

Identification of Range Extent of the Morrison Creek Lamprey (*Lampetra richardsoni* var. *marifuga*) in Canada

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ABSTRACT: In 2014, preliminary surveys were undertaken to assess the extent of distribution of lamprey in the headwaters of Morrison Creek in Courtenay, BC. In support of the identification of critical habitat of Morrison Creek lamprey (*Lampetra richardsoni* var. *marifuga*), further studies were undertaken in June and July 2015 to determine if adult lamprey were present in the headwaters. Until this time, they had only been observed in the main stem of the creek. Over the 23 days of trapping, 176 lampreys were caught and measured, 15 of which were adult *L. richardsoni* variety *marifuga*. This information confirms the increased expansion of the previously reported distribution of *L. richardsoni* variety *marifuga* within the Morrison Creek watershed.

Keywords: lamprey, conservation, range, distribution, Morrison Creek

Introduction

Morrison Creek lamprey, *Lampetra richardsoni* variety *marifuga* are present only in Morrison Creek in Courtenay, British Columbia (National Recovery Team for Morrison Creek Lamprey 2007); it is a variety of western brook lamprey (*L. richardsoni*). In 1995, this species was assessed as Endangered by COSEWIC and is currently protected under the Canadian *Species at Risk Act* (SARA). Very little information is known about the biology, status and

extent of range of this population of lamprey. However, in recent years, efforts have been made to address some of these basic science questions and inform the protection and management of the population as reflected in the recovery strategy (National Recovery Team for Morrison Creek Lamprey 2007), specifically, the determination of abundance and distribution of the species.

In 2014 and 2015, in conjunction with Hancock Forest Management, surveys were undertaken to begin determining the extent of distribution of lamprey in the headwaters of Morrison Creek; specifically within the company's property (Wade and MacConnachie 2014). Previous surveys focused on areas of the creek within the city of Courtenay with limited efforts elsewhere (Beamish 1987, Beamish 2013, Wade and MacConnachie 2014).

In 2014 passive milk crate traps (Wade and MacConnachie 2014) were installed and monitored on Hancock Forest Management land for ammocoetes and recently metamorphosed lamprey. Because it is not possible to distinguish between *L. richardsoni* and *L. richardsoni* var. *marifuga* at either of these stages, areas identified as successful trapping locations in 2014 were further studied in 2015 using a different type of trap in order to determine if *L. richardsoni* var. *marifuga* were present in this headwater region.

Methods

Following the methods described in Wade and MacConnachie (2014) three in-stream, flow through traps were installed in the upper reaches of Morrison Creek. All traps were installed in the main stem of Morrison Creek (Figure 1) and contained HOBO TidbiTv2 temperature data loggers to record water temperatures. Trap site selection required the presence of a mix of sandy/silty habitat where the trap could be buried in the sediment, such that the inflow pipe was submerged. Moderate stream flow is required to move fish toward the mouth of the intake pipe. Traps were installed in early summer when *L. richardsoni* var. *marifuga* are known to be in or near spawning condition (Beamish 2013).

Traps were checked daily until their removal on July 6, 2015. Traps were removed earlier than planned due to extreme fire hazard and drought conditions. Any non-lamprey species were identified, enumerated and released downstream of the trap. Lamprey were removed from the trap with a small dip net and placed in an anesthetic bath (100-125 ppm tricaine methanesulfonate). Once fish were sedated, they were removed from the bath, identified (*L. richardsoni* or *L. richardsoni* var. *marifuga*), identified to stage of development, and measured for total length. After sampling, they were placed in a recovery bucket with creek water. Once completely recovered they were returned to the creek, downstream of the trap.

Results

Three traps were fished for a total of 69 trapping days from June 13 to July 6, 2015 (Figure 2). A total of 176 lamprey were captured (Table 1), 156 *L. richardsoni*, 5 ammocoetes and 15 *L. richardsoni* var. *marifuga*. Lamprey were captured each day throughout the sampling period (Figure 2).

	Trap 1	Trap 2	Trap 3	Total
<i>L. richardsoni</i>	13	138	1	152
<i>L. richardsoni</i> var. <i>marifuga</i>	4	11	0	15
Ammocoete	2	1	2	5
Total	19	150	3	172

Table 1: Lamprey catches in the headwaters of Morrison Creek in 2015.

