# Ontario Species at Risk Evaluation Report

# for

# American Badger (*Taxidea taxus*)

**Committee on the Status of Species at Risk in Ontario (COSSARO)**

**Northwestern Ontario population (*Taxidea taxus taxus*)**
**&**
**Southwestern Ontario population (*Taxidea taxus jacksoni*)**

**Assessed by COSSARO as ENDANGERED**

**May 2014**

**FINAL**

**Population du nord-ouest de l'Ontario (*Taxidea taxus taxus*)**

Le blaireau d'Amérique (*Taxidea taxus*) est un carnivore solitaire de taille moyenne, principalement nocturne, de la famille des belettes. Ses griffes puissantes lui permettent de creuser ses tanières et les terriers de ses proies. Il vit dans les prairies à herbes hautes, les forêts ouvertes, les haies et les bordures de champs. Le blaireau se nourrit de marmottes communes, de lapins à queue de coton, d'œufs d'oiseaux, de crapauds, de tamias et d'animaux écrasés sur les routes.

Le blaireau d'Amérique est commun et largement répandu en Amérique du Nord. En Ontario, on le retrouve à l'extrémité nord-est de son aire de répartition dans deux petits secteurs qui représentent deux unités désignables distinctes (populations) et sous-espèces distinctes : une dans le nord-ouest de l'Ontario (*Taxidea taxus taxus*) et une dans le sud-ouest de l'Ontario (*Taxidea taxus jacksoni*).

Bien que les blaireaux soient peu nombreux dans le nord-ouest de l'Ontario, on les voit régulièrement, surtout dans la région de Rainy River. Il se peut qu'il n'y en ait que cinq, mais aucun relevé détaillé n'a été effectué. En Ontario, le blaireau est surtout menacé par la perte d'habitat et la mortalité sur les routes. La population de blaireaux d'Amérique du nord-ouest de l'Ontario est considérée comme une espèce en péril en raison de son nombre limité et de son aire de répartition de petite taille.

**Population du sud-ouest de l'Ontario (*Taxidea taxus jacksoni*)**

Le blaireau d'Amérique (*Taxidea taxus*) est un carnivore solitaire de taille moyenne, principalement nocturne, de la famille des belettes. Ses griffes puissantes lui permettent de creuser ses tanières et les terriers de ses proies. Il vit dans les prairies à herbes hautes, les forêts ouvertes, les haies et les bordures de champs. Le blaireau se nourrit de marmottes communes, de lapins à queue de coton, d'œufs d'oiseaux, de crapauds, de tamias et d'animaux écrasés sur la route.

Le blaireau d'Amérique est commun et largement répandu en Amérique du Nord. En Ontario, on le retrouve à l'extrémité nord-est de son aire de répartition dans deux petits secteurs qui représentent deux unités désignables distinctes (populations) et sous-espèces distinctes : une dans le nord-ouest de l'Ontario (*Taxidea taxus taxus*) et une dans le sud-ouest de l'Ontario (*Taxidea taxus jacksoni*).

On estime la population du sud-ouest de l'Ontario à moins de 200 individus, dont la plupart ont été observés dans la région de Norfolk et de Middlesex, avec quelques observations aussi loin au nord que les comtés de Grey et de Bruce. En Ontario, le blaireau est surtout menacé par la perte d'habitat et la mortalité sur les routes. La population de blaireaux d'Amérique du sud-ouest de l'Ontario est considérée comme une espèce en péril en raison de son nombre limité.

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## EXECUTIVE SUMMARY


### Northwestern Ontario Population (*Taxidea taxus taxus*)

The American Badger (*Taxidea taxus*) is a medium-sized, mainly nocturnal, solitary carnivore in the weasel family with large, powerful claws suited to excavating dens and digging for prey. It occupies grasslands, open forests, hedgerows, and field edges. The badger eats woodchucks, cottontails, bird eggs, toads, chipmunks, and road-killed animals.

The American Badger is common and widespread in North America. It is at the northeastern edge of its range in Ontario where it occurs in two small areas. These areas represent two distinct designatable units (populations) that reflect different subspecies, one in northwestern Ontario (*Taxidea taxus taxus*) and one in southwestern Ontario (*Taxidea taxus jacksoni*).

The population in northwestern Ontario is small, but supported by consistent sightings, primarily in the Rainy River area. This population could be as small as five individuals, but detailed surveys have not been performed. The major threats to the badger in Ontario are habitat loss and road mortality. The northwestern Ontario population of American Badger is assessed as endangered due to the small population size (Criterion D) and range (Criterion B).

### Southwestern Ontario Population (*Taxidea taxus jacksoni*)

The American Badger (*Taxidea taxus*) is a medium-sized, mainly nocturnal, solitary carnivore in the weasel family with large, powerful claws suited to excavating dens and digging for prey. It occupies grasslands, open forests, hedgerows, and field edges. The badger eats woodchucks, cottontails, bird eggs, toads, chipmunks, and road-killed animals.

