ATTACHMENT 2

The Ecological Accounting Process (EAP)

Richards Creek: Year 1 Analysis

Mount Arrowsmith Biosphere Region Research Institute

Vancouver Island University

the partnership for water sustainability in bc

Regional District of Nanaimo

City of Nanaimo

Mount Arrowsmith Biosphere Region Research Institute

Municipality of North Cowichan

Vancouver Island University

Overview

What to expect from this presentation

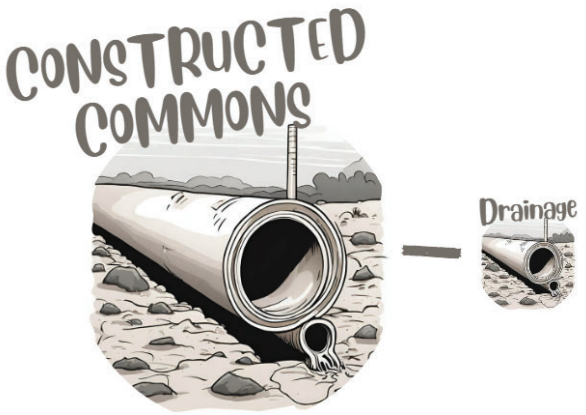
1. What is EAP?
2. Richards Creek
3. Research Question
4. Results
5. Applications

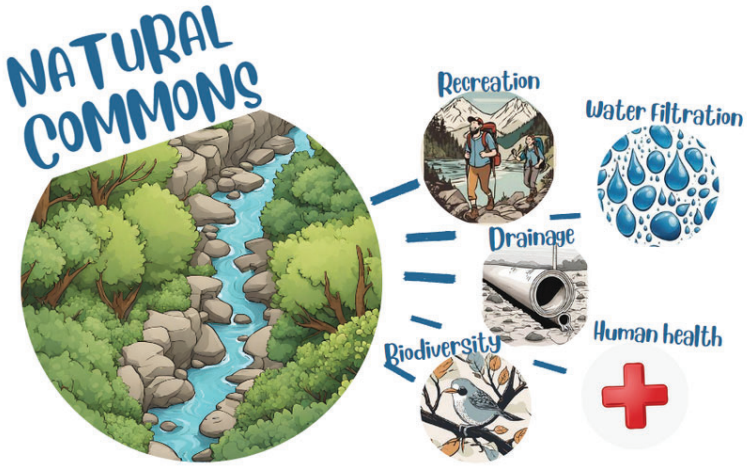
What is EAP?

A way of valuing a stream as a Natural Commons or Natural Asset.

Natural assets serve the same function as constructed assets with additional benefits.

EAP is a methodology and set of metrics to assist local governments estimate financial value of streams as natural assets.





EAP Assumptions

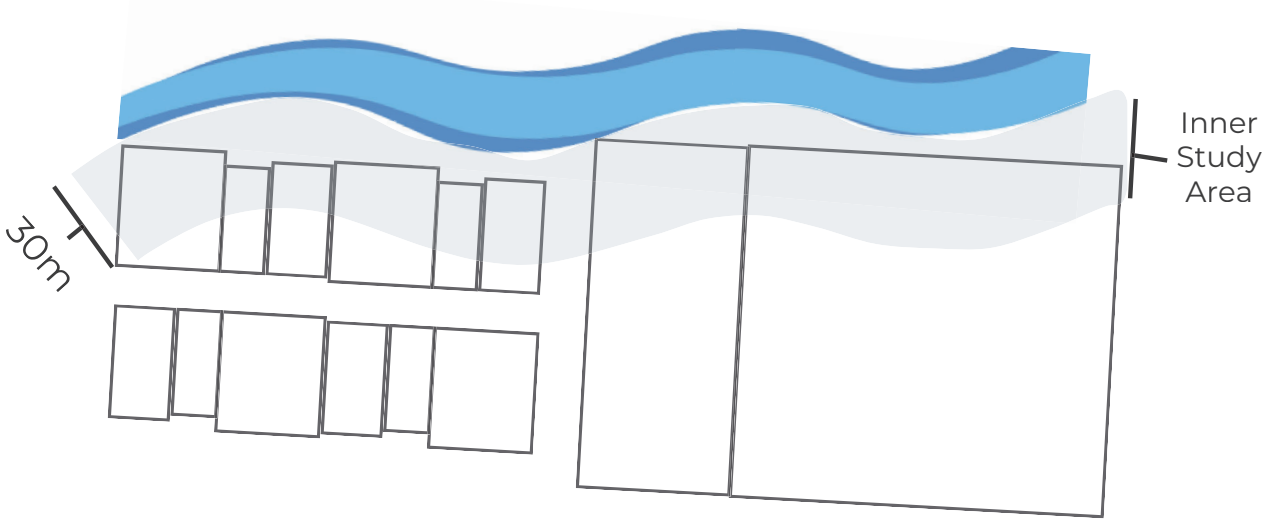
A stream is a land use, thus the underlying land has value.

