




the partnership
for water sustainability in bc

Waterbucket eNews on May 17, 2022
<https://waterbucket.ca/wscblog/>



**Living Water Smart
in British Columbia:
*Integration of Stream
Systems into 'Sustainable
Drainage Service Delivery'***

Note to Reader:

Waterbucket eNews¹ celebrates the leadership of individuals and organizations who are guided by the vision for [Living Water Smart in British Columbia](#)².

On May 17, 2022, Waterbucket eNews celebrated “Asset Management Awareness Day in British Columbia” by featuring [Asset Management for Sustainable Service Delivery: A BC Framework](#), released in December 2014. This is a case study illustration of how to achieve desired outcomes provincially by influencing behaviour at the local government scale over time.

The umbrella for Partnership initiatives and programs is the [Water Sustainability Action Plan for British Columbia](#)³. In turn, the Action Plan is nested within [Living Water Smart, British Columbia's Water Plan](#).



Cover Image Credit: photo by David Mackenzie,
a *Lifetime Member* of the Partnership for Water Sustainability

¹ <https://waterbucket.ca/wscblog/>

² https://waterbucket.ca/wcp/wp-content/uploads/sites/6/2017/11/livingwatersmart_book.pdf

³ <https://www.waterbucket.ca/cfa/sites/wbccfa/documents/media/81.pdf>

TABLE OF CONTENTS

	Editor's Perspective
1	Avoid the Pain, Be Deliberate, Fund the Plan
2	'Sustainable Service Delivery' explained
3	'Drainage Service' is the Neglected Service
4	Ecological Services are Core Services

Editor's Perspective

It takes courage on the part of a Council or Regional Board members to look beyond the short-term, understand what sustainable funding entails over the long-term, and direct staff to get on with the job. This is the local government reality-check.

In November 2015, release of [Beyond the Guidebook 2015: Moving Towards "Sustainable Watershed Systems, through Asset Management"](#) launched an educational process that is ongoing. Led by the Partnership for Water Sustainability, program alignment with [Asset Management for Sustainable Service Delivery: A BC Framework](#), released a year earlier through Asset Management BC, is the context for including asset management in the title.

The educational goal is to encourage local governments to reframe how they look at urbanizing watersheds, and then connect the dots between drainage infrastructure and stream health. What happens on the land does matter to streams. Moreover, getting an unfunded liability under control is their incentive for moving from awareness to action.

Asset Management Awareness Day in British Columbia on May 18, 2022 provided the occasion to both celebrate the BC Framework and draw attention to the "drainage service". Provincial recognition of this day helps to highlight the importance of sound asset management practices.

Local governments strive to deliver services sustainably, and work to ensure that current community service needs, and how those services are delivered, do not compromise the ability of future generations to meet their own needs through sound asset management practices.

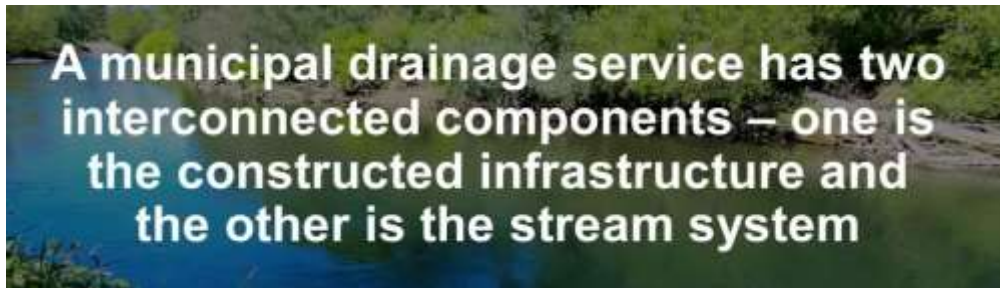


Integration of Stream Systems into 'Sustainable Drainage Service Delivery'

