus nelsoni</i>
Northern Goshawk (interior subspecies)	<i>Accipiter gentilis atricapillus</i>
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>
Osprey	<i>Pandion haliaetus</i>
Pacific Loon	<i>Gavia pacifica</i>
Red-necked Grebe	<i>Podiceps grisegena</i>
Red-tailed Hawk	<i>Buteo jamaicensis</i>
Red-throated Loon	<i>Gavia stellata</i>
Ruffed Grouse	<i>Bonasa umbellus</i>
Sandhill Crane	<i>Grus canadensis</i>
Sharp-shinned Hawk	<i>Accipiter striatus</i>
Sharp-tailed Grouse	<i>Tympanuchus phasianellus</i>
Short-eared Owl	<i>Asio flammeus</i>
Spruce Grouse	<i>Dendragapus canadensis</i>
Swainson's Hawk	<i>Buteo swainsoni</i>
Trumpeter Swan	<i>Cygnus buccinator</i>

Mammals	
bighorn sheep	<i>Ovis canadensis</i>
bison	<i>Bos bison</i>
black bear	<i>Ursus americanus</i>
coyote	<i>Canis latrans</i>
Dall's sheep	<i>Ovis dalli dalli</i>
elk	<i>Cervus elaphus</i>
gray wolf	<i>Canis lupus</i>
grizzly bear	<i>Ursus arctos</i>
Keen's long-eared myotis	<i>Myotis keenii</i>
moose	<i>Alces alces</i>
mountain goat	<i>Oreamnos americanus</i>
northern long-eared myotis	<i>Myotis evotis</i>
red fox	<i>Vulpes vulpes</i>
silver-haired bat	<i>Lasionycteris noctivagans</i>
stone sheep	<i>Ovus dalli stonei</i>
Townsend's big-eared bat	<i>Plecotus townsendii</i>
western long-eared myotis	<i>Myotis evotis</i>
Fish	
arctic grayling	<i>Thymallus arcticus</i>
black crappie	<i>Pomoxis nigromaculatus</i>
brook trout	<i>Salvelinus fontinalis</i>
brown trout	<i>Salmo trutta</i>
bull trout	<i>Salvelinus confluentus</i>
burbot	<i>Lota lota</i>
char	<i>Salvelinus alpinus</i>
cutthroat trout	<i>Oncorhynchus clarki</i>
dolly varden	<i>Salvelinus malma</i>
kokanee	<i>Oncorhynchus nerka</i>
lake trout	<i>Salvelinus namaycush</i>
lake whitefish	<i>Coregonus clupeaformis</i>
largemouth bass	<i>Micropterus salmoides</i>
mountain whitefish	<i>Prosopium williamsoni</i>
northern pike	<i>Esox lucius</i>
rainbow trout	<i>Oncorhynchus mykiss</i>
smallmouth bass	<i>Micropterus dolomieu</i>
walleye	<i>Stizostedion vitreum</i>
white sturgeon	<i>Acipenser transmontanus</i>
yellow perch	<i>Perca flavescens</i>

Reptiles	
common garter snake	<i>Thamnophis sirtalis fitchi</i> <i>Thamnophis sirtalis parietalis</i> <i>Thamnophis sirtalis pickeringii</i>
western terrestrial garter snake	<i>Thamnophis elegans nigrescens</i> <i>Thamnophis elegans vagrans</i>
Amphibians	
spotted frog	<i>Rana pretiosa</i>
western toad	<i>Bufo boreas</i>

Appendix 2. CDC Animal, Plant, and Plant Association Observation Forms

**B.C. Conservation Data Centre
FIELD OBSERVATION FORM (ANIMALS)**

Complete only for Red or Blue listed species. Complete as many fields as possible.

SPECIES: _____

Name of recorder/reporter: _____

Address: _____

Phone #: _____ **e-mail:** _____

Location: (We use the information you provide to map locations, and to relocate sites on the ground. We need you to be as precise as possible. Provide written directions below and sketch a map on the back of this page. A photocopy of a 1:50,000 topographic map, showing the location would be appreciated).

