

# Badger Wildlife Habitat Decision Aid

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## Introduction

Under the *Forest and Range Practices Act*, forest and range licensees in British Columbia are required to develop Forest Stewardship Plans and manage their operations to maintain limiting habitats of *Identified Wildlife* within their tenures. North American badgers (*Taxidea taxus*) are large members of the weasel family that are a *Species At Risk* within the Identified Wildlife Management Strategy (IWMS) and are listed as *Endangered* by COSEWIC. Several aspects of their ecology make them susceptible to forest and range management activities, including their dependence on the grassland, open forest, and modified forested habitat that supports their prey. This Wildlife Habitat Decision Aid (WHDA) summarizes the latest scientific and experiential information that forest and range managers, including silviculture planners, operational foresters, and ranchers, need to consider when managing for badger habitat requirements. This information was obtained through a literature review and discussions with researchers studying badger ecology in British Columbia.

The WHDA format has been used to convey information on factors requiring consideration when managing forests and range in British Columbia for specific wildlife species. This WHDA provides information on habitat features needed by badgers for reproductive dens, resting sites, and foraging habitats; biogeoclimatic zones where badgers occur; and considerations when conducting harvesting, silviculture activities, or livestock grazing in badger range. We provide a map of the distribution and list the biogeoclimatic zones in which badgers occur to help users identify where to apply management considerations. Also included is a valuable resource and reference list that contains more detailed information. Most reference material that is not available online can be ordered through libraries.

## Acknowledgements

The preparation and publication of this decision aid was supported by the Province of British Columbia through Forest Investment Account – Forest Science Program funding. The authors would like to thank the numerous colleagues who provided key information and reviews during the elaboration of this WHDA. Special thanks to Richard Klafki (Thompson Rivers University), Roger Packham (BC Ministry of Environment), Eric Lofroth (BC Ministry of Environment), Harry Jennings (BC Ministry of Forests and Range), Harold Armleder (BC Ministry of Forests and Range), Trevor Kinley (Sylvan Consulting), John Surgenor (BC Ministry of Environment), Kathie Swift (FORREX), and four anonymous reviewers from the BC Ministry of Forests and Range Ecosystem Restoration and Range programs.

**KEYWORDS:** *badger, denning, foraging, forest planning, harvesting, home range, mustelid, range management, Taxidea taxus jeffersonii (badger), reproduction, resting, silviculture, wildlife habitat.*

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## Badger – Southern Interior



Philippe Verkerk

### Description

Badgers are stout, shaggy animals with distinctive black and white facial markings and a short tail. About 6–14 kg in weight and 65–90 cm long, these short-legged animals seem to flow along the ground. The fur is short on the back and longer on the sides, giving the badger a squat, flattened appearance. Badgers have silver-grey to yellow-brown upperparts with some intermixing of black and buff. Their undersides are lighter, usually grey, buff, or cream. The feet and lower legs are black. The striking black and white markings on the head include a conspicuous white stripe along the midline of the head, from the nose to base of the neck; black fur around the eyes and on the side of the snout; and a triangular black patch, surrounded by white fur, on the side of the face. These black “badges,” one on each cheek, are the basis for the badger’s name.

### Diet

Badgers have well-adapted, powerful forearms and long claws that allow them to dig for prey successfully. They are the only predator in British Columbia specialized to capture burrowing rodents. Primary prey for badgers include Columbian ground squirrels, mice and voles, and muskrats. Badgers will also consume other types of small mammals, birds, reptiles, and fish. Badgers are generally active year-round, but their primary prey are not. Hence, they may occasionally kill and cache large numbers of ground squirrels or spend the entire winter occupying a single colony, eating the hibernating prey.

### Distribution

In British Columbia, badgers are most common in the dry interior grasslands and open forests of the Thompson, Okanagan, Cariboo, and East Kootenay regions. Badgers also occur in some logged or burned mid- and upper-elevation forests in these regions.

### Biogeoclimatic subzones<sup>a</sup> where badgers are most commonly found

PPdh	MSdm
PPxh	MSxk
BGxh	ESSFdc
BGxw	ESSFdk
IDFdm	ESSFxc
IDFhx	ICHmk
IDFdk	ICHxw
IDFhx	SBSdw
IDFmw	SBPSmk
MSdk	

