

Ontario Species at Risk Evaluation Report for
Silver Lamprey
lamproie argentée
(*Ichthyomyzon unicuspis*)

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

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Great Lakes – Upper St. Lawrence populations

Saskatchewan – Nelson Rivers populations

Assessed by COSSARO as Species Concern

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Lamproie argentée (*Ichthyomyzon unicuspis*)

La lamproie argentée est une lamproie parasite de petite taille dont l'aire de répartition englobe les cours d'eau et les lacs de l'ensemble du bassin hydrographique des Grands Lacs laurentiens, ainsi que le bassin des rivières Saskatchewan et Nelson, ce qui constitue deux unités désignables (UD) distinctes dont l'évaluation du CDSEPO doit tenir compte.

La lamproie argentée (UD du bassin des Grands Lacs) est classée dans la catégorie des espèces préoccupantes et la lamproie argentée (population des rivières Saskatchewan et Nelson) est classée dans la catégorie des espèces pour lesquelles les données sont insuffisantes en Ontario par le CDSEPO. Des précisions sont fournies ci-dessous, ventilées selon les UD.

Dans le bassin des Grands Lacs (UD 1), qui constitue une grande partie de l'aire de répartition, environ la moitié des cours d'eau abritant l'espèce comportent des barrières d'exclusion de la grande lamproie marine ou font l'objet de traitements chimiques continus contre celle-ci. Ces deux méthodes de lutte empêchent la migration vers les frayères ou causent une mortalité élevée des larves de l'espèce. À l'échelle de son aire de répartition, l'espèce peut être exposée à d'autres menaces telles que la pollution causée par les effluents agricoles, les effets des ouvrages de régularisation des eaux, ainsi que la hausse des températures et la baisse des niveaux d'eau liées aux changements climatiques. Si ces menaces ne sont pas gérées efficacement, le risque de disparition de l'espèce pourra devenir plus élevé. Le CDSEPO désigne la population de l'UD 1 comme espèce préoccupante, compte tenu des facteurs ci-dessus.

La population de lamproie argentée des rivières Saskatchewan et Nelson (UD 2) se trouve dans des zones très distinctes, mais limitées, de cours d'eau et de lacs des bassins hydrographiques des rivières Nelson et Winnipeg du Manitoba et du nord-ouest de l'Ontario. Cette espèce est vulnérable à la fluctuation des niveaux d'eau liée à la gestion de l'eau et au changement climatique. En raison des données limitées disponibles pour cette population dans la province de l'Ontario, cette espèce a été classée dans la catégorie des espèces pour lesquelles les données sont insuffisantes par le CDSEPO.

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Executive summary

Silver Lamprey are a small parasitic lamprey that is distributed in streams and lakes throughout the Laurentian Great Lakes basin and in the Saskatchewan and Nelson River watershed, providing for two distinct Designatable Units for COSSARO assessment consideration.

In the Great Lakes basin (DU1), a major part of its range, about half of the streams that it inhabits have barriers, or are subjected to ongoing chemical treatment for Sea Lamprey control. These control methods prevent migration to spawning areas or cause significant mortality to larval individuals, respectively. Throughout its range, it may be exposed to additional threats such as pollution from agricultural effluents, effects of water control structures, and increased temperatures and decreased water flows related to climate change. If these threats are not managed effectively, this species may become at greater risk of extinction. COSSARO designates the DU1 population as Special Concern on the above noted factors.

Silver Lamprey - Saskatchewan – Nelson Rivers population (DU2) is found in widely disjunct, but limited, areas in streams and lakes in the Nelson and Winnipeg River basins of Manitoba and northwestern Ontario. The species is susceptible to fluctuating water levels as a result of water management and climate change. Due to limited available data for this population, within the province of Ontario, a COSSARO classification of Data Deficient has been assigned.

