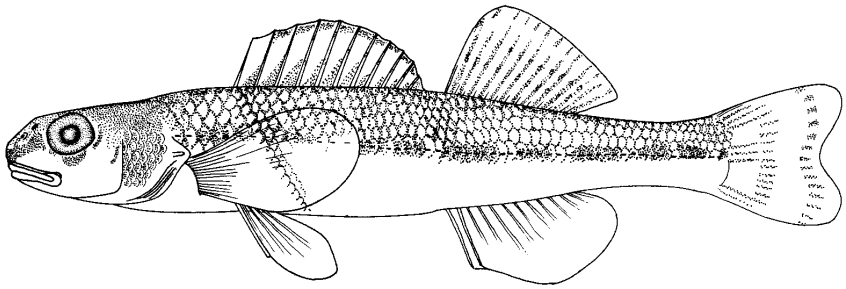
COSEWIC
Assessment and Update Status Report

on the

Channel Darter
Percina copelandi

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

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Également disponible en français sous le titre Évaluation et Rapport de situation du COSEPAC sur la situation du fouille-roche gris (*Percina copelandi*) au Canada – Mise à jour

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Channel darter — Illustration by S. Gadd, Canadian Museum of Nature.

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COSEWIC
Assessment Summary

Assessment Summary – May 2002

Common name
Channel darter

Scientific name
Percina copelandi

Status
Threatened

Reason for designation
This species exists in low numbers where found, and its habitat is impacted by siltation and fluctuations in water temperature.

Occurrence
Ontario and Quebec

Status history
Designated Threatened in April 1993. Status re-examined and confirmed in May 2002. Last assessment based on an update status report.

COSEWIC
Executive Summary

Channel Darter
Percina copelandi

Description

The channel darter, *Percina copelandi* (Jordan, 1877), is a small benthic percid (subfamily Etheostomatinae). The official French common name is the fouille-roche gris, although dard gris was used in older literature. This fish is light sand or olive-coloured with brown speckles on its back. X-shaped markings are scattered over its dorsal surface. A dark spot or bar may be present beneath the eye and extend onto the snout. There are 8-18 brown oblong blotches along the lateral line linked by a thin brown line. Adults are commonly 40 mm in total length. This species has been described by Goodchild (1994) in the original status report, Scott and Crossman (1973) and Coad *et al*. (1995).

Distribution

In the United States, *Percina copelandi* is widely but discontinuously distributed and present in low numbers. It is found along the eastern margin of the lower peninsula of Michigan, west of the Appalachians, south to Alabama, Arkansas, Oklahoma, Mississippi, Louisiana and southeastern Kansas. Individuals have been captured in Lake Champlain bordering New York and Vermont. Records of capture have also been confirmed in the southwest corner of Oklahoma in the East Cache and Medicine creeks in Comanche County (Brown *et al*. 1997).

While the channel darter was and still is uncommon in Canada, disjunct populations can be found in Ontario and Quebec. In Ontario, specimens were found in the tributaries to Lake Ontario and along the shores and tributaries of Lake Erie and Lake St. Clair. In Quebec, specimens of channel darter were captured in the tributaries of the St. Lawrence River in the regions of Chaudière-Appalaches, Estrie, Lanaudière, Maurice-Bois Francs, Montérégie and the Outaouais.

Habitat

The channel darter prefers pools and margins of riffles of small to medium-sized rivers and sand and gravel beaches of lakeshores where the current is slow or sluggish. Locations where channel darters were collected have been described as undisturbed rivers along forested or agricultural areas with natural shorelines and good water quality (Lapointe 1997). Channel darters migrate short distances to spawning grounds in the spring and early summer to areas with moderate to fast current and a gravel or rubble substrate. Areas of suitable spawning habitat are diminishing due to naturally occurring and human induced flow modifications and increased sedimentation.

General Biology

Goodchild (1994) and Scott and Crossman (1973) summarized the general biology of the channel darter. In the spring or early summer, individuals move upstream to areas with moderate water flow and smooth rocks. Channel darters are communal spawners. Males establish breeding territories and females spawn repeatedly with several males. There is no parental care. Due to its scarcity and small size, the channel darter has not been extensively studied. Little is known about its movements or migrations.

Population Size and Trends

Fewer than 100 specimens of channel darter were captured in Ontario prior to 1993 as reported in the original status report (Goodchild 1994). Biologists have since returned to these sites in Ontario and have captured 57 specimens. Since the original status report, 127+ specimens of *Percina copelandi* were captured from four new waterbodies in Ontario. The majority of these specimens were captured at sampling sites in the St. Clair River (65 specimens) and in the Moira River (58+ specimens).

In Quebec, 700+ specimens were captured prior to 1993 with the majority of specimens captured in Rivière du Sud (259 specimens) and Rivière Bécancour (380 specimens) in 1964. Biologists have since returned to many of the original sampling locations and have captured 52+ specimens but were unsuccessful at collecting channel darter from six rivers including Rivière du Sud. Rivière Bécancour has not been re-examined. Since the original status report, 102 channel darters have been captured from six new rivers in Quebec. At the majority of these new sites, only one or two individuals were captured, except in the Rivière Gatineau (76 specimens) and in the Rivière Kinonge (16 specimens).

The number of channel darters has declined since the previous status report. Prior to 1993, 700+ specimens were captured in Ontario and Quebec. Since 1993, 338+ specimens have been captured. Although the channel darter is more widespread than previously thought, it is likely that the new records of capture in both Ontario and Quebec are the result of increased sampling efforts and not increasing population sizes.

