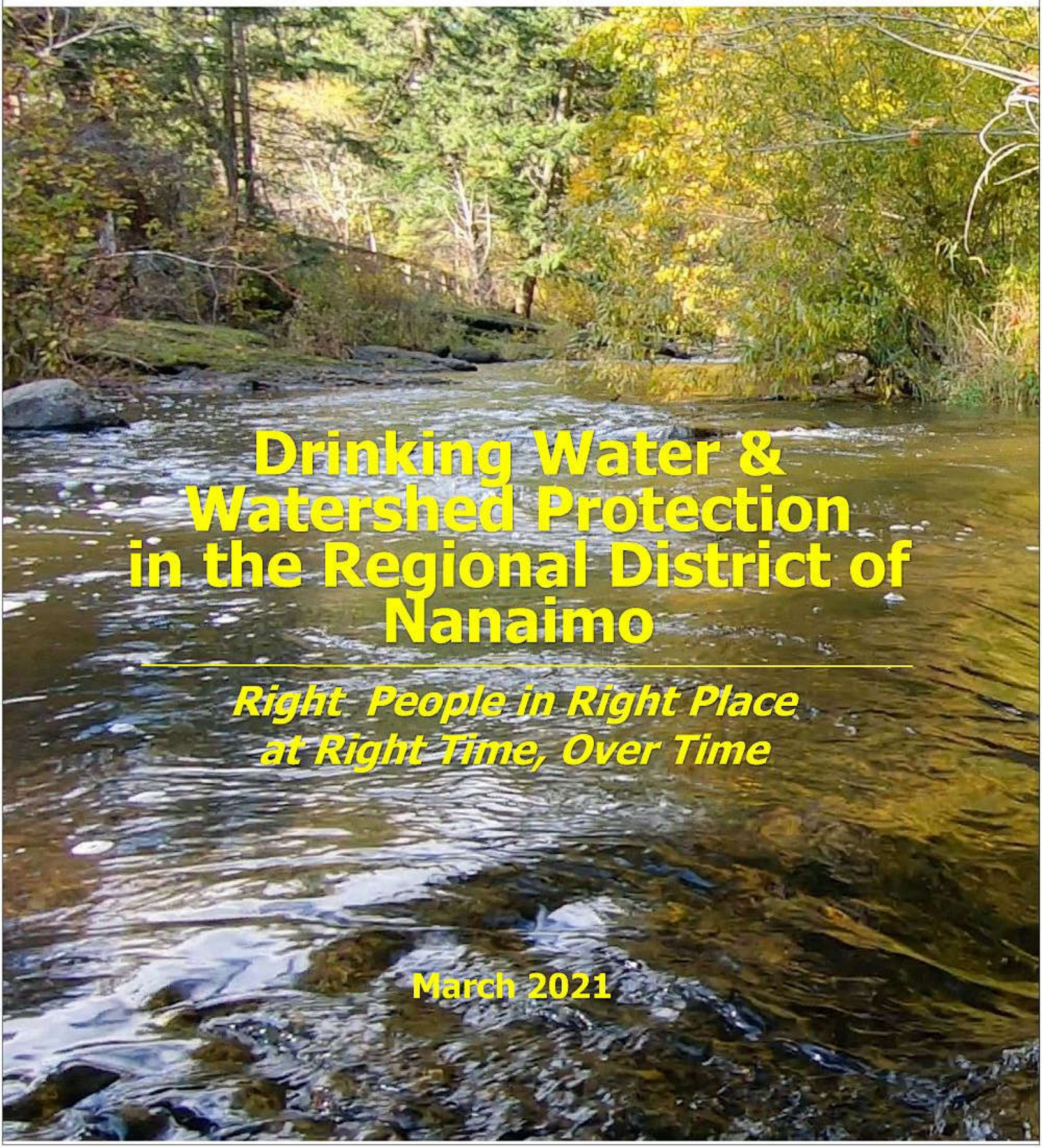
the partnership
for water sustainability in bc



Drinking Water & Watershed Protection in the Regional District of Nanaimo

Right People in Right Place at Right Time, Over Time

March 2021

Note to Reader:

This publication is the 9th in the Partnership's "Watershed Blueprint Case Profile Series".

To download a PDF copy of this Watershed Case Profile, as well as any of the others in the series, visit the Rainwater Management community-of-interest on the waterbucket.ca website at:

http://waterbucket.ca/rm/category/showcasing-british-columbias-watershed-based-approach/watershed-case-profile-series/

Or go directly to the following link:

https://waterbucket.ca/rm/wp-content/uploads/sites/5/2021/03/Nanaimo-Region_Story-of-DWWP-Program_March-2021.pdf

REGIONAL DISTRICT OF NANAIMO

DEDICATION: This Watershed Blueprint Case Profile recognizes the many individuals whose passion, commitment, perseverance, and tireless efforts over many years made it possible to take an idea - the Drinking Water and Watershed Protection service – and give it life. Collectively, they have made a difference. The "DWWP story" is indeed a blueprint for what the phrase **hard work of hope** means in practice; and demonstrates the importance of 'the right people being in the right place at the right time, over time'. The DWWP is truly a beacon of hope.

ABOUT THE SERIES: *The series showcases and celebrates successes and long-term 'good work' in the local government setting in British Columbia. Our spotlight is on champions in communities which are breaking new ground and establishing replicable precedents.*

Storylines touch lightly on technical matters, yet are grounded in a technical foundation. The objective in 'telling a story' is to engage, inform and educate multiple audiences – whether elected, administrative, technical or stewardship.

Stories in the series are presented in a magazine style to make it easier to read, comprehend and absorb technical information. Stories are designed to connect dots.

