

COSSARO Candidate Species at Risk Evaluation
for
Northern Map Turtle (*Graptemys geographica*)

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

Assessed by COSSARO as Special Concern

January 2013

Final

Tortue géographique (*Graptemys geographica*)

La tortue géographique est essentiellement aquatique. Sa dossière olive à brunâtre est ornée d'un motif réticulé de lignes jaunes pâles qui s'estompent à mesure que la tortue vieillit et qui ressemblent à une carte en courbes de niveau. Les adultes présentent un dimorphisme sexuel très marqué, les femelles étant beaucoup plus grosses que les mâles. Aucune sous-espèce n'a été identifiée et il s'agit de l'unique représentant du genre *Graptemys* au Canada. La tortue géographique habite les rivières et les lacs et se chauffe au soleil sur des objets émergents pendant la saison active. En hiver, elle hiberne sur le fond des rivières ou de lacs profonds où le débit d'eau est lent. Les tortues géographiques occupent une vaste aire de répartition qui englobe l'est des États-Unis, le sud de l'Ontario et le sud-ouest du Québec. En Ontario, l'espèce se retrouve dans l'ensemble du bassin des Grands Lacs et du fleuve Saint-Laurent et dans le sud du Bouclier canadien du fleuve St-Laurent jusqu'à la rivière Blind. Environ 10 % de l'aire de répartition mondiale de l'espèce se trouve en Ontario. Cette espèce a une répartition stable avec des nombres en déclin et parmi ses facteurs limitatifs, il y a la température, la longévité et une maturation tardive. Les menaces principales qui pèsent sur elle sont les collisions avec les bateaux à moteur, la perte de l'habitat riverain et les taux élevés de prédation au nid. La mortalité sur les routes, le prélèvement illégal et la prise accidentelle lors de la pêche constituent des menaces supplémentaires. La tortue géographique est désignée comme une espèce **préoccupante**.

Cette publication hautement spécialisée « Ontario Species at Risk evaluation report prepared under the Endangered Species Act, 2007 by the Committee on the Status of Species at Risk in Ontario », n'est disponible qu'en anglais conformément au Règlement 671/92, selon lequel il n'est pas obligatoire de la traduire en vertu de la Loi sur les services en français. Pour obtenir des renseignements en français, veuillez communiquer avec le ministère des Richesses naturelles par courriel à recovery.planning@ontario.ca.

PART 1

CURRENT STATUS AND DISTRIBUTION

Current Designations:

GRANK – G 5 (Assessed 02/05/2005) (NatureServe, accessed 15/01/2013); Least Concern (IUCN Assessed 2011; accessed Jan. 31, 2013).

NRANK Canada – N 3 (Assessed 10/09/2011) (NatureServe, accessed 15/01/2013)

COSEWIC – Special Concern (COSEWIC, Nov. 2012)

SARA – Special Concern (Schedule 1) (Environment Canada, 2012)

ESA 2007 – Special Concern (Ministry of Natural Resources, 2002)

SRANK – S 3 (NHIC/NatureServe, accessed 15/01/2013)

Distribution in Ontario:

The Northern Map Turtle occurs in central and southern Ontario from the Ottawa River to southwest Ontario and westward across the southern edge of the Canadian Shield to the eastern shore of Georgian Bay (COSEWIC 2012; Figure 4). Physiography and climate strongly influence the abundance and distribution limits of the species (Bleakney 1958). The majority of the map turtle population is in the St. Lawrence Lowlands, with the current distribution resulting from postglacial immigrations from refugia outside the margins of the ice-sheets, and is bounded by cooler climate to the north and west on the Shield uplift (Bleakney 1958).

Distribution and Status Outside Ontario:

The Northern Map Turtle has an extensive range throughout the northeastern United States, extending throughout the Great Lakes region to Wisconsin, and the Mississippi Drainage from central Minnesota south to northern Louisiana and west to eastern Oklahoma and Kansas. It is found throughout the Tennessee River Drainage, in streams above the Fall Line in the Tombigbee River Drainage of Alabama, and in the Ohio Drainage from West Virginia to Illinois. Isolated populations occur in the Susquehanna Drainage in Pennsylvania (eastern range limit) and Maryland, the Delaware River from the mouth northward to Sussex County, New Jersey and the lower Hudson River, New York (COSEWIC 2012; Figure 3). It is considered secure in most jurisdictions (Appendix 1).

PART 2

ELIGIBILITY FOR ONTARIO STATUS ASSESSMENT

2.1 APPLICATION OF ELIGIBILITY CRITERIA

Taxonomic Distinctness

Yes. The Northern Map Turtle has been known in Ontario since the early 1800's and has been an accepted species since that time (COSEWIC 2012; Crother *et al.* 2012).