NatureServe ranked the global populations of Silver lampreys as G5 (Secure)

1. Eligibility for Ontario status assessment

1.1. Eligibility conditions

1.1.1. Taxonomic distinctness

Silver Lamprey (*Ichthyomyzon unicuspis*) are closely related to the Northern Brook Lamprey (*Ichthyomyzon fossor*), as they are generally indistinguishable during their long larval phase, but have adopted very different lifestyles at metamorphosis and are therefore formally recognized as different species.

The Silver Lamprey feeds parasitically on other fishes for approximately one year before initiating sexual maturation. Silver Lamprey reach between least 250–300 mm in length. Lampreys have special scientific significance as one of only two groups of jawless fishes that evolved more than 500 million years ago. Lampreys are also fed on by a variety of aquatic, aerial, and terrestrial predators.

1.1.2. Designatable units

Historically, geographical locations were utilized to separate known populations between continental divides. Great Lake – Upper St. Lawrence watershed (Atlantic Ocean) represented one designatable unit (DU) and the Saskatchewan and Nelson River watershed (Arctic Ocean) represented the second designatable unit. This classification of the various DU's have been confirmed with mtDNA analysis.

Results from mtDNA analysis for Silver Lamprey within the Great Lakes-Upper St. Lawrence and Saskatchewan-Nelson River basins represent discrete and evolutionarily significant units. Silver Lamprey differ significantly in the frequency of four mtDNA haplotypes; those from the Great Lakes-Upper St. Lawrence watershed (n = 155) exhibited four mtDNA haplotypes (A1, A2, A4, and B1), while Silver Lamprey (n = 15) from the Saskatchewan-Nelson River watershed was fixed for a single haplotype (COSEWIC 2020).

1.1.3. Native status

Silver Lamprey are native to Ontario and are found in both the Arctic and Atlantic watersheds.

1.1.4. Occurrence

Silver Lamprey have been identified within the province of Ontario going back to 1930 (COSSARO, 2011)

In the Great Lakes-Upper St. Lawrence watershed, Silver Lamprey (DU1) adults or post-metamorphic juveniles have been recorded at 310 locations in Ontario. Silver Lamprey are found in the four Canadian Great Lakes watersheds (Erie, Huron, Ontario, and Superior), in

Lake St. Clair (which connects lakes Erie and Huron) and Lake Nipissing (which drains into Lake Huron via Georgian Bay), and in the St. Lawrence River and its major tributary, the Ottawa River.

Silver Lamprey within the Saskatchewan-Nelson River watershed (DU2), have been recorded in 18 locations within the province of Ontario that are focused along the Canada/US international boundary waters in Northwestern Ontario.

1.2. Eligibility results

Silver Lamprey (*Ichthyomyzon unicuspis*) has two Designatable Units identified within the province of Ontario and both populations are eligible for status assessment in Ontario.

2. Background information

2.1. Current designations

- GRANK: G5 (NatureServe, 2021)
- IUCN: Least Concern (NatureServe ,February 2012)
- NRANK Canada:
 - a. DU1 - N3
 - b. DU2 - NNR_
- COSEWIC:
 - a. DU 1 – Special Concern (November 2020)
 - b. DU 2 – Special Concern (November 2020)
- SARA:
 - a. DU 1 - Special Concern (Schedule 1)
 - b. DU 2 – Not Listed
- ESA 2007:
 - a. DU 1 – Special Concern (Schedule 4) (2013)
 - b. DU 2 – Data Deficient (2013)
- SRANK:
 - a. DU1 - S3 (ranked in 2011)
 - b. DU2 – S1 (ranked in 2018)

2.2. Distribution in Ontario

With two DU being found in Ontario, effort and species collections vary depending on the DU. It should be noted that record identifications have increased over the past decade, with more effort being applied in both DU.

The Silver Lamprey species found within the Great Lakes – Upper St. Lawrence (DU1) have over 310 (307 – NHIC) identified locations within the province of Ontario, ranging from watercourses in flowing in Lake Superior to tributaries of the Ottawa River and have been identified in all four Canadian Great Lakes watersheds.

The Silver Lamprey found within the Saskatchewan and Nelson Rivers (DU1) have 16 records of capture (13 – NHIC) and as found in Northwestern Ontario, as part of the Winnipeg River system that conveys flows to the Nelson River drainage system.

