SPECIES ACCOUNT

Species Data

Common Name:	Badger
Scientific Name:	*Taxidea taxus jeffersonii*
Species Code:	M-TATA
BC Status:	Red-listed
Identified Wildlife Status:	V2004
COSEWIC Status:	Endangered

Project Data

Project Name:	Vernon Commonage Sensitive Ecosystems Inventory
Project Type:	Terrestrial Ecosystem Mapping
Area:	Central Okanagan
Ecoprovince:	Southern Interior
Ecoregions:	Thompson-Okanagan Plateau
Ecosections:	Northern Okanagan Basin (NOB)
BGC Units:	IDFxh1
Map Scale:	1:15 000

Distribution

Provincial Range

Badgers are concentrated in drier areas of the Kootenays and southern interior, extending into the central interior as far north as Alexis Creek and Quesnel Lake (Adams and Kinley 2004). Badgers are most common in the bunchgrass grasslands and open ponderosa pine forests in valleys of the Cariboo and Thompson-Nicola areas, and from the Okanagan valley through to the southern Rocky Mtn. Trench (Rahme et al. 1995).

Badger distribution in BC is correlated with the occurrence of major prey species and preferred biogeoclimatic zones: Bunchgrass (BG), Ponderosa Pine (PP), and Interior Douglas-fir (IDF) (Rahme et al. 1995, *jeffersonii* Badger Recovery Team 2004). Other zones they have been reported from include: Interior Cedar-Hemlock (ICH), Montane Spruce (MS), Sub-Boreal Pine-Spruce (SBPS), Sub-Boreal Spruce (SBS), Engelmann Spruce-Subalpine Fir (ESSF) and even Alpine Tundra (AT) (Newhouse and Kinley 2000a, Apps et al. 2001, Weir et al. 2003, Adams and Kinley 2004).

Elevation Range

Badgers occur from 300 m up to about 2800 m, but occurrence is usually greatest near valley bottoms (Adams and Kinley 2004).

Distribution in the Project Area

Numerous observations have been reported from the Vernon and Kelowna area, and a few in higher elevations to the east of the study area (Ministry of Environment. 2005). Several records occur on the Commonage, but are confined to the area around the Allan Brooks Nature Centre and surrounding DND lands.

Ecology and Habitat Requirements

Badgers are solitary, nocturnal carnivores of open habitats, highly specialized for digging and spending much of their time in underground burrows. Badgers are less active in the winter and spend most of their time in burrows (Weir et al. 2003, *jeffersonii* Badger Recovery Team 2004), and will occasionally enter a state of torpor (Messick and Hornocker 1981, Apps et al. 2001). Burrows are used throughout the growing season as well, especially during the day and for maternity sites. A new burrow may be dug each day in summer, but are often reused, while one burrow may be used for the entire winter (Sargeant and Warner 1972, Long 1973). Burrows have an elliptical entrance 20-30 cm wide, and maternity dens have branched main channels and side tunnels (Lindzey 1976). Mating occurs in June and July (Weir et al. 2005), but implantation is delayed until February and young are born about April (Adams and Kinley 2004); this allows Badgers to mate in summer when they are the most active and likely to interact, and raise young in the spring when food is most abundant. Litter size is generally one to four (Messick and Hornocker 1981), but appears to be lower in BC, at one or two young per litter (Newhouse and Kinley 2004). Young disperse in their first summer, and may travel up to 110 km to locate a suitable home range (Messick and Hornocker 1981). Only yearling or older males will reproduce, but some females will mate their first summer, at an age of only four to five months (Messick and Hornocker 1981).

Badgers generally hunt for fossorial or semi-fossorial prey, primarily Columbian Ground Squirrels, Northern Pocket Gophers and Yellow-bellied Marmots (Hoodicoff 2003). Badgers are opportunistic and will also eat other rodents, amphibians, snakes, hares, chipmunks, birds, eggs, insects, fish, carrion and even vegetation when prey availability is low (Rahme et al. 1995, Cannings et al. 1999, Newhouse and Kinley 2000a, Hoodicoff 2005, Kinley and Newhouse 2005).

Home range sizes vary considerably, with male home ranges larger than those of females. Overlap occurs between neighboring animals, particularly during the breeding season (Messick and Hornocker 1981, Newhouse and Kinley 2002b, Hoodicoff 2003). Home range sizes in BC appear to be much larger than further south in their range, with female and male home ranges, respectively, up to 11 and 258 km^2 in the Thompson (Hoodicoff 2003) and averaging 35 and 301 km^2 in the East Kootenays (Kinley and Newhouse 2005). Core areas within home ranges are used more extensively (average of 82% of telemetry locations in the Thompson), particularly in fall and winter (Hoodicoff 2003).

Unfortunately, Badgers have not been studied extensively in the Okanagan. Telemetry studies in the Thompson and East Kootenay have been based on samples of predominantly male animals, and male home ranges are thought to be largely influenced by the distribution of females, while female home ranges are based on resources such as suitable soils for burrowing and food availability (Minta 1993). The large home ranges of male Badgers in BC may be related to the low density of females (Hoodicoff 2003).

