the partnership
for water sustainability in bc

Waterbucket eNews on April 9, 2024
https://waterbucket.ca/wscblog/

Living Water Smart in British Columbia:

Delta's rain garden program for streetscape revitalization

Note to Reader:

Waterbucket eNews[1] celebrates the leadership of individuals and organizations who are guided by the vision for Living Water Smart in British Columbia[2].

The edition published on April 9, 2024 featured the City of Delta's rain garden program for streetscape revitalization. Now in Decade Three, the program is driven by a vision for protection of stream health through the use of green infrastructure that captures and sinks road runoff. The story behind the story is told by Hugh Fraser and Harvy Singh Takhar and showcases the passing of the intergenerational baton from Hugh to Harvy.

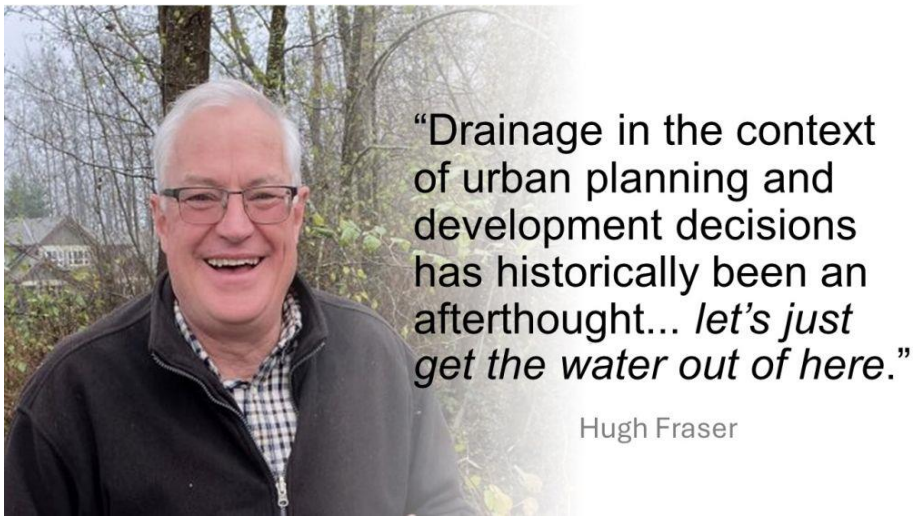
The umbrella for Partnership initiatives and programs is the Water Sustainability Action Plan for British Columbia[3]. In turn, the Action Plan is nested within Living Water Smart, British Columbia's Water Plan.

Cover Image Credit: photo by Deborah Jones, Cougar Creek Streamkeepers, Delta

[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

One-Minute Takeaway

"Road designers have a major influence on the future condition of a watershed."



Delta's rain garden program for urban streetscape revitalization

"Historically, drainage has been an afterthought in urban planning decisions. Neighbourhoods were developed without thinking about drainage in a broader watershed context," states Hugh Fraser.

"Circa 2000, the emphasis became let's look at this on a watershed basis. For municipalities like Delta with well-developed infrastructure, this meant figuring out HOW to retrofit and redesign drainage systems."

"Road rights-of-way account for one-third of the land area of a typical urban watershed. From the rainwater management and stream health perspective, in Delta we believed that commitment to a rain garden program would make a material difference over time."

"When Delta re-builds roads, streetscape enhancement is part of the capital budget. For the program to be effective, and the changes in practice to be lasting, everyone in the process must care about the big-picture goal."

"In the early years, it required constant reminders to staff about the WHY. We asked designers to think about HOW to incorporate something as simple as curb cuts to direct road runoff into boulevard rain gardens. And we added a landscape designer (Sarah Howie) to the design team."

"I had the privilege of carrying on from Hugh Fraser and Sarah Howie," continues Harvy S. Takhar. He is one of Delta's two Utilities Engineers. "It does feel like the rain garden ethic is embedded in the culture of the organization. Curb cuts for drainage is normal practice."

Hugh Fraser successfully guided the City of Delta through the first two decades of its green infrastructure journey and streetscape revitalization program. He is an original "streetscape enhancement champion" in the Metro Vancouver region.

