

Ontario Species at Risk Evaluation Report

for

Black Redhorse (*Moxostoma duquesnei*)

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

Assessed by COSSARO as THREATENED

January, 2016

Final

Chevalier noir (*Moxostoma duquesnei*)

Le chevalier noir (*Moxostoma duquesnei*), qui est l'une des six espèces de chevaliers présentes dans les eaux de l'Ontario, peut se distinguer des autres par sa couleur, par la morphologie de ses lèvres et par le nombre d'écaillés de sa ligne latérale (Scott et Crossman 1998). Le chevalier noir est dispersé sur de grandes distances dans l'est de l'Amérique du Nord, mais sa distribution ne chevauche pas deux grandes aires de répartition contiguës ni cinq à dix plus petites zones isolées. Le chevalier noir de l'Ontario possède l'une des plus petites aires de répartition disjointes. Le chevalier noir est présent, au Canada, dans les affluents des lacs Huron, Sainte-Claire et Érié et il est concentré dans les bassins de drainage des rivières Grand et Thames. Des chevaliers noirs ont été signalés au fil du temps dans le ruisseau Catfish et dans la rivière Sauble, mais ils ont probablement disparu de ces régions. Les chevaliers noirs fréquentent des radiers à débit modéré ainsi que des fosses peu profondes dans de grands cours d'eau avec des substrats composés de galets et de gravier. Le chevalier noir mature (âgé de deux à six ans) migre en amont vers un habitat de frai adéquat au printemps (Reid 2006). La répartition mondiale du chevalier noir est stable ou en faible diminution et, bien qu'il n'y ait pas de données quantitatives sur l'abondance de cette espèce en Ontario, les registres des prises indiquent qu'elle est stable ou légèrement à la baisse en Ontario. Le chevalier noir est particulièrement vulnérable à la pollution (agricole et urbaine) dans son aire de répartition située dans le sud-ouest de l'Ontario, mais le changement climatique risque d'entraîner d'autres pertes pour les habitats de frai et de grossissement du chevalier noir. Bien que les barrages aient été déterminés constituer une menace pour le chevalier noir, des renseignements récents sur ses déplacements à travers des barrages donnent à entendre qu'ils représentent davantage un facteur limitatif qu'une menace directe. Le chevalier noir a été inscrit comme une espèce menacée par le COSEPAC en mai 2015 (aucune modification de son statut) et il est actuellement inscrit comme une espèce menacée en vertu de la *Loi de 2007 sur les espèces en voie de disparition*.

Le chevalier noir (*Moxostoma duquesnei*) est classifié comme une espèce menacée en Ontario en raison de sa répartition limitée (neuf emplacements isolés) et de la menace continue de la pollution et de la variation des niveaux d'eau qui a des répercussions sur la qualité et la disponibilité des habitats. Il répond au critère B1ab(iii) + 2ab(iii).

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

Executive summary

The Black Redhorse (*Moxostoma duquesnei*) is one of six redhorse species in Ontario waters and can be distinguished from the others based on colour, lip morphology and lateral line scale count (Scott & Crossman 1998). The Black Redhorse is widely distributed in Eastern North America, but its distribution is highly disjunct with 2 large contiguous distribution areas and 5-10 smaller isolated areas, the Ontario Black Redhorse is one of the smaller disjunct distributional areas. Black Redhorse are found in Canada in tributaries to Lakes Huron, St. Clair and Erie, with most found in the Grand and Thames River drainages. Black Redhorse were historically reported in Catfish Creek and Sauble River, but are likely extirpated from those areas. Black Redhorse use moderate flow riffles, and shallow pools in large streams with cobble or gravel substrates. Mature Black Redhorse (age 2-6 years) migrate upstream for suitable spawning habitat in the spring (Reid 2006). The global distribution of the Black Redhorse is stable or declining slowly, and while there is no quantitative data on this species abundance in Ontario, capture records indicate they are likely stable or slightly declining in numbers in Ontario. Black Redhorse is most vulnerable to pollution (agricultural and urban) within their southwestern Ontario distribution; however, climate change may result in further loss of Black Redhorse spawning and rearing habitat. While dams have been identified as a threat to the Black Redhorse, recent information on their movement across dams indicate dams more likely represent a limiting factor, not a direct threat. Black Redhorse was listed as Threatened by COSEWIC in May 2015 (no change in status) and is currently listed as Threatened under the Ontario ESA.

