

IMPACTS OF THE CONTRECŒOEUR PORT TERMINAL EXPANSION PROJECT ON THE COPPER REDHORSE



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A SPECIAL SPECIES AND A VITAL CONSERVATION CHALLENGE

The copper redhorse is a unique and very fragile species of extreme importance to biodiversity because it exists nowhere else on earth apart from in a very small section of the St. Lawrence River and the Richelieu River in southern Quebec. Ever since a sharp-eyed Montreal-area commercial fisherman brought it to the attention of government biologists in 1942,

many studies have been carried out to determine its biology, define its status, and identify and implement effective conservation and restoration measures.

This highly specialized species is the result of hundreds of thousands of years of evolution, and its disappearance would represent an irreparable loss. Since the last Ice Age, the aquatic environments on the planet able to provide adequate habitat for this species and ensure its survival have been ours.

The copper redhorse is considered one of the standard bearers of biodiversity in Quebec and serves as a symbol for raising awareness of the cause of endangered species. The statements and assertions presented in this document are drawn from various official reports produced jointly by federal government scientists, Quebec provincial government scientists and university researchers. They have also been taken from references used to legislate on this species, which is listed as endangered under the Species at Risk Act.

STATUS OF THE SPECIES IN CANADA AND QUEBEC

As established by Lippé, et al. (2006), all the copper redhorse belong to a single population, and as far as is currently known, reproduce only in the Richelieu River. In 1987 the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) designated the copper redhorse as threatened (a species likely to become endangered if limiting factors are not reversed), and in 1999 it became the first wildlife species designated as threatened by the Quebec government. Subsequently, in 2004 COSEWIC assigned it the status of endangered species (a wild species at imminent risk of extinction from the country or from the planet), a status sanctioned in 2007 by the federal government under Canada's Species at Risk Act and still valid in 2021. This status was also maintained during a review by COSEWIC in 2014. Since 2004, after weak natural reproduction was observed, an artificial reproduction and stocking plan was implemented to compensate (in addition to several other conservation measures, including, among others, protecting spawning grounds, constructing a migratory pass on the Richelieu River and reducing incidental catches).



COPPER REDHORSE TERRITORY AND POPULATION SIZE

The global distribution of this species is extremely limited. It is found only in the St. Lawrence River, between Lake Saint-Louis in Montreal and Lake Saint-Pierre in Trois-Rivières, over a distance of about 170 km, as well as in short sections of a few of the St. Lawrence's tributaries - the Prairies. Mille-Îles and Richelieu rivers, the latter being the only known spawning ground for the species. The species does not use the entire range uniformly, but concentrates itself in certain restricted types of habitat that meet its ecological requirements.

Although no study has enabled an estimation of total population size, a study of adult Redhorse passing through the Contrecœur-Lavaltrie segment - that is, excluding those present in the Richelieu River and a few other potential segments - was carried out at the beginning of the 2000s. It quantified the population as including approximately 500 to 1500 fish. Subsequent sampling showed that the number of mature individuals remains extremely low. For example, in comparison to the first years of the artificial reproduction program, there are fewer spawners, the population is aging and few juvenile Redhorse are captured during sampling. Archaeological excavations suggest that the copper redhorse was once more abundant, because it accounted for 16.7% of the specimens of the five species of redhorse identified on an Iroquois occupation site along the west bank of the Richelieu River (1450 to 1550 BC), and it accounted for 9.1% of species identified on the site of an inn in Place Royale in Old Montreal (early nineteenth century). These results are clearly higher than the proportion of 2% to 3% reported during fish inventories taken in Montreal-area waters between 1963 and 1985, and also higher than the 0.04% recorded at the Vianney-Legendre fish pass in the St-Ours Canal on the Richelieu River in the spring of 2003. Furthermore, the copper redhorse was sufficiently abundant in the mid-nineteenth century to have caught the attention of Pierre-Étienne Fortin, considered to be the first Québécois ecologist. Indeed, the species merits a detailed description in the fourth part of his list of fish in the St. Lawrence, published in 1866.

