the partnership
for water sustainability in bc

OUR STORY

The Partnership for Water Sustainability in BC (the Partnership) was incorporated as a not-for-profit society in 2010 to promote and advance the protection and management of natural and engineered water resources in British Columbia.

The Partnership's Leadership Team includes engineers and geoscientists experienced within the private and public sector, as well as community engagement through stewardship. The success of the Partnership has been the collaboration developed with provincial, regional, local levels of government and the community, through the provision of leadership, innovation and expertise.

We are working with practitioners involved in water resources functions to foster integrated protection and management strategies through enhancement of practitioner expertise (i.e. "developing talent"), and through further evolution and delivery of program elements developed under the umbrella of the Water Sustainability Action Plan (the Plan) for British Columbia.

We believe that by providing education, research, technical services and tools, we can, through collaboration and innovation, help communities both reduce the increased demand for water and, protect stream health from the adverse consequences of land development practices.

And here is how:

WHAT IS OUR VISION?

The vision of the Partnership is that water sustainability will be achieved through implementation of green infrastructure policies and practices. How communities in BC get there relies on a change in mind-set.

WHAT IS OUR MISSION?

The mission of the Partnership is to develop tools and talent and, focus on outcomes that align regional and local actions with a provincial policy, program and regulatory framework for achieving water and watershed sustainability.

ABOUT THE WATER SUSTAINABILITY ACTION PLAN

Released by the provincial government in February 2004, the *Water Sustainability Action Plan for British* Columbia provides a partnership umbrella for advancing on-the-ground initiatives in the local government setting. In the early years, initiatives were inspired by and built on the conceptual foundation provided by *A Water Conservation Strategy for British Columbia,* released in 1998. Ian McHarg's "Design with Nature" vision has influenced Action Plan implementation. The desired outcome is to achieve settlement, economy and ecology in balance.

THE PLAN AND THE PARTNERSHIP

The Partnership is the hub for a "convening for action" network in the local government and community setting, and is responsible for delivering the Plan program through partnerships and collaboration, and embraces a vision for shared responsibility where all the players align their efforts for the common good.

The Partnership plays a bridging role between provincial, regional and local governments and, between local governments and the stewardship sector; and is the steward for *Stormwater Planning: A Guidebook for British Columbia*, a provincial guidance document released in 2002.

Under the Action Plan umbrella, the Partnership collaborates with government and others to develop methodologies, tools and resources to support implementation of the Whole-System, Water Balance approach to land use, infrastructure servicing and asset management and as a result, the protection of natural systems.

THE FOUR PILLARS OF THE PLAN

In order to achieve our mission, the Partnership has developed four pillars as illustrated on the previous page and described as follows:

1. NETWORKING AND OUTREACH: (*methods for Collaborating with Peers*)

   Our objective for this pillar is to reach key audiences through networking and outreach communication efforts to increase public awareness and assist them to help their community meet water management plans and embrace sustainability practices.

   The Partnership supports networking as a strategy to advance evidence-informed practice and policy in British Columbia. Building and sustaining networks of individuals and entities for community improvement or research includes establishing and maintaining communication channels, exchanging resources, and coordinating collaborative activities.

Our successes to date:

- Weekly e-Newsletters (e-blasts) are sent to almost 2,000 subscribers in B.C. and across Canada. These feature champions who are leading changes in practice
- Establishing **Convening for Action in British Columbia**, a provincial initiative that supports innovation on-the-ground. From the perspective of those leading and/or participating in regional programs, having this community-of-interest provides the opportunity to tell their story and record their history as a work-in-progress. To date, the Partnership has hosted or co-sponsored 96 workshops in various regions of British Columbia.

The Partnership's convening for action' mantra is that when we gather; it is for a purpose. There must be an action item or an outcome. Committed to achieving settlement in balance with ecology and economy, the grass-roots collective partnership approach is founded upon collaboration. It reaches across boundaries. It brings together those who plan and regulate land use (local government) those who build (developers) and those who provide the legislative framework (the Province) and those who engage in the community (stewardship groups and citizens).

This collaborative model results in the provision of expertise and support to local governments and organizations with a focus on achieving water sustainability through the sharing of ideas and success stories based upon a common vision.

At the level of neighbourhoods and communities, it is a matter of creating reciprocal relationships with other members of society. ... This requires that diverse members of the population build relationships, share resources, and work together in an organized way for social change

Learning about a community, whether it is defined geographically or by a common interest, means knowing the community's cultures, policy and procedures, its capabilities and assets, and its water needs and challenges. Typically, learning about a community requires a variety of approaches, including gathering existing data and generating new information, combining qualitative and quantitative data, and incorporating the perspectives of a broad spectrum of individuals, organizations, and groups

What happens on the land matters. By applying "cathedral thinking", a well thought-out blueprint and a shared commitment to inter-generational implementation can create a lasting water sustainability legacy. Convening for Action is a British Columbia process that is about moving from defining the problems (*the 'what'*), to determining options (*the 'so what'*), to taking action to achieve results (*the 'now what'*), and after that, to replicating in other communities (*the 'then what'*).