The American Badger is common and widespread in North America. It is at the northeastern edge of its range in Ontario where it occurs in two small areas. These areas represent two distinct designatable units (populations) that reflect different subspecies, one in northwestern Ontario (*Taxidea taxus taxus*) and one in southwestern Ontario (*Taxidea taxus jacksoni*).

The population in southwestern Ontario is estimated to be less than 200 individuals. Most observations are from the Norfolk and Middlesex area, with scattered records as far north as Grey and Bruce counties. The major threats to the badger in Ontario are habitat loss and road mortality. The southwestern Ontario population of American Badger is assessed as endangered due to the small population size (Criterion D).

# 1. BACKGROUND INFORMATION

## 1.1 CURRENT DESIGNATIONS

**GRANK**:
**G5T5**: Northwestern Ontario population (*Taxidea taxus taxus)*
**G5TNR**: Southwestern Ontario population (*Taxidea taxus jacksoni)*
(*NatureServe, accessed July 7, 2014*).

**NRANK Canada**:
**N4**: Northwestern Ontario population (*Taxidea taxus taxus)*
**N1**: Southwestern Ontario population (*Taxidea taxus jacksoni)*
(*NatureServe, accessed July 7, 2014*).

**COSEWIC:**
**Special Concern** (2012): Northwestern Ontario population (*Taxidea taxus taxus)*
**Endangered** (2012): Southwestern Ontario population (*Taxidea taxus jacksoni*)

**SARA:**
**No status, no schedule:** Northwestern Ontario population (*Taxidea taxus taxus)*
**Endangered, Schedule 1:** Southwestern Ontario population (*Taxidea taxus jacksoni*)

**ESA 2007**:
**Endangered** (*2008*) (*Taxidea taxus)*
Northwestern Ontario population (*Taxidea taxus taxus)* and Southwestern Ontario population (*Taxidea taxus jacksoni*) are treated under the species name.

**SRANK**: **S2** (*Taxidea taxus)* (based on NatureServe, web site accessed July 7, 2014)
Northwestern Ontario population (*Taxidea taxus taxus)* and Southwestern Ontario population (*Taxidea taxus jacksoni*) are treated under the species name.

## 1.2 DISTRIBUTION IN ONTARIO

There are two recognized designatable units (populations) in the province that reflect different subspecies: *Taxidea taxus taxus* in northwestern Ontario, and *T.t. jacksoni* in southwestern Ontario.

The southwestern Ontario population is concentrated in the Norfolk and Middlesex regions, with scattered observastions as far north as Grey and Bruce counties. Observations in the northwestern Ontario population are primarily from the Rainy River region (Figure 1).

## 1.3 DISTRIBUTION AND STATUS OUTSIDE ONTARIO

The American Badger is common and widespread in North America and is ranked G5 by NatureServe.

*Taxidea taxus taxus* extends from northwestern Ontario west to Alberta and south into Kansas and Missouri. *T.t. jacksoni* has a much smaller range that only includes Ontario, Michigan and Ohio (Figure 3). Appendix 2 provides the status and trends for American Badger for all jurisdictions adjacent to Ontario.

## 1.4 ONTARIO CONSERVATION RESPONSIBILITY

Ontario accounts for much less than 10% of the global range of the *Taxidea taxus taxus* DU (northwestern Ontario) of the American Badger (Figure 2). There is uncertainty about the true global range of the *T.t. jacksoni* DU of the badger; the hard line defining the subspecies range in Figure 2 is based on limited data. Considering the available information, however, it appears that Ontario may account for 10% or less of the subspecies geographic range depicted in Figure 2.

## 1.5 DIRECT THREATS

The major threats to the badger in Ontario are loss of tallgrass prairie, savannah and pasture/hedgerow habitat and mortality on roads (OABRT 2010, COSEWIC 2012); more than 25% of the badger observations in the province have been of road-killed animals (OABRT 2010). These factors may be preventing the badger population from increasing, but more information on limiting factors is needed. As part of the Ontario Badger Project (OBP 2014), burrow searches, hair samples, and radio-collaring are all being used to better understand the relationship between badgers and their habitat in southern Ontario.

## 1.6 SPECIALIZED LIFE HISTORY OR HABITAT USE CHARACTERISTICS

The American Badger is a medium-sized, burrowing, mainly nocturnal, solitary carnivore in the weasel family with large claws on its front feet suited to excavating dens and digging for prey. It will occupy grassland, wetland, and open forest habitat, as well as ravines, orchards, hedgerows, and the edges of agricultural land, provided prey and soils suitable for digging are present (COSEWIC 2012, OBP 2014). The badger eats woodchucks, cottontails, bird eggs, toads, chipmunks, and road-killed animals (COSEWIC 2012, OBP 2014).