2.3. Distribution, status and the broader biologically relevant geographic range outside Ontario

Silver lamprey are restricted to eastern North America and found in the Hudson Bay, Great Lakes, St. Lawrence River, and Mississippi River drainages (Potter *et al.* 2015). In Canada, Silver Lamprey are found in Manitoba, Ontario, and Québec. In the United States, the Silver Lamprey occurs in Illinois, Indiana, Kentucky, Michigan, Minnesota, Missouri, New York, Ohio, Pennsylvania, Vermont, West Virginia, Wisconsin; Iowa, Mississippi, Nebraska, North Dakota, and Tennessee (NatureServe Explorer 2021).

Silver Lamprey Great Lakes – Upper St. Lawrence River (DU1) is distributed in streams and lakes throughout the Laurentian Great Lakes basin. In the Great Lakes basin, a major part of its range, about half of the streams that it inhabits have barriers, or are subjected to ongoing chemical treatment for Sea Lamprey control.

Silver Lamprey (DU2) is found widely disjunct, but limited, areas in streams and lakes in the Nelson and Winnipeg River basins of Manitoba and Northwestern Ontario.

Table 1. Condition of the Species in Adjacent Jurisdictions and Broader Biologically Relevant Geographic Range

Adjacent Jurisdictions	Biologically Relevant to Ontario (n/a, yes, no)	Condition	Notes & Sources
Quebec	Yes	S3	DU1 (NatureServe 2021)
Manitoba	Yes	SNR	DU2 (NatureServe 2021)
Michigan	Yes	S4	DU1 (NatureServe 2021)
Minnesota	Yes	SNR	DU1 and DU2 (NatureServe 2021)
New York	Yes	S3	DU1 NatureServe 2021
Ohio	Yes	S4	DU1 NatureServe 2021
Pennsylvania	Yes	SNR	DU1 NatureServe 2021
Wisconsin	Yes	S4	DU1 NatureServe 2021

2.4. Ontario conservation responsibility

For Silver Lamprey in the Great Lakes - St. Lawrence River DU1. Ontario's areal extent appears to comprise about 35% of the range of the Silver Lamprey that lies within the Great Lakes - St. Lawrence watershed based on the range map shown in COSEWIC (2020).

In the Saskatchewan and Nelson Rivers (DU2) Silver Lamprey population, the Ontario range in the Nelson River (Winnipeg River sub watershed) occupies less than 5% of the global range for the entire Canadian DU. (COSEWIC 2020).

2.5. Direct threats

Unique for the Silver Lamprey Great Lakes – Upper St. Lawrence River (DU1) population, lampricide treatments of populations co-occurring with Sea Lamprey larvae is considered to be High

Threats for both the DU1 and DU2 populations of the Silver Lamprey include;

1. Dams and water management/use (Medium-Low)
2. Invasive non-native species (Medium-Low)
3. Climate change and severe weather (Medium-Low)

4. Forestry practices (Low)

2.6. Specialized life history or habitat use characteristics

Silver Lamprey and the Northern Brook Lamprey are closely related “paired” species that are generally indistinguishable during their long larval phase, but they adopt very different lifestyles at metamorphosis and they are formally recognized as valid species. The Silver Lamprey at metamorphosis feeds parasitically on other fishes for approximately one year before initiating sexual maturation. Northern Brook Lamprey begins sexual maturation during metamorphosis, spawns and then dies without a parasitic phase noted in the Silver Lamprey

Silver lampreys burrow in silty substrate in rivers and streams. Silver Lamprey migrate downstream to large river or lake systems to feed as parasites; at maturity, they migrate upstream and spawn in similar habitats as Northern Brook Lamprey or, sometimes, in deeper rivers. May not return to their natal stream to spawn.

The Silver Lamprey in the Great Lakes – Upper St. Lawrence (DU1) population have a major habitat overlap with the invasive exotic Sea Lamprey.

