Richfield Creek Riparian Fencing

Installation Report

2021

Prepared For:

Department of Fisheries and Oceans Canada

&

Society for Ecosystem Restoration in Northern British Columbia

Prepared By:

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Northwest Research and Monitoring Ltd.

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Figures & Tables

1 Introduction

Between November 26 and December 14, 2021, 1100 m of riparian exclusion fencing was installed along a portion of lower Richfield creek in the upper Bulkley watershed to exclude cattle from sensitive riparian areas along the corridor. Funding for this project was provided by the Department of Fisheries and Oceans Canada, the Society for Ecosystem Restoration in Northern British Columbia (SERNBC), and Hatch Creek Ranch Ltd.

Al Irvine (New Graph Environment) and other consultants identified the need for improved fencing along Richfield Creek while working on other restoration work there in 2021. In combination with restoration work completed by the Morice Watershed Monitoring Trust (MWMT) in 2021, this project created a substantial amount of high value riparian habitat along an important salmon bearing stream in the Bulkley River watershed.

Proceeding sections of this report detail what was done along Richfield Creek, including some analysis of habitat area created/protected, costs of fencing and recommendations for future research/monitoring. Information from this project is intended to inform future work of a similar nature in this region, including potential costs and potential gains for habitat restoration in northern British Columbia.

2 Background

The Morice Watershed Monitoring Trust (MWMT) received $500,000 during 2021 from the British Columbia Healthy Watersheds Initiative (HWI) for low-tech restoration in the upper Bulkley River watershed and indigenous employment. Years of collaborative work in the watershed facilitated through the Upper Bulkley Round Table (UBR), identified numerous problem areas in need of stabilization and restoration. Strong relationships with local landowners fostered by A Rocha Canada provided the foundation for collaborative restoration work in the watershed. A total of ten sites on more than six different parcels of private land received various low-tech restoration work in 2021.

Three of these sites are located along lower Richfield Creek owned by Hatch Creek Ranch Ltd. (Roger and Lana Groot). Appendix B includes a series of maps detailing the location and nature of the works performed along Richfield Creek as part of the MWMT-HWI project. Restoration works along Richfield Creek included:

- Stabilization of ~ 90 m of stream bank
- Installation of ~ 200, 15-20 cm diameter vertical posts for stability
- Live staking of over ~500 dormant stems of willow and cottonwood
- Planting of ~2500 rooted willow plugs from nursery stock

2.1 Project Site – Lower Richfield Creek

Fencing was installed along a section of Lower Richfield Creek, located approximately 3 km west of Topley BC along Highway 16 in west central BC (Figure 1). Richfield Creek is a direct tributary to the Bulkley River and provides habitat for numerous fish species including several salmonids (e.g., Oncorhynchus kisutch). Richfield Creek through the project area is bound on the eastern bank by a residential subdivision and on the western bank by hay fields owned by Hatch Creek Ranch Ltd.

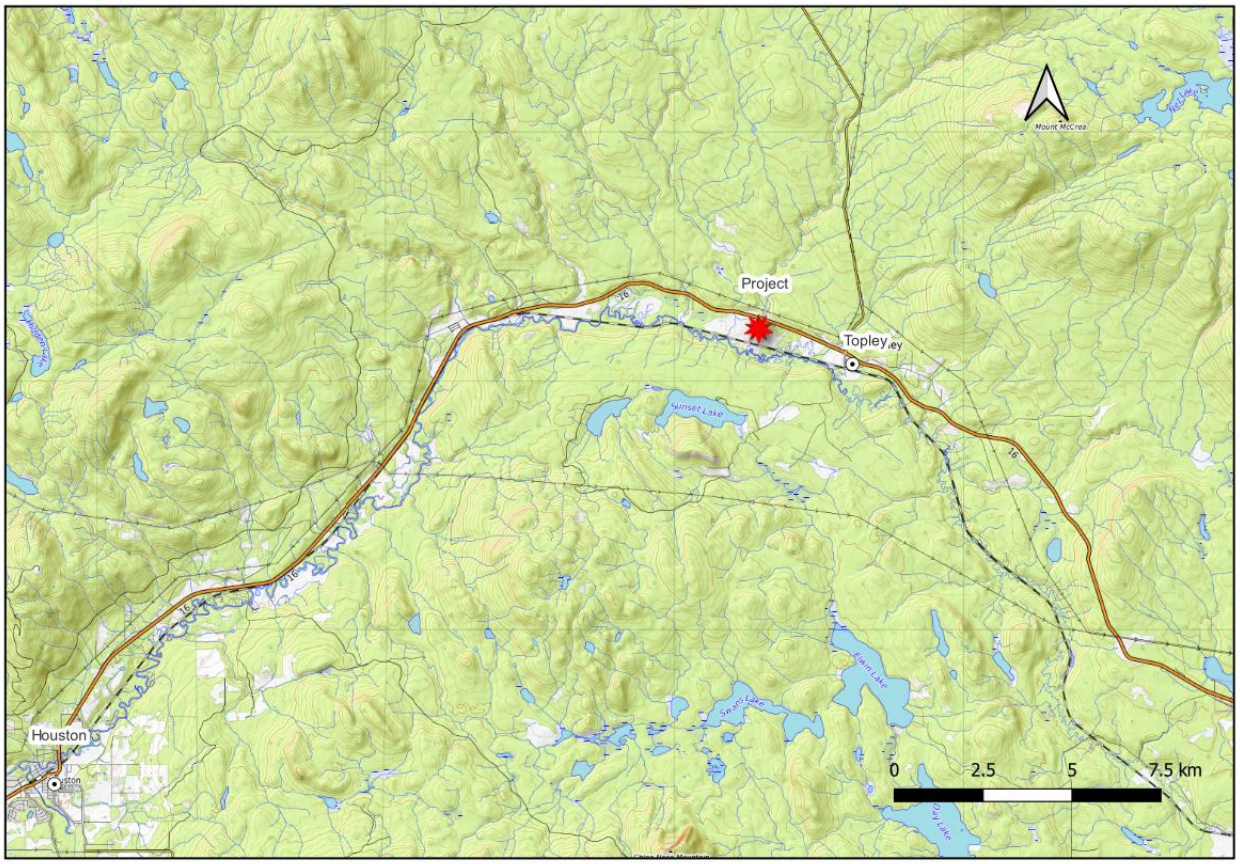

Figure 1: Fence line project location relative to surrounding landmarks.