Benefits of a stream are shared, therefore, stream health is a shared responsibility.

What is EAP?

A methodology and set of metrics to assist local governments operationalize maintenance and management of streams and their riparian corridors.

Natural Capital Asset (NCA) value



Maintenance and Management value (M&M)

1%

Limitations of EAP

EAP assessed valuations of streams do not directly engage in an in-depth consideration of social, cultural, ecological, or intrinsic value of streams.

EAP is not an ecosystems services approach or a direct source of funding for riparian management.

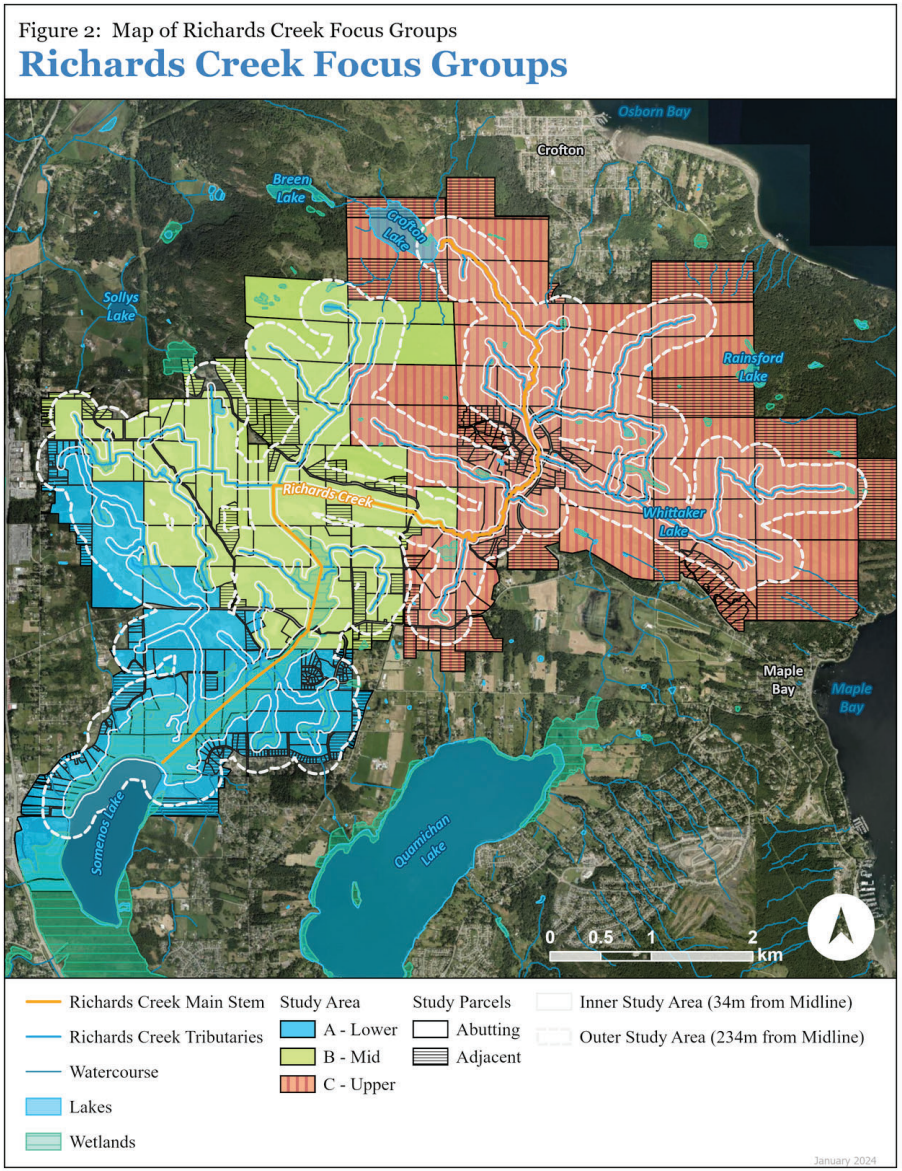
Figure 1: Map of Richards Creek Watershed

