

Progress Towards the Implementation of Recovery
Strategy for the

Copper Redhorse (*Moxostoma hubbsi*) for the Period 2019 to 2023



2026

Species at Risk Act

Recovery Strategy Report Series

Canada

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For copies of the recovery documents, or for additional information on species at risk, including Committee on the Status of Endangered Wildlife in Canada (COSEWIC) status reports, and other related documents, please visit the [Species at Risk Public Registry](#).

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Preface

The *Species at Risk Act* (S.C. 2002, c.29) (SARA) requires the competent minister(s) to monitor and report on the implementation of recovery documents (that is, recovery strategies, action plans, and management plans) for species at risk. These reports must describe the progress made towards the species' recovery or conservation¹.

The Minister of Fisheries is the competent minister for aquatic species at risk. The minister responsible for the Parks Canada Agency is the competent minister for aquatic species at risk that are found in their jurisdiction. Fisheries and Oceans Canada (DFO) and Parks Canada (PC) have jointly prepared this progress report.

Reporting on the progress toward implementing the recovery strategy includes the collective efforts of the competent ministers, provincial and territorial governments, and all other parties involved in carrying out actions that contribute to the species' recovery.

As stated in the preamble to SARA, success in the recovery of species at risk depends on the commitment and cooperation of many contributors, and will not be achieved by DFO and PC, or any other jurisdiction, alone. All Canadians are invited to join in supporting and implementing the recovery documents, for the benefit of the species and Canadian society as a whole.

Acknowledgements

The progress report was prepared by regional recovery planners Anaïs Tétreault and Marie-Pierre Veilleux (DFO). It was prepared in collaboration with members of the Copper Redhorse recovery team. The progress toward species recovery described in this report would not have been achieved without the partnerships and contributions of many individuals and organizations. DFO would like to thank all the individuals and organizations who have contributed to the recovery of the Copper Redhorse.

¹ "Recovery" applies to species listed under SARA as threatened, endangered or extirpated, which require a recovery strategy and one or more action plan(s). "Conservation" applies to species listed under SARA as special concern, which require a management plan.

Executive summary

This report summarizes the progress made by Fisheries and Oceans Canada (DFO), Parks Canada (PC) and their partners towards implementing the recovery strategy for the Copper Redhorse (*Moxostoma hubbsi*), between 2019 and 2023.

For more information on the contents of this document, please contact the Species at Risk Program (DFO.NCRSARA-LEPRCN.MPO@DFO-MPO.GC.CA).

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1 Copper Redhorse (*Moxostoma hubbsi*)

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Fisheries and Oceans Canada (DFO), Parks Canada (PC) and their partners have made additional progress towards the implementation of the measures identified in the [Recovery Strategy for the Copper Redhorse \(*Moxostoma hubbsi*\) in Canada](#), through the actions taken between January 2019 and December 2023 to support the recovery of the Copper Redhorse. The recovery strategy provides detailed information on the species, its threats, its needs, population and distribution objectives, the identification of critical habitat, along with approaches, strategies and measures to meet the recovery objectives.



Photo credit: Fisheries and Oceans Canada

This progress report is part of a series of documents for the Copper Redhorse that should be taken into consideration together, including the recovery strategy and the previous progress report for the period 2012 to 2018. Refer to the [Copper Redhorse](#) species profile on the [Species at Risk Public Registry](#) for more information and related documents.

1.1 Progress towards meeting the population and distribution objectives for the Copper Redhorse

The population and distribution objectives establish, to the extent possible, the conditions necessary for the species' recovery. The goal established in the recovery strategy is to reach a population of 4,000 mature individuals over a 20 year period. To achieve this goal, 4 population and distribution objectives were established:

- the ratio of Copper Redhorse spawners to the total redhorse population, irrespective of species, should reach 3%
- autumn catches of Copper Redhorse young-of-the-year should constitute at least 3% of total juvenile redhorse catches, irrespective of species
- in the next few years, juveniles introduced through stocking initiatives should contribute significantly to population inventories, while those issuing from natural reproduction gradually increase
- the present distribution range must be maintained

Three approaches were identified in the recovery strategy to meet the population and distribution objectives for the Copper Redhorse. During the reporting period, measures were undertaken by DFO and/or its partners under each approach. Some key achievements are described below.