2.2 Project Rationale

Much of the riparian zone along the eastern boundary of Richfield Creek is heavily degraded or absent and the stream has nowhere to move in that direction due to the homes and private land there. Along the western bank is mostly a well forested riparian zone bordering hay fields owned by Hatch Creek Ranch Ltd. Mature black cottonwood (*Populus trichocarpa*) tower over the western zone and exist in a corridor ranging in width, but regularly exceeding 30 m from the water's edge. Due to poor placement of historic fencing very close to Richfield Creek (Table 1), much of the understory vegetation and spruce have been eliminated from this zone due to the presence of cattle. In addition, in several places the historic fence line was lost to erosion from Richfield Creek into the adjacent hay fields. An inadequate riparian zone existed as a result of poor fence line placement historically (Figure 2 & Appendix A).

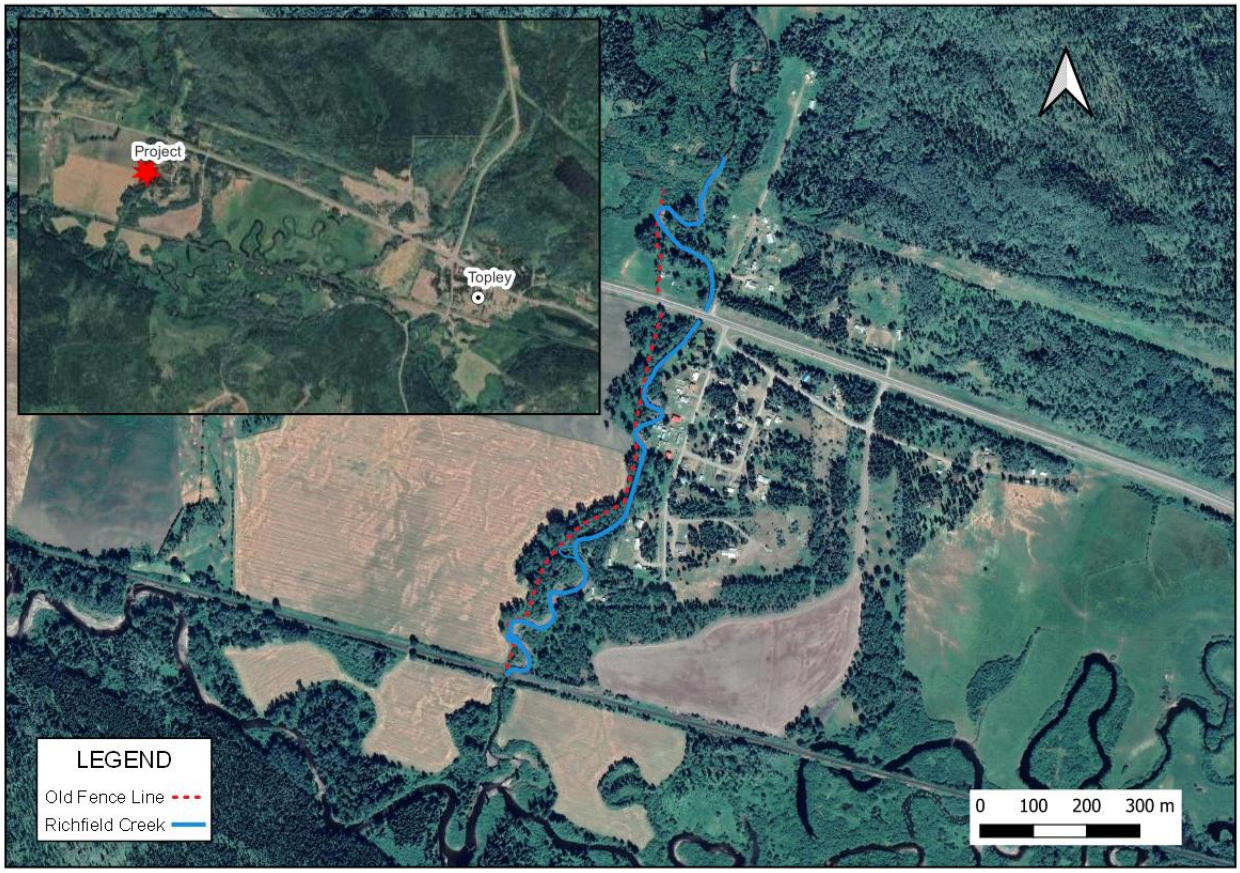

Figure 2: Project overview showing Richfield Creek with existing riparian zone and historic fence line.

Figure (3) below is a photo from one section of the riparian zone documenting the lack of understory vegetation due to livestock damage. Note the presence of a thick understory and numerous spruce adjacent to the old fence line in the excluded area compared to the foreground where cattle are present. What we noticed most was the impact to the shrub layer and lack of replacement trees for the sustainability of the riparian zone. Conifers are conspicuously absent along the western edge of the historic fence line as a result of damage from cattle.

