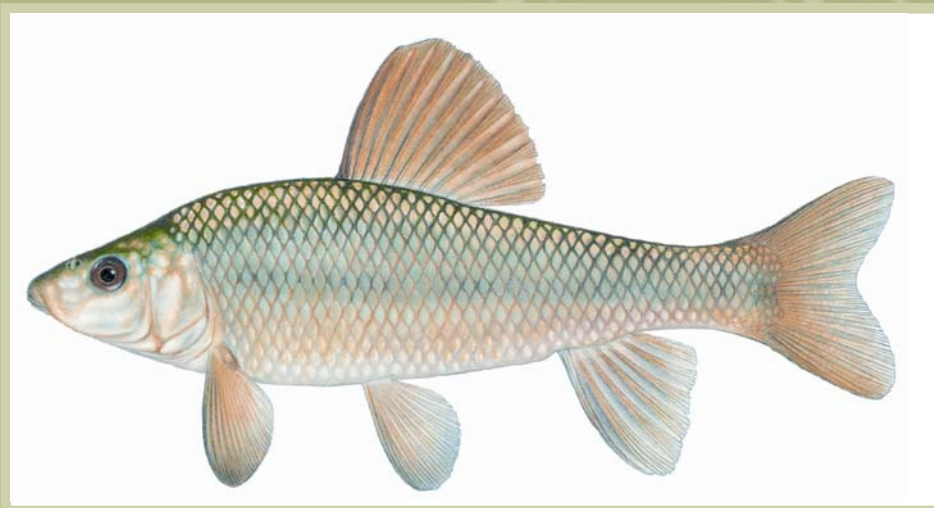


# Recovery Strategy for the Lake Chubsucker (*Erimyzon sucetta*) in Canada

## Lake Chubsucker



June 2007



## About the *Species at Risk Act* Recovery Strategy Series

### What is the *Species at Risk Act* (SARA)?

SARA is the Act developed by the federal government as a key contribution to the common national effort to protect and conserve species at risk in Canada. SARA came into force in 2003 and one of its purposes is “*to provide for the recovery of wildlife species that are extirpated, endangered or threatened as a result of human activity.*”

### What is recovery?

In the context of species at risk conservation, **recovery** is the process by which the decline of an endangered, threatened, or extirpated species is arrested or reversed and threats are removed or reduced to improve the likelihood of the species’ persistence in the wild. A species will be considered **recovered** when its long-term persistence in the wild has been secured.

### What is a recovery strategy?

A recovery strategy is a planning document that identifies what needs to be done to arrest or reverse the decline of a species. It sets goals and objectives and identifies the main areas of activities to be undertaken. Detailed planning is done at the action plan stage.

Recovery strategy development is a commitment of all provinces and territories and of three federal agencies — Environment Canada, Parks Canada Agency, and Fisheries and Oceans Canada — under the Accord for the Protection of Species at Risk. Sections 37–46 of SARA

([http://www.sararegistry.gc.ca/the\\_act/](http://www.sararegistry.gc.ca/the_act/)) outline both the required content and the process for developing recovery strategies published in this series.

Depending on the status of the species and when it was assessed, a recovery strategy has to be developed within one to two years after the species is added to the List of Wildlife Species at Risk. Three to four years is allowed for those species that were automatically listed when SARA came into force.

### What’s next?

In most cases, one or more action plans will be developed to define and guide implementation of the recovery strategy. Nevertheless, directions set in the recovery strategy are sufficient to begin involving communities, land users, and conservationists in recovery implementation. Cost-effective measures to prevent the reduction or loss of the species should not be postponed for lack of full scientific certainty.

### The series

This series presents the recovery strategies prepared or adopted by the federal government under SARA. New documents will be added regularly as species get listed and as strategies are updated.

### To learn more

To learn more about the *Species at Risk Act* and recovery initiatives, please consult the SARA Public Registry (<http://www.sararegistry.gc.ca/>) and the Web site of the Recovery Secretariat (<http://www.speciesatrisk.gc.ca/recovery/>).

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**Additional copies:**

Additional copies can be downloaded from the SARA Public Registry (<http://www.sararegistry.gc.ca/>)

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## DECLARATION

The recovery strategy for the lake chubsucker has been prepared in cooperation with the jurisdictions described in the Preface. Fisheries and Oceans Canada has reviewed and accepts this document as its recovery strategy for the lake chubsucker as required under the *Species at Risk Act* (SARA). This recovery strategy also constitutes advice to other jurisdictions and organizations on the recovery goals, approaches and objectives that are recommended to protect and recover the species.

Success in the recovery of this species depends on the commitment and cooperation of many different constituencies that will be involved in implementing the directions set out in this strategy and will not be achieved by Fisheries and Oceans Canada or any other jurisdiction alone. In the spirit of the National Accord for the Protection of Species at Risk, the Minister of Fisheries and Oceans invites all Canadians to join Fisheries and Oceans Canada in supporting and implementing this strategy for the benefit of the species and Canadian society as a whole. Fisheries and Oceans Canada will support implementation of this strategy to the extent possible, given available resources and its overall responsibility for species at risk conservation. Implementation of the strategy by other participating jurisdictions and organizations is subject to their respective policies, appropriations, priorities, and budgetary constraints.

The goals, objectives and recovery approaches identified in the strategy are based on the best existing knowledge and are subject to modifications resulting from new information. The Minister of Fisheries and Oceans will report on progress within five years.

This strategy will be complemented by one or more action plans that will provide details on specific recovery measures to be taken to support conservation of the species. The Minister of Fisheries and Oceans will take steps to ensure that, to the extent possible, Canadians interested in or affected by these measures will be consulted.

## RESPONSIBLE JURISDICTIONS

Under the *Species at Risk Act*, Fisheries and Oceans Canada is the responsible jurisdiction for the lake chubsucker. The province of Ontario also cooperated in the production of this recovery strategy.

## AUTHORS

This document was prepared by Kara L. Vlasman and Shawn K. Staton on behalf of the Ontario Freshwater Fish Recovery Team.

## ACKNOWLEDGMENTS

The Ontario Freshwater Fish Recovery Team would like to thank the following organizations for their support in the development of the lake chubsucker recovery strategy: Fisheries and Oceans Canada, Ontario Ministry of Natural Resources, Essex Region Conservation Authority, Trent University, Niagara Peninsula Conservation Authority, Old Ausable Channel Management Committee, Ausable Bayfield Conservation Authority and the Niagara Parks Commission. Mapping was produced by Graham Krall (DFO).

## STRATEGIC ENVIRONMENTAL ASSESSMENT STATEMENT

In accordance with the *Cabinet Directive on the Environmental Assessment of Policy, Plan and Program Proposals*, the purpose of a Strategic Environmental Assessment (SEA) is to incorporate environmental considerations into the development of public policies, plans, and program proposals to support environmentally-sound decision making.

Recovery planning is intended to benefit species at risk and biodiversity in general. However, it is recognized that strategies may also inadvertently lead to environmental effects beyond the intended benefits. The planning process based on national guidelines directly incorporates consideration of all environmental effects, with a particular focus on possible impacts on non-target species or habitats.

This recovery strategy will clearly benefit the environment by promoting the recovery of the lake chubsucker. The potential for the strategy to inadvertently lead to adverse effects on other species was considered. The SEA concluded that this strategy will clearly benefit the environment and will not entail any significant adverse effects. Refer to the following sections of the document in particular: Description of the species' habitat and biological needs, ecological role, and limiting factors; Effects on other species; and the recommended approaches to meet recovery objectives.

## RESIDENCE

SARA defines residence as: “*a dwelling-place, such as a den, nest or other similar area or place, that is occupied or habitually occupied by one or more individuals during all or part of their life cycles, including breeding, rearing, staging, wintering, feeding or hibernating*” [SARA S2(1)].

Residence descriptions, or the rationale for why the residence concept does not apply to a given species, are posted on the SARA public registry:

[http://www.sararegistry.gc.ca/plans/residence\\_e.cfm](http://www.sararegistry.gc.ca/plans/residence_e.cfm)

## PREFACE

The responsible jurisdiction for the lake chubsucker under the *Species at Risk Act* (SARA) is Fisheries and Oceans Canada. Section 37 of SARA requires the competent minister to prepare recovery strategies for listed extirpated, endangered or threatened species. The lake chubsucker was listed as Threatened under SARA in June 2003. Fisheries and Oceans Canada – Central and Arctic Region, led the development of this recovery strategy. The proposed strategy meets SARA requirements in terms of content and process (Sections 39-41). It was developed in cooperation or consultation with (see Appendix II for full record of consultations), as appropriate:

- Jurisdictions - Province of Ontario, Parks Canada Agency;
- Environmental non-government groups – Essex Region Conservation Authority, Trent University, Niagara Peninsula Conservation Authority, Ausable Bayfield Conservation Authority, Old Ausable Channel Management Committee.

## EXECUTIVE SUMMARY

The lake chubsucker is declining throughout most of its range across Canada and the United States. The Canadian range of this species is restricted to southwestern Ontario: the Ausable River, Lake St. Clair, Thames River (Jeanette's Creek), coastal wetlands of Lake Erie, several tributaries of Big Creek and Niagara rivers (Tee Creek and Lyons Creek).