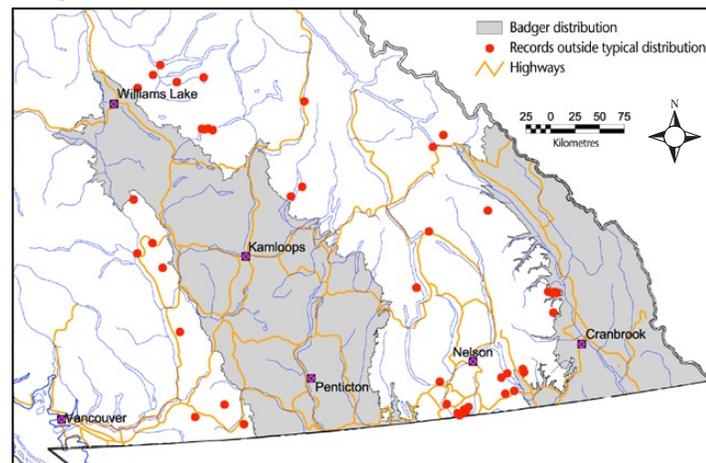
<sup>a</sup> See Meidinger and Pojar (1991) for an explanation of Biogeoclimatic Ecosystem Classification (BEC) zone, subzone, and variant abbreviations.

### Habitat

#### General considerations

- Badgers rely on open habitats throughout the year. Little or no tree cover, abundant grass and forb cover, and soils suitable for digging usually typify habitats that support badgers.
- Badgers occasionally use subalpine and alpine habitats where ground squirrels and marmots occur.
- Badgers have large home ranges and require substantial tracts of suitable habitat. Female home ranges average 5–20 km<sup>2</sup> (but may be as large as 85 km<sup>2</sup>) and often extend along valley bottoms. Male home ranges average 50–100 km<sup>2</sup> (and may be up to 800 km<sup>2</sup>). Despite large home ranges, badgers are non-migratory and use the entire territory throughout the year.
- Because of large home ranges, badgers cross roads frequently. Getting struck and killed on roads is the primary cause of death among badgers in British Columbia.

### Badger distribution in British Columbia



*Distribution of badgers in British Columbia, showing records from outside of areas that usually support the species. Map elaborated in March 2009 by Richard Weir with data courtesy of Roger Packham (BC Ministry of Environment), Richard Weir, and Helen Davis (Artemis Wildlife Consultants), and Nancy Newhouse and Trevor Kinley (Sylvan Consulting).*

- The best indication of recent badger activity in an area is the presence of freshly dug badger burrows. A badger burrow differs from those dug by other species by its slightly elliptical shape (about 20–30 cm wide and 15–25 cm high). Conspicuous claw marks, 3–5 cm apart, may be seen along sides and tops of burrow tunnels. Holes dug by coyotes, foxes, and domestic dogs are usually



Richard Klafki

Badger burrow.

triangular with the height of the entrance much larger than the width. Burrows dug by ground squirrels and yellow-bellied marmots are more-or-less round with a smaller width (10–15 cm) than badger burrows.

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### Habitat (continued)

- Although badgers are usually considered a creature of the grasslands, habitats only need two features to support badgers—prey to eat and suitable soils in which to dig. Thus, badgers are also found in some forested environments having these characteristics.
- Badgers generally only occur where colonial burrowing rodents are common, although in the southern Cariboo badgers can occur in areas without colonial burrowing rodents.

### Prey habitat

- Ground squirrels rely on habitats with little tree cover, abundant forb cover, easily dug soils, and moderate soil moisture. They are occasionally associated with highly disturbed moist sites that have been overgrazed by livestock.
- Yellow-bellied marmots require habitats with little tree cover, considerable forb cover, and security cover provided by objects such as rock piles or abandoned buildings.
- In forested biogeoclimatic zones, prey colonies are usually associated with modified sites, such as cutblocks, logging landings, and debris piles of logs and soil.
- Patches of suitable prey habitat need to occur close (e.g.,  $\leq 1$  km) to each other to support dispersal and establishment of sustainable prey colonies.

### Burrowing habitat (soil conditions)

- Soil plays a key role in the abilities of badgers to dig, catch prey, and make the burrows in which to rest and rear young (maternal dens).
- Silty, fine sandy, and loamy soils are optimal. These soil types are easy to dig into, are stable, and have unique moisture-wicking properties, which allow a large warm-bodied animal to live comfortably underground.
- Badgers may occasionally burrow into clay or sandy soils; however, these types are difficult to dig, collapse easily, and do not wick moisture away.
- Soils with more than 20% coarse fragments (e.g., stones and rocks) by volume are less suitable

for burrowing; however, badgers seem to tolerate areas with higher coarse fragment contents (e.g., cutblocks) if abundant ground squirrel populations are present.

### Grassland and open forest habitat

- Badgers are usually associated with open productive sites that support ground squirrels or marmots. These sites are often on the edges of agricultural areas, such as pastures, golf courses, and irrigated fields.
- Low-elevation, open forests of ponderosa pine and Douglas-fir can also support badgers and their prey, especially in the Rocky Mountain Trench.
- In areas where Columbian ground squirrels are absent (e.g., southern Cariboo), badgers may rely on prey species that require healthy grassland communities (e.g., microtine rodents) with high variance in structure (e.g., areas with short stubble; tall stubble; mixed grass and shrub; and mixed grass, shrub, and forb).