It is material that the Boards of Metro Vancouver and four Vancouver Island regional districts have passed Board Resolutions endorsing collaboration with the Partnership and supporting submissions by the Partnership to the Province. The four are Vancouver Island regional districts are Comox Valley, Nanaimo, Cowichan Valley and Capital Region.

Each regional district and its member municipalities have been taking steps to plan for water sustainability and pit place implementation strategies.

Each region has developed a provincially significant plan or approach to achieve over the long term, water and watershed sustainability. All are striving to implement a consistent regional approach that protects and/or restores natural watershed function over time.

The experience and insights yielded by the Convening for Action programs in Metro Vancouver and on the east coast of Vancouver Island are described in *Beyond the Guidebook 2015: Sustainable Watershed Systems, through Asset Management*. This provincial guidance document presents the framework for a 'regional team approach' to water and watershed sustainability.

2. EDUCATION AND TRAINING (*programs and frameworks for Providing Current Knowledge*)

Our objective for this pillar is to assist in the development and/or improvement of outreach and education programs and training materials focusing on water management.

Our successes to date:

- The Partnership embraces shared responsibility, and is responsible for delivering the Action Plan program through partnerships and collaboration. This program includes the Georgia Basin Inter-Regional Educational (IREI) initiative, the umbrella for the *Sustainable Watershed Systems through Asset Management* program.
- Launched in 2012 by the Partnership in collaboration with the five aforementioned regional districts, the (IREI) provides local governments with a mechanism for sharing and learning from each other through collaborative processes.

Secondly, it provides the framework for consistent messaging and consistent application of tools and understanding. Thirdly, it helps the champions in each region understand what the other regions are doing, what works and what does not. Now, the Metro Vancouver region and four largest Vancouver Island regional districts are collaborating to make the link between local government services, the infrastructure that supports the delivery of those services, and watershed health.

- The Partnership is supporting the government of British Columbia and the Union of B.C. Municipalities with implementation of **Asset Management for Sustainable Service Delivery: A B.C. Framework** (i.e. "the Framework"). This is being accomplished by means of the *Sustainable Watershed Systems through Asset Management* program, which is co-funded by the governments of Canada and British Columbia.

  In BC, with the introduction of the new Water Sustainability Act, a greater awareness is building about the importance of planning from a watershed perspective and using asset management approaches.

  Under the *Sustainable Watershed Systems through Asset Management Program,* the educational goal of the IREI is to build practitioner capacity within local government to implement a whole system, water balance approach. No longer is asset management only about hard engineered assets such as watermains, sewers and roads. Watershed systems are also infrastructure systems. The BC Framework sets a strategic direction that would focus business processes on outcomes that reduce life-cycle costs and risks.

3. CAPACITY BUILDING (*helping to Integrate Sustainability into Professional Practice)*

Capacity building is the process by which individual and organizations obtain, improve, and retain the skills and knowledge needed to do their jobs competently. Community capacity building is a conceptual approach to social, behavioural change and leads to infrastructure development in case of water and sanitation that focuses on understanding the obstacles that inhibit people, governments, international organizations and non-governmental organizations from realizing their development goals while enhancing the abilities that will allow them to achieve measurable and sustainable results.

Our objective for this pillar is to establish and strengthen effective partnerships with communities and organizations to influence choices and encourage action so that water stewardship will become an integral part of their water management goals.

Our successes to date:

- The *Sustainable Watershed Systems through Asset Management* program showcases Green Infrastructure strategies used by local governments in environmental protection and infrastructure design. To protect watershed health, engineered infrastructure ought to fit into natural systems rather than the other way around. The new paradigm is that watersheds are infrastructure assets, providing water balance services. Currently, the *Sustainable Watershed Systems through Asset Management* program is comprised of three initiatives:

  - **Ecological Accounting Process:** Local governments would use EAP to develop a more complete financial picture. Sustainable service delivery would then be more robust with the inclusion of the value and costs associated with the use of services from natural assets as municipal infrastructure. Two case study areas are underway for applying/testing EAP.

  - **Water Balance Methodology** / **Model** / **Express:** Local governments would use the suite of Water Balance online tools to both establish and implement performance targets for restoring hydrologic integrity, and thus the water balance. The existing tools will be enhanced to support EAP plus expand their use.