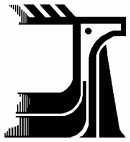
Limiting Factors and Threats

Channel darters are threatened by the loss of suitable habitat because they are sensitive to sedimentation and decreased water quality. In Ontario, dams are also an important threat to this species (Alan Dextrase, OMNR, personal communication). Other threats to the survival of *Percina copelandi* include the disruption of spawning activities. Any activity that impedes or slows water flow during spawning stops their spawning activities. Barriers blocking access to spawning areas also compromise the spawning success of this species. The introduced round goby *Neogobius melanostomus* may be a threat to the channel darter in Ontario. The round goby has become established in the Great Lakes area and likely competes with the channel darter for resources.

A tolerance for only a narrow range of habitat characteristics and a limited amount of suitable habitat restrict the population size and distribution of the channel darter. *Percina copelandi* is at the northern limit of its distribution in Canada with low species numbers and disjunct distributions. All of these factors threaten the continued survival of the channel darter in Canada.

Existing Protection

In Canada there is no protection specific to the channel darter. Fish habitat is protected by the federal *Fisheries Act*. The *Ontario Lakes and Rivers Improvement Act* provides additional protection for the habitat of this species. In Quebec, fish habitat is protected by the *Environmental Quality Act*.



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.

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Update
COSEWIC Status Report

on the

Channel Darter
Percina copelandi

in Canada

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Anthony Francis[1]

2002

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SPECIES INFORMATION

Name, Classification and Taxonomy

The channel darter, *Percina copelandi* (Jordan, 1877), is a small benthic percid (subfamily Etheostomatinae). The official French common name is the fouille-roche gris, although dard gris was used in older literature. The channel darter is rare in Canada as it is restricted to a few streams, rivers and lakes in Ontario and Quebec.

Description

A description of the channel darter was provided by Goodchild (1994) in the original status report. This species has also been described by Scott and Crossman (1973) and Coad *et al*. (1995). The channel darter is light sand or olive-coloured with brown speckles on its back. X-shaped markings are scattered over its dorsal surface (Fig 1). A dark spot or bar may be present beneath the eye and extend onto the snout. There are 8-18 brown oblong blotches along the lateral line linked by a thin brown line. Adults are rarely larger than 40 mm in total length. The channel darter can be distinguished from the johnny darter, *Etheostoma nigrum*, and the tesselated darter, *Etheostoma olmstedi*, since both of these species have one anal spine, while the channel darter has two anal spines and a series of lateral blotches along its lateral line. The channel darter is superficially similar to the river darter *Percina shumardi*; however, the channel darter has clear or lightly speckled fins whereas the river darter has a dark blotch on the membrane behind the first spine of the spiny dorsal fin and a blotch on the membrane connecting the last three spines. The blackside darter *Percina maculata* has been confused with the channel darter in the past. Both of these species have two anal spines but the blackside darter has 13-14 rays in its first spiny dorsal fin and its premaxillary is not protractile while the channel darter has 11 rays in its first spiny dorsal fin and its premaxillaries are protractile.

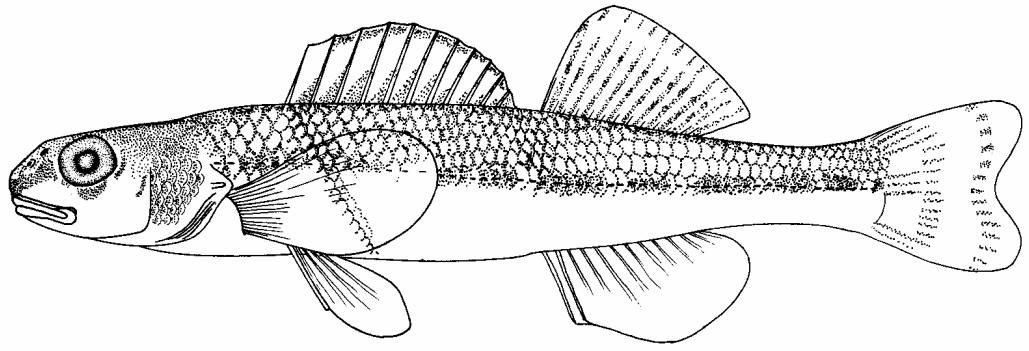

Figure 1. Drawing of a channel darter *Percina copelandi*. Figure drawn by S. Gadd, Canadian Museum of Nature. Specimen 4.0 cm in standard length.

DISTRIBUTION

North American Range

The distribution of the channel darter throughout North America has been characterized as highly localized (Alan Dextrase, OMNR, personal communication) and was described in the previous status report (Goodchild 1994). In the United States, specimens of *Percina copelandi* are widely distributed but present in low numbers (Fig. 2). They are found along the eastern margin of the lower peninsula of Michigan, west of the Appalachians, south to Alabama, Arkansas, Oklahoma, and southeastern Kansas (Scott and Crossman 1973). Individuals have been captured in Lake Champlain bordering New York and Vermont. Records of capture have also been confirmed in the southwest corner of Oklahoma in the East Cache and Medicine creeks in Comanche County (Brown *et al.* 1997).

Canadian Range

While the channel darter was and still is uncommon in Canada, disjunct populations can be found in Ontario and Quebec (Fig. 3). In Ontario, specimens were found in Lake Ontario and along the shores and tributaries of Lakes Erie and Lake St. Clair. In Quebec, channel darters were captured in the tributaries of the St. Lawrence River in the regions of Chaudière-Appalaches, Estrie, Lanaudière, Maurice-Bois Francs, Montérégie and the Outaouais.