COVER PHOTO CREDIT: David Mackenzie

Drinking Water & Watershed Protection in the RDN

What the Reader Will Learn

British Columbia is at a tipping point. Can local governments successfully adapt to a changing climate and create greener communities by bridging the gaps between science, policy and standards of practice to **reconnect hydrology and stream ecology**? Will they?

Through its Drinking Water and Watershed Protection program (DWWP), the Regional District of Nanaimo (RDN) is pointing the way forward and answering yes to both questions posed above. Leading by example is a journey. It takes time because a process must evolve as it unfolds. There is no shortcut. As **Julie Pisani, DWWP Program Coordinator**, explains:

> "The objective and mission of the DWWP program has always been about connecting land and water management. But the RDN couldn't just leap straight there. We first had to build partnerships, trust, datasets and knowledge. We had to test ideas, learn, earn credibility, and deepen relationships across jurisdictions."

The narrative that follows is the outcome of a collaborative effort with RDN staff. This is not a report with conclusions and recommendations. Rather, we share the human side of the story of the DWWP journey as it has unfolded over the past two decades. It is an inspirational story.

Simply put, the thread that weaves through the DWWP storyline is **the right people in the right place at the right time, over time**. It is not a sprint; it is a marathon. It is not one individual; it is a team effort. The DWWP is now implementing its second 10-year Action Plan. The program vision, motivating sense of purpose, and career commitment are enthusiastically shared by successive generations of program champions. Continue reading and be inspired!

Kim A. Stephens, MEng, PEng,
Executive Director
Partnership for Water Sustainability in BC
March 2021

A program deliverable for *"Sustainable Watershed Systems, through Asset Management"*,
Implemented under the umbrella of the Georgia Basin Inter-Regional Education Initiative

Georgia Basin Inter-Regional Education Initiative (IREI)

Educational Goal

Build practitioner capacity within the local government context to implement the whole-system, water balance approach known as ***Sustainable Creekshed Systems, through Asset Management***.

Mandate: Provide value through collaboration and partnerships.

Acknowledgments

The Partnership for Water Sustainability gratefully acknowledges the support of the Province of British Columbia through the Ministry of Municipal Affairs, as well as that of the Real Estate Foundation of BC. Their financial support enables the Partnership to deliver the IREI program.

About the Partnership for Water Sustainability

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. Two decades earlier, a group of like-minded and passionate individuals, including representatives of three levels of government, came together as a technical committee. Over time, this "water roundtable" evolved into The Partnership.

The umbrella for Partnership initiatives and programs is **the Water Sustainability Action Plan for British Columbia**. *In turn, the Action Plan is nested within* **Living Water Smart, British Columbia's Water Plan**. *Released in 2008, Living Water Smart was the provincial government's call to action, and to this day transcends governments.*

The Partnership's guiding philosophy is to help others be successful. When they are successful, we are successful. The Partnership is led by a team of mission-focused volunteers, elders and collaborators. These individuals bring experience, knowledge and wisdom to the Partnership roundtable. This enhances the effectiveness of the Partnership as "the hub for a convening for action network". Although many on the Partnership leadership team have retired from their day jobs, the water-centric mission continues.

