



## Species At Risk Natural Heritage Strategy

### *Summary Report*



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**SPECIES AT RISK NATURAL HERITAGE STRATEGY**

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## BACKGROUND

Based on the Natural Heritage Information Centre (NHIC) database there are 12 Species at Risk (SAR) found in Haliburton County. However the location, availability, abundance, connectivity and quality of these habitats within the County have not been investigated. Planning applications are reviewed on a daily basis and land management practices are put into effect. In the absence of a Species at Risk Natural Heritage Strategy, both the species and their habitats are vulnerable. Furthermore, conservation cannot be guided without a Species at Risk Natural Heritage Strategy to prioritize efforts.

The Haliburton Highlands Land Trust recently completed a Natural Heritage Mapping project to document the types of habitat found within the County of Haliburton (Heaven, County of Haliburton Natural Heritage Mapping: A compilation and preliminary assessment, 2007). A preliminary investigation of habitat availability was conducted for a select few Species at Risk. The Haliburton Highlands Land Trust recognized the need to better delineate potential habitat for Species at Risk as this is one of the criteria for land acquisitions. The objective of this report is to expand on the Species at Risk component of the Natural Heritage Mapping project to complete a comprehensive Species at Risk Natural Heritage Strategy for Haliburton County.

This summary report is based on the Species at Risk Natural Heritage Strategy Final Report (Heaven, Species at Risk Natural Heritage Strategy, 2008). As such it does not include any of the process through which the Species at Risk potentially suitable habitat was derived, or the maps displaying the results, due to the sensitivity of the information. The summary report has been approved by the OMNR for public viewing.

## PURPOSE AND SCOPE OF STUDY

This project has five components:

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### SAR HABITAT PREFERENCES AND REQUIREMENTS

Critical habitat has yet to be defined for the majority of the Species at Risk found in the County of Haliburton and habitat requirements and preferences of species can vary based on geographical locations. This component of the project reviewed the primary literature, Ontario



Ministry of Natural Resources (OMNR) reports, Committee on the Status of Endangered Wildlife in Canada (COSEWIC) recovery strategies and other relevant and available literature; and compiles attributes of preferred and required habitat for the various life stages and activities of Species at Risk. Specifically this component focused on habitat structure and quality requirements and sensitivities.

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#### SPATIAL DATA PREPARATION

Available spatial data was assessed for its relevance to the habitat requirements of each Species at Risk. Where required, spatial features were developed through satellite imagery interpretation and multi-feature analysis.

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#### SAR HABITAT AVAILABILITY AND QUALITY

An assessment was conducted by correlating Species at Risk habitat requirements with existing digital spatial data. Available spatial data included but was not limited to, forest resource inventory (FRI) data, quaternary geology data, Natural Resource Values and Information System (NRVIS) waterbody coverage and the Enhanced Wetland Mapping developed by the OMNR in partnership with Ducks Unlimited Canada. NHIC element occurrences were used to desktop verify the Species at Risk potential suitable habitat mapping results.

The quality of available habitats was assessed based on Species at Risk sensitivities, spatial attributes (e.g. size, edge/core, fragmentation etc.), satellite imagery or other spatial datasets such as the Ontario Road Network (roadlessness), utility corridors, natural shorelines, etc.

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#### PRIORITIES FOR STEWARDSHIP AND SECUREMENT

Optimal habitats of the individual Species at Risk were compiled to prioritize areas in Haliburton County for future land-use planning, private land stewardship, and securement of SAR habitat for the Haliburton Highlands Land Trust.

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#### EDUCATION AND COMMUNITY MOBILIZATION

Periodically competent local naturalists are spotting Species at Risk yet failing to report such sightings to the NHIC, as demonstrated by the paucity of element occurrences in Haliburton



County. If captured, these data would be extremely valuable in a natural heritage planning exercise.

Although not addressed in this report a database was developed for the HHLT to record species observations in a format compatible with the NHIC database. A series of presentations were delivered to local schools to introduce SAR and stimulate public reporting of SAR observations. The HHLT also provided presentations to focal organizations with the intent of introducing the HHLT and its objectives, as well as providing these organizations with background information on the Species at Risk in Haliburton County.

#### ACKNOWLEDGEMENTS

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**SPECIES AT RISK HABITAT REQUIREMENTS**

## OVERVIEW

Prior to any delineation of suitable habitat for Species at Risk it is paramount to fully comprehend the habitat preferences of each species. Further, many species' habitat preferences vary geographically and therefore a focus on studies in close proximity to the County of Haliburton is essential. To this end, Glenside Ecological Services Limited conducted a full review of the primary literature. Glenside also obtained access to the Natural Heritage Information Centre (NHIC) library and reviewed all literature available for the focal Species at Risk. Finally, Glenside consulted with NHIC and OMNR staff and authors and investigators of published studies. The following summarizes the findings from this review for each Species at Risk found in the County of Haliburton.

