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Waterbucket eNews on June 7, 2022 https://waterbucket.ca/wscblog/

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Living Water Sma in British Columbi lopment and atershed COLLEGITO

Note to Reader:

Waterbucket eNews¹ celebrates the leadership of individuals and organizations who are guided by the vision for Living Water Smart in British Columbia².

The edition published on June 7, 2022 featured Peter Law and the "story behind the story" of *Stormwater Planning: A Guidebook for British Columbia*, released in June 2002. Without Peter Law, there would have been no Guidebook. Peter saw the need, garnered support within government, and was hands-on in shepherding the Guidebook from inception to completion.

The umbrella for Partnership initiatives and programs is the Water Sustainability Action Plan for British Columbia³. In turn, the Action Plan is nested within Living Water Smart, British Columbia's Water Plan.



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

PART ONE - Editor's Perspective



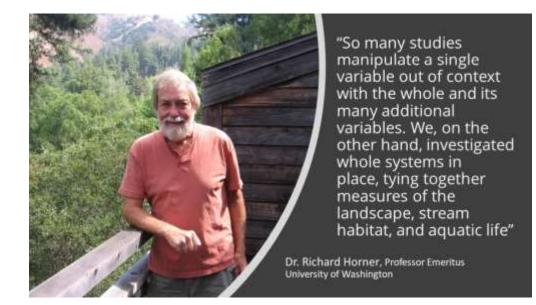
"The Ministry of Environment appreciates that the Partnership for Water Sustainability embraces shared responsibility for *Stormwater Planning: A Guidebook for British Columbia* and is also adding depth to the Guidebook through the *Beyond the Guidebook Series,*" stated Wes Shoemaker, former Deputy Minister, in a letter to the Partnership (February 2016)

Story behind the story of "Stormwater Planning: A Guidebook for BC"

Rollout of the Fish Protection Act in 1997 was the catalyst for my collaboration with Peter Law over the past 25 years. At the time, Peter was a member of the inter-ministry working group tasked with developing the **streamside protection regulation**. A defining moment was a consultation workshop hosted by the Union of BC Municipalities in October 1997.

Washington State's Bill Derry and I presented what were soon known as the "**fish pictures**". One of the first stormater utility managers, Bill Derry chaired a local government committee that was instrumental in founding a research centre at the University of Washington. Their mission was to understand and correlate changes on the landscape with impacts on stream system condition.

Bill's committee framed eight key questions. These then defined areas of research by graduate students under the guidance of Dr. Richard Horner. Chris May then pulled together this original research in his PhD dissertation. His doctoral work is the foundation that the Partnership continues to build on as our understanding of the science grows.

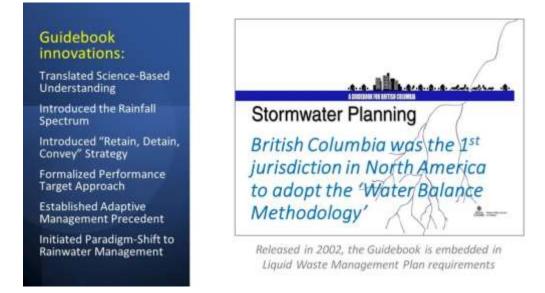


Application of science-based understanding

The context for B.C.'s Fish Protection Act was the "salmon crisis" in the Salish Sea bioregion. Bill Derry and I developed the "fish pictures" to explain the **science of land use change** to local government audiences. These graphics were powerful communication tools.

At the conclusion of Bill and my presentation, the chair (Erik Karlsen) of the streamside regulation working group observed, "At last, we have a science-based understanding of cause-and-effect. This is our point of departure for action to protect stream systems."

Within five years, and as a direct result of Peter Law's tireless efforts, the provincial government released Stormwater Planning: A Guidebook for British Columbia. The fish pictures are incorporated in the Guidebook.



"The volume-based approach that is being implemented in British Columbia picks up the baton that Stanford University's Dr. Ray Linsley started more than a generation ago. He had little or no use for 'simple hydrology' and the many simple equations that were used to represent the hydrologic cycle."



