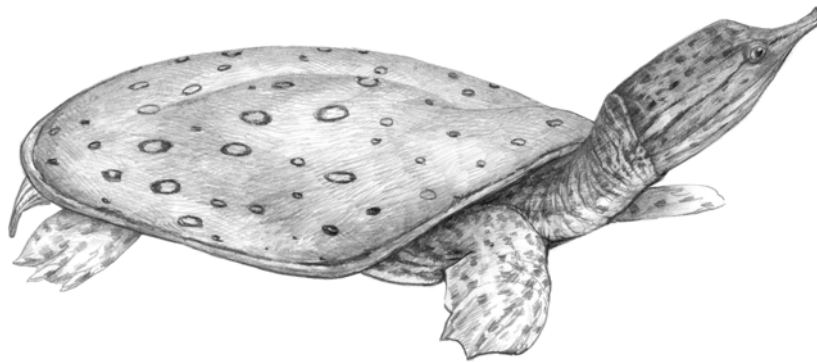


**COSEWIC**  
**Assessment and Update Status Report**

on the

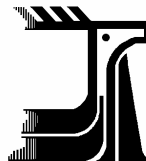
**Spiny Softshell Turtle**  
*Apalone spinifera*

in Canada



**THREATENED**  
**2002**

**COSEWIC**  
COMMITTEE ON THE STATUS OF  
ENDANGERED WILDLIFE IN  
CANADA



**COSEPAC**  
COMITÉ SUR LA SITUATION DES  
ESPÈCES EN PÉRIL  
AU CANADA

COSEWIC status reports are working documents used in assigning the status of wildlife species suspected of being at risk. This report may be cited as follows:

Please note: Persons wishing to cite data in the report should refer to the report (and cite the author(s)); persons wishing to cite the COSEWIC status will refer to the assessment (and cite COSEWIC). A production note will be provided if additional information on the status report history is required.

COSEWIC 2002. COSEWIC assessment and update status report on the spiny softshell turtle *Apalone spinifera* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 17 pp.

Fletcher, M. 2002. Update COSEWIC status report on the spiny softshell turtle *Apalone spinifera* in Canada, in COSEWIC assessment and update status report on the spiny softshell turtle *Apalone spinifera* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 1-17 pp.

Previous report:

Campbell, C.A., and G.R. Donaldson. 1991. Revised and updated by Martyn E. Obbard. COSEWIC status report on the spiny softshell turtle *Apalone spinifera* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 32 pp.

Production note:

The spiny softshell turtle *Apalone spinifera* was previously listed as the Eastern spiny softshell turtle *Apalone spinifera*.

For additional copies contact:

COSEWIC Secretariat  
c/o Canadian Wildlife Service  
Environment Canada  
Ottawa, ON  
K1A 0H3

Tel.: (819) 997-4991 / (819) 953-3215

Fax: (819) 994-3684

E-mail: COSEWIC/COSEPAC@ec.gc.ca

<http://www.cosewic.gc.ca>

Également disponible en français sous le titre Rapport du COSEPAC sur la situation de la tortue molle à épines (*Apalone spinifera*) au Canada – Mise à jour.

Cover illustration:

Spiny softshell turtle — Judie Shore, Richmond Hill, Ontario.

©Her Majesty the Queen in Right of Canada, 2003  
Catalogue No. CW69-14/293-2002E-IN  
ISBN 0-662-34130-9



Recycled paper



## COSEWIC Assessment Summary

### Assessment Summary – May 2002

**Common name**

Spiny softshell turtle

**Scientific name**

*Apalone spinifera*

**Status**

Threatened

**Reason for designation**

Substantial habitat loss in the past has restricted the distribution of this species to a small part of its former range. Habitat degradation through development and recreation may be blocking access to nesting, hibernation, feeding and basking sites. Other potential threats include the partial or complete isolation of segments of the population by dams and other structures, the reduction of juvenile recruitment by high predation rates on nests and high mortality rates due to collisions with motor boats, trapping and incidental mortality from fisheries.

**Occurrence**

Ontario, Quebec

**Status history**

Designated Threatened in April 1991. Status re-examined and confirmed in May 2002. Last assessment based on an update status report.



**COSEWIC**  
**Executive Summary**

**Spiny Softshell Turtle**  
*Apalone spinifera*

**Description**

The softshell is a medium to large-sized freshwater turtle. Males can reach a carapace length of up to 21.6 cm. Females can reach up to 54.0 cm, weigh as much as 11.7 kg and are, on average, more than 1.6 times larger than males (Harding 1997). The carapace is olive to tan in colour, flat, round, keelless, and leathery with inconspicuous, spiny projections present along the anterior edge. The surface of the carapace may be slightly roughened like sandpaper, particularly in juveniles. Adult males retain the juvenile pattern of ocelli, spots, and lines, whereas females develop a mottled or blotched pattern which is slightly noticeable even at the time of hatching (Fletcher pers. obs.).

**Distribution**

*Apalone spinifera spinifera* ranges from New York to Wisconsin, down the Tennessee and Mississippi Rivers, and north to southern Ontario and Quebec (Harding 1997). The centre of abundance and continuous distribution for this subspecies is the Mississippi River-Ohio River system and the lower Great Lakes (Bleakney 1958, Conant and Collins 1991).

In Canada, *A. s. spinifera* was formerly found throughout the lower Great Lakes/ St. Lawrence watershed from upper St. Lawrence to lower Lake Huron including some tributaries. Presently the spiny softshell can only be found in isolated locales throughout this historic range. The Canadian population can be divided into two subpopulations. The first is located in the Ottawa River, St. Lawrence River, and the Richelieu River-Lake Champlain system, with the majority of individuals located in Lake Champlain. The second much larger subpopulation is located in Lake St. Clair, Lake Erie (including major tributaries e.g. Thames and Sydenham Rivers), and western Lake Ontario. The majority of the individuals in this subpopulation can be found in the Thames and Sydenham Rivers and at two sites on Lake Erie (Rondeau and Long Point).