Two records of capture were not included in the previous status report. One specimen was captured in 1989 in Prescott and Russell County, Ontario, at the mouth of Little Rideau Creek where it enters the Ottawa River in Voyageur Provincial Park. This specimen is catalogued in the Royal Ontario Museum (ROM) in Toronto [ROM 70682]. The other record was for a specimen captured in a tributary to Black Creek, Enniskillen Ontario, in 1979 [CMNFI 79-1028]; however, this specimen was re-examined by E. Holm (ROM) in 1999 and identified as a blackside darter, *Percina maculata*.

Since the previous status report, channel darter specimens have been collected from four new waterbodies in Ontario (Appendix 1). In 1996, four channel darter specimens were captured in Lake St. Clair at Laforet Beach in Essex County [ROM 70523] and 65 were collected from several points along the St. Clair River near Walpole Island in Kent County, Ontario [ROM 70533; 70534; 70789; 70535; 70791; 70537]. In Hastings County, specimens were collected from the Moira River during the spring of 1999 by Golder Associates (exact number unknown). Seven more fish were collected from this same location in June that same year (OMNR field collection record DS-99-01). During June and July 2001, another 47 specimens were captured in the Moira River (Jason Lean, Trent University, personal communication). Suitable habitat for channel darter appeared to be present in the Black River, which is close to other eastern Ontario populations in Hastings County. Biologists from the Ontario Ministry

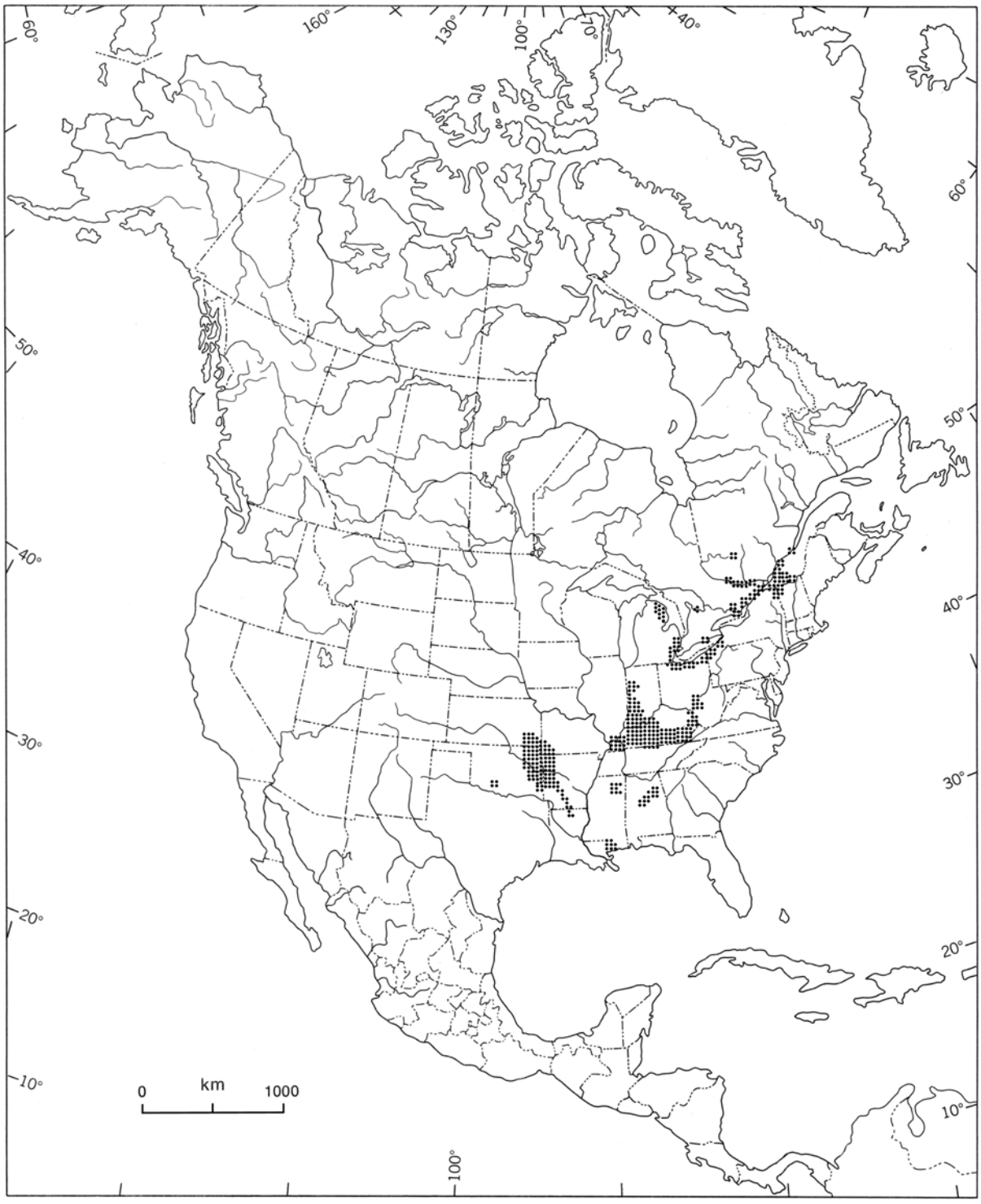

Figure 2. North American distribution of the channel darter *Percina copelandi*. The stippled area indicates the known distribution of the channel darter in North America.