When Hugh Fraser retired in 2021, he handed the intergenerational baton to Harvy Singh Takhar to provide green infrastructure inspiration going forward. Harvy is following his passion in unexpected ways because it was happenstance that led him down the green roof pathway to international recognition.

The Partnership previously featured Harvy S. Takhar in *Living Water Smart in British Columbia: Looking at green roofs through a water balance lens*, a story published in 2023.

Editor's Perspective by Kim A Stephens

Delta's rain garden program

Hugh Fraser played a leadership role at the SILG table because he walked the talk at Delta. He implemented ideas that were then being discussed at SILG. His learning by doing experience provides valuable historical context in understanding why watershed planning became a regional priority. It was in response to the "salmon crisis" which was caused by the rapid pace of land development.

Hugh Fraser is a green infrastructure pioneer in the Metro Vancouver region. In the early 2000s, Hugh was a leading voice on Metro Vancouver's Stormwater Interagency Liaison Group when green infrastructure was in its infancy.

At the time, this regional group had energy. And they made things happen under the umbrella of the rainwater (aka "streams and trees") component of the region's first Liquid Waste Management Plan (LWMP).

The regulatory requirement for this plan component flowed from the Fish Protection Act 1997 which itself was a "watershed moment" as Susan Haid explained in the April 2nd edition of Waterbucket eNews.

Delta's rain garden program began in the 2000s as a demonstration application for operationalizing the region's LWMP to achieve desired watershed health outcomes. **The program is now in Decade Three**. Shared responsibility and intergenerational commitment are foundation pieces for enduring success.

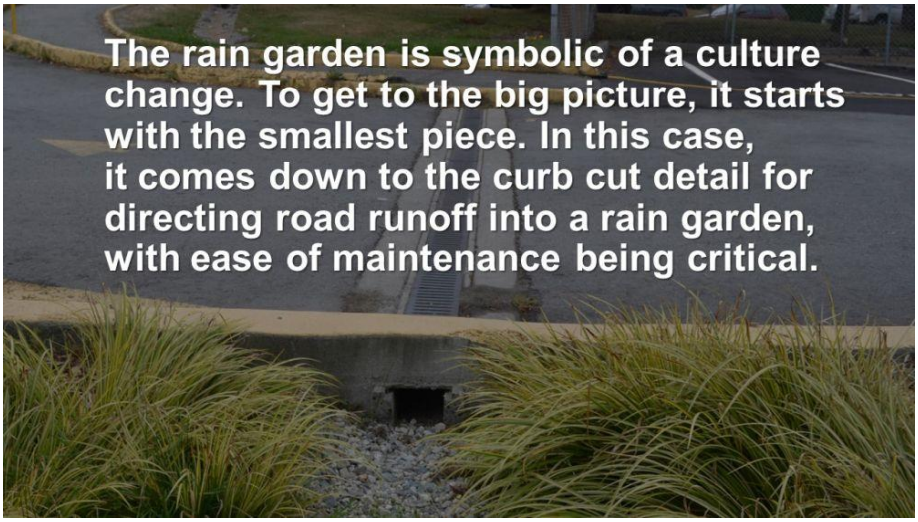
Delta's rain garden program is a team effort

The intergenerational aspect of passing the baton within local government intrigues me. One of the things Hugh Fraser told me many years ago was about the need, as he saw it, to embed the green infrastructure ethic in the culture of the municipal organization and community at large.

In 2014, Hugh Fraser provided this perspective: “Everyone involved...students, designers, managers, constructors and operators...must understand and care about the big-picture goal. This is a team effort."

“Yes, we are making progress on the public side, but there is much more that can be done on the private side. The opportunities to work with property owners to retrofit rain gardens result from redevelopment, especially in commercial areas."

“Creating a watershed health legacy will ultimately depend on how well we are able to achieve rainwater management improvements on both public and private sides of a watershed. There is a huge up-side if the private sector embraces their contribution to shared responsibility.”