When one thinks about asset management, it is often in the context of municipal infrastructure and how this provides the “water service” or the “sanitary sewer service”, and so on. **The Drainage Service is the neglected service, and the cost of neglect grows over time.**

The consequence of neglect is an accumulating financial liability to fund creek channel stabilization and riparian corridor restoration in urban and rural settings. Thus, the Partnership mission is to focus attention on this foundational concept: **Drainage infrastructure and the stream system together constitute the municipal Drainage Service.**

The urgency of the drainage liability issue spurred the Partnership's analytical process that linked municipal asset management and stream health as “cause-and-effect”, for better or for worse. The Asset Management Continuum, included as **Figure A**, serves as a road map for local governments wishing to move **from stopgap remediation to long-term solutions.**



Continuum of Steps: The asset management journey for a local government is a “continuum of steps” as illustrated on **Figure A**. Step One is to embrace the BC Framework. Step Two is to implement Sustainable Service Delivery. Step Three is to apply the Ecological Accounting Process.

There is typically no funding mechanism for **stream maintenance and management (M&M)** such as for water and sanitary sewer utilities. So, the unfunded liability caused by drainage impacts grows over time. Once the life-cycle approach is standard practice for constructed assets, getting to Step Three would be so much easier!



Kim A. Stephens, MEng, PEng,
Executive Director

Partnership for Water Sustainability in BC
May 2022



Figure A

Integration of Stream Systems into "Asset Management for Sustainable Drainage Service Delivery"

'Continuum of Steps'



Branding logo for
Asset Management for Sustainable Service Delivery:
A BC Framework, released December 2014

WHAT is the issue (Ground Zero):

There is no **Asset Management Strategy**. There is an *'unfunded infrastructure (gap, deficit, liability)'*.

SO WHAT can be done (Step One):

Embrace the **BC Framework**. Focus first on constructed assets (pipes & buildings). Implement an **Asset Management Strategy / Program**.

NOW WHAT can we do (Step Two):

Life-cycle approach and **Sustainable Service Delivery** are standard practice for maintenance and management (M&M) of constructed assets.

THEN WHAT will we do (Step Three):

"Twin Pillars" for protection of stream system integrity is standard practice for the drainage service. Apply **EAP, the Ecological Accounting Process**, to quantify *Riparian Deficit* values and establish annual budgets for ongoing stream corridor M&M.

As understanding of the **Local Government Finance Vision** grows, communities progress incrementally along the Continuum

Integration of Stream Systems into 'Sustainable Drainage Service Delivery'

With release of **Beyond the Guidebook 2015**, an educational goal:

Those who are involved in municipal land use and drainage would understand the vision for.....

“Sustainable Watershed Systems, through Asset Management”

THE NEW PARADIGM —

“Creeksheds as Infrastructure Assets”

A creekshed is an **integrated system**.

The **three pathways** by which rainfall reaches streams are 'infrastructure assets'.

The three pathways provide '**water balance services**'.



1. Avoid the Pain, Be Deliberate, Fund the Plan

Know your history. Understand the context. These are key thoughts, and they provide an over-arching perspective for stories published on Waterbucket eNews. In this edition, we feature the "story behind the story" for [Asset Management for Sustainable Service Delivery: A BC Framework](#).

Released in December 2014 by the Ministry of Municipal Affairs and Union of BC Municipalities (UBCM) through Asset Management BC, the **game-changing BC Framework** is a case study illustration of how to achieve desired outcomes provincially by influencing behaviour at the local government scale over time.



Why the BC Framework is a game-changer

The BC Framework establishes expectations; it does not prescribe solutions. It is a game-changer because it redefines the context for deciding how infrastructure is planned, financed, implemented, and maintained. It raises questions about how communities would service urbanizing and redeveloping areas in future.

Most importantly, the BC Framework emphasizes the paramount nature of the **services** that constructed infrastructure provides. The BC Framework also shines the spotlight on what the **life-cycle costs** are over time to maintain, renew or replace assets such as pipes, pumps, roads, and buildings.