UTM grid reference (from blue grid on 1:50,000 NTS map): _____ NTS MAPSHEET NO.: _____

Please note which North American Datum (NAD) was used (found below the contour interval scale on NTS map): 27 or 83

ZONE (e.g. 10U) _____ NORTHING _____ EASTING _____ NAD: _____

Did you use a GPS unit to determine this UTM point? Y / N Precision of point (+/- metres) _____

Date			Numbers			Comments			Observer
year	month	day	Adult			Immature			
			m	f	u	m	f	u	

Evidence of breeding: none mating observed nest found young being fed out of nest
 singing/displaying male(s) egg-laying observed larva/pupa found
 other: _____

Comments: _____

Habitat: (include. dominant plants if possible; a general description of area): _____

Elevation _____ metres feet (*circle one*) Slope % _____ Aspect _____

Comments/Remarks _____

Area for sketch:

Size (square meters, kilometres or hectares): (area covered by the population at this location)._____

Landscape context (degree of fragmentation and connectivity, species composition, biological structure, ecological processes, and abiotic factors in the surrounding area):

Condition: *(Condition is an integrated measure of the quality of biotic and abiotic factors, structures and processes within the occurrence, and the degree to which they affect the continued existence of the occurrence. Components of condition for species are: 1) reproduction and health, 2) ecological processes, 3) species composition and biological structure, 4) abiotic physical/chemical factors. Factors to consider: evidence of regular successful reproduction, habitat degradation, disturbance, presence of exotic species, the degree to which ecological processes are sustaining the habitat. Where possible include a comparison to other occurrences.)*

Notes (land ownership, development plans, management activities, if any, other comments):

Please return forms to: CDC, BC Ministry of Sustainable Resource Management, P.O. Box 9993, Station Provincial Government, Victoria, BC, V8W 9R7. (FAX: 250-387-2733) **THANK YOU!**



**B.C. Conservation Data Centre
FIELD SURVEY FORM (PLANTS)**

Note: Complete only for Red- or Blue-Listed species. Please fill out as many fields as you can, but precise locality and population data are especially important pieces of information.

Project name: _____
 New/Update
 Update EO # _____

Species: _____

Name of surveyor/Address/ phone #/Email: _____

Survey Date: (Month/Day/year): _____

1st visit or repeat visit to this site: _____

Revisit needed? ___yes ___no Why?: _____

Specimen Collection # & Herbarium: (Please make a collection; in most cases, a collection is necessary to verify identification) _____ Was a photo taken? _____

Location/Directions: (Please be as precise as possible; include photocopies of 1:20,000 trim or 1:50,000 topographic maps (if possible, but any maps are welcome)

Position:

UTM grid reference: (from blue grid on 1:50,000 NTS map):

MAP SHEET# _____

(North American Datum (NAD) designation is found below the contour interval scale on NTS map, 27 or 83; a GPS unit can be set to either NAD designation; We use NAD 83 data).

ZONE _____ EASTING _____ NORTHING _____ NAD _____

LATITUDE _____ LONGITUDE _____

Did you use a GPS unit to determine this value? Y / N Precision of point (+/- metres) _____

Habitat: (Please include dominant plants and identify plant communities, a general description of area including land forms/use)

Topographic features: Elevation: _____ metres feet (circle one) Slope: _____ Aspect: _____

(Please note if elevation was derived from GPS unit)

Light:

- ___ open
- ___ partial
- ___ filtered
- ___ shade

Slope Position:

- ___ crest
- ___ upper slope
- ___ mid slope
- ___ lower slope
- ___ bottom

Moisture:

- ___ inundated
- ___ saturated (wet-mesic)
- ___ moist (mesic)
- ___ dry-mesic
- ___ dry (xeric)

Population Data:

Number of individuals: (estimate or exact count, if feasible; if plants are spreading vegetatively, indicate number of aerial stems): _____

Number of sub-populations & separation distances (if applicable): _____

Area and units covered by population: _____ Length: _____ Width: _____

(Please also indicate direction for length & width and reference to any landscape features, shape of areas & how areas relates to any UTM's provided, ie the centrum): _____

Confidence Extent: ___ Full extent of population known ___ Full extent not known ___ Uncertain full extent known

Phenology: (Indicate the number observed in each category (or check if numbers are unknown):

___ in leaf ___ in bud ___ in flower ___ immature fruit ___ mature fruit ___ seed dispersing ___ dormant
___ seedlings

Area for sketch:

Rank Considerations:

Condition: *An integrated measure of the quality of biotic and abiotic factors, structures and processes within the habitat the population occupies, and how they reflect on how well this species is doing at this site.*

Please consider:

- 1) reproduction and health
- 2) ecological processes
- 3) species composition and biological structure
- 4) habitat degradation, presence of exotic species and disturbance
- 5) physical/chemical factors that affect the element's ability to persist at the site.