## Habitat

*A. s. spinifera* inhabits a wide variety of aquatic habitats including rivers, marshy creeks, bayous, oxbows, lakes, and impoundments. Common habitat features include a soft bottom with some aquatic vegetation as well as sandbars or mudflats (Ernst et al. 1994). Five habitat components that appear to be essential are: sandy or gravelly nesting areas that are close to the water and relatively clear of vegetation, shallow muddy or sandy areas to bury in, deep pools for hibernation, basking areas, and suitable habitat for crayfish and other softshell food sources (Fletcher et al. 1995).

## Population sizes and trends

Research conducted since the completion of the original status report in 1985 (Campbell and Donaldson) suggests that the southwestern Ontario subpopulation has a size of approximately 800-1000 individuals (M. Fletcher unpub. data.). There is currently no estimate for the size of the Quebec subpopulation, but, based on the observation that there have not been more than 100 individuals encountered in one season, it is in the low hundreds (P. Galois pers. comm.). The sections of the Ontario subpopulation that have been consistently observed over the past 5 years appear to be stable, but it is difficult to estimate overall trends for the Canadian population. There are few published historic estimates of densities for the population and only scattered sighting and survey records prior to 1994 (Gartshore and Carson 1990). It would appear that the population has decreased dramatically if one compares a 1792 journal entry from the Chatham area of the Thames River which states that “hundreds of soft-shelled river turtles were scooped off floating logs to make supper that everyone enjoyed” (Gray 1956) to 1997 survey work which located fewer than 10 individuals in the same area (Fletcher 1997).

## Limiting factors and threats

Although habitat loss was probably the most significant factor causing the historic decline of this species, habitat degradation is the biggest current problem. Several of the largest remaining nest sites are also heavily used for human recreation and activity on these sites appears to be increasing. Softshells are easily disturbed during nesting so increased recreational use of these sites may result in decreased nesting success. Environmental contamination may also be having an effect on nesting success. High numbers of infertile eggs at some sites in Ontario have prompted the need for analysis of contaminant levels in eggs. Egg samples collected from 1997-1999 are currently being analyzed for contaminant levels.

## Existing protection

Currently, the eastern spiny softshell is listed by COSEWIC as **Threatened**. In Ontario, this species is currently protected under the Ontario Fish and Wildlife Conservation Act 1999. The habitat of this species also receives some protection through the natural heritage component of the Provincial Policy Statement under

Ontario's Planning Act. This Act protects significant portions of the habitat of all threatened species. Several nesting sites are also protected, to varying degrees, as they are located on provincial or federally owned land. In Quebec, new legislation is currently under review that will prohibit the capture, holding, transportation or sale of any subspecies of *Apalone spinifera* (P. Galois, per. comm.).



## COSEWIC MANDATE

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) determines the national status of wild species, subspecies, varieties, and nationally significant populations that are considered to be at risk in Canada. Designations are made on all native species for the following taxonomic groups: mammals, birds, reptiles, amphibians, fish, lepidopterans, molluscs, vascular plants, lichens, and mosses.

## COSEWIC MEMBERSHIP

COSEWIC comprises representatives from each provincial and territorial government wildlife agency, four federal agencies (Canadian Wildlife Service, Parks Canada Agency, Department of Fisheries and Oceans, and the Federal Biosystematic Partnership), three nonjurisdictional members and the co-chairs of the species specialist groups. The committee meets to consider status reports on candidate species.

## DEFINITIONS

Species	Any indigenous species, subspecies, variety, or geographically defined population of wild fauna and flora.
Extinct (X)	A species that no longer exists.
Extirpated (XT)	A species no longer existing in the wild in Canada, but occurring elsewhere.
Endangered (E)	A species facing imminent extirpation or extinction.
Threatened (T)	A species likely to become endangered if limiting factors are not reversed.
Special Concern (SC)*	A species of special concern because of characteristics that make it particularly sensitive to human activities or natural events.
Not at Risk (NAR)**	A species that has been evaluated and found to be not at risk.
Data Deficient (DD)***	A species for which there is insufficient scientific information to support status designation.

\* Formerly described as “Vulnerable” from 1990 to 1999, or “Rare” prior to 1990.

\*\* Formerly described as “Not In Any Category”, or “No Designation Required.”

\*\*\* Formerly described as “Indeterminate” from 1994 to 1999 or “ISIBD” (insufficient scientific information on which to base a designation) prior to 1994.

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) was created in 1977 as a result of a recommendation at the Federal-Provincial Wildlife Conference held in 1976. It arose from the need for a single, official, scientifically sound, national listing of wildlife species at risk. In 1978, COSEWIC designated its first species and produced its first list of Canadian species at risk. Species designated at meetings of the full committee are added to the list.



Environment  
Canada

Environnement  
Canada

Canadian Wildlife  
Service

Service canadien  
de la faune

Canada

The Canadian Wildlife Service, Environment Canada, provides full administrative and financial support to the COSEWIC Secretariat.

**Update  
COSEWIC Status Report**

on the

**Spiny Softshell Turtle**  
*Apalone spinifera*

**in Canada**

Michelle Fletcher<sup>1</sup>

2002

<sup>1</sup>Upper Thames River Conservation Authority  
1424 Clarke Road  
London, ON  
N5V 5B9



# TABLE OF CONTENTS

SPECIES INFORMATION.....	3
Name and classification.....	3
Description.....	3
DISTRIBUTION.....	3
North American range.....	3
Canadian range.....	3
HABITAT.....	6
Habitat requirements.....	6
Trends.....	7
Protection/ownership.....	7
BIOLOGY.....	8
General.....	8
Reproduction.....	8
Survival.....	8
Physiology.....	9
Movements.....	9
Nutrition and interspecific interactions.....	9
Behaviour/adaptability.....	10
POPULATION SIZES AND TRENDS.....	10
LIMITING FACTORS AND THREATS.....	10
SPECIAL SIGNIFICANCE OF THE SPECIES.....	11
EXISTING PROTECTION OR OTHER STATUS.....	11
SUMMARY OF STATUS REPORT.....	11
TECHNICAL SUMMARY.....	13
BIOGRAPHICAL SUMMARY OF AUTHOR.....	15
AUTHORITIES CONSULTED.....	15
RECORD OF FIELD WORK CONDUCTED.....	16
LITERATURE CITED.....	16

## List of figures

Figure 1. Distribution of <i>Apalone spinifera spinifera</i> in North America.....	4
Figure 2. Distribution of <i>A. s. spinifera</i> in Ontario.....	5
Figure 3. Distribution of <i>A. s. spinifera</i> in Quebec.....	5

## SPECIES INFORMATION

### Name and classification

The eastern spiny softshell (*Apalone spinifera spinifera*) or la tortue-molle à épines is the only one of the six subspecies of *Apalone spinifera* whose range extends north into Canada. The genus name is derived from *apala* = soft, and the species name is from *spinifer* = thorn bearing. Originally classified as *Trionyx spiniferus* (Lesueur 1827) the name *Apalone spinifera* has recently been applied to the three American species of softshell turtle (Smith and Smith 1980).