The lake chubsucker is a small (less than 254 mm in total length), robust, deep bodied member of the sucker family, Catostomidae. Across its range, the lake chubsucker tends to inhabit clear, well-vegetated, slow-moving or still waters with substrates of gravel, sand, silt and organic debris. Ontario specimens have typically been captured in heavily vegetated, stagnant bays, channels, ponds and swamps. Suitable habitats are thought to be decreasing in size and quality, predominantly due to agriculture-induced siltation and wetland drainage.

The lake chubsucker is considered a Threatened species under the federal *Species at Risk Act*. As such, the Act requires that a recovery strategy be developed to identify approaches required to arrest or reverse the species' decline. Fisheries and Oceans Canada, in cooperation with the government of Ontario, has developed a recovery strategy to facilitate the protection and recovery of this species.

The long-term recovery goal (>20 years) is "to maintain existing distributions and densities of the lake chubsucker and restore viable populations to formerly occupied wetland habitats." The following recovery objectives will be addressed over a 5-10 year period to assist with meeting the long term goal:

- i. Determine the extent, abundance and population demographics of existing populations through a targeted sampling program.
- ii. Identify key habitat requirements to define critical habitat and implement strategies to protect known occupied and recovery habitats.
- iii. Establish a long-term population and habitat monitoring program.
- iv. Identify threats, evaluate their relative impacts, and implement remedial actions to reduce their effects, where feasible.
- v. Investigate the feasibility of re-introductions for populations that may be extirpated or reduced.
- vi. Coordinate recovery efforts with aquatic and terrestrial ecosystem recovery teams and other relevant or complimentary groups/ initiatives.
- vii. Increase awareness of the lake chubsucker and the role of healthy aquatic ecosystems, and their importance to humans.

The recovery team has identified several approaches necessary to ensure that recovery objectives for the lake chubsucker are met. These approaches have been organized into three categories; urgent actions are summarized below:

### **Research and Monitoring:**



- Conduct targeted background surveys at historical sites as well as other areas of suitable habitat.
- Conduct targeted surveys of existing populations to determine range, abundance, and population demographics.
- Develop and implement a population and habitat monitoring program to assess changes in population and habitat characteristics.
- Determine seasonal habitat needs of all life stages of the species.
- Ensure planning and management agencies are aware of habitats that are important to lake chubsucker.

**Management and Coordination:**

- Share knowledge with relevant ecosystem recovery teams and work cooperatively to implement recovery actions.
- Encourage municipalities to protect habitats that are important to the lake chubsucker.

**Stewardship, Outreach and Awareness:**

- Promote stewardship among owners of land abutting habitats of the lake chubsucker. Ensure they are aware of opportunities for financial assistance.
- Work with landowners to implement best management practices. Encourage the completion of Environmental Farm and Nutrient Management Plans.

The identification of Critical Habitat is an essential component to the recovery of Endangered and Threatened species under *SARA*. Due to the general lack of detailed knowledge, the Recovery Team has developed a schedule of studies which outlines necessary steps to obtaining information for the identification of critical habitat. Until critical habitat can be adequately defined, the recovery team has identified 'currently occupied habitats' as habitat in need of conservation.

A dual approach to recovery implementation will be taken which combines an ecosystem-based approach complemented by a single-species focus. This will be accomplished through coordinated efforts with relevant ecosystem-based recovery teams (Ausable River, Thames River and Essex-Erie) and their associated Recovery Implementation Groups. The recovery strategy will be supported by one or more action plans that will be developed within five years. The success of recovery actions in meeting recovery objectives will be evaluated through the performance measures provided. The entire recovery strategy will be reassessed every 5 years to evaluate progress and to incorporate new information.

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## 1. BACKGROUND

### 1.1 Species Assessment Information from COSEWIC

**Common Name:** Lake Chubsucker

**Scientific Name:** *Erimyzon sucetta*

**Status:** Threatened

**Last Examination and Change:** 2001, THR (*status update report in prep.*)

**Canadian Occurrence:** Ontario

**Reason for designation:** Within Canada, this species occurs only in southwestern Ontario where it has been found at seven locations and has not been found at three of these since 1983. Never abundant, the species is in decline throughout its range as a result of siltation and drainage of wetlands.

**Status History:** Designated Special Concern in April 1994. Status re-examined and uplisted to Threatened in November 2001. Last assessment based on an existing status report with an addendum.

### 1.2 Description

The lake chubsucker is a robust, slightly compressed, deep-bodied member of the sucker family, Catostomidae (Figure 1). It has a wide head, blunt snout, a small protruding downward directed mouth and a moderately deep-arched back. The fish's dorsal surface is deep olive to greenish-bronze. The underside is green-yellow to yellow-white. Scales on the back and upper sides are dark-edged, creating a crosshatched pattern. The lateral stripe, if present, is either continuous (and often striking in juveniles) or broken into lateral blotches or bands. A lateral line is lacking. The dorsal fin has a short base without a rounded or pointed anterior lobe and has fewer than 20 rays, distinguishing this genus from *Carpionides*, *Cycleptus* and *Ictiobus*. In Canada, it is typically less than 254 mm in total length, but has been reported to reach lengths and weights up to 292 mm and 397 g, respectively (Coker *et al.* 2001). Individuals tend to be smaller in Canada than in their southern range.

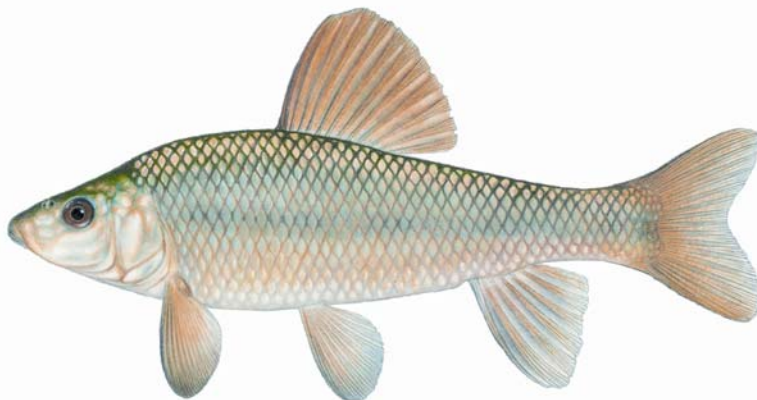


Figure 1. The lake chubsucker (*Erimyzon sucetta*). © Joseph R. Tomelleri.

### 1.3 Populations and Distribution

**Global Range:** The lake chubsucker has a fragmented, disjunct distribution from the lower coastal plain extending from Texas to Virginia, to a northern element in the southern Great Lakes drainages (Figure 2). It occurs in 1 province and 22 states (introduced to Nebraska). The species is considered globally secure but is imperiled in Ontario (S2) and considered extirpated in Iowa and Pennsylvania, and possibly New York (Table 1). Less than 5% of the species' global range currently occurs in Canada.

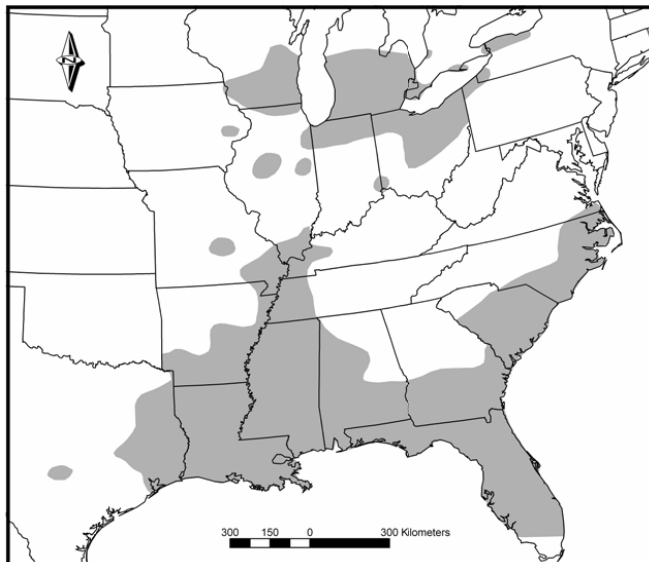


Figure 2. Global distribution of the lake chubsucker. Modified from Page and Burr (1991). (Source: Mandrak *et al.* submitted).

**Table 1. Global, national, and sub-national ranks for the lake chubsucker.**

<b>RANK</b>	<b>JURISDICTION RANK</b>
<b>Global (G)</b>	<b>G5</b> (Aug. 17, 2001)
<b>National (N)</b> CANADA US	<b>N2</b> <b>N5</b>
<b>Sub-National (S)</b> CANADA US	Ontario ( <b>S2</b> ) Alabama ( <b>S5</b> ), Arkansas ( <b>S2?</b> ), Florida ( <b>SNR</b> ), Georgia ( <b>S5</b> ), Illinois ( <b>S2S3</b> ), Indiana ( <b>S3</b> ), Iowa ( <b>SX</b> ), Kentucky ( <b>S2</b> ), Louisiana ( <b>S5</b> ), Michigan ( <b>S4</b> ), Mississippi ( <b>S5</b> ), Missouri ( <b>S2</b> ), Nebraska ( <b>SNA</b> ), New York ( <b>SH</b> ), North Carolina ( <b>S4</b> ), North Dakota ( <b>SNR</b> ), Ohio ( <b>S2</b> ), Oklahoma ( <b>S3</b> ), Pennsylvania ( <b>SX</b> ), South Carolina ( <b>SNR</b> ), Tennessee ( <b>S3S4</b> ), Texas ( <b>S3</b> ), Virginia ( <b>S2</b> ), Wisconsin ( <b>S3</b> )

Source: NatureServe. 2005. (Accessed Jan. 30, 2006). Refer to Appendix 1 for definition of status rankings.