L. richardsoni var. *marifuga* ranged in length from 9.8 to 15.6 cm (N=15) and a mean of 12.06 cm (Figure 3). *L. richardsoni* ranged in length from 8.9 to 14.5 cm (N=156), mean length of 11.17cm. Ammocoetes ranged from 6.2 to 11.6 cm in length (N=5), with mean of 9.4cm.

Discussion

This survey was undertaken to determine the presence and extent of the range of *L. richardsoni* var. *marifuga* in the headwaters of Morrison Creek. This information is important in that it increases our knowledge of distribution of *L. richardsoni* var. *marifuga* within the Morrison Creek watershed that was previously only known to occur in the lower reaches of the creek within the boundary limits of the city of Courtney. The results will inform Hancock Forest Management land planning. This work also supports the recent recommendations for critical habitat for this species (Wade et al 2015).

Acknowledgments

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References

Beamish, R. J. 1987. Evidence that parasitic and nonparasitic life history types are produced by one population of lamprey. *Can. J. Fish. Aquat. Sci.* 44: 1779-1782.

Beamish, R. 2013. A summary of the early field studies of the Morrison Creek lamprey and a new assessment of its taxonomy. *Can. Tech. Rep. Fish. Aquat. Sci.* 3031: iv + 36 p.

National Recovery Team for Morrison Creek Lamprey. 2007. Recovery strategy for the Morrison Creek Lamprey (*Lampetra richardsoni* var. *marifuga*) in Canada. Species at Risk Act Recovery Strategy Series, Fisheries and Oceans Canada

Wade, J., and S. MacConnachie. 2014. Summary of Morrison Creek Lamprey (*Lampetra richardsoni* variety *marifuga*) trapping studies 2011-2014. *Can. Manusc. Rep. Fish. Aquat. Sci.* 3047: iv + 14p.

Wade, J., N. Pinnell, G. Kosminder, and S. MacConnachie. 2015. Information to support the identification of critical habitat for the Morrison Creek Lamprey (*Lampetra richardsoni* var. *marifuga*). DFO *Can. Sci. Advis. Sec. Res. Doc.* 2015/031. v + 24 p.

Figures

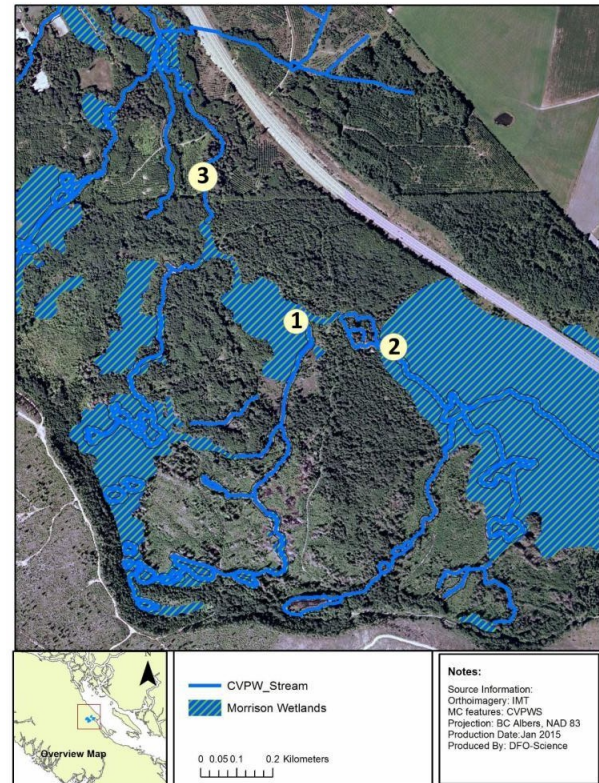


Figure 1: Trap locations in the Morrison Creek headwaters within Hancock Forest Management property for the 2015 survey. Traps identified as 1-3 corresponding to results presented in Table 1.

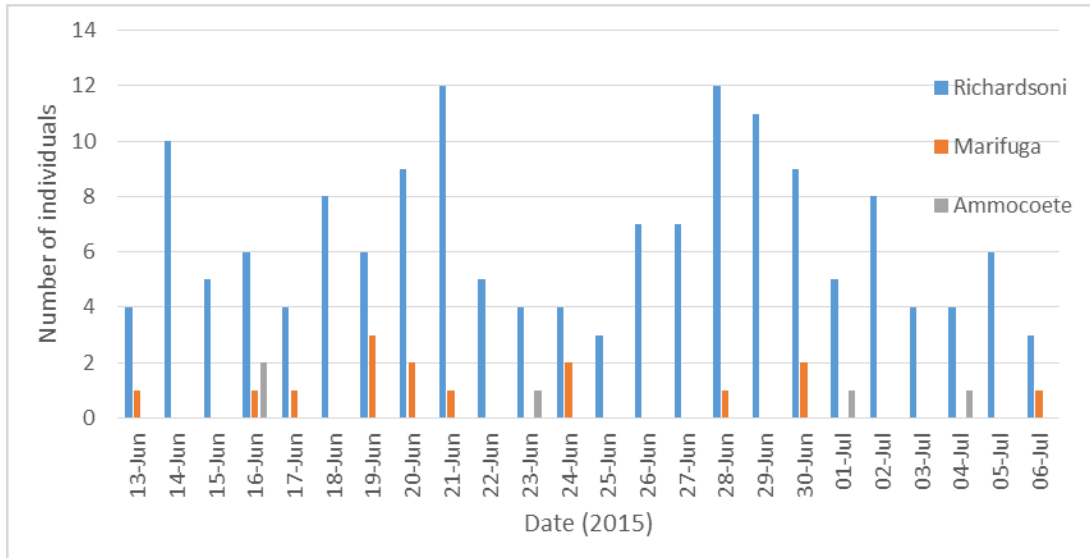


Figure 2: Daily capture rates of *L. richardsoni*, *L. richardsoni* var. *marifuga* and ammocoetes in Morrison Creek headwaters in 2015.

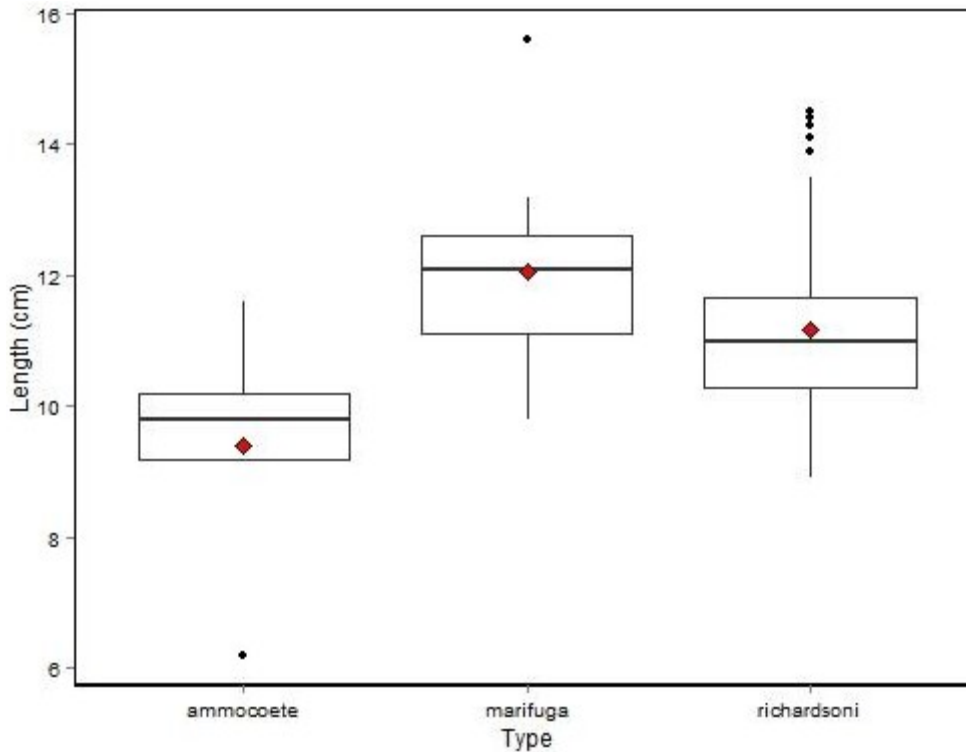


Figure 3: Length distribution of *L. richardsoni* var. *marifuga*, *L. richardsoni* and ammocoetes from the headwaters of Morrison Creek 2015. Red diamond= mean, black lines in the boxes show the median, upper and lower limits of boxes represent 75th and 25th percentiles respectively, whiskers represent highest and lowest values within the 75th and 25th percentiles, and dots are outliers.