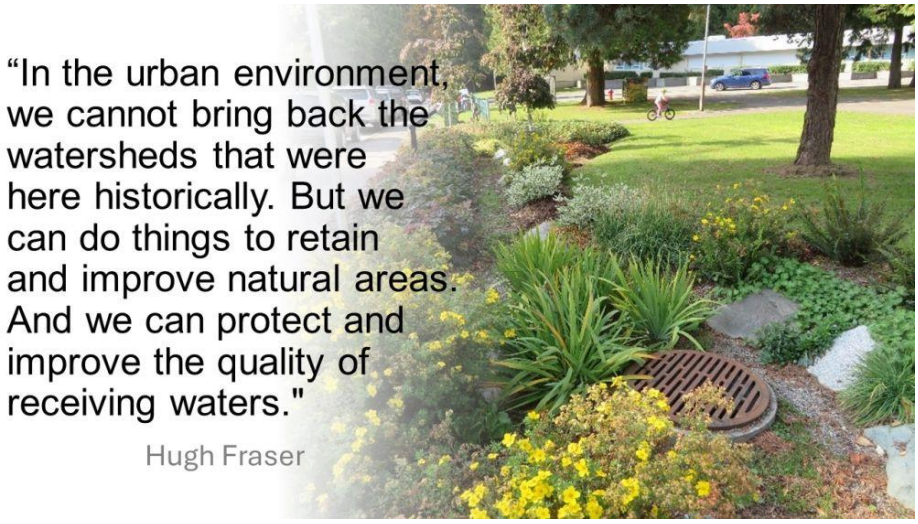


Rain gardens cumulatively contribute to restoration of stream health

“Delta urban areas are built out," states Hugh Fraser. "This reality means there are limited opportunities for slowing, spreading and sinking rainwater. The municipality is effectively limited to retrofitting of rain gardens within road corridors in order to provide rainwater infiltration that protects stream health.”

"Delta has some 500 kilometres of roadways. In 2005, the municipality embarked upon a long-term initiative to incrementally improve the urban landscape though a streetscape revitalization program. The corporate vision is to enhance community liveability by beautifying streets, one block at a time."

Curiosity prompted me to have a 3-way conversation with Hugh Fraser and Harvy S. Takhar about Delta's rain garden program. Three years after Hugh's retirement, I wondered, what intergenerational perspective Harvy would bring to what Hugh started? That is the story behind the story!



STORY BEHIND THE STORY:

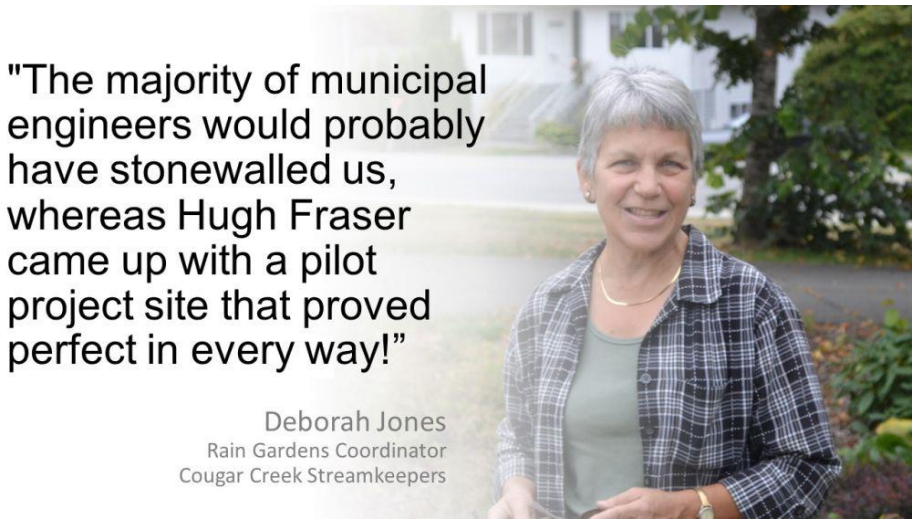
Delta's rain garden program for streetscape revitalization

-extracts from conversations with Hugh Fraser and Harvy Takhar

"Delta's rain garden program started with a phone call from Deb Jones, a volunteer with the Cougar Creek Streamkeepers. She expressed her wish to do a 'ditch-scaping' project as she described it in front of her house," recalls Hugh Fraser.

