

Ecological Accounting Process Summary Report for French Creek Year 1 of 2



Report prepared by the Mount Arrowsmith Biosphere Region Research Institute for the
Regional District of Nanaimo

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The Ecological Accounting Process (EAP) is a methodology and metric using GIS analysis and British Columbia Assessment data to quantify a value for ecological assets (specifically stream corridor systems) to be allocated into annual municipal maintenance and management budgeting. Informed by decades of green infrastructure principles, EAP was developed by the Partnership for Water Sustainability in British Columbia in 2016. With intent to embed this into municipal asset management and the next generation of municipal employees, EAP is now being transferred over to the Mount Arrowsmith Biosphere Region Research Institute in Vancouver Island University in a three-year partnership with three local government partners: the Regional District of Nanaimo (RDN), the Municipality of North Cowichan, and the City of Nanaimo. The following report is a summary of a Year 1 analysis on French Creek for the RDN. For more information about this project, please refer to the full report accompanying this document, and to Appendix A for key terms and references.

We respectfully acknowledge that French Creek is situated within Coast Salish territories, on the ancestral lands of the Snaw-naw-as and Qualicum Peoples. While the EAP methodology offers a fiscal baseline valuation, it does not offer a substantial picture of social and cultural worth, which exceeds monetary value. We offer our thanks and respects to historic and present stewards of the lands and waters in French Creek's riparian areas, and hope that the following reports can offer a contribution to regional movements towards sustainable drainage service delivery and natural asset management.

Located in RDN Electoral areas G, F, and C, French Creek is approximately 24km in length, and contains forested headlands, agricultural/rural midstream segments, and residential areas near the mouth draining into the Salish Sea. Identified as a sensitive stream under the Water Sustainability Act¹, French Creek experiences reduced riparian integrity due to rapid development, water quality concerns, drought, and flooding. In Year 1 of the EAP Partnership, the MABRRI team conducted EAP Steps 1-3 on French Creek to gather an overview, as guided by the Regional District of Nanaimo. These steps entail calculating the Natural Capital Asset (NCA) value of parcels abutting within 30m on each side of the stream, suggesting an annual maintenance and management budget applicable to municipal government based off the NCA value, and an investigation into the riparian deficit (a concept similar to the infrastructure deficit). Steps 1-3 were analyzed primarily through GIS data, where abutting parcels were grouped into land use categories based on municipal zoning information, to allow comparisons between land uses. In addition to Steps 1-3, mapping of impervious surfaces up to 230m on either side of French Creek was conducted to gain further insight into riparian corridor quality. This analysis provides baseline data to ground future research of French Creek, which will be guided by a Technical Advisory Committee in Year 2.

Results were displayed in two formats: one to include all land use groups assigned to all abutting and adjacent parcels, and one where land use groups exclude 'Managed Forest Land and Cut Timber' parcels from the 'Agricultural and Rural Residential' land use categories. The reason for this separation is because zoning titles do not always coincide with actual land use and the value of 'Managed Forest Land and Cut Timber' parcels has the potential to skew valuation of the category they are grouped into. The second reason is because the RDN does not have jurisdiction over these parcels, therefore impacting the potential application of EAP metrics. There is rationale to include these parcels because of their impact on overall land value, however that is likely dependent on the vision of larger overarching management plans.

Ultimately, the total Natural Capital Asset (NCA) value of French Creek is \$22.8 million CAD and could be as high as \$33.5 million CAD with the inclusion of 'Managed Forest and Cut Timber' lands.

1 Water Sustainability Regulation, BC Reg 36/2016. https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/36_2016#section17 (Accessed November 10, 2023).

Using EAP's allocation of 1% towards a maintenance and management budget, this translates to an annual figure of between \$228,500 and \$335,400 to be incorporated into budgeting depending on whether 'Managed Forest Land and Cut Timber' parcels are to be included in these allocations.

The largest contributing land use category to the total value of French Creek were 'Agricultural' parcels, comprising 59% of the total NCA value. However, one key takeaway is that although the 'Suburban Residential' category abutting French Creek comprised a small footprint, it was of disproportionate worth, contributing to between 22% and 32% of the total NCA value dependent on inclusion of 'Managed Forest and Cut Timber' parcels. This suggests that the Riparian Deficit in this area is greater (as it posits that greater development has a greater ecological impact), and may indicate that riparian health may be under more stress in these areas of greater development.

Analysis of impervious surface coverage yielded that highest concentrations were in the 'Residential Suburban' category (comprising 16% of the surface area within this category), indicating more development closer to French Creek and higher potential for areas of disturbed riparian habitat. These findings warrant further research within the Suburban Residential land use zone. Future research areas could be on upstream uses of French Creek, comparisons between lower watershed health to mid and upper reaches, and examination of legislation on riparian areas under different governing bodies.