Figure 3: Photo along historic fence line showing healthy riparian zone on left and results of cattle pressure on right.

Areas of active erosion into the adjacent fields was addressed during the fall of 2021 using a series of low-tech restoration techniques to both stabilize and revegetate the various problem sites. Additionally, as a result of this fencing project, we decided to plant approximately 2500 rooted willow seedlings along a large section of riparian zone now protected from cattle by the new fencing. This planting occurred under the mature black cottonwood trees and is detailed in Figure (10) in Appendix B. Fencing this area protected the significant restoration work already completed in by the MWMT-HWI project, while at the same time drastically expanding and improving the area of the riparian zone along Richfield Creek.

3 Results and Analysis

3.1 Overview

Approximately 1100 m of new four strand barbed wire fencing was installed to the west of Richfield Creek between November 26 and December 14, 2021. Figure (4) shows a representation of the new fencing installed on site.

Figure 4: Representative photo of new fence line.

Old fencing, including the posts and old wire were removed from the new riparian corridor and disposed of. Table (1) details some basic stats from the fence line project, comparing the historic fence and the new fence in terms of length and distance from Richfield Creek.

Table 1: Comparison of new and historic fence lines in terms of length and riparian set back.

	Total Length	**% < 15 m to stream**	**% ≥ 20 m to stream**	**% ≥ 30 m to stream**
Old Fence Line	987	45	40	30
New Fence Line	1104	0	92	54

Figure (5) illustrates the improvement of the riparian corridor along one section of Richfield Creek; a 15 m buffer was added to Richfield creek to illustrate how much of the old fence line was within the 15 m riparian corridor. Appendix (A), includes a series of maps illustrating the riparian improvement as a result of new fencing for the entire project site.

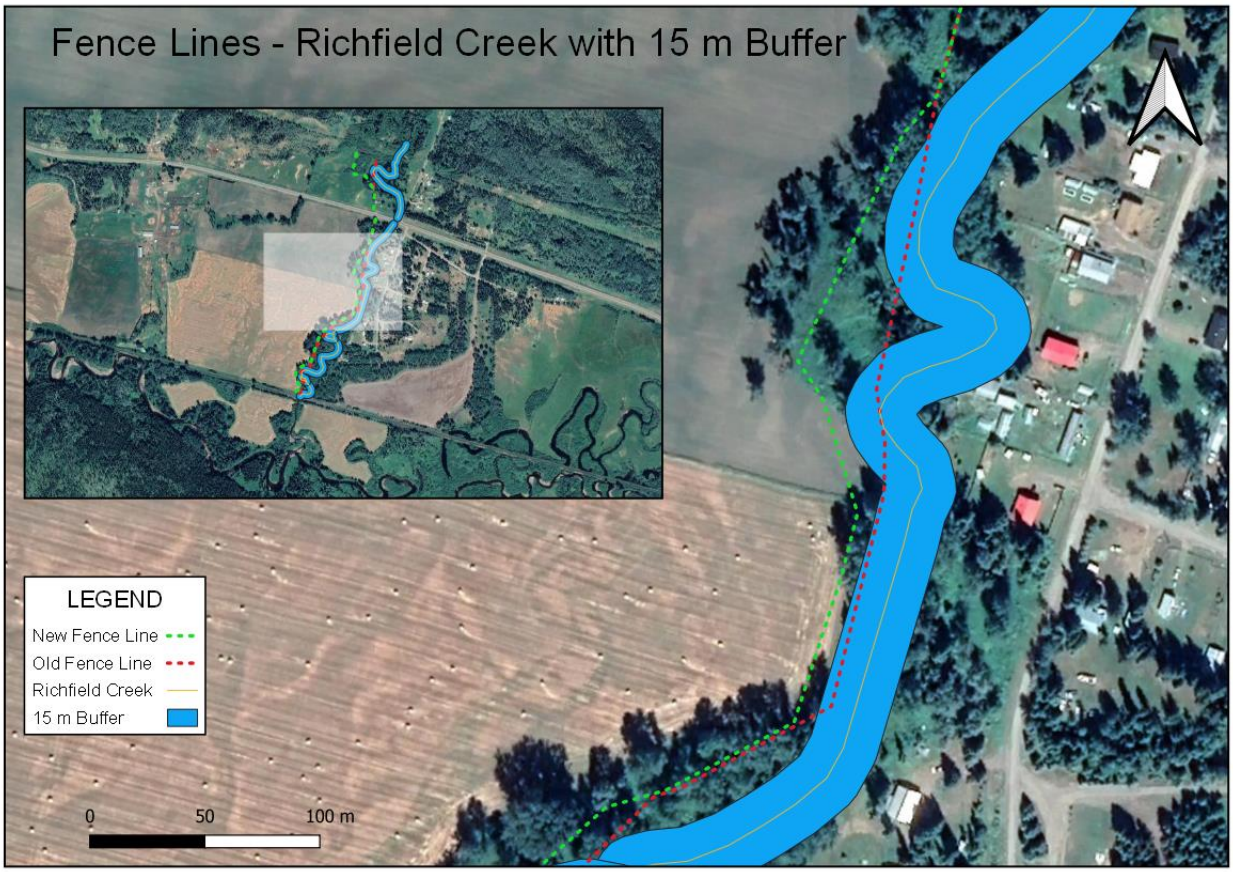

Figure 5: Map showing Richfield Creek with 15 m buffer and old and new fence lines overlayed in central part of project area.