Designatable Units

This species displays low levels of genetic variation, which is unusual given its extensive range and suggests a recent (Holocene) northward expansion (Ernst and Lovich 2009). Additionally, although some populations appear naturally disjunct (occurring in different river systems) or occupy different eco-regions (Great Lakes/St. Lawrence Faunal Province or Carolinian Faunal Province), there is no evidence of local adaptation or significant differences in population trends or factors affecting them. Therefore, there is no current evidence to warrant more than one status designation for this species in Ontario.

Native Status

Yes. Northern Map Turtles are native to Ontario.

Presence/Absence

Present. Northern Map Turtles are widespread in Ontario.

2.2 ELIGIBILITY RESULTS

1. The putative taxon or DU is valid. **Yes**
2. The taxon or DU is native to Ontario. **Yes**
3. The taxon or DU is **Present** in Ontario

PART 3

ONTARIO STATUS BASED ON COSSARO EVALUATION CRITERIA

3.1 APPLICATION OF PRIMARY CRITERIA (Rarity and Declines)

1. Global Rank

Not in any category. G 5

2. Global Decline

Not in any category. Although there have been local declines across its range, there has been no range-wide or large decline (> 30 %) (NatureServe 2013)

3. Northeastern North America Ranks

Not in any category. The species is S1, S2, SH or SX in 14% of jurisdictions where it has been ranked.

4. Northeastern North America Decline

Not in any category. There is no evidence of declines of greater than 30%, either short or long term.

5. Ontario Occurrences

Not in any category. There are more than 50 extant element occurrences of Map Turtle in Ontario (OMNR 2010).

6. Ontario Decline

Special concern. Currently, there are no baseline data from which to draw definitive quantitative conclusions regarding overall population trends in Ontario. However, it is inferred that many Ontario map turtle populations are in decline from a multitude of anthropogenic threats that increase mortality rates of adults. Lack of long-term population studies makes it difficult to detect large-scale population trends directly. No contraction of the range of the Northern Map Turtle in Ontario has been documented.

According to the Natural Heritage Information Centre's (NHIC) Biodiversity Explorer, 51 of 86 Element Occurrences for the Northern Map Turtle in Ontario are considered historical (OMNR 2010). Furthermore, data from Ontario Nature's Ontario Reptile and Amphibian Atlas reveal that 53% of the atlas squares where the species has previously been reported (n=166) have not had map turtle observations since 1985, despite this being an easily observed turtle. In contrast, 47% of occurrences continue to have observations until the present. In addition, 98 new 10 X10 km atlas squares (37% of all 264 known occurrences) have been reported since 1991 (Ontario Nature 2012), with over 50 of these new locations being identified in 2009-2010 alone (COSEWIC 2012). Presumably, the species was always in these locations but not recorded. It is also probable that many "historical" sites still maintain map turtles but have just not had any

reported observations or survey efforts over the last 20 years.

Surveys conducted along the Trent-Severn Waterway (TSW) in 2005 found map turtles in 30 of 31 NHIC historical EO's indicating persistence within this waterway (Cebek *et al.* 2005). Other recent research in the TSW revealed a trend toward decreased body sizes, greater female bias, and younger age distributions for populations within fragmented habitats (Bennett *et al.* 2009; COSEWIC 2012).

At Point Pelee National Park, there appeared to be a trend toward an older age distribution, which may foreshadow a population decline (Browne and Hecnar 2002, 2007). Although map turtle captures at Point Pelee were 40 times greater in 2001-2002 than in a study 30 years earlier (Rivard and Smith 1973), this apparent increase in abundance is probably the result of capture methodology given that the 1970s study did not use basking traps, the sampling method which produced over 80% of captures in 2001-2002 (Browne and Hecnar 2007; COSEWIC 2012).

7. Ontario's Conservation Responsibility

Threatened. Approximately 10 % of the global range of the Northern Map Turtle is in Ontario (COSEWIC 2012).

3.2 APPLICATION OF SECONDARY CRITERIA (Threats and Vulnerability)

8. Population Sustainability

Special concern. Populations of map turtles will likely not persist where major threats occur (e.g., recreational boating, shoreline habitat destruction, intense commercial fishing, illegal harvest). In such late maturing species, even low rates of chronic, increased mortality of adult females will cause declines over the short term (Congdon *et al.* 1993) and, possibly, extirpation of populations over the long term (Bulté *et al.* 2010; Carrière and Blouin-Demers 2010; Pitt and Nickerson 2012).