PART ONE: Rain garden at Cougar Canyon Elementary School launched the program

"Deb Jones was passionate and persistent. In 2004, Deb and her group approached me with a request that the municipality undertake a stormwater pilot infiltration pilot project in North Delta. We identified the opportunity to build the first rain garden at Cougar Canyon Elementary School."



"The project was collaborative and involved the Cougar Canyon students. The project was a success and so was the ensuing program. Within the first decade, for example, Delta had constructed a total of 50-plus rain gardens. 10 of these were located at elementary schools."

"Delta rain garden projects are not cookie-cutter designs. Each site is unique; and there will always be constraints and challenges. Fortunately, rain gardens are adaptable, and the approach in Delta was adaptive from day one. That means learn by doing."

The right people at the right time

"The program came about through a fortunate confluence of personalities, interests and skills – it is not something that a community can necessarily just decide to do, and presto, it happens."

"Remove any one of the individuals or organizations who played roles in the process, and North Delta's school and community rain gardens either would not have happened at all, or would have been much less successful."

Deborah Jones, 2014

Rain Garden at Cougar Canyon Elementary School

Precedent-Setting Decision: An Engineer teamed with a Landscape Architect

"One of our early decisions was to add a landscape designer (Sarah Howie) to the engineering design team. Her role was to find ways to incorporate rainwater capture technologies into landscaped amenities that beautify roadways."

"At the time, within local government, this was viewed as a novel idea and approach – an engineer and landscape architect working as a design team. Looking back, so many good things have resulted from that one decision."

- Hugh Fraser, 2014

Adopt-a-Rain-Garden: To address the need for ongoing maintenance:

adoptagarden@delta.ca

Delta adopt a RAIN Garden

The City of Delta instituted the **Adopt-a-Rain-Garden** program. Residents, families, local groups, clubs, and other organizations work with Delta to ensure that the community's rain gardens are kept up and function properly.

PART TWO: Influence of road designers on watershed condition and stream health

“We have done a lot of back and forth on road designs," continues Harvy S. Takhar. "The streetscape enhancement ideology is being implemented at the forefront rather than through a review of utilities to see whether there any drainage concerns."

“The road designers are taking the initiative to incorporate curb cuts and even linear rain gardens. Their understanding of the need has evolved through internal collaboration. Before, emphasis was on THE WHY. Now we are getting better at THE HOW.”

“Since 2005, green infrastructure has been standard practice in Delta. Every road and/or utility capital project includes it, wherever feasible.”

Hugh Fraser, 2014

Evolution of design details in response to operational experience

“The pandemic created a bit of a speed hump in terms of passing on learning, especially with staff turnover. By working with the roads people on curb cuts, we have actually come up with variations. Our original detail was quite generic. Now we are able to implement it in various types of curb designs."

“We are striving to make sure that rain garden maintenance is as easy as possible, including inlets and outlets for drainage. We have evolved the designs so it is EASY CLEAN for all the sediment buildup. Our crews can quickly scoop it with a shovel and be on their way!"

“That change resulted from feedback from engineering operations staff regarding what they wanted to see. We just evolved the design as per their operational needs."