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

Not applicable. No information available on population trends for Silver Lamprey in DU1 or DU2 populations

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

Not applicable. EOO and IAO exceed thresholds for DU1. Population estimates are not available, but changes in relative abundance can be inferred in the Great Lakes basin from incidental capture during Sea Lamprey control efforts (although this means that sampling is biased towards stream reaches with Sea Lamprey). Catch rates of larval Northern Brook and Silver lampreys (combined) have been relatively consistent over the last three generations, but they were lower in 2001–2018 than in 1989–2000. Catch rates of adult Silver Lamprey appear to have stabilized or increased over the last three generations, although they are low overall (COSEWIC 2020)

Not applicable for DU2. May meet Threatened, For B1 threshold is just above the <20,000km² at 20,478 km² and B2ab(i, iv), with AAO (56 km²) and number of locations at 12, just above the 10 threshold, but not severely fragmented, and declines in EOO, IAO and locations likely related to search effort. No decline in habitat quality or quality.

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

Not applicable. No information available on population size for DU1 and DU2.

3.1.4. Criterion D – Very small or restricted total population

Not applicable. No information available on population size for DU1 and DU2

3.1.5. Criterion E – Quantitative analysis

Not applicable. No data available for DU1 and DU2.

3.2. Application of Special Concern in Ontario

Silver Lamprey for the Great Lakes and Upper St. Lawrence (DU1) population and

approximately 50 % of the streams are known to inhabit are currently subjected to ongoing chemical treatment for Sea Lamprey control, which in turn results in causes significant mortality to larval Silver Lampreys. Barriers that exclude Sea Lamprey protect this species from exposure to lampricides in upper reaches of many tributaries, and it is still relatively abundant in untreated streams. The overall population is thought to be currently stable. However, ongoing threats such as pollution from agricultural effluents, increased temperatures, and decreased water flows related to climate change and water control structures. If these threats are not addressed, this population may become at greater risk of extinction.

Silver Lamprey for the Saskatchewan and Nelson Rivers (DU2) population data is on 12 catch records and thus pushes the data deficient for a classification in Ontario.

3.3. Status category modifiers

3.3.1. Ontario's conservation responsibility

Ontario's conservation responsibility is moderate to high for the DU1 population of Silver Lamprey as a considerable portion of the global range lies within provincial boundaries. Modifier not applicable.

Ontario's conservation responsibility is low for the DU2 population of Silver Lamprey as less than <5% of the global range lies within provincial boundaries. Modifier not applicable.

Status modification based on rescue effect or level of risk in broader biologically relevant geographic range

As this species is migratory, the potential for rescue from adjacent jurisdictions may potential happen within the Great Lake and Upper St. Lawrence (DU1) population, but other factors may limit the ability for the rescue effect to occur.

Due to the sporadic natural of the population distribution for the Saskatchewan and Nelson Rivers (DU2) populations within Ontario, rescue effect is limited or absent. This species requires watercourse that lack dams and waterfalls as these structures are barriers to upstream movement.

Silver Lamprey status throughout the broader biologically relevant geographic range varies from Secure (S5) to Critically Imperiled (S1).

3.4. Other status categories

3.4.1. Data deficient

For the Silver Lamprey Saskatchewan and Nelson River (DU2) population, only 12 capture locations have been identified. With Ontario representing less than 5% of the

global range and lack of target sampling effort to identify this species in the area, insufficient data exists to classify this species.

3.4.2. Extinct or extirpated

Not Applicable

3.4.3. Not at risk

Not Applicable

4. Summary of Ontario status

Silver Lamprey (*Ichthyomyzon unicuspis*) Great Lakes and Upper St. Lawrence (DU1) population is classified as Special Concern in Ontario based on ongoing impacts of sea lamprey control programs that are on-going and active on 50% of known streams containing this species.

Silver Lamprey (*Ichthyomyzon unicuspis*) Saskatchewan and Nelson Rivers (DU2) population is classified as Data Deficient in Ontario.

This status of this species is consistent with the definition of status under the Endangered Species Act, 2007.