Vision for fully integrated and sustainable service delivery in BC

The BC Framework also points the way to a holistic and integrated approach to asset management. Nature, and the ecosystem services that it provides, are viewed as a fundamental and integral part of a community's infrastructure system. This is not to suggest, however, that all ecosystem services provide a municipal function.

The ultimate vision for fully integrated Sustainable Service Delivery is that communities would protect, preserve, restore, and manage **"natural assets"** in the same way that they manage their engineered assets.

Stream corridor systems, parks, and conservation areas - these are land uses that constitute "natural assets". From a municipal asset management perspective, stream corridor systems are the most important because they provide a "package of ecological services" - drainage, habitat, recreation, and enjoyment of property - and they are a focal point for community involvement.

BC Framework inextricably linked to senior government grant programs: A longstanding goal of the Ministry of the Municipal Affairs is to find a balance between supporting those local governments who are leaders, while over time raising the bar to encourage the rest.

Over time, the process has been one of incrementally raising the bar in defined steps – awareness first, then education, and finally, full implementation.



2. 'Sustainable Service Delivery' explained


It is all about the service

Glen Brown coined the term Sustainable Service Delivery in 2010 when he was an Executive Director with the Ministry of Municipal Affairs. Formal branding came with release of Asset Management for Sustainable Service Delivery: A BC Framework in December 2014, and rollout in 2015. The emphasis on service is a game-changer for local government infrastructure asset management.

At that time, and thanks to the early work of the then newly formed Asset Management BC, chaired by Glen Brown, local governments were just starting to wrap their minds around the '20/80 Rule' and the implications of the 80% as an unfunded liability.

"My inspiration came from Guy Felio, one of the original gurus of asset management nationally. Guy said, 'It's all about the service', because infrastructure/ assets are worthless IF they do not provide a service," explains Glen Brown.

"That is what resonated with me. Also, Guy Felio said, for any asset management approach to be successful, it must not focus on the infrastructure asset by itself. That way-of-thinking applies to nature and the environment as well."



"Different local governments will always be at different points and different levels of maturity along the asset management continuum. This is why we focus on outcomes and do not prescribe what to do in BC."

Glen Brown, Chair of Asset Management BC,
June 2016 in Sitelines magazine



Sustainable Service Delivery – Two Desired Outcomes

Local governments would shift the spotlight from the infrastructure itself to the service AND the level-of-service that the infrastructure asset provides.

Local governments would implement a life-cycle approach to asset management AND eliminate the unfunded gap for infrastructure replacement.

A Synthesis of Three Ideas

During a curriculum planning session for a local government workshop organized by the Partnership for Water Sustainability, Glen Brown synthesized three themes – financial accountability, infrastructure sustainability, service delivery – into a single easy to remember phrase: Sustainable Service Delivery. The rest is history, as they say.

Glen Brown coined the term to focus local government attention on two desired outcomes that flow from policy objectives in Living Water Smart, BC's Water Plan.



The 4Cs for Sustainable Service Delivery: Collaboration, Capacity, Culture & Council

“After becoming CAO of Courtenay, BC in 2013, we began exploring how to implement an Asset Management Program at the City. Collaborating with external agencies opened our minds to thinking of AM practices in far broader terms, so that they might be applied in any community, regardless of size,” states David Allen, Past-Chair (2012-2020), Asset Management BC Community-of-Practice.

“We didn’t realize it, at the time, but it led to us eventually conclude that operationalizing AM would involve four separate, interconnected initiatives that would be the pathway for our journey toward Sustainable Service Delivery: They coalesced into what we locally refer to as **The 4C’s - Collaboration, Capacity, Culture, and Council.**”

“It is all about building trust between Council and staff, keeping in mind what can realistically be accomplished by an organization, and being clear about the limitations of the current state-of-practice and knowledge and our ability to explain what the numbers mean in that context.”



“Implementing asset management can happen at every level in local government. But to effectively achieve organization-wide Sustainable Service Delivery it must be led by the CAO and supported by Councils and Boards.”