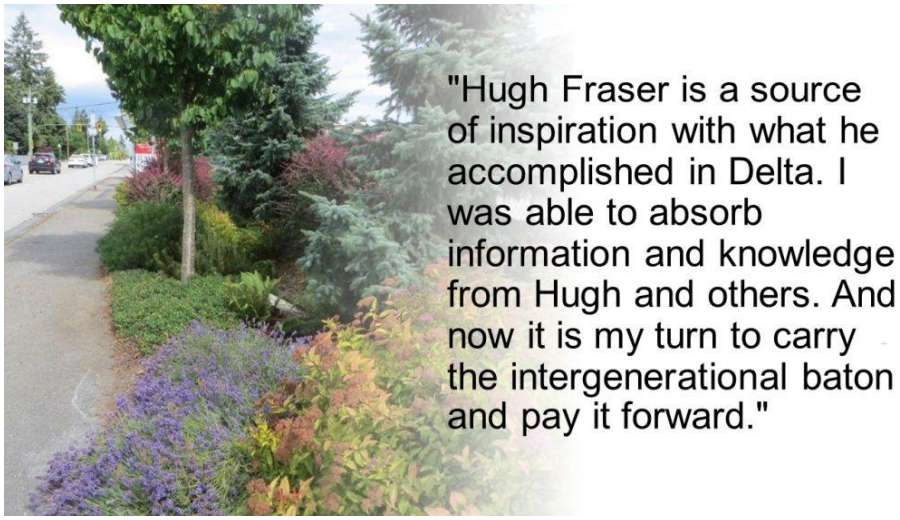
"Delta's approach to rain garden implementation is 'design-build'. We use our own crews, and because we do, this provides us with flexibility to adapt to unforeseen or unexpected site conditions."

Sarah Howie, 2014

Pay the intergenerational baton forward

"And we have more staff buying in which is really important. Nina Tong, an engineer in training, represents the third generation of rain garden designers. She follows Sarah Howie and me. Nina has been instrumental in running some current green infrastructure projects."

"She is now evolving into the design and ideological aspects and how we look for opportunities to incorporate rain gardens. It is about being hands-on and proactive. My message to Nina and others is, do not be afraid to hop in there and show our operations people the opportunities."



PART THREE: Be part of the solution

“Delta has so many new staff fresh out of school. And I am not that far ahead of them! Part of my role is to help guide them regarding the sustainability and environmental factors. The best way to do that I have found is to take them with me out in the field to look at things, whether it is a curb cut or salmon spawning.

“I take little opportunities to see whether they feel a spark or not. It is unfortunate if they say I am just here to do my job! But the vast majority do care. And they do want to be part of the solution," emphasizes Harvy S. Takhar.

A perspective on engineering education

“Drainage is but a sub-set of municipal engineering. Historical engineering practice did not consider some of the broader objectives that we now try to address through green infrastructure," observes Hugh Fraser.

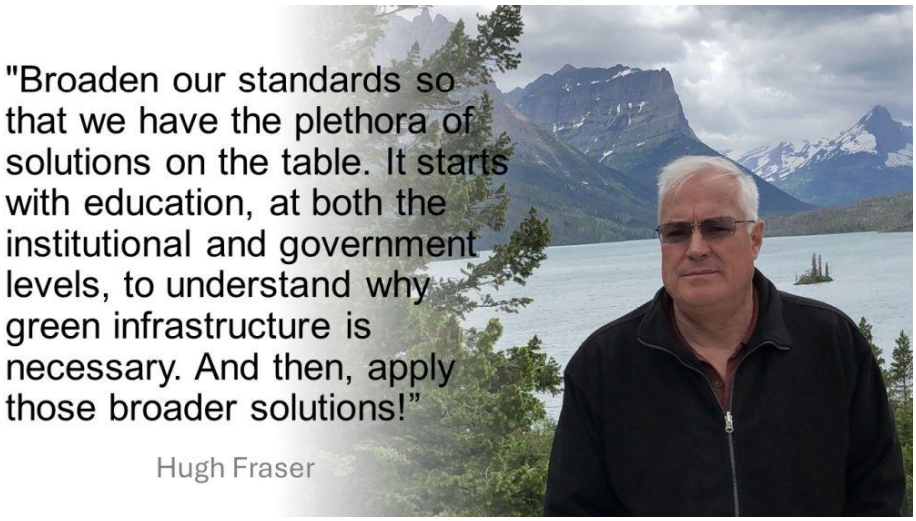
"Do teachers present the plethora of options and solutions that are available? Sure, drainage engineers study hydraulics, and they may take a course or two on hydrology. But in my experience that is about it."

"The application side needs to be fleshed out more for students so that in their minds they know about the range of design tools, the plethora of green infrastructure solutions, and the ancillary benefits. Designers then need to think about and apply those solutions."