3.2 Riparian Benefits

As outlined in Section (2) of this report, considerable resources were applied to eroding banks in three distinct areas along lower Richfield Creek (Appendix B). Installation of this new fencing protected those investments while increasing the protected riparian zone along the western side of Richfield Creek to over 4 ha.

3.3 Route Selection

Specific route selection for the new fence was determined after discussions with the landowner and included a number of considerations, including:

- Maintenance of a minimum setback of 15 m from Richfield Creek;
- Avoidance of difficult terrain features (avoiding gullies etc.);
- Minimizing the amount of disturbance required to access potential fence line with post pounder and tractor; and
- Operational considerations for Hatch Creek Ranch Ltd.

New fence was routed under existing mature cottonwood forest in many places to reduce the overall length of fencing and to avoid damage to fencing from haying equipment along highly undulating field edges such as those in the southern portion of the project area. Final route selection included establishing control points along the potential line where the line approached

the 15 m minimum setback. These sites were measured in the field to ensure the new fence was a minimum of 15 m from the top of the western bank of Richfield Creek. Riparian set back distances were maximized to the extent practicable provided the considerations outlined above.

3.4 Costs

Our total costs to install 1100 m of new fence was just over $19,000.00, a cost of just over $17/m. Consultation with local area fencing contractors indicate that installed barbed wire fence in this area typically costs approximately $20/m. Our reduced costs reflect in kind contributions from the land owner, including some supplies, some machine time and some labour.

4 Discussion

Fencing the western side of Richfield Creek to establish a minimum 15 m riparian setback provided a significant improvement to this valuable stream. In combination with the MWMT-HWI restoration work, this fencing will affect very positive improvements to the overall stream health and function of this system, while drastically reducing negative impacts to the property owner. Expertise from the landowner as well as the in-kind contributions proved invaluable to the success of this installation.

A key observation and point of discussion from this project is the topic of minimum set back distances to the watercourse. In this case, 15 m was chosen as an adequate set back based on the size of Richfield Creek. Though this was the minimum, it is worth noting that the land owner through his commitment to stewardship of his land, maximized the setbacks to the extent practicable for his operations. The point being, that although there is a minimum that came at a cost to the landowner in some key locations (i.e., forfeiture of productive hay lands), his desire was to maximize this as much as possible. For potential funders, it is important to recognize that these minimums don't translate into actual fence placement, but rather guide discussions with landowners, who in this case, maximized the set back based on their operational realities and on the ground land features. Indeed, 90% of the new fence was installed ≥ 20 m from Richfield Creek and over half was placed ≥ 30 m from the stream.

Overall, we feel that substantial ecological benefits were realized at considerable financial savings. Partnerships like these provide for significant ecological gains while simultaneously fostering strong relationships with local landowners, establishing a foundation for local stewardship into the future.

5 Recommendations

Fences are an important land management tool to improve ecological health of streams in BC. We recommend additional research and monitoring to direct future exclusion fencing projects to ensure that they meet the desired ecological goals. In terms of research, ecologically relevant set back distances should be determined based on parameters of a given watercourse. In terms of monitoring, vegetation monitoring should occur within the riparian exclusion area to determine whether future projects should include planting or whether natural successional processes will sufficiently re-vegetate these areas in this bio-geoclimatic zone.

Considerable literature exists on the topic of riparian corridors and set back distances to development, but this information should be summarized to provide ecologically relevant recommendations specific to minimum riparian set back distances for various sized

watercourses. These recommendations will need to be rationale and scientifically defensible as increasing the minimums beyond what is defensible may deter landowners from partnering in such work, leaving the worst-case scenario in place. Land values in the valleys of BC are generally very high and so these types of riparian exclusion projects come at a very real cost to landowners and the benefits, though numerous (e.g., bank stability, elevated water tables, increased ecological diversity etc.), are often obscure. Failure in this key area, could spell the loss of considerable future restoration work.

Part of the work completed by MWMT-HWI included planting of a significant area with rooted willow seedling within the newly created riparian corridor along Richfield Creek. Time and budgetary constraints prevented planting the entire area, so this site provides an excellent opportunity for comparison between planted and unplanted areas to determine the rate and composition of re-vegetation respectively. Planting increases costs significantly, so in areas where it can be avoided it would be prudent to do so. Appendix (B) details the work completed by MWMT-HWI along Richfield Creek including the area planted with rooted willow ((detailed in Figure (10) as the orange cross hatch)). Contingent on future funding, scientifically relevant monitoring methodology should be applied to this site and may be informed by the monitoring work completed as part of the larger MWMT-HWI restoration project.

6 Conclusion

Partnerships with ranchers and farmers are critical to ecological restoration in BC. Farming in BC is nearly exclusively located along river and stream corridors. Much of the early development of farming and ranching in the province included poor choices of fence placement and high impacts to these important ecological corridors. Highways, roadways and railways are located in these same corridors, putting additional pressures on the hydrology of these systems. Because these critical valley lands are under mostly private ownership, partnerships with the farming and ranching communities are critical to advancing vital restoration work into the future. Indeed, these types of partnerships are the future of restoration in BC.

As evidenced by the MWMT-HWI project and this small fencing project, partnerships provide opportunities for significant cost reductions for restoration works. Our partner landowners provided machinery, ideas and expertise necessary to achieve success in restoration works completed during 2021. Collaboration with these key partners in restoration proved highly valuable and demonstrated the care and diligence of these operators when it comes to improving the health of the land under their stewardship.