**Figure 1.**
Areas where American Badgers were observed in southwestern Ontario (jacksoni population); left panel) and northwestern Ontario (taxus population); right panel) up to 2009, according to OMNR's Natural Heritage Information Centre (NHIC) database. Blue dots indicate either historical or more recent observations.

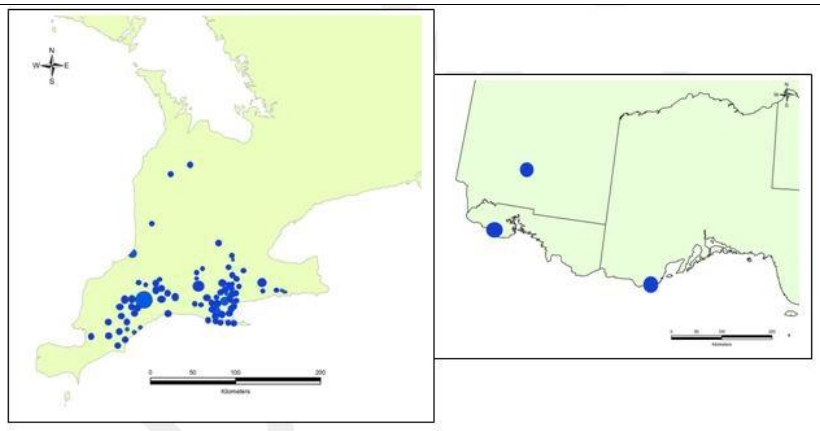

**Figure 2**
Global distribution of the American badger (*Taxidea taxus*), illustrating the ranges of the four recognized subspecies identified by COSEWIC (2012). The *taxus* subspecies also occurs (not illustrated) in a small area in southern northwestern Ontario near the Manitoba-Minnesota border (see Figure 1).

## 2. ELIGIBILITY FOR ONTARIO STATUS ASSESSMENT

### 2.1 ELIGIBILITY CONDITIONS

**Taxonomic Distinctness: Yes.** The America Badger is recognized as a distinct species occurring in Ontario (Banfield 1974; COSEWIC 2012).

**Designatable Units: Yes.** There are two recognized designatable units (populations) in the province that reflect different subspecies: *Taxidea taxus taxus* in northwestern Ontario, and *T.t. jacksoni* in southwestern Ontario (Ethier et al. 2012). Sightings of both subspecies have been consistent and there is evidence of reproduction in both regions of the province (OABRT 2010, Van den Broeck pers. comm.).

**Native Status: Yes**. There are documented occurrences of the species in Ontario since the 1800s, and there is evidence of reproduction in both regions (OABRT 2010).

**Occurrence: Extant.**
Recent observations of both the *Taxidea taxus jacksoni* DU (OBP 2014) and the *Taxidea taxus taxus* DU (John Van den Broeck pers. comm., OMNR biologist, May 2014) confirm that the subspecies are still present in Ontario.

### 2.2 ELIGIBILITY RESULTS
**American Badger** (*Taxidea taxus taxus* and *Taxidea taxus jacksoni*) is eligible for status assessment in Ontario.

## 3. ONTARIO STATUS ASSESSMENT

### 3.1 APPLICATION OF ENDANGERED/THREATENED STATUS IN ONTARIO

**Criterion A – Decline in Total Number of Mature Individuals**

Northwestern Ontario population (*T. t. taxus*): Not applicable
Southwestern Ontario population (*T. t. jacksoni*): Not applicable

COSEWIC (2012) and OABRT (2010) explained that it is difficult to enumerate the American Badger because of its solitary, burrowing, nocturnal habits. However, COSEWIC (2012) concluded that no overall decline in the number of mature individuals has been noted.

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**Criterion B – Small Distribution Range and Decline or Fluctuation**

Northwestern Ontario population (*T. t. taxus*): **Endangered**

Based on Figure 1, the extent of occurrence of the *T. t. taxus* DU of the badger in northwestern Ontario is less than 20,000 $km^2$. The area of occupancy would most likely be < 500 $km^2$ if only the observations since the year 2000 are considered. The number of locations has not been formally updated by NHIC but would represent five or fewer for this DU.

Badgers have been reported consistently in northwestern Ontario, which would technically disqualify the DU from this criterion despite the fact that three or possibly more of the potential requirements were met (B1 - extent of occurrence small enough to qualify at least for Threatened status; B2 - small area of occupancy, B2a - known from few locations, which would potentially qualify the DU for Endangered status. The number of individuals has fluctuated as well (Table 1), although numbers have been too small to assess reliably under B2c(iv) ). On balance, we accept that the DU qualifies as endangered under this criterion.