Regional Districts supporting the IREI

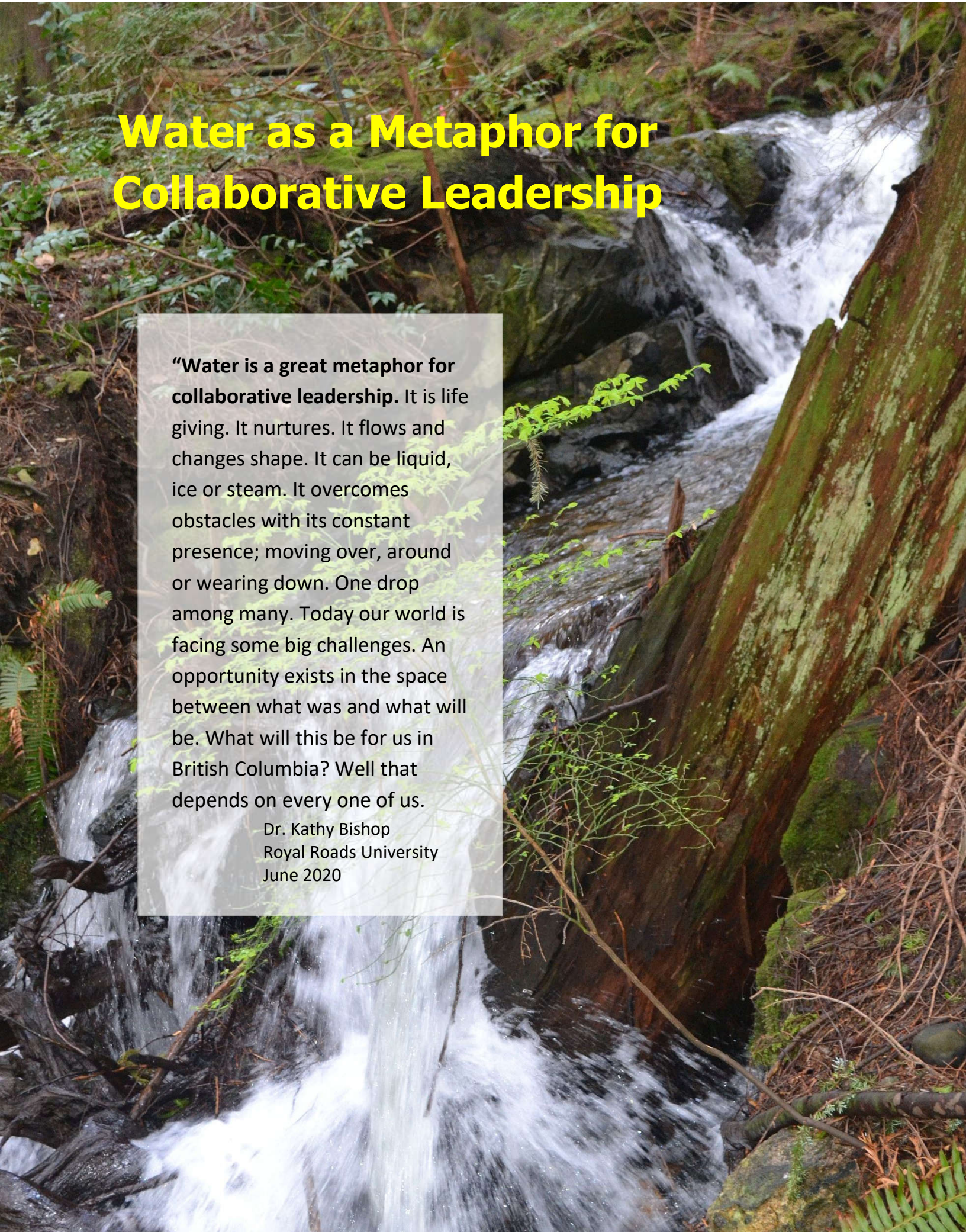
Regional District of Nanaimo

Comox Valley Regional District

C·V·R·D

CRD — Making a difference...together

Metro Vancouver



Water as a Metaphor for Collaborative Leadership

"Water is a great metaphor for collaborative leadership. It is life giving. It nurtures. It flows and changes shape. It can be liquid, ice or steam. It overcomes obstacles with its constant presence; moving over, around or wearing down. One drop among many. Today our world is facing some big challenges. An opportunity exists in the space between what was and what will be. What will this be for us in British Columbia? Well that depends on every one of us.

Dr. Kathy Bishop
Royal Roads University
June 2020

Collaborative Leadership: Water and the DWWP

DWWP Themes

When leadership is shared among members, rather than turning to one heroic leader to guide and be the expert, it is known as **collaborative leadership.** It involves bringing the right people together in constructive ways with good information, such that they create authentic visions and strategies for addressing the shared concerns of their organizations and community. Thus, *collaborative leadership* is an apt description of the DWWP process. The DWWP program is built on three themes:

> Education and Awareness (influencing behaviour)
>
> Building Knowledge (science and data) for good decision-making
>
> Supporting Sound Land Use Decision-Making

Land, Water and People: "The metaphor of water, and the way that Kathy Bishop has connected it to leadership, is relevant when talking about the incremental progress evolving land and water management in the RDN," concluded Julie Pisani during the development of this Watershed Case Profile.

"Water flowing as a river and slowly washing over river rocks takes a while to shape those rocks. Meanwhile, the river channel itself is incrementally changing over time.

"Sometimes there is a big storm, and this could be analogous to a flood of information and resources; or a crisis that generates creativity shapes our path and sets us onto a new trajectory.

"Sometimes it is more like a pool where you have still water, more focus, and you go deeper on certain aspects, but do not push everything forward in the same rapid way as for a flush-through event."

Dynamic Tension between Urgency and Getting It Right: "It is actually valuable that processes take time and are incremental. We get a lot of richness from that, and more diverse perspective from going over things in different ways and angles with different combinations of people over time.

"Sometimes issues are urgent, and we need to act quickly. But that fast pace of everything moving urgently does not always serve us well. There is a dynamic tension between the urgency to act when it is urgent, versus the time it takes to build buy-in, consensus and understanding. And to take time to reflect; and not to proceed without reflecting on what is working and what is not, and who is at the table and who is missing and should be there."

The Human Dimension: "Water teaches us that progress is not always going to be a firehose. Sometimes it is going to be more like a trickle, or a pool. The ultimate process, one that will never be done, is to figure out how we can manage land and water and people and everything that comes along with it."