APPENDIX A

New and Old Fence Lines Relative to Richfield Creek with 15 m Buffer Overlay

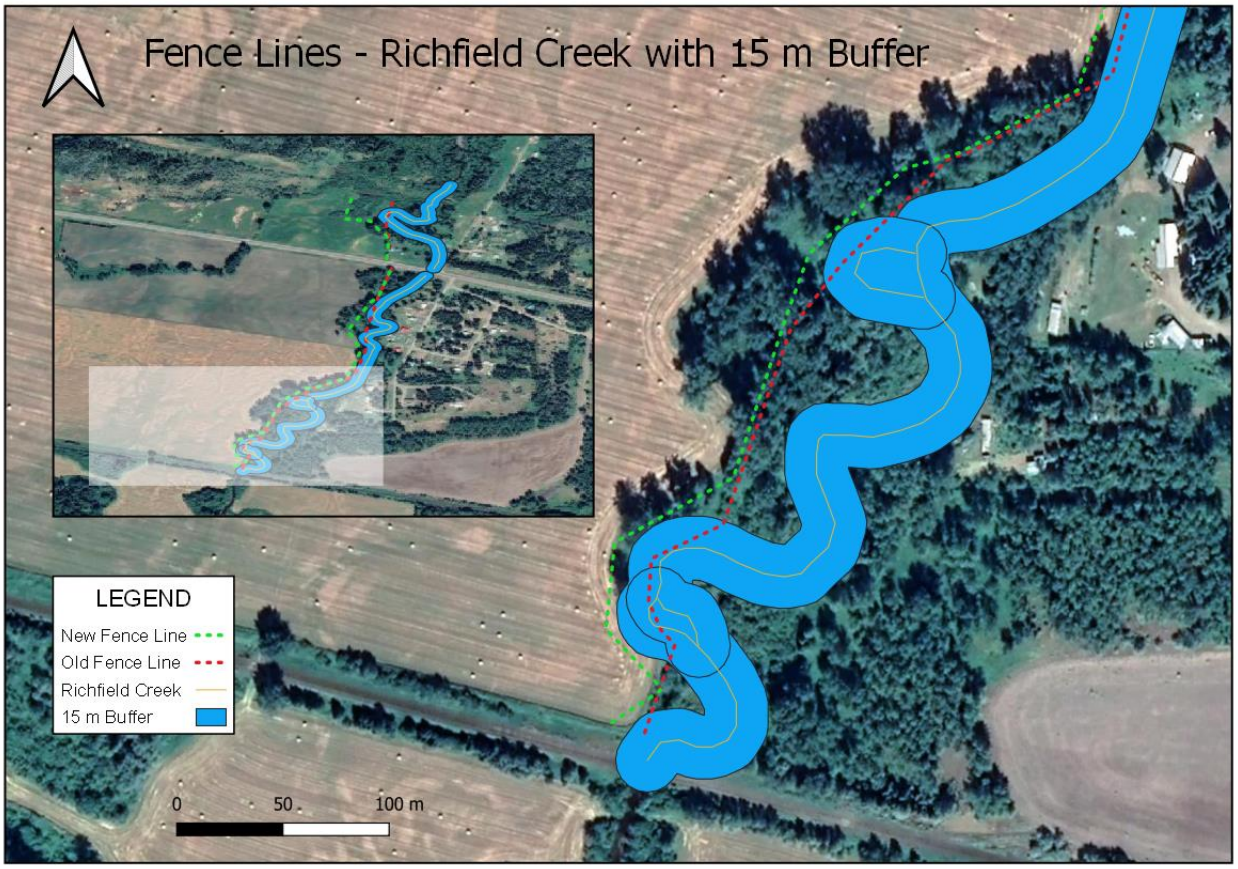

Figure 6: Map showing new and old fence lines in relation to Richfield Creek with a 15 m buffer overlay in the southern portion of the project area.