**Canadian Range:** In Canada, the lake chubsucker is only known to occur in southwestern Ontario (Figure 3). It has been found in the Ausable River (tributary of Lake Huron), Lake St. Clair (Mitchell's Bay, St. Clair National Wildlife Area and Walpole Island), Thames River (Jeanette's Creek), Lake Erie (Point Pelee, Rondeau Bay, and

Long Point Bay), several tributaries of Big Creek and Niagara rivers (Tee Creek and Lyons Creek). Since Tee Creek is a tributary of Lyons Creek, these occurrences may have been part of the same population. All populations should be considered nationally significant due to the species' restriction to southwestern Ontario.

Canadian collections have not been made in a standardized manner, nor have there been specific studies on population size, making it difficult to assess population sizes and trends. The paucity of records, however, suggests low abundance. The population in the Old Ausable Channel (OAC) of the Ausable River is thought to have remained in stable condition since its discovery in 1982 (ARRT 2005). Populations in Point Pelee National Park and Long Point Bay are also thought to be stable (EERT 2007). Extensive sampling of over 300 sites at Point Pelee in 2002-03 using a variety of methods produced 25 individuals at 22 sites (Mandrak *et al.* submitted). The species had not been recorded at Rondeau Bay since 1963, until 2005, when a single individual was found despite considerable search effort in 2004 and 2005 (Tom Macdougall, OMNR pers comm. Feb. 16, 2006). It has not been collected from Jeanette's Creek or Tee Creek since 1970, or from Big Creek tributaries and Mitchell's Bay since 1989 (Mandrak *et al.* submitted). Recent surveys in areas of historic occurrence in the upper Big Creek watershed have not taken place and many nearshore areas with suitable habitat in Long Point Bay have not yet been sampled. Recent detailed fish biomass surveys which were undertaken in Tee Creek from 2003 to 2005 yielded no catches of this species (A. Yagi, OMNR, pers. comm.), however, the species persists along a 1.8 km stretch of Lyons Creek where clear water is maintained by overflow of the Welland Canal (Mandrak *et al.* submitted). Further surveys are required to verify the status of populations from Jeanette's Creek, Tee Creek, Big Creek tributaries and Mitchell's Bay.

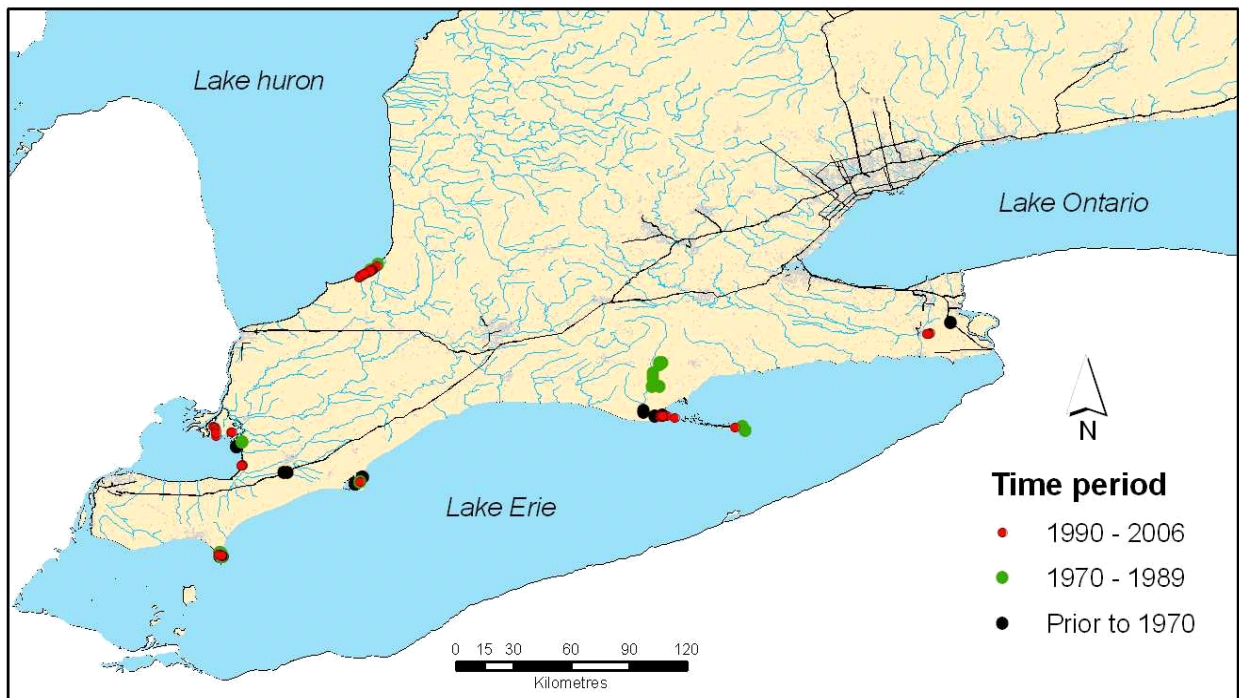


Figure 3. Canadian distribution of the lake chubsucker.

## 1.4 Needs of the Lake Chubsucker

### 1.4.1 Habitat and biological needs

The lake chubsucker is a warm water species, with a preferred temperature range of 28 - 34 °C (Coker *et al.* 2001). It is an omnivorous bottom feeder, feeding primarily on plankton, small crustaceans, mussels, aquatic insects, filamentous algae and other plant material. Suitable habitat includes clear, well-vegetated, slow-moving or still waters with substrates of gravel, sand and silt mixed with organic debris: such as those provided by backwaters, bayous, drainage ditches, floodplain lakes, marshes, oxbows, sloughs and wetlands (see Mandrak *et al.* submitted). In Ontario, the species has typically been captured in heavily vegetated, stagnant bays, channels, ponds and swamps with low turbidity and clay, silt, sand and organic debris substrates (Mandrak *et al.* submitted). Within Lake St. Clair and Lake Erie, coastal wetlands are particularly significant for this species (EERT 2007). Barriers between coastal wetlands, adjacent Lake Erie, appear to maintain the species' preferred clear, well-vegetated habitat in the coastal wetlands.

Lake chubsuckers move into marshes to spawn, although they are thought to have limited dispersal ability. Therefore, suitable spawning sites must be in close proximity to available habitat. In the Great Lakes area, spawning sites may include shallow waters of bays, lower reaches of tributaries, ponds and marshes where eggs are scattered over beds of aquatic vegetation, dead grass or filamentous algae (Goodyear *et al.* 1982). In Ontario, spawning likely occurs between April and June. Mature adult females (age 3 yr +) lay from 3,000 to 20,000 eggs (Becker 1983) on aquatic vegetation. Eggs hatch in water temperatures of 22-29 °C.

Nursery habitat for this species occurs over silt, sand or clay within the first two meters of vegetated water (Lane *et al.* 1996 in Mandrak *et al.* submitted). Mandrak *et al.* (submitted) provide habitat descriptions from Leslie and Timmins' (1997) study of this species' early life history based on collections from Long Point's Inner Bay, Lake Erie. Age 0+ specimens were found inhabiting a vegetated drainage ditch with water temperatures of 24-28°C; specimens on Walpole Island, Lake St. Clair were found in approximately 10cm of water under a layer of leaves in a roadside ditch intermittently connected to the St. Clair River in early January; and age 1+ specimens on Long Point were found in marshes associated with *Eleocharis*, *Carex* and *Typha*.

### 1.4.2 Ecological role

The significance of this species' role in the ecosystem is not known due to its rarity; however, because of its specific habitat requirements (clear, slow-moving, heavily-vegetated waters), declining populations are indicative of deteriorating ecosystem conditions. In Ontario, the species is often found with blackchin shiner (*Notropis heterodon*), blacknose shiner (*N. heterolepis*) and pugnose shiner (*N. anogenus*) – species which prefer similar habitats (Mandrak *et al.* submitted). In Niagara area

wetland streams, the species most commonly associated with such habitats include grass pickerel (*Esox americanus vermiculatus*), golden shiner (*Notemigonus crysoleucas*), brown bullhead (*Ameiurus nebulosus*) and central mudminnow (*Umbra limi*) (A. Yagi, OMNR, pers. comm.). The lake chubsucker has been identified as an ideal forage fish for bass (Carlander 1969 in Mandrak *et al.* submitted), but it is unlikely to be prominent in bass' diet due to its general rarity.

### 1.4.3 Limiting factors

The lake chubsucker is at its northern range limit in Canada. This species has very specific habitat requirements and is intolerant of turbidity and highly silted waters (Mandrak *et al.* submitted). The lake chubsucker appears to have limited dispersal ability (Leslie and Timmins 1997) which may prevent the re-establishment of extirpated populations.

## 1.5 Threats

### 1.5.1 Threat classification

Threats thought to be affecting the lake chubsucker are listed in Table 2. Nine unique threats were ranked based on their relative impact, spatial extent and expected severity.