Southwestern Ontario population (*T. t. jacksoni*): Not applicable

COSEWIC (2012) estimated the extent of occurrence of the *T. t. jacksoni* DU in southern Ontario to be 15,438 $km^2$. However, the area of occupancy is more than 2,000 $km^2$ and the taxon is known from many locations (Figure 1). Therefore, this criterion is not applicable to the *T. t. jacksoni* DU.

**Table 1.** Documented observations of the American Badger in Ontario up to 2008 by time period and county or area. These are not equivalent to NHIC Element Occurrences (EOs) which combine observations into "populations". Data in this table are from the Ontario American Badger Recovery Team (2010). NHIC has more recent observations that have not been assessed yet as EOs (pers. comm. Mike Oldham, OMNR, NHIC). The Ontario Badger Project (OBP 2014) is also accumulating information on recent occurrences in southern Ontario. An occupied denning site, not described in the table, was observed in the Rainy River to Fort Frances area in 2014 (personal communication John Van den Broeck, OMNR biologist).

| Region | County or Area | Pre 1970 | 1970-1979 | 1980-1989 | 1990-1999 | 2000-2008 | Grand Total | Post 1979 Total |
|---|---|---|---|---|---|---|---|---|
| NW Ontario | Kenora/Dryden | | 1 | | | 1 | 2 | 1 |
| | Rainy River to Fort Frances | 4 | 3 | 2 | 4 | 2 | 15 | 8 |
| | Thunder Bay | | | | | 1 | 1 | 1 |
| | Total | 4 | 4 | 2 | 4 | 4 | 18 | 10 |
| SW Ontario | Grey | | | 1 | | 1 | 2 | 2 |
| | Bruce | | | 1 | | | 1 | 1 |
| | Huron | 1 | 1 | | | | 2 | 0 |
| | Lambton | 1 | 1 | | 1 | 2 | 5 | 3 |
| | Middlesex | 1 | 8 | 5 | 3 | 4 | 21 | 12 |
| | Kent | 5 | 5 | 3 | | 1 | 14 | 4 |
| | Elgin | 4 | 6 | | | | 10 | 0 |
| | Oxford | | | | 2 | 3 | 5 | 5 |
| | Norfolk | 2 | 10 | 17 | 10 | 17 | 56 | 44 |
| | Haldimand | | | 1 | 1 | | 2 | 2 |
| | Waterloo | | 1 | | | 1 | 2 | 1 |
| | Brant | | | | | 4 | 4 | 4 |
| | Wentworth | | | | | 1 | 1 | 1 |
| | Northumberland | 1 | | | | | 1 | 0 |
| | Total | 15 | 32 | 28 | 17 | 34 | 126 | 79 |
| Ontario | Total | 19 | 36 | 30 | 21 | 38 | 144 | 89 |

**Criterion C – Small and Declining Number of Mature Individuals**

Northwestern Ontario population (*T. t. taxus*): Not applicable
Southwestern Ontario population (*T. t. jacksoni*): Not applicable

The total number of mature American Badgers in Ontario as a whole is estimated to be 200 or fewer (COSEWIC 2012, OABRT 2010). However, neither DU is considered to be declining. Therefore this criterion does not apply to either DU.

**Criterion D – Very Small or Restricted Total Population**

Northwestern Ontario population (*T. t. taxus*): Endangered

The known population in northwestern Ontario could be as small as 5 or fewer badgers, but detailed surveys over the large area where historical observations were made and where there is suitable habitat have not been performed.

Southwestern Ontario population (*T. t. jacksoni*): Endangered

The total number of mature American Badgers in Ontario as a whole is estimated to be 200 or fewer (COSEWIC 2012, OABRT 2010).

**Criterion E – Quantitative Analysis**
A quantitative analysis has not been performed for either population.

**3.2 APPLICATION OF SPECIAL CONCERN IN ONTARIO**
Not applicable
Both populations (DUs) qualify as Endangered under criterion D and therefore Special Concern status does not apply.

**3.3 STATUS CATEGORY MODIFIERS**
**Ontario's Conservation Responsibility**
Not applicable
Ontario accounts for much less than 10% of the global range of the *T. t. taxus* DU (northwestern Ontario) of the American Badger (Figure 2). There is uncertainty about the true global range of the *T. t. jacksoni* DU of the badger; the hard line defining the subspecies range in Figure 2 is based on limited data. Considering the available information, however, it appears that Ontario may account for 10% or less of the subspecies geographic range depicted in Figure 2.