  - **Professional Development & Outreach:** A program of teaching, training and mentoring would ensure consistent understanding of WHY and HOW to apply methodologies and tools, and would build up practitioner capacity within local governments and communities thus advancing water and watershed sustainability outcomes, and sustainable service delivery.

- Implementation of the whole-system, water balance approach branded as *Sustainable Watershed Systems through Asset Management* will help build practitioner capacity within the local governments. Comprehensive and coordinated use of the decision support tools and calculators located on the waterbucket.ca website will help communities achieve this desired outcome.

- Implementing a rolling 3-year plan on the waterbucket.ca website to support capacity-building by showcasing projects, tools and activities that strengthen the ability of local governments to develop and implement integrated community sustainability planning. Through the family of communities-of-interest that form the waterbucket.ca website, provide local governments with a 'sustainability lens' through which they can view their plans and planning activities. The plan will materially enhance the technological capabilities of the website such that users will be able to make more effective use of the resources available.

4. PRODUCTS AND TOOLS (*that enable clear justifications to implement solutions and help assess performance and opportunities for improvement*)

   Our objective for this pillar is to provide on-line web based tools that enable organizations and communities to better understand their relationship to water and water management and initiate and/or implement water sustainability strategies and plans.

Our successes to date:

- **The Water Balance Mode**l (WBM) was developed as an extension of *Stormwater Planning: A Guidebook for BC*. It is a web-based tool for doing scenario comparisons and decision support. It the Whole-System, Water Balance approach. It is a tool that fills a gap not covered by commercial software. To date, over 7,500 subscribers have used the WBM. As well, several universities, including UBC, are using the WBM as part of their curriculum.

  In 2005, integration of QUALHYMO with the WBM interface, resulted in the *WBM powered by QUALHYMO*, a truly pan-Canadian tool. The WBM was enhanced to provide information to a continuum of users with a wide range of technical backgrounds – ranging from little technical knowledge to hydrologic experts. Dr. Charles Rowney is the Scientific Authority for the Water Balance family of tools.

  The QUALHYMO engine can simulate surface hydrology as well as pollutant loads associated with surface runoff, and can route flows and pollutant loads through stream channels and rainwater/stormwater management facilities such as detention ponds.

  The tool consists of numerous modules which simulate parts of the hydrologic cycle, and which can be combined to simulate a wide range of conditions. It links the site to the watershed and stream and it helps communities establish performance targets and 'design so that land development mimics the water balance. The model is tailored to multiple levels of users who have a wide range of technical backgrounds, from hydrology experts to community stewardship groups.

- The **Beyond the Guidebook Initiative** is adding depth to specific aspects of the *Stormwater Planning: A Guidebook for British Columbia*, released by the government of B.C. in 2002.

  BC was the first province or state in North America to adopt the Water Balance Methodology. This enables local governments to establish performance targets for land use. The goal is to protect watershed and stream health. The goal is to inform and educate infrastructure, land use and environmental professionals and community stewards about core concepts related to implementing actions at the site scale that will achieve desired outcomes at the watershed scale.

  The Guidebook established a guiding principle that achievable and affordable performance targets at the watershed scale provide a starting point to guide the land use actions of local government in the right direction. The Water Balance Model Online enables the user to evaluate and establish performance targets for rainwater capture and runoff control. The desired outcome is to protect and/or restore stream health.

To date, there are three (3) guidance documents in the *Beyond the Guidebook Series* (released in 2007, 2010 and 2015) and six (6) primers in the *Beyond the Guidebook Primer Series*. The goal in producing the periodic guidance documents and Primer is to facilitate inter-regional collaboration, such that sharing and cross fertilization of experience and understanding helps all local governments go farther, more efficiently and effectively. The scope of this work is summarized below.

Primer #1 - Primer on Rainwater Management in an Urban Watershed Context: The purpose of this Primer is to provide engineers and non-engineers with a common understanding of how a science-based approach to rainwater management has evolved since the mid-1990s

Primer #2 - Primer on Urban Watershed Modelling to Inform Local Government Decision Processes: The purpose of this Primer is to provide engineers and non-engineers with a common understanding regarding 'appropriate and affordable' computer modelling. A guiding principle is that the level and/or detail of modelling should reflect what information is needed by local government to make an informed decision. The Primer addresses two dimensions of an ISMP (Integrated Stormwater Management Plan)

Primer #3 - Primer for Integrated Rainwater and Groundwater Management: The federal-provincial Regional Adaptation Collaboratives (RACs) Program provided funding for development of this Primer. The purpose of the RACs Program is to support coordinated action towards advancing regional climate change adaptation decision-making.