Badgers appear relatively tolerant of human disturbance, and have been observed in agricultural, rural and even urban areas (Hoodicoff 2003). Despite their valuable role in control of rodents such as marmots and pocket gophers, Badgers have often been persecuted as pests (Adams and Kinley 2004), as have their prey species. Highway and train rights-of-way are often used for burrowing and as travel corridors, and road or train mortality in the Thompson area has been reported as 36% to at least 46% of deaths, although the studies may have been biased towards animals located close to transportation corridors (Hoodicoff 2003, Weir et al. 2003, Weir et al. 2005). In an Idaho study area, highway mortality was 59% of Badger deaths, or 65% excluding animals shot for study purposes (Messick and Hornocker 1981).

General Living (Food and Security/Thermal Habitat)

Badgers require deep, friable soils for digging and abundant prey, particularly pocket gophers, ground squirrels or marmots (Rahme et al. 1995). They occur most commonly in open habitats of lower elevations (BG, PP and IDF biogeoclimatic zones) of the dry interior valleys.

Habitats preferred by Badgers were generally associated with relatively open forest or non-forest, both natural and anthropogenically-altered, including grassland, cultivated fields and pastures, and road and powerline rights-of-way, and negatively associated with canopy closure (Apps et al. 2002, Weir et al. 2003). Sites with 35% tree cover or less were preferred; sites with 6-15% cover were highly preferred; and sites with 0-5% were used extensively (Newhouse and Kinley 2000a). Most burrows were located in habitat types dominated by grasses and low shrubs (Hoodicoff 2003).

Soils characteristics appear to be the most important factor in habitat suitability, related to both burrowing (ease of digging and burrow stability) and availability of fossorial prey. Burrows generally tend to be located in glaciofluvial and glaciolacustrine soils, of generally medium texture (silt loam to sandy loam) with low to medium (<35%) coarse fragment content (Newhouse and Kinley 2000a, Newhouse and Kinley 2000b, Apps et al. 2001, Apps et al. 2002, Hoodicoff 2003, Weir et al. 2003, Hoodicoff 2005).

Although grasslands and open forests that are overgrazed have lower carrying capacities for rodents and Badgers (Rahme et al. 1995), many ground squirrel colonies exploited by badgers were on lands that had been heavily grazed (Newhouse and Kinley 2000a). Where ground squirrels are absent, Badgers are more reliant on small mammals that inhabit well-structured grasslands, and livestock grazing may affect prey populations (*jeffersonii* Badger Recovery Team 2004).

Badgers have been positively associated with southern aspects (Apps et al. 2002, Packham 2004), although this does not appear to be a strong or consistent preference. A negative association with slope and terrain ruggedness has been reported as well (Apps et al. 2002), which may be at least partly related to soil texture and/or depth.

Ratings

This model employs a 4-class rating scheme because there is insufficient knowledge of habitat requirements to use a 6-class scheme yet there is sufficient knowledge to go beyond a 2-class rating scheme. This complies with the recommended rating scheme in the RIC (1999) standards manual.

Provincial Benchmark

Ecosection	Unknown (OKR, SOB, NOB, SOH, THB, PAR, FRB, EKT)
Biogeoclimatic Zones	BG, PP, IDF
Habitats	Grasslands, shrub-steppe, open Py/Fd forest

Map Themes

Habitat Use	Life Requisite	Season	Rating Code	Ecosystem Attributes
General Living	Security/ Thermal, Food	All year	LIA	•open habitats with deep, friable soils that are well-drained and medium to slightly coarse texture

Ratings Assumptions

General Living all year – Security/Thermal, Food (LIA)	
Site Series	• Grasslands, shrub-steppe, open Py/Fd forest (<35% canopy cover) and cutbanks rated up to High; other open habitat up to Moderate
Structural Stage	• Early structural stage (2) of closed forest rated up to Moderate
Range Condition	• No effect on rating
Aspect	• No effect on rating
Slope	• Steep rated up to Moderate; very steep rated up to Low
Soil Texture	• Medium textures rated up to High; very fine (clay/silt) and coarse (sandy or high coarse fragment content) rated down 1
Soil Depth	• Shallow rated up to Moderate; very shallow rated Nil

Map Interpretation

One map theme, general living all year (LIA), is portrayed by this model, which includes foraging, denning (security/thermal cover), and birthing (maternity dens). The dot-density method is used to display ratings, which applies dots of various shades (darker =higher suitability) randomly within the polygon, based on the percent area of the polygon receiving that rating. This method indicates the relative amount of area of each of the units occurring in the polygon.

It should be noted that shallow soiled (up to 1 m depth) grassland units may be highly variable, and while they are rated Moderate, actual suitability ranges from High to Nil.

Major transportation corridors, including highways and railways, will be highlighted as areas of potentially high mortality due to their appeal to Badgers and resultant death toll.

Literature Cited

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Badger Suitability - Vernon Commonage