### Description

The softshell is a medium to large-sized freshwater turtle. Males can reach a carapace length of up to 21.6 cm. Females can reach up to 54.0 cm and weigh as much as 11.7 kg and are on average more than 1.6 times larger than males (Harding 1997). The carapace is olive to tan in colour, flat, round, keelless, and leathery with inconspicuous, spiny projections present along the anterior edge. The surface of the carapace may be slightly roughened like sandpaper, particularly in juveniles. Adult males retain the juvenile pattern of ocelli, spots, and lines whereas females develop a mottled or blotched pattern that is slightly noticeable even at the time of hatching. The head and limbs are olive to gray, with a pattern of dark spots and yellowish-green stripes. The tubular snout is truncated, with large nostrils, each of which contains a septal ridge; the lips are yellowish with dark spotting, and the jaws are sharp. All four feet are webbed, and the webbing extends up the shank of the hind limbs.

## DISTRIBUTION

### North American range

*Apalone spinifera spinifera* ranges from New York to Wisconsin, down the Tennessee and Mississippi Rivers, and north to southern Ontario and Quebec (Harding 1997; Figure 1). The centre of abundance and continuous distribution for this subspecies is the Mississippi River-Ohio River system and the lower Great Lakes (Bleakney 1958, Conant 1975).

### Canadian range

In Canada, *A. s. spinifera* was formerly found throughout the lower Great Lakes/ St. Lawrence watershed from upper St. Lawrence to lower Lake Huron including some but not all tributaries. At present, the softshell turtle can only be found in isolated locales throughout this historic range and appears to have disappeared from about 16 sites where it has been observed (OHS, 2000). The Canadian population can be divided into two subpopulations. The first is located in the Ottawa River, St. Lawrence River, and the Richelieu River-Lake Champlain system, with the majority of individuals

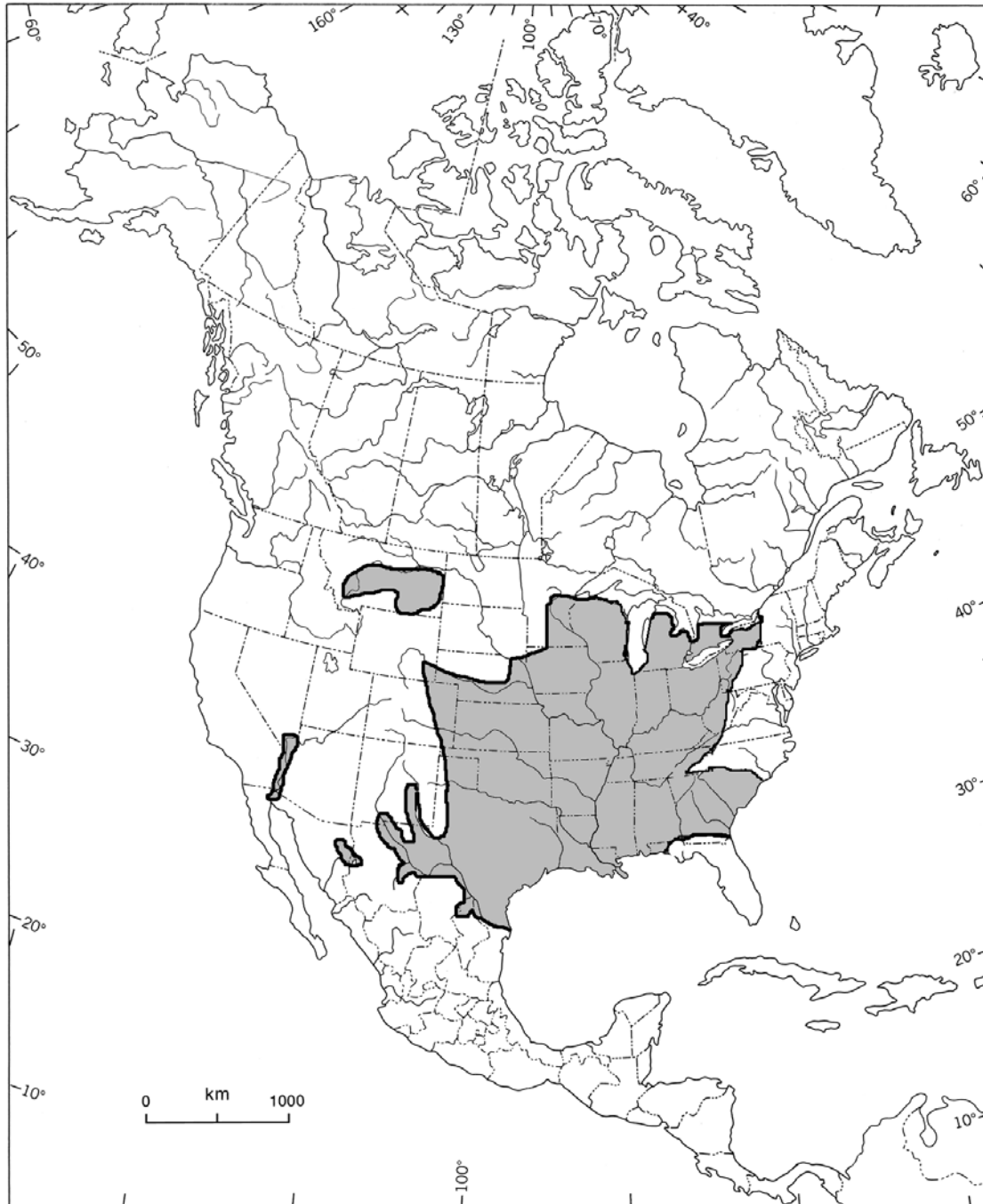


Figure 1. Distribution of *Apalone spinifer spinifera* in North America (after Harding 1997).

located in Lake Champlain (Figure 2). The second much larger subpopulation is located Lake St. Clair, Lake Erie (including major tributaries e.g. Thames and Sydenham Rivers), and western Lake Ontario. The majority of the individuals in this subpopulation can be found in the Thames and Sydenham Rivers and at two sites on Lake Erie (Rondeau and Long Point).