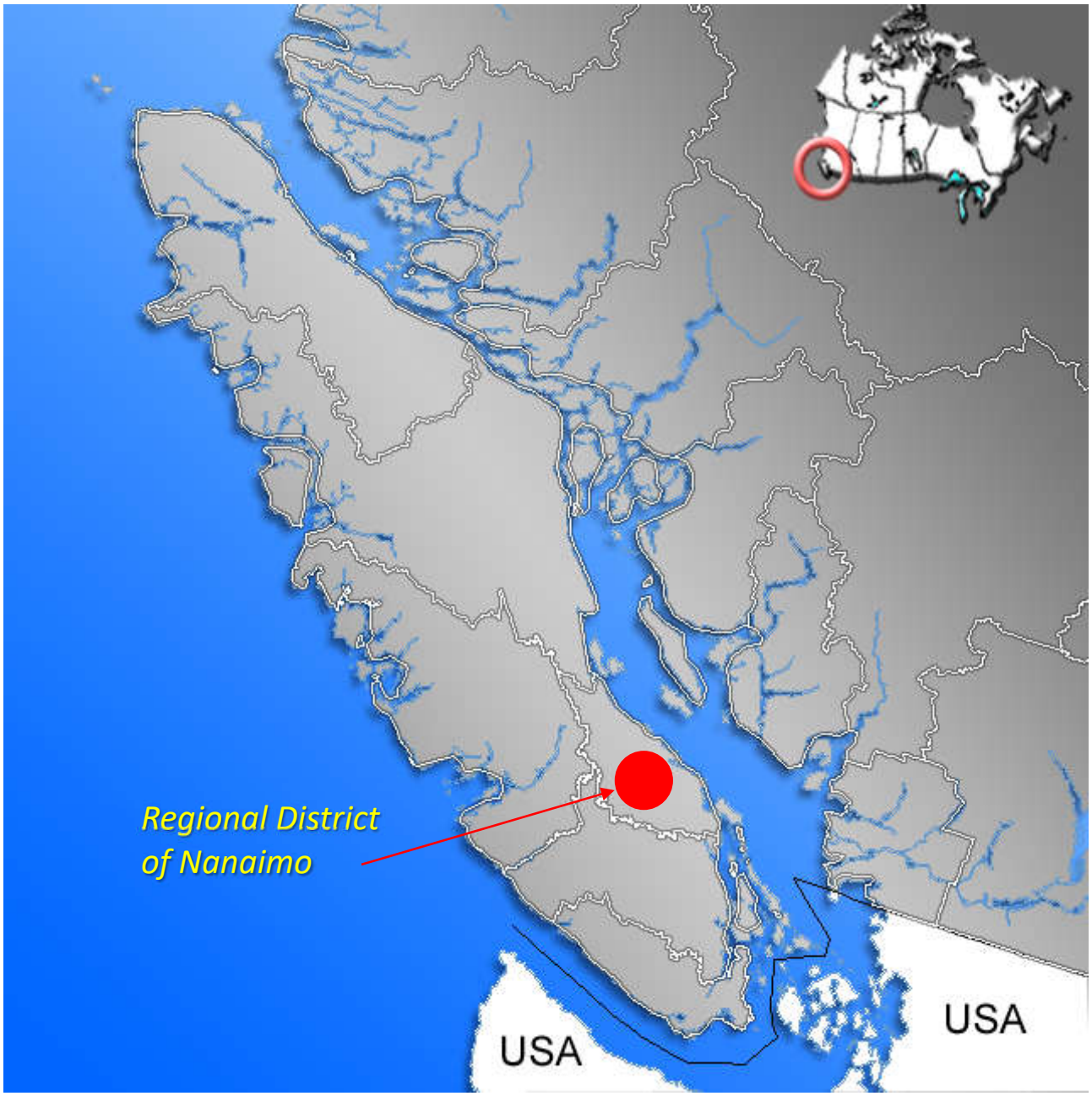


IMAGE SOURCE: https://commons.wikimedia.org/wiki/File:Vancouver_Island_contour_map.png

Location Map

Guide for the Busy Reader

Table of Contents / Storyline

In sharing the 'story behind the story' of the DWWP program, this Watershed Case Profile connects dots, both through time and concurrently happening in time. Synthesizing the historical flow of how processes and events have unfolded is necessary and important. This provides the reader with vital context that enhances understanding. Furthermore, our primary goal is to help the reader connect the dots to what is happening right now in the RDN with respect to DWWP.

Structured in three parts, this Watershed Case Profile serves multiple purposes. First, it is an element of the *Georgia Basin Inter-Regional Education Initiative*. Secondly, and this is material, the document is an historical record of DWWP achievement. Thirdly, it concludes with a big picture view of the strategic nature of the DWWP Service as seen through the eyes of the RDN's Julie Pisani in the context of her Master's research.

Below is a synopsis. It distils the essence of the each section into a set of 'storyboards'. This provides the reader with a mind-map.

Guide for the Busy Reader

Table of Contents / Storyline (continued)

Drinking Water & Watershed Protection in the RDN

'Living Water Smart' vision transcends governments

Released in 2008, "Living Water Smart, British Columbia's Water Plan" was the provincial government's call to action, and to this day transcends governments. The vision: ***we take care of our water, our water takes care of us****.*

Over the past decade, the hard work of hope has resulted in a policy, program and regulatory framework that enables community-based action in order to adapt to the New Reality – warmer, wetter winters and longer, drier summers.

Living Water Smart successes are defined by collaboration and a "top-down / bottom-up" approach. Collaboration for the common good interweaves the efforts of decision-makers and community advocates.

Living Water Smart

The 45 actions and targets in Living Water Smart, British Columbia's Water Plan [1] establish expectations for building greener communities and adapting to a changing climate. It is clear that the RDN's journey related to land and water management, valuing ecological services and stream restoration is guided by the Living Water Smart vision, in particular this lynch-pin target:

> ***"All land and water managers will know what makes a stream healthy, and therefore be able to help land and water users factor in new approaches to securing stream health and the full range of stream benefits."*** (ref: page 43)

DWWP is Leading by Example: The RDN journey began in 2001. In this Watershed Case Profile, we take stock of milestones along the way, with a focus on learnings to inspire others to take similar action.

Board commitment to action has enabled the DWWP program to build a strong foundation upon which to erect the **twin pillars of the whole-system, water balance approach** to land and water management.

The twin pillars are the **Water Balance Methodology** and EAP, the **Ecological Accounting Process**. These are explained in Part B.

The DWWP Genesis, or, Know One's History: The RDN was the partner region for Stormwater Planning: A Guidebook for British Columbia[2], released by the Province in June 2002. The RDN undertook a case study demonstration to test a watershed-based approach to land planning. The process planted seeds. These ultimately bore fruit with the 2008 referendum which created the DWWP Service.

The Guidebook was developed to support the rainwater management component of Liquid Waste Management Plans (LWMP) as required by the Province of BC. Two decades later, the DWWP is the service delivery model for the Rainwater Program under the RDN's LWMP. This directly links the two programs.

[1] https://waterbucket.ca/wcp/wp-content/uploads/sites/6/2017/11/livingwatersmart_book.pdf, June 2008
[2] https://waterbucket.ca/rm/sites/wbcrm/documents/media/242.pdf, June 2002

DWWP Success in Attracting Talented People

"Over the years, I managed various groups at the RDN. It was very rare to have a group like the DWWP team - one that worked so well together, consistently AND in challenging circumstances. And they excelled! They didn't just get the job done; they made the whole thing better. So, it was a joy for me to be part of that."