Primer #4 - Industry Standards of Practice in Implementing Rainwater Management: This Primer supports implementation of targets and actions listed in "Living Water Smart: British Columbia's Water Plan". The targets and actions establish expectations as to how land will be (re)developed:

Primer #5 - Primer on Water Balance Methodology for Protecting Watershed Health: This Primer supports implementation of targets and actions listed in "Living Water Smart: British Columbia's Water Plan". The targets and actions establish expectations as to how land will be (re)developed so that stream and watershed health are protected and/or restored.

Primer #6 - Primer on Application of Ecosystem-based Understanding in the Georgia Basin: The Primer serves as a refresher on core concepts that underpin the vision for Sustainable W atershed Systems, through Asset Management, released by the Partnership in November 2015.

- The **Water Balance Express for Landowners** was created to spur changes in practice. Although it may be viewed by some as an educational tool, use of the Express would help local governments achieve a regulatory outcome that is framed this way: implement performance targets, restore stream health.

Homeowners can locate their property on a map, recreate their current house and yard, and then like Lego, add building blocks of different rainwater management features to the property, to reduce their property's runoff and infiltrate more water into the soil.

The Express is integrated with Google Maps / Earth and land use zoning. Also, the Express has pre-set, region-specific Water Balance performance targets for volume, infiltration and flow. An image of a gauge provides a visual measure of stream health.

- The **Drainage Infrastructure Screening Tool** (DIST) was co-funded by the governments of Canada and British Columbia, the Metro Vancouver Regional District and others under a climate adaptation program. DIST was developed in 2012 in recognition of the need to look at drainage analysis differently. With the support of the BC Ministry of Environment support and federal funding, the Partnership developed this tool to add to the practitioner toolbox.

The Partnership recognized that good engineering is all about knowing when and how to ask the right questions before diving into technical analyses. Drainage engineers who are experienced in modelling storm sewer systems (for drainage collection and conveyance) know that 'problems' fall within a narrow range. A lesson learned through experience is that one need not model every section of pipe.

Many storm sewer systems operate without serious problems for many years. Yet many engineering studies recommend plans for pipe replacement and upsizing that would cost multi-millions of dollars, money that local governments do not have. Reliance on complex computer models and inflexible application of design standards may be having unintended consequences.

The tool is an intermediate step in the assessment process, not a replacement for detailed analyses. The added value it provides is the capability to look at how land use densification and climate change would affect storm sewer systems.

- Requested by the province and farmers, the **Water Licencing Tool** uses the climate grid data that was generated for the water demand model to determine the amount of water that a grower should apply for. It has been integrated into the water licencing process and is used by provincial water staff as well as agricultural producers.. The tool will calculate irrigation water use based on soil, crop and irrigation system type and climatic conditions for the farm location. Livestock water use can also be calculated. The tool also generates a report that can be submitted as a planning document to the province under the licencing process.

- The **Water Use Reporting Tool:** The province is considering a regulation requiring all licenced large water users to report their water use annually. This would be particularly cumbersome for farmers and producers in BC. The Partnership has worked with the province and the Okanagan Basin Water Board in producing a water use reporting tool that can be used by farmers to calculate water use and submit water use reports.

- The Partnership is now in the last year of a five year agreement with the Ministry of Agriculture to deliver the **Agriculture Water Demand Model** program. The model won the Premiers Award in the innovation category in 2010. This past year Metro Vancouver Region was resurveyed along with new surveys in Squamish Lillooet and Mt Waddington. Extensive work was completed on digitizing soils data in regions where the model is operational. The AWDM has also been transferred over to a new platform that will allow the model to be run from a website in a future date if desired. To date, the entire southern half of the province is operational. The Cariboo, parts of the Nechako and the Peace River remain to be completed. The climate data layer required to operate the model has been completed for the entire province and has also been used to develop the Water Licence Calculator.

- The **Water Conservation Calculator (WCC)** was originally designed for use by small to mid-size communities and is a free, web-based decision-support tool. It is used to illustrate how specific water conservation measures can yield both fiscal and physical water savings for communities. It can be used to assist communities in meeting the conditional requirements of provincial capital grant programs while meeting both local and provincial commitments to water sustainability. The WCC produces charts and a printed report intended to support the case or water conservation when presented to decision makers. Other key functions of the WCC include:

  - Providing useful information on the current state of the water system
  - Offering a “snap shot” of future demands and the positive impacts of conservation on those demands
  - Assisting in more accurately targeting conservation efforts, thereby increasing the cost effectiveness of conservation initiatives
  - Assisting in decision making around new infrastructure by illustrating the possibility of capital deferment

- Developed in conjunction with the Irrigation Industry Association of British Columbia, the **Agricultural Irrigation Scheduling Calculator** helps irrigators in British Columbia determine a schedule for their irrigation system. The calculator works in real time and obtains daily Evapotranspiration (ET) rates  from climate stations linked to www.Farmwest.com. For cases where climate stations are not available; the Calculator allows users to input local ET data that reflects the climate conditions at their specific location. The calculator uses crop, soil irrigation system and climate information to determine when an irrigator should irrigate. The calculator works for both landscape and agricultural systems and is able to accommodate all types of irrigation systems.