Landscape context: *Factors, structures and processes at work over the landscape surrounding the population.*

Please consider:

- 1) the degree of fragmentation and connectivity of suitable habitat for this species
- 2) species composition
- 3) biological structure
- 4) ecological processes
- 5) abiotic factors

Notes: *(Land ownership, development plans, management activities, if any, or other comments):*

Please return forms to: CDC, Ministry of Sustainable Resource Management, Terrestrial Information Branch, P.O. Box 9993 Station Provincial Government, Victoria BC V8W 9R7 (fax: 250-387-2733) **THANK YOU!**



B.C. Conservation Data Centre
**FIELD OBSERVATION FORM:
RARE PLANT ASSOCIATIONS**

EO: Create _____
Update _____
EO # _____
DONE _____

NOTE TO PROFESSIONAL ECOLOGISTS: IF YOU ARE ALREADY DOING A FULL PLOT [FS882 (1)(2)&(3)] OR GROUND INSPECTION, PLEASE USE THE ABBREVIATED "RARE PLANT ASSOCIATION TECHNICAL FIELD FORM," WHICH IS AVAILABLE ON OUR WEBSITE.

Plant association type (if known) _____

Name of observer _____ Date of observations _____

Company/Project (if applicable) _____

Address _____

Phone / Fax _____

E-mail _____

Location & Directions (Please be as accurate as possible, preferably to within 100m; attach a photocopy of an air photo or map with the site marked, if possible)

UTM Coordinates:

Zone _____ Easting _____ Northing _____

NAD: 27 or 83 _____ NTS Mapsheet number _____

Determined with GPS? Y N Accuracy (specify units): +/- _____

General description of plant association (if possible include successional stage, structural stage, canopy closure, evidence of disturbances; attach photos if taken)

Dominant plant species: (include % cover if possible)

Trees _____

Shrubs _____

Grasses _____

Forbs _____

Non-Vascular Plants _____

Percent non-native plant cover: _____ %

Site description (if possible include humus form, soil texture, soil classification, soil drainage, surficial material, topographic position, bedrock, adjacent vegetation types & disturbances, etc.)

Elevation (specify units) _____ Determined by: Altimeter / Map / GPS / GIS (circle one)

Wildlife Habitat Features – Summary of Management Guidelines - Northern Interior Forest Region

Slope (specify units) _____ Aspect _____

Ownership/Jurisdiction _____

Known threats _____

Adjacent land uses _____

NOTES:

Return this form to:

**B.C. Conservation Data Centre
Ministry of Sustainable Resource Management
PO Box 9993 Stn Prov Govt, Victoria, BC V8W 9R7**

Questions?

Phone: (250) 356-0928 (Toll Free through Enquiry B.C.)

e-mail: cdcdata@victoria1.gov.bc.ca

Fax (250) 387-2733

Website: srmwww.gov.bc.ca/cdc/

THANK YOU!

Appendix 3. Large Stick Nest Identification and Survey Techniques

Searches for large stick nests can be conducted at anytime of the year. In spring and summer, it is easier to confirm species and activity, as nests are active then. In winter, some large stick nests become easier to detect because of the layer of snow that settles on them and because deciduous trees have lost their leaves, providing a clearer view from the ground. Many large stick nests are conspicuous and are easily seen from the ground. However, some nests, particularly in tall conifer stands, are easily overlooked in the field and require acute observation skills to identify.

Field workers should walk along parallel transects within visual distance of one another. Each tree that a worker passes should be visually scanned or inspected for nest structures. Binoculars may be used for taller trees and differentiating mistletoe-like structures (Figure 29). The bases of trees should also be checked for any evidence of use (i.e., whitewash, prey remains, pellets, raptor feathers).



Figure 29: Mistletoe structures that resemble large stick nests. (Photo: John Muir)

What to look for – large stick nests.

- Large stick nests vary in size from 30 cm to >3 m across (i.e., any nest structure larger than a soccer ball).
- Nests can appear large, thick and robust, or small, shallow and flimsy.
- Typically built in larger trees, up against the tree trunk or on a large forked branch or stem crotch.
- Generally built at ½ to ¾ canopy height. Some raptor species prefer building near the top of the tree, particularly, Bald Eagles, Ospreys and Swainson's Hawk.
- Some are built on top of mistletoe-like structures or other defects on the tree.
- Sticks used in construction are generally >0.75 cm in diameter (the width of a pencil).

What to look for – tree top depression nest

- Some raptor species, particularly owls, nest in depressions, cavities or concave hollows at the top of a broken tree trunk.
- Tree top depression nests may appear like a large stick nest from the ground, as birds may add branches or twigs to the structure to enlarge it.
- Nests can be located on live broken top trees, or standing dead trees.
- Nests can also be built along the trunk in large, natural cavities or hollows created by tree damage, limb loss, or decay.