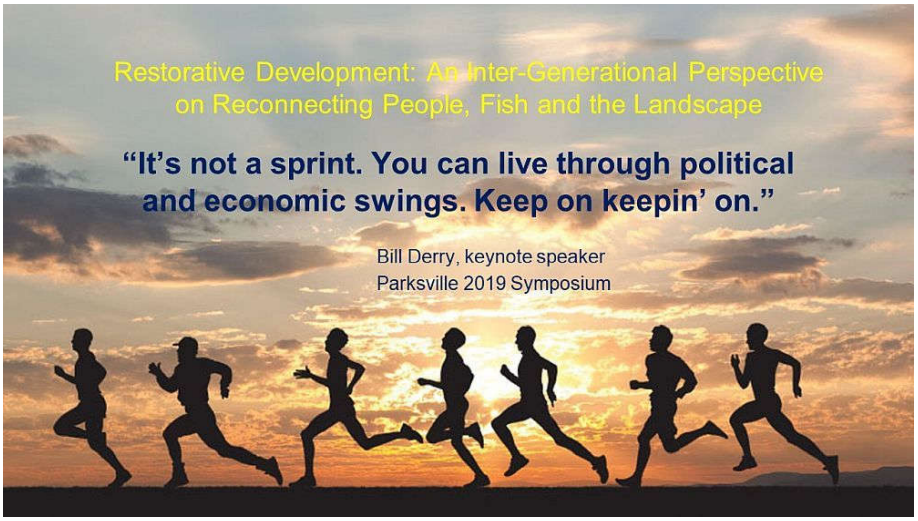
- Mike Donnelly, RDN Water Services Manager (2004-2016)

"There is a lot of free thinking and creativity required to make a program like DWWP work. It is so dependent on the people involved understanding what the end goal is, and then, being able to wrap their minds around taking a long view. The DWWP program has had no problem in attracting really talented, high-level people."

- Murray Walters, RDN Water Services Manager (2018-present)

Right People in the Right Place at the Right Time, Over Time

The program vision for the DWWP Service function, the motivating sense of purpose, and career commitment are enthusiastically shared by successive generations of program champions at the Board and senior management levels, and by program managers and doers. Success does not depend on one individual. It has been, and continues to be, a team effort. **When the baton is handed off, everyone understands that the race is a marathon, not a sprint**.



The Players: The DWWP Service is a shared legacy, past and present. In this Watershed Case Profile, the spotlight is on the human dimension. In particular, we tell the DWWP story through the eyes of individuals whose leadership, and willingness to push the boundaries of their imaginations, translated a bold vision into a ground-breaking and unique program that has attracted province-wide attention for many years.

These leaders, past and present, are John Finnie, Mike Donnelly, Randy Alexander, Murray Walters and especially Julie Pisani.

Others who played pivotal leadership roles at critical moments in the early years to create the vision and get the DWWP off the ground include: Joe Stanhope, former RDN Chair; Dave Bartram, former RDN Area H Director; Kelly Daniels, former Chief Administrative Officer; and Christina Metherall, the first DWWP Program Coordinator. In recent years, others have taken the baton and emerged as program champions. Their contributions are also recognized herein.

Tyler Brown
RDN Chair

"The RDN has articulated, through our Strategic Plan and Drinking Water and Watershed Protection (DWWP) Action Plan, a clear vision and strong support for sustainable water management for the wellbeing of our citizens and ecosystems, now and into the future."

"The DWWP regional service was created explicitly to protect water at a watershed scale. The program is a leading example of how local governments can drive innovation and be a powerful influencer in watershed sustainability."

"We are proud of our accomplishments over the last 10 years, and our vision remains focused on the future. The DWWP program helps us make informed decisions today, and create the framework for sustainable decision making for the long term. Our recently adopted Action Plan for the next 10 years will allow the program to continue to innovate, better protect our water, and extend its reach."

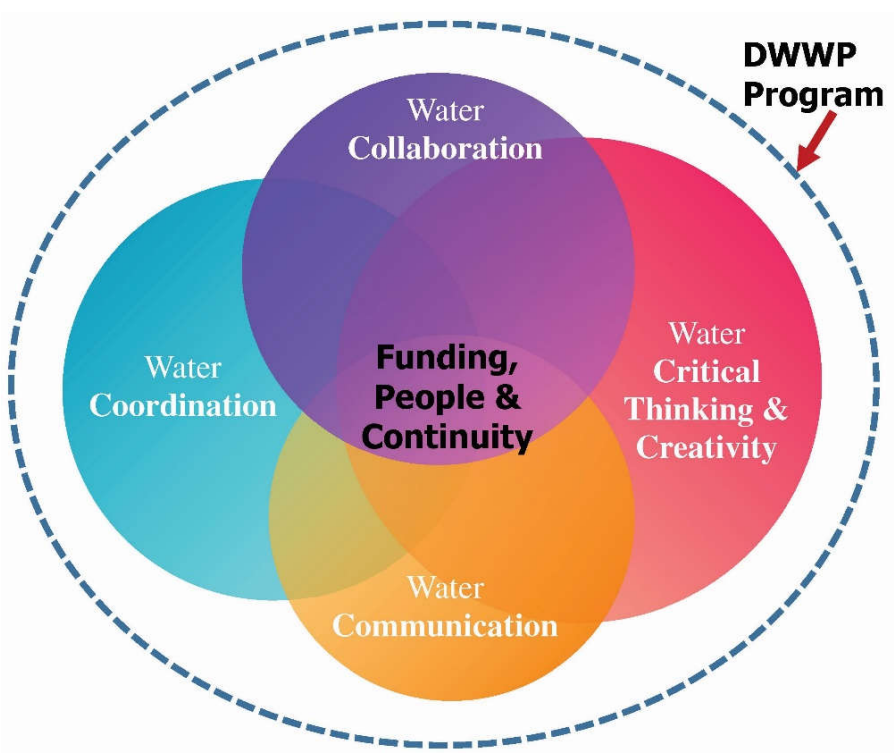
DWWP Service is a Container for 'The 5Cs'

The Venn diagram below is a high-level way of visualizing the context for the DWWP.