Although Northern Map Turtles are widespread, and seemingly locally numerous given their high visibility, perceptions of abundance need to be considered in light of our "shifting baseline", where each succeeding human generation perceives the current level of species' abundance as the new norm, sometimes obscuring the reality that historical numbers may actually have been much greater (Gaston and Fuller 2008; Roberts 2007). Indeed, some authors suggest that freshwater turtle abundance today often represents only a small fraction of historical abundance (Iverson 1982; Congdon *et al.* 1986). Northern Map Turtles are highly visible and hence can give an impression of great abundance. However, data collected recently on impacts of fishery bycatch and mortality from boats and nest predators when combined with modeling of life-history traits (Hutchings *et al.* (2012) indicate that Ontario map turtle populations may have declined considerably in the past three generations (96 years).

9. Lack of Regulatory Protection for Exploited Wild Populations

Not in any category. The Northern Map Turtle is listed as Special Concern under the Ontario *Endangered Species Act, 2007* and is protected under the *Fish and Wildlife Act*. There is no legal commercial harvest of map turtles, but illegal collection for food and the pet trade does occur (COSEWIC 2012).

10. Direct Threats

Special concern. Northern Map Turtles face a plethora of anthropogenic threats, especially motorized watercraft. Other significant threats are from fisheries bycatch, loss of shoreline basking and nesting habitat, increased nest depredation from higher numbers of “subsidized” mammalian predators, road mortality, and illegal harvest (COSEWIC 2012). Several of these threats are local (fisheries bycatch; Larocque et al. 2012 a,b, roadkill) and for some the impact is uncertain. Two threats, boat strikes and nest depredation, are clearly significant (COSEWIC 2012).

Quantitative assessments of boat impacts on Ontario map turtles reported scars from boat propellers (3.8 - 8.3 % of captured individuals), and it is likely that many turtles are killed annually in these study areas by such collisions (Bulté *et al.* 2010; Carrière and Blouin-Demers 2010). The prevalence of propeller injuries was two to nine times higher in adult females than in adult males or juvenile females owing to demographic differences in patterns of movement, habitat use, and aquatic basking. Population viability analyses conducted on these populations concluded that even low boat mortality rates of adult females, i.e., a risk of mortality greater than 10% when hit by a boat, led to a high probability of extirpation of the population. For example, if only one adult female is killed by a boat every 3 years the probability of extinction over 500 years is 63% for the Lake Opinicon population and 99% for the St. Lawrence Islands National Park population (Bulté *et al.* 2010).

A large increase in Raccoon (*Procyon lotor*) populations often accompanies urban and recreational encroachment (Garrott *et al.* 1993). At Point Pelee National Park (PPNP), 63-100% of turtle nests were lost to Raccoon predation (Browne and Hecnar 2007). Phillips and Murray (2005) found that density of Raccoons was four times higher in PPNP than the overall average for rural Ontario, and that Raccoons were the primary predators of turtle nests within the park (Phillips 2008). Increased nest mortality in disturbed habitat was due primarily to greater Raccoon densities rather than foraging efforts targeted toward turtle nests (Phillips 2008). Mammalian predators, mostly Raccoons and Coyotes (*Canis latrans*), have been observed to take 100% of known turtle nests at Rondeau Provincial Park, Long Point National Wildlife Area, and the Thames River in years where nest protection measures were not carried out (COSEWIC 2012). At Lac des Deux-Montagnes, the rate of nest predation was estimated between 55 -95%, and nesting sites near human-modified landscapes were under greater predation pressure from Raccoons (Bernier and Rouleau 2010).

11. Specialized Life History or Habitat-use Characteristics

Special concern. Northern Map Turtle in Ontario have delayed maturity (~ 14 years for

females), small clutches and high mortality rates of eggs and hatchlings leading to a slow rate of reproduction and vulnerability to increases in rates of adult and juvenile mortality (Congdon *et al.* 1993; Gibbs and Shriver 2002, Pitt and Nickerson 2012). Age at maturity is a strong predictor of extinction risk independent of taxon, with later maturity associated with greater extinction risk (Hutchings *et al.* 2013).

3.3 COSSARO EVALUATION RESULTS

1. Criteria satisfied in each status category

Number of primary and secondary criteria met in each status category:

ENDANGERED – [0/0]
THREATENED – [1/0]
SPECIAL CONCERN – [1/3]

Ontario-specific criteria met in each status category (primary criteria 5, 6 and 7):

ENDANGERED – [0]
THREATENED – [1]
SPECIAL CONCERN – [1]

2. Data Deficiency

No. The number of criteria assessed as “insufficient information” is 0.