David Allen, Past-Chair (2012-2020)
Asset Management BC Community-of-Practice

“Climate change impacts are risks which can be addressed by aligning asset lifecycles to performance or change thresholds which consider how levels-of-service are likely to deteriorate in response to climate changes impacts.”

Robert Hicks
Senior Policy and Process Engineer
City of Vancouver



3. 'Drainage Service' is the Neglected Service

Asset Management for Sustainable Drainage Service Delivery

When one thinks about asset management, it is often in the context of municipal infrastructure and how this provides the “water service” or the “sanitary sewer service”, and so on. Because the drainage service is the “neglected service”, a goal of EAP, the Ecological Accounting Process, is to focus attention on this foundational concept:

Drainage infrastructure and the stream system together constitute the municipal Drainage Service.

EAP is a land use perspective

The EAP methodology focuses on the historical and current land use practices that have changed landscapes, modified hydrology, and have led to present-day community perceptions of the worth of a stream in a creekshed, and the ecological services the stream system provides.

*In a sentence, the essence of EAP is expressed as follows: **What is the environment that supports the package of ecological services? This is a land use perspective.***

The above statement can also be applied as a guiding principle for operationalizing [Asset Management for Sustainable Drainage Service Delivery](#).

About EAP, the Ecological Accounting Process

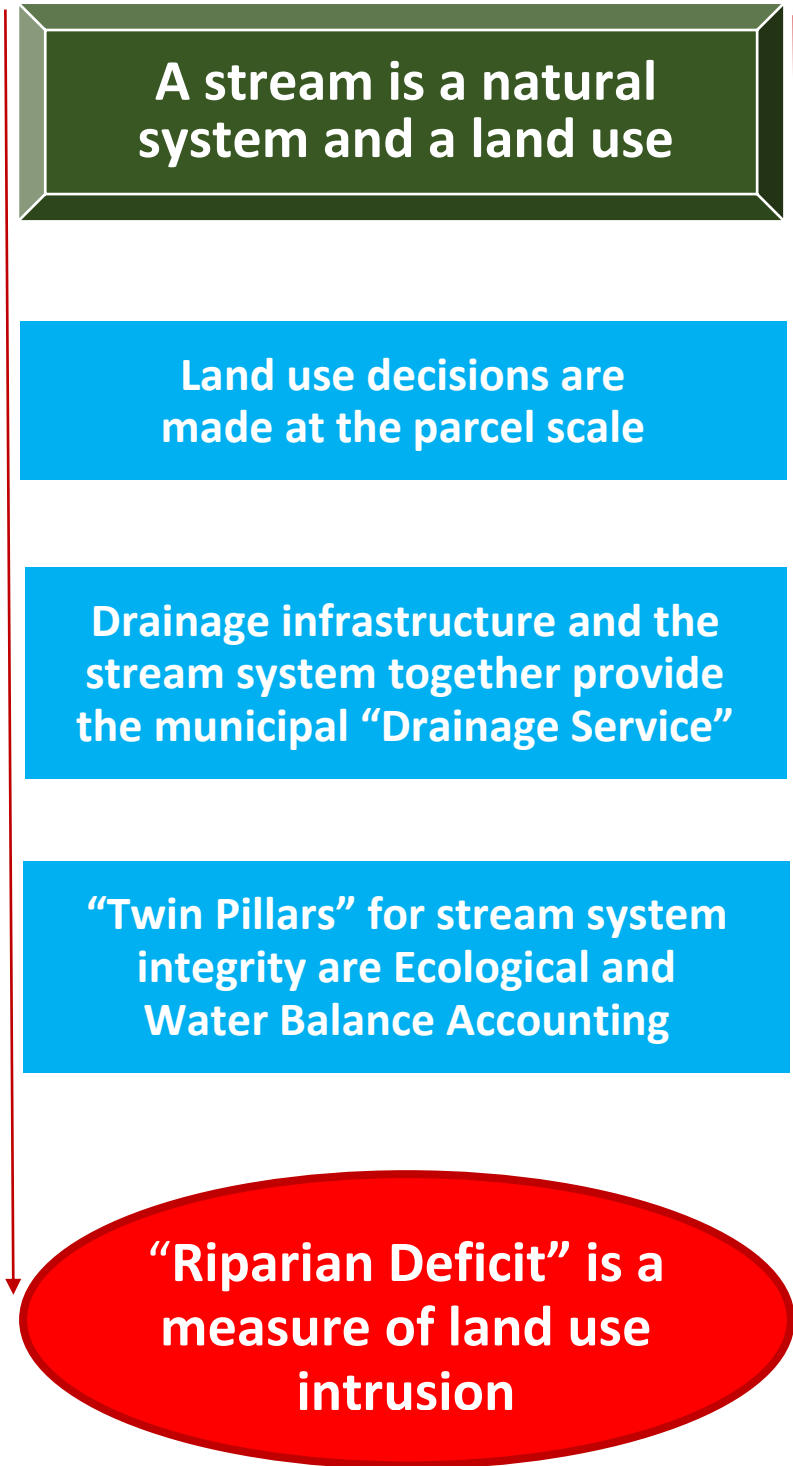
How concepts are explained is crucial. What is easily understood and can be measured gets implemented. EAP puts the environmental perspective on an equal footing with the engineering and accounting perspectives and thus bridges a gap.