**Rescue Effect**
Potential, but not applied
The state of Michigan contains a population of badgers of the same DU as the those found in southwestern Ontario, it is ranked as S4 (apparently secure – uncommon but not rare) by NatureServe, and genetic analysis suggests similarity between the two areas (COSEWIC 2012). Badgers are capable of dispersing long distances (Messick and Hornocker (1981). Radio-tagged badgers in southern Ontario moved up to 70

kilometers (OBP 2014). The Great Lakes and St. Clair River could provide barriers to movement of badgers into Ontario but COSEWIC (2012) speculated that the American Badger can swim across the St. Clair River. Using genetic analysis, Ethier et al. (2012, p. 636) concluded that the 0.5 km wide St. Clair River that separates Michigan from Ontario "appears to have had a less substantial impact on dispersal of American Badgers between these regions" than the 8 km wide Strait of Mackinac has had on Michigan's two DUs. COSEWIC suggested that urban development along the St. Clair River may preclude successful dispersal of badgers from Michigan to Ontario. However, the OBP (2014) reported that one radio-tagged American Badger was located frequently within the limits of the town of Tillsonburg where it mainly followed ravines, suggesting that moderate urban development does not provide an impenetrable barrier to badgers. Since genetic analysis suggests there has been no isolation to this time, we conclude that dispersal from Michigan to Ontario remains possible but the ability of dispersal to rescue the population may be low.

Sightings (Table 1) compiled by the OABRT (2010) and Skitt and Van den Broeck (2004), and a recent observation (John Van den Broeck, OMNR biologist, personal communication May 2014) indicate that there have been 19 confirmed occurrences of American Badgers overall in northwestern Ontario since the late 1800s. Observations have been very few, but they have been "consistent" since documentation began. The northwestern Ontario observations represent 12% of the total for the province in all periods combined and 11% of the total since 1980 (Table 1). The small population of American Badgers in northwestern Ontario may be the result of "rare, extra-limital forays" from adjacent portions of the *taxus* DU in Minnesota (COSEWIC 2012). The species has not been assigned a G rank in Minnesota based on information provided by NatureServe and is likely to be relatively common there. According to Skitt and Van den Broeck (2004), the northern extent of the population of badgers in Minnesota is 100 km south of the international border between Canada and the USA. Unpublished information from the Minnesota Department of Natural Resources indicates that "low and infrequent numbers [of badgers] are reported in the intervening landscape between the core population in Minnesota and in Ontario" (Skitt and Van den Broeck 2004). This region is more heavily forested and may limit badger dispersal. This suggests that the likelihood of American Badgers dispersing into Ontario in the future remains possible. However, the ability of that dispersal to rescue the population is unknown.

### 3.4 OTHER STATUS CATEGORIES

**DATA DEFICIENT**
Not applicable

**EXTINCT OR EXTIRPATED**
Not applicable

**NOT AT RISK**
Not applicable

## 4. SUMMARY OF ONTARIO STATUS

The **northwestern Ontario population of the American Badger (***Taxidea taxus taxus)* is classified as **Endangered** in Ontario.

This classification is based on the small population size and range in northwestern Ontario, and the apparent fluctuation in the number of locations.

D1: Very small or restricted total Ontario population. Population estimated to be <250 mature individuals.

B2(c) (iii): Small distribution range and decline or fluctuation. The area of occupancy estimated to be <500km$^2$. There are fewer than five locations and apparent fluctuations in the number of these locations.

The **southwestern Ontario population of the American Badger (***Taxidea taxus jacksoni)* is classified as **Endangered** in Ontario.

This classification is based on the small population size of badgers in southwestern Ontario.

D1: Very small or restricted total Ontario population. Population estimated to be <250 mature individuals.

## 5. INFORMATION SOURCES


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## APPENDIX 1: TECHNICAL SUMMARY FOR ONTARIO

**Species:** American Badger northwestern Ontario population (*Taxidea taxus taxus)*

| **Demographic Information** | |
|---|---|
| Generation time.<br>Based on average age of breeding adult: age at first breeding = 1 year; average life span = 6 years. | 3 years |
| Is there an observed, inferred, or projected continuing decline in number of mature individuals? | No |
| Estimated percent of continuing decline in total number of mature individuals within 5 years or 2 generations. | No apparent decline |
| Observed, estimated, inferred, or suspected percent reduction or increase in total number of mature individuals over the last 10 years or 3 generations. | No apparent decline |
| Projected or suspected percent reduction or increase in total number of mature individuals over the next 10 years or 3 generations. | Unknown |
| Observed, estimated, inferred, or suspected percent reduction or increase in total number of mature individuals over any 10 years, or 3 generations, over a time period including both the past and the future. | No apparent decline |
| Are the causes of the decline a. clearly reversible and b. understood and c. ceased? | No apparent decline |
| Are there extreme fluctuations in number of mature individuals? | Unknown |

| **Extent and Occupancy Information in Ontario** | |
|---|---|
| Estimated extent of occurrence.<br>*(Request value from MNRF or use http://geocat.kew.org/)* | < 20,000 km$^2$ |
| Index of area of occupancy (IAO).<br>*(Request value from MNRF or use http://geocat.kew.org/)* | < 500 km$^2$ |
| Is the total population severely fragmented?<br>(i.e. is >50% of its total area of occupancy is in habitat patches that are (a) smaller than would be required to support a viable population, and (b) separated from other habitat patches by a distance larger than the species can be expected to disperse?) | a. No<br>b. Maybe |
| Number of locations (*as defined by COSEWIC*). | 3 |
| Number of NHIC Element Occurrences (*Request data from MNRF)* | Likely 3 |
| Is there an observed, inferred, or projected continuing decline in extent of occurrence? | No |
| Is there an observed, inferred, or projected continuing decline in index of area of occupancy? | No |
| Is there an observed, inferred, or projected continuing decline in number of populations? | No |
| Is there an observed, inferred, or projected continuing decline in number of locations? | No |
| Is there an observed, inferred, or projected continuing decline in [area, extent and/or quality] of habitat? | No |
| Are there extreme fluctuations in number of populations? | Unknown |
| Are there extreme fluctuations in number of locations? | Unknown |
| Are there extreme fluctuations in extent of occurrence? | Unknown |
| Are there extreme fluctuations in index of area of occupancy? | Unknown |

| **Number of Mature Individuals In Each Sub-Population or Total Population (if known)** | |
|---|---|
| Sub-Population (or Total Population) | N of Mature Individuals |
| Northwestern Ontario population (*Taxidea taxus taxus*) | <200. Possibly as low as five. |

| **Quantitative Analysis** |
|---|
| Population viability analysis not conducted. |

| **Rescue Effect** | |
|---|---|
| Is immigration of individuals and/or propagules between Ontario and outside populations known or possible? | Yes |
| Would immigrants be adapted to survive in Ontario? | Yes |
| Is there sufficient suitable habitat for immigrants in Ontario? | Yes |
| Is the species of conservation concern in bordering jurisdictions? | No |
| Is rescue from outside populations reliant upon continued intensive recovery efforts? | No |

**Species:** American Badger southwestern Ontario population (*Taxidea taxus jacksoni)*

| **Demographic Information** | |
|---|---|
| Generation time.<br>Based on average age of breeding adult: age at first breeding = 1 year; average life span = 6 years. | 3 years |
| Generation time.<br>Based on average age of breeding adult: age at first breeding = 3 year; average life span = 10 years. | Average age of breeding adult estimated to be 3 years (COSEWIC 2012) |
| Is there an observed, inferred, or projected continuing decline in number of mature individuals? | No |
| Estimated percent of continuing decline in total number of mature individuals within 5 years or 2 generations. | No apparent decline |
| Observed, estimated, inferred, or suspected percent reduction or increase in total number of mature individuals over the last 10 years or 3 generations. | No apparent decline |
| Projected or suspected percent reduction or increase in total number of mature individuals over the next 10 years or 3 generations. | Unknown |
| Observed, estimated, inferred, or suspected percent reduction or increase in total number of mature individuals over any 10 years, or 3 generations, over a time period including both the past and the future. | Unknown |
| Are the causes of the decline a. clearly reversible and b. understood and c. ceased? | No apparent decline |
| Are there extreme fluctuations in number of mature individuals? | No |

| **Extent and Occupancy Information in Ontario** | |
|---|---|
| Estimated extent of occurrence.<br>*(Request value from MNRF or use http://geocat.kew.org/)* | 15,438 $km^2$ |
| Index of area of occupancy (IAO).<br>*(Request value from MNRF or use http://geocat.kew.org/)* | >2,000 $km^2$ |
| Is the total population severely fragmented?<br>(i.e. is >50% of its total area of occupancy is in habitat patches that are (a) smaller than would be required to support a viable population, and (b) separated from other habitat patches by a distance larger than the species can be expected to disperse?) | a. No<br>b. No |
| Number of locations (*as defined by COSEWIC*). | Many |
| Number of NHIC Element Occurrences (*Request data from MNRF)* | Many |
| Is there an observed, inferred, or projected continuing decline in extent of occurrence? | No |
| Is there an observed, inferred, or projected continuing decline in index of area of occupancy? | No |
| Is there an observed, inferred, or projected continuing decline in number of populations? | No |
| Is there an observed, inferred, or projected continuing decline in number of locations? | No |
| Is there an observed, inferred, or projected continuing decline in [area, extent and/or quality] of habitat? | Yes. Habitat on agricultural land can be expected to decrease (COSEWIC 2012). |
| Are there extreme fluctuations in number of populations? | No |
| Are there extreme fluctuations in number of locations? | No |
| Are there extreme fluctuations in extent of occurrence? | No |
| Are there extreme fluctuations in index of area of occupancy? | No |