## PLANTS

### AMERICAN GINSENG (*PANAX QUINQUEFOLIUS*)

#### STATUS

American ginseng (*Panax quinquefolius*) is categorized as *Endangered*, both provincially and nationally, although it is not regulated under Ontario's Endangered Species Act ( Ontario Ministry of Natural Resources, 2006) (Nault & White, 1999). This perennial herb is subject to illegal harvesting and, habitat loss and degradation from clearing and logging activities (Nault & White, 1999).

#### HABITAT PREFERENCES

American ginseng prefers rich, moist, undisturbed and relatively mature, sugar maple-dominated deciduous forests with a forest canopy specifically dominated by sugar maple, white ash, bitternut hickory and basswood (Nault & White, 1999). A basal area of 18m<sup>2</sup>/ha or greater would provide the necessary canopy closure for American ginseng (Irwin, 2007)

American ginseng requires circumneutral soils such as soils over limestone or marble bedrock and colonies are often found near the bottom of gentle slopes facing south-east to south-west (Nault & White, 1999).



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## SPECIES SENSITIVITIES

The primary threats to American ginseng are illegal harvesting and habitat loss and degradation. The market value of wild American ginseng remains high despite legal cultivation and exportation of ginseng. If populations are harvested below their minimal viable population - estimated at approximately 170 plants - local extirpation can result (Nault & White, 1999).

American ginseng is a shade tolerant species with specific habitat requirements and therefore heavy logging operations that open the forest canopy significantly can be detrimental (Nault & White, 1999). Physical damage can also result from the skidding and felling of logs.

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## ENGELMANN'S QUILLWORT (*ISOETES ENGELMANNII*)

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### STATUS

Engelmann's quillwort (*Isoetes engelmannii*) is an inconspicuous perennial plant with simple grass-like leaves. This shallow water species is categorized as *Endangered* nationally and *Endangered (not regulated)* provincially ( Parks Canada, 2007) ( Ontario Ministry of Natural Resources, 2006). There are only two known locations in Canada, both of which occur in Ontario and one of which is in the County of Haliburton ( Parks Canada, 2007).

In 2007 a recovery strategy was published by Parks Canada that details the actions required to support protection and promote recovery of the species.

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### HABITAT PREFERENCES

In Canada Engelmann's quillwort is found in shallow waters in fresh, flowing, circumneutral to calcareous waters and substrates (ph 6-8.1). The substrates consist of a sand or silty sand layer over clay or clayey-sand, often within a dense granitic cobble bed. Engelmann's quillwort occurs on open relatively rock-free river sediment as well. River habitat is typically protected from heavy currents and wave action, but currents must be moderate as Engelmann's quillwort is rarely found in still, warm water ( Parks Canada, 2007).

In Haliburton the backshore vegetation consists of mixed and deciduous forest cover.



On-site surveys of approximately 120 potential sites along the Severn and Gull River populations were completed in 2002-2005. However, no further populations were identified on the Gull River. At this time it appears that the critical habitat as identified in the recovery strategy ( Parks Canada, 2007) represents the only population of Engelmann's quillwort in the County of Haliburton.

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#### SPECIES SENSITIVITIES

Threats to Engelmann's quillwort include mechanical damage (boat traffic, wave action, raking etc.), nutrient enrichment, herbicide application, competition and deliberate removal. The uplands adjacent to the Gull River population are privately owned ( Parks Canada, 2007).

#### BIRDS

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#### PEREGRINE FALCON (*FALCO PEREGRINUS ANATUM*)

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#### STATUS

The peregrine falcon (*Falco peregrinus anatum*) is categorized as a species of *Special Concern* federally and *Threatened* provincially (COSEWIC, 2007) ( Ontario Ministry of Natural Resources, 2006). Peregrine falcon populations suffered a DDT-induced collapse in North America in the 1950's and 1960's, however surveys since the 1970's show substantial increases with notable increases between 2000 and 2005 (COSEWIC, 2007).

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#### HABITAT PREFERENCES

Peregrine falcons inhabit a wide range of habitats but breed only in habitat with access to sufficient food supplies. In the County of Haliburton, prey would consist primarily of birds, particularly shorebirds, waterfowl and other waterbirds, pigeons and songbirds. Preferred nest sites are ledges or crevices found on cliffs ranging from 50-200m high (COSEWIC, 2007).