EAP provides communities with a philosophy, pragmatic methodology and metrics to make the financial case for annual investment to prevent degradation and improve the condition of ecological assets that constitute a stream corridor system.

To help a continuum of audiences come to grips with the practical aspects of the drainage service, **Figure B** distills five cascading concepts. These foundational ideas underpin EAP. Figure B provides the “point of departure” for integration of stream systems into “asset management for sustainable service delivery”.

EAP expresses stream system maintenance and management (M&M) as a measurable metric, the **Riparian Deficit**, which is the environmental equivalent of the **Infrastructure Gap (Deficit)**. The riparian deficit is a measure of "loss of riparian integrity" due to land use intrusion into the regulated streamside setback zone.

Figure B



Cascading Concepts Create a Mind-Map for EAP

The adjacent visual distills five key ideas. These underpin EAP, the [Ecological Accounting Process](#). The purpose of this mind-map is to provide the curious reader with a point of departure for learning more.

The context for EAP is protection and restoration of stream systems. Streams are the natural component of the municipal **Drainage Service**.

The desired outcome is that BC local governments would apply EAP metrics to establish annual budgets for maintenance and management (M&M) of stream corridor systems.

Stream M&M would then be a line item within an Asset Management Strategy that accounts for both constructed and natural assets.

A stream corridor is a land use because stream setbacks are defined in regulation. Also, a proxy financial value is readily determined from the BC Assessment database.

EAP defines the regulated zone as the **Natural Commons Asset (NCA)**. This foundation has two primary metrics or measures: the NCA financial value is expressed as **\$ per km of stream**; the annual M&M budget is **1% of the NCA value** consistent with accepted practice for constructed assets.

Integrate Stream Systems into 'Sustainable Drainage Service Delivery'

Unless communities measure the effect of impacts, destabilization of stream channels and degradation of riparian assets and streamside protection areas will continue. EAP helps to quantify the unfunded and growing cost (hence liability) to protect, remediate or enhance stream systems in disturbed urban and rural landscapes. **This is the starting point for a life-cycle approach to M&M of the drainage service.**

Budget Line Items

EAP bridges a gap. While local governments have existing tools in the form of policies and legislation for 'maintenance and management' of ecological assets, they have until now lacked a pragmatic methodology and meaningful metrics to incorporate stream systems as line items in Asset Management Strategies.

Using numbers generated through application of EAP, however, local governments would have a sound basis for implementing a baseline annual budget for enhancement of the stream system (which is the natural or ecological asset) within a setback zone.