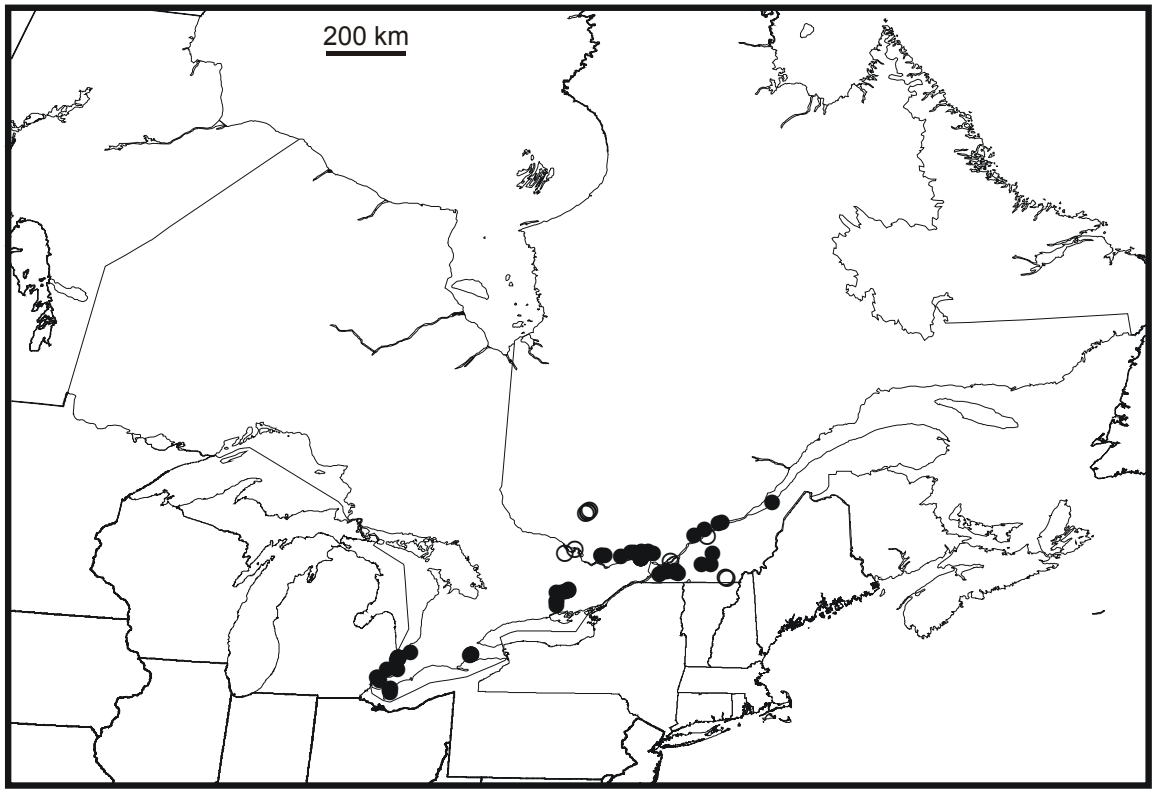

Figure 3. Canadian distribution of the channel darter *Percina copelandi*. The closed circles represent new records of capture and records of recapture since the original status report (Goodchild 1994); the open circles represent extirpated sites.

of Natural Resources (OMNR) attempted to capture channel darters in the Black River with a seine net in 1999 but were unsuccessful (Alan Dextrase, OMNR, personal communication). However, in 2001, three specimens were captured in the Black River 7-8 river km further downstream from the 1999 site (Jason Lean, Trent University, personal communication). It is unlikely that channel darters have access to the upstream site due to a series of rapids.

In Quebec, channel darter specimens were captured in six new waterbodies in the vicinity of the Ottawa River (Appendix 1). One specimen was captured in the Rivière Rouge, two in Rivière Blanche, two in Rivière Petite Nation, and 16 in the Rivière Kinonge (Dubuc 1999). Furthermore, over a two-month period in 1999, 76 specimens were captured by the Société de la faune et des parcs du Québec (MEF) and the University of Ottawa in the Gatineau River, 12 km upstream from its confluence with the Ottawa River (Richard Pariseau, MEF, personal communication). *Percina copelandi* was first captured in Lac St. Pierre as recently as 1995. One specimen was captured from Lac Saint Pierre – Rive Nord and four were captured from Lac Saint Pierre – Rive Sud. No specimens were captured in the l'Archipel of Lac Saint Pierre (Fournier *et al*. 1996).

HABITAT

Definition

The habitat characteristics preferred by the channel darter were described by Goodchild (1994), McAllister and Coad (1974), and Scott and Crossman (1973). The channel darter prefers pools and margins of riffles of small to medium-sized rivers over sand and gravel substrate. This fish has been found in lakes along sand and gravel beaches with gentle wave action and slow current. In large rivers channel darters have been found in shallow water with slow current sufficient to remove sediment from the rock, sand or gravel substrate. Channel darters migrate short distances to spawning grounds in the spring and early summer to areas with moderate to fast current and a gravel or rubble substrate.

The sites where channel darters were captured in Quebec were described as located in undisturbed rivers along forested or agricultural areas with natural shorelines and good water quality (Lapointe 1997). Dumas (1996) also described the habitat characteristics of the channel darter in Quebec. Channel darters captured in the Rivière Truite were taken from locations where the river was wide and shallow. Water depth was less than 50 cm with a sand and gravel substrate. In the Rivière Anglais, channel darters were captured where the water depth was less than 1 m deep with slow to no current in agricultural areas with a sand and gravel substrate. There was vegetation along the shoreline and some vegetation in the water.