- Recognizing a need for a single point of access to news, information and tools for sustainable water management in BC, the **waterbucket.ca website** was launched in 2005. The site supports an array of  virtual "communities of interest" with features that resemble those of a real community as well as a growing library of information resources on the BC experience and it houses "Made in BC" tools and experience.

  A goal of waterbucket.ca as a province-wide communication vehicle is to play a supporting function in achieving the desired outcome that has been stated for Integrated Community Sustainability Planning and that is - to advance the environmental, economic, social and cultural sustainability of British Columbia's communities.

  As an example: in 2016 the waterbucket.ca website was the first source of reference guide for the University of British Columbia School of Architecture and Landscape Architecture Vertical Studio titled "Storm Water Design: From Source to Stream. David Matsubara a Civil Engineer from the City of North Vancouver was one of the professional advisors throughout the studio.

- For the past 5 years the Partnership has co-hosted an **Annual Water Sustainability Workshop** in partnership with the Irrigation Industry Association of British Columbia. These workshops serve as an outreach and professional development event, sharing information on innovative developments in water sustainability and introducing "big ideas". The most recent, the Blue Ecology Workshop was held in November 2017, in Richmond B.C.

Blue Water Ecology Workshop

No longer is climate change a future scenario. It has happened more quickly than predicted. The real story is the accelerating rate of change, especially since extreme events create their own weather. Adapting to a changing climate requires transformational changes in how we apply hydrologic understanding, value nature, and service land.

Blue Ecology is a message of hope. Blue Ecology is an ecological philosophy that looks at the water cycle differently to interweave First Nations and Western thought. Interweaving is a collaborative process. Designed to be a conversation starter, the Blue Ecology Workshop had a town-hall format that created a 'sharing & learning' atmosphere for interaction between the audience and the presentation team.

Storytelling is Powerful

We learn from stories. Flashback to September 2014. The Regional District of Nanaimo (RDN), a partner in the *Georgia Basin Inter-Regional Education Initiative* (IREI), co-hosted a walkabout with First Nations elders on the banks of the Englishman River. IREI representatives travelled from the Metro Vancouver region and four regional districts along the east coast of Vancouver Island to participate.

Reconnect with Nature

The storytelling by the elders opened our eyes and minds. In the outdoor setting, and with the sounds of the river and birds in the background, the cultural experience was personal and profound. The storytelling triggered an Aha Moment about the way water is valued by First Nations. Consequently, the Partnership leadership resolved to find a way to connect the dots between Western understanding of the water cycle and First Nations traditional knowledge

A Potential Game-Changer

We then discovered that Michael Blackstock had already trail blazed the way forward two decades earlier when he developed the **Blue Ecology water cycle**. The next step was to connect with Michael. We promptly concluded that the moment had come to mainstream Michael's vision for Blue Ecology - and especially in the local government setting - because we believed that wholehearted application of this ecological philosophy would be a game-changer for water resource management

A Water-First Approach

What we are essentially talking about is reconciliation: going back to the headwaters of where we got our relationships with water and with one another wrong; and then starting back down the river of time – this time together – with a full understanding of the importance of embracing a **water-first approach** to planning human interventions in the environment.

Because Our Climate is Changing!

The warming of the planet's atmosphere is causing water to move more quickly and disruptively through the global water cycle. Local consequences are magnified. To make the right choices moving forward, decision-makers at all levels and scales must understand how and where the rhythms of water are changing. After that, collaborate to adapt our land use and infrastructure servicing practices appropriately!

The gravity of the situation calls for a **Whole-System, Water Balance Approach** to the built environment. Successful implementation would depend on all the players – including politicians, planners, landowners, designers and implementers - collectively choosing to build on the Blue Ecology philosophical foundation. If they did, we would be on our way to 'getting it right' as communities develop and redevelop land.

Blue Ecology: A Bridging Philosophy

"Over the generations, we have lost our way," states Michael Blackstock. "Western science is not wrong. It is just not complete. It does not account for water as part of a living ecosystem. The journey to a water-resilient future starts with Western science acknowledging water for its central functional and spiritual roles in our world.

A New Way of Looking at Water

"Blue Ecology is an ecological philosophy, which emerged from interweaving First Nations and Western thought. It is meant to be a companion because it augments existing Western science hydrology rather than displacing this knowledge."

"Hydrologists and water managers can help build a brighter future by rediscovering the meaning of water, and interweaving the predominant Western analytical models with the more intuitive indigenous models. Blue Ecology's philosophy is meant to be the bridge between these two cultural ways of knowing.