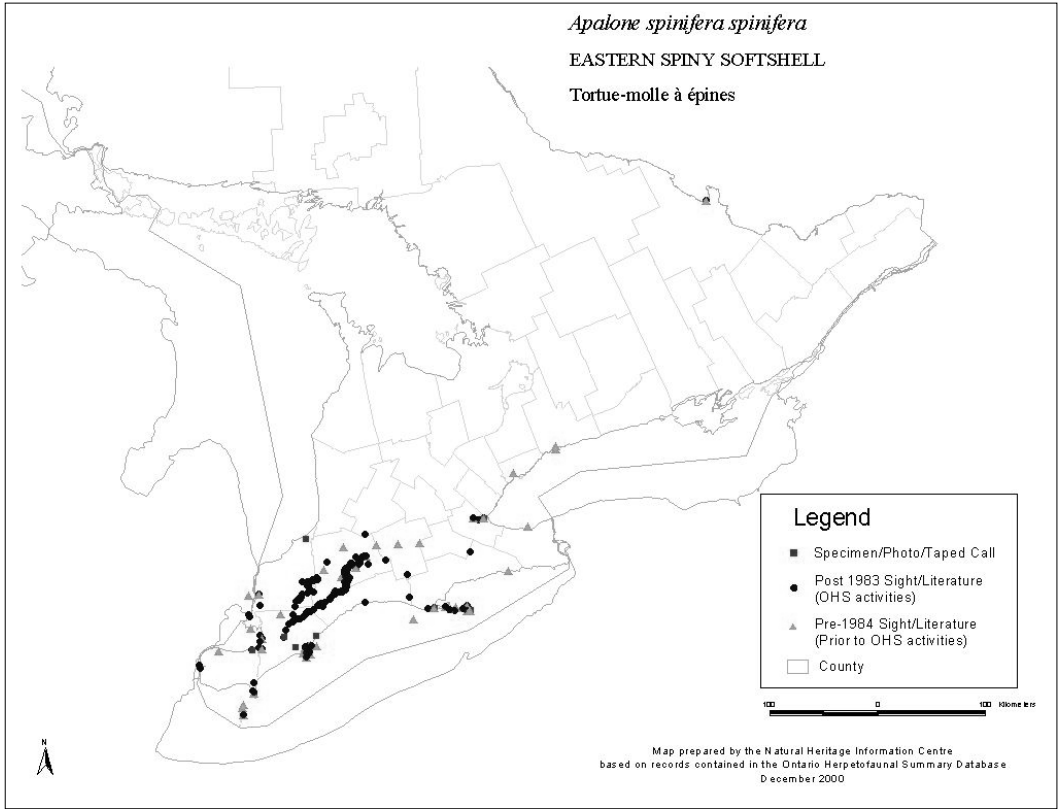


Figure 2. Distribution of *A. s. spinifera* in Ontario (Ontario Herpetofaunal Summary, 2000).

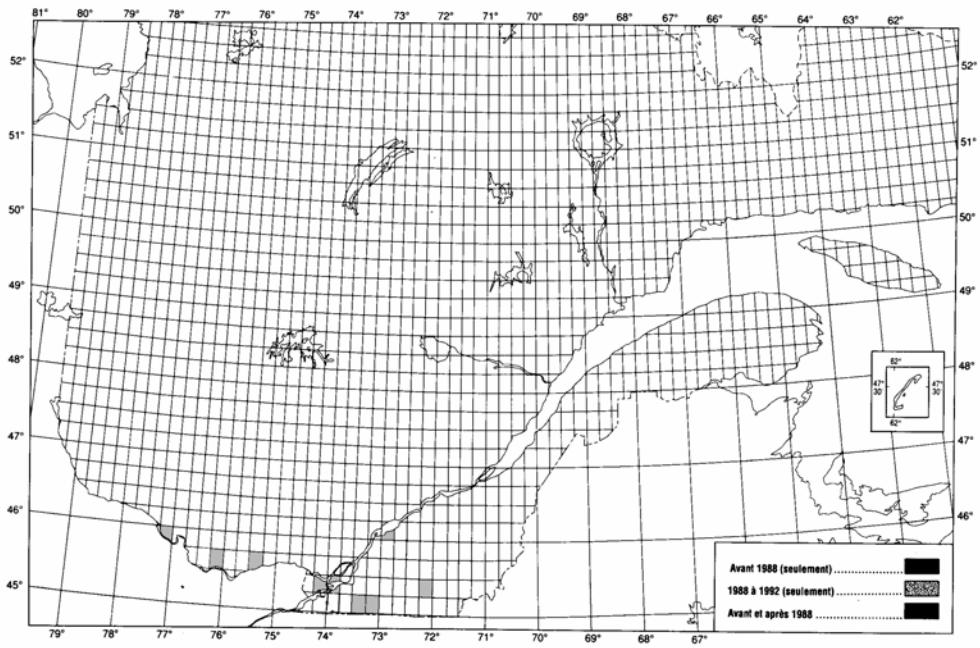


Figure 3. Distribution of *A. s. spinifera* in Quebec (after Bider and Matte 1996).