An over-arching goal of drinking water and watershed protection in the RDN is to transform good intentions and associated policies into standard practices on the ground. Getting such practices right is key to achieving *beneficial outcomes*, and, ultimately serving the *common good*.

Funding, People and Continuity: Beneficial outcomes depend on alignment of interests within a *regional team* framework, such that all players involved in the local government mix are guided by **shared responsibility and collaborative leadership**. These are foundational ingredients.

The 5Cs - communication, cooperation, coordination, and critical thinking and creativity – are also essential ingredients. The DWWP Service is the **container** to hold the 5Cs. What is the container? It is **funding, people and continuity**.



Ben Geselbracht
Nanaimo City Councillor

"Having stable funding has been a huge part of the success of the DWWP program. It has enabled education of both the community and those who hold political office. This laid the foundation for strong Board support."

"Because Board members are well-educated about the issues, we can provide informed and strong leadership that allows staff to achieve program objectives. We see the fruits of collaboration that brings people together at the same table to move processes forward. This collaboration has also led to the spread of important pieces of knowledge and understanding."

"Education and collaboration - these are the key ingredients of the success of everything that the RDN does under the DWWP program."

Regional Board: *Contemporary Perspective*

Strong and enduring political leadership is a critical success factor. Over the past two decades, successive Regional Boards have handed the DWWP baton to their successors to carry on the mission. Director Ben Geselbracht is one of three Board members who guided DWWP Action Plan 2.0 over the finish line. Elected to Nanaimo City Council in 2018, he provides a contemporary Board perspective as follows**:**

Watershed-Based Approach: "Prior to becoming a member of the Regional Board, I was well aware of the DWWP program and that the watershed is a fundamental management unit. The effectiveness of the community outreach by the team led by Julie Pisani made the DWWP a visible entity in the community. When I joined the Board, my focus was on updating the DWWP and making it a Strategic Plan priority."

"Because the updating and educational process for DWWP Action Plan 2.0 was so thorough, the entire Board had a clear understanding of why it was important and necessary to: 1) address climate change adaptation; and, 2) integrate what had been learned in Decade #1 of the DWWP into regional policies and land use planning in Decade #2."

Be Guided by Cathedral Thinking: "When I think about sustaining the DWWP legacy from one Board to the next, it is about viewing it within a larger vision for creating sustainable human settlement. Looking through an inter-generational lens, the term permaculture is what resonates with me. It has three guiding principles. The first is **care of land**. It is foundational because the other two build on it. The second principle is **care of people**, and the third is **care of the process**."

"When our perspective is the watershed, water is fundamentally what keeps everything moving. It maintains biodiversity; it maintains our health. The watershed is the foundational scale of consideration, and therefore we must base our design of human settlements upon it.

"The DWWP is helping us to identify the **care of land considerations** that we must design human settlements around. We are not there yet, mainly because watershed governance is distributed due to fractured jurisdictional responsibilities (i.e. federal, provincial, regional, local)."

"A long-term and shared community vision is necessary to integrate all the care of land considerations such that **Design With Nature** is on the tip of everyone's tongue. And when that happens, people will understand why our communities must be built based on care of land principles."

The DWWP: *Cathedral Thinking in Action*

The DWWP is an ongoing program in a journey that leads to a water-resilient future. The phrase "cathedral thinking" aptly describes the long-term commitment required by the community at large, successive Regional Boards, and generations of land and water professionals to achieve the *design with nature* sustainability vision that guides the program for drinking water and watershed protection.

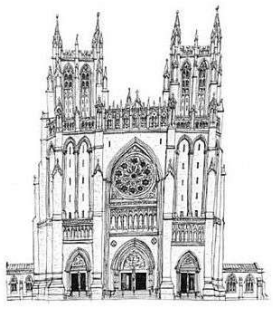
When one thinks of a cathedral, two aspects come to mind: a soaring aspiration; and a grounded structure firmly planted throughout time. We can learn from our ancestors. The grand creations of antiquity were not designed with a quarterly report or four-year election term in mind.

The builders of great cathedrals in medieval times thought in terms of multiple generations carrying out their work, to complete a dream that would not be realised until long after the originator's death. In the case of the RDN, the dream is Living Water Smart to achieve a "water-resilient future".

Randy Alexander
General Manager,
RDN Regional & Community Utilities (2012-2021)

"The continuing success of the RDN's DWWP program comes down to the strong leadership of our elected officials, and our focus on forging and maintaining strong long-term partnerships, internally and externally.

"We are confident that we have a strong foundation for the DWWP program. Working together internally, and with our external partners, we believe we will continue to be successful."



Cathedral Thinking:

A far-reaching vision,
a well thought-out blueprint,
and a shared commitment to
long-term implementation

Forward Looking: "It really is important for us to be focused on the future," emphasizes Randy Alexander. "We have mapped out the next 10 years with DWWP Action Plan 2.0, but our vision really needs to remain focused on a much longer time horizon."

"It is essential that we always be looking forward and reflecting on this question: *Where does the RDN need be in 30, 50, 100 years?* That question frames all of our decision-making towards the long-term goal. 10 years is not enough. 100 years is what we need to be looking at."