CHARACTERISTICS OF ITS CRITICAL HABITAT IN THE ST. LAWRENCE RIVER

During the 2000s, telemetric monitoring of copper redhorse equipped with a transmitter (20 fish in 2004 and 12 in 2007–2008) made it possible to specify the characteristics of the spring, summer and winter habitats sought by the adult population in the St. Lawrence River corridor and the Richelieu River for growth and nourishment – characteristics such as speed of the current, depth of the water, type of substrate, density of vegetation, presence of prey, etc. Subsequent modelling using these data enabled the mapping of these habitats throughout the territory, resulting in the areas' designation as critical habitat for the species (i.e., habitat essential for survival or recovery) in the recovery strategy submitted in 2012.

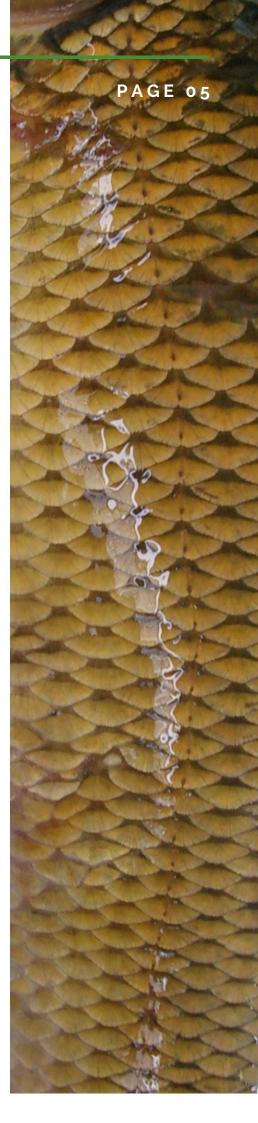
In the river portion, these habitats correspond to shallow aquatic grass beds, with a weak current, a relatively fine substrate and an average to high density of aquatic plants supporting the copper redhorse's favourite food, gastropod molluscs. Notwithstanding these results, the telemetry inventories showed that the redhorse made very little use of the large grass beds in the two fluvial lakes (Saint-Louis and Saint-Pierre).

SCIENCE ADVICE

The preferred habitats are, above all, the aquatic grass beds surrounding the many islands between Verchères and Sorel-Tracy, most of which are in the Contrecœur-Lanoraie sector where the Contrecœur Port Terminal expansion is planned. The available area between Montreal and Sorel, extending across a narrow corridor of only 125 km, is estimated at between 25 and 35 km², depending on the prevailing current. Specialists consider this size insufficient to maintain the population at an optimal level for species recovery, a fact that in itself calls for retaining all existing aquatic grass beds in this sector.

THE COPPER REDHORSE'S HABITAT AND THE CONTRECŒUR PORT FACILITY EXPANSION PROJECT

No one in Canada could imagine that ambient air is the only component of moose habitat or that moose could complete their entire life cycle in agricultural pasture. And yet, water is often seen as the sole component in the habitat of aquatic fauna. This poses an extra challenge to the fair and rigorous analysis of major development projects and to the comprehension, at all levels of decision-making, of the projects' impacts on these environments. One has to be a specialist or a seasoned sport or commercial fisherman to grasp that each fish species (there are over 100 in the fresh waters of the St. Lawrence) has its own requirements, for example, as regards the substrate, depth, temperature, transparency, speed of current, quantity of dissolved oxygen, abundance of vegetation and invertebrates, and presence of obstacle-free migratory routes, and that these requirements may change depending on the stage of the fish's development, from egg to adult. In the case of the copper redhorse, which must make long migrations to reproduce and which mainly feeds on certain types of molluscs, these parameters are even narrower.