Black Redhorse (*Moxostoma duquesnei*) is classified as Threatened in Ontario due to its limited distribution (nine isolated locations) and the continuing threat of pollution as well as water level variation that impacts habitat quality and availability. It meets criterion B1ab(iii) + 2ab(iii).

1. Background information

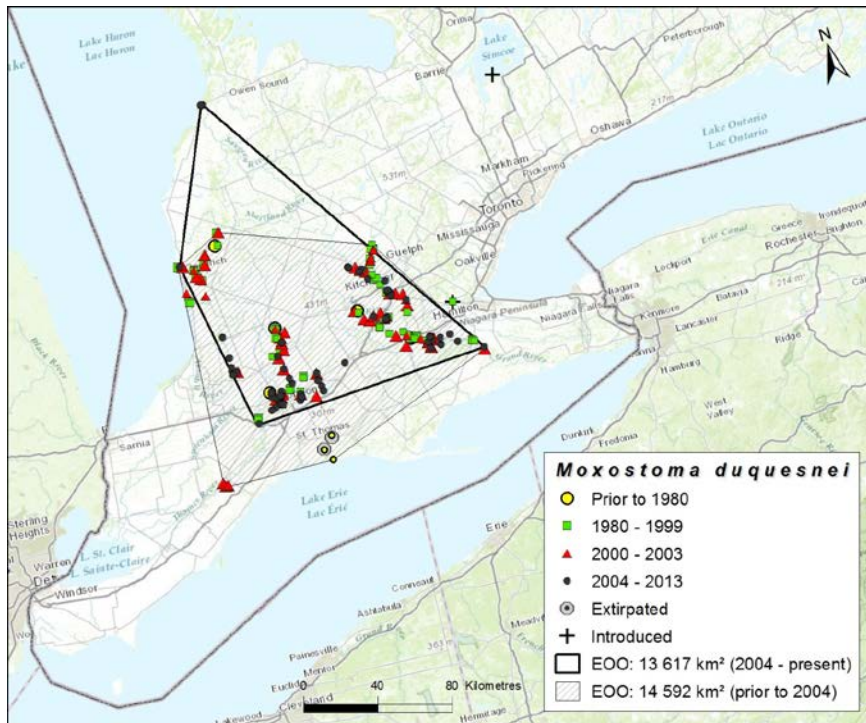
1.1. Current designations

- GRANK: G5 (NatureServe 2015)
- NRANK Canada: N2
- COSEWIC: Threatened (May 2015)
- SARA: Not listed
- ESA 2007: Threatened (2008)
- SRANK: S2

1.2. Distribution in Ontario

The Black Redhorse Ontario distribution includes tributaries of Lake Erie, Lake St. Clair and Lake Huron in southwestern Ontario (see Figure 1; COSEWIC 2015). The two primary drainages for Black Redhorse are the Grand and Thames river drainages, more specifically, they occur in; North Thames River, South Thames River, Grand River, Conestogo River, Nith River, Saugeen River, Maitland River, Bayfield River and Ausable River. Captures of Black Redhorse in Spencer Creek (Lake Ontario tributary) and in Lake Simcoe are likely the results of introductions, while the capture of Black Redhorse in the lower Thames River in 2003 was not repeated and thus those fish were likely strays from the upper Thames River. As there have been no observations of Black Redhorse in either Catfish Creek (since 1938) or Sauble River (since 1958), those population are likely extirpated.