Richards Creek

Fish bearing with a range of ecological conditions.

Richards Creek lacks the optimal conditions to support healthy fish populations in the lower reaches, with degraded water quality.

Figure 2: Map of Richards Creek Focus Groups



Richards Creek

- Upper section: relatively intact riparian area, steeper, abutted by forestry and residential land uses.
- Mid section: ditched with limited riparian areas below Richards Trail, abutted primarily by agriculture.
- Lower section: low flow and low gradient with poorer water quality, abutted by agriculture and residential uses.

Research Question

What is a baseline payment to agricultural landowners for ecological services on parcels abutting Richards Creek, as one method to apply riparian stewardship?

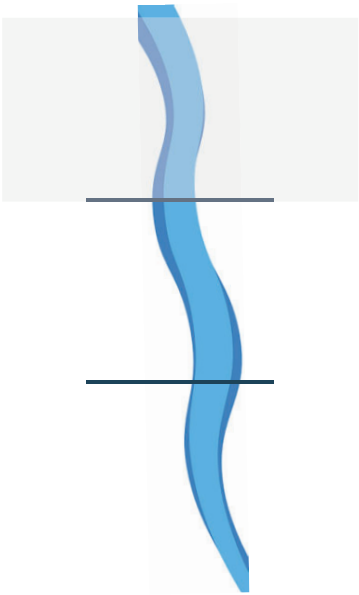
As a part of this: calculate NCA and M&M value of Richards Creek and highlight a sample portion of the stream in the focus area.

Results

The upper section of the stream is influenced by forestry as parcels here are 63% larger and valued 19% lower than the total average.

Table 1: Parcel Summary

Parcel Group	A - Lower	B - Mid	C - Upper	Total
Total Number	192	98	135	425
Abutting	73	52	57	182
Adjacent	119	46	78	243
In ALR	86	70	29	185
Not in ALR	106	28	106	240
Abutting Farm Designated	10	23	10	43
Stream Length thru Parcel Area (km)	23.66	25.07	24.14	72.87
Average Abutting Parcel Value ($) per m^2	14.51	11.10	9.77	12.03
Average Abutting Parcel Size (ha)	6.21	13.44	18.18	11.18



Results

44% of abutting parcels in the mid section of the stream are farm designated, with 71% of mid section parcels in the Agricultural Land Reserve (ALR).

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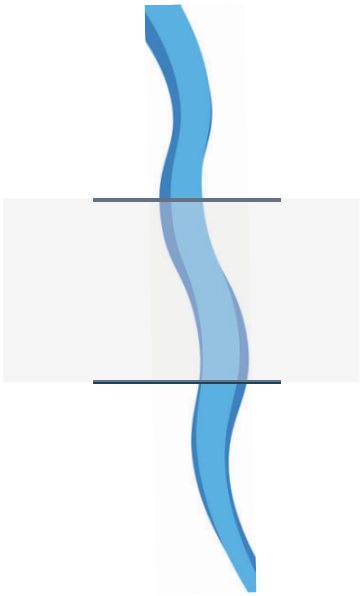

Results

The lower section is influenced by residential use as parcels here are 21% more valuable and 44% smaller than average.