Approach 1: conservation

- Several organizations have taken steps to protect Copper Redhorse habitat. The Ministère de l'Environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs du Québec (MELCCFP) worked on integrating Jeannotte Island, aux Cerfs Island, and the downstream reach of the Saint-Ours dam into the [Pierre-Étienne-](#)

[Fortin Wildlife Preserve](#). Éco-Nature led planning efforts to expand the [Rivière-des-Mille-Îles Wildlife Sanctuary](#) from 26 to over 971 hectares. The Nature Conservancy of Canada (NCC) acquired Hervieux Island and, with partners, put in place plans to restore aquatic grass beds in the species' range. These actions help reduce the threats associated with the degradation of Copper Redhorse habitat.

- Parks Canada, responsible for the operation and maintenance of the Vianney-Legendre fish ladder, took steps to address the suboptimal fish passage efficiency at the fishway by optimizing operations and maintenance at the Saint-Ours dam, where the fishway is located.
- With the support of Fisheries and Oceans Canada (DFO) funding, community groups restored and improved over 328,000 m² of shoreline in the Richelieu River watershed², and carried out work to eradicate water chestnut, an invasive species modifying Copper Redhorse habitat.
- Agricultural producers implemented over 250 on-farm measures³ to mitigate agriculture-related threats to the species and its habitat. This included planting 3,660 hectares⁴ of cover crops across the Montérégie region in collaboration with the Union des Producteurs agricoles (UPA), supported by DFO-funded seeding equipment that enabled a free service for farmers. In addition, Groupe ProConseil led a major initiative to improve pesticide management and reduce reliance on insecticide-treated seeds.
- In 2023, the *Vessel Operation Restriction Regulations* (D. 274-2023) were amended, as enacted by Transport Canada. These amendments prohibit power-driven and electrical propulsion vessels, establish a speed limit, and prohibit towing and wake surfing in certain sections of the Richelieu River that overlap with Copper Redhorse rearing and feeding habitats. These measures help protect the critical habitat by reducing wave action from vessels and ultimately erosion in the Richelieu River.

Approach 2: outreach and education

- DFO-funded organizations educated more than 57,440 people⁵ about the presence of the Copper Redhorse, its habitat and its threats. The Comité de concertation et de valorisation du bassin de la rivière Richelieu (COVABAR), NCC and Éco-Nature engaged with anglers and recreational boaters within the species' range on over 10,000 occasions.
- During the reporting period, DFO funded numerous Copper Redhorse outreach activities. For example, COVABAR developed outreach materials aimed at stand-up paddleboard users and pet stores. The Centre d'exploration de la rivière des Mille-Îles also inaugurated a new permanent exhibition in 2019 highlighting the Copper Redhorse. The Granby Zoo established school-based awareness workshops in which the Copper Redhorse was featured prominently.

² Results based on the deliverables provided under DFO contribution funding for species at risk, that is, the Canadian Nature Fund for Aquatic Species at Risk (CNFASAR), Habitat Stewardship Program for Species at Risk (HSP) and Aboriginal Fund for Species at Risk (AFSAR).

³ Total number of measures taken by producers participating each year in the Union des Producteurs agricoles (UPA) and Groupe ProConseil projects. Results based on the deliverables provided under DFO contribution funding for species at risk, that is, CNFASAR, HSP and AFSAR.

⁴ Results based on the deliverables provided under DFO contribution funding for species at risk, that is, CNFASAR, HSP and AFSAR.