In Ontario, similar habitat descriptions were provided for channel darter specimens captured in the Trent River during 2001. Specimens were captured in shallow water along fast flowing gravel and rubble riffles with boulders and along shallow gravel shoals (Alan Dextrase, OMNR, personal communication). Habitat descriptions also were provided in the OMNR field collection records for the channel darter specimens that were captured in the St. Clair River during 1996, the Skootamatta River during 1997 and Moira Rivers during 1999. In the St. Clair River, maximum water depth was 1.6 m with no or slow current. The substrate was composed of sand, gravel, and clay with some submergent and emergent macrophytes. The Skootamatta River collection sites were sparsely vegetated with a sandy substrate with a small amount of gravel. The current was slow and the water depth was less than 1.2 m. In the Moira River, the substrate was composed of rubble, gravel, and sand. The channel darter specimens were captured in small shallow pools less than 0.5 m deep located behind boulders in riffle areas with medium current.

The recent descriptions of channel darter habitat provided for Quebec and Ontario are similar to the habitat description provided by Goodchild (1994) in the original status report.

GENERAL BIOLOGY

General

Goodchild (1994) and Scott and Crossman (1973) summarized the general biology of the channel darter. Individuals spawn in spring or early summer; they move upstream to areas with moderate water flow, a gravel substrate and smooth rocks. Access to moderate current is essential for spawning success. Spawning is communal; males establish and defend breeding territories centred around a rock in the current. Females move from one territory to another, spawning with successive males and laying 4-10 eggs in each nest. Females lay between 350 and 700 eggs in total. There is no parental care. There is little information on generation time for this species, although eggs have been collected from 1-2 year old females (Page 1983). Channel darters are sensitive to fluctuations in water flow while spawning. Decreased water flow interrupts spawning activities resulting in fewer eggs being deposited (Goodchild 1994).

The OMNR field collect records show that on June 21, 1999, in the Moira River, several channel darter specimens were captured in small, shallow pools behind boulders in riffle areas. The male specimens appeared to be in spawning condition, as they were very darkly coloured with bright green on the rear edge of their operculum. The water temperature was 21^{o}C and the substrate was composed of rubble, gravel, and sand.

This species is frequently found in the same locations as the logperch, *Percina caprodes* and the mimic shiner, *Notropis volucellus* (Goodchild 1994). Lapointe (1997) noted that in Quebec, channel darters were captured with johnny darter *Etheostoma nigrum*, logperch *Percina caprodes*, trout perch *Percopsis omiscomaycus*, and white sucker *Catostomus commersoni*. Competition for spawning territory with *Etheostoma nigrum* and *Percina caprodes* may limit the abundance of *Percina copelandi* in Canada and possibly increase the likelihood of hybridization (Goodchild 1994).

Due to its scarcity and small size, the channel darter has not been extensively studied. Little is known about its movements or migrations.

Nutritional or Interspecific Interactions

The channel darter is a benthic feeder; it feeds on insects that live on the stream bottom. Reported foods include mayfly and midge larvae with large amounts of algae and debris (Goodchild 1994). Strange (1997) examined the stomach contents of 13 channel darters collected from the Ohio River in 1991 and found that their diet consisted of chironomid larvae and pupae with ostracods forming a minor component of their stomach contents. Channel darters have diurnal feeding habits. Strange (1997) reported that these diet items were from specimens collected two hours after dusk, which may differ from foods taken during the day.

POPULATION SIZE AND TRENDS

Biologists have returned to the original locations and several of the new locations of capture in Ontario and Quebec in an attempt to determine the status of the channel darter in Canada (Appendix 1). In the westernmost part of the channel darter's range, individuals had been observed from Lake Erie around Port Dover in 1946-47, at the mouth of Pike Creek in 1980, and at Pelee Island in 1984 (Goodchild 1994). While no recent data exist for these sites, two specimens were captured in Lake Erie at Holiday Beach Provincial Park in 1997 [ROM 70951], indicating that this species still occurs in this area. In 1940, one specimen was collected in the Detroit River one mile south of Amherstburg, Essex County; a single specimen was again captured in the Detroit River near Bois Blanc Island in 1997 [ROM 70916].

Following up on the specimens collected in eastern Ontario, two specimens were collected in 1948 from an unnamed creek near Moira Lake; none were observed when the area was re-examined in 1997 and the population is thought to be extirpated (Appendix 1) (Alan Dextrase, OMNR, personal communication). Nine individuals were observed in the Trent River in 1976 [OMNRS64]; two specimens were found at the same location in 1997 [ROM 70990] and two more specimens were captured in 2001 (Alan Dextrase, OMNR, personal communication). A new population of channel darter was discovered near the mouth of the Trent River in 1998, four specimens were captured (Alan Dextrase, OMNR, personal communication). Eleven more were collected in 2001 and biologists discovered a new collection site further upstream where two more specimens were collected (Alan Dextrase, OMNR, personal communication). Channel darters are extant at all three of these sites along the Trent River, which are separated by dams.

Biologists from the OMNR reported captures of the channel darter in the Skootamatta River in 1974. During 1991, biologists returned to this river and captured 21 specimens [ROM 70537]. Twelve additional specimens were captured when the area was sampled in June 2001 (Jason Lean, Trent University, personal communication).