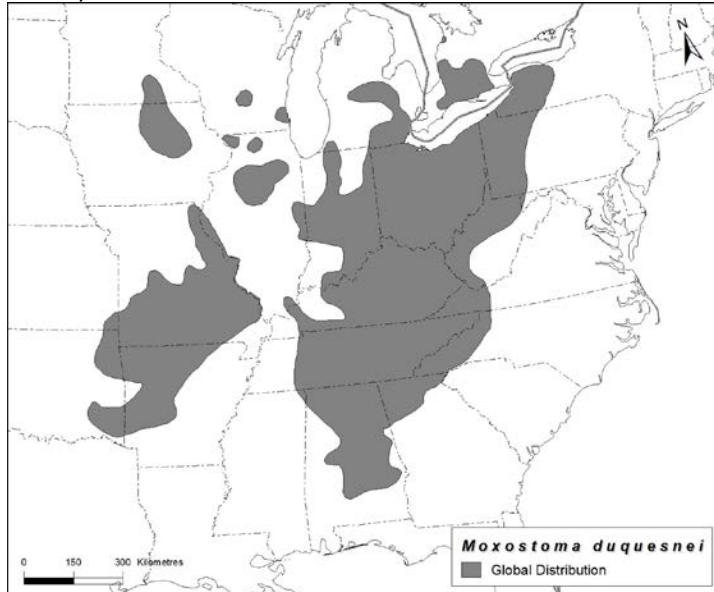
Figure 1. Ontario distribution of the black redbhorse, *Moxostoma duquesnei*, current and historic. Outlines show extent of occurrence for prior to 2004 and for 2004-present (COSEWIC, 2005).



1.3. Distribution and status outside Ontario

The Black Redhorse global distribution is widespread but disjunct in the eastern US. They range from Mississippi in the south to Ontario in the north, and from New York in the east to Oklahoma in the west (see Figure 2). Black Redhorse populations are globally stable or slowly declining (NatureServe 2015), but are at risk in some neighbouring states (MI=S3; New York=S2; Wisconsin=S1)

Figure 2. Global distribution of the black redhorse, *Moxostoma duquesnei* (COSEWIC 2015).



1.4. Ontario conservation responsibility

Ontario Black Redhorse constitute less than 5% of the global range (based on area estimates from global distribution maps).

1.5. Direct threats

The main threats facing the Black Redhorse in Ontario include pollution (Medium impact based on threats calculator) and climate change (Medium-Low impact based on threats calculator) (COSEWIC 2015).

1.6. Pollution

The largest populations of Ontario Black Redhorse are in the Grand and Thames rivers, where agricultural runoff represents an on-going threat to their habitat (both rearing and spawning). Urban growth in these two drainages is expected to be substantial, so urban pollution is a growing threat to the Black Redhorse in Ontario. Specific pollution-related threats include eutrophication (and associated habitat changes), contaminant spills, and siltation. It is likely that pollution threats also apply to the other populations of Black Redhorse that are not hydraulically connected with the Grand or Thames rivers. However, major sewage treatment upgrade efforts are being made in the [Grand River drainage](#), and some of the watershed report cards indicate either “steady” water quality (south Thames River) or improving (middle Thames River).

1.7. Climate Change

Although climate change effects are not known for southwestern Ontario, increased frequency of droughts are likely, and reduced water levels will impact Black Redhorse

habitat negatively. Additionally, reduced groundwater input into Black Redhorse habitat will impact the species through increased water temperatures and reduced oxygen levels. Severe weather events would be expected to impact Black Redhorse habitat through loss of suitable substrate and channel morphology changes.

1.8. Specialized life history or habitat use characteristics

None

2. Eligibility for Ontario status assessment

2.1. Eligibility conditions

2.1.1. Taxonomic distinctness

Yes: Black Redhorse is morphologically distinct from other related species and is taxonomically recognized (Scott & Crossman 1998).

2.1.2. Designatable units

No: While the Ontario locations are likely independent, no genetic evidence exists to justify assigning more than one DU as they reside in a single National Freshwater Biogeographic Zone.

2.1.3. Native status

Yes: Historic records of the Black Redhorse date back to 1926 (Catfish Creek, Lake Erie tributary) (COSEWIC 2015).

2.1.4. Occurrence

The Black Redhorse currently occurs in Ontario, with captures as recent as 2013 (Grand River) (COSEWIC 2015).