"Blue Ecology is an incremental example of how we can interweave cultural perspectives on water, but that is just a starting point in this new era of *interweaving*. There is hope for future generations if we take a **water-first approach** to setting priorities," concluded Michael Blackstock.

- **More success to come:**

The upcoming Water Symposium in Nanaimo (April 11th and 12th 2018) will focus on watershed stewardship, the water balance and restorative development. Adapting to climate change requires transformation in how we value nature and service land. The symposium is an outreach and professional development event, held under the umbrella of the Georgia Basin Inter-Regional Education Initiative, and designed to foster a conversation in the Nanaimo Region about "Sustainable Watershed Systems, through Asset Management"

The symposium will show that an informed stewardship sector can be a catalyst for action and show what stewardship groups are already doing to make a difference.

Renowned author and speaker Bob Sandford, EPCOR Chair for Water & Climate Security at the United Nations University, will set the tone for the symposium. What we are essentially talking about is reconciliation: going back to the headwaters of where we got our relationships with water and with one another wrong so that we can start back down the river of time – this time together – with a full understanding of the importance of embracing a water-first approach to planning human interventions in the environment," urges Bob Sandford.

Success can only be accomplished through the integration of efforts of practitioners including our many partners in the provincial government, local governments and non-profit societies. Our successes are only possible with their support and efforts.

The Partnership, Looking Forward

There is no question that water resiliency will be the focus of the future and will be an essential condition to maintain a stable society and an effective economy, as it is a given that water is truly the connector of all activities on earth. This realization demands innovation and creative partnerships, heretofore not considered possible.

From Awareness to Action:

It is against this backdrop that the Partnership was formed in 2010 with a specific focus of promoting the protection and management of natural and engineering water resources in British Columbia.

This has been achieved through a combination of strategies, including, partnerships, education, innovation, networking, outreach, capacity building and the provision of products and tools. This translates to action on the ground and an effective, as well as a forward thinking approach to water management in British Columbia and beyond.

Collaborate, Collaborate, Collaborate:

In essence, central to the success of the Partnership has been the collaboration developed with provincial, regional, local levels of government and the community, through the provision of leadership, innovation and expertise, "stepping outside the box" and "looking outside the pipe" for solutions that address the reality of climate change and its impact on water management.

This is a major shift from addressing water management through an infrastructure response alone, to recognizing the role of natural systems in achieving water resiliency and stability, given the backdrop of an unpredictable water cycle.

Provincial Influence:

By way of information, the Partnership members have also been involved in the development of many of the key water policy initiatives in BC including the Water Conservation Strategy of BC, the Water Sustainable Action Plan for BC, the new Water Sustainability Act, and the Stormwater Planning, A Guidebook for BC, as well as hosting or co-sponsoring almost a 100 workshops including a number of conferences.

Vision + Pragmatism:

Indeed future planners, engineers, scientists, politicians and citizens alike will be called upon to demonstrate both vision and pragmatism, working as a team towards consensus, commitment and collaboration for the common good. Such collaboration is essential and must cross all political and community boundaries given that climate change is no respecter of such creations. This premise is fundamental and the basis for each of the Partnership initiatives.

In effect we are being challenged to re-assess our thinking regarding how we practice water management in the 21st century. Albert Einstein captured the challenge well when he observed: *"No problem can be solved from the same consciousness that created it. We have to see the world anew."* The Partnership has accepted this challenge and its implementation.

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Governments of Canada and British Columbia fund Georgia Basin Inter-Regional Education Initiative

Moving Towards "Sustainable Watershed Systems, through Asset Management"

Water Sustainability Action Plan for British Columbia

Published on the waterbucket.ca Website – April 2017

ASSET MANAGEMENT FOR SUSTAINABLE SERVICE DELIVERY:

"Collaboration is leading to precedents for integrating watershed systems with land use and infrastructure decisions," stated Jon Lefebure, Chair of the Cowichan Valley Regional District

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Collaborating under the umbrella of the Georgia Basin Inter-Regional Education Initiative[1] *(IREI), the Cowichan Valley Regional District is one of five regional districts sharing and learning from each other about how to implement* "Sustainable Watershed Systems, through Asset Management"[2].

The other IREI partners are Capital Region, Nanaimo Region, Comox Valley and Metro Vancouver. Together, the five represent 75% of British Columbia's population. The not-for-profit Partnership for Water Sustainability in BC is the IREI secretariat.

On March 17th 2017, the governments of Canada and British Columbia announced program funding for Sustainable Watershed Systems. The Cowichan Valley Regional District (CVRD) acted on behalf of the partners to receive the capacity-building grant from the Clean Water and Wastewater Fund (CWWF).