### Forested habitat

- Forest harvesting may benefit badgers by increasing the amount of open, early successional forests preferred by Columbian ground squirrels and other prey. Regenerating stands in these areas, which have high densities of Columbian ground squirrels and soils suitable for digging, can support badgers. These sites are typified by the following.
  - Open, not satisfactorily restocked (NSR) or not free-growing cutblocks (i.e., typically  $< 20$  years old).
  - Road cuts and edges of abandoned gravel pits (borrow pits) used for road construction, as these sites may expose good burrow sites.
  - Silty, fine sandy, or loamy soils with few coarse fragments.
- Badgers that occur in forested areas with predominately morainal deposits (e.g., portions of ESSF, MS zones) may be somewhat limited to using disturbed soils (e.g., overburden, road fill) or small glaciofluvial sites.
- Forested habitats need to be close to open forests or grasslands to facilitate occupation by badgers.

### Current habitat protection measures

- On Crown land, Wildlife Habitat Areas (WHAs) for badgers, which are often between 2 and 100 ha, can be identified to protect important habitat such as concentrations of burrow

sites (especially maternal dens) and prey species or suitable soil habitat.

- Stated objectives of WHAs for badgers are to:
  - maintain important habitat features including suitable soils and prey;
  - control forest encroachment and in-growth;
  - protect existing burrow complexes from machine disturbance and degradation;
  - manage livestock grazing to maintain suitable habitat for prey species; and
  - minimize disturbance of badgers during the breeding season.

### Forest management considerations

**Open forest zones:** PP (non-grassland phases), IDFxh, IDFxk

**Forested zones:** IDFdK, IDFdm, IDFmw, MS zones, ESSF zones, ICH zones

### Harvesting considerations (stand level)

- In low-elevation open forests, harvesting to support ecosystem restoration will promote use of sites by badgers and their prey. This may entail manual slashing and thinning of conifers less than 12.5 cm DBH followed by a broadcast prescribed burn. This may be in concert with regular forest harvesting activities.
- Reducing forest in-growth and encroachment will increase areas of grassland and open forest, which will also facilitate use of sites by badgers. This can be achieved by the following suggested targets based on expert opinion.
  - In late-seral open forests, target is 20 stems per hectare and 15% or less canopy by retaining veteran trees of greater than 40 cm DBH and maintaining widely spaced seedlings.
  - In mid-seral open forests, target is less than 75 stems per hectare.
- In areas with suitable soils (i.e., silty, fine sandy, or loamy soils), forest harvesting will reduce tree cover and promote forb productivity of a site for at least 20 years. If open areas are maintained in regenerating cutblocks, the badgers and their prey may be capable of colonizing and using these ephemeral habitats.

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- In forested zones, forest harvesting in sites with soils suitable for digging and that are close to existing prey populations may increase the amount of habitat available to badgers.
- Badgers occasionally use forested sites for burrowing. If badger burrows are encountered during cutblock layout or harvest, then these burrows should not be disturbed.
  - Establish Wildlife Tree Patches around burrows found in forested sites whenever possible.
  - Avoid woody debris accumulation and skidding over existing burrows.
  - Establish machine-free zones to avoid damaging burrows and use a feller-buncher to harvest and extract trees. The IWMS account for badgers recommends a machine-free zone (20 m radius) around the burrow to reduce machinery impacts and soil disturbance. A feller-buncher should be able to extract trees 6–8 m into this zone without affecting burrow integrity.

### Harvesting considerations (landscape level)

Configuring rotations and harvest schedules to enhance badger habitat can help facilitate their persistence in forested habitats and maintain healthy source populations for recolonization of other areas. Using local badger experts may help to identify priority areas for this type of management.

- Plan landscape cutting pattern and timing to promote connectivity to grassland habitat and open forest biogeoclimatic zones. Enhance connectivity for prey species by considering linkages for ground squirrel colonization and distribution of NSR stands across the landscape. This can be achieved by situating cutting units within 1 km of other cutblocks less than 20 years old, NSR stands, or existing grassland habitats.
- Restrict access to active maternal areas between 1 April and 15 August. Active areas may be identified by repeat sightings of family groups (> 1 badger) or other means (e.g., radio-telemetry). Active closures need only be in place for the current season.
- Deactivate established roads after resource extraction is complete in areas that support badgers.

### Silviculture considerations

Regeneration of harvested stands can impede the supply of prey for badgers by increasing canopy cover and reducing forb production. Several opportunities exist to maintain habitat for badger prey at sites in which prey colonies have become established.