## HABITAT

### Habitat requirements

In general spiny softshells inhabit soft-bottomed bodies of water with an abundance of prey sources and an availability of nesting sites. Initial studies into the habitat requirements of softshell turtles on the Thames and Sydenham Rivers have revealed the following specific habitat requirements:

*Nesting Areas:* Eggs are typically laid from mid-June to mid-July in sunlit areas above the summer high water level but still within view of the water. Female softshells appear to have a preference for laying eggs in substrates that range from sand to fine gravel. On the Thames River, this habitat is most frequently found downstream of eroding sandy slopes where sand has been deposited on the inside of a meander or where islands have formed. Where there is a lack of sand, such as on some parts of the Thames River and most of the Sydenham River, turtles have been observed to nest on top of sun-baked clay banks or in gravel areas.

*Shallow Underwater Muddy/Sandy Areas:* Softshells bury themselves in these areas, juveniles and males in particular, perhaps to avoid potential predators and for thermoregulation. These areas also appear to be vital nursery habitat for young softshells because predation by animals such as great blue heron and mink is highest in the first few years of life. Unfortunately, these areas also provide habitat for some prey species of the softshell.

*Basking Areas:* Most frequently, softshells are observed basking on riverbanks where vegetation does not block sunlight or prevent them from climbing onto the bank. They have also been observed basking on rocks, logs, rip rap and even the cement spillway of Fanshawe Dam in London. They do not, however, appear to be able to use areas where gabion baskets or sheet-pile walls line the river bank.

*Deep Pools:* In the Thames and Sydenham Rivers, pools that are more than one metre deep during the low water levels of summer will not freeze completely in the winter. During the summer, deep pools may also provide cover and food and allow the turtles to moderate body temperature.

*Foraging Habitat:* Softshells are known to eat crayfish, tadpoles, minnows and aquatic insects. An adequate food source appears to be available in river reaches containing riffle areas, adjoining creeks, shallow inlets, shallow muddy/sandy areas, vegetative debris and aquatic plants.

Although all of these habitat features appear to be required for the river populations studied, they are not all utilized to the same extent. Nesting areas and deep pools, which are only used at certain times of the year, are not always plentiful or located in close proximity of one another. This lack of proximity may require the turtles to migrate long distances prior to nesting or hibernation. Shallow muddy/sandy areas,

basking areas and food sources are more common than nesting sites and deep pools and must be close together as they are used every day. Hence, the quality of the land joining these habitat elements is also critical. If access to any one of these five features is blocked (e.g. if access to basking areas is blocked by gabion baskets) then areas will become useless to the turtles even if all of the five features are present.

GIS mapping has shown a distinct pattern of softshell sightings on the Thames and Sydenham Rivers in that most sightings are at or just downstream of bends in the rivers. This pattern correlates with the above-mentioned availability of critical habitat features in these areas and suggests that along these rivers any river bend and the area directly downstream of it may be potential softshell habitat (Fletcher et al 1995).

## **Trends**

The information available, although limited, indicates that there has been extensive habitat loss from the historic range (Bonin 1993). In addition, it is the opinion of several researchers (Campbell and Donaldson 1985, Fletcher and Gillingwater 1994, Bonin 1994) that the remaining habitat is not ideal and continues to be degraded by development pressures from agriculture, recreation and road/bridge building. I am currently providing comments on the possible impacts of a proposed bridge and pipeline crossing of the Thames River as well as construction of a sewer treatment plant that will discharge into the river. Currently, human recreational activities at nest sites are having the biggest impact on softshell turtles. In addition, recreation impacts seem to have increased during the past six years at the two Lake Erie sites (Rondeau and Long Point).

## **Protection/ownership**

In Ontario, one of the nesting sites used by softshells is located on federal land (in Big Creek National Wildlife Area) and another is located on provincial land (in Rondeau Provincial Park), whereas all other known nesting sites are on private land. Although the sites located on government land are protected from future development, these two sites experience the highest levels of recreational activity of all the Ontario nest sites. The national wildlife area is signed as no access and periodically patrolled to keep people out, but staff levels are not sufficient to monitor the area adequately and there is a significant amount of disturbance at the nest sites. In the provincial park, there is no restriction of access to the nest sites and not only is there disturbance at these sites, but protective cages placed over the softshell nests are tampered with and the eggs destroyed by vandals each year. In addition to increased human activity directly affecting the turtles (disturbance, possibility of collision with watercraft, etc.), there are also large populations of raccoons in these areas. There are a few softshell records from other protected areas in Ontario (e.g. St. Clair NWA, Point Pelee National Park, Hillman Marsh Conservation Area, Tremblay Beach Conservation Area, Komoka Provincial Park, Coote's Paradise, Lighthouse Provincial Nature Reserve) and although there is no evidence of nesting from these sites, it is probable that the species has nested or does nest in some of them (M. Oldham, pers.comm.).

In Quebec, nesting sites are being protected on Lake Champlain. The Nature Conservancy is negotiating agreements with the private landowners of these sites and programs such as the St. Lawrence Action Plan offer financial support for land acquisition opportunities.

## BIOLOGY

### General

No new information.

### Reproduction

From the recent (1994-2000) work conducted in Ontario, clutch size ranges from 6-36 eggs, and it is possible that during long warm summers that double clutching occurs (Fletcher 1999). Softshells are solitary breeders but, with the lack of available nest sites, many individuals will lay their clutch in the same nesting area. The requirements for these areas are that they are open, have a sandy or gravelly substrate, and are in close proximity to water. Along the river, these sites tend to be sand deposits at riverbends or on islands. On the lake, preferred sites appear to be those where a narrow strip of sand separates the lake from a pond or other quiet water such as a bay. Although there was a certain amount of fidelity to these sites during the drought conditions of the late 1990s, softshells were observed to start nesting on areas that in other years would have been underwater (Fletcher 1998). A few nests were destroyed in 1996 (Fletcher 1996) and 1997 (Fletcher 1997) and close to 100% of nests failed during the flood year of 2000 (Fletcher, pers.obs.). There is a 1:1 sex ratio of hatchlings. Sources and rates of egg mortality vary from site to site, but major causes of mortality are nest depredation by raccoon or fox, nest infestation by sarcophagid fly maggots, egg infertility, and egg collection by humans. Predation of eggs could become a factor in survival of local subpopulations as 100% of softshell nests that were not protected by the research team were preyed upon, as were more than 650 nests of other turtle species (Fletcher 1999).