Hydrology Powers Stream Ecology

*The flow of rainwater from cloud to stream is comprised of three water balance pathways: **surface runoff, horizontal shallow interflow, and deep groundwater.** Yet the latter two are routinely ignored by planners and designers. Time, a critical factor, is also ignored. These omissions have stream health plus financial consequences.*

A Stream is a Land Use: The EAP methodology and metrics recognize the importance of the stream system in the landscape. A stream is a land use because the stream corridor is defined in regulations and has a financial value. EAP uses real numbers from BC Assessment, not hypothetical assumptions, to establish the financial case for the stream corridor system.

Hydrology powers stream ecology. Thus, effective M&M requires an understanding of how water balance pathways connect creekshed hydrology and stream ecology, how changes on the land disconnect them, and how green infrastructure design can reconnect them.

Understanding how hydrology powers stream ecology is the starting point for developing meaningful M&M metrics. Managing the built and natural environments as interconnected systems is a guiding principle.

Over the past six years, a series of "big ideas" have emerged during the 3-stage program of testing, refining and mainstreaming EAP. These big ideas are transformative in their implications for local government asset management. To learn more about EAP, visit www.naturalcommons.ca.

4. Ecological Services are Core Services

Drainage, Recreation, Habitat and Enjoyment Uses

Core services such as utilities, roads, parks, and recreation take up the bulk of a local government budget and are the traditional focus of asset management. Prior to release of the [Primer on Integrating Natural Assets with Asset Management](#) in 2019, ecological services were not typically part of the asset management mind-set.

Ecological services are not intuitively understood by the public, elected representatives, and asset managers. At best, they have been considered as an add-on. To inform and educate, it helps to define ecological services in terms of drainage, recreation, habitat, and enjoyment of property uses.

Once communities make the mental transition to view ecological services as core local government services, and then look at their budgets differently, the change in mind-set should lead to this question, how can we do things better? This logically leads to the next question:

How do we establish an annual budget for M&M that sustains the ‘package of ecological services’ in a stream system that humans depend upon for drainage, recreation, habitat, and enjoyment of property uses?



Context for Integration of Stream Systems with Constructed Assets

Released in September 2019 by Asset Management BC, the Primer introduces EAP with this statement:

“Significant strides have been made in natural asset management in British Columbia and across Canada. Several initiatives have built on each other, forming a foundation for local governments to increase their consideration of the potential of natural assets.”

Continuum of Steps: The asset management journey is a “continuum of steps” as shown on **Figure A** and synthesized below:

- **Step One** – embrace the BC Framework
- **Step Two** – implement Sustainable Service Delivery
- **Step Three** – apply the Ecological Accounting Process

Once the life-cycle approach is standard practice for constructed assets, it would then be much easier to add M&M for stream systems. In Step Three, EAP focuses on the investment of resources already made by many stakeholders, as well as their two-fold aspirations concerning degradation prevention and enhancement of ecological services, respectively.

Sustainable Drainage Service Delivery and the Asset Management Continuum

Move from Stopgap Remediation to Long-Term Solutions

A goal is to ‘get it right’, both in the stream channel and on the land draining to the stream.

The challenge in ‘getting it right’ is to move from stop-gap remediation of problems to long-term restoration of a properly functioning creekshed.

In 2014, three landmark provincial initiatives came to fruition. See below. Together they provide a platform for integrated and coordinated actions.



If we know how to do a much better job of protecting ecological features and stream systems in our communities and on our landscape, then why aren't communities doing a better job? Why are streams still being degraded? How do we change that to prevent the unfunded liability caused by drainage impacts on stream systems growing over time?

The desired outcome in operationalizing EAP under the Asset Management umbrella is to truly restore stream system integrity through community investment in stream systems. The challenge is to **move from stopgap remediation (what we see) to long-term solutions (what communities want)**.

Getting to Step Three on the Continuum

EAP implementation depends on decision-makers understanding that a municipal drainage service has two interconnected components – one being constructed infrastructure and the other the stream system.