In Quebec, *Percina copelandi* is still found in a number of sites in the Montérégie region. In the Rivière aux Outardes-Est, the Rivière aux Anglais and the Rivière à la Truite, channel darter had been previously captured in 1976. Channel darter was captured in all three of these rivers as recently as 1996. Thirteen specimens were collected from Rivière aux Outardes-Est, four from Rivière aux Anglais and 20 were collected from Rivière à la Truite (Desrochers *et al*. 1996). Also the Rivière Noire, previously searched in 1987, was still home to channel darter in 1995, when two specimens were captured (LaViolette 1998).

In Papineau County, a channel darter was captured in the Ottawa River near Quyon as reported by McAllister and Coad (1974). Chabot and Caron (1996) reported the capture of three additional specimens in the Ottawa River between Hull and Quyon in 1996.

In the Chaudière-Appalaches region, channel darters were captured in the Rivière aux Bleuets in 1977 but subsequent searches in 1992 and 1996 failed to find any further specimens. Also, in the Rivière du Sud near Montmagny, channel darters were captured in 1941 and again in 1964; however, none were found when the area was searched in 1996 (Desroches *et al*. 1996). The channel darter is sensitive to sedimentation and poor water quality. It is likely that recent agricultural and urban development along these rivers has caused an increase in the suspended sediment levels and has led to the extirpation of this species at these locations (Lapointe 1997). *Percina copelandi* was still found in the Rivière Bras Saint-Nicolas in 1997 (exact number unknown), after initially being found there in 1980 (Lapointe 1997).

In the Estrie region, the channel darter was captured in the Rivière Niger near Ayer's Cliff in 1931 but was not found when the area was searched in 1996. In the Rivière Maskinongé, channel darter specimens were captured in 1934 but a search in 1996 failed to find any specimens. Field notes collected by Desrochers *et al*. (1996) for Rivière Maskinongé indicated that significant shoreline erosion occurred at this site, a result of increased boat traffic. Specimens of *Percina copelandi* were originally found at several sites along the Rivière Yamaska in 1969; one specimen was found in the southeast portion of the river in 1995 (LaViolette 1998). Other sites along the Yamaska have not yet been re-examined.

In the Lanaudière region, channel darters had been captured in the Rivière du Chicot in 1941 and in 1971 but a more recent search in 1996 with a variety of sampling gear types found no specimens (R. Dumas, MEF, personal communication). Elsewhere in the region, five specimens of *Percina copelandi* were found in the Rivière Bayonne in 1996, after last being captured there in 1971 (Lapointe 1997).

In the Mauricie-Bois Francs region, specimens of *Percina copelandi* have been captured at several sites along the St. Lawrence River. Channel darters were captured in the Rivière Gentilly and in the Rivière Bécancour, tributaries to the St. Lawrence, in 1941 and 1964 respectively. In 1996, Fournier *et al*. (1997) reported that three specimens were captured in the Gentilly – Bastican reach of the St. Lawrence River. Specimens were last found near Port St-François in 1972 as none were captured when the area was re-examined in 1995 (Fournier 1996).

There has been little information available on the population sizes of channel darter, which make it difficult to evaluate population trends. Optimal habitat conditions for channel darter survival may not occur every year. This may result in variation in reproductive success and changes in abundance from year to year. Goodchild (1994) suggested that channel darters might be able to repopulate areas when water quality improves. In Quebec, one of the objectives of the channel darter recovery team is to study the possibility of restoring channel darter habitats in order to re-establish the species (Équipe de rétablissement du fouille-roche gris 2001).

There are nine sites in Quebec for which no recent data exist because they have not been re-examined since the previous status report. These include Rivière

Châteauguay, Rivière Richelieu and Point-du-Buisson from the Montérégie region, Ruisseau Salmon from the Estrie region, Rivière aux Ormes, Rivière du Chêne, Rivière Henri from the Chaudière-Appalaches region, Rivière Bécancour from the Mauricie-Bois Francs region and Rivière L'Assomption from the Lanaudière region.

Areas where channel darters were collected were generally located in undisturbed rivers along forested or agricultural areas with natural shorelines and good water quality (Lapointe 1997). The six waterbodies in Quebec where biologists returned in unsuccessful attempts to collect channel darter were areas that have undergone habitat changes such as agricultural and urban development causing increased sedimentation (Lapointe 1997). These sites include rivières Niger and Maskinongé in the Estrie region, Rivière du Sud and Rivière aux Bleuets in the Chaudière – Appalaches region, Port St. François in the St. Lawrence River, and Rivière du Chicot in Lanaudière (Appendix 1). Lapointe (1997) suggested that in the St. Lawrence drainage, agricultural and urban development has caused increased sedimentation. In the St. Lawrence valley, 70% of forested habitats have disappeared and 40 000 km of water have been drained essentially eliminating optimal channel darter habitat (Équipe de rétablissement du fouille-roche gris 2001).

The distribution of the channel darter is more widespread than previously thought, particularly throughout Quebec, considering its rarity throughout North America. Since the original status report, 127+ specimens of *Percina copelandi* were captured from four new waterbodies in Ontario and 102 specimens were captured from six new waterbodies in Quebec. At the majority of these new sites fewer than ten specimens were captured. Although in Ontario 65 specimens were captured in the St. Clair River and 58+ specimens were captured in the Moira River. In Quebec, 76 specimens were captured in the Gatineau River and 16 specimens were captured from Rivière Kinonge (Appendix 1). It is likely that the new records of capture are the result of increased sampling efforts and not increasing population sizes. The St. Lawrence and its tributaries have been more thoroughly sampled.