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#### SPECIES SENSITIVITIES

Most anatum peregrine falcon populations are stable or increasing, although chemical pollution still remains a concern (COSEWIC, 2007).



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**GOLDEN-WINGED WARBLER (*VERMIVORA CHRYSOPTERA*)**

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**STATUS**

The golden-winged warbler (*Vermivora chrysoptera*) is categorized as *Threatened* nationally and a species of *Special Concern* provincially (Ontario Ministry of Natural Resources, 2007) (COSEWIC, 2006). The primary threats responsible for the recent decline of this small songbird are competition and hybridization from the closely related blue-winged warbler. The latter is spreading north due to habitat and climate change (COSEWIC, 2006).

**HABITAT PREFERENCES**

The breeding range in Ontario of the golden-winged warbler extends from extreme south western Ontario north to Central Nipissing. The golden-winged warbler establishes territories of approximately 1-2 ha in size. Nest sites are on the ground in patches of herbs and low shrubs and foraging sites are typically scattered trees and forested edge. Territories in early stages of succession are preferable, specifically stands of northern hardwood <15 years of age (Klaus & Buehler, 2001). Examples of some preferred habitat include: hydro/utility corridors, field edges, recently logged areas and beaver marshes, and on the Canadian Shield, alder bogs with scattered black ash (COSEWIC, 2006).

**SPECIES SENSITIVITIES**

The golden-winged warbler faces habitat loss and hybridization with blue-winged warblers (COSEWIC, 2006). In regard to habitat loss they are dependent on early successional scrub habitat; a habitat that is in decline in the County of Haliburton due to the natural regeneration of farmland established in the mid to late 1800's.

**REPTILES**

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**SPOTTED TURTLE (*CLEMMYS GUTTATA*)**

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**STATUS**

The spotted turtle (*Clemmys guttata*) is categorized as *Endangered* nationally and *Endangered (not regulated)* provincially (COSEWIC, 2004) (Ontario Ministry of Natural Resources, 2006).



This species occurs in small numbers in bogs and marshes: a habitat that is fragmented and disappearing due to human encroachment (COSEWIC, 2004).

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#### HABITAT PREFERENCES

Although the habitat requirements of spotted turtles are reportedly somewhat ambiguous, a study in the City of Kawartha Lakes defined the habitat requirements as mainly aquatic with limited terrestrial activity (Haxton & Berrill, 1999). More specifically Haxton & Berrill found that spotted turtles in Central Ontario tend to hibernate in bogs and shortly after their emergence, migrate to marshes. The bogs were described as covered with low shrubs and a prevalence of sphagnum moss (*Sphagnum spp.*). The marshes were generally shallow, with floating vegetation, sedges, submergent vegetation, and a periphery of low shrubs (Haxton & Berrill, 1999).

Litzgus et al (Litzgus, Costanzo, Brooks, & Lee, 1999) studied a population east of Georgian Bay and reported that spotted turtles hibernated primarily in sphagnum moss hummocks and rock caverns found in swamps. The swamps were described as consisting of abundant sphagnum moss, ferns, hydrophilic shrubs and a tree species composition of red maple, red oak, white oak and tamarack (Litzgus, Costanzo, Brooks, & Lee, 1999).

The differing hibernacula descriptions of these studies are likely related to the study site characteristics (i.e. geology and flora) and the County of Haliburton has more similarities to the study in the City of Kawartha Lakes. Most known hibernacula in close proximity to the County of Haliburton are in bog wetlands (Oldham, 2007).

Of the studies in Ontario the largest average home range of spotted turtles is 4.7 ha (Haxton & Berrill, 1999) with daily movements of 20-30 m (COSEWIC, 2004). A study in southern Maine found that spotted turtles will travel up to 1150 m between wetland sites with an average seasonal travel distance of 1120 m. Nest sites were typically within 50 m from a wetland but as far away as 120 m (Joyal, 2001), opting for areas exposed to full sunlight including soil filled crevices in the Canadian Shield bedrock (Haxton & Berrill, 1999). They also utilize the forested uplands within 80 m of a wetland to aestivate during hot summer months (Joyal, 2001).



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## SPECIES SENSITIVITIES

Although habitat loss is likely the primary cause of decline, spotted turtles are also highly valued by reptile hobbyists due to their small size and bright colours (Harding, 1997). Road mortality is another cause of decline. Based on these sensitivities it is reasonable to assume that roads located between bogs and adjacent marshes - thereby bisecting migration routes - would compromise the value of the habitat. Similarly shoreline development adjacent to marshes and bogs would limit access and increase vulnerability during migration, aestivation and nesting.

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## WOOD TURTLE (*CLEMMYS INSCULPTA*)

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### STATUS

The wood turtle (*Clemmys insculpta*) is categorized as a species of *Special Concern* nationally and *Endangered (not regulated)* provincially (Kraus, 2005) ( Ontario Ministry of Natural Resources, 2006). Although widespread, the wood turtle population is relatively low and very vulnerable to commercial exploitation.

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### HABITAT PREFERENCES

Wood turtles are aquatic hibernators preferring shallow, slow moving, meandering rivers with sandy substrates (Greaves & Litzgus, 2007). Cover is not always required however most hibernate at a depth of approximately 1 m (Greaves & Litzgus, 2007).

During the active season, wood turtles utilize the uplands adjacent to streams and rivers preferring mixed forests near streams that are clear, with hard sand or gravel substrates, a moderate current and a mean width of at least 7 m (Haxton, 1999). Alder thickets and alder swale are the preferred or most used habitats in Ontario (Kraus, 2005) and it is unlikely that wood turtles would utilize pure conifer stands (Oldham, 2007). Wood turtles have been located up to 600 m from water but tend to stay within 300 m of the home stream (Arvisais, Bourgeois, Levesque, Daigle, Masse, & Jutras, 2002) (Seburn C. N., 1997).

Wood turtles prefer to nest in sand or gravel-sand beaches and banks, gravel and dirt roads/shoulders and gravel pits if available (Kraus, 2005). Studies have found that 84% of nests



are less than 10 m from water with an east-southeast to west-southwest aspect if the slope is greater than 20° (Seburn C. N., 1997).

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#### SPECIES SENSITIVITIES

The primary factors limiting wood turtle numbers are road mortality, collection for the pet trade and degradation/destruction of habitat due to logging roads, recreational vehicles and stream and river bank alterations (Kraus, 2005).

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#### BLANDING'S TURTLE (*EMYDOIDEA BLANDINGII*)

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#### STATUS

The Great Lakes St. Lawrence population of Blanding's turtle (*Emydoidea blandingii*) is categorized as *Threatened*, both nationally and provincially (COSEWIC, 2005) ( Ontario Ministry of Natural Resources, 2006). The Blanding's turtle is subject to habitat fragmentation, increased rates of mortality (road kill), habitat degradation and loss and illegal pet trade (COSEWIC, 2005).

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#### HABITAT PREFERENCES

Blanding's turtles use a wide variety of habitats. Although Blanding's turtles use edges of larger lakes they prefer small ponds and marshes (Bury & Germano, 2002) with emergent (e.g. *Carex* spp or *Typha* spp.) or submergent and floating vegetation, and mucky substrates (Hamernick, 2000) (COSEWIC, 2005). The water quality is typically high with a relatively high amount of dissolved oxygen (Standing, 2000). Crustaceans, particularly crayfish are favourable food items. Insects, leeches, worms, small fish, tadpoles and frogs, snails and some plants are also part of their diet (Harding, 1997).

Blanding's turtles are also highly mobile and will utilize upland habitat for nesting, basking and summer dormancy. In a study in southern Maine the mean distances from wetlands to nest sites, basking sites and dormancy sites were 242 m, 10 m and 78 m respectively with nest sites as far away from the nearest wetland as 410 m (Joyal, 2001). Upland habitat that they move through is generally mixed deciduous or coniferous forests. Nesting locations are open with substrates of loose sand or organic soils (COSEWIC, 2005).



Multiple small wetlands are used by Blanding's turtles in a season and they will travel through upland an average distance of 680 m between wetlands and as far as 2050 m (Joyal, 2001). A landscape with numerous small wetlands in close proximity has a higher probability of occupancy by Blanding's turtles (Joyal, 2001).

Blanding's turtles hibernate underwater and therefore permanent bodies of water are selected (COSEWIC, 2005).

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#### SPECIES SENSITIVITIES

Due to their high level of mobility Blanding's turtles are detrimentally impacted by roads. As well as the incidental crossing of roads by adults, the selection of road shoulders by gravid females as nesting sites increases vulnerability of the adult females and the hatchlings to road mortality and pet/trade collection.

Loss of marsh habitat has impacted the southern populations however the abundance of marshes is still high in the County of Haliburton and therefore loss of marsh habitat is likely less of an impact to the Haliburton populations than the fragmentation through adjacent land development and the road network.

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#### STINKPOT (*STERNOTHERUS ODORATUS*)

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##### STATUS

The stinkpot (*Sternotherus odoratus*) is categorized as *Threatened* nationally and provincially (Edmonds, 2002) ( Ontario Ministry of Natural Resources, 2006). The stinkpot has disappeared over most of the southern half of its range and is vulnerable to shoreline development and increased mortality from outboard motors (Edmonds, 2002).

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##### HABITAT PREFERENCES

Stinkpots prefer shallow water with a soft substrate and are rarely found at depths greater than 2 m. In Parry Sound, Ontario stinkpots were found in association with a variety of vegetation including grasses, sedges, rushes, cattails, pipewort, water shield, hornwort, bullhead lilies, fragrant lilies, pickerel weed, pondweed, arrowhead, bladderwort and water celery (Edmonds, 2002). This composition is typically associated with the marsh wetland type.



Stinkpots do not venture onto land except to nest. On the Precambrian shield stinkpots nest in rock crevices located on rock faces exposed to direct sunlight (Edmonds, 2002). These sites do not need to be immediately adjacent to a marsh as stinkpots will travel along a littoral zone of a lake to reach a suitable site (Oldham, 2007). Nests are typically found within 45 m of water (Edmonds, 2002).

Stinkpots cannot stay out of water for extended periods of time as they are highly susceptible to desiccation (Harding, 1997) and therefore their home ranges are limited to single bodies of water ranging from 50 - 155 ha in size (Edmonds, 2002). A lake with numerous small marshy bays would also be suitable (Oldham, 2007). Hibernation occurs underwater, burrowing into approximately 30 cm of mud (Edmonds, 2002).

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#### SPECIES SENSITIVITIES

Motorboat traffic, fishing and habitat destruction through shoreline development (loss of nest sites), wetland drainage and pollution are the primary causes of population decline. On the Canadian Shield suitable nesting sites may be limited due to the additional need for direct sunlight to compensate for the cooler temperatures. Therefore shoreline development on the Canadian Shield may be more detrimental than in other areas (Edmonds, 2002).

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#### FIVE-LINED SKINK (*EUMECES FASCIATUS*)

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#### STATUS

The five-lined skink (*Eumeces fasciatus*) is eastern Canada's only lizard and is categorized as a species of *Special Concern* nationally and provincially (COSEWIC, 2007) ( Ontario Ministry of Natural Resources, 2006). The most serious threat to the Great Lakes/St Lawrence population is habitat loss on the macro and micro scale. Although the habitat of the five-lined skink is relatively robust (i.e. rocky barrens) damage to the vegetation in the surrounding landscape, and microhabitat alteration in the form of loss or movement of cover rock, can be detrimental (COSEWIC, 2007).



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### HABITAT PREFERENCES

The habitat requirements of the Great Lakes/St Lawrence population of five-lined skink consist primarily as rocky outcrops embedded within a matrix of coniferous and deciduous forest (COSEWIC, 2007). At a microhabitat level there is also an association with loose cover rock scattered over the rocky outcrops (Howes & Loughheed, 2004) (Quirt, 2006). Cover rocks are utilized for nesting, hibernation, foraging and thermo-regulating (COSEWIC, 2007).

Home ranges are relatively small and are estimated to be between 270 m<sup>2</sup> and 578 m<sup>2</sup>. However, individuals have been found up to 208 m from an original point of capture, indicating that they are capable of dispersing up to this distance (COSEWIC, 2007).

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### SPECIES SENSITIVITIES

Rocky outcrops are not susceptible to rapid change resulting from natural succession or agricultural use. However pressures from cottages, recreational trails and roads may be detrimental to the populations of five-lined skink found in the County of Haliburton.

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## EASTERN HOG-NOSED SNAKE (*HETERODON PLATIRHINOS*)

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### STATUS

The eastern hog-nosed snake (*Heterodon platirhinos*) is categorized as *Threatened* nationally and provincially due to its rarity, and a decrease in abundance and area of occurrence (Seburn D. , 2006) ( Ontario Ministry of Natural Resources, 2006).

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### HABITAT PREFERENCES

Habitat requirements of the eastern hog-nosed snake have been defined as well drained soil; loose or sandy soil; open vegetative cover such as open woods; brushland or forest edge; proximity to water; and climatic conditions typical of the eastern deciduous forest biome (Seburn D. , 2006). Conifer plantations, meadows and developed areas are less suitable. (Seburn D. , 2006).



The diet of the eastern hog-nosed snake consists primarily of American toads (*Bufo americanus*) although it will also consume frogs, salamanders, turtle eggs, small mammals and birds (Seburn D. , 2006).

The eastern hog-nosed snake hibernates in nondescript burrows (often abandoned rodent burrows) in upland forested habitat with a favour for dry mixed forests and pine/oak forests. It nests in open areas with sandy soils and a southeast aspect (Cunnington & Cebek, 2005). Forested ecosites 11, 12, and 14 are used by eastern hog-nosed snakes (Bellhouse & Naylor, 1997). These ecosites are dry and associated with poor, sandy soils; characteristics that are typical of hibernation sites.

In the spring the eastern hog-nosed snake is not overly active until temperatures rise above 20°C at which point they will move to sunny areas to bask. Typically, these areas are characterized as small forest clearings with leaf litter or low plants such as blueberry, juniper or similar shrubbery rather than rock barrens. The eastern hog-nosed snake is rarely found under logs or rocks except when shedding (Cunnington G. , 2007) however rocky outcrops provide good basking opportunities (Oldham, 2007) and would have exposed leaf litter and scattered low shrubbery.

The range length<sup>1</sup> of the eastern hog-nosed snake averages 2.7 km with a maximum recorded range length of 6.2 km (Rouse, 2006). The home range of the species exceeds 100 ha and they have daily movements of approximately 100 m (Cunnington G. , 2007).

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#### SPECIES SENSITIVITIES

Threats to this species have been attributed to habitat loss, degradation and fragmentation, roads, persecution, collecting and contaminants (Seburn D. , 2006).

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<sup>1</sup> Distance between the two farthest apart locations in an active season



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**MILK SNAKE (*LAMPROPELTIS TRIANGULUM*)**

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**STATUS**

The milksnake (*Lampropeltis triangulum*) is categorized as a species of *Special Concern* nationally and provincially (Fischer, 2002) ( Ontario Ministry of Natural Resources, 2006). The population, although widespread, occurs in small numbers scattered throughout Ontario and Quebec. The milksnake suffers from high levels of road kill and persecution due to its resemblance to venomous snakes (Fischer, 2002).

**HABITAT PREFERENCES**

Although the eastern milksnake (*Lampropeltis triangulum triangulum*) can be found in a variety of forested habitat such as deciduous forests, pine plantations, bog forests, pine forests and mixed pine-hardwoods, a study in eastern Ontario found that they have a habitat preference for fields, rocky outcrops and marshes due to the thermal quality associated with these areas (Row & Blouin-Demurs, 2006). In the spring and fall eastern milksnakes have a preference for upland, possibly migrating to wetland edges in the summer (Fischer, 2002). Milksnakes are not aquatic and therefore are more associated with riparian areas around marshes rather than in the marshes themselves (Oldham, 2007). They also utilize edge habitats such as power-line cuts and railway embankments and have been reported to be in rural areas in and around buildings such as barns, sheds and houses (Fischer, 2002).

At the landscape level eastern milksnakes in Ontario are more common in areas that are heavily forested (Fischer, 2002).

Eastern milksnakes often hibernate communally and suitable hibernation sites include mammal burrows, dirt banks, hollow logs, rotting stumps and rock crevices. They have also been found in old building foundations, stone walls, cisterns, crawl spaces, old wells and basements of older homes (Fischer, 2002).

Home range size has been estimated at 20 ha with a maximum recorded range length of 396 m and a mean distance of 254 m (Fischer, 2002).



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## SPECIES SENSITIVITIES

Human encroachment is of concern as road kill and persecution are the two primary reasons for decline. Therefore habitat fragmentation by roads and residential development reduces the quality of the available habitat.

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## EASTERN RIBBONSNAKE (*THAMNOPHIS SAURITUS*)

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### STATUS

The Great Lakes population of the eastern ribbonsnake (*Thamnophis sauritus*) is categorized as a species of *Special Concern* nationally and provincially (Smith K. , 2002) ( Ontario Ministry of Natural Resources, 2006). Extreme loss of wetland habitat, shoreline development and mortality on roads are the primary contributors to this species' plight (Smith K. , 2002).

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### HABITAT PREFERENCES

The eastern ribbonsnake is a semi-aquatic species that frequents wetlands, ponds and streams with a preference for quiet, shallow water with abundant sunlight and bordered by low dense vegetation (Smith K. , 1999). Gravid females may move short distances from water prior to giving birth (Harding, 1997) however snakes are typically found within 5 m of the wetland (Bell, Herman, & Wassersug, 2007) unless the adjacent land is an open field where prey may be found (Oldham, 2007).

From September to October eastern ribbonsnakes will move short distances from the water to hibernate. A study in Nova Scotia found that the maximum distance from the water at this time was 173 m followed by the second greatest at 145 m (Bell, Herman, & Wassersug, 2007). Eastern ribbonsnakes hibernate in other animal burrows or cracks and crevices created by geological events (Smith K. , 2002). It has been suggested that eastern ribbonsnakes may be using submerged hibernation sites as all movement away from the water at this time was along the same gradient and not uphill (Bell, Herman, & Wassersug, 2007).



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**SPECIES SENSITIVITIES**

The eastern ribbonsnake suffers from habitat loss related to the availability and health of wetland and littoral habitats and shoreline vegetation; declines in prey specifically amphibian populations; direct persecution and road mortality (Smith K. , 2002).





## SUMMARY AND RECOMMENDATIONS

Potentially suitable habitat for the majority of the Species at Risk in the County of Haliburton appeared to be consistently located in the southern and western portions of the County. To examine this quantitatively, a grid of 2500m<sup>2</sup> squares was overlaid onto the County and the area of suitable habitat for each species within each square was calculated. To standardize the results across species, the areas were converted to percentages of total suitable habitat within the County of Haliburton.

The peregrine falcon, stinkpot and Engelmann's quillwort were not included in this analysis as the methodology utilized to identify their suitable habitat was not compatible.

Weighing each of the Species at Risk equally, percentages for all species were averaged for each square, thereby highlighting areas used by a multitude of Species at Risk or areas that represent the majority of habitat for a single Species at Risk (See Figure 1).

In retrospect the results are not overly surprising. Habitat loss is one of the primary causes for species decline and much of this is driven by human alteration of the environment. As the human population increases, development has been moving steadily north. The Canadian Shield represents a northern boundary for many species, particularly those associated with circumneutral soils or warmer climes. The transition zone between the Canadian Shield and the limestones to the south transects the southern portion of the County of Haliburton. With much of their habitat lost in the south and no suitable habitat to the north the remaining natural areas of southern Haliburton provide a last refuge.

The distribution of Crown Land captures some of the core areas of potentially suitable habitat, specifically in the Townships of Anson/Lutterworth and Snowdon/Glamorgan (See Figure 1). However, there is also a significant amount of potentially suitable habitat for many Species at Risk that is located on private land. Areas such as south of Kashagawigamog Lake, the Beech Lake chain and south of Elephant Lake all represent potentially suitable habitat for a multitude of Species at Risk. It is interesting to note that the area south of Kashagawigamog Lake and the Maple/Beech/Green Lake chain were also identified as priority stewardship areas in the



Conservation Blueprint (Henson, Brodribb, & Riley, 2005) (Wichert, Brodribb, Henson, & Phair, 2005).

The golden-winged warbler and milksnake are Species at Risk that have a preference for old fields or early successional scrub areas. Open areas such as these are very limited in the County of Haliburton and are typically associated with old farmlands located off the Canadian Shield. This habitat type is continuing to disappear due to natural succession and development. Some of the better concentrations of this habitat type are located around Minden; Maple and Beech Lake; south of Kashagawigamog Lake and north of Cardiff. Preservation and maintenance of open areas in the County of Haliburton represent an opportunity for the Haliburton Highlands Land Trust.

Another significant habitat characteristic located in the southern portion of the County is the diversification of habitat. Specifically in the southwest, the County of Haliburton has a relatively high concentration of marshes and fens/bogs. This same area has the greatest concentration of rocky barrens as well as some of our limited ecosites such as the pine dominated forests (Heaven, 2007). A mosaic of habitat types such as this can provide habitat for a number of Species at Risk simultaneously, possibly explaining why the area is highlighted in the SAR summary analysis.

Documented element occurrences of Species at Risk are limited in the County of Haliburton with an average of less than 10 per species. More documented element occurrences in the County would allow the Haliburton Highlands Land Trust to further refine the habitat preferences of Species at Risk and highlight those habitats with known occurrences. To this end it is recommended that the Haliburton Highlands Land Trust establish a mechanism for collecting and verifying sightings of Species at Risk. Glenside Ecological Services Limited developed and provided an MS Access database to the HHLT to capture observations in a format compatible with the NHIC database however the HHLT must still implement a reporting mechanism for the public to utilize (i.e. a hotline, website, email address etc.)

In regard to individual Species at Risk, critical habitat for Engelmann's quillwort has been defined in the County of Haliburton and the adjacent lands to this habitat are privately owned. Therefore there may be opportunities to enhance the protection associated with this species.



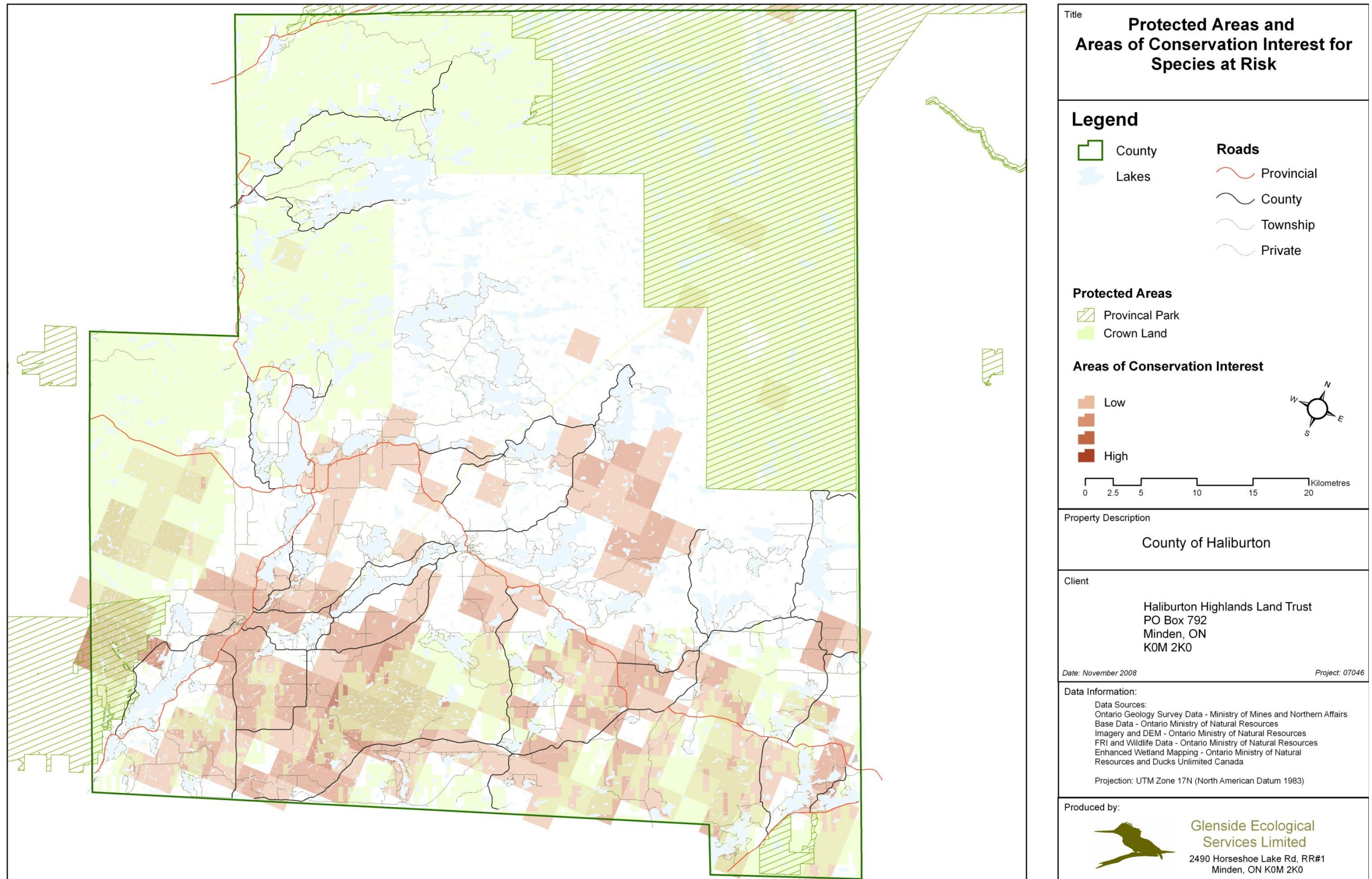
It must be noted that the maps of potentially suitable habitat provided in the original report, were produced based on the best available spatial data and have yet to be ground verified. The environment is changing continuously and ground verification is required to determine whether the habitat is still suitable and whether the related Species at Risk is currently utilizing the subject property. Ground verification is highly recommended and sites can be prioritized based on historical sightings of SAR (NHIC database, BBA, local knowledge) and/or the limited availability of habitat in the County of Haliburton.

The maps provided in the original report are an excellent reference when assessing a property for acquisition or other conservation efforts as they provide direction on which Species at Risk may be found on a subject property: information that will allow the Haliburton Highlands Land Trust to scope and temporally plan assessments to optimize sightings of Species at Risk.

Further, the maps provided in the original report will help the Haliburton Highlands Land Trust to be proactive in terms of education and private landowner contact. By focussing on areas of Species at Risk habitat concentration, or limited habitats, the Haliburton Highlands Land Trust can approach the relevant landowners and provide direction in regard to habitat maintenance, protection and/or rehabilitation.



Figure 1: Protected areas and areas of conservation interest for Species at Risk





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