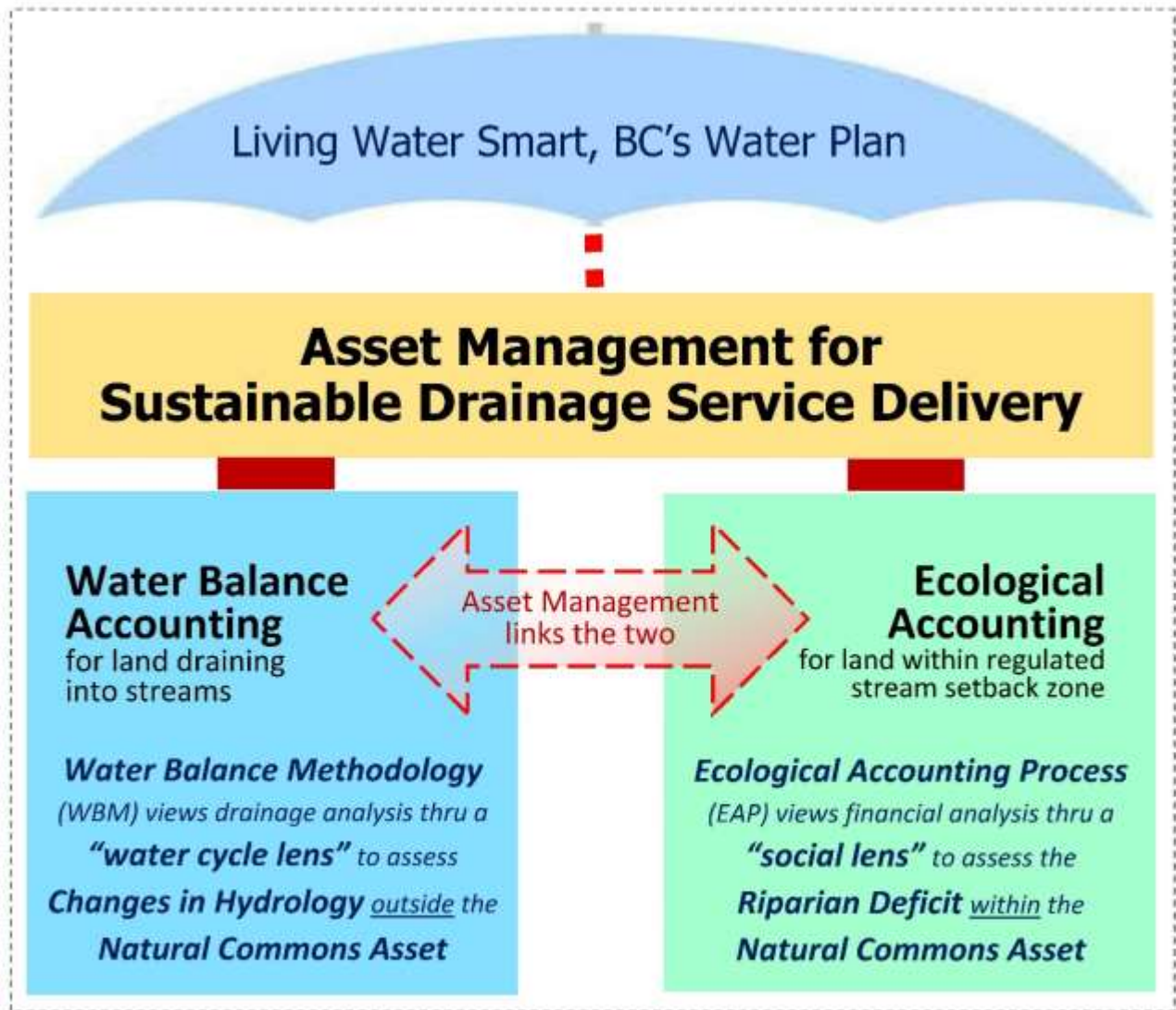
There is typically no funding mechanism for stream M&M such as for water and sanitary sewer utilities. Although several local governments in BC do have “stormwater utilities”, their main purpose is to fund infrastructure such as pipes and ponds.