⁵ Results based on the deliverables provided under DFO contribution funding for species at risk, that is, CNFASAR, HSP and AFSAR.

- DFO has also funded projects in the agricultural sector. UPA Montérégie and Groupe ProConseil carried out outreach with farmers, including mentoring activities and knowledge transfer days on sustainable agri-environmental practices.
- DFO developed a social marketing strategy for the Richelieu River that included a map of sensitive Copper Redhorse areas for recreational boaters and a mural showcasing the Vianney-Legendre fishway.
- With the support of DFO funding, organizations such as Éco-Nature and NCC conducted outreach with municipal employees and waterfront property owners undertaking shoreline projects, promoting compliance with existing regulations and bylaws and supporting improvements to municipal bylaws related to shoreline impacts.
- DFO fishery officers conducted outreach activities with waterway users to promote best navigation practices. These initiatives aim to reduce harmful impacts on the habitat of species at risk, including the Copper Redhorse while reminding users of the importance of complying with current regulations.

Approach 3: research and monitoring

- Several organizations advanced knowledge of aquatic vegetation within the Copper Redhorse's range. Since 2020, the MELCCFP Réseau de suivi ichtyologique (RSI) has been assessing the condition of submerged vegetation in the St. Lawrence River. Between 2019 and 2023, NCC and its partners characterized seagrass beds around several islands to assess changes in their distribution and diversity and to detect the presence of invasive plants. In addition, Éco-Nature identified roughly 40 habitats of interest in the Rivière des Mille-Îles that will be monitored to maintain their integrity.
- Since 2018, McGill University has been studying the potential effect of contaminants present in the aquatic environment on the early life stages of the Copper Redhorse, and has found that exposure of eggs to pollutants in the Richelieu River leads to earlier hatching, reduced larval survival, and changes in the expression of genes related to immune and digestive functions (Marchand et al. 2022).
- In 2022, the Fondation Espace pour la vie announced the creation of a [species at risk fund](#) (in French only) that has enabled the Montreal Biodôme to undertake priority research and conservation efforts for the Copper Redhorse.
- In 2020, MELCCFP established a captive broodstock program for the Copper Redhorse at the Baldwin-Coaticook fish hatchery to support assisted reproduction efforts, leading to the stocking of 15,000 age-1+ juveniles in the Richelieu River in 2022.
- MELCCFP parental assignment analyses demonstrated that a younger age class is participating in spawning and that stocked individuals are helping to rebuild the population (N. Tessier and N. Vachon, MELCCFP, pers. comm. 2023). The analyses also confirmed the successful use of cryopreserved milt and showed that stocked individuals exhibit homing behaviour, supporting successful migration to spawning grounds.
- New genetic analyses estimated the effective population size of the Copper Redhorse (that is, the number of individuals contributing to reproduction at a given point in time) (MELCCFP 2024). The effective population size decreased by nearly 60% between the early 2000s and the early 2010s, from about 496 (1999 to 2004) to 172 (2008 to 2013) individuals. It subsequently appears to have stabilized, with estimates of approximately 205 individuals during 2017 to 2022. A target of 1000 individuals has been recommended to support long-term survival (MELCCFP 2024).

- A master’s thesis examined the distribution of young-of-the-year *Moxostoma* and the influence of biotic and abiotic environmental factors, improving understanding of juvenile habitat use and the effects of current stocking measures (Bannester-Marchand 2023).

Achievement of the population and distribution objectives is evaluated using performance indicators. Table 1 provides an overview of the status of performance indicators as of the end of the period covered. Performance indicators that were partially met or not met are discussed in the “Key knowledge gaps and future priorities for the Copper Redhorse” section.

Table 1: Status of performance indicators for the Copper Redhorse for the period 2019 to 2023.