"Board leadership is really important. This ingredient is sometimes left behind when we are focused on the great work that staff do. But it is the Board that sets the direction, and decides what we are going to spend money on. The DWWP program is very important to the current Board members. Without them, we would not be here."

The Reason for DWWP Success

"Plenty of plans have been developed. That is not the amazing story in and of itself. What distinguishes the RDN plan is having a service area dedicated to implementing the DWWP Action Plan programs."

"In recent years, I have been asked to talk about the DWWP to groups and committees in different regions that are looking to pursue watershed initiatives, yet have no means to coordinate and fund a process."

"The amazing feat for the DWWP was not the coming up with a plan. It was coming up with a funding mechanism to implement and resource the plan. Funding allows for staffing. And that's the human element – the people who are carrying the plan forward and dedicated to doing that because they are not doing it off the side of their desk. We do not rely on the whimsy of grant funding."

- Julie Pisani
June 2020

The DWWP: *A Three-Decade Perspective*

The ongoing success of the DWWP program flows from partnerships and a belief in their value. Julie Pisani provides this informative perspective on the strategic role that the DWWP plays:

> *"A key point is that the work of the DWWP is strategic, it is community based, and it makes links interdepartmentally and with external agencies. And that in itself is the super power of what we do. It does not fit into a box of what a usual local government service is or does."*

Viewed through a multi-decadal lens, three distinct eras provide structure for elaborating on the RDN journey and DWWP evolution:

Period from 2000 through 2008 is bracketed by the Guidebook case study process and the successful referendum.

After that, **DWWP Action Plan 1.0** covers the ten years from 2009 through 2019 (aka the First Decade).

Currently underway is **DWWP Action Plan 2.0** (aka the Second Decade) for the period 2020 through 2030.

From the Partnership for Water Sustainabiliity perspective, the rainwater management emphasis in the DWWP Action Plan 2.0 presents the opportunity to close the loop on the whole-system, water balance approach that was initiated 20 years ago with the Guidebook.

Linking of Eras and Importance: Looking ahead to Part B, we describe how the Millstone River EAP project pulls the thread of collaboration, community outreach and stream stewardship from Action Plan 1.0 through to Action Plan 2.0 with an additional new lens: accounting for natural watershed assets and ecosystem valuation.

The Millstone River EAP project is also inter-regionally significant. One of ten demonstration applications (case studies) in five regions, it is part of a three-stage program to test, refine and mainstream EAP. DWWP experience will inform other local governments.

Led by the Partnership for Water Sustainability, the EAP program supports local government Asset Management for Sustainable Service Delivery [3]. **EAP establishes metrics for managing the built and natural environments as components of one system, and determining baseline annual budgets for stream restoration**.

[3] https://www.assetmanagementbc.ca/wp-content/uploads/Integrating-Natural-Assets-into-Asset-Management.pdf

PART A

Action Plan 1.0

For the past two decades, RDN elected representatives and staff have been on a journey. Their experience shows what the phrase hard work of hope means in practice, and what leading by example involves. Success depends on a team effort.

A Window into the RDN Water Journey

Look Back to Look Ahead

Understanding context and history is a prerequisite for an appreciation of how seeds are planted and take root, and how a program unfolds and evolves over time. The **DWWP has been influenced by, benefitted from, and influenced inter-regional collaboration** along the east coast of Vancouver Island[4].

Collaboration had its genesis in the inter-governmental process which launched Stormwater Planning: A Guidebook for British Columbia; and less than two years later culminated in the Water Sustainability Action Plan for BC [5], released in 2004. CAVI and the IREI are initiatives under the Action Plan umbrella.

The RDN was the first regional district to embrace a leadership role within the CAVI initiative. The RDN's John Finnie was the first CAVI Chair (2006-2011). His annual updates to the Board enabled the Board to regularly reaffirm commitment to inter-regional collaboration.

Vehicles for Collaboration

2006 through 2011: Convening for Action on Vancouver Island (CAVI) – Leadership in Water Sustainability

2012 to the present: Georgia Basin Inter-Regional Education Initiative (IREI)

Internal Partnerships: *Team Approach*

"The RDN is future-focussed, and our DWWP program provides key information to assist organization-wide efforts. We are confident that working together as one team we will be successful," emphasizes Randy Alexander in providing an over-arching context for internal collaboration.

"The RDN organization is focussed on making good decisions today. Our combined efforts are creating a framework for sustainable decision-making in the future. Water issues are critical across all RDN functions."

"Internally, the DWWP program plays an important role in supporting and complementing the strong sustainability focus and leadership of the other departments across the RDN. They are really the leaders. Our job is to support them to meet the strategic and operational goals of the organization. The essence of our job is that we support people in other departments to achieve the organization's goals."

Role of DWWP within the RDN Organization

"This is not just about the DWWP program. This is about the RDN organization as a whole and how we look at things, how we solve problems, and how we all work together towards common goals."

- Randy Alexander, October 2020

[4] https://waterbucket.ca/viw/category/cavi-leadership-in-water-sustainability/
[5] https://waterbucket.ca/cfa/category/turning_ideas_into_action/2004-action-plan-guidance-document/

Internal Partnerships: *Towards Resilience*

Geoff Garbutt
General Manager,
RDN Strategic and
Community Development

"The RDN was the first regional district outside Metro Vancouver and Capital Regional District to develop a Regional Growth Strategy. As an early adopter, the RDN showed leadership. The first Regional Growth Strategy started the process to connect growth management, environmental sustainability, and our carrying capacity."

"The great part about the DWWP is that it is building the level of information needed for successful implementation of the Regional Growth Strategy."