5. Information sources

COSEWIC. 2020. IN PRESS. COSEWIC assessment and status report on the Northern Brook Lamprey *Ichthyomyzon fossor* (Great Lakes - Upper St. Lawrence populations and Saskatchewan - Nelson River populations) and the Silver Lamprey *Ichthyomyzon unicuspis* (Great Lakes - Upper St. Lawrence populations, Saskatchewan - Nelson River populations and Southern Hudson Bay - James Bay populations) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xxiv + 156 pp. (<https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html>).

COSSARO. 2011. COSSARO Candidate Species at Risk Evaluation for Silver Lamprey (*Ichthyomyzon unicuspis*), Great Lake – Upper St. Lawrence River Population and Northwestern Ontario Population. i + 13 pp.

Potter, I.C., H.S. Gill, C.B. Renaud, and D. Haoucher. 2015. The taxonomy, phylogeny, and distribution of lampreys. Pp. 35-73. in M.F. Docker (ed.). Lampreys: Biology, Conservation and Control, Volume 1, Springer, Dordrecht, Netherlands.

NatureServe. 2015. *Ichthyomyzon unicuspis*. *The IUCN Red List of Threatened Species* 2015: e.T202621A76578043. <https://dx.doi.org/10.2305/IUCN.UK.2015-1.RLTS.T202621A76578043.en>. Downloaded on 14 February 2021

Appendix 1: Technical summaries for Ontario

1.1 Silver Lamprey (*Ichthyomyzon unicuspis*) Great Lakes - Upper St. Lawrence River populations

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.	6 years
Is there an observed, inferred, or projected continuing decline in number of mature individuals?	No, catches in traps very low but appear to have stabilized or increased over the last 3 generations
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?	No

Extent and occupancy information in Ontario

Extent and occupancy attributes	Value
Estimated extent of occurrence (EOO). <i>If value in COSEWIC status report is not applicable, then use geocat.kew.org. State source of estimate.</i>	426,269 km ²
Index of area of occupancy (IAO). <i>If value in COSEWIC status report is not applicable, then use geocat.kew.org. State source of estimate.</i>	560 km ²
Is the total population severely fragmented?	a. No b. No

Extent and occupancy attributes	Value
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?	
Number of locations. <i>See Definitions and Abbreviations on COSEWIC and IUCN websites for more information on the term "location". Use plausible range to reflect uncertainty if appropriate.</i>	>310.
Number of NHIC Element Occurrences <i>Request data from MNRF.</i>	307
Is there an observed, inferred, or projected continuing decline in extent of occurrence?	Yes, observed
Is there an observed, inferred, or projected continuing decline in index of area of occupancy?	Yes, observed
Is there an observed, inferred, or projected continuing decline in number of sub-populations or EOs?	Not applicable
Is there an observed, inferred, or projected continuing decline in number of locations?	Yes, inferred 41 locations in previous report
Is there an observed, inferred, or projected continuing decline in [area, extent and/or quality] of habitat?	No
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)

Sub-population (or total population)	Number of mature individuals
<i>Total</i>	<i>Unknown</i>

Quantitative analysis (population viability analysis conducted)

Probability of extinction in the wild is unknown.

Threats

The ICUN threat calculator was used for the Silver Lamprey Great Lakes – St. Lawrence Populations and determined to be Very High by COSEWIC (2020).

Specific threats and threat ranking include:

- i. Lampricide treatments of populations co-occurring with Sea Lamprey larvae (High)
- ii. Dams and water management/use (Medium-Low)
- iii. Invasive non-native species (Medium-Low)
- iv. Climate change and severe weather (Medium-Low)

The migratory behaviour of Silver Lamprey means that its in-stream distribution overlaps considerably with Sea Lamprey in the Great Lakes, but its lower fecundity makes it a poor competitor to the invasive Sea Lamprey.