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Parcel Group	A - Lower	B - Mid	C - Upper	Total
Total Number	192	98	135	425
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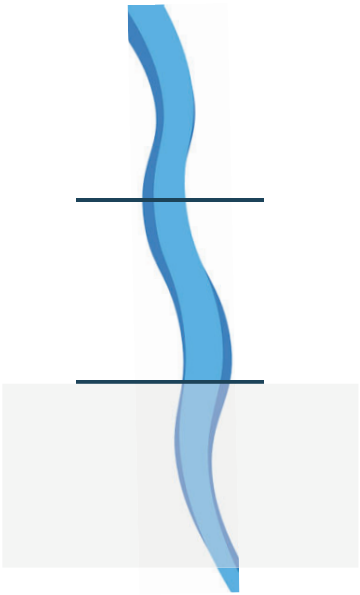
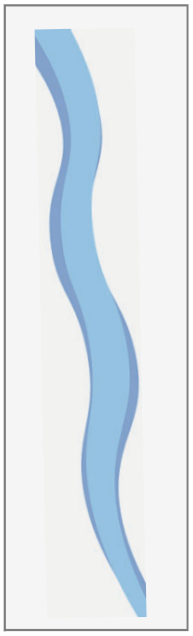
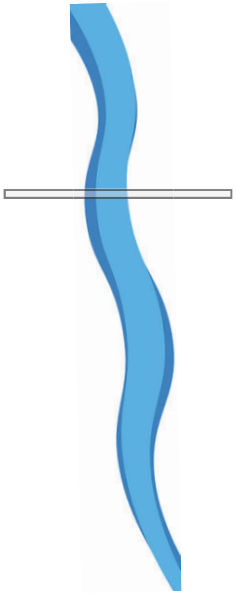


Results

The total NCA value of Richards Creek: $31.5 million ($433 per metre)
Annual M&M: $315,450



$31.5
million

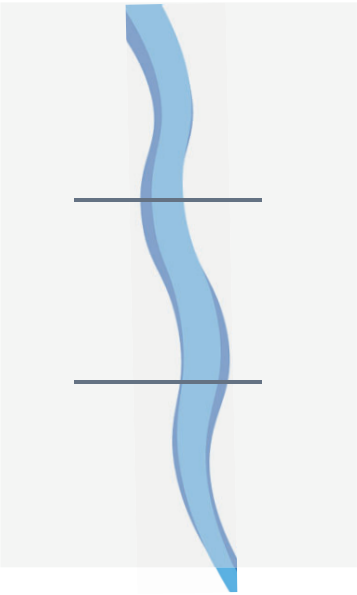


$433
per m

$315,450
annual

Results

Impervious surface coverage is about 1.4% of inner study area and 3.4% of outer study area. The largest proportion of impervious surface coverage in the ISA is in the mid section of the stream.



Row Labels	Parcels	OSA Total Area (m^2)	OSA Impervious Area (m^2)	Percent of OSA (%)	ISA Total Area (m^2)	ISA Impervious Area (m^2)	Percent of ISA (%)
A - Lower	192	4,513,783.63	205,441.56	4.55	1,683,436.35	13,504.42	0.80
B - Mid	98	6,430,115.88	266,240.87	4.14	1,462,513.28	27,986.47	1.91
C - Upper	135	7,835,725.37	161,372.95	2.06	1,490,001.47	22,379.08	1.50
Total	**425**	**18,779,624.88**	**633,055.38**	**3.37***	**4,635,951.10**	**63,869.97**	**1.38***
							***Total percent of OSA and ISA have been averaged.**

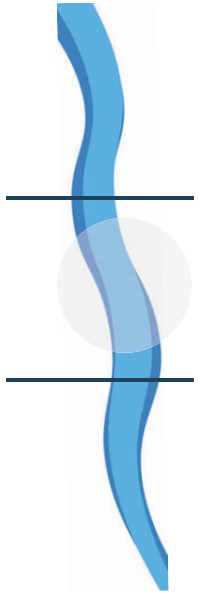
Results

In the mid section of the stream, a subset of agricultural parcels only along the main tributary of the stream, have a NCA value of $2.8 million (M&M = $28,300).