- Site preparation activities can promote colonization of cutblocks by burrowing prey, which help support use of these sites by badgers. Examples include the following.
  - Mound debris (wood waste) into three or more piles about 5 × 3 × 5 m on the edges of landings and other cleared areas to provide sites for yellow-bellied marmot and Columbian ground squirrel colonies.
  - Prescribed burning (where appropriate) to increase the production of herbaceous plants that promote the establishment of ground squirrel colonies.
- Within regenerating cutblocks, ground squirrels and other badger prey are negatively affected by increasing crown closure; therefore, reducing stocking densities to less than 150 stems per hectare may help maintain prey colonies where they occur. Cutblocks in silty, fine sandy, or sandy soils (glaciofluvial or glaciolacustrine deposits) are more likely to support persistent colonies of badger prey than those with other soil types.
- Unplanted openings, whether natural or artificial (e.g., landings, areas with soil compaction), allow ground squirrels to occupy regenerating cutblocks for longer periods until these sites either fill in naturally with conifers or retain their natural open characteristics.
- Outside of regenerating cutblocks, maintaining cleared areas (e.g., landings, road rights-of-way) in a grass or forb stage will help support badger prey.

### Growth and yield implications

- Relaxing free-to-grow standards and stocking densities of cutblocks may reduce volume productivity.
- Licensees may benefit from lower costs associated with reducing stocking densities in areas where badger prey occur.
- Although ground squirrels consume primarily forbs, the likelihood of damage to seedlings and saplings from increased ground squirrel populations in regenerating forests is largely unknown.

### Range management considerations

- Grassland zones:** BG (all subzones), PPxh1a, PPxh2a, IDFxh1a, IDFxh2a, IDFdK1a, IDFdK2a
- Open forest zones:** PP (all subzones other than grassland phases), IDFxh, IDFxk
- Forested zones:** IDFdK, IDFdM, ICHmk, ICHxw

Range practices on Crown land, especially in areas outside of WHAs, play a prominent role in maintaining and enhancing habitats for badgers and their prey.

- Badger burrows pose a very low risk to livestock; fences or burrows excavated by badger prey are more likely to injure livestock.
- Most grazing in grassland zones is compatible with habitat conservation for badgers providing that prey are not actively removed (i.e., poisoning, shooting).
- Concentrated livestock use of an area can disturb sensitive badger burrows. Avoid placing livestock attractants (i.e., salt blocks) in areas with abundant badger burrows.
- Grazing patterns can be managed to ensure conditions that support prey species. This includes abundant habitat cover for small mammals and maintaining vegetation in various successional stages to support colonial rodents. In grassland areas, this can be achieved by:
  - maintaining heavily grazed sites to a minimum of 15 cm stubble height and most of sites with stubble substantially higher;
  - retaining 40% or more native vegetation cover in mid-August;
  - deferring grazing on bunchgrass portions of range unit until late spring;
  - using rest-rotation grazing; and
  - excluding livestock from heavily grazed pastures.

### Monitoring recommendations

Monitoring the occurrence of badgers is a key component of the recovery of their populations. If badgers or badger burrows are found anywhere in British Columbia, please pass along this information to the Badger Recovery Team (1-888-223-4376). Experts from the recovery team will be able to provide recommendations to address site-specific issues.

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Recent badger information and updates are available online at: [www.badgers.bc.ca](http://www.badgers.bc.ca)

ARTICLE RECEIVED: March 1, 2009

ARTICLE ACCEPTED: March 31, 2009



Production of this article was funded, in part, by the British Columbia Ministry of Forests and Range through the Forest Investment Account–Forest Science Program.

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## Test Your Knowledge . . .

### *British Columbia's Southern Interior: Badger Wildlife Habitat Decision Aid*

How well can you recall some of the main messages in the preceding Extension Note?

Test your knowledge by answering the following questions. Answers are at the bottom of the page.

1. What is the average home range for a male badger?
  - A) 5–20 km<sup>2</sup>
  - B) 20–50 km<sup>2</sup>
  - C) 50–100 km<sup>2</sup>
2. Badger burrows can be differentiated from those dug by other species because . . .
  - A) They are triangular in shape with the height of the entrance much larger than the width
  - B) They are slightly elliptical in shape; about 20–30 cm wide and 15–25 cm high
  - C) They are more-or-less round and 10–15 cm wide
3. Although badgers are usually considered a creature of the grasslands, habitats need only two features to support badgers:
  - A) Abundant forb cover and disturbed soils
  - B) Freshly dug burrows and healthy grassland communities
  - C) Prey to eat and suitable soils in which to dig

### ANSWERS

1. C Male home ranges average 50 to 100 km<sup>2</sup> and may be up to 800 km<sup>2</sup>.
2. B Conspicuous claw marks, 3–5 cm apart, may also be seen along sides and top of the burrow tunnel.
3. C Thus, they are also found in some forested environments with these characteristics.