Directions for future research are far reaching. One short-term suggestion is to complete EAP steps 4 and 5 to determine extent of woodland cover within the study areas. Other suggestions include further exploration within the Suburban Residential Land use zone (which reflects a larger Riparian Deficit) and gaining further understanding of resident values relating to the natural commons. Pertinent areas of further research also include focus on the quality of upper reaches of the creek (which impacts all areas downstream), as well as seeking viable funding sources to support restoration efforts by all levels of the community, including municipal government, volunteer stewards, and landowners. Ultimately, the ongoing maintenance and management of French Creek requires collective and streamlined measures, and baseline figures presented in this report offer a viable starting point.

Table 1. Parcel Summary (Including Managed Forest and Cut Timber)

	Agriculture	Commercial/ Industrial/ Institutional	Forestry/ Resource	Residential Rural	Residential Suburban	Total
Total Number	309	41	63	79	335	827
Abutting	141	8	33	11	74	267
Adjacent	168	33	30	68	261	560
In ALR	128	1	3	2	1	135
Not in ALR	181	40	60	77	334	692
Farm Designated	50	0	1	1	0	52
Stream Length thru Parcel Area (km)	37.6	0.5	57.2	1.5	3.9	100.5
	Agriculture	Commercial/ Industrial/ Institutional	Forestry/ Resource	Residential Rural	Residential Suburban	Weighted Average of Abutting Parcels

Weighted Average Parcel Area of Abutting Parcels (ha)	14.9*	12.8	301.9	7.5*	0.7	67.5
Weighted Average Parcel Value per m ² of Abutting Parcels (\$ CAD)	11.31**	10.90	1.56	20.87**	94.09	27.75
*Average parcel sizes without inclusion of Managed Forest and Cut Timber are 7.8ha and 2.4ha for Agriculture and Residential Rural uses, respectively. ** Average parcel value per m² without inclusion of Managed Forest and Cut Timber are \$13.23 and \$25.45 for Agriculture and Residential Rural uses, respectively.						

Table 2. NCA Summary Table (Including Managed Forest Land and Cut Timber)

Group	Stream Length (m)	Parcels	Natural Capital Asset Values		
			Total \$	\$ per m	\$ per m ²
Agriculture	37,614.44	141	18,973,689	504	7
Commercial/Industrial/Institutional	493.68	8	374,884	759	5
Forestry/Resource	57,150.96	33	5,378,477	94	1
Residential Rural	1,460.58	11	1,238,768	848	13
Residential Suburban	3,851.63	71	7,577,337	1,967	47
Weighted Averages				334	3
*All financial values have been rounded to the closest dollar.					

Table 3. NCA Summary Table (Excluding Managed Forest Land and Cut Timber)

Group	Stream Length (m)	Parcels	Natural Capital Asset Values		
			Total \$	\$ per m	\$ per m ²
Agriculture	26,285.40	120	13,516,137	514	7
Commercial/Industrial/Institutional	493.68	8	374,884	759	5
Forestry/Resource	1,884.80	8	511,422	271	3
Residential Rural	1,020.94	9	875,201	857	13
Residential Suburban	3,851.63	71	7,577,337	1,967	47
Weighted Averages				682	9
*All financial values have been rounded to the closest dollar.					

Table 4. Maintenance and Management Budget (including Managed Forest Land and Cut Timber)

Group	NCA Total (\$)	M&M (\$)
Agriculture	18,973,689	189,737
Commercial/Industrial/Institutional	374,884	3,749
Forestry/Resource	5,378,477	53,785
Residential Rural	1,238,768	12,388
Residential Suburban	7,577,337	75,773
Total	33,543,154	335,432
*All financial values have been rounded to the closest dollar.		

Table 5. Maintenance and Management Budget (Excluding Managed Forest Land and Cut Timber)

Group	NCA Total (\$)	M&M (\$)
Agriculture	13,516,137	135,161
Commercial/Industrial/Institutional	374,884	3,749
Forestry/Resource	511,422	5,114
Residential Rural	875,201	8,752
Residential Suburban	7,577,337	75,773
Total	22,854,980	228,550
*All financial values have been rounded to the closest dollar.		

Table 6. Impervious Surface Summary (Including Managed Forest and Cut Timber)

Row Labels	Count of Reference #	Sum of Area (m2)	Sum of Area Within Study Area (m2)	Sum of Impervious Area (m2)	Percent of Study Area (OSA)	Sum of Area (m2) within the 30m Study Area
Agriculture	309	34,791,818.58	14,194,176.36	385,372.90	2.715007094	2,608,870.39
Commercial/Industrial/Institutional	41	1,971,022.47	394,741.54	60,553.91	15.34014164	64,568.19
Forestry/Resource	63	106,273,240.46	21,306,697.43	389,723.23	1.829111373	3,830,334.30
Residential Rural	79	2,066,886.06	633,320.45	26,530.61	4.189128697	93,940.41
Residential Suburban	335	1,166,214.53	682,393.26	109,758.67	16.08437204	148,019.36
Remaining Study Area	N/A	N/A	2,648,661.57	337,479.06	12.74149438	800,512.45
Total	827	146,269,182.09	39,859,990.62	1,309,418.38	3.29	7,546,245.10