Fewer than 100 specimens of channel darter were captured in Ontario prior to 1993 (Goodchild 1994). Since this report, 184+ specimens have been captured in Ontario in the tributaries to Lake Ontario and along the shores and tributaries of Lake Erie and Lake St. Clair. In Quebec, 700+ specimens of channel darter were captured prior to 1993. Since 1993, 154+ specimens were captured in the tributaries of the St. Lawrence River in the regions of Chaudière-Appalaches, Estrie, Lanaudière, Maurice-Bois Francs, Montérégie and the Outaouais.

LIMITING FACTORS AND THREATS

Channel darters are threatened by the loss of suitable habitat because they are sensitive to sedimentation and decreased water quality. Sedimentation caused by agricultural or urban development affects the survival of the channel darter. Lapointe (1997) described the six rivers in Quebec where biologists failed to capture channel

darters as areas that had undergone habitat changes such as agricultural and urban development causing increased sedimentation. In Ontario, dams are an important threat to this species (Alan Dextrase, OMNR, personal communication). Dams alter flow, flood habitats, cause erosion, fragment populations and restrict access to spawning areas.

Other threats to the survival of *Percina copelandi* include the disruption of spawning activities. Any activity that impedes or slows water flow during spawning stops their spawning activities. Barriers blocking access to spawning areas also compromise the spawning success of this species. Areas of suitable spawning habitat are diminishing due to naturally occurring and human induced flow modifications and increased suspended sediment.

The round goby, *Neogobius melanostomus*, may also be a threat to the survival of channel darter in Ontario. The round goby was introduced into the St. Clair River in the mid-1980s from ship ballast water and has since become established in the Great Lakes area. The round goby is tolerant of a wide range of habitat conditions and likely competes with the channel darter for resources. The effect of the goby on channel darters is difficult to estimate although channel darter continue to inhabit the St. Clair River as 65 specimens of channel darter were captured there in 1996.

A tolerance for only a narrow range of habitat characteristics and a limited amount of suitable habitat restrict the population size and distribution of the channel darter. *Percina copelandi* is at the northern limit of its distribution in Canada with low species numbers and disjunct distributions. All of these factors threaten the continued survival of the channel darter in Canada.

SPECIAL SIGNIFICANCE OF THE SPECIES

There is little interest in this species by the public or fisheries managers and this species is not economically important. However, the channel darter is unique in Canada to the provinces of Ontario and Quebec and it contributes to the biodiversity of aquatic ecosystems.

EVALUATION AND PROPOSED STATUS

Existing Legal Protection or Other Status

In Canada there is no protection specific to the channel darter. Fish habitat is protected by the federal *Fisheries Act*. The *Ontario Lakes and Rivers Improvement Act* provides additional protection for the habitat of this species. In Quebec, fish habitat is protected by the *Environmental Quality Act*.

Current COSEWIC status in Canada: Threatened (1993)
Current COSSARO status in Ontario: Threatened (May 2001)

Natureserve:

Global Heritage Status Rank: G4 (Sept. 1996)
National Heritage Status Rank Canada: N3 (Dec. 1996)
National Heritage Status Rank United States: N4 (Sept. 1996)
Provincial Heritage Status Rank Ontario: S2
Provincial Heritage Status Rank Quebec: S2

Assessment of Status and Authors' Recommendation

Percina copelandi is at the northern limit of its distribution in Canada with low numbers of individuals, limited habitat, and disjunct distributions. Although the distribution of the channel darter is more widespread than first thought, fewer than ten specimens were captured at most sites. There are seven sites in Ontario and Quebec where this species is no longer being captured and is possibly extirpated. These factors call into question the continued survival of the channel darter in Canada. As such, the current status of threatened should be retained. It is not recommended that the status of the channel darter be down-graded to "not at risk" because this species has a very limited range and is sensitive to disturbance.

TECHNICAL SUMMARY

DISTRIBUTION

Extent of occurrence in Canada: 80 000 km^2
Extent of occurrence in North America: 500 000 km^2
Area of occupancy in Canada: 300 km^2
Area of occupancy in North America: unknown

POPULATION INFORMATION

Total number of individuals captured in Canada prior to 1993: 700+
Total number of individuals captured in Canada 1993 to 2001: 338+
Generation Time: 1-2 years
Population Trend: The channel darter population is in decline. Fewer than 100 specimens of channel darter were captured in Ontario and 700+ specimens were captured in Quebec prior to 1993 (Goodchild 1994). Since this report, 184+ specimens have been captured in Ontario and 154+ specimens have been captured in Quebec. Channel darters are no longer found in 7 water bodies. Channel darters were captured in 10 new water bodies as a result of increased sampling, although fewer than ten specimens were captured at the majority of these new sites.
Number of sub-populations in Canada: Specimens were captured at 55 separate locations in 23 water bodies
Is the population fragmented? Yes
Number of individuals in each sub-population (range): 1-76 (number of specimens captured at a sampling site)
Number of extant sites in Canada: specimens captured at 55 separate locations in 23 waterbodies
Number of historic sites from which species has been extirpated in Canada: 7
Does the species undergo fluctuations? Yes. Channel darters are sensitive to habitat degradation. They live in dynamic environments in small streams and rivers likely to undergo changes in temperature and flow. This may result in variations in reproductive success from year to year.