Table 5: Subset Area B and C Parcel Comparison: Richards Creek Main Stem

	Main Stream Farm Designated	Main Stream not Farm Designated	All Tributaries Combined Land use (Same as Table 1,2,3)
Subset B – Mid – Herd Road Bridge to Richards Trail			
Number of Parcels*	7	5	52
Average Parcel Size (ha)	18.7	14.3	12.9
NCA Total Values ($)	2,837,864	1,063,008	10,003,036.49
NCA ($) per m²	7.88**	4.28	6.60
ISA Impervious Area (%)	0.31	1.39	1.91
Subset C – Upper – Richards Trail to Crofton Lake			
Number of Parcels*	3	19	57
Average Parcel Size (ha)	13.6	14.1	18.9
NCA Total Values ($)	1,072,873	1,681,695	9,078,682.27
NCA ($) per m²	7.88**	3.63	5.30
ISA Impervious Area (%)	0.80	2.62	1.50

*All values are abutting parcels only.
**Farm designated parcel values are drawn from Farm Credit Canada and are allocated by region.



Results

In the upper section of the stream, a subset of agricultural parcels only along the main tributary of the stream, have a NCA value of $1.1 million (M&M = $10,100).

Table 5: Subset Area B and C Parcel Comparison: Richards Creek Main Stem

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ISA Impervious Area (%)	0.80	2.62	1.50

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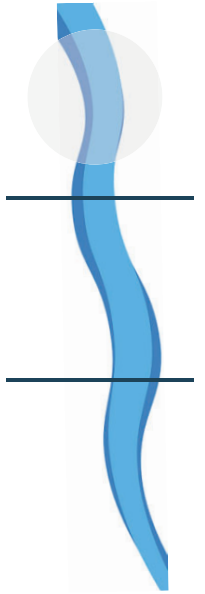
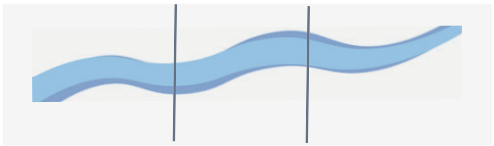
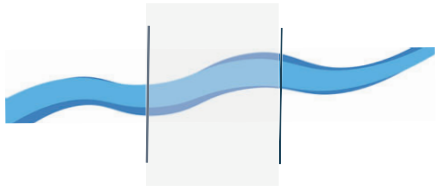


Results

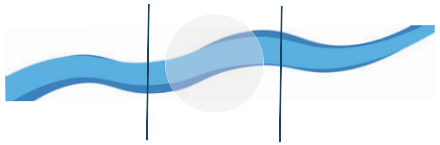
EAP analysis suggests valuations and M&M budgets for Richards Creek at different scales:



The whole stream and its tributaries is worth 31.5 million, with a suggested annual M&M budget of $315,450.



The upper, mid, and lower sections of the stream and their tributaries are worth approximately $9.1 million, $10.0 million, and $12.5 million, respectively.



The agricultural parcels abutting the main stream are worth $2.8 million in the mid section and $1.1 million in the upper section.

Applications

Agricultural development and fair levels of ecological integrity: enhancing quality of abutting agricultural parcels in the thirty-metre riparian area is likely to positively impact stream quality.

A baseline compensation to agricultural landowners was calculated at $7.88 per m2 or $78,800.00 per hectare.

Applications

Funding pathways to ensure annual investment into maintenance and management of stream systems.

Tracking maintenance and management investment of regional creeksheds to compare current spending levels to what is suggested by EAP analyses.

Thank you

Questions?

Mount Arrowsmith Biosphere Region Research Institute

Vancouver Island University