The complete interview with Hugh Fraser about leading and managing change in the public realm follows in Appendix A. It is extracted from:

Chronicle of the Metro Vancouver region's Green Infrastructure Journey (1997-2023): *Create Liveable Communities and Protect Stream Health*

The Partnership will release this legacy resource later in 2024. There is so much oral history to be documented. It is a story that begins in 1997 with passage of the Fish Protection Act. However, the genesis is actually the 1970s. Thus, the story is truly intergenerational in nature.



APPENDIX A

A window into the green infrastructure journey in the Metro Vancouver region:

The complete interview with Hugh Fraser provides valuable context for urban streetscape revitalization

Streetscape Enhancement Champion

Challenges in Retrofitting Rainwater Capture in a Developed Urban Watershed

Reflections on Effectiveness Monitoring

Hugh Fraser, former Deputy Director of Engineering, City of Delta (1997 – 2021)

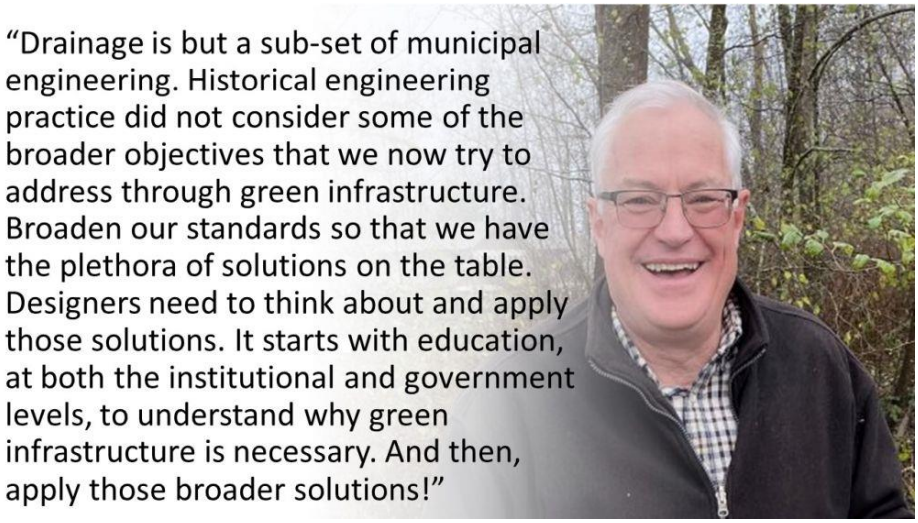
Streetscape Enhancement Champion

Hugh Fraser joined Delta municipality, the 10th largest city in British Columbia in 1997. When he retired in 2021, he was the long serving Deputy Director of Engineering who had successfully guided Delta through the first two decades of its green infrastructure journey and streetscape enhancement program.

A regional response to the "salmon crisis"

"The requirements in the region's LWMP provided the impetus for municipalities to do comprehensive watershed studies and planning in the 2000s. We had both federal and provincial representation on SILG. One of the challenges we were facing at the time was to mitigate the impacts of runoff from new development plus a broader desire to have fisheries enhancement. So, a lot of municipalities were working on that front. Langley and Surrey were early leaders," recalls Hugh Fraser.

"In hindsight, it is too bad that watershed planning did not come earlier in BC. That became the practice in Ontario after Hurricane Hazel (1954). They realized the importance of having a more comprehensive understanding of watersheds and runoff behaviour."

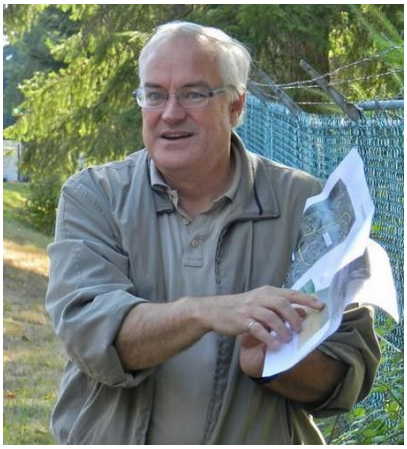


In the early 2000s, Hugh Fraser played a leadership role at the SILG table because he *walked the talk* at Delta. He implemented ideas that were then being discussed at SILG. His *learning by doing* experience provides valuable historical context in understanding why watershed

planning became a regional priority. It was in response to the *"salmon crisis"* which was caused by the rapid pace of land development.