Dr. Thomas Debo is a Professor Emeritus at the Georgia Institute of Technology, and co-author of the best-selling textbook "Municipal Stormwater Management"

A stream is a system

Peter Law had a clear and pragmatic vision for developing a Stormwater Guidebook for British Columbia. Guided by a mantra of "affordable and effective", the Guidebook team built on Puget Sound research and validated our "made in BC" approach through case study experience.

A stream is a system, but that is not how land and drainage practitioners treat streams. Moreover, high-level policy statements are often not helpful. To achieve the twin goals of stream stability and aquatic habitat protection, we literally had to re-invent urban hydrology (*To read an article published in 2003, go to Appendix 1*). These one-two drivers resulted in the Water Balance Methodology which transcends the 'voodoo hydrology' and simple equations that characterize standard engineering practice.

Two local governments - City of Chilliwack and the Regional District of Nanaimo - stepped up to serve as **Guidebook feedback loops** to test the water-centric approach to development planning. Numerous other local governments also contributed (District of North Vancouver, Surrey, Kelowna, Coquitlam, Maple Ridge, Metro Vancouver), as well as the City of Burnaby and the UniverCity Sustainable Community at Simon Fraser University.

Kim A. Stephens, MEng, PEng, Executive Director Partnership for Water Sustainability in BC January 2022



PART TWO - Restore the 'natural Water Balance' to stabilize streams, restore aquatic habitat, and sustain summer streamflow

Twenty years ago in June 2002, the government of British Columbia released Stormwater Planning: A Guidebook for British Columbia. This moment of celebration is the opportunity to reflect on what we know in order to foreshadow what comes next.

The Guidebook was immediately recognized across North America for its science-based foundation and its innovation. Tom Schueler, the respected thought leader who founded the Center for Urban Watershed Protection, extolled the Guidebook because of the nightand-day contrast with cookie-cutter guides and manuals in the United States.

The Guidebook demonstrates how to apply a Watershed / Landscapebased Approach to Community Planning a description coined by the late, great Erik Karlsen (1945-2020). Developed by a Metro Vancouver intergovernmental working group concurrently with the Guidebook, the importance of this landmark document is now lost in the mists of time.

The Guidebook premise is that land development and watershed protection can be compatible, BUT ONLY IF communities apply systems thinking and **Design With Nature** to restore the natural water balance.

"In the United States, too often we see a cookie-cutter approach when guidebooks and manuals are replicated across the country. Not so with the British Columbia Guidebook – it is unique, and it is innovative. I really like what British Columbia did."



TOM SCHUELER FOUNDER (1992) & FORMER EXECUTIVE DIRECTOR, CENTEE FOR URBAN WATERSHED PROTECTION, MARYLAND

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The BC Guidebook is also a pioneer application in North America of an adaptive approach to urban drainage. This means learning by doing. The guiding principle is: **"Change direction when the** science leads to a better way." In other words, the adaptive approach is outcome-based.

Guidebook is a Shared Responsibility

The story behind the story is about the visionary leadership of the Ministry of Environment's Peter Law, Chair of the Guidebook intergovernmental steering committee. Without Peter Law, there would have been no Guidebook. Peter saw the need, garnered support within government, and was hands-on in shepherding the Guidebook from inception to completion.

When the Partnership for Water Sustainability morphed from an intergovernmental technical committee into a non-profit legal entity in 2010, the Ministry of Environment entrusted the Partnership with responsibility as stewards of the Guidebook. Peter Law is a founding Director of the Partnership.

"I AM APPRECIATIVE THAT THE PARTNERSHIP IS THE STEWARD OF THE STORMWATER GUIDEBOOK. IT IS AT THE CORE OF WHO WE ARE. WITH THE PASSAGE OF TIME, IT IS CLEAR THAT WE GOT IT RIGHT WITH OUR APPROACH."



Peter Law, founding Director, Partnership for Water Sustainability in BC

Beyond the Guidebook Series

The Guidebook is the foundation document for the Beyond the Guidebook Series of guidance documents. The titles themselves tell a story about the partnership journey in building on the Guidebook through case studies that showcase and celebrate good work, and advance implementation of science-informed approaches.

Context for Rainwater Management and Green Infrastructure in British Columbia (2007)

Implementing a New Culture for Urban Watershed Protection and Restoration in British Columbia (2010).

Moving Towards "Sustainable Watershed Systems, through Asset Management (2015).