2.2. Eligibility results

Black Redhorse (*Moxostoma duquesnei*) is eligible for status assessment in Ontario.

3. Ontario status assessment

3.1. Application of endangered/threatened status in Ontario

3.1.1. Criterion A – Decline in total number of mature individuals

Does not apply: While numbers of mature individuals are not known, capture data in the two main drainages (Grand and Thames) indicate likely stable population sizes

3.1.2. Criterion B – Small distribution range and decline or fluctuation

Threatened B1 ab(iii) + B2 ab(iii): Ontario Black Redhorse meets the Threatened species criteria as its estimated extent of occurrence is below 20,000 km² (13,617 km²) AND its index of occupancy is below 2000 km² (988 km²). In addition it exists at fewer than 10 location (9 locations) AND there is inferred likelihood for continued decline in habitat (quality) based on ongoing agricultural runoff (all locations), urban sewage discharge and runoff (some locations) and contaminant spills (all locations) (COSEWIC 2015). Continued loss of habitat quality would result from increased water flow variation due to climate change events that results in impact on the preferred habitat of the Black Redhorse (pools and riffles). The Black Redhorse will also likely experience increased effects from urban and agricultural pollution as the species is primarily found in the upper Thames and Grand rivers where extensive agriculture and growing urbanization dominates the landscape.

3.1.3. Criterion C – Small and declining number of mature individuals

Does not apply/insufficient information. Past and current numbers of mature individuals are not known.

3.1.4. Criterion D – Very small or restricted total population

Does not apply/insufficient information. Past and current numbers of mature individuals are not known.

3.1.5. Criterion E – Quantitative analysis

Does not apply. No analysis has been done.

3.2. Application of Special Concern in Ontario

Does not apply.

3.3. Status category modifiers

3.3.1. Ontario's conservation responsibility

Does not apply (< 5% global distribution)

3.3.2. Rescue effect

Does not apply: while adjacent jurisdictions do have Black Redhorse, their dispersal to suitable habitat in Ontario is highly unlikely. Additionally, Black Redhorse are at risk in some of the adjacent jurisdictions. Human mediated movement is possible, but not warranted.

3.4. Other status categories

3.4.1. Data deficient

Does not apply.

3.4.2. Extinct or extirpated

Does not apply.

3.4.3. Not at risk

Does not apply.

4. Summary of Ontario status

Black Redhorse (*Moxostoma duquesnei*) is classified as Threatened in Ontario. It meets criterion B1 ab(iii) + B2 ab(iii).

5. Information sources

COSEWIC. 2015. [COSEWIC assessment and status report on the Black Redhorse *Moxostoma duquesnei* in Canada](#). Committee on the Status of Endangered Wildlife in Canada. Ottawa. xii + 50 pp.

NatureServe. 2015. [NatureServe Explorer: An online encyclopedia of life](#). Version 7.1. NatureServe, Arlington, Virginia. [website accessed November 23, 2015].

Reid, S.M. 2006. Timing and characteristics of *Moxostoma* spawning runs in three Great Lakes rivers. *Journal of Freshwater Ecology* 21:249-258.

Scott, W.B., and E.J. Crossman. 1998. *Freshwater fishes of Canada*. Fisheries Research Board of Canada Bulletin 184. 966 pp + xvii. Reprinted by Galt House Publications, Burlington, ON.

Appendix 1: Technical summary for Ontario

Species: Black Redhorse (*Moxostoma duquesnei*)

Demographic information

Demographic attribute	Value
Generation time. Based on average age of breeding adult: age at first breeding = X year; average life span = Y years.	~5 years
Is there an observed, inferred, or projected continuing decline in number of mature individuals?	Unknown
Estimated percent of continuing decline in total number of mature individuals within 5 years or 2 generations.	Unknown
Observed, estimated, inferred, or suspected percent reduction or increase in total number of mature individuals over the last 10 years or 3 generations.	Unknown
Projected or suspected percent reduction or increase in total number of mature individuals over the next 10 years or 3 generations.	Unknown
Observed, estimated, inferred, or suspected percent reduction or increase in total number of mature individuals over any 10 years, or 3 generations, over a time period including both the past and the future.	Unknown
Are the causes of the decline a. clearly reversible and b. understood and c. ceased?	a. Unknown b. Unknown c. Unknown
Are there extreme fluctuations in number of mature individuals?	Unknown