Figure B1 – Streetscape Enhancement in Delta

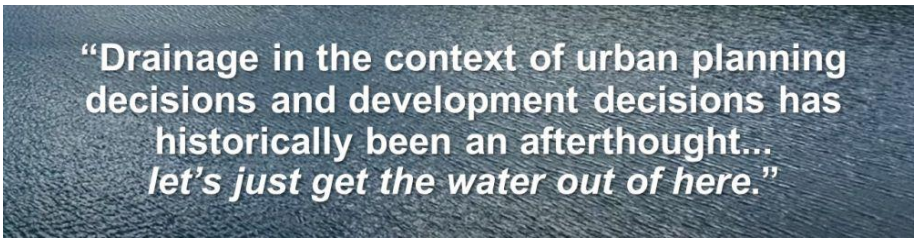
Streetscape Revitalization:
"Delta's urban areas are built out. This reality means there are limited opportunities for slowing, spreading, and sinking rainwater. We are effectively limited to retrofitting of rain gardens within road corridors in order to provide rainwater infiltration that protects stream health." - Hugh Fraser, 2014



Fit the Right Design in the Right Place:
"Since 2005, green infrastructure has been standard practice in Delta. Every road and/or utility capital project includes it, wherever feasible." – Hugh Fraser, 2014

Challenges in Retrofitting Rainwater Capture in a Developed Urban Watershed

"There was a period from before the 1990s when stormwater system design focused primarily on the local area being developed without thinking about the broader watershed context. It is almost impossible, if not very difficult, to retrofit drainage systems in urban areas after the initial installation," explains Hugh Fraser.



Shift to a new paradigm in the 2000s

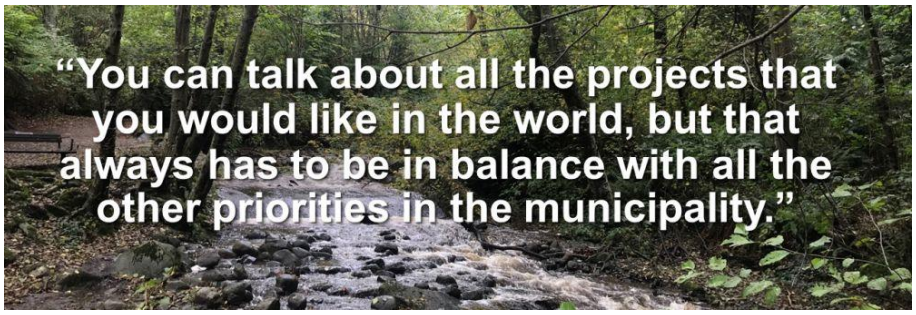
"Circa 2000, the emphasis became *let's look at this on a watershed basis*. For municipalities like Delta with well developed infrastructure, this meant figuring out HOW to retrofit and redesign systems. Where there is new development, however, it was widely recognized that opportunities for watershed enhancement needed to be considered, planned, designed, implemented, operated and maintained."

"Watershed planning and preparation of ISMPs represented a step forward, both from the municipal and regional perspectives. They helped staff to address regulatory requirements and assisted in obtaining provincial Ministry of Environment and federal DFO approvals. While the studies did provide some guidance, municipal staff found it difficult to implement all the recommendations."

"Out of the watershed studies there were commitments that we were all trying to achieve. But the challenge is limited budgets and the allocation of resources. And that has always been a challenge."

"In the urban environment, we cannot bring back the watersheds that were here historically. But we can do things to retain and improve natural areas. And we can protect and improve the quality of receiving waters."

"A good project idea that we had for Cougar Creek never did come to fruition. I still think about what might have been. There were just too many other things competing with it. Environmental enhancement projects take longer and are challenging to get on the table."