Rescue effect

Rescue effect attribute	Value
Does the broader biologically relevant geographic range for this species extend beyond Ontario?	Yes
Status of outside population(s) most likely to provide immigrants to Ontario	Quebec and United States
Is immigration of individuals and/or propagules between Ontario and outside populations known or possible?	Unknown, but likely
Would immigrants be adapted to survive in Ontario?	Yes
Is there sufficient suitable habitat for immigrants in Ontario?	Unknown; accessible habitat unaffected by lampricides may be insufficient
Are conditions deteriorating in Ontario?	Probably
Is the species of conservation concern in bordering jurisdictions?	Yes
Is the Ontario population considered to be a sink?	Unknown; lampricide treatments ongoing
Is rescue from outside populations likely?	No

Sensitive species

Data for the Silver Lamprey Great Lakes – St. Lawrence populations is not considered to be a data sensitive species.

1.2 Silver Lamprey (*Ichthyomyzon unicuspis*) Saskatchewan – Nelson River populations

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.	6 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 (EOO). <i>If value in COSEWIC status report is not applicable, then use geocat.kew.org. State source of estimate.</i>	20,478 km ²
Index of area of occupancy (IAO). <i>If value in COSEWIC status report is not applicable, then use geocat.kew.org. State source of estimate.</i>	56 km ²
Is the total population severely fragmented? i.e., is >50% of its total area of occupancy 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. Yes

Extent and occupancy attributes	Value
Number of locations. <i>See Definitions and Abbreviations on COSEWIC and IUCN websites for more information on the term "location". Use plausible range to reflect uncertainty if appropriate.</i>	>16
Number of NHIC Element Occurrences <i>Request data from MNRF.</i>	13
Is there an observed, inferred, or projected continuing decline in extent of occurrence?	Yes, observed
Is there an observed, inferred, or projected continuing decline in index of area of occupancy?	Yes, observed
Is there an observed, inferred, or projected continuing decline in number of sub-populations or EOs?	Not applicable
Is there an observed, inferred, or projected continuing decline in number of locations?	Yes, although likely due to differences in search effort and uncertainty.
Is there an observed, inferred, or projected continuing decline in [area, extent and/or quality] of habitat?	No
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)

Sub-population (or total population)	Number of mature individuals
<i>Total</i>	<i>Unknown</i>

Quantitative analysis (population viability analysis conducted)

Probability of extinction in the wild is unknown.

Threats

The ICUN threat calculator was used for the Silver Lamprey Saskatchewan- Nelson River populations to be High-Medium by COSEWIC (2020).

Specific threats and threat ranking include:

- i. Dams and water management (Medium/Low)
- ii. Climate change and severe weather (Low)
- iii. Invasive non-native species (Low)
- iv. Forestry effluents (Low)

Rescue effect

Rescue effect attribute	Value
Does the broader biologically relevant geographic range for this species extend beyond Ontario?	Yes
Status of outside population(s) most likely to provide immigrants to Ontario	Minnesota and Manitoba
Is immigration of individuals and/or propagules between Ontario and outside populations known or possible?	Unknown
Would immigrants be adapted to survive in Ontario?	Yes
Is there sufficient suitable habitat for immigrants in Ontario?	Unknown;
Are conditions deteriorating in Ontario?	No
Is the species of conservation concern in bordering jurisdictions?	Yes
Is the Ontario population considered to be a sink?	Unknown; lampricide treatments ongoing
Is rescue from outside populations likely?	No

Sensitive species

Data for the Silver Lamprey Saskatchewan – Nelson River populations is not considered to be a data sensitive species.

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
EO: Element occurrence (as defined by NHIC)
EOO: extent of occurrence
GRANK: global conservation status assessments
IAO: index of area of occupancy
IUCN: International Union for Conservation of Nature and Natural Resources
MNRF: Ministry of Natural Resources and Forestry
NHIC: Natural Heritage Information Centre
NNR: Unranked
NRANK: National conservation status assessment
SARA: Species at Risk Act
SNR: unranked
SRANK: subnational conservation status assessment
S1: Critically Imperiled
S2: Imperiled
S3: Vulnerable
S4: Apparently Secure
S5: Secure
IUCN: International Union for Conservation of Nature and Natural Resources
CDSEPO: Le Comité de détermination du statut des espèces en péril en Ontario