Spiny softshells seem to require unvegetated areas of fine gravel or coarse sand on which to nest. They may be well adapted to nesting on this substrate because unlike other species of turtles in Canada, *A. spinifera* has a hard-shelled egg that is fairly impermeable to water (e.g. Packard et al. 1979). This may allow them to nest successfully in dry sandy areas that are unsuitable to other turtles. These sandy beaches are also prime habitat for recreation.

### Survival

There are few factors that currently affect adult survival other than incidental mortality due to boat collisions and capture through commercial and sport fishing. Softshell turtles should closely follow the expected age dependant survival rates

outlined by Congdon et al. (1993) for Blanding's turtle (*Emydoidea blandingii*) that show that survival rates during the early stages of life are very low, whereas during the late juvenile and adult stages they are very high. The potential problem that the Ontario softshell population may face is that recruitment may not be sufficient to compensate for natural adult mortality. Survey work along the Sydenham River in particular only found adult softshells and most of these were large and therefore likely older adults (Fletcher and Gillingwater 1994). In general, 6 years of intensive work in Ontario have provided very few observations of softshells under the age of 5 and even fewer sightings of young adults (Fletcher 1999). Success of nest predators has been shown to be quite high in some areas and, although this is to be expected, when our high observed level of depredation is combined with the fact that in some areas we may have a population consisting of older adults with few or no juveniles the future of these populations may be in doubt. Such a skewed age distribution has been associated with population collapse in models of long-lived species. A collapse is more likely if adults are being subjected to increased rates of mortality by humans (boat collisions, incidental trapping, etc.).

## **Physiology**

No new information.

## **Movements**

Radio-telemetry studies throughout the Canadian range indicate that over the course of the year softshell turtles can travel more than 30 km between nesting and hibernation sites (Fletcher 1996, Galois 1997). To date there has not been a large amount of time spent studying the characteristics of the sites chosen for overwintering by the Ontario population, but the work on Lake Champlain has shown softshells leave the lake to overwinter in some of the tributary rivers of the lake (Galois 1997). This could also be true of the Ontario lake populations as the author was informed by a trapper that softshell turtles were being caught in traps set for snapping turtles in some of the tributary streams around Rondeau Bay during October.

On the Thames River, there are two dams in the City of London preventing migration of individuals past these points. There are turtles both upstream and downstream of these dams (part of this population is between the two dams) and more extensive migration and interaction within the population would most likely occur without this blockage of access. Other factors that might interrupt migration movements are large scale construction projects along the river, such as bridge and pipeline crossings, which may not completely block access through these areas, but may deter softshells from passing through the area because of increased noise and activity.

## **Nutrition and interspecific interactions**

There is no new information on nutrition. However, it is important to consider that spiny softshells feed heavily on crayfish and molluscs, two taxa that are themselves



declining in southern Canada (Campbell et al. 1985; McCoy 1982). Thus, decline in food supply may be a problem for spiny softshells.

### **Behaviour/adaptability**

No new information.

## **POPULATION SIZES AND TRENDS**

Research conducted since the completion of the original status report in 1985 (Campbell and Donaldson) suggests that the southwestern Ontario subpopulation may be approximately 800-1000 individuals (Fletcher 1999). However, the long-term study did not mark individuals so an accurate or precise estimate of population size is not possible. It is impossible to determine to what extent the Canadian population has declined as there are no published historic estimates of densities for the population. It would appear that the population has decreased dramatically if one compares a 1792 journal entry from the Chatham area of the Thames River which states that “hundreds of soft-shelled river turtles were scooped off floating logs to make supper that everyone enjoyed” (Gray 1956) to 1997 survey work which located fewer than 10 individuals in the same area (Fletcher 1997).

The Quebec subpopulation appears to be stable, but much smaller, consisting of probably no more than 100 individuals (P. Galois, pers.comm.). As with the Ontario subpopulation, there are no historic population estimates that would allow for an accurate determination of the extent of population decline. Current research in Ontario indicates that parts of that subpopulation may be subject to significant future decline as the turtles of most areas appear to consist solely of older adults (recruitment appears to be almost zero). Habitat loss has been significant throughout the entire Canadian range so that not only has the range shrunk, but it has become more fragmented within this region (Spiny Softshell Turtle Recovery Team 1997). There are no estimates on the amount of softshell habitat lost or the percent of habitat that has been altered in some way along the rivers (although it would be well over 50% along the Thames). Habitat is currently being lost, but less rapidly than it was years ago. Patrick Galois and the author both agree that even if the population is not declining, a future increase in the population may not be possible as there is a lack of suitable additional habitat.

## **LIMITING FACTORS AND THREATS**

Although habitat loss may be the most significant cause of the historic decline of this species, habitat degradation is currently the biggest problem. Several of the largest remaining nest sites are also popular human recreation sites, and human alteration of these sites is increasing. This species is easily disturbed during nesting so increased recreational use of these sites will likely cause a decline in already poor nesting success. The presence of humans may have increased the population size of some

predators, such as raccoons, particularly in Rondeau where the campground offers increased access to food throughout the year. Sarcophagid fly infestation of softshell nests has also been noted in the Ontario population, but to what degree this affects hatchling survival is not yet well understood. Environmental contamination may also be having an effect on nesting success. High numbers of infertile eggs at some sites in Ontario have prompted an analysis of contaminant levels in eggs and a manuscript on this topic has been submitted (S. de Solla, pers. comm.). Egg samples were collected from 1997-1999 and are currently being analyzed for contaminant levels. Finally, the decline in crayfish and mollusc populations, for spiny softshell's diet is specialized, may limit the size and distribution of the spiny softshell population.

### **SPECIAL SIGNIFICANCE OF THE SPECIES**

*A. s. spinifera* is the only softshell turtle species in Canada.