The activities permitted during the first phase of the Contrecœur Port Terminal Expansion Project –wharf construction, dredging activities, pipeline installation and the backfilling of sections of the waterway – will result in losses and changes in the habitat for fish and benthic fauna. The total area of aquatic habitats affected by the project will be 23.5 hectares in the fluvial environment, representing a permanent loss of 7.1 hectares of habitat for fish and benthic fauna, plus an additional 16.3 hectares of aquatic habitat that will be disturbed and modified by the dredging planned to develop the approach zone and the mooring area. Finally, to the calculation of fluvial habitat loss can be added 0.1 hectare of aquatic grass located downstream of the wharf, which will be lost due to the wharf and the approach zone modifying the pattern of currents.



The project could also resuspend significant quantities of contaminants. Samples of surface sediment collected in the St. Lawrence River between 2003 and 2010 and analyzed by Environment Canada identified the Contrecœur region as an area heavily contaminated by butyltins, a biocide linked to maritime transport. Levels measured near the current loading dock were between 800 and 1000 ngSn/g - high concentrations similar to those found in contaminated port sites elsewhere in the world. The spatial sampling coverage has, however, been insufficient to determine the full extent of butyltin contamination in the area targeted by the port expansion project. The absence of data on the bioconcentrations of butyltins in aquatic species living in the area also does not allow us to properly assess the impacts of the chemicals on the food chain and on the ecosystem of the Contrecœur region. Thus, the potential toxic effects of the butyltins present in the Contrecœur sector remain unknown. However, these contaminants are recognized endocrine disruptors, and their resuspension in large quantities could aggravate the reproduction difficulties already observed in the copper redhorse.

For the copper redhorse, the first phase of the work, as currently authorized, will result in the loss of 0.9 hectares of aquatic grass beds, which – in shallow waters and exposed to a weak current – serve as feeding grounds in the adult stage. These meadows are legally recognized as part of the copper redhorse's critical habitat, that is, "the habitat necessary for survival or recovery." Additional critical habitat losses of 1.8 hectares and 2.6 hectares are also expected during Phase 2 (in about 25 years) and Phase 3 (in about 50 years) of the Contrecœur Port Terminal development.

Uncertainties remain regarding the impacts on grass beds downstream of the construction zone that are important for the copper redhorse. Increased turbidity in the water column and the deposition of suspended matter in downstream grass beds could also disrupt other parts of the critical habitat. During the construction phase, depending on the dredging method chosen, an area of 330 to 350 hectares of aquatic grasses will be affected by the plume. This area includes a portion of the Îles-de-Contrecœur National Wildlife Area. In addition, the anticipated increase in commercial navigation in the St. Lawrence River, including increases associated with two subsequent phases of port terminal development, could also have a negative impact on aquatic grass beds and riverine ecosystems, especially because of the increase in wave action and the erosion of riverbanks.

Moreover, studies carried out in the St. Lawrence River have shown a significant decrease in macrophytes in recent years. The sharp decrease in grass beds in Lake Saint-Pierre is believed to be one of the causes of the difficulties yellow perch have been encountering in this segment of the St. Lawrence River. Even if the exact causes of the depletion of macrophytes and grass beds are not fully understood, it is likely that inputs of sediments and contaminants are involved.

To reduce the impacts of the project on fish and their habitat – including benthic fauna and the copper redhorse – the developer is proposing that several mitigation measures be applied during the construction phase. The company is also proposing that a 27.7-hectare reserve habitat be developed in the Boucherville Islands to compensate for the permanent loss of 24.6 hectares of fish habitat.

For the copper redhorse, whose needs do not correspond to the characteristics of this reserve habitat, the developer has agreed to create 1.8 hectares of aquatic grass beds to compensate for the permanent loss of 0.9 hectares of critical habitat. In accordance with this proposal, the Government of Canada is asking the developer to design a plan to compensate for this loss of an endangered species' critical habitat and to submit the plan after it has been approved by Fisheries and Oceans Canada and before implementing it.