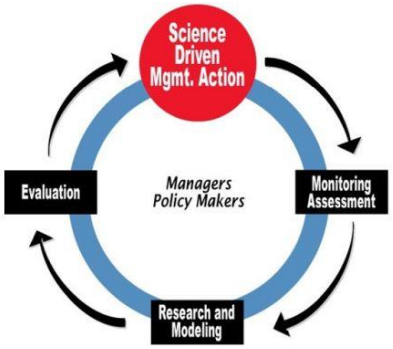
Reflections on Effectiveness Monitoring

"Going back to my time at the SILG table and the key objectives in the (rainwater component of the) LWMP, I believe it would be a good idea to revisit them. Are we meeting the key objectives? What does benthic monitoring, for example, show over time? I have not seen recent analyses that summarize local stream conditions from a benthic perspective. There was once a huge emphasis on benthic scores because of the correlation with water quality," muses Hugh Fraser.

Adaptive Framework

"In the BC Guidebook, adaptive management means: *We change direction when the science leads us to a better way."*

– Beyond the Guidebook 2007



Adaptive management cycle: *learning by doing*

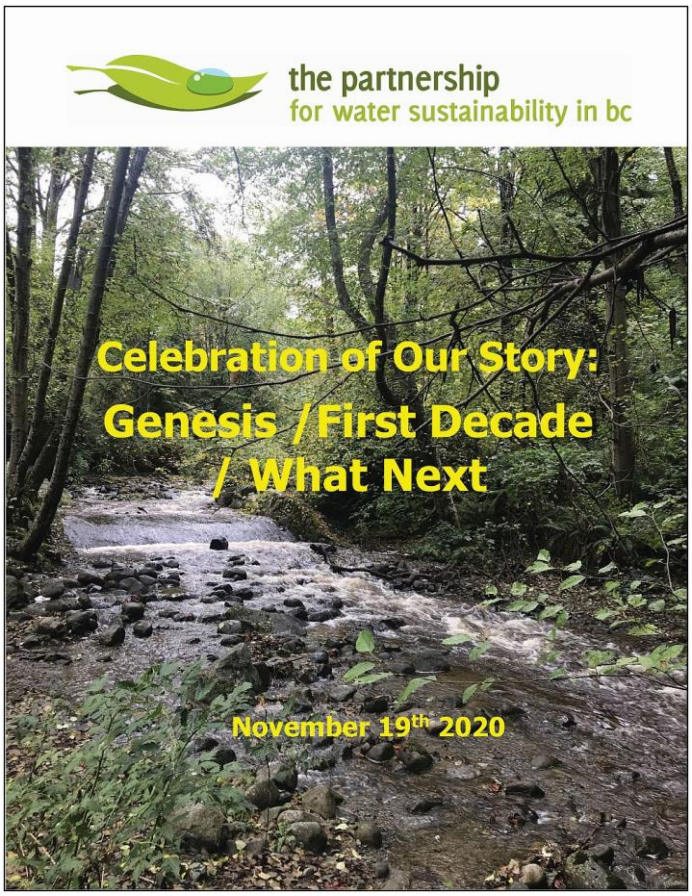
"There were goals spelled out in the original LWMP. So, just get on with evaluating them. There is a constant need for review and regular assessment of watershed system performance. As a research project, it would be interesting for someone to compare different watersheds in the region and evaluate their runoff and water quality performance."

"From a management perspective it is better to have an overview of system performance than no assessment. The data should be looked at every 5 to 10 years and an overview assessment provided. It is easy to get drowned in the numbers. Avoid that pitfall."

"An overview assessment should consider the objectives and then provide commentary on the past performance. What was achieved over 5 to 10 years, and this is where we are today. With a better understanding of where we are at today, where do we want to be if we look forward another 10 years or more?"

"Let's get a university researcher or a student to look at all the data that has been collected for flow, water quality and benthic. What are the trends? How effective have the measures for rainfall capture been? if we have not met the desired objectives, what are we going to do now and going forward?"

"Drainage is typically a sub-set of municipal engineering. Do teachers present the plethora of options and solutions that are available? Sure, drainage engineers study hydraulics, and they may take a course or two on hydrology. But that's about it. The application side needs to be fleshed out more for students so that in their minds they know about the range of design tools, the plethora of green infrastructure solutions, and the ancillary benefits."



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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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