The Partnership has undertaken to help build local government capacity to implement Sustainable Watershed Systems, through Asset Management. Tools and programs are accessible, replicable and align fully with the strategy to implement Asset Management for Sustainable Service Delivery: A Framework for BC[3]

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[1] http://waterbucket.ca/viw/category/inter-regional-education-initiative/

[2] http://waterbucket.ca/rm/category/sustainable-watershed-systems/

[3] http://waterbucket.ca/wscblog/files/2015/01/Asset-Management-for-Sustainable-Service_Delivery_A-Framework_for_BC_Dec-2014_short-version.pdf

Sustainable Watershed Systems – thru Collaboration!

Asset management for sustainable service delivery occurs alongside associated evolution in community thinking. It is a continuous quality-improvement process, and incremental. A local government would experience the asset management process for sustainable service delivery as a continuum leading to a water-resilient future. ***Sustainable Watershed Systems*** *would be the outcome in Step Three.*

In Step Three, the principal focus of the ***Ecological Accounting Process*** *is on the investment of resources already made by many stakeholders, as well as their aspirations concerning the management (prevention of degradation to and work on enhancement) of ecological services in the creekshed.*

Sustainable Watershed Systems and the Asset Management Continuum

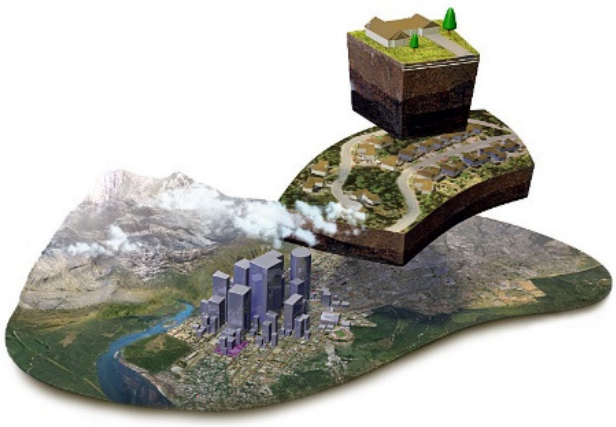
GROUND ZERO: There is no **Asset Management Plan**.
There is an 'unfunded infrastructure liability'.

STEP ONE: Embrace the **BC Framework**. Focus on engineered assets.
Develop Asset Management Strategy / Plan / Program.

STEP TWO: **Sustainable Service Delivery** is standard practice.
Think holistically. Implement life-cycle approach.

STEP THREE: Apply the **Ecological Accounting Process**. Account for Water Balance Services provided by naturally functioning watersheds.
Assess hydrology to accurately describe ecological services.
Integrate climate adaptation into asset management.

As understanding grows, local governments progress incrementally along the **Continuum**



THE OUTCOME?

A Sustainable Watershed System!

Never forget that a watershed is an integrated system – with three flows *(surface, shallow horizontal, and deep vertical),* **each with a different time scale**

OPINION: Vision for "Sustainable Watershed Systems" resonates with audiences in BC and beyond

By Kim Stephens, M.Eng., P.Eng, Executive Director
Partnership for Water Sustainability in BC

A new way of thinking about municipal infrastructure has the attention of the local government world. Simply put, natural watershed systems are infrastructure assets – we must manage and protect them as such.

A mere fifteen months ago the Partnership for Water Sustainability framed the following **program goal** for the Georgia Basin Inter-Regional Education Initiative:

> *By 2017, local governments would understand how to achieve "Sustainable Watershed Systems, through Asset Management"*

At the dawn of 2017, the purpose of this article is two-fold: take stock of our progress in 2016 to inform and educate; and foreshadow where we may be at year-end

The desired outcome that would flow from Sustainable Watershed Systems is a water-resilient future. This way of thinking builds on the vision for *Asset Management for Sustainable Service Delivery: A Framework for BC*; and has twin technical pillars – Water Balance Methodology and Ecological Accounting Protocol.

Understanding leads to action. Getting there is a step-by-step process to build practitioner capacity to get the job done. Presently, we are creating awareness of the goal.

Looking Back: What We Accomplished

Early uptake of the vision for Sustainable Watershed Systems has exceeded our expectations. There is clearly interest and an appetite to learn more. It is an idea whose time has come.

Asset Management Continuum: Starting in November 2015, we have introduced the Asset Management Continuum (see image below) to an array of audiences in a variety of forums and media.

Our key message is that Sustainable Watershed Systems will be the outcome in Step Three. But it is not a wait-and-see proposition. Even as local governments are progressing through Steps One and Two for their core infrastructure, they need to be laying the groundwork so that they will be ready to implement Step Three.

Our outreach program for sharing the Sustainable Watershed Systems message is broadly based. Within the initial 12-month period, getting the word out involved constantly making presentations to inform and educate:

> Regional boards and municipal councils (6), conference audiences (6), local government technical groups (3), professional groups (1), stewardship sector (1) and university classes (2).