UNCERTAINTIES REGARDING FISHERIES ACT MEASURES FOR OFFSETTING ADVERSE EFFECTS ON FISH AND THEIR HABITAT

According to the Policy for Applying Measures to Offset Adverse Effects on Fish and Fish Habitat Under the Fisheries Act (https://www.dfompo.gc.ca/pnw-ppe/reviewsrevues/policies-politiques-eng.html), offsetting plans aim to counteract residual adverse effects on fish and fish habitat at a given location and provide measurable benefits to fish and fish habitat. Such compensatory measures may include: i) restoring degraded fish habitat to improve conditions for fish production; ii) improving fish habitat to enhance conditions for fish production, or; iii) creating productive and sustainable fish habitat where none previously existed.

From a scientific point of view, the principle underlying the application of compensatory measures is that they must result in "no net loss" in terms of fish survival and habitat productivity. These measures must therefore counterbalance the effects resulting from works, undertakings or activities - which is to say, they must be proportional to the adverse residual effects resulting from works, undertakings or activities. In a socalled "in kind" compensation approach, affected fish and habitat are replaced with the same quantity and quality of the same type of fish or habitat. Planning of this kind, such as the new grass beds proposed for the St. Lawrence River, is in fact the main offsetting measure proposed by the developer.

With this so-called "in kind" approach, we read on the Fisheries and Oceans Canada website about the Policy for Applying Measures to Offset Adverse Effects on Fish and Fish Habitat Under the Fisheries Act that "balancing the residual adverse effects on fish and fish habitat ... with the benefits resulting from measures to offset is ... uncomplicated." However, in our opinion, nothing is less certain, particularly in the case of the copper redhorse affected by the expansion of the Port of Montreal in Contrecoeur.

On the one hand, the copper redhorse's habitat, the St. Lawrence River, is an extremely dynamic, changing and complex system that makes restoration activities especially challenging. On the other hand, for the copper redhorse – a species endemic to southern Quebec that is highly specialized and adapted to its environment – there are no comparative and convincing examples anywhere in the world, to our knowledge, demonstrating through rigorous analysis that compensatory measures for a species of fish as specialized (and living in a habitat as complex as the St. Lawrence River) have resulted in benefits for the fish and its habitat.

More generally, and despite the laudable principles on which the Fisheries Act is based, it is clear that the fish habitat compensation measures that have been applied in Canada in recent decades have had very mixed success in achieving the principle of no net loss in terms of fish survival and habitat productivity. As an obvious example, the scientific publication by Quigley and Harper (2006) entitled "Effectiveness of Fish Habitat Compensation in Canada in Achieving No Net Loss" reports that nearly two-thirds (63%) of compensation plans have resulted in a net loss of habitat productivity, even with the doubling of the area of new habitat in comparison to that of the habitat destroyed (as recommended by the Port of Montreal).



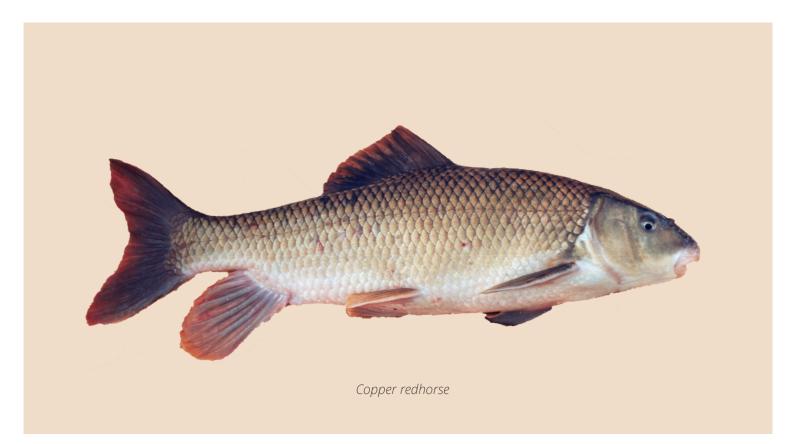
The habitat intended to compensate for the loss of critical copper redhorse habitats should be designed and constructed to include shallow grass beds exposed to a slow current (less than 0.5 m/s) on a bed of silt or sand, and should provide a medium to dense vegetation cover ideally dominated by one to three submerged plant species (Vallisneria americana, Elodea canadensis or Heterenthera dubia) that offer a high density of gastropod molluscs able to benefit from the good supply of light in the relatively clear waters.

This 1.8-hectare grass bed should be able to sustain itself in a narrow section of the St. Lawrence River where flow rates may vary by up to 100% annually and by up to 200% from year to year. The method used to identify, delimit and map the distribution of the copper redhorse's critical habitats in the river corridor between Montreal and Lake Saint-Pierre showed that environments offering all of these conditions are rare and that there are no similar sites other than those listed that combine them all. In other words, to the best of our knowledge, it is not possible to create aquatic grass beds in areas where the conditions are not favourable, and all the areas where favourable conditions exist are already covered with these beds.

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In short, these observations show, in our opinion, that it is simply impossible for the federal authorities to assert that the compensation measures proposed – in particular, the development of an area of aquatic grass bed twice that of the area destroyed – will make it possible to achieve the principle of proportionality to the harmful residual effects resulting from works, undertakings or activities. On the contrary, the available evidence in the scientific literature indicates that fish habitat compensation measures applied in Canada generally result in a net loss of habitat productivity. It should be remembered that despite the existence of legislation such as the Fisheries Act and the Species at Risk Act, 56% of the unique species or populations of freshwater fish in Canada are at risk, and that Canada has already lost 13 species and 62 more are threatened with extinction.

The great complexity of the St. Lawrence River ecosystem, coupled with the very specialized biology of the copper redhorse (especially the habitat required in the adult phase) suggest, therefore, that the likelihood of success of the proposed compensation measures is, at best, very weak and the advantages of those measures, if any, difficult to calculate. In addition, the time factor must be taken into account, given that any habitat compensation measure using bioengineering involves a considerable delay in years before potentially yielding noticeable results in the functionality and productivity of managed habitats. Such delays in evaluating the compensation measures' probability of success are unacceptable in the case of the copper redhorse, a species for which there is only one population, a population already on the brink of extinction.



CONCLUSION

It is our opinion that the negative impacts on the copper redhorse of the Contrecœur Port Terminal Expansion

Project are underestimated and that the benefits of the measures proposed to compensate for the loss of critical habitat are speculative - hypothetical, at best.

The development would, however, have significant impacts on the critical habitat of the copper redhorse and, furthermore, they would occur in the heart of its range. Part of the critical habitat, the species' food supply, would be permanently destroyed. The construction phase would also lead to the resuspension of significant amounts of sediment and contaminants that could affect the species' reproduction, cause the destruction of aspects of other areas of critical habitat downstream and disturb individual members of the species. Finally, the increase in maritime transport in this region would have chronic negative impacts on critical habitat and on individuals. The Policy for Applying Measures to Offset Adverse Effects on Fish and Fish Habitat Under the Fisheries Act may prove to be an appropriate decision-making framework for a common species and in the discretionary context of the Fisheries Act. However, in this case, the fundamental issue is the protection of an endemic, endangered species listed in the Species at Risk Act. It is imperative that science and the precautionary principle continue to guide the implementation of this law, especially for a species that has only one population. We do not have the luxury of being wrong in this case.

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PAGE 13

In the Canadian Impact Assessment Registry, the documents concerning the Contrecœur Port Terminal Expansion Project may be found at the following link:

https://iaacaeic.gc.ca/050/evaluations/proj/80116?culture=fr-CA

We focused mainly on the following documents:

- Déclaration de décision Émise aux termes de l'article 54 de la Loi canadienne sur l'évaluation environnementale (2012) [Decision statement issued under section 54 of the Canadian Environmental Assessment Act (2012)] - Document 206: https://iaacaeic.gc.ca/050/documents/p8
 0116/138167F.pdf
- Rapport d'évaluation environnemental version finale, document 205
 [Environmental Assessment Report Final Version, Document 205]:
 https://iaacaeic.gc.ca/050/documents/p8
 0116/138166F.pdf
- Deuxième avis du gouvernement du Québec [Second announcement from the Government of Quebec] - Document 152: https://iaacaeic.gc.ca/050/documents/p8
 0116/136894F.pdf
- Premier avis du gouvernement du Québec [First announcement from the Government of Quebec] – Document 120: https://iaacaeic.gc.ca/050/documents/p8
 0116/122848F.pdf (see 9.7.2 especially)
- Deuxième avis du ministère des Pêches et des Océans [Second announcement from the Department of Fisheries and Oceans] – Document 139: https://iaacaeic.gc.ca/050/documents/p8
 0116/136106F.pdf

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Montréal, Québec et Trois-Rivières, le 17 mars 2021

Objet : Analyse de la demande de permis des travaux du Projet d'agrandissement du terminal portuaire de Contrecœur en vertu de la Loi sur les espèces en péril

Madame la ministre, monsieur le ministre,

C'est avec une vive inquiétude que nous nous adressons à vous aujourd'hui en tant que groupe de scientifiques ayant à cœur la sauvegarde des espèces en voie de disparition, dont le chevalier cuivré (*Moxostoma hubbsi*).

Vous trouverez en pièce jointe un avis scientifique que nous avons produit à votre intention. Le moment de prendre connaissance de cet avis ne saurait pas être plus opportun ni plus urgent ; la demande d'autorisation des travaux en vertu de la Loi sur les espèces en péril du Projet d'agrandissement du terminal portuaire de Contrecœur est entre vos mains, toute comme l'acceptation ou le refus des mesures de compensation proposées par le promoteur du projet pour la destruction d'une partie significative de l'habitat essentiel du chevalier cuivré.

À la lumière de nos connaissances sur l'espèce, son habitat et son déclin des dernières décennies, nous avons analysé les impacts probables découlant de la construction de cette grande infrastructure portuaire. Les conclusions de notre avis sont claires : les perspectives qui s'offrent à nous n'ont rien de rassurant, les avantages des mesures de compensation pour la perte d'habitat essentiel demeurent spéculatifs, et au mieux, hypothétiques. L'avenir de la seule population de chevaliers cuivrés semble plus compromis que jamais.

Nos observations, étalées sur plusieurs années de recherche, démontrent que les travaux d'agrandissement du terminal portuaire de Contrecœur s'effectueraient au cœur même de l'habitat unique du chevalier cuivré. Le mot unique revêt ici un sens absolu. La répartition mondiale de cette espèce est extrêmement limitée. On la trouve seulement dans le fleuve Saint-Laurent, entre le lac Saint-Louis à Montréal et le lac Saint-Pierre à Trois-Rivières, sur une distance d'environ 170 km, ainsi que dans de courtes sections de quelques-uns de ses tributaires, les rivières des Prairies, des Mille îles et Richelieu, cette dernière étant le seul lieu de reproduction connu de l'espèce.

L'agrandissement du port entraînerait des perturbations majeures et permanentes à l'habitat essentiel du chevalier cuivré. Comme nous le notons dans notre avis, les activités de dragage, la construction du quai, la mise en place de canalisations et le remblayage de certaines sections de cours d'eau entraîneront des pertes et des modifications de l'habitat du poisson et de la faune benthique, la remise en suspension des contaminants accumulés depuis longtemps dans les sédiments, et la modification du patron des courants dans des herbiers où le chevalier cuivré se nourrit.