Performance indicator	Status ⁶	Description of progress
Increase in the number of adults inventoried at the Vianney-Legendre fishway during upstream migration	Partially met, underway	Although no surveys were conducted at the Vianney-Legendre fishway in 2020 and in 2021, the number of adult Copper Redhorse counted during upstream migration increased from 15 in 2019 to 17 in 2022, and then more than doubled to 36 in 2023. Another positive sign is that the annual recapture rate has been declining since its peak in 2014, suggesting that new individuals are migrating up the Richelieu River (N. Tessier and N. Vachon, MELCCFP, pers. comm. 2023). In 2023, a monitoring device with a camera and automatic fish counter was installed to improve future tracking of fish migration. In addition, the removal of accumulated sediment in the fishway and adjusting dam gate operations should improve both assisted-reproduction capture efforts and the upstream migration of spawners.
Copper Redhorse represent 3% of all redhorse captured during sampling operations	Not met	This indicator is difficult to assess because it requires considerable efforts during the redhorse spawning season, a sensitive period when disturbance must be minimized. Sampling programs implemented did not specifically target Copper Redhorse. Thus, the available summary data was insufficient to determine the proportion of Copper Redhorse among all redhorse species captured.

⁶ **Met:** the performance indicator has been met and no further action is required

Met, ongoing: the performance indicator has been met, but efforts will continue until such time the population is considered to be recovered

Not met: the performance indicator has not been met, and little to no progress has been made

Partially met, underway: the performance indicator has not been met, but there has been moderate to significant progress made

Performance indicator	Status ⁶	Description of progress
<p>Juvenile Copper Redhorse represent 3% of all juvenile redhorse in the Richelieu River</p>	<p>Met, ongoing</p>	<p>Because juvenile recruitment was not monitored in 2019 or 2021, only a partial picture was obtained for the reporting period. The proportion of young-of-the-year (YOY) Copper Redhorse relative to YOY of the 4 other redhorse species found in the Richelieu River was influenced by the success of annual artificial spawning operations, rearing success and stocking, with available years showing averages above 3%. However, this indicator cannot be reliably measured through recruitment monitoring until artificial spawning activities have been completed, since intercepting spawners at Saint-Ours dam affects results relative to natural spawning.</p>
<p>Increase in the number and percentage of naturally spawned juveniles enumerated in the Richelieu River</p>	<p>Not met</p>	<p>Because juvenile recruitment was not monitored in 2019 or 2021 and artificial spawning did not occur in 2020, this indicator cannot be fully assessed. However, recent parental assignment analyses indicate that natural spawning occurs annually and that fish used in artificial spawning also participate in natural spawning in the same year, ensuring more genetic mixing in future generations (N. Tessier and N. Vachon, MELCCFP, pers. comm. 2023). This indicator will remain incomplete until artificial spawning activities have concluded.</p>
<p>At least 2 spawning grounds used by the species</p>	<p>Met, ongoing</p>	<p>The species continues to use its 2 known spawning grounds: the Chambly Rapids archipelago and the downstream reach of Saint-Ours dam. Environmental DNA surveys conducted in the Saint-François River (Pierreville) from 2019 to 2021 during the redhorse spawning period detected a strong signal for Greater Redhorse, while signals for Copper Redhorse and River Redhorse were weak (M.-A. Couillard, MELCCFP, pers. comm. 2020).</p>
<p>Increase in the number of individuals inventoried in Lake Saint-Louis, Lake Saint-Pierre, des Mille Îles River and des Prairies River</p>	<p>Not met</p>	<p>Based on the information available, no Copper Redhorse were found in these water bodies between 2019 and 2023.</p>

Performance indicator	Status ⁶	Description of progress
Area (in km ²) of the Copper Redhorse's range maintained	Partially met, underway	The measures implemented to minimize the impacts of development projects, along with offsetting projects and conservation efforts, have maintained the species' range. The extent of the species' occupancy within its range cannot be evaluated due to insufficient monitoring.