THREATS

Channel darters are threatened by the loss of suitable habitat because they are sensitive to sedimentation and decreased water quality. In Ontario, dams are also an important threat to this species. Other threats to the survival of *Percina copelandi* include the disruption of spawning activities. Any activity that impedes or slows water flow during spawning stops their spawning activities. Barriers blocking access to spawning areas also compromise the spawning success of this species. The introduced round goby *Neogobius melanostomus* may be a threat to the channel darter in Ontario. The round goby has become established in the Great Lakes area and likely competes with the channel darter for resources.

A tolerance for only a narrow range of habitat characteristics and a limited amount of suitable habitat restrict the population size and distribution of the channel darter.

Percina copelandi is at the northern limit of its distribution in Canada with low species numbers and disjunct distributions. All of these factors threaten the continued survival of the channel darter in Canada.

RESCUE POTENTIAL

Does this species exist outside Canada? Yes

Is immigration known or possible? Unlikely, although possible through the Great Lakes

Would individuals from the nearest foreign population be adapted to survive in Canada? Yes

Would sufficient suitable habitat be available for immigrants? Possibly. Current populations are threatened by habitat degradation due to agricultural activities and urban development. Goodchild (1994) suggested that channel darters may be able to repopulate areas when water quality improves.

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Appendix 1. Canadian records of capture for the channel darter *Percina copelandi* for specimens captured since the original status report (Goodchild 1994).

New sites of Channel Darter capture since original status report

Province	Waterbody	County	Qty	Date	Reference
Ontario	Lake St. Clair	Essex	4	1996	ROM70523
	St. Clair River	Kent	65	1996	ROM70533
				1996	ROM70534
				1996	ROM70535
				1996	ROM70536
				1996	ROM70537
				1996	ROM70789
				1996	ROM70791
				1996	ROM Unnumbered
				1996	ROM Unnumbered
				1996	ROM Unnumbered
	Moira River	Hastings	1+	1999	Golder Associates
			7	1999	OMNR9901
			3	2001	J. Lean pers. com.
			1	2001	J. Lean pers. com.
			8	2001	J. Lean pers. com.
			35	2001	J. Lean pers. com.
	Black River	Hastings	3	2001	J. Lean pers. com.
Quebec	Rivière Rouge	Outaouais	1	1999	Dubuc 1999
	Rivière Blanche (Thurso)	Outaouais	1	1999	Dubuc 1999
	Rivière Blanche (Gatineau)	Outaouais	1	1999	Dubuc 1999
	Petit Nation	Outaouais	2	1999	Dubuc 1999
	Rivère Kinonge	Outaouais	16	1999	Dubuc 1999
	Gatineau River	Hull	76	1999	R. Pariseau pers. com.
	Lac St. Pierre	Mauricie-Bois Francs	1	1995	Fournier, D. et al. 1996
			2	1995	Fournier, D. et al. 1996
			1	1995	Fournier, D. et al. 1996
			1	1995	Fournier, D. et al. 1996

Extirpated Channel Darter sites since original status report

Province	Waterbody	County	Qty	Date	Reference
Ontario	Moira Lake	Hastings	0	1997	A. Dextrase pers. com.
Quebec	Rivière aux Bleuets	Chaudière-Appalaches	0	1996	Desrochers et al. 1996
	Rivière du Sud	Chaudière-Appalaches	0	1996	Desrochers et al. 1996
			0	1996	Desrochers et al. 1996
			0	1996	Desrochers et al. 1996
			0	1996	Desrochers et al. 1996
	Rivière Niger	Estrie	0	1996	Desrochers et al. 1996
	Rivière Maskinongé	Estrie	0	1996	Desrochers et al. 1996
	Rivière du Chicot	Lanaudière	0	1996	R. Dumas pers. com.
	Port St. François	Mauricie-Bois Francs	0	1995	Fournier et al. 1996

Channel Darter sites of recapture since original status report

Province	Waterbody	County	Qty	Date	Reference
Ontario	Lake Erie	Norfolk/Essex	2	1997	ROM70951
	Detroit River	Essex	1	1997	ROM70916
	Trent River	Hastings	2	1997	A. Dextrase pers. com.
			4	1998	A. Dextrase pers. com.
			11	2001	A. Dextrase pers. com.
			2	2001	A. Dextrase pers. com.
			2	2001	A. Dextrase pers. com.
	Skootamatta River	Hastings	21	1997	A. Dextrase pers. com.
			8	2001	J. Lean pers. com.
			4	2001	J. Lean pers. com.
Quebec	Ottawa River	Papineau	1	1996	Chabot and Caron 1996
			1	1996	Chabot and Caron 1996
			1	1996	Chabot and Caron 1996
	Rivière aux Outardes	Montérégie	13	1996	Desrochers et al. 1996
	Rivière Anglais	Montérégie	1+	1996	Desrochers et al. 1996
			1+	1996	Desrochers et al. 1996
			1+	1996	Desrochers et al. 1996
			1+	1996	Desrochers et al. 1996
	Rivière la Triute	Montérégie	10	1996	Desrochers et al. 1996
			10	1996	Desrochers et al. 1996
	Rivière Noir	Montérégie	2	1995	LaViolette 1998
	Rivière Bras St. Nicolas	Chaudière-Appalaches	1+	1997	Lapointe 1997
	Rivière Yamaska	Estrie	1+	1995	LaViolette 1998
	Rivière Bayonne	Lanaudière	3	1996	R. Dumas pers. com.
			2	1996	R. Dumas pers. com.
	Rivière Gentilly	Mauricie-Bois Francs	2	1996	Fournier et al. 1997
			1	1996	Fournier et al. 1997