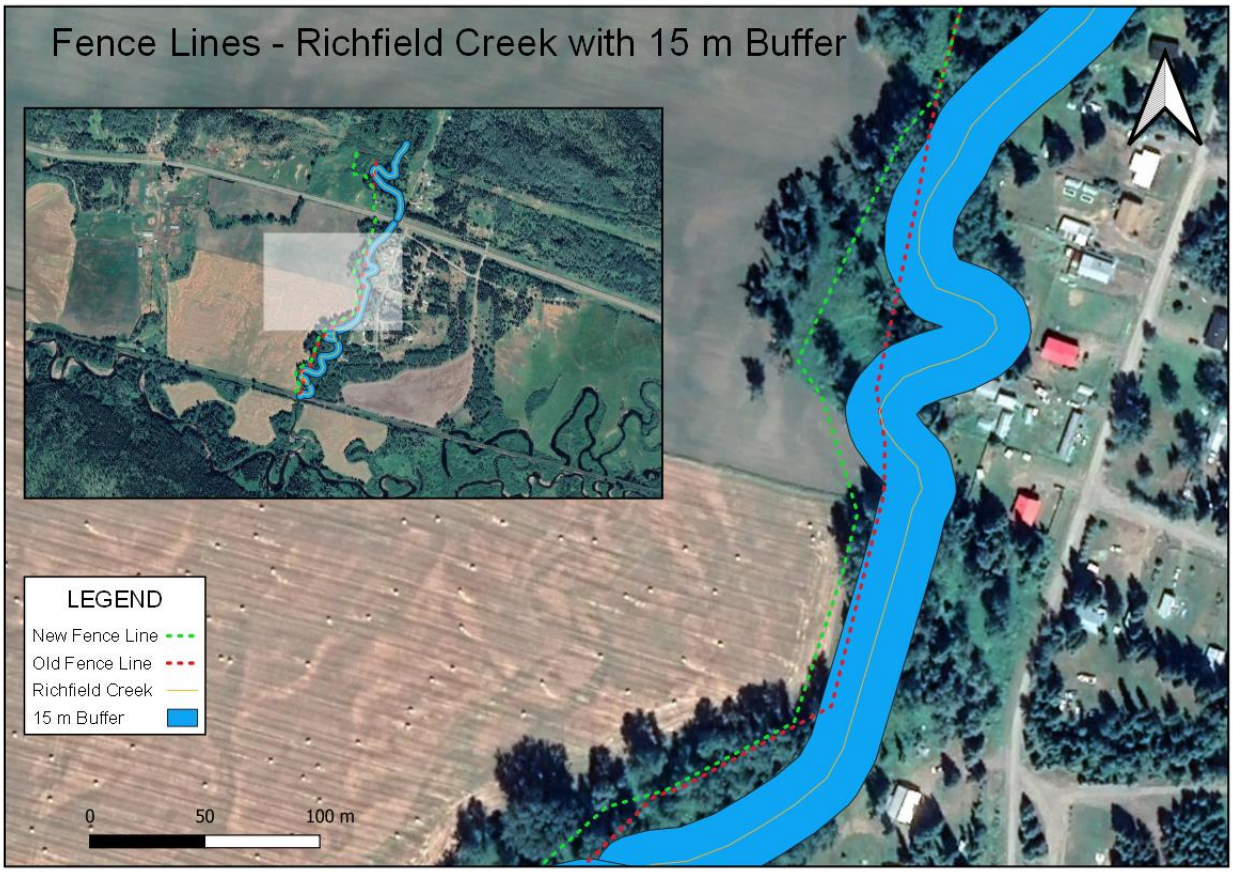

Figure 7:Map showing new and old fence lines in relation to Richfield Creek with a 15 m buffer overlay in the central portion of the project area.

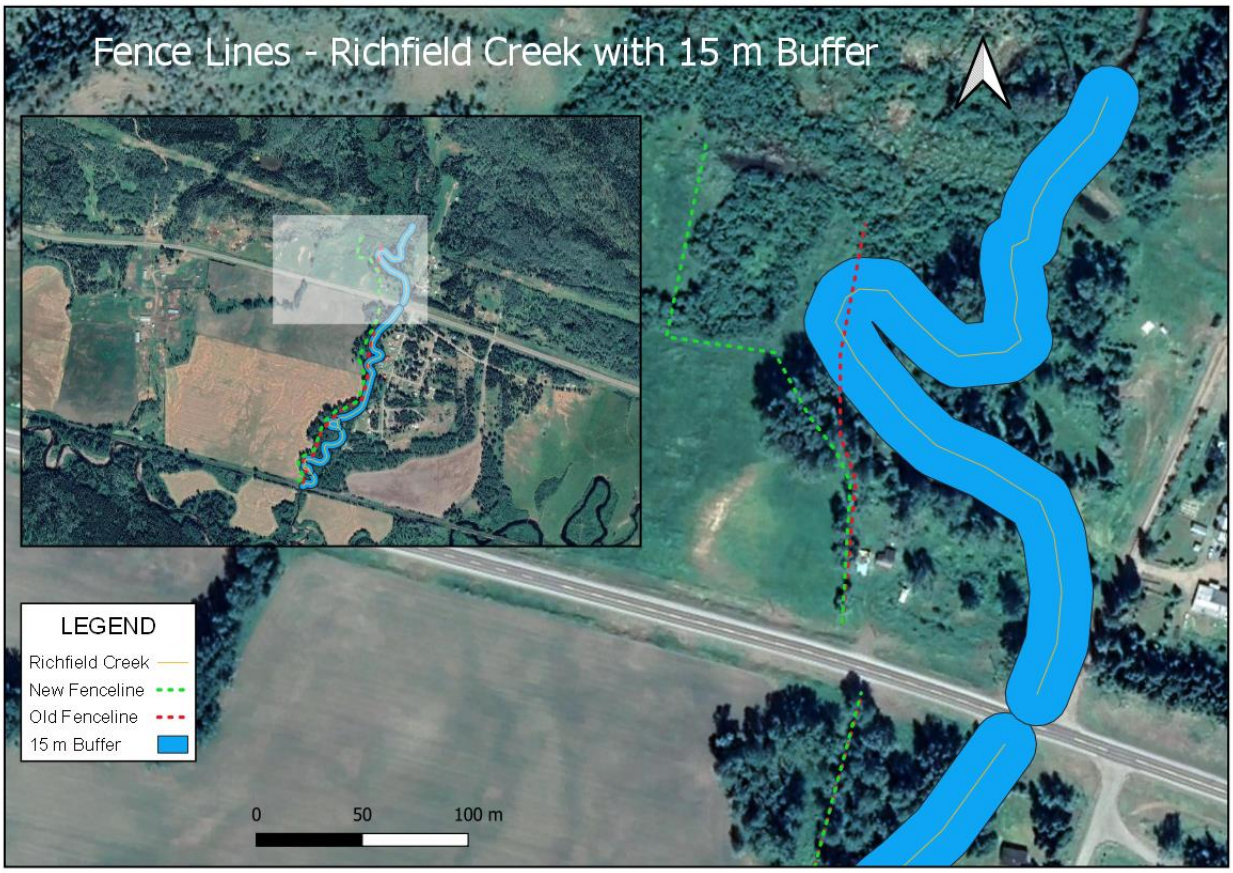

Figure 8: Map showing new and old fence lines in relation to Richfield Creek with a 15 m buffer overlay in the northern portion of the project area.