Nous arrivons à la conclusion qu'il est difficile, voire impossible de remplacer cet habitat unique, et que les mesures de compensation mises de l'avant par le promoteur ont très peu de chances de donner le résultat escompté. La population des chevaliers cuivrés verrait ainsi ses chances de rétablissement considérablement réduites.

L'application de mesures visant à compenser les effets néfastes sur le poisson et son habitat en vertu de la Loi sur les pêches peut s'avérer appropriée pour une espèce commune. Ce n'est pas le cas du chevalier cuivré. Devant le risque de priver les générations futures d'une espèce unique sur Terre et qui n'existe que dans une toute petite section du fleuve Saint-Laurent, nous vous demandons d'appliquer rigoureusement la Loi sur les espèces en péril, dernier rempart pour empêcher la destruction de l'habitat essentiel du chevalier cuivré.

Nous vous prions, madame la ministre, monsieur le ministre, de prendre connaissance de notre avis scientifique. En espérant avoir l'opportunité d'en discuter en profondeur avec vous dans un futur rapproché, nous vous prions d'agréer l'expression de nos sentiments les plus cordiaux.

Respectueusement,

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C.c. Mr. Pierre Dufour

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Montréal, Québec and Trois-Rivières, March 17th, 2021

Re: Scientific opinion - Issuing of a permit under the Species at Risk Act for the Contrecœur Port Terminal Expansion Project

Dear ministers Jordan and Wilkinson,

We are writing to you today as a group of scientists concerned about saving endangered species, including the Copper Redhorse (Moxostoma hubbsi).

You will find attached a scientific opinion that we have produced for you. The time to read this notice could not be more timely or more urgent; the application for authorization of the work under the Species at Risk Act of the Contrecœur Port Terminal Expansion Project is in your hands, as is the acceptance or refusal of the compensation measures proposed by the proponent for the destruction of a significant portion of the critical habitat of the Copper Redhorse.

Based on our knowledge of the species, its habitat, and its decline in recent decades, we have analysed the likely impacts arising from the construction of this major port infrastructure. The conclusions are clear: the benefits of the compensation measures for the loss of critical habitat remain speculative, at best hypothetical. The future of the copper redhorse population alone appears to be more compromised than ever.

Our observations, spread out over several years of research, show that the port terminal expansion work in Contrecœur would take place at the very heart of the Copper Redhorse's unique habitat. The word unique must be understood here in its full sense. The worldwide distribution of this species is extremely limited. It is found only in the St. Lawrence River, between Lake St. Louis in Montreal and Lake St. Pierre in Trois-Rivières, over about 170 km, as well as in short sections of some of its tributaries, the Des Prairies River, the Mille-Îles River and Richelieu River, the latter being the only known breeding ground for the species.

The expansion of the port terminal would result in major and permanent destruction to the Copper Redhorse's critical habitat. As noted in our opinion, dredging activities, the construction of the wharf, the installation of pipes and the filling of certain sections of the waterway will result in the loss and modification of fish and benthic fauna habitat, the resuspension of contaminants that have accumulated for a long time in the sediments, and the modification of the current pattern in the grass beds where the Copper Redhorse feeds.

We conclude that it is difficult, if not impossible, to replace this unique habitat, and that the compensation measures proposed by the proponent are highly unlikely to produce the desired result. The Copper Redhorse population would thus see its chances of recovery considerably reduced.

The application of measures to compensate for adverse effects on fish and fish habitat under the Fisheries Act may be appropriate for a common species. This is not the case for the Copper Redhorse. Faced with the risk of depriving future generations of a species that is unique on Earth and exists only in a very small section of the St. Lawrence River, we ask you to rigorously apply the Species at Risk Act, which is the last line of defence to prevent the destruction of the Copper Redhorse's critical habitat.

Minister Jordan, Minister Wilkinson, please take note of our scientific opinion. We hope to have the opportunity to discuss it in depth with you in a near future.

Sincerely,

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