Differentiating between raptor and corvid nests

Raptor nests can be difficult to differentiate from corvid (e.g., crow or raven) nests. However, some general principles can be applied to help distinguish them.

- Corvid nests are generally smaller and more flimsy looking than raptor nests.
- Generally, there are a greater number of discarded sticks at the base of corvid nest trees than raptor nest trees.
- Typically, corvids use smaller diameter sticks for their nests than raptors.
- Corvids, particularly ravens, may also regurgitate pellets that can be found at the base of nest trees. Corvid pellets are typically a firmer texture and a darker charcoal gray, than lighter gray raptor pellets.
- Corvids scavenge much of their prey, as a consequence, prey remains; (i.e.), feathers, fur tufts, bones or carcasses may also be found discarded at the base of the nest tree.
- Abandoned corvid nests can be used by some raptors, including Merlins and owls.

Differentiating between raptor and heron nests

Raptor nests are generally more easily distinguishable from Great Blue Heron nests than from corvid nests.

- Heron nests are smaller, flimsy looking and shallow in depth.
- Heron nests are typically made with thinner diameter branches that are more loosely arranged, and consequently make the nest look wispy than a raptor nest.
- Several pairs of herons may build nests in a single tree; not all of them are necessarily active during a single year.
- Herons may nest in loose or tight colonies, building nests in several different trees that may or may not be clustered.
- Herons may regurgitate indigestible food that can be found at the base of the nest tree. Like its whitewash, the regurgitated food is usually dark gray in colour, with a slight greasy-look or sheen to it, and may smell of fish.

Occupied vs. unoccupied or abandoned nests

Some raptor species have large territories (e.g., >20 km²). Most of this territory is used for hunting and foraging, while generally, only a small area of the territory (e.g., 10 ha), is used as a nesting stand where the nest tree is located. Consequently, a raptor may spend several hours away from its nest on hunting forays in different parts of its territory. Several visits may be required at the nest before an adult bird is observed and identified. An incubating adult can sit motionless for hours and remain low down in the nest, making it virtually undetectable from the ground. For species such as goshawks, the nest stand is important to identify and preserve, even if the nest or nest tree falls, as this raptor species will use alternate nest trees in the same stand.

If a large stick nest has not been used for several years, it may seem somewhat dilapidated and rundown. Generally, large, robust looking nests have been used for several consecutive years, with each year, more sticks and branches being added to the structure. In drier areas of the province, where decomposition rates are slower, some nests may be over 20 years old and may persist for many years more.

The condition of the nest and the lack of sightings of a species associated with it should not be equated to the nest being inactive or abandoned. More importantly, any fresh signs of prey remains or whitewash at the base of the nest tree, generally indicates that the nest is active (see Table A-1). Some raptor species will not attempt to breed or nest during years when there are low prey populations or long periods of poor weather conditions, or if disturbed in late winter on their territory. The monitoring for activity is important to determine if a nest is being used that year so that licensees can plan activities in the area, or know if time restrictions will apply.

Table A - 1: Descriptions of evidence of raptor use.

Evidence of Use	Description
Whitewash	Bird feces that are usually found at the base of the nest tree, on the ground, or on the foliage of low shrubs and herbs. Typically white to light gray for raptors and light to dark gray for herons and corvids. At the beginning of the nesting season, only small amounts are found at the base of the nest tree. As young birds begin to mature, they defecate over the side of the nest and a large amount can collect at the base of the nest tree.
Prey Remains	Any discarded part of the prey. Includes: feathers, fur tufts, bones, internal organs, entire skeletons or carcasses
Pellets	Pellets are regurgitated castings of indigestible parts of prey, mostly feathers, fur and bones. They are generally light gray in colour, but at times, dark gray when wet or made up of dark coloured prey. Sausage-shaped and small, pellets are from 1-4 cm in length and 1.5 cm in diameter, no larger than a person’s thumb.
Raptor Feathers	Normally only the larger tail and wing feathers are found. They vary in size depending on the species, but generally are >15 cm in length. Raptor feathers are generally tan to brown in colour and can either be solid in colour, mottled or barred.

What to do if no birds are seen at the nest

Conduct call playbacks

Some raptor species can be quite vocal near their nest tree at certain stages, in particular, Red-tailed Hawk, Sharp-shinned Hawk, Northern Goshawk and Great Horned Owl. Workers doing surveys need to be familiar with raptor calls and listen for them while searching. Call playbacks can be conducted for these vocal raptor species by using recordings of their calls and broadcasting them through a megaphone in the area of interest. Nesting birds often attribute the recorded calls to intruding birds and may fly in to defend their territory against them, or may become very quiet when incubating.