The fourth in the series, scheduled for release in June 2022, is titled **A BC Strategy for Community Investment in Stream Systems**.

PART THREE - Land development and watershed protection can be compatible

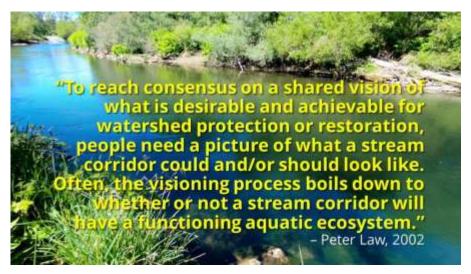
Conversational interview with Peter Law about the 'story behind the story' of the Stormwater Guidebook

Twenty years after release of the Guidebook, how water gets to a stream and how long it takes, is still not widely understood among drainage practitioners and local government decision-makers. "When I look back, the thing that disappoints me is how long it has taken for the practitioners to apply the approach versus playing lip service to what we were requesting at the time," stated Peter Law in a moment of reflection.

For the past decade, as a volunteer streamkeeper, Peter Law has been putting Guidebook principles into practice in Shelly Creek. This is the last fish-bearing stream in the City of Parksville. Peter is Vice-President of the Mid Vancouver Island Habitat Enhancement Society.

With support from the Partnership for Water Sustainability, MVIHES has undertaken a range of demonstration applications that push the envelope of contemporary practices. As Peter Law often reminds those who are curious, "Shelly Creek is an ongoing test case for the Water Balance Methodology".

The conversational interview is organized in three parts. In Part One of the storyline, Peter describes how his journey began in 1997. In Part Two, he explains the Guidebook breakthrough which is the science-based Water Balance Methodology. In Part Three, he describes his Shelly Creek mission to make a difference.



PART A: How the Guidebook journey began

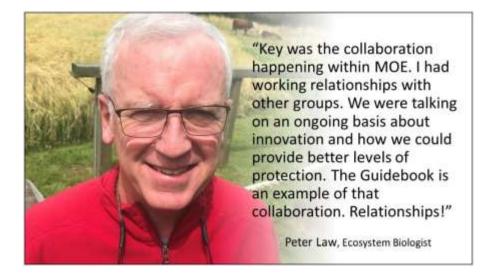
When the inter-ministry working group was developing the streamside protection regulation in 1997, the presentation on the **science of land use change** by Kim Stephens and Bill Derry helped us realize that we needed more than a setback to protect aquatic habitat.

The science showed that communities also needed to tackle what was happening on the land that drains to streams. This realization set in motion two parallel paths, the Streamside Protection Regulation which eventually became the Riparian Area Regulation (RAR) and Stormwater Planning: A Guidebook for British Columbia⁴. The focus of streamside setbacks is to protect fish and fish habitat.

For the Guidebook path, I found the opportunity to "look beyond the stream" and address poor water quality from drainage runoff in the Waste Management Act. The opportunity resided in the non-point source provision for Liquid Waste Management Plans (LWMP).

The term non-point source pollution, or NPS, was used by my colleagues in the Waste Management Branch to highlight poor quality of runoff from developed and/or developing lands - that is, "stormwater".

But the NPS provision was not being applied to the issue of how land is developed. So, I asked my colleagues, why not use this mechanism to connect the dots between changes to the land and impacts on streams?



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⁴ https://waterbucket.ca/rm/sites/wbcrm/documents/media/242.pdf

Relationships and collaboration between branches - that is how we moved the Guidebook idea forward within the Ministry of Environment. After the success of the first of the SmartStorm Forums in January 1999, I made a pitch to the Regional Director and Section Head for Waste Management. They saw the utility in the idea. The next step was getting buy-in from a senior manager in Victoria. She thought the idea made a lot of sense.

Then, out of the blue, Environment Canada stepped up to co-fund the Guidebook and assign a co-chair (Laura Maclean) who was terrific in that role. This was the first game-changer. The second game-changer was a sentence in a letter from the Minister of Environment that "encouraged" the Regional District of Nanaimo to upgrade the stormwater component of its LWMP. The stars had aligned!

Stormwater Planning: A Guidebook for British Columbia was developed to provide guidance for the "stormwater component" of LWMPs. The regulatory significance is that the Minister approves the plan. This creates a legal obligation on the part of local governments.

There is a clear link between the land use planning required of local governments in British Columbia's *Community Charter*, which is enabling legislation, and the Liquid Waste Management Plan process.

PART TWO: Water Balance Methodology enables performance targets

The Guidebook process straddled two provincial government administrations. The potential implication of a change in government is illustrated by what happened to the streamside protection regulation. The previous order-in-council for the Streamside Protection Regulation was rescinded in 2001. It was 2006 before the replacement Riparian Areas Protection Regulation became law.

Meanwhile, the Guidebook rolled out smoothly. The Guidebook's reliance on case studies combined with the emphasis on performance targets aligned with the philosophy of the Premier and cabinet.

Within months of publication, there was funding to develop the Water Balance Model⁵ as an extension of the Guidebook.

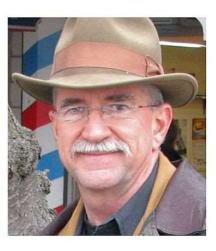
In 2009, the intergovernmental partnership co-chaired by the Province and Environment Canada received a Premier's Award of Excellence for the online decision support tool, the first of its kind.

"Everyone on the Guidebook steering committee had a role to play. And several members were tasked with delivering outcomes to show how this can happen." – Peter Law

Breakthrough after breakthrough: In 1997, Washington State science defined and correlated the nature of the land use problem. Their breakthrough was in establishing impervious area thresholds for irreversible impacts on stream ecology.

Bill Derry believed that BC would leapfrog Washington State. He was proven right. In 2000, the BC breakthrough was development of the Water Balance Methodology⁶. It gave communities a path forward to tackle changes in watershed hydrology at the source - that is, on individual properties.

"In the 1980s, the lack of science was a real issue. Science is no longer the issue. While there will always be a need for more science, we have enough science to know what practices are good, and what needs to be done to reconnect hydrology and ecology," stated Bill Derry in his keynote address at the 2019 Parksville Symposium



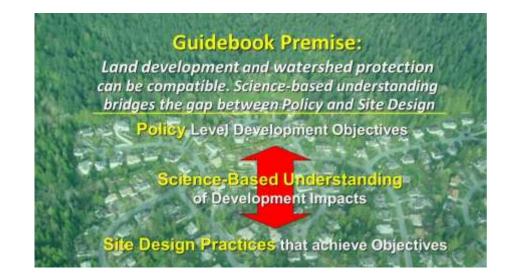
⁵ https://waterbalance.ca/

⁶ https://waterbucket.ca/wp-content/uploads/2012/05/Primer-on-Water-Balance-Methodology-for-Protecting-Watershed-Health_February-2014.pdf

The Guidebook premise: The volume-based Water Balance Methodology is also described as "water balance accounting". The methodology allows local governments to establish achievable performance targets to slow, spread and sink rainwater runoff in order to mimic the natural flow patterns in streams.

When the Guidebook was released, this capability to set targets gave the steering committee the confidence to be bold and state: land development and watershed protection can be compatible. In 2002, this statement represented a radical shift in thinking. It became known as "the Guidebook premise".

We were hopeful that all the players would embrace shared responsibility and communities would move from stopgap remediation to long-term restoration of properly functioning streams. We are not there yet.



PART C: Shelly Creek on Vancouver Island

Restoration of Shelly Creek is my passion and my mission. The good news is that the creek provides limited but valuable habitat for Coho and Trout populations. The bad news is that turbidity values are among the highest in the region. The ugly news is that the stream channel is suffering from severe erosion and low summer flows.

So, can we put the Genie back in the bottle? Can we restore stream flows to natural conditions? Yes, I believe we can. It means we must build trust with elected reps, local government staff and developers to collaborate on Win-Win rainwater projects in the Shelley Creek drainage area.

To this day, all my volunteer work is based on looking to the Guidebook and seeing where and how we can make something happen. Consider, for example, streamflow monitoring that would inform adaptive management.



Stewardship groups have local knowledge about local water

resources, and are the most invested and most connected to the land base. It is in the small tributary streams where the impacts of changes in the seasonal water balance are being felt most.

Small streams are now going dry and have zero levels of riparian protection, mostly because in the early days of streamside protection they weren't seen as worthy of levels of protection.

In 2018, MVIHES partnered with the Ministry of Environment to pilot Closing the Data Gap: Water Stewards, the Key to the Future⁷, *To read an article published in 2019, go to Appendix 2*). Streamflow monitoring by MVIHES is ongoing. The Ministry's objective is to build stewardship sector capacity to do flow measurement. The people who are involved in this grass-roots program are all volunteers.

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⁷ https://waterbucket.ca/rm/wp-content/uploads/sites/5/2022/06/Closing-the-Data-Gap.pdf

Now that I am the one standing in the creek to take the flow measurements, I appreciate just how much variability there is around hydrology. So, I can see why it take 10 years to have confidence in computer model results. Over the long-term, I believe local stewardship groups have an essential role to play in refining the water balance numbers and our understanding of what they mean.

"Since 2010, Our volunteers have embraced the idea of monitoring aquatic ecosystems and habitats in our watershed, often times partnering with agencies, local governments or private landowners to identify the status of certain indicators."

– Peter Law



Appendix 1

Re-Inventing Urban Hydrology – Going Back to Basics to Develop New Tools

An article published in the February 2003 issue of FreshOutook Magazine

Re-Inventing Urban Hydrology – Going Back to Basics to Develop New Tools

by

Kim A Stephens⁸, Inter-Governmental Partnership Thomas N Debo⁹, PhD, Georgia Institute of Technology

British Columbia is leading the way in North America in developing and implementing innovative approaches, criteria and tools for reducing stormwater runoff volumes at the source, where rain falls. Through *Stormwater Planning: A Guidebook for British Columbia*, science-based performance targets have been established for designing individual sites and entire neighbourhoods to function hydrologically as though they are still naturally forested. Getting to this point has involved the re-thinking of traditional approaches to urban hydrology and computer modelling.

Drainage engineers have traditionally thought in terms of flow rates, not volumes. In dealing with urban hydrology, we need to focus on how much rainfall volume has fallen, how we are going to capture it, and what we are going to do with it.

The volume-based approach that is being implemented in British Columbia picks up the baton that Dr. Ray Linsley (Note: Thomas Debo was a former colleague and friend of Dr. Linsley) started more than a generation ago. As a professor of Civil Engineering at Stanford University, and later as a consulting engineer, Linsley pioneered the development of continuous hydrologic simulation as the foundation for water balance management. He has received world-wide recognition for his vision and his contributions to the field of hydrology and continuous hydrologic simulation modelling:

• In the 1960s, Linsley championed the paradigm-shift from empirical relationships to computer simulation of hydrologic processes. He had little or no use for "simple hydrology" and the many simple equations that were used to represent the hydrologic cycle.

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⁸ Kim Stephens has been involved in a series of landmark initiatives over the past decade in British Columbia related to watershed-based stormwater management, low impact development, and water conservation. He was Project Manager for *Stormwater Planning: A Guidebook for British Columbia*, and is presently the IGP Liaison and Project Coordinator for the *Inter-Governmental Partnership to Develop a Water Balance Model for BC*.

⁹ Thomas Debo is a Professor Emeritus at the Georgia Institute of Technology in Atlanta, Georgia, and was a colleague and friend of the late Dr. Ray Linsley. Thomas Debo and Andrew J Reese are co-authors of the textbook *Municipal Storm Water Management*. He continues to conduct workshop courses at venues around North America for the American Society of Civil Engineers.

- Linsley fought a difficult war to replace the established procedures that had been used for many years, and that continue to be used in most urban hydrologic analyses throughout North America and in other locations around the world. He believed that continuous simulation was the only hydrology that should be used for most design and analysis applications.
- Linsley's pioneering efforts resulted in development of the well-known HSPF Model. This continues to be the hydrologic simulation tool of choice in many parts of North America, notably Washington State where its use is mandated by the Department of Ecology, even though it is a complex model with great data input needs.

Somewhat ironically, the "hydrology engine" for HSPF and other contemporary models (such as SWMM) is based on 1930s and 1940s science. As reported by Linsley in a 1976 article:

- In 1933 Horton first proposed the concept of infiltration, which is at the heart of continuous simulation.
- In 1934 Zoch first suggested the use of routing to develop the runoff hydrograph.
- In 1942 Linsley and Ackerman introduced the idea of continuous soil moisture accounting.

For the past thirty years, there has been a fixation on peak flow control through the use of detention ponds for all flood events from the 2-year through 100-year floods, and the conveyance of major flood events caused by urban developments of all kinds. The recently developed software focus has been on the user interfaces, but not on the hydrology engine; and certainly not on improvements in the science of infiltration.

Traditional applications of hydrology models such as HSPF and SWMM reflect "peak flow thinking" at a watershed or macro scale. But the models may not be appropriate for simulating what happens at the site scale, nor for assessing the effects of storm runoff volume changes caused by urban development.

The missing link in urban hydrology has been a tool that quantifies the benefits, in terms of reducing stormwater runoff volume at the site level, of installing source controls under a variety of circumstances. The water balance modeling approach was developed to demonstrate how to meet performance targets for water balance management at the site, neighbourhood, drainage catchment, and watershed scales. The Water Balance ModelTM assists local governments to integrate land use planning with volume-based analysis of stormwater management strategies.

The power of the model is in the engine that interactively and transparently models how runoff is generated at the site level, including the processes that govern the movement of water through soil and vegetation. It provides a continuous simulation of the runoff from a site, neighbourhood, drainage catchment, or watershed. It allows the user to visualize the "how to" details of source control implementation.

The model enables users to model of all three components of the integrated strategy - illustrated in Figure 1 - for managing the complete spectrum of rainfall events. The three components are:

- *retain* the small frequent events;
- *detain* the large events; and
- *convey* the extreme events.

The output volumes and hydrographs generated by water balance modelling can become an input to a number of hydraulic routing models. The *Stormwater Planning Guidebook* defines the target condition for a "healthy watershed" as follows - manage runoff volume so that an urban watershed behaves as though it has less than 10% impervious area. Figure 1 highlights the corresponding performance targets for rainfall capture (volume reduction) and rate control that characterize a healthy watershed. Water balance modeling defines option for achieving this target condition.

The accompanying article talks about a model that will be a decision support and scenario modelling tool. It will be used for evaluating the potential for developing or redeveloping communities that function hydrologically like naturally forested or vegetated systems. The tool will create an understanding of *how*, and *how well*, stormwater source control strategies for runoff reduction would be expected to meet performance targets and achieve watershed protection and/or restoration objectives.

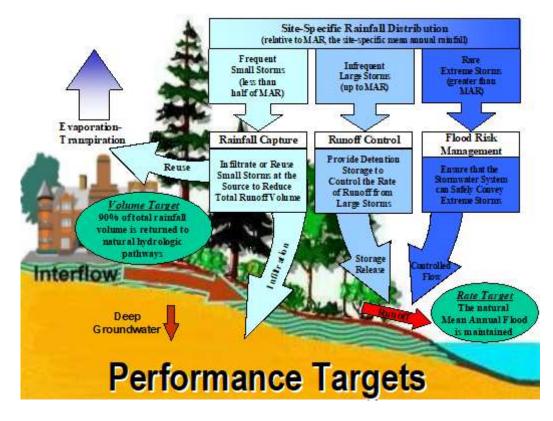


Figure 1 - Managing the complete spectrum of rainfall events. Taken from Stormwater Planning: A Guidebook for BC (2002).

Appendix 2

IMPLEMENTING THE WHOLE-SYSTEM, WATER BALANCE APPROACH IN BRITISH COLUMBIA: "Closing the Data Gap: Water Stewards, the Key to the Future" – provincial government initiative aims to build capacity and mobilize the stewardship sector to collect flow data in creeksheds

An article posted on the waterbucket.ca website in February 2019

"Closing the Data Gap: Water Stewards, the Key to the Future"

The rhythms of water are changing in British Columbia – summers are longer and drier, winters are warmer and wetter. This has gamechanging implications for water management. Adapting to this 'new normal' requires transformation in how practitioners view the water cycle. The 'new normal' is a catalyst for action by the provincial government to collaborate with the stewardship sector on Vancouver Island to involve volunteers in flow data collection in creeksheds

A creekshed is, by definition, a small watershed (i.e., a 1st order stream) that is local in scale such that residents can relate to it.