So, what were the defining moments in 2016? In August, my keynote address at a national conference in Australia provided a platform to reflect on "parallel journeys". In October, publication of an op-ed in the Vancouver Sun demonstrated that our whole-system, water balance message is news worthy.

Asset Management Continuum for Sustainable Service Delivery

GROUND ZERO: In the beginning, no **Asset Management Plan** exists. A consequence is an 'unfunded infrastructure liability'.

STEP ONE: Local governments embrace the BC Framework, with an initial focus on core engineered assets (water supply, sewage, roads) and embark on an **Asset Management Strategy / Plan / Program** process.

STEP TWO: Local governments start thinking holistically and implement a life-cycle approach to infrastructure decision-making so that **Sustainable Service Delivery** for engineered assets becomes standard practice.

STEP THREE: For the drainage function, local governments will integrate natural systems thinking and climate adaptation into asset management and account for the **Water Balance Services** provided by watershed systems.

As understanding grows, local governments will progress incrementally along the **Continuum**

Australian Keynote: The BC approach to infrastructure asset management has learned from and built upon Australian experience, and is now taking asset management to another level with *Asset Management for Sustainable Service Delivery: A Framework for BC*.

To develop a storyline on parallel journeys for my 2016 keynote, I interviewed a cross-section of "water thought leaders" from across Australia. These conversations allowed me to identify over-arching themes that shaped my storyline and relevancy to an Australian audience.

The conference then served as the moment of truth for audience response. Would Australians be receptive to the storyline? Would they understand our way of watershed systems thinking? Would they grasp the significance of the Asset Management Continuum?

Just as the BC Framework has garnered both Canada-wide and international attention, so too is "Sustainable Watershed Systems, through Asset Management" attracting interest in our pragmatic whole-system, water balance approach to GETTING IT RIGHT.

Other regions recognize BC as a leader. They perceive BC moving in the right direction with integration of watershed systems thinking and asset management. International exposure allows us to judge how BC stacks up against the rest of the world.

Journey to a Water-Resilient Future

Visit https://youtu.be/JCrdEkK61GY to watch and learn how I introduced Australians to three "big ideas" that underpin where we are heading in BC, namely: Primacy of Hydrology, Shifting Baseline Syndrome, and Cathedral Thinking. The three are interconnected. The outcome would be Sustainable Watershed Systems.

Changes in hydrology, not water quality, must be the primary focus. If we can get the hydrology right, and recreate watershed systems, then as an added benefit the water quality would be greatly improved.

The good news is that redevelopment creates an opportunity. If we do get the hydrology right the second time, and restore the **watershed system**, this would then reset the ecological baseline.

Coined by University of British Columbia's Dr. Daniel Pauly, the Shifting Baseline Syndrome describes an incremental and imperceptible eroding of expectations and standards that results from each new generation lacking knowledge of the historical condition of the environment.

Resetting the ecological baseline would take time, inter-generational commitment, and perseverance. This is the essence of "cathedral thinking" which describes our BC vision for **Sustainable Watershed Systems.**

In embarking on the journey to a water-resilient future, we can learn from our ancestors. The foundation for cathedral thinking is a far-reaching vision, a well thought-out blueprint, and long-term implementation.

These ideas resonated with the audience in Australia, and opened eyes and minds to a different way of thinking. These ideas are also resonating with audiences in British Columbia.

Looking Ahead: What is on the Horizon

The BC Framework links local government services, infrastructure that supports service delivery, and watershed health. Thus, it sets a strategic direction that would refocus business processes to properly manage **watershed systems** within the built environment:

> *Mimic natural flows in streams. Preserve the natural pathways by which water reaches streams. Slow, spread and absorb runoff.*

Benefits of the whole-system approach include less flooding, less stream erosion, and more streamflow during dry weather when needed most. These water balance benefits ultimately translate into lower life-cycle costs and a water-resilient future!

But there is a caveat - moving from understanding to implementation requires a sustaining commitment by local governments to implement 'standards of practice' that restore the desired watershed condition over time.

Some communities already have some of the puzzle pieces needed to ensure a water-resilient future. What is lacking, however, are precedents that demonstrate HOW to fit those pieces together to form a complete puzzle picture…..AND also 'walk the talk' to implement a pragmatic whole-system approach that resets the baseline. This is a major gap. The Partnership is working with our local government partners to fill it through development of the **Ecological Accounting Protocol**.

By the end of 2017, success would be measured by progress on two case studies that would refine, apply and test application of the Ecological Accounting Protocol to show that: *To protect watershed health, engineered infrastructure out to fit into natural systems, rather than the other way around*.