"There is a prevailing Vancouver Island mind-set that maintaining what makes this place attractive depends on communities having a long-term view that extends out 30, 50 100 years. This has spurred Island-wide innovation," notes Geoff Garbutt when he reflects on what he has observed over the course of his career in local government.

"The word that has crystallized in my mind to describe the RDN approach is **resilience**. This differs in meaning from sustainability. It is actually much more. As I conceptualize it, resilience has three parts: being able to support oneself; supporting others; and then prospering together. It is a 3-legged stool concept using different words."

Resilience is the Ability to Recover: Sustainable and resilient are complementary terms that draw attention to the future and help focus thought and action. However, use of "resilient" more clearly shines the spotlight on Context, Intent and Results.

Sustainable refers to allowing certain conditions in the context of social, economic and environmental considerations. **Resilient in a biological sense is primarily the ability for an ecosystem to recover from an intervention**. Below, Geoff Garbutt elaborates on the RDN's embrace of resiliency in the approach to community development**:**

Influence of DWWP on the Decision Process: "In the Strategic and Community Development department which I lead, we recognize the importance of having a long-term vision and connecting the dots. As a local government, we need to understand what is driving change in our region, as well as what is driving challenges. Understanding both allows us to bring them together under the third leg of the resilience stool - which is economic growth."

"As a community planner, I have a resilience focus. But my role is also about growth and support. When we are all prospering, we can all move forward together. To do that, we need information; and that is where the DWWP program has been really great."

"One can develop all types of great plans. Unless plans are backed up by data, however, the ability of a local government to achieve the intent of the plans is constrained. The DWWP program is helping the RDN face our challenges and prepare for the future. **The Action Plan 2.0 is exciting. It is affecting decision-making**."

Action for Water (2000 through 2008)

Once it is completed, the rainwater management component of DWWP Action Plan 2.0 would bring to fruition the process that began in 2000. The regulatory requirement rippling through time is the Liquid Waste Management Plan (LWMP). It is a focal point in the DWWP narrative.

John Finnie
(retired) General Manager, RDN Regional & Community Utilities

"In 2008, and as the outcome of a successful referendum, the RDN became the first regional government to create a drinking water and watershed protection service area with taxation authority in an electoral area. This cumulated a 6-year effort."

"In 2012, the service area was expanded to include the four municipalities within the regional district, and they became active participants in the watershed function."

Liquid Waste Management Plan: When the RDN created a voluntary LWMP in 1997, it had a wastewater focus. Three years later, a letter from the Minister of Environment encouraged the RDN to upgrade the stormwater component of its LWMP. To accomplish this task, the RDN partnered with the Ministry and the Georgia Basin Ecosystem Initiative to develop a five-year **Stormwater Action Plan**.

This work was undertaken as a demonstration application for inclusion in Stormwater Planning: A Guidebook for British Columbia. This case study **developed and tested a decision process for reconnecting hydrology and ecology** through watershed-based land planning. The outputs were embodied in two Stormwater Guidebook chapters:

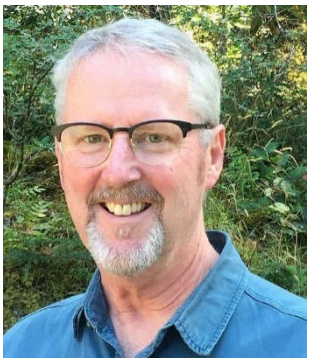
- **Policy for Integration of Land Use Planning and Stormwater Management** *(Chapter 4)*
- **Setting Priorities for Early Action** *(Chapter 5)*

The Guidebook process included a stakeholder involvement component conducted in 2001; and built around a series of workshops.

Key RDN Board Members Participated in the Process: Two Board champions emerged following the Guidebook process – Chair Joe Stanhope and Area Director Dave Bartram. "They spoke up and the rest of the Board got aboard. It was Dave Bartram who said the RDN really needs to develop a strategy for watershed protection, and for protection of streams and the water supply," states John Finnie.

"There is no question that the Guidebook process had an influence in seeding the ground for the DWWP. The Guidebook case study outputs were being talked about. So it is not like the idea came to Dave out of the blue," adds Mike Donnelly, former Manager of Utilities.

Lloyd Sherry, a City of Nanaimo Councillor, also played a role during the Guidebook process. In effect, he was a litmus test for the Board's willingness to take action. "If Lloyd agreed or did not agree with something, he would make that known. His experience and tenure on Council had influence with other City Councillors who were on the RDN Board," notes John Finnie.



Mike Donnelly
RDN Water Services Manager (2004-2016)

"The word alchemy keeps coming to mind to describe how the DWWP happened. It is a magic mix of organizational structure, direction and people. It is forever changing. When one door closes, another opens."

"If not for Dave Bartram and Joe Stanhope, there would be no DWWP. Fortunately, they were influential in pushing it. The angst over the 2003 drought also helped to move things along!"

"Kelly Daniels, then the CAO, was a key player. He was very good at getting things done. Kelly saw the need for the DWWP and he would say 'let's keep it going' and 'we need a report to the Board with next steps'."

The First Five Years: In February 2003, just eight months after release of the Guidebook, John Finnie wrote a report to the Board that laid out a strategy for moving forward incrementally to create a regional service. The DWWP concept was a priority in the *Strategic Plan for 2003-2005*. In March 2006, the Board established the *Drinking Water-Watershed Protection Stewardship Committee* to guide the process. This culminated with the 2008 referendum, which narrowly passed.

Political Will and Energy: "CAO Kelly Daniels and GM John Finnie foresaw the need for a service area with taxation authority to achieve water protection. They also recognized the opportunity to harness the political energy at the RDN Board level. