

General Habitat Description for the Massasauga (*Sistrurus catenatus*)

A general habitat description is a technical document that provides greater clarity on the area of habitat protected for a species based on the general habitat definition found in the Endangered Species Act, 2007. General habitat protection does not include an area where the species formerly occurred or has the potential to be reintroduced unless existing members of the species depend on that area to carry out their life processes. A general habitat description also indicates how the species' habitat has been categorized, as per the policy "Categorizing and Protecting Habitat Under the Endangered Species Act", and is based on the best scientific information available.

HABITAT CATEGORIZATION

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| 1 | Gestation sites and the area within 30 m, and overwintering sites and the area within 100 m |
| 2 | Open and semi-open habitat with suitable microhabitat, as well as forest edge habitat, that is within 1.2 km of an occurrence of the species |
| 3 | Forest within 1.2 km of an occurrence of the species |

Category 1

Gestation sites and the area within 30 m, and hibernacula and the area within 100 m will be considered to have the lowest level of tolerance to alteration. Alteration within this area is likely to compromise the function of the gestation and overwintering habitat. Massasaugas depend on these areas for sensitive life processes including reproduction, hibernation and thermal regulation. Both gestation and hibernation sites are of limited availability on the landscape, they may support concentrations of individuals, and they are habitually used. A 30 m radius (average tree height) buffer around gestation sites is important to maintain the microclimate conditions (e.g., thermal, vegetative and lighting features) and a 100 m radius around the hibernacula encompasses the hibernation habitat that Massasaugas generally show high fidelity to.

Gestation Sites

Gravid female Massasaugas use very specific microhabitats, referred to as gestation sites (Rouse and Wilson 2002, EMRT 2005, Harvey and Weatherhead 2006a, Marshal et al. 2006, Harvey 2008, Foster et al. 2009, Parks Canada Agency 2011). Preserving a 30 m area (average tree height) around gestation sites ensures that the microclimate conditions (e.g., thermal, vegetative and lighting features) are maintained and that the site will receive continued use.

Because of the limited availability of Massasauga gestation sites on the landscape, sites are often re-used over the life span of an individual and/or may be occupied communally by gravid females (EMRT 2002a, Rouse and Wilson 2002, Harvey 2008, Parks Canada Agency 2011). Gravid females will remain at gestation sites for approximately 3 months until they give birth in August or early September (Parks Canada Agency 2011, Joe Crowley pers. comm.).

Gravid females are sedentary and will rarely move from gestation sites during the gestation period (Johnson 1995, Rouse and Wilson 2002, Marshall *et al.* 2006, DeGregorio *et al.* 2011b). Gravid females select gestation sites located in open habitat or areas with low (<25%) canopy cover, such as forest clearings, forest edges, rock outcrops, early/mid-successional wetlands, shorelines, meadows, fields and alvars (Johnson 1995, EMRT 2002a, EMRT 2005, Yagi 2005, Harvey and Weatherhead 2006a, Marshall *et al.* 2006, Rouse 2006, Harvey 2008, Foster *et al.* 2009, Crowley unpublished data). These areas allow gestating females to maintain consistently high body temperatures, which increase the speed and success of embryogenesis (Johnson 1995, Foster *et al.* 2009, Harvey and Weatherhead 2010). Where gestation sites occur along forest edges, they typically have a southern exposure to maximize the time that the site receives full sunlight (Harvey pers. comm. 2008; Joe Crowley pers. comm.).

Massasauga gestation sites are usually centered around a feature such as a large table rock, rock pile, undercut rock ridge, beaver lodge, raised cobble beach, brush or debris pile and partially surrounded by low-lying vegetation such as grasses or shrubs (EMRT 2005, Harvey and Weatherhead 2006a, Marshall *et al.* 2006, Harvey 2008, Parks Canada Agency 2011). These microhabitat features help provide the species with an optimal range of thermal conditions as well as protection from predation (EMRT 2005, Harvey 2005, Harvey and Weatherhead 2006a, Harvey 2008, Foster *et al.* 2009).

Overwintering Sites

Massasaugas spend the winter (6-7 months) in underground hibernacula where they are able to get below the frost line, but remain above the water table (Parks Canada Agency 2011, Yagi and Planck 2011). Massasaugas often display high fidelity to a specific hibernaculum or a hibernation area (EMRT 2002a, Yagi 2005, Harvey and Weatherhead 2006b, Harvey 2008). On the Bruce Peninsula, 70% of radio-tracked Massasaugas returned to the same general area and selected a hibernaculum that was within 100 m of the previous year's site (Harvey and Weatherhead 2006b). Similarly, most Massasaugas at Wainfleet Bog will hibernate within 100 m of the location they occupied previously (Yagi pers. comm. 2011 in Parks Canada Agency 2011). Hibernation habitat is often localized in specific areas with favourable microhabitat conditions rather than being dispersed throughout the landscape (Yagi 2005, Harvey and Weatherhead 2006b). The species typically hibernates independently, but sites may be used by two or more individuals in areas where overwintering habitat is limited (EMRT 2002b, Rouse and Wilson 2002, Harvey and Weatherhead 2006b, Harvey 2008). The area surrounding hibernation sites is also important to maintain the microclimate conditions (e.g., thermal, vegetative and lighting features) that keep the hibernation site functional. A 100 m radius around the hibernacula encompasses the hibernation habitat that Massasaugas show high fidelity to.

Suitable hibernation habitat for Massasaugas is typically found in lowland areas with water-saturated soils and where the water table is close to the surface so that snakes can avoid desiccation (Johnson 1995, EMRT 2005, Parks Canada Agency 2011). Suitable hibernacula must also provide suitable aerobic conditions throughout the overwintering period (Yagi and Planck 2011). Hibernacula may be located within tree root systems, rock crevices/fissures or small mammal or crayfish burrows (EMRT 2002a, EMRT 2002b, Rouse and Wilson 2002, EMRT 2005, Yagi 2005, Harvey and Weatherhead 2006b). Massasaugas typically bask at the hibernacula for a few weeks after emergence and prior to spring dispersal, as well as in the fall before permanently entering the hibernacula in October (EMRT 2002b, Yagi 2005, Harvey and Weatherhead 2006a, Marshall *et al.* 2006).

On the Bruce Peninsula, hibernacula are located in deciduous and conifer forests (Harvey and Weatherhead 2006a, Harvey and Weatherhead 2006b). Suitable hibernacula habitat includes areas of karst topography where fissures extend to the groundwater table, as well as tree root systems and rodent burrows (EMRT 2005, Harvey and Weatherhead 2006b). Harvey and Weatherhead (2006b) found that hibernacula always had a southern exposure and were associated with abundant ground cover, tall shrubs and large rocks, which may assist in moderating extreme weather conditions and temperatures. In the eastern Georgian Bay region, Massasaugas hibernate primarily in wetlands, such as conifer or shrub swamps, fens or wet depressions that support sphagnum moss or sedge hummocks and sparse tree or shrub communities (EMRT 2002a, Rouse and Wilson 2002, EMRT 2005). Massasaugas in Wainfleet bog have been documented to use subterranean burrows created by root systems or small mammals in organic soils within shrub or forest/shrub communities (Yagi 2005, Yagi pers. comm. 2012). Information on overwintering habitat for the Ojibway Prairie population is limited. Massasaugas at this site have been documented to use crayfish (*Cambarus diogenes*) burrows and anthropogenic features such as concrete sidewalks within shrub thickets, mixed deciduous forest, early successional meadow and tallgrass prairie habitat (Preney pers. comm. 2012). Small mammal burrows and root systems that provide suitable hibernacula conditions may also be utilized (Preney pers. comm. 2012).

Category 2

Open and semi-open habitat types with suitable microhabitat, as well as forest edge habitat that is within 1.2 km of an occurrence of the species will be considered to have a moderate level of tolerance to alteration before their function for the species is compromised. These habitat areas are depended upon for foraging, thermoregulation, mating, shedding, movement and connectivity to gestation and overwintering sites.

Average home range lengths for Massasaugas in an eastern Georgian Bay population were found to be 1.2 km and 1.1 km for males and females respectively (Rouse *et al.* 2011). Similarly, the average home range length of Massasaugas on the northern Bruce Peninsula has been documented to be 1.2 km, with a maximum home range length of 2.3 km (Harvey unpublished data 2012). Massasaugas tend to disperse away from their hibernacula in the spring, resulting in the hibernacula being near the edge of the species' home range (Johnson 1995, Rouse *et al.* 2011).

During the active season, Massasaugas primarily use open and semi-open habitats that maximize basking opportunities (Harvey and Weatherhead 2006a, Rouse 2006, Foster *et al.* 2009, Harvey and Weatherhead 2010) and that support high densities of small mammal prey (EMRT 2005, Yagi pers. comm. 2011 in Parks Canada Agency 2011). In Ontario, suitable habitats include sparse forests, forest clearings, forest edges, fields, tall grass prairie (Ojibway population), meadows, wetlands (such as fens, bogs, marshes and swamps), alvars, shorelines and rock barrens (EMRT 2002b, Harvey and Weatherhead 2006a, EMRT 2005, Rouse 2006 in Harvey 2008; Harvey and Weatherhead 2010). Massasaugas exhibit strong selection for forest edge habitat (Harvey and Weatherhead 2006a, Harvey 2008, Rouse 2006), which provides an optimal range of thermoregulatory conditions.

At a microhabitat scale, Massasaugas use sites with low canopy cover, high ground cover (rocks and vegetation) and sites that are within close proximity (0.5 m or less) to retreat sites (Johnson 1995, Harvey and Weatherhead 2006a, Harvey and Weatherhead 2010). The presence of ground cover reduces the detectability of the species to potential predators (Harvey 2005), while retreat sites facilitate a quick escape (Harvey and Weatherhead 2006a, Crowley pers. comm.). High abundance and diversity of ground cover, such as rocks and shrubs, is also important in providing a range of thermoregulation opportunities (Harvey and Weatherhead 2006a).

Category 3

Forest habitat that is within 1.2 km of an occurrence will be considered to have the highest level of tolerance to alteration. This habitat is depended upon for life processes including foraging and movements between gestation sties, hibernacula and other activity areas.

Although Massasaugas demonstrate selection for open and semi-open habitats during the active season, forest habitat still accounts for a significant portion of their habitat use (Harvey and Weatherhead 2006a, Rouse 2006). For example, forest habitat on the Bruce Peninsula is used almost exclusively in the months prior to and following hibernation, and accounted for 25-30% of the total habitat use during the summer months (Harvey and Weatherhead 2006a). Similarly, in Eastern Georgian Bay, over 30% of all telemetry locations were within forest habitat (Rouse 2006). Forest habitat within the home range of Massasaugas is used extensively for travel between hibernation, foraging and reproduction habitat. Travel corridors are necessary for allowing seasonal movement within an individual's home range (EMRT 2002b).

Activities in Massasauga habitat

Activities in general habitat can continue as long as the *function of these areas for the species is maintained and individuals of the species are not killed, harmed, or harassed.*

Generally compatible:

- General yard work such as lawn care and gardening.
- Residential renovations or construction of small structures such as a shed or deck
- Continuation of existing agricultural practices such as annual harvest.
- Small-scale selective removal of individual trees

Generally not compatible:*

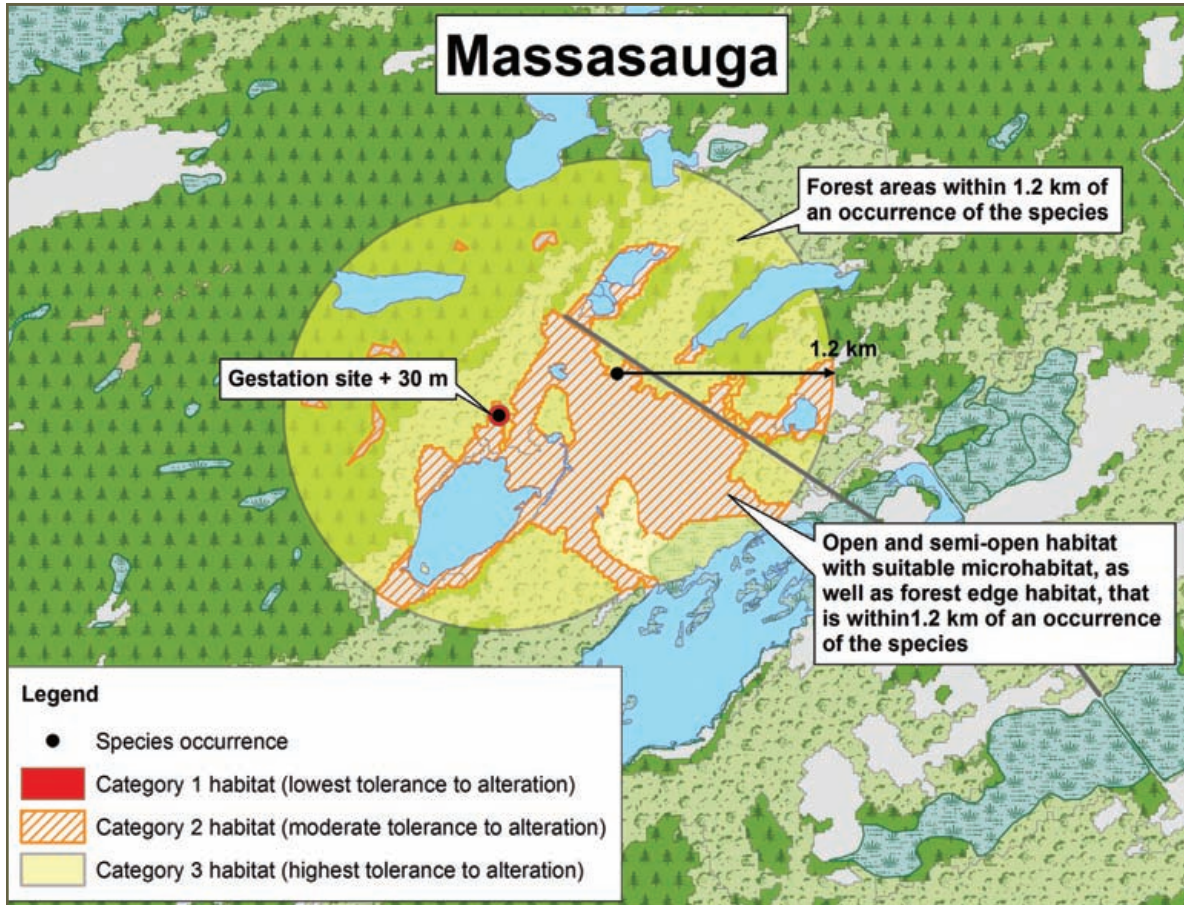
- Removal or alteration of documented hibernation or gestation sites.
- Significant alteration, reduction, or clearing of habitat types such as forests, meadows, grasslands, wetlands, peatlands, shorelines, rock barrens, and alvars.

* If you are considering an activity that may not be compatible with general habitat, please contact your local MNR office for more information.

Key terms:

- **Hibernaculum:** Underground feature, natural or man-made, extending below the frost line where snakes hibernate to avoid extreme cold temperatures during the winter. Some examples are bedrock crevices, small mammal burrows and building foundations.
- **Thermoregulation:** Some animals, such as turtles, use thermoregulation to alter their internal body temperature through behavioural patterns, such as basking in the sun to increase body temperature or seeking out cool areas to lower body temperature.

Sample application of the general habitat protection for Massasauga



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