1.2 Actions supporting the identification of critical habitat

Critical habitat for the Copper Redhorse was identified in the recovery strategy to the extent possible, using the best available information. Critical habitat provides the features and attributes necessary to support the species' life-cycle functions and achievement of the species' population and distribution objectives. Legal protection of critical habitat for the Copper Redhorse was achieved on May 6, 2021 through the making of a Critical Habitat Order, which triggered the unauthorized prohibition against the destruction of any part of the critical habitat.

The recovery strategy includes a schedule of studies outlining one study to identify additional critical habitat. Table 2 provides an overview of the current status of this study.

Table 2: Status of the implementation of the schedule of studies to identify additional critical habitat for Copper Redhorse for the period 2019 to 2023.

Study	Timeline	Status ⁷	Description of progress
Identify the grass beds in Lake Saint-Pierre, Lake Saint-Louis and in the de la Prairie basin which exhibit the necessary attributes of critical feeding habitat for adult Copper Redhorse	2016	In progress	The Haut-Saint-Laurent and Jacques-Cartier zones d'interventions prioritaires (ZIP) committees used sonar to characterize the aquatic grass beds in Lake Saint-Louis. The data will be analyzed by MELCCFP and will be used to model aquatic grass beds in certain parts of the Copper Redhorse's range.

⁷ **Completed:** the study has been carried out and concluded
In progress: the planned study is underway and has not concluded
Not started: the study has been planned but has yet to start
Cancelled: the planned study will not be started or completed

1.3 Key knowledge gaps and future priorities for the Copper Redhorse

Despite substantial efforts over the reporting period, a number of knowledge gaps remain. There is still insufficient information on the habitats used by larvae and sub-adults as well as on the species' spawning and nursery areas, and threats to the species also remain poorly understood.

The impact of Copper Redhorse bycatch in commercial and recreational fisheries has not been thoroughly assessed and may be underestimated. In addition, the effects of the introduction and spread of aquatic invasive species on the Copper Redhorse remain poorly known, and pollution sources that may affect reproduction require further documentation. Targeted efforts to address these gaps in knowledge on habitat and threats are needed to better inform recovery measures.

Several priorities are emerging for the Copper Redhorse. Reducing threats to the species and its habitats remains a top priority, notably through shoreline protection and revegetation, reduction of contaminant inputs from agricultural, urban and industrial sources, and habitat protection and restoration. The implementation of the Multi-species Action Plan for the Richelieu River Watershed in Canada (DFO 2024), which uses an ecosystem-based approach to address aquatic habitat degradation, is fully aligned with Copper Redhorse recovery priorities.

Ensuring the availability of, and access to, quality habitats is also essential. This includes optimal operation of the Saint-Ours dam and the Vianney-Legendre fishway, as well as strengthening the protection of habitats within the Pierre-Étienne-Fortin and Rivière-des-Mille-Îles wildlife preserves. Continuing assisted reproduction efforts (artificial spawning, rearing, and stocking) remain critical to population recovery and will require updating the reproduction plan to reflect recommendations by Garant and Houle (MELCCFP 2024).

Lastly, rigorous population and habitat monitoring is needed to track changes in the species' status and adapt recovery measures accordingly. Compiling and analyzing data on water quality and the condition of aquatic grass beds across the species' range will facilitate integration of knowledge acquired to date to inform monitoring efforts. These data could support updates to identified critical feeding habitats, including aquatic grass beds in Lake Saint-Pierre, Lake Saint-Louis and La Prairie Basin (DFO 2012).

2 Concluding statement

During the reporting period, progress was made toward implementing the research and management activities identified in the recovery strategy for the Copper Redhorse.

DFO remains committed to the recovery of all aquatic species at risk. The work that has been initiated and completed to date has built a strong foundation for the continued management of the Copper Redhorse. DFO, PC and their partners will continue to work towards the achievement of the population and distribution objectives for the Copper Redhorse, and welcome the participation of additional partners.

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