Some raptor species may also respond to the calls of a different raptor species being broadcast in their nesting territory, e.g., playing a taped Northern Goshawk call may elicit a response from a Sharp-shinned Hawk or jay and vice versa. See Resources Information Standards Committee (RISC) manual – Inventory Methods for Raptors for standardized methodologies for conducting raptor call playbacks and surveys (<http://srmwww.gov.bc.ca/risc/>).

In addition to RISC standards, success will depend on the knowledge and experience of the observer, particularly for identifying more cryptic sounds and signs. This expertise is typically outside of normal forestry training and experience. Inexperienced observers generally have low success rates detecting raptors. It is important that such survey results are not interpreted as the absence of birds.

Search for alternate nests

Most raptor species build alternate nests, which are additional nests in different trees located within the nest stand. Some individual birds may build over 10 alternate nests, but typically <5 are built, and occasionally, none at all. Alternate nests are used if damage or disturbance occurs at the main nest tree, if nests are unsuccessful, or for other reasons. Some alternate nests may never be used again, but it is difficult to tell which ones have been permanently abandoned as they might be used only once every five years, or even less frequently.

Generally, alternate nests are clustered within 500 m of one another, but more typically, within 150 m of one another. If a large stick nest is found and no adult birds are observed, alternate nests should be searched for within the rest of the area of interest, as there is a good probability that there are other nests in the vicinity.

Plucking posts should also be searched for and can be used as a clue to the location of nest trees. Plucking posts are typically, stumps, snags, large branches, root wads, ridge crests, or dirt mounts that are in visual distance of the nest. Plucking posts are where raptors pluck their prey before taking it back to the nest. Nest trees are often found within the near vicinity of plucking posts, typically within 100 m. Multiple prey remains at a plucking post are a good indication of an active nest in the area.

CAUTION: At times, raptor feathers can be found at the base of the nest tree. Raptor feathers can be difficult to identify to species, as many look similar. If a feather can be identified to a particular species of raptor, it does not necessarily indicate that this species is using the nest, as larger raptors will prey upon smaller raptors. Consequently, the identified feather may be a prey remain, not a feather from the species using the nest.

Appendix 4. List of Technical Reviewers

WHF	Technical Reviewer
Fisheries Sensitive Features	<ul style="list-style-type: none"> Peter Tschaplinski, Research Br., Min. Forests, Victoria, BC
Mineral Licks and Wallows	<ul style="list-style-type: none"> Dale Seip, Wildlife Ecologist, Min. Forests, Prince George Forest Region, Prince George, BC
Specified Nests and Large Stick Nests	<ul style="list-style-type: none"> Anne Hetherington, Wildlife Biologist, Min. Water, Land and Air Protection, Smithers, BC Erica McClaren, Endangered Species Biologist, Min. Water, Land and Air Protection, Nanaimo, BC
Sharp-tailed Grouse Leks	<ul style="list-style-type: none"> Doug Jury, Wildlife Biologist, Min. Water, Land and Air Protection, Kamloops, BC
Ungulate Natal Areas	<ul style="list-style-type: none"> Harold Armleder, Wildlife Ecologist, Min. Forests, Williams Lake, BC
Ground Dens	<ul style="list-style-type: none"> Stefan Himmer – Bear Biologist, Arctos Wildlife Services, Bella Coola, BC Tony Hamilton, Wildlife Biologist, Biodiversity Br., Min. Water, Land and Air Protection, Victoria, BC
Black Bear Den Trees	<ul style="list-style-type: none"> Stefan Himmer, Arctos Wildlife Services, Bella Coola, BC Tony Hamilton, Wildlife Biologist, Biodiversity Br., Min. Water, Land and Air Protection, Victoria, BC
Snake Hibernacula	<ul style="list-style-type: none"> Patrick Gregory, Dept. of Biology, Univ. of Victoria, Victoria, BC Jared Hobbs, Identified Wildlife Biologist, Biodiversity Br., Min. Water, Land and Air Protection, Victoria, BC
Bat Hibernacula and Maternity Roosts	<ul style="list-style-type: none"> Robert Barclay, Dept. of Biological Sciences, Univ. of Calgary, Calgary, AB
Hot Springs	<ul style="list-style-type: none"> Ted Lea, Vegetation Ecologist, Biodiversity Br., Min. Water, Land and Air Protection, Victoria, BC
Non-classified wetlands and Ephemeral Ponds	<ul style="list-style-type: none"> Roger Packham, Ecosystem Specialist, Min. Water, Land and Air Protection, 100 Mile House, BC