Extent and occupancy information in Ontario

Extent and occupancy attributes	Value
Estimated extent of occurrence. (Request value from MNRF or use http://geocat.kew.org/)	13,617 km ²
Index of area of occupancy (IAO). (Request value from MNRF or use http://geocat.kew.org/)	988 km ²

Is the total population severely fragmented? (i.e. is >50% of its total area of occupancy is in habitat patches that are (a) smaller than would be required to support a viable population, and (b) separated from other habitat patches by a distance larger than the species can be expected to disperse?)	a. No b. No
Number of locations (<i>as defined by COSEWIC</i>). 1. North Thames River 2. South Thames River 3. Grand River 4. Conestogo River 5. Nith River 6. Saugeen River 7. Maitland River 8. Bayfield River 9. Ausable River	9
Number of NHIC Element Occurrences (<i>Request data from MNR</i>)	n/a
Is there an observed, inferred, or projected continuing decline in extent of occurrence?	Unknown
Is there an observed, inferred, or projected continuing decline in index of area of occupancy?	Unknown
Is there an observed, inferred, or projected continuing decline in number of populations?	Unknown
Is there an observed, inferred, or projected continuing decline in number of locations?	Unknown
Is there an observed, inferred, or projected continuing decline in [area, extent and/or quality] of habitat?	Yes, habitat quality
Are there extreme fluctuations in number of populations?	No
Are there extreme fluctuations in number of locations?	No
Are there extreme fluctuations in extent of occurrence?	No
Are there extreme fluctuations in index of area of occupancy?	No

Number of mature individuals in each sub-population or total population (if known)

Number of mature individuals in the total population is unknown.

Quantitative analysis (population viability analysis conducted)

Probability of extinction in the wild is at least: unknown.

Rescue effect

Rescue effect attribute	Likelihood
Is immigration of individuals and/or propagules between Ontario and outside populations known or possible?	Possibly
Would immigrants be adapted to survive in Ontario?	Yes
Is there sufficient suitable habitat for immigrants in Ontario?	Probably
Is the species of conservation concern in bordering jurisdictions?	Yes: NY – S2 MI – S3 OH – S5 PA – S5
Is rescue from outside populations reliant upon continued intensive recovery efforts?	Probably

Appendix 2: Adjoining jurisdiction status rank and decline Information regarding status rank and decline for Black Redhorse

Jurisdiction	Subnational Rank	Population Trend	Sources
Ontario	S2	n/a	NatureServe 2015
Quebec	Not present	n/a	n/a
Manitoba	Not present	n/a	n/a
Michigan	S3	Uncertain, likely stable or slowly declining	NatureServe 2015
Minnesota	S4	Uncertain, likely stable or slowly declining	NatureServe 2015
Nunavut	Not present	n/a	n/a
New York	S2	Uncertain, likely stable or slowly declining	NatureServe 2015
Ohio	S5	Uncertain, likely stable or slowly declining	NatureServe 2015
Pennsylvania	S5	Uncertain, likely stable or slowly declining	NatureServe 2015
Wisconsin	S1	Uncertain, likely stable or slowly declining	NatureServe 2015

Acronyms

COSEWIC: Committee on the Status of Endangered Wildlife in Canada

COSSARO: Committee on the Status of Species at Risk in Ontario

ESA: Endangered Species Act

GRANK: global conservation status assessments

IAO: index of area of occupancy

MNRF: Ministry of Natural Resources and Forestry

NHIC: Natural Heritage Information Centre

SARA: Species at Risk Act

SRANK: subnational conservation status assessment

S1: Critically imperiled

S2: Imperiled

S3: Vulnerable

S4: Apparently Secure

S5: Secure

COSEPAC: Le Comité sur la situation des espèces en péril au Canada