**Table 2. Threat classification table for the lake chubsucker.**

Threat	Relative Impact	Spatial Extent	Evaluation of Threat
A Wetland Habitat Loss	Predominant	Widespread	Probable
B Sediment Loading & Turbidity	Predominant	Widespread	Probable
C Channelization/ Altered Water Flow	Contributing	Local	Speculative
D Exotic Species	Contributing	Widespread	Speculative
E Vegetation Removal/ Control	Contributing	Local	Speculative
F Barriers to Movement	Contributing	Local	Speculative
G Climate Change	Contributing	Widespread	Speculative
H Incidental Harvest (Commercial and Bait Fisheries)	Contributing	Local	Speculative
I Changes to Trophic Dynamics	Contributing	Local	Speculative

### 1.5.2 Description of threats

The lake chubsucker is subject to a broad array of threats across its range. Threats to this species include siltation; increased turbidity and loss of its preferred wetland habitat (clear, still, well vegetated waters) through habitat alteration, channelization, wetland drainage, vegetation removal/ control, pollution, changes to rates of flow, and possibly exotic species and climate change. In southwestern Ontario, the leading causes of habitat loss for this species appear to be the draining of wetlands and siltation due to agricultural practices. Unless further drainage and siltation of habitat is prevented,

population declines will continue to occur (Mandrak *et al.* submitted). Remaining populations of the lake chubsucker are found predominantly in coastal wetlands where barriers between wetlands and the adjacent lake waters appear to maintain suitable habitat (but also prevent movement). Exotic species such as common carp (*Cyprinus carpio*) and common reed grass (*Phragmites australis*) may pose a threat to some populations through alteration of wetland habitats. However, the establishment of the exotic zebra mussel (*Dreissena polymorpha*) may have improved habitat conditions in some areas through increased water clarity. Incidental harvest in commercial and bait fisheries may represent an additional threat but requires further investigation.

Climate change is expected to have significant effects on aquatic communities of the Great Lakes basin in the coming decades. In a recent assessment of the projected impacts of climate change on coastal wetland fish communities in the lower Great Lakes, Doka *et al.* (2006) predicted several species at risk fishes as most vulnerable; their results showed that lake chubsucker ranked 4<sup>th</sup> highest in final vulnerability scores of 99 fish species that use lacustrine habitats. In this study, vulnerabilities were based on an assessment of climate change risk associated with coastal wetland and thermal preferences for different life stages as well as species distributions.

The following summarizes information on threats to extant and extirpated populations. An overview is provided in table 3.

### **Threats to Extant Populations:**

*Ausable River:* Within the Ausable River watershed, the OAC population is believed to be stable and is protected from influxes of suspended solids in the river by a dam; therefore, siltation is not currently a serious threat to this population. Although much of the OAC habitat receives protection due to its presence in a Provincial Park, the ecosystem is vulnerable to non-indigenous, introduced species. The potential use of live baitfish in this habitat may present a real risk of introducing non-indigenous species to the otherwise essentially closed system. Common carp presently occur at low densities here, but represent a potential threat to the lake chubsucker if their numbers increase (ARRT 2005). The destructive feeding behavior of common carp, involving the uprooting of aquatic vegetation and associated elevation of turbidity levels can cause deterioration of wetland habitat. Development activities occurring outside the Pinery Provincial Park in close proximity to the OAC may be exerting negative pressures on the system (ARRT 2005). Changes to trophic dynamics may also be a concern for this population. Recent shifts in the aquatic community have resulted in an increased prevalence of larger predatory centrarchids and the appearance of northern pike (*Esox lucius*) in the OAC (ARRT 2005).

*Lake St. Clair:* Development along the shorelines of Lake St. Clair is a potential threat to the population occupying the east shore of Lake St. Clair.



*Lake Erie (Rondeau Bay, Long Point Bay, Point Pelee):* The main threats to the lake chubsucker in the Lake Erie coastal wetlands are thought to be siltation, turbidity and wetland loss. Additional and related threats include sediment and nutrient loadings, alterations to shoreline processes (EERT 2007).

*Niagara River, Lyons Creek:* The lake chubsucker presently occurs along a 1.8 km stretch of clear water maintained by the clean overflow water of the Welland Canal (Mandrak *et al.* submitted). The remainder of the Creek is now highly degraded and siltation may remain an immediate threat to this population. In addition, PCB contamination within Lyons Creek has been an ongoing concern with site remediation plans in the early stages (I. Barret, NPCA, pers. comm.).

### Threats to Historically Occupied Habitats:

*Thames River population, Jeanette's Creek:* The main threats thought to be associated with this population's possible extirpation are increased siltation and turbidity from agriculture, industry and urbanization (TRRT 2005).

*Upper tributaries of Big Creek (Long Point Region):* Conditions/ threats within these tributaries are unknown at this time.

*Niagara River, Tee Creek:* This population/ subpopulation is now likely extirpated as a result of habitat degradation, primarily resulting from agriculture-induced siltation and turbidity (Mandrak *et al.* submitted). The historically occupied reaches of Tee Creek are now separated from extant populations in Lyons Creek by large distances of very poor habitat. Tee Creek now has a fairly entrenched channel and is classified as a municipal drain (I. Barret, NPCA, pers. comm.).

**Table 3: Predominant threats to populations of the lake chubsucker in Ontario.**

System	Distribution	Population Status	Predominant Threats
Ausable River	Old Ausable Channel	Stable	Changes in trophic dynamics, exotic species, nutrients?
Thames River	Jeanette's Creek	Extirpated	Habitat loss, sediment loading and turbidity, channelization/ altered water flow.
Lake St. Clair	Walpole Island	Extant	Unknown
	Mitchell's Bay	Extirpated?	Shoreline development
	St. Clair WMA	Extant	Unknown
Lake Erie	Long Point Bay	Declining?	Habitat loss and siltation
	Point Pelee	Stable	Habitat loss and siltation
	Rondeau Bay	Declining?	Nutrient loading, vegetation removal/ control
	Big Creek tributaries (Long Point region)	Extirpated?	Unknown

Niagara River	Tee Creek	Extirpated	Habitat loss, sediment loading and turbidity
	Lyons Creek	Declining	Habitat loss, sediment loading and turbidity

## 1.6 Actions Already Completed or Underway

**Ecosystem Recovery Strategies:** The following aquatic ecosystem-based recovery strategies address several lake chubsucker populations and are currently being implemented by their respective recovery teams. Recovery activities implemented by these teams include active stewardship and outreach/awareness programs to reduce identified threats.

*Ausable River Ecosystem (OAC population):* The long-term goal of this strategy is “to sustain a healthy native aquatic community in the Ausable River through an ecosystem approach that focuses on the recovery of species at risk” (ARRT 2005). The Ausable River Recovery Team has facilitated the development of a management plan for the OAC and is working towards the identification of critical habitat for the lake chubsucker within the OAC.

*Essex-Erie Region Fishes (Point Pelee, Rondeau Bay, Long Point Bay and Big Creek populations):* The long-term goal of this strategy is “to maintain and restore ecosystem quality and function in the Essex-Erie region in order to support viable populations of fish species at risk, across their current and former range.” (EERT 2007). The Essex-Erie region is located on the north shore of Lake Erie and bordered to the east by the Grand River watershed, to the west by the Detroit River and to the north by Lake St. Clair and Thames River watershed.

*Thames River Ecosystem (Jeanette’s Creek historical population):* The long-term goal of this strategy is “to use an ecosystem approach to stabilize and improve species at risk populations within the Thames River ecosystem and to reduce or eliminate threats to these species and their associated habitats, so that their long-term viability in the watershed is ensured.” (TRRT 2005).

**Awareness – Incidental Harvest:** A color brochure of fish species at risk (including lake chubsucker) was distributed to bait fish harvesters in 2006 to raise general awareness and help prevent incidental harvest through this means.

**Recent Surveys:** The following table summarizes recent fish surveys conducted by various agencies within areas of known occurrence of the lake chubsucker.

**Table 4: Summary of recent fish surveys in areas of lake chubsucker occurrence (adapted from EERT 2007; Mandrak *et al.* submitted).**

<b>Waterbody/ General Area</b>	<b>Survey Description (years of survey effort)</b>
Ausable (OAC)	<ul style="list-style-type: none"> <li>• DFO targeted sampling 2002, 2004<sup>a,c,d,e</sup></li> <li>• Complimentary habitat surveys also conducted by DFO</li> </ul>
Essex region	<ul style="list-style-type: none"> <li>• ERCA sampling of inland watercourses (2000-2001)<sup>c</sup>, targeted sampling (2004)<sup>c</sup>, surveys of drains and inland watercourses (2004)<sup>c</sup></li> </ul>
Lake Erie	<ul style="list-style-type: none"> <li>• OMNR coastal wetlands along Lake Erie (2004-2005)<sup>c</sup></li> </ul>
Point Pelee	<ul style="list-style-type: none"> <li>• DFO and Point Pelee National Park (2002-2003)<sup>a,b,d,e</sup></li> </ul>
Rondeau Bay	<ul style="list-style-type: none"> <li>• DFO targeted sampling in 2002<sup>d</sup></li> <li>• OMNR and DFO (2004-2005)<sup>a,e</sup></li> </ul>
Lake St. Clair (St. Clair NWA)	<ul style="list-style-type: none"> <li>• DFO sampling (2003, 2004)<sup>d?</sup></li> </ul>
Lake St. Clair (Walpole Island)	<ul style="list-style-type: none"> <li>• Royal Ontario Museum (2001-02)</li> </ul>
Lake St. Clair (Mitchell's Bay)	<ul style="list-style-type: none"> <li>• DFO/ University of Guelph sampling (2003, 2004)<sup>d,e</sup></li> </ul>
Long Point Bay	<ul style="list-style-type: none"> <li>• OMNR Index Surveys of Long Point Bay (annually)<sup>b</sup></li> <li>• DFO targeted sampling in 2004, 2005 (including dyked marshes)<sup>a,d,e</sup></li> </ul>
Lyons Creek	<ul style="list-style-type: none"> <li>• DFO targeted sampling 2004 along the entire creek.</li> </ul>

Gear type: a-seine, b-trawl, c-backpack electrofishing unit, d-boat electrofishing unit, e-additional gear (trap nets, hoop nets, Windermere traps).