The driving force behind this grass-roots provincial government initiative is Neil Goeller, Ministry of Environment and Climate Change Strategy. He is working with streamkeepers to implement a hands-on program for assessing flow in streams under drought conditions. This critical need aligned with the educational goals of **Parksville 2019**, the 2nd Annual Vancouver Island Symposium on Water Stewardship in a Changing Climate.

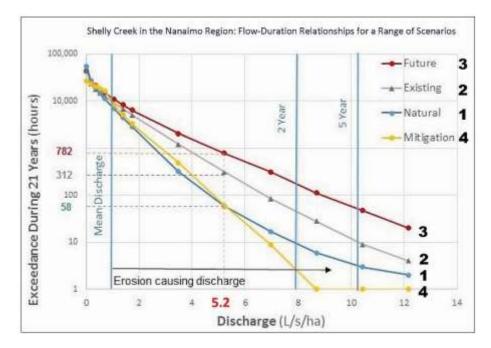


What Happens on the Land Matters to Streams!

"The collaborative approach championed by Neil Goeller has the potential for a considerable beneficial impact. Streamflow data collection is a practical way to educate streamkeepers about creekshed hydrology," states Peter Law, President of the Mid Vancouver Island Habitat Enhancement Society (MVIHES).



"They would then be effective in explaining to elected officials and others in local government why water balance restoration must be a fundamental requirement of the land development process. Simply put, it is all about understanding what those points on the flow-duration curve mean."



Top-Down & Bottom-Up

"This is the kind of top-down and bottom-up grassroots initiative that the Partnership for Water Sustainability actively supports because, in building an informed understanding of cause-and-effect, we see the potential for Neil's program being a difference-maker over time.

"What happens on the land does matter to streams. Development reduces the capacity of the landscape to absorb and hold water. In a drought, there is little or no flow as the land dries out," continues Kim Stephens, Partnership Executive Director.



"Right now, the vision for collaboration consists of government and other regulatory bodies building better decision-making capacity for watershed decisions, by involving the watershed stakeholders in the collection of relevant scientific data that would be used to inform watershed decisions," adds Richard Boase,

He is the Section Manager Environmental Sustainability (Operations) at the District of North Vancouver; and Vice-President of the Partnership for Water Sustainability. Richard Boase is a champion of **citizen science**.

TO LEARN MORE: Download a copy of Water Balance Approach on Vancouver Island¹⁰, released in January 2018, for an explanation of the flow-duration relationships as illustrated below.

Whole-System, Water Balance Approach

MVIHES was the first stewardship group to become involved in this grass-roots program, in large part because the educational outcomes align with the professional experience of Peter Law. Before retiring from government, he was a Senior Biologist in the BC Ministry of Environment.

As Chair of the inter-governmental Steering Committee responsible for Stormwater Planning: A Guidebook for British Columbia, he played a leadership role in introducing the Whole-System, Water Balance Approach to British Columbia. Kim Stephens was the project manager and principal author of the Guidebook.

Stormwater Planning: A Guidebook for British Columbia

"The Guidebook is standing the test of time because the foundation material is science-based," emphasizes Peter Law. "The Guidebook applied a science-based understanding of the relationship between land use change and 'changes in hydrology'. This resulted in development of the water balance methodology to establish performance targets for reducing rainwater runoff volume when it rains and sustaining flow in creeks when there is a drought."

¹⁰ https://waterbucket.ca/rm/wp-content/uploads/sites/5/2018/01/Water-Balance-Approach-on-Vancouver-Island_Jan2018.pdf

Involvement of Stewardship Sector in Flow Measurement

"Understanding the complex interactions of **whole-system**, water **balance** processes that lead to water availability in and on the ground, and all the values that depend on it, is critical to effective water resource allocation," continues Neil Goeller.

"The provincial government leads the way with collection, storage and dissemination of surface and groundwater data. A federal agreement provides for large scale data collection on major sources (rivers and lakes). However, there is a gap at the local level.

"Stewardship groups have local knowledge about local water resources; and are the most invested and most connected to the land base. Participation in streamflow data collection is a way to educate them about creekshed hydrology, in particular correct data collection techniques and their importance for refining the water balance and understanding what the numbers mean.