APPENDIX B

Restoration Works Along Richfield Creek Completed as part of the MWMT-HWI Project

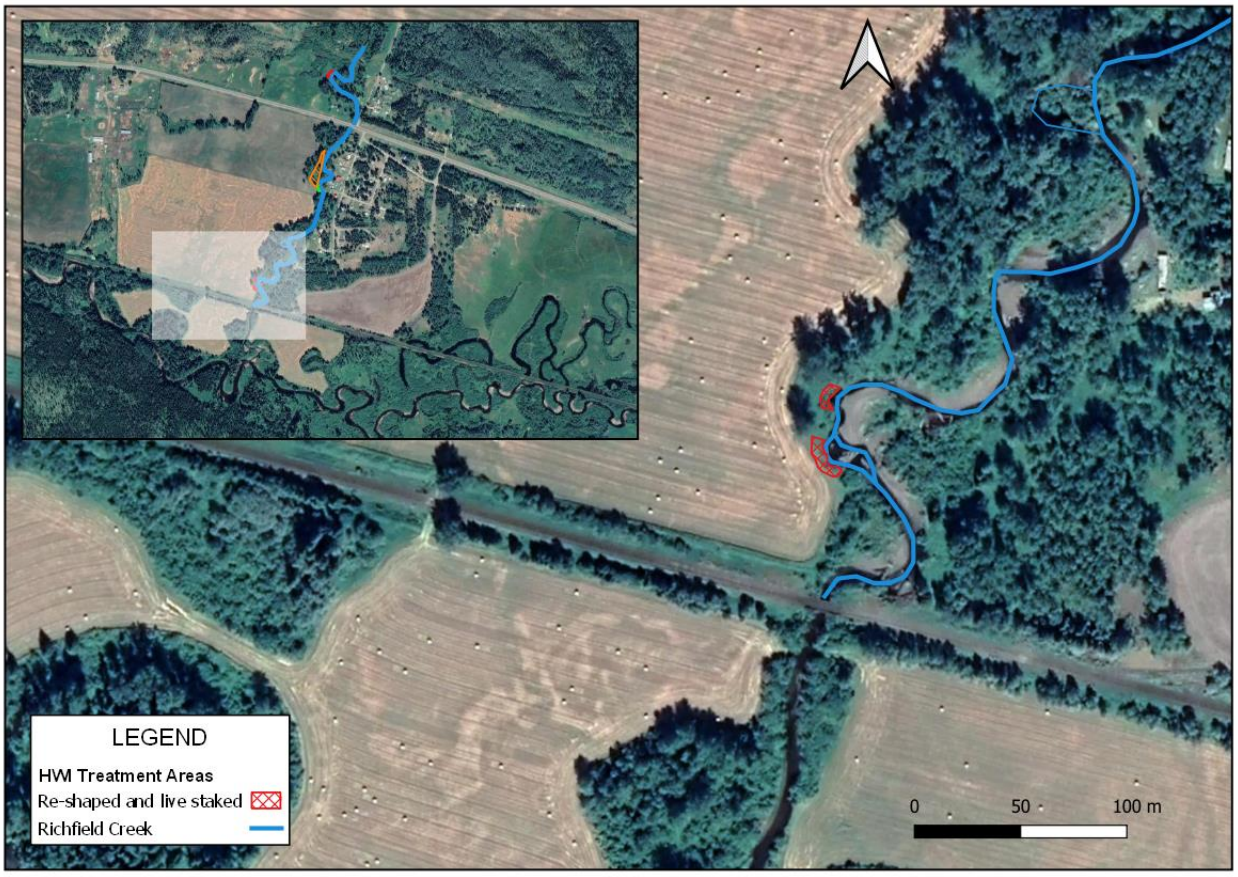

Figure 9: Map showing MWMT-HWI restoration sites on Richfield Creek in southern part of the project area where bank re-shaping, pegging and live staking occurred.