### **EXISTING PROTECTION OR OTHER STATUS**

The Spiny Softshell Turtle is currently listed by COSEWIC as **Threatened**. In Ontario this species is currently protected under the Ontario Fish and Wildlife Conservation Act 1999. The habitat of this species also receives some protection through the natural heritage component of the Provincial Policy Statement under Ontario's Planning Act. This Act protects significant portions of the habitat of all threatened species. Several nesting sites are also protected, to varying degrees, as they are located on provincial or federally owned land. In Quebec, new legislation is currently under review that will prohibit the catching, keeping, transporting or selling of any subspecies of *Apalone spinifera* (P. Galois, pers. com.).

In Ontario, one of the nesting sites is located on federal land and another is located on provincial land while the rest of the sites are on private land. Even though the sites located on government land should be protected from future development, these two sites presently experience the highest levels of recreation activity of all the Ontario nest sites. Not only does this increased human activity directly affect the turtles (disturbance, possibility of collision with watercraft, etc.) there also tends to be increased raccoon populations in these areas. As well, trapping for snapping turtles occurs adjacent to these areas and softshells are being taken in these traps.

### **SUMMARY OF STATUS REPORT**

My recommendation is that the current species status of **Threatened** be maintained for the eastern spiny softshell. Substantial habitat loss in the past has restricted the distribution of this species to small, isolated areas within its former range. Habitat degradation through development and recreation may be further preventing the turtles from utilizing the whole of their habitat by blocking access to nest, hibernation,

feeding and basking sites. In addition, dams and other structures on the Thames seem to have partially or completely isolated segments of the population. Some Ontario softshell populations appear to have skewed population demographics (many older adults and no juveniles or hatchlings). This could be the result of increasing nest site disturbance and high nest predation severely limiting, or even preventing, recruitment of juveniles in the Ontario populations. Adult mortality rates are likely higher than “normal” because of collisions with motorboats, trapping and incidental mortality from fisheries operators. With these significant threats to such small populations, it is clear that the eastern spiny softshell requires protection in Canada.

## TECHNICAL SUMMARY

### *Apalone spinifera*

Spiny Softshell Turtle

La tortue-molle à épines

Occurrence in Canada: Ontario and Quebec

<b>Extent and Area information</b>	
• <i>Extent of occurrence (EO)(km<sup>2</sup>)</i>	55250 km <sup>2</sup>
• <i>specify trend (decline, stable, increasing, unknown)</i>	Stable?
• <i>are there extreme fluctuations in EO (&gt; 1 order of magnitude)?</i>	No
• <i>area of occupancy (AO) (km<sup>2</sup>)</i>	3000 km <sup>2</sup>
• <i>specify trend (decline, stable, increasing, unknown)</i>	Stable?
• <i>are there extreme fluctuations in AO (&gt; 1 order magnitude)?</i>	No
• <i>number of extant locations</i>	11
• <i>specify trend in # locations (decline, stable, increasing, unknown)</i>	decline (16 historic sites where species was extirpated)
• <i>are there extreme fluctuations in # locations (&gt;1 order of magnitude)?</i>	No
• <i>habitat trend: specify declining, stable, increasing or unknown trend in area, extent or quality of habitat</i>	Declining quality and extent
<b>Population information</b>	
• <i>generation time (average age of parents in the population) (indicate years, months, days, etc.)</i>	18+ years
• <i>number of mature individuals (capable of reproduction) in the Canadian population (or, specify a range of plausible values)</i>	Ont: 1000 (approx)
• <i>total population trend: specify declining, stable, increasing or unknown trend in number of mature individuals</i>	most likely declining from historic population
• <i>if decline, % decline over the last/next 10 years or 3 generations, whichever is greater (or specify if for shorter time period)</i>	--
• <i>are there extreme fluctuations in number of mature individuals (&gt; 1 order of magnitude)?</i>	--
• <i>is the total population severely fragmented (most individuals found within small and relatively isolated (geographically or otherwise) populations between which there is little exchange, i.e., ≤ 1 successful migrant / year)?</i>	Yes
• <i>list each population and the number of mature individuals in each</i>	Ontario ~ 800-1000 Quebec ~ 100
• <i>specify trend in number of populations (decline, stable, increasing, unknown)</i>	Stable?
• <i>are there extreme fluctuations in number of populations (&gt;1 order of magnitude)?</i>	No
<b>Threats (actual or imminent threats to populations or habitats)</b>	
<ul style="list-style-type: none"> <li>- recreational use of nesting areas by humans and potential consequences (disturbance during nesting, collisions with watercraft etc.);</li> <li>- poaching of eggs, high populations of egg predators, continued developmental pressure on nest sites.</li> <li>- decline in crayfish which are a major component of their diet</li> <li>- increased fragmentation of habitat and population by dams</li> <li>- incidental captures of adults by commercial and sport fisheries, and by trappers of other turtles.</li> </ul>	

<b>Rescue Effect (immigration from an outside source)</b>	
• <i>does species exist elsewhere (in Canada or outside)?</i>	yes
• <i>status of the outside population(s)?</i>	Varied
• <i>is immigration known or possible?</i>	Yes, for Quebec population
• <i>would immigrants be adapted to survive here?</i>	Yes
• <i>is there sufficient habitat for immigrants here?</i>	No
<b>Quantitative Analysis</b>	

## BIOGRAPHICAL SUMMARY OF AUTHOR

Michelle Fletcher is a graduate of the University of Guelph and is currently employed in a biologist position at the Upper Thames River Conservation Authority in London, Ontario. She has been a member of the research team studying the softshell population in Ontario since 1994.

## AUTHORITIES CONSULTED

Patrick Galois  
St-Lawrence Valley Natural History Society/  
Société d'Histoire Naturelle de la Vallée du St-Laurent  
21 125, ch. Ste-Marie  
Ste-Anne-de-Bellevue (Québec) H9X 3Y7  
Tel: (514) 457 9449  
Courriel: pagalois@aei.ca

Scott Gillingwater  
8 Peter Street  
Princeton, Ontario  
N0J 1V0  
ph: 1-(519)-458-4911  
e-mail: indotestudo@hotmail.com

Jacques Jutras, Coordonnateur herpétofaune et micromammifères  
Société de la Faune et des Parcs du Québec  
Direction du Développement de la faune  
Édifice Marie-Guyart, 11e  
675 bl René Lévesque est  
Québec (Québec), G1R 5V7  
Téléphone: (418) 521-3875 (poste 4456)  
Télécopieur: (418) 646-6863  
Courriel: jacques.jutras@fapaq.gouv.qc.ca

Martin Léveillé, biologiste, M.Sc., Société Faune et Parcs, Québec  
Direction de l'aménagement de la faune de la Montérégie  
201, place Charles-Lemoyne, 2e étage  
Longueuil (Québec), J4K 2T5  
Téléphone: (450) 928-7607 poste 310  
Télécopieur: (450) 928-7625  
Courriel: martin.leveille@fapaq.gouv.qc.ca

## RECORD OF FIELD WORK CONDUCTED

The contractor has been a participant in ongoing fieldwork on the southwestern Ontario subpopulation from 1994 through 2000. This work has included population surveys throughout southwestern Ontario as well as nesting studies, habitat rehabilitation, and radio tracking at several sites including the Thames and Sydenham Rivers and Rondeau and Long Point along the Lake Erie shoreline.

Patrick Galois has been a participant in ongoing fieldwork on the Quebec population from 1996 through 1999. This work has included population surveys throughout Quebec as well as nesting studies and radio tracking in Lake Champlain.

## LITERATURE CITED

- Bider, J.R. and S. Matte. 1996. The atlas of amphibians and reptiles of Quebec. St. Lawrence Valley Natural History Society and the Ministère de l'environnement et de la faune, direction de la faune et des habitats: Quebec, Q.C. 106 p.
- Bleakney, J.S. 1958. A zoogeographical study of the amphibians and reptiles of eastern Canada. Natl. Mus. Canada Bull. No. 155: 1-119.
- Bonin, J. 1993. Inventaire herpétologique en Montérégie, région de la baie Missisquoi. Ministère du Loisir, de la Chasse et de la Pêche du Québec, direction de la gestion des espèces et des habitats, Québec. 17 pp.
- Bonin, J. 1994. Preserve design package: the turtle habitat of the East swamp, Chapman Bay, Lake Champlain, Quebec. Unpub. report to the Nature Conservancy of Canada. 29 pp.
- Campbell, C.A., and G.R. Donaldson. 1985. A Status Report for the Spiny Softshell Turtle, *Trionyx spiniferus spiniferus*, in Canada. Ontario Ministry of Natural Resources, Toronto. 50 pp. (Edited and revised in March 1985 by M.E. Obbard.)
- Congdon, J.D., A.E. Dunham, and R.C. Van Loben Sels. 1993. Delayed Sexual Maturity and Demographics of Blanding's Turtles (*Emydoidea blandingii*): Implications for Conservation and Management of Long-Lived Organisms. Conserv. Biol. 7(4):826-833.
- Conant, R., and J. T. Collins. 1991. A field guide to reptiles and amphibians: Eastern and Central North America. Houghton Mifflin Company, Boston. xiv + 450 pages.
- Eastern Spiny Softshell Recovery Team. 1997. National Recovery Plan for the Spiny Softshell Turtle (*Apalone spinifera*) DRAFT. 55 pp.
- Ernst, C.H., R.W. Barbour, and J.E. Lovich. 1994. Turtles of the United States and Canada. Smithsonian Institution Press, Washington. 578 pp.
- Fletcher, M.L. 1996. Management of Softshell Turtle Habitat: Year 1, 1996. Upper Thames River Conservation Authority, London, Ontario. 23 pp.
- Fletcher, M.L. 1997. Management of Softshell Turtle Habitat: Year 2, 1997. Upper Thames River Conservation Authority, London, Ontario. 30 pp.
- Fletcher, M.L. 1998. Management of Softshell Turtle Habitat: Year 3, 1998. Upper Thames River Conservation Authority, London, Ontario. 33 pp.

- Fletcher, M.L. 1999. Management of Softshell Turtle Habitat: Year 4, 1999, Final Year. Upper Thames River Conservation Authority, London, Ontario. 17 pp.
- Fletcher, M.L., and S.D. Gillingwater. 1994. A Survey of the Spiny Softshell Turtle along the Thames and Sydenham Rivers 1994. St. Clair Region Conservation Authority, Strathroy, Ontario. 32 pp.
- Fletcher, M.L., S. Graff, and S.D. Gillingwater. 1995. Site Specific Examination of Spiny Softshell Turtle Populations on the Thames and Sydenham Rivers. Upper Thames River Conservation Authority, London, Ontario. 17 pp.
- Galois, P. 1997. Identification des habitats essentiels de la tortue-molle à épines (*Apalone spinifera spinifera*) au lac Champlain par radio-téléométrie. Ministère de l'Environnement et de la Faune. 139 pp.
- Gartshore, M.E., and P.E. Carson. 1990. Queen Snakes and Spiny Softshell Turtles on the Thames River, Aylmer District. Unpublished report to the Ministry of Natural Resources, Aylmer. 18 pp.
- Gray, E.E. 1956. Wilderness Christmas: The Moravian Mission to the Delaware Indians. Macmillan, Toronto. 91 pp.
- Lesueur, C.A. 1827. Note sur deux especes de tortues du genre *Trionyx* Gff, St. H. Mem. Mus. Hist. Nat. Paris 15:257-268.
- McCoy, C.J. 1982. Amphibians and reptiles in Pennsylvania. Carnegie Museum of Natural History Special Publication Number 6.
- Herpetofaunal Summary. 2000. Natural Heritage Information Centre. Ontario Ministry of Natural Resources.
- Packard, G.C., T.L. Taigen, T.J. Boardman, M.J. Packard, and C.R. Tracy. 1979. Changes in mass of softshell turtle (*Apalone spinifera*) eggs incubated on substrates differing in water potential. *Herpetologica* 35: 78-86.
- Smith, M.A. and R.B. Smith. 1980. Synopsis of the herpetofauna of Mexico. Vol. VI. Guide to Mexican Turtles. Bibliographic addendum III. John Johnson, North Bennington, Vermont. xviii + 1044 pp.

The executive summary, technical summary and final edit were completed by Melissa Cameron and Ron Brooks.