3. Status Based on COSSARO Evaluation Criteria

The application of COSSARO evaluation criteria suggests that **Northern Map Turtle** is **Special Concern** in Ontario.

PART 4

ONTARIO STATUS BASED ON COSEWIC EVALUATION CRITERIA

4.1 APPLICATION OF COSEWIC CRITERIA

Regional (Ontario) COSEWIC Criteria Assessment

Criterion A – Decline in Total Number of Mature Individuals

Insufficient information. Although this species is declining in many sites, there are no data to estimate the overall size of this decline.

Criterion B – Small Distribution Range and Decline or Fluctuation

Not in any category. The EO and IAO exceed thresholds.

Criterion C – Small and Declining Number of Mature Individual

Not in any category. Population size exceeds thresholds.

Criterion D – Very Small or Restricted Total Population

Not in any category. Population size and range exceed thresholds.

Criterion E – Quantitative Analysis

Not in any category. Quantitative analyses have only been done on local populations (see **Direct Threats**).

Rescue Effect

No. Given that there is anecdotal evidence of immigration, that Michigan has a population ranked secure, and that the Northern Map Turtle has the ability to disperse up to at least 24 km within a season (Tessier and Lapointe 2009), the movement of individuals across international boundaries is possible. Rescue, however, would only be possible if the threats responsible for the original population's decline had been addressed and eliminated. The lack of map turtles along the border of Michigan, in Lambton and Kent in Ontario, and the presence of Detroit as a barrier combine to make rescue unlikely.

Special Concern Status

Yes. The species is likely to become Threatened if factors suspected of negatively influencing the persistence of the species are neither reversed nor managed with demonstrable effectiveness.

4.2 COSEWIC EVALUATION RESULTS

1. Criteria satisfied in each status category

ENDANGERED – [no]
THREATENED – [no]
SPECIAL CONCERN – [yes]

2. Data Deficiency

No

3. Status Based on COSEWIC Evaluation Criteria

The application of COSEWIC evaluation criteria suggests that **Northern Map Turtle** is **Special Concern** in Ontario.

PART 5

ONTARIO STATUS DETERMINATION

5.1 APPLICATION OF COSSARO AND COSEWIC CRITERIA

COSSARO and COSEWIC criteria give the same result. **Yes**

5.2 SUMMARY OF STATUS EVALUATION

Northern Map Turtle is classified as **Special Concern** in Ontario.

The Northern Map Turtle (*Graptemys geographica*) is highly aquatic. Its olive-brown carapace has a reticulate pattern of pale yellow lines that fade as the turtle matures and resemble lines on a contour map. Adults show extreme sexual size dimorphism with females being much larger than males. There are no recognized subspecies, and this is the only *Graptemys* species to occur within Canada. Map turtles inhabit rivers and lakes and bask on emergent objects throughout the active season. In winter, map turtles hibernate on the bottom of deep, slow-moving sections of rivers or lakes. Northern Map Turtles are widely distributed throughout the eastern United States, southern Ontario, and southwestern Québec. In Ontario, they occur throughout the Great Lakes-St. Lawrence basin and across the southern Shield from the St. Lawrence River to Blind River. Approximately 10% of the Northern Map Turtle's global range is in Ontario. This species has a stable distribution with declining numbers and is limited by temperature and a long-lived life history with late maturity. Major threats are collisions with motor boats, loss of shoreline habitat, and high rates of nest predation. Road kill, illegal collection and fisheries bycatch comprise additional threats. The Northern Map Turtle is assessed as Special Concern.

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2. Community and Aboriginal Traditional Knowledge Sources

No ATK or community knowledge was available.

APPENDIX 1

NORTHEASTERN NORTH AMERICA STATUS RANK AND DECLINE

	Subnational Rank	Sources	Decline	Sources
CT	NA	NatureServe	See section 3.1.4	NatureServe
DE	NA			
IL	S4			
IN	S4			
IA	S4			
LB	NA			
KY	S4			
MA	NA			
MB	NA			
MD	S1			
ME	NA			
MI	S5			
MN	SNR			
NB	NA			
NF	NA			
NH	NA			
NJ	SNR			
NS	NA			
NY	S3			
OH	SNR			
ON	S3			
PA	S4			
PE	NA			
QC	S2			
RI	NA			
VA	S3			
VT	S3			
WI	S5			
WV	S2			

Occurs as a native species in 17 of 29 northeastern jurisdictions
 Srank or equivalent information available for 14 of 17 jurisdictions = (82 %)
 S1, S2, SH, or SX in 2 of 14 = (14 %)