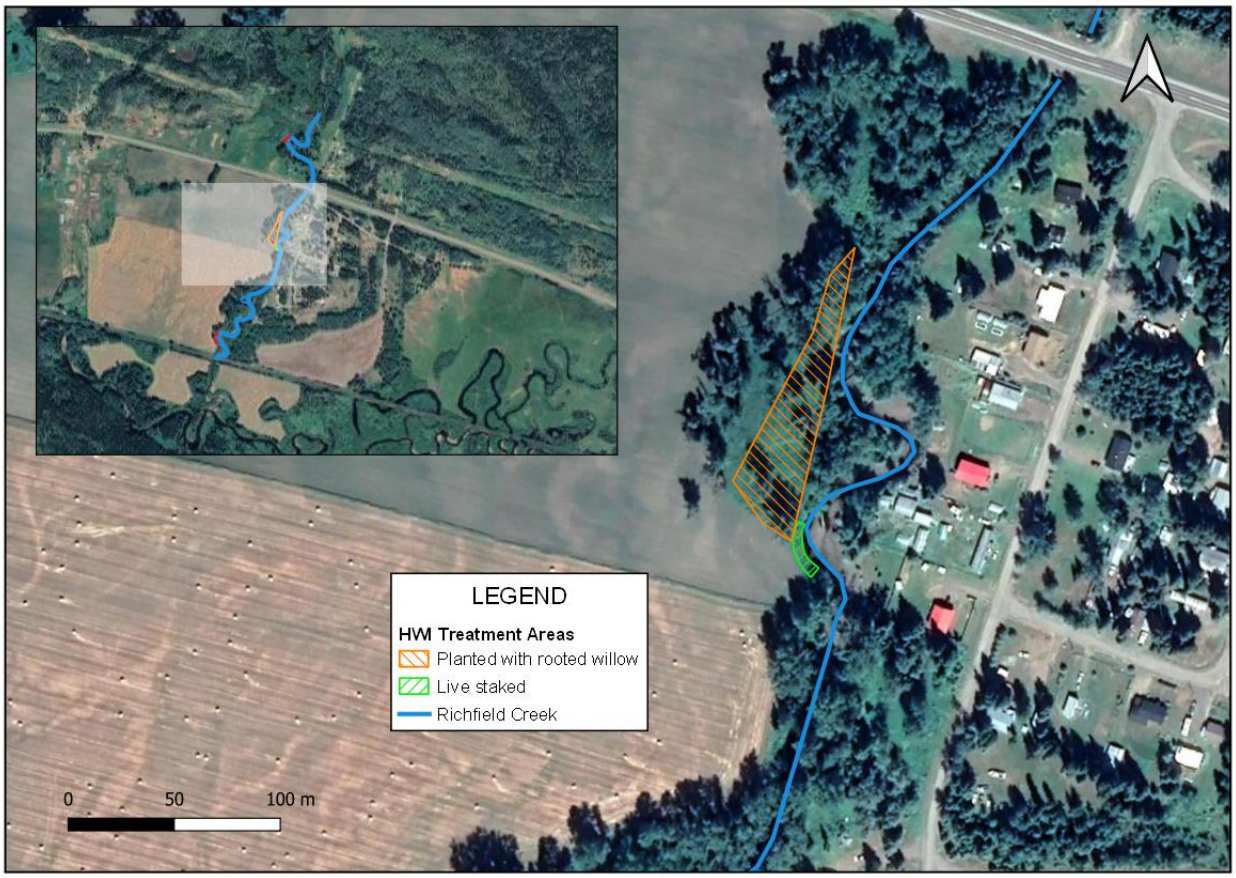

Figure 10: Map showing areas along Richfield creek planted and live staked as part of the MWMT-HWI restoration work in 2021 in the central part of the project area.

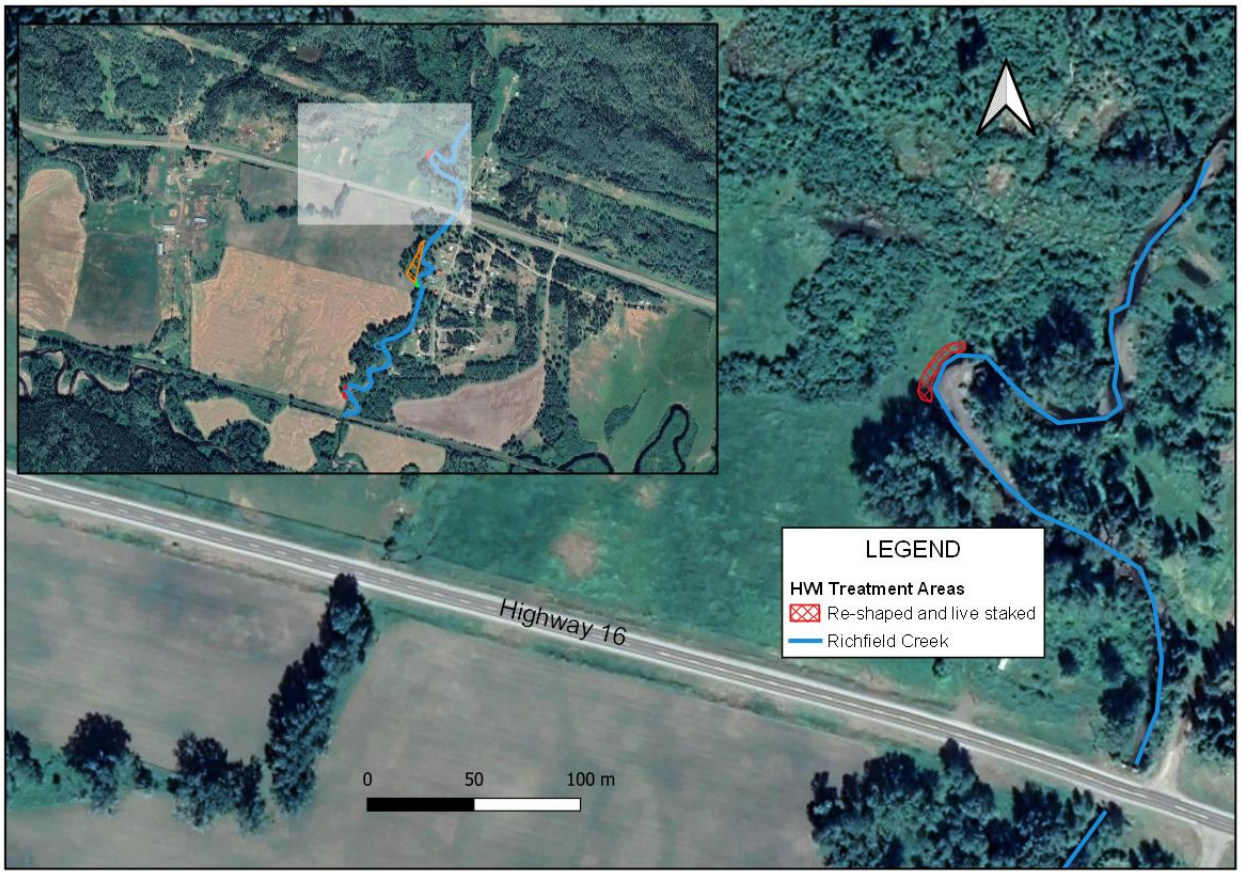

Figure 11: Map showing area where bank re-shaping, pegging and live staking occurred as part to the MWMT-HWI restoration work in 2021 in the northern part of the project area.

Figure 12: Photo of MWMT-HWI restoration works completed on Richfield Creek in the northern portion of the project area.