## 1.7 Knowledge Gaps

Very little is known about the life history or biology of this species. There is a specific need to examine any physiological or environmental tolerances that the lake chubsucker may have. Threat clarification is required, as well as determination of significant contributors to extirpation where populations have been lost (Jeanette's Creek and Tee Creek). Additional sampling is required to determine the full extent of the lake chubsucker's distribution across all Ontario populations, except in the OAC where the extent of distribution is relatively well known. Sampling efforts are sometimes hampered by the lack of adequate methods for small, highly vegetated pond areas with soft organic substrates and water depths greater than 1m (Mandrak *et al.* submitted). The impacts of introduced fishes (i.e. common carp, northern pike, centrarchids) and other exotic species on the lake chubsucker and its habitat require further investigation.

## 2. RECOVERY

The following goals, objectives and recovery approaches were adapted from the Essex-Erie Recovery Strategy (EERT 2007) which covers a substantial portion of the Canadian range of the lake chubsucker. Additional considerations were included from the Ausable River Recovery Strategy (ARRT 2005) and Thames River Recovery Strategy (TRRT 2005).

### 2.1 Recovery Feasibility

The recovery of the lake chubsucker is considered to be both biologically and technically feasible. The following feasibility criteria<sup>1</sup> have been met for the species:

1. *Are individuals capable of reproduction currently available to improve the population growth or population abundance?*  
Yes. Reproducing populations currently exist within the Canadian range of the species (ex. OAC, Point Pelee National Park and Long Point Bay) which could be used for translocations or artificial propagation if necessary.
2. *Is sufficient habitat available to support the species or could it be made available through habitat management or restoration?*  
Yes. Suitable habitat is present at several locations with extant populations. At locations with extirpated or declining populations, suitable habitat may be made available through restoration actions.
3. *Can significant threats to the species or its habitats be avoided or mitigated through recovery actions?*  
Yes. Significant threats such as sedimentation, increased levels of turbidity and loss of wetland habitat can be mitigated through established restoration methods.
4. *Do the necessary recovery techniques exist and are they demonstrated to be effective?*  
Yes. Techniques to reduce identified threats (ex, BMPs to reduce sedimentation) and restore wetland habitats are well known and proven to be effective.

The effort expended to achieve recovery will not be uniform across all populations. Locations with extirpated populations (Jeanette's Creek and Tee Creek) may require substantial effort to improve habitat as well as reintroductions. In such cases, the recovery team endorses a reintroduction approach as outlined below (modified from EERT 2007).

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<sup>1</sup> Draft Policy on the Feasibility of Recovery, Species at Risk Act Policy. January 2005.

## Reintroduction Approach

Reintroduction efforts to re-establish viable populations of the lake chubsucker need to consider the following:

- i. Prior to developing reintroduction plans, it is necessary to confirm through intensive sampling that they are no longer present.
- ii. The success of reintroductions will depend on an understanding of the species' habitat needs and on a sufficient quantity of suitable habitat being available at the repatriation site. Surveys need to be undertaken to characterize current habitat conditions and identify appropriate actions to improve degraded habitats. If habitat requirements are poorly understood, then studies of habitat use will need to be undertaken.
- iii. Reintroductions should not be considered until the factors for extirpation are understood and addressed.
- iv. Source populations to support reintroductions need to be identified. Ideally, source populations possess a high level of genetic diversity and genetic composition developed under similar historic conditions as the repatriation site. Where possible, source populations within the same watershed are preferred.
- v. Removal of individuals from source populations should not negatively affect the status of these populations.
- vi. The preferred method of introduction (e.g. adult transfer versus captive-reared) needs to be determined. If captive-rearing is the preferred option, propagation and rearing methods and an appropriate rearing facility will need to be identified.
- vii. To successfully establish self-sustaining populations and preserve the genetic composition, the number of individuals to be introduced, appropriate life-stages and the frequency and duration of supplemental stockings needs to be determined.
- viii. Monitoring is required to ensure that newly established populations are viable, that the stocking rate is appropriate and habitat conditions remain suitable.
- ix. All proposed reintroductions associated with this strategy will involve the preparation of a reintroduction plan that will address the logistic and ecological aspects discussed above, as well as stakeholder issues.
- x. Reintroductions should follow the American Fisheries Society Guidelines for Introductions of Threatened and Endangered Fishes. Website: <http://www.fisheries.org/html/resource/page17.shtml>

## 2.2 Recovery Goal

The long term recovery goal (>20 years) is to maintain existing distributions and densities of the lake chubsucker and restore viable populations to formerly occupied wetland habitats.

## **2.3 Population and Distribution Objective(s)**

Over the next five year period, maintain current densities and abundance of known extant populations in the Old Ausable Channel, Lake St. Clair (Walpole Island and St. Clair NWA), Lake Erie (Point Pelee, Rondeau Bay, Long Point Bay) and the upper Niagara River (Lyons Creek). More quantifiable objectives relating to individual populations are not possible at this time, but will be developed once the necessary sampling and studies have been completed. Such knowledge gaps will be addressed by recovery actions given 'urgent' priority included in the recovery planning approaches.

## **2.4 Recovery Objectives**

The following recovery objectives will be addressed over a 5-10 year period:

- i. Determine the extent, abundance and population demographics of existing populations through a focused sampling program.
- ii. Identify key habitat requirements to define critical habitat and implement strategies to protect known occupied and recovery habitats.
- iii. Establish a long-term population and habitat monitoring program.
- iv. Identify threats, evaluate their relative impacts, and implement remedial actions to reduce their effects, where feasible.
- v. Investigate the feasibility of re-introduction for populations that may be extirpated or reduced.
- vi. Coordinate recovery efforts with aquatic and terrestrial ecosystem recovery teams and other relevant or complimentary groups/ initiatives.
- vii. Increase awareness of the lake chubsucker and the role of healthy aquatic ecosystems, and their importance to humans.

## **2.5 Approaches Recommended to Meet Recovery Objectives**

### **2.5.1 Recovery planning**

The overall strategies/approaches recommended to meet the recovery objectives have been organized into three categories represented by the following tables: Research and Monitoring; Management and Coordination; Stewardship, Outreach and Awareness. Each table presents specific steps with a ranking of priority (urgent, necessary, beneficial), a link to the recovery objectives, a listing of the broad approach/strategy, a description of the threat addressed, and suggested outcomes or deliverables to measure progress. A narrative following each table is included when further explanation of specific approaches/strategies is warranted. Implementation of the following approaches will be accomplished in coordination with relevant ecosystem-based recovery teams and associated implementation groups.

**Table 5. Recovery planning table – research and monitoring**

Priority	Objective Addressed	Threats Addressed	Broad Strategy to Address Threats	Recommended Approaches to Meet Recovery Objectives	Outcomes or Deliverables (Identify Measurable Targets)
URGENT	I, VI	N/A	1. Background Surveys	Conduct targeted surveys of preferred habitats in tributaries of Big Creek (Long Point region), Jeanette's Creek and Tee Creek to determine the status of these populations.	Will determine the presence/absence of populations at these locations.
URGENT	I, VI	N/A	2. Background Surveys (extant occurrences)	Complete targeted surveys of extant populations.	Will determine health, range, abundance, and population demographics and contribute to the identification of critical habitat.
URGENT	I, VI	N/A	3. Background Surveys (new occurrences)	Conduct targeted surveys for undetected populations in high probability areas with suitable habitat. Areas to target would include L Lake (near the OAC) and tributaries of the upper Niagara River.	May detect new occurrences of lake chubsucker.
URGENT	III	N/A	4. Monitoring-Populations & Habitat	Develop and implement a standardized index population monitoring program and habitat monitoring program with a specific sampling and training protocol.	Will enable assessments of changes in range, population abundance and distribution, key demographic characters and changes in habitat features, extent and health.
URGENT	II	N/A	5. Research - Habitat Requirements	Determine the seasonal habitat needs of all life stages of the lake chubsucker ( <i>in situ/ ex situ</i> studies, analytical research).	Will allow for the identification of critical habitat for lake chubsucker, as per SARA. Will assist with the development of a habitat model.
URGENT	II	Habitat Destruction/ Fragmentation	6. Habitat Management	Ensure planning and management agencies are aware of habitats that are important to lake chubsucker.	Protection of important lake chubsucker habitat from industrial and development activities.