| **Number of Mature Individuals In Each Sub-Population or Total Population (if known)** | |
|---|---|
| Sub-Population (or Total Population) | N of Mature Individuals |
| Southwestern Ontario population (*Taxidea taxus jacksoni*) | *<200* |

| **Quantitative Analysis** |
|---|
| Population viability analysis not conducted. |

| **Rescue Effect** | |
|---|---|
| Is immigration of individuals and/or propagules between Ontario and outside populations known or possible? | Possibly |
| Would immigrants be adapted to survive in Ontario? | Yes |
| Is there sufficient suitable habitat for immigrants in Ontario? | Possibly |
| Is the species of conservation concern in bordering jurisdictions? | Possibly |
| Is rescue from outside populations reliant upon continued intensive recovery efforts? | No |

## APPENDIX 2: ADJOINING JURISDICTION STATUS RANK AND DECLINE

| | Subnational Rank* | Population Trend | Sources |
|---|---|---|---|
| Ontario | S2 | | |
| Quebec | Not present | | |
| Manitoba | S4 | | |
| Michigan | S4 | Increasing? Michigan introduced a trapping season in 1989, Over 100 badgers are trapped annually. | Frawley 2012 |
| Minnesota | SNR | Likely common: Minnesota has a hunting and trapping season for badger | MDNR 2014 |
| Nunavut | Not present | | |
| New York | Not present | | |
| Ohio | S2 | Species of Concern | |
| Pennsylvania | Not present | | |
| Wisconsin | S4 | Stable or slight decline | Kahler 2010 |

## APPENDIX 3: COSEWIC QUANTITATIVE CRITERIA AND GUIDELINES FOR THE STATUS ASSESSMENT OF WILDLIFE SPECIES

COSEWIC's revised criteria to guide the status assessment of wildlife species. These were in use by COSEWIC by November 2001, and are based on the revised IUCN Red List categories (IUCN 20012). Some minor changes to definitions were made in 2011 to make COSEWIC criteria more consistent with IUCN criteria. An earlier version of the quantitative criteria was used by COSEWIC from October 1999 to May 2001 (http://www.cosewic.gc.ca/eng/sct0/original_criteria_e.cfm) For definitions of terms, see COSEWIC's Glossary of Definitions and Abbreviations. This table is a short-hand reminder, for more fulsome guidance on applying these criteria see the latest IUCN Redlist guidelines.

| Indicator | Endangered | Threatened |
|---|---|---|
| **A. Decline in Total Number of Mature Individuals** | | |
| A1. An observed, estimated, inferred or suspected reduction in total number of mature individuals over the last 10 years or 3 generations, whichever is the longer, where the causes of the reduction are: clearly reversible **and**understood **and** ceased, based on (and specifying) any of the following:<br>(a) direct observation<br>(b) an index of abundance appropriate to the taxon<br>(c) a decline in index of area of occupancy, extent of occurrence and/or quality of habitat<br>(d) actual or potential levels of exploitation<br>(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites. | Reduction of ≥70% | Reduction of ≥50% |
| A2. An observed, estimated, inferred or suspected reduction in total number of mature individuals over the last 10 years or 3 generations, whichever is the longer, where the reduction or its causes may not have ceased **or** may not be understood **or** may not be reversible, based on (and specifying) any of (a) to (e) under A1. | Reduction of ≥50% | Reduction of ≥30% |
| A3. A reduction in total number of mature individuals, projected or suspected to be met within the next 10 years or 3 generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1. | Reduction of ≥50% | Reduction of ≥30% |
| A4. An observed, estimated, inferred, projected or suspected reduction in total number of mature individuals over any 10 year or 3 generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, and where the reduction or its causes may not have ceased **or** may not be | Reduction of ≥50% | Reduction of ≥30% |