"This would create understanding that would enhance their effectiveness as champions for reconnecting hydrology and ecology. It would also fill a gap at the creekshed micro-scale where flow data are sparse to non-existent."

TO LEARN MORE: Download a copy of Primer on Water Balance Methodology for Protecting Watershed Health. The Primer storyline is structured in five parts:

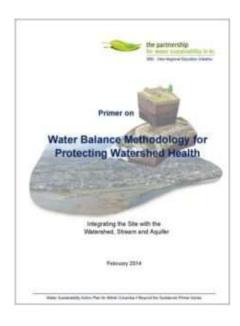
Part A: Watershed-Based Approach to Rainwater Management

Part B: Water Balance Methodology Explained

Part C: Science Behind the Methodology

Part D: How to Establish Targets

Part E: References





Shelly Creek Demonstration Applications

"Neil Goeller will do an in-stream flowmeter demonstration at Shelly Creek on April 2. This on-site activity is part of the program for the Dave Derrick Workshop on sustainable stream restoration that precedes the Parksville 2019 Symposium," states Peter Law.

We also plan to include this demonstration as a scene in a video that we have commissioned for the symposium, and that will be showcased during the symposium. In this way, we hope to expand awareness and create interest on the part of stewardship groups to participate in the initiative."

Building Stewardship Sector Capacity on Vancouver Island

"MVIHES and the Friends of French Creek are the first two groups to participate in the flow monitoring program. Both are very enthusiastic. They have established the precedent for top-down and bottom-up collaboration," reports Neil Goeller.



"These groups have talented and intelligent members, and the task that we are looking to them to undertake is relatively simple. People like to do the things that they like to do. And they are keen to help."

"All things considered, it is a word-of-mouth process to expand participation in the initiative. That is the value of the Parksville 2019 Symposium – it is an

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opportunity to raise awareness; and if groups are interested, we would then bring them into the program. As word spreads, I can meet with people on-site to train them in the use of the flowmeter. When I look at the big picture, I see it as a self-selecting process to grow the collaboration." "It really is a long-term objective to build stewardship sector capacity to do flow measurement. The people who are involved in this grassroots program are all volunteers. They are doing the field work because they are passionate about it, and most importantly, they have the time. Again, it is a long-term and slow process to interface with these groups and build working relationships."

"My vision is to develop relationships and partnerships with stewardship groups, local governments, federal government and First Nations to expand our collection and understanding of data. The province's new Water Data Portal for BC stores all our collected data and makes it available for public use."

"The surface water network is growing alongside the well-established groundwater well network. I tend to have a deficit of staff time (my own), but reasonable access to resources (equipment). Hence, my hope is to leverage interested parties to collect the data they are interested in, or that may have value to them now and in the future, to allow better resource decision making."



Peter Law measuring the flow in Shelly Creek



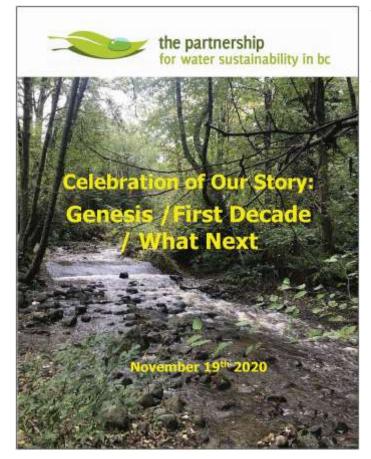
Building Stewardship Sector Capacity in the District of North Vancouver

Richard Boase will also do an in-stream demonstration at Shelly Creek, thereby demonstrating inter-regional collaboration in action. "As part of the Water Quality program for our ISMP (Integrated Stormwater Management Plan), the District of North Vancouver (DNV) has purchased state of the art equipment that we use to monitor water quality," reports Richard Boase.

"Streams and storm sewers are part of an established program to collect data from strategic points within a watershed. The data collected is used to inform decision-making regarding land use, operations and pollution prevention. The DNV has enlisted and trained approximately 10 local volunteers and stream keepers in the use of the equipment. Volunteers sign out the equipment and conduct sampling of predetermined stations in a watershed that is close to their home.







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-forprofit 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 intergenerational 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.