Priority	Objective Addressed	Threats Addressed	Broad Strategy to Address Threats	Recommended Approaches to Meet Recovery Objectives	Outcomes or Deliverables (Identify Measurable Targets)
NECESSARY	IV	Exotic species	7. Threat Evaluation – Exotic Species	Evaluate the impacts of exotic species (including common carp and exotic plant species) on the lake chubsucker and its habitat.	Will help evaluate the severity of threat posed by the common carp in preferred wetland habitats.
NECESSARY	IV	All	8. Threat Evaluation & Mitigation	Investigate and evaluate the significance of threat factors that may be impacting extant populations. Take steps to mitigate immediate threats identified.	Will determine the severity of specific threats to individual populations and alleviate their impacts.
BENEFICIAL	IV	Exotic species (e.g. common carp)	9. Exotics - Monitoring	Monitor watersheds for exotics of concern in cooperation with aquatic ecosystem recovery teams.	Will monitor the advancement/ establishment of exotic species and provide early opportunities to mitigate this threat.
NECESSARY	II, IV	N/A	10. Research - Controlled Water Levels & Wetland Dynamics	Investigate impacts of regulated water levels (i.e. dyked wetlands) vs. natural wetlands (undyked) on habitat conditions for lake chubsucker. Extreme events (floods and droughts) are important features of healthy wetlands.	Will determine the impact of controlled water levels on the species and its habitat. Will assist with restoring/ maintaining ecological processes.
NECESSARY	I, IV, VI	Sediment & Nutrient Loads/ Contaminants	11. Water Quality Monitoring	Measure sediment and nutrient loads emitted from streams.	Will determine priority areas for restoration/ stewardship.
BENEFICIAL	V	N/A	12. Collaboration & Information Sharing	Collaboration with relevant groups, initiatives and recovery teams to address recovery actions of benefit to the lake chubsucker.	Will combine efficiencies in addressing common recovery actions, and ensure information is disseminated in a timely, cooperative fashion.

*1-3. Background Surveys:* Focused efforts are required to determine the lake chubsucker's current distribution throughout known watersheds of historic and extant occurrence as well as directed searches to detect new populations in high probability locations. This survey work will be facilitated through a coordinated effort amongst the



ecosystem recovery teams responsible for the species. Concerted effort should be directed to historical occurrences within the tributaries of Big Creek, Rondeau Bay and nearshore areas in Long Point Bay and Niagara River tributaries (particularly Lyons/Tee Creek). Additional suitable habitats may be located within old oxbows of the lower Ausable River (such as L Lake) in the vicinity of the OAC as well as tributaries of the upper Niagara River. Sampling methods should be standardized at all sampling sites and include a relevant assessment of habitat. Previous work within the OAC suggests that boat seining and boat electro-fishing methods worked best for capturing lake chubsucker in such habitats (DFO unpublished data).

**4. Monitoring Populations and Habitat:** The monitoring program should be designed to allow for:

- Quantitative tracking of changes in population abundance and demographics.
- Analyses of habitat use and availability and changes in these parameters over time.
- The ability to detect the presence of exotic species such as common carp.

The fish monitoring protocol that is developed should have regard for the methodologies used in background survey work (see above) and provide guidance on time of sampling and define the types of biological samples that should be collected (e.g. fin rays, length, weight, etc).

**9. Exotics – Monitoring:** Common carp densities in the OAC are currently low. Density and abundance of this exotic requires monitoring to ensure this threat level is not elevated (ARRT 2005). Carp captured during monitoring initiatives should be removed and released elsewhere. The possible pathway of carp (and other exotics) entering the upper OAC through back flow conditions due to spring ice damming should be investigated.

**Table 6. Recovery planning table – management and coordination**

PRIORITY	OBJECTIVE ADDRESSED	THREATS ADDRESSED	BROAD STRATEGY TO ADDRESS THREATS	RECOMMENDED APPROACHES TO MEET RECOVERY OBJECTIVES	OUTCOMES OR DELIVERABLES (IDENTIFY MEASURABLE TARGETS)
URGENT	VI	N/A	1. Coordination with Other Recovery Teams	Work with relevant ecosystem- and single-species recovery teams to share knowledge, implement recovery actions and to obtain incidental sightings.	Will combine efficiencies, resources, ensure information dissemination, help prioritize most urgent actions across the species' range, and allow for a coordinated approach to recovery.
URGENT	VI, VII	Habitat loss	2. Municipal Planning – Involvement	Encourage municipalities to protect habitats that are important to the lake chubsucker in their Official Plans.	Will assist with the recovery of the lake chubsucker and the amelioration of the water quality of watersheds it inhabits.

PRIORITY	OBJECTIVE ADDRESSED	THREATS ADDRESSED	BROAD STRATEGY TO ADDRESS THREATS	RECOMMENDED APPROACHES TO MEET RECOVERY OBJECTIVES	OUTCOMES OR DELIVERABLES (IDENTIFY MEASURABLE TARGETS)
NECESSARY	VI, VII	Sediment loading & turbidity, channelization / altered flow	3. Relationship Building – Drainage	Establish good working relationships with drainage supervisors, engineers and contractors to limit the effects of drainage activities on this species.	Will increase the knowledge and understanding of fish habitat needs and may lead to fewer and/or less harmful alterations.
NECESSARY	IV, VI	All	4. Assessment of Watershed-scale Stressors	In cooperation with relevant ecosystem recovery teams, address watershed-scale stressors to populations and their habitat.	Will identify multiple stressors that may affect lake chubsucker populations.
BENEFICIAL	IV, VI	Exotic species	5. Exotic Species Management Plan	Development of a management plan that addresses potential risks, impacts, and proposed actions (including feasibility of control) in response to the arrival or establishment of exotics such as common carp (OAC). Appropriate regulatory approvals will be acquired.	Will ensure a timely response should this threat more fully materialize.  Will assist with addressing key threats to this population.
BENEFICIAL		Non-indigenous species Introductions	6. Prohibitions – Baitfishes	Evaluate the feasibility of prohibitions on the use of live baitfishes within the OAC (both inside and outside of the Pinery Provincial Park)	Will help prevent the establishment of exotics in the OAC.

*1. Coordination with other recovery teams:* Many of the threats facing the lake chubsucker are a result of habitat alteration and degradation. Multi-species/ ecosystem recovery strategies (Ausable River, Thames River and Essex-Erie region) have incorporated the biological and ecological requirements of this species into relevant watershed-based recovery approaches as well as species-specific approaches. There will be opportunities for these teams to share resources, develop and adopt similar approaches and combine efficiencies through a coordinated approach. The recovery team will coordinate a science-based threat ranking of all lake chubsucker populations to provide guidance for the prioritization of approaches to ecosystem teams.

**Table 7. Recovery planning table – stewardship, outreach and awareness**

<b>PRIORITY</b>	<b>OBJECTIVE ADDRESSED</b>	<b>THREATS ADDRESSED</b>	<b>BROAD STRATEGY TO ADDRESS THREATS</b>	<b>RECOMMENDED APPROACHES TO MEET RECOVERY OBJECTIVES</b>	<b>OUTCOMES OR DELIVERABLES (IDENTIFY MEASURABLE TARGETS)</b>
<b>URGENT</b>	VI	N/A	1. Collaboration & Information Sharing	Collaboration with relevant groups, initiatives and recovery teams to address recovery actions of benefit to the lake chubsucker.	Will combine efficiencies in addressing common recovery actions, and ensure information is disseminated in a timely, cooperative fashion.
<b>URGENT</b>	IV, VII	N/A	2. Stewardship and Habitat Initiatives	Promote stewardship among landowners abutting aquatic habitats of lake chubsucker and other local residents. For significant habitat improvements to be made, basin wide efforts will be necessary.	Will raise community support and awareness of recovery initiatives. Will raise profile of lake chubsucker and improve awareness of opportunities to improve water quality and species habitat.
<b>URGENT</b>	IV, VII	Habitat degradation	3. Stewardship - Implementation of BMPs	Work with landowners to implement BMPs. Encourage the completion of environmental farm management plans (EFPs) and Nutrient Management Plans (NMPs).	Will minimize threats from soil erosion, stream sedimentation, and nutrient and chemical contamination.
<b>NECESSARY</b>	VII	N/A	4. Communications Strategy	Develop a communications strategy that identifies partners, approaches, information products, educational and outreach opportunities, stewardship resources and specific BMPs that will assist with the recovery of this species.	Will provide a strategic basis for improving public awareness of species at risk and promote ways in which community and public involvement can be most effectively solicited for the recovery of this species.
<b>NECESSARY</b>	VI	N/A	5. Stewardship - Financial Assistance/ Incentives	Facilitate access to funding sources for landowner and local community groups engaged in stewardship activities.	Will facilitate the implementation of recovery efforts, BMPs associated with water quality improvements, sediment load reduction, etc.

NECESSARY	VII	N/A	6. Awareness - Addressing Landowner Concerns	Provide clear communications addressing financial compensation opportunities and landowner concerns and responsibilities under SARA.	Will address landowner concerns surrounding the lake chubsucker and facilitate public interest and involvement in stewardship initiatives.
BENEFICIAL	VII	Incidental Harvest	7. Awareness – Incidental Harvest	Provide a lake chubsucker information package to commercial fishers (including bait fishers). Request avoidance of occupied habitats, and the release and reporting of lake chubsuckers captured.	Reduce number of lake chubsuckers lost to incidental harvest and build upon monitoring efforts of this species.
BENEFICIAL	VII	Exotic species/ baitfish	8. Exotic Species/ Bait Fish Introductions	Increase public awareness of the impacts of exotic species on the natural ecosystem and develop an exotic species reporting system. Angers should be discouraged from emptying the contents of their bait buckets in local waters.	Will reduce the transport and release of exotics (including bait fish) and prevent their establishment in areas of lake chubsucker habitat.

**2. Stewardship and Habitat Initiatives:** Large-scale efforts to improve the habitat quality of areas currently (and historically) occupied by lake chubsucker will be required at some locations. It will be necessary to engage land owners, local communities and stewardship councils in the issues of lake chubsucker recovery, ecosystem and environmental health, clean water protection, nutrient management, best management practices (BMPs), stewardship projects and associated financial incentive programs. Towards this end, the recovery team will work closely with the 3 ecosystem-based recovery teams, all of which have established stewardship programs that will benefit this species.

**3. Implementation of BMPs:** The implementation of BMPs will be largely facilitated through established stewardship programs of existing ecosystem-based recovery teams. Additional stewardship programs will be directed as necessary to areas outside the boundaries of ecosystem-based programs. BMPs implemented will include those relating to: the establishment of riparian buffers, soil conservation, herd management, nutrient and manure management, and tile drainage. Establishing riparian buffers reduces nutrient (nitrogen and phosphorus) and sediment inputs to receiving waters and overland run-off. Restriction of livestock from watercourses leads to reductions in erosion and sediment and nutrient loadings. Nutrient and manure management will reduce nitrogen and phosphorus inputs into adjacent water bodies, thereby improving water quality. Low-till practices can reduce soil erosion and improve soil structure while

reducing the sediment loads of adjacent watercourses. Environmental Farm Plans (EFPs) prioritize BMP implementation at the level of individual farms and are often a pre-requisite for funding programs. For more information on BMPs see: Ministry of Agriculture and Food, Best Management Practices Series: <http://www.omafra.gov.on.ca/english/environment/bmp/series.htm>.

*4. Communications Strategy.* The communications strategy will cover various topics, including, but not limited to, those outlined in the specific steps column. Target audiences should include the general public, local public and private landowners, stewardship groups, municipalities, drainage superintendents and industry. Public support and participation will be encouraged through the distribution of various educational materials and the provision of stewardship resources and contacts. The strategy will acknowledge and build on the work of the OAC Management Committee which is currently addressing awareness concerns related to the lake chubsucker through various means.

*7. Awareness – Incidental Harvest.* The lake chubsucker is not a legal baitfish in Ontario. It is unlikely this species was ever targeted by the baitfish industry due to its size and rarity. However, in some areas of its range it has been susceptible to incidental catches from commercial seining (Becker 1983). An information package will be developed and distributed with bait fish licenses in areas occupied by the lake chubsucker. The information package will include a description and illustration of the species, a map of known areas of occupation, a description of preferred habitats, and a reporting form. Bait harvesters will be asked to avoid areas of known occurrence and to report areas of incidental captures.

## 2.6 Performance Measures

The success of implementing the recommended recovery approaches will be evaluated primarily through routine population (distribution and abundance) and habitat (quality and quantity) surveys and monitoring. During the next five years, quantifiable targets will be established for the lake chubsucker. The recovery strategy will be reviewed in five years to evaluate progress made toward short-term and long-term targets, and the current goals and objectives will be reviewed within an adaptive management planning framework with input from the various ecosystem recovery teams.

Performance measures to evaluate recovery progress include:

- Progress made toward achieving long-term goals and short-term objectives.
- Review of goals, objectives, strategic approaches, and the success of implemented activities as new information is attained.
- Completion of activities outlined in the Schedule of Studies for the determination of critical habitat within the proposed timelines.
- Designation of critical habitat in a recovery strategy or action plan.

- Degree of protection/ restoration achieved for known habitats of the lake chubsucker (e.g. number of habitat patches/ populations enhanced).
- Knowledge gaps addressed and understanding of lake chubsucker ecology advanced.
- Number of high priority sites enhanced/ protected by stewardship actions.
- Documentation of public and agency participation/ support for recovery actions identified in the recovery strategy (including in-kind and contributed financial resources).

## 2.7 Critical Habitat

### 2.7.1 Identification of the species' critical habitat

Although critical habitat cannot be identified at this time, currently occupied and historically occupied habitats are summarized below. The recovery team recommends that currently occupied habitat be recognized as habitat in need of conservation for the lake chubsucker.

#### **Currently Occupied Habitat:**

*Ausable River (OAC):* extant populations are located entirely in the dunes sub-basin within the Old Ausable Channel of the Ausable River watershed. The Ausable River Recovery Team recommends that the entire OAC upstream of the low head dam (within the Pinery Provincial Park) to its end near Grand Bend be designated as critical habitat for the lake chubsucker (ARRT 2005). This channel reach covers a distance of approximately 9.5 km, the majority (approximately 6.4 km) being located within the Park proper. The scientific analysis on which the Recovery Team based its recommendation will undergo a peer-review, which will then inform the ecosystem-based recovery strategy being developed for the Ausable River watershed. It should be further noted that the lake chubsucker was also detected in the reaches of the OAC downstream of the low head dam in 2004 by DFO.

*Lake Erie:* Occupied habitat includes Long Point Bay area (dyked marshes of Big Creek NWA and a pond located at the tip of Long Point), Point Pelee National Park interior marshes and Rondeau Bay coastal wetlands.

*Lake St. Clair:* Occupied habitat includes the St. Clair NWA and the dyked marshes of Walpole Island.

*Lyons Creek:* Occupied habitat includes a 1.8 km stretch of clear water maintained by the clean overflow water of the Welland Canal (Mandrak *et al.* submitted).

### **Historically Occupied Habitat:**

*Ausable River:* The lake chubsucker is assumed to have inhabited the lower Ausable River prior to its diversion in the 1800s, but to what extent is not known (ARRT). The lower Ausable River has since become degraded in habitat quality and the species is now confined to the high quality habitat protected by the closed system of the OAC.

*Lake Erie:* Lake chubsucker were recorded from tributaries in the upper reaches of Big Creek (Long Point Region), but have not been confirmed present in recent years.

*Thames River:* Jeanette's Creek, a tributary of the lower Thames River.

*Tee Creek:* A tributary of Lyons Creek, which is a tributary of the Niagara River.

### **2.7.2 Examples of activities likely to impact currently occupied habitat**

Habitats occupied by the lake chubsucker could be negatively impacted by a wide range of activities that ultimately increase siltation/ turbidity levels and/or result in the removal of dense aquatic vegetation. High levels of siltation and turbidity limits sunlight penetration through the water, thereby limiting aquatic macrophyte growth. Direct destruction of habitat results from habitat loss and fragmentation are caused by activities such as dredging and the construction of dams and impoundments. Habitat deterioration through activities resulting in the elevation of nutrient, sediment, and toxic substance levels will also have negative impacts. The main activities contributing to the deterioration of water quality and quantity include instream/ in water work without proper sedimentation control, cultivation of riparian areas, unfettered livestock access to rivers, channelization and drainage works, removal of riparian vegetation which serve as biological filters to contaminants/ sediment in runoff entering water bodies, aggregate extraction, input of toxic substances, and water taking.

### **2.7.3 Schedule of studies to identify critical habitat**

The identification of critical habitats of Threatened and Endangered species (on Schedule 1) is a requirement of the Species at Risk Act (*SARA*). Once identified, *SARA* includes provisions to protect critical habitat of these species. Critical habitat is defined under section 2 of *SARA* as “the habitat necessary for the survival or recovery of a listed wildlife species and that is identified as the species’ critical habitat in the recovery strategy or in an action plan for the species”. The identification of critical habitat requires a thorough knowledge of the species’ habitat requirements during all life history stages as well as detailed knowledge of the distribution, quantity and quality of habitats across its range. With the exception of the OAC (see below), this level of detail is not currently available for populations of the lake chubsucker. As such, the following schedule of studies (table 8) outlines activities that will assist in obtaining the required information. The activities listed are not exhaustive and it is likely that the process of

investigating these actions will lead to the discovery of further knowledge gaps that need to be addressed. Until critical habitat can be defined, the recovery team has identified areas listed as 'currently occupied habitat' as areas in need of conservation for the lake chubsucker.

Due to the significance of the OAC aquatic community, rigorous sampling of habitat and fishes has recently taken place. The Ausable River Recovery Team (ARRT) is currently analyzing this data and has recommended that significant portions of the OAC be designated critical habitat for the lake chubsucker. The Ontario Freshwater Fish Recovery Team is working with the ARRT to complete this designation within an expected timeframe of one year (Table 8). This incremental approach to the identification of critical habitat will provide timely protection for one of the most significant populations remaining in Canada.

**Table 8: Schedule of studies to identify critical habitat for the lake chubsucker.**

Description of Activity	Approximate <sup>1</sup> Time Frame
Extensive review of known life history and ecological needs. Identification of associated habitat features with the expressed consideration that each population/ subpopulation must have access to all such habitats of adequate quality to remain viable.	2007 -
Assist the ARRT in designating critical habitat within the OAC; designation to be published within the finalized Ausable River Recovery Strategy.	2007 - 2008
Conduct background population and habitat surveys/ monitoring to confirm: <ul style="list-style-type: none"> <li>• presence, extent and demographics of extant populations</li> <li>• extent and quality of suitable habitat (both occupied and non-occupied)</li> </ul>	2007-2010
Map current and historically occupied areas, as well as areas that are suitable but uninhabited. Highlight areas of former occurrence that are restorable.	2007 -
Assess existing habitat conditions (e.g. water quality and quantity, flow, substrate, vegetation, etc.) within the historic range of the lake chubsucker at all known sites. Compare current conditions to species' requirements to identify circumstances/ factors that led to habitat unsuitability/ deterioration at some sites. This exercise will reinforce the importance of a suite of habitat features that are critical to the species.	2009-2011
Assess degree of connectivity of habitat patches/ populations of the lake chubsucker through physical surveys and genetic analyses.	2009-2012
Based on information gathered, review population and distribution goals (i.e. survival vs. recovery)	2012
Determine amount and configuration of critical habitat required to achieve goal if adequate information exists. Validate model.	2012

<sup>1</sup> Timeframes are subject to change in response to demands on resources and/ or personnel, and as new priorities arise.

Activities identified in this schedule of studies will be further detailed in an action plan and carried out in collaboration with the appropriate ecosystem-based recovery teams and other relevant organizations, agencies, groups and individuals. Note that many of the individual recovery approaches will address some of the information requirements listed above.



## 2.8 Existing and Recommended Approaches to Habitat Protection

Habitats of the lake chubsucker receive general protection under the habitat provisions of the federal *Fisheries Act*. The *Canadian Environmental Assessment Act* (CEAA) also considers the impacts of projects on all listed wildlife species and their critical habitat. During the CEAA review of a project, all adverse effects of the project on a listed species and its critical habitat must be identified. If the project is carried out, measures must be taken that are consistent with applicable recovery strategies or action plans to avoid or lessen those effects (mitigation measures) and to monitor those effects. Protection is also afforded under the *Planning Act*. Planning authorities are required to be “consistent with” the provincial Policy Statement under Section 3 of Ontario’s Planning Act which prohibits development and site alteration in the habitat of Endangered and Threatened species. The Ontario Lakes and Rivers Improvement Act prohibits the impoundment or diversion of a watercourse if siltation will result, and the voluntary Land Stewardship II program of the Ontario Ministry of Agriculture, Food and Rural Affairs is designed to reduce erosion on agricultural lands. Stream-side development in Ontario is managed through floodplain regulations enforced by local conservation authorities.

A majority of the land adjacent to the rivers inhabited by the lake chubsucker is privately owned; however, the river-bottom is generally owned by the Crown. In the Ausable River watershed, the majority of the OAC, where lake chubsuckers occur, is protected within the boundaries of the Pinery Provincial Park, conferring some degree of protection from development pressures and activities. This is also the case with the population within Rondeau Provincial Park (which represents a portion of Rondeau Bay). The Canada National Parks Act protects the species and its habitat located entirely within Point Pelee National Park. Habitat within Big Creek, St. Clair, and Long Point NWAs is also afforded some level of protection. Once defined, it will be prohibited to destroy the critical habitat of the lake chubsucker under *SARA*.

Recommended high priority habitats for stewardship include Rondeau Bay and Lyons/Tee Creek where declining populations may benefit most from efforts to improve habitat. The recovery team will endeavor to more fully prioritize and direct efforts to improve and protect habitat as informed through the recommended approaches.

## 2.9 Effects on Other Species

The proposed recovery activities will benefit the environment in general and are expected to positively affect other sympatric native species. Many of the stewardship and habitat improvement activities to benefit the lake chubsucker will be implemented through existing ecosystem-based recovery programs that have already taken into account the needs of other species at risk.

## 2.10 Recommended Approach for Recovery Implementation

The recovery team recommends a dual approach to recovery implementation which combines an ecosystem-based approach complimented by a single-species focus. The team will accomplish this by working closely with existing multi-species ecosystem recovery teams to combine efficiencies and share knowledge on recovery initiatives. Currently, there are 3 multi-species, ecosystem-based recovery strategies (Ausable and Thames rivers and the Essex-Erie region) that address several populations of the lake chubsucker and are currently being implemented. These strategies incorporate the biological and ecological requirements of the lake chubsucker, address the local threats it faces (or would face if re-introduced, in the case of the Thames River strategy), and present prioritized strategies/ approaches for the species' recovery within these systems. Ecosystem strategies simultaneously employ basin-wide recovery approaches to reduce identified threats to multiple aquatic species at risk including the lake chubsucker. Populations of the lake chubsucker also occur outside the boundaries of existing ecosystem-based recovery programs in the upper Niagara River drainage (Lyons/Tee Creek) and Lake St. Clair. As such, a single species approach to recovery will facilitate implementation of recovery actions within these watersheds through partnerships with local watershed management and stewardship agencies. If ecosystem-based recovery initiatives are developed in the future for these watersheds, the present single-species strategy will provide a strong foundation to build upon.

## 2.11 Statement on Action Plans

One or more action plans relating to this recovery strategy will be produced within five years of the final strategy being posted on the public registry.

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## 4. RECOVERY TEAM MEMBERS

The following members of the Ontario Freshwater Fish Recovery Team were involved in the development of the recovery strategy for the lake chubsucker:

Shawn Staton (Chair)	Fisheries and Oceans Canada
Mike Nelson	Essex Region Conservation Authority
Joe de Laronde	Fisheries and Oceans Canada
Brian Locke	Ontario Ministry of Natural Resources
Dr. Nicholas Mandrak	Fisheries and Oceans Canada
Scott Reid	Trent University
Alan Dextrase	Ontario Ministry of Natural Resources
Ian Barret	Niagara Peninsula Conservation Authority
Brian Locke	Ontario Ministry of Natural Resources
Tom Purdy	OAC Management Committee
Mari Veliz, Kari Killins	Ausable Bayfield Conservation Authority
Robert Ritchie	Niagara Parks Commission

## Appendix 1

### Definition of Status Rankings

**G-Rank (global):** Rank assigned to an element based on its range-wide conservation status rank (G1 to G5, in decreasing order of priority). Elements ranked G1, G2 or G3 are considered imperilled. G-rank is assigned by NatureServe or the conservation data centre responsible for the element in question.

**N-Rank (national):** Rank assigned to an element based on its national conservation status rank (N1 to N5, in decreasing order of priority). Elements ranked N1, N2 or N3 are considered imperilled.

**S-Rank (subnational):** Rank assigned to element based on its provincial or state conservation status rank (S1 to S5, in decreasing order of priority. Elements ranked S1, S2 or S3 are considered imperilled).

Priority ranking value	Priority ranking definition
<b>S1</b> (extremely rare)	Usually 5 or fewer occurrences in the province or very few remaining individuals; often especially vulnerable to extirpation.
<b>S2</b> (very rare)	Usually between 5 and 20 occurrences in the province or with many individuals in fewer occurrences; often susceptible to extirpation.
<b>S3</b> (rare to uncommon)	Usually between 20 and 100 occurrences in the province; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.
<b>S4</b> (common)	apparently secure in Ontario; usually with more than 100 occurrences in the province.
<b>S5</b> (very common)	demonstrably secure in Ontario.

For more information on status ranks see: [www.mnr.gov.on.ca/MNR/nhic/](http://www.mnr.gov.on.ca/MNR/nhic/)

## Appendix 2.

### RECORD OF COOPERATION AND CONSULTATION

The Lake Chubsucker Recovery Strategy was prepared by Fisheries and Oceans Canada (DFO) with input from representatives of the Ontario Ministry of Natural Resources (OMNR), Ausable Bayfield Conservation Authority, Essex Region Conservation Authority, Niagara Peninsula Conservation Authority, Old Ausable Channel Management Committee, Niagara Parks Commission, Trent University and Parks Canada Agency - Point Pelee National Park.

Fisheries and Oceans Canada has attempted to engage all potentially affected Aboriginal communities in Southern Ontario during the development of this recovery strategy for the lake chubsucker. Information packages were sent to Chief and council of Aamjiwnaang First Nation, Caldwell First Nation, Chippewas of Kettle & Stony Point, Chippewas of the Thames First Nation, Mississauga of the New Credit, Moravian of the Thames, Munsee-Delaware Nation, Oneida Nation of the Thames, Six Nations of the Grand, and Walpole Island First Nation. Information packages were also sent to the Metis Nation of Ontario (MNO), MNO Captain of the Hunt for Regions 7 and 9, Metis National Council, Association of Iroquois and Allied Indians, Union of Ontario Indians (Anishnabek Nation), Union of Ontario Indians (Anishnabek Nation), Chiefs of Ontario, and the Assembly of First Nations. Members of these communities may have traveled or harvested fish from the waters where this fish species occurs or was historically found. Follow-up telephone calls were made to each community office to ensure that packages were received and to ask if they would like to schedule a meeting to learn more about Species at Risk in general and the proposed recovery strategies. As a result of these letters and calls, one meeting with Aamjiwnaang First Nation has been requested. To date comments have been received from the Association of Iroquois and Allied Indians.

In addition to the above activities, DFO has established an ongoing dialogue with respect to aquatic species at risk in general with the policy advisor to the Southern First Nations Secretariat and has engaged the London Chiefs Council (an association of the 8 area First Nation governments in Southwestern Ontario) on several occasions. Meetings have been held with the director of the Walpole Island Natural Heritage Centre and the Fish and Game Enforcement Officer from Walpole Island First Nation. DFO also discussed SARA issues with a representative of the Six Nations of the Grand who works for the Six Nations EcoCentre and who also represents First Nation interests on the Thames River Fish Management Plan and the St. Clair River Management Strategy.

DFO has prepared a list of non-government organizations and municipalities which may be impacted by the proposed recovery strategy. Information packages have been prepared to inform these groups that the proposed recovery strategy is about to be approved and invites each group to comment on the strategy. As well, an announcement has been prepared and will be placed in newspapers with circulation in the area where this fish occurs or was historically found to inform landowners and the

general public about the strategy and to request their comments. These packages will be sent and the announcements published at the time the proposed recovery strategy is posted on the SARA registry.

Letters were sent to the province of Ontario and Parks Canada Agency (PCA). Comments were received from both Ontario and PCA and incorporated into the recovery strategy.