Benefits to Communities by Designing with Nature: The whole-system approach to protecting stream integrity is founded on the twin pillars of Ecological Accounting and Water Balance Accounting illustrated on **Figure C**. An implementation plan that reflects the twin pillars would result in multiple desired outcomes:

- **ENHANCE** stream corridors to create high value public assets.
- **AVOID** an unfunded financial liability (by limiting stream erosion, preventing flooding, improving water quality).
- **ADAPT** to a changing climate.
- **REDUCE** life-cycle costs for drainage infrastructure.

Management of “natural assets” within a local government’s Asset Management Strategy is an idea whose time has come. To this end, the foregoing discussion provides a big picture perspective to introduce readers to foundational concepts and whet their interest to learn more about EAP at www.naturalcommons.ca.

Figure C



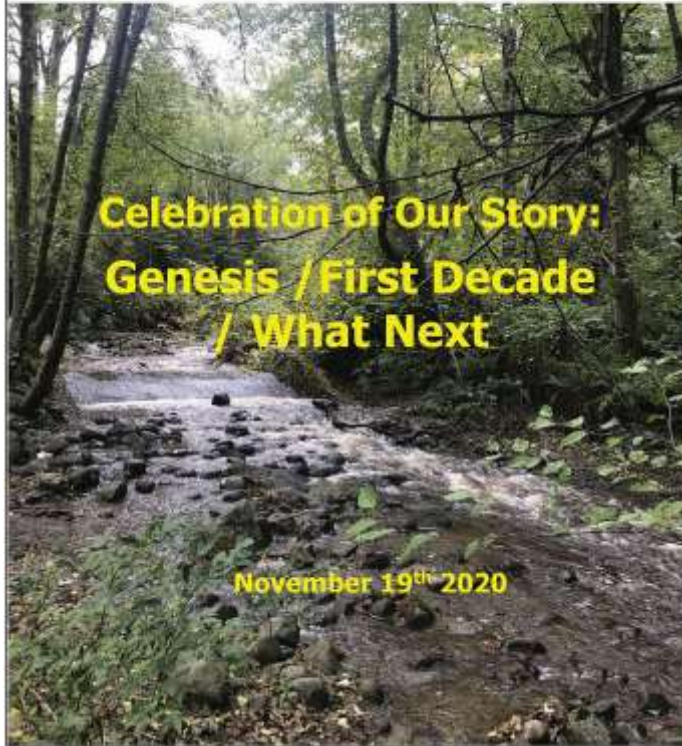
Hydrology is the Engine that Powers Ecological Services

To learn more about the Ecological Accounting Pillar, visit <https://waterbucket.ca/gi/category/ecological-accounting-process/>

To learn more about the Water Balance Accounting Pillar, visit <https://waterbucket.ca/rm/category/british-columbia-guidance-documents/>



the partnership
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TO LEARN MORE, VISIT:
<https://waterbucket.ca/about-us/>

About the Partnership for Water Sustainability in British Columbia

Incorporation of the Partnership for Water Sustainability in British Columbia as a not-for-profit society on November 19, 2010 was a milestone moment. Incorporation signified a bold leap forward.

Over two decades, the Partnership had evolved from a technical committee in the 1990s, to a “water roundtable” in the first decade of the 2000s, and then to a legal entity. The Partnership has its roots in government – local, provincial, federal.

The Partnership has a primary goal, to **build bridges of understanding** and pass the baton from the past to the present and future. To achieve the goal, the Partnership is growing a network in the local government setting. This network embraces collaborative leadership and **inter-generational collaboration**.

The Partnership believes that when each generation is receptive to accepting the inter-generational baton and embracing the wisdom that goes with it, the decisions of successive generations will benefit from and build upon the experience of those who went before them.



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