

# Shared Values, Shared Success: Remediating Endangered Lamprey Habitat in British Columbia

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**ABSTRACT:** Stream remediation was undertaken at two impassable fish obstacles in Morrison Creek in Courtenay, British Columbia. These barriers were identified as impassable to the endangered Morrison Creek lamprey (*Lampetra richardsoni* variety *marifuga*) and a seasonal impediment to the movement of salmonids. The success of this remediation was not only in the removal of barriers to lamprey but in balancing the needs of multiple species of differing and sometimes conflicting habitat requirements. Community engagement was also a key outcome of the remediation with increased awareness of the protected lamprey species, hands-on interaction with stream remediation activities and the interaction and cooperation with landowners. What remains to be determined is if these remediation activities can slow or reverse the decline observed in catches of Morrison Creek lamprey.

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**Keywords:** Lamprey; habitat; endangered species, British Columbia

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In Courtenay, British Columbia in a small creek approximately 24 km long (Wade et al. 2015) exists a biological enigma (Beamish et al. 2015), the Morrison Creek lamprey (*Lampetra richardsoni* variety *marifuga*). This small, 114-124 mm (silver form) (Beamish 2013) parasitic lamprey is a distinct form of the western brook lamprey (*Lampetra richardsoni*) found only in Morrison Creek and its tributaries (National Recovery Team for Morrison Creek Lamprey 2007). It has been proposed by Youson (2004) that Morrison Creek lamprey may represent a step

in the evolution of lampreys. One explanation may be that Morrison Creek lamprey is an intermediate stage in the evolution of *L. richardsoni* from the parasitic anadromous *L. ayresii* (Wade & Beamish 2014). Understanding Morrison Creek lamprey may lead to the understanding of how lamprey have survived for over 300 million years.

The extreme endemism and a unique life history led this animal to being assessed as endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in 1995 and its subsequent protection under Canada's Species at Risk Act (SARA) (National Recovery Team for Morrison Creek Lamprey 2007).

Morrison Creek lamprey inhabit an urban creek which is supplied water through underground sources located in the headwaters of Morrison Creek (Wade et al. 2015). It is believed these underground sources may include bodies of water such as Comox Lake, First Supply Creek and Nellie Creek (Wade et al. 2015). This urban creek is not unlike other urban bodies of water; it is bordered by private land, parks, schools and industrial sites. The Morrison Creek watershed is home to a diversity of species including large mammals such as black bear (*Ursus americanus*) and Roosevelt elk (*Cervus elaphus roosevelti*), amphibians and crustaceans, most notably signal crayfish (*Pacifastacus lenisculus*) (Wade et al. 2015). In addition to western brook lamprey (*L.*

*richardsoni*) and Morrison Creek lamprey, fish species present in Morrison Creek include Pacific lamprey (*Entosphenus tridentatus*), coho salmon (*Onchorhynchus kisutch*), pink salmon (*O. gorbuscha*), chum salmon (*O. keta*), cutthroat trout (*O. clarkii*), rainbow trout (*O. mykiss*) and threespine stickleback (*Gasterosteus aculeatus*) (Wade et al. 2015). It is believed this complex environment has somehow provided for the existence of Morrison Creek lamprey, what conditions they may be are unknown, however, what we can describe are the current physical and biological conditions.

Although Morrison Creek lamprey were first discovered in the late 1970s and first described in 1987 (Beamish 1987) no research was conducted again until 2011. Little is known about the abundance of lamprey in Morrison Creek however based on differences in catch rates from trapping activities from the late 1970s to the late 1980s compared to similar trapping activities in 2011 and 2012, catch rates have declined (Wade & Beamish 2014; Beamish 2013). Understanding that there are many single and cumulative reasons for the decline in any fish population compounded by the fact that we do not know what regulates the expression of the Morrison Creek lamprey form, limiting factors associated within the watershed were explored. Physical barriers to fish movement with the potential for habitat fragmentation were discovered in several locations (Wade & Beamish 2014). As the negative effects of habitat fragmentation or discontinuity on anadromous or potamodromous fish species can range from disruption of migration to localized extinction (Beamish & Northcote 1989; Baras & Lucas 2001; McLaughlin et al. 2006) the remediation of the barriers was recommended and undertaken.

Two barriers, a hung culvert and a defunct salmon weir (Figure 1a, b respectively) were identified as impassable by Morrison Creek lamprey (Wade & Beamish 2014). Because these lamprey reside in an environment which is important to multiple species which would benefit from remediation of these barriers, funding was requested from various

sources. Funding was secured from three sources: Environment Canada's Habitat Stewardship Program (HSP) for species at risk, the Habitat Conservation Trust Fund (HCTF) and British Columbia Hydro's Fish and Wildlife Compensation Program (FWCP). In addition, in-kind contributions were made by Island Valley Farms, Timberwest, Fisheries and Oceans Canada, Fundy Aqua Services Inc. and the Morrison Creek Streamkeepers. In 2015, stream remediation activities were undertaken in early fall (Figure 2a,b), recognizing the need to take into consideration the ecological sensitivities of both spawning lamprey and returning pink salmon.

The project has proven to be a success in many ways. An incredible amount of community involvement and engagement resulted from this work with volunteers of all ages ready and willing to commit hands-on time to the rehabilitation work. There was the cooperation of local residents through access to land and engagement of individuals and funders via guided watershed walks. This remediation project has provided a platform to increase awareness of a protected species as well as the importance of balancing the needs of multiple species (including humans) in a complex ecosystem.

Physically, sensitive areas of the river have now been ameliorated which will aid in reducing sedimentation, an issue of high importance for salmonids. Within days of completing the remediation work, pink salmon were observed swimming up Morrison Creek and were found in the upper headwaters where they had not been seen before by local residents (Jim Palmer, Personal Communication 2015). The next measure of success will be to determine if lamprey can move freely within their range and whether these efforts can slow or reverse the decline in numbers as observed through trapping.

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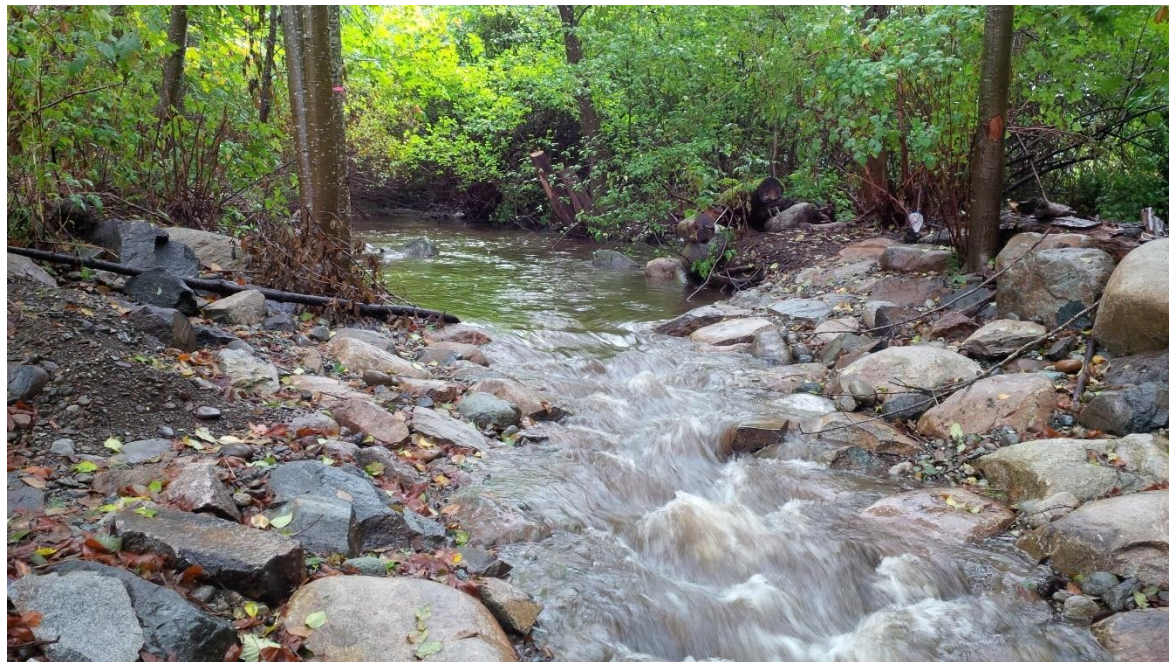
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**Figure 1:** Photograph of impassable barriers to Morrison Creek lamprey taken in spring 2013.

Pictured left: Hung-culvert

Pictured right: Defunct salmon weir



**Figure 2:** Photographs of remediated areas of Morrison Creek (fall 2015).

Picture above: Remediated culvert

Picture below: Remediated location of salmon weir.