| | | |
|---|---|---|
| understood **or** may not be reversible, based on (and specifying) any of (a) to (e) under A1. | | |
| **B. Small Distribution Range and Decline or Fluctuation** | | |
| B1. Extent of occurrence estimated to be | < 5,000 km² | < 20,000 km² |
| **or** | | |
| B2. Index of area of occupancy estimated to be | < 500 km² | < 2,000 km² |
| **and (for either B1 or B2)** estimates indicating at least two of a – c: | | |
| a. Severely fragmented **or** known to exist at:<br>b. Continuing decline, observed, inferred or projected, in any of (i) extent of occurrence, (ii) index of area of occupancy, (iii) area, extent and/or quality of habitat, (iv) number of locations or subpopulations, (v) number of mature individuals.<br>c. Extreme fluctuations in any of (i) extent of occurrence, (ii) index of area of occupancy, (iii) number of locations or subpopulations, (iv) number of mature individuals. | ≤ 5 locations | ≤ 10 locations |
| **C. Small and Declining Number of Mature Individuals** | | |
| C. Total number of mature individuals estimated to be: | <2,500 | <10,000 |
| **and one of either C1 or C2:** | | |
| C1. An estimated continuing decline in total number of mature individuals of at least: | 20% within 5 years or two generations, whichever is longer, up to a maximum of 100 years in thefuture | 10% within 10 years or three generations, whichever is longer, up to a maximum of 100 years in the future |
| **or** | | |
| C2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals<br>**and at least one of the following:**<br>a.(i) No subpopulation estimated to contain<br>**or**<br>a.(ii) one subpopulation has<br>**or**<br>b. There are extreme fluctuations in number of mature individuals. | > 250 mature individuals<br>≥ 95% of all mature individuals | > 1000 mature individuals<br>100% of all mature individuals |
| **D. Very Small or Restricted Total Canadian Population** | | |

| | | |
|---|---|---|
| D. Total number of mature individuals very small or restricted in the form of either of the following: | | |
| D1. Population estimated to have | < 250 mature individuals | < 1000 mature individuals |
| **or** | | |
| D2. **For threatened only**: Canadian population with a very restricted index of area of occupancy (typically < 20 km²) or number of locations (typically ≤ 5) such that it is prone to the effects of human activities or stochastic events within a very short time period (1-2 generations) in an uncertain future, and is thus capable of becoming endangered or extinct in a very short time period. | Does not apply | Index of area of occupancy < 20 km²<br><br>**or**<br><br>≤ 5 locations |
| **E. Quantitative Analysis** | | |
| E. Quantitative analysis (population projections) showing the probability of extinction or extirpation in the wild is at least | 20% within 20 years or 5 generations, whichever is longer, up to a maximum of 100 years | 10% within 100 years |

**Special Concern:**

Those wildlife species that are particularly sensitive to human activities or natural events but are not endangered or threatened wildlife species.

Wildlife species may be classified as being of Special Concern if:

(a) the wildlife species has declined to a level of abundance at which its persistence is increasingly threatened by genetic, demographic or environmental stochasticity, but the decline is not sufficient to qualify the wildlife species as Threatened; or

(b) the wildlife species may become Threatened if factors suspected of negatively influencing the persistence of the wildlife species are neither reversed nor managed with demonstrable effectiveness; or

(c) the wildlife species is near to qualifying, under any criterion, for Threatened status; or

(d) the wildlife species qualifies for Threatened status but there is clear indication of rescue effect from extra-limital subpopulations.

**Examples of reasons why a wildlife species may qualify for "Special Concern":**

- a wildlife species that is particularly susceptible to a catastrophic event (e.g., a seabird population near an oil tanker route); or
- a wildlife species with very restricted habitat or food requirements for which a threat to that habitat or food supply has been identified (e.g., a bird that forages primarily in old-growth forest, a plant that grows primarily on undisturbed sand dunes, a fish that spawns primarily in estuaries, a snake that feeds primarily on a crayfish whose habitat is threatened by siltation; or
- a recovering wildlife species no longer considered to be Threatened or Endangered but not yet clearly secure.

**Examples of reasons why a wildlife species may not qualify for "Special Concern":**

- a wildlife species existing at low density in the absence of recognized threat (e.g., a large predatory animal defending a large home range or territory); or

- a wildlife species existing at low density that does not qualify for Threatened status for which there is a clear indication of rescue effect.

**Guidelines for use of Extinct or Extirpated**

A wildlife species may be assessed as extinct or extirpated from Canada if:

- there exists no remaining habitat for the wildlife species and there have been no records of the wildlife species despite recent surveys; or
- 50 years have passed since the last credible record of the wildlife species, despite surveys in the interim; or
- there is sufficient information to document that no individuals of the wildlife species remain alive.

**Guidelines for use of Data Deficient**

Data Deficient should be used for cases where the status report has fully investigated all best available information yet that information is insufficient to: a) satisfy any criteria or assign any status, or b) resolve the wildlife species' eligibility for assessment.

*Examples:*

- Records of occurrence are too infrequent or too widespread to make any conclusions about extent of occurrence, population size, threats, or trends.
- Surveys to verify occurrences, when undertaken, have not been sufficiently intensive or extensive or have not been conducted at the appropriate time of the year or under suitable conditions to ensure the reliability of the conclusions drawn from the data gathered.
- The wildlife species' occurrence in Canada cannot be confirmed or denied with assurance.

Data Deficient should **not** be used if: a) the choice between two status designations is difficult to resolve by COSEWIC, or b) the status report is inadequate and has not fully investigated all best available information (in which case the report should be rejected), or c) the information available is minimally sufficient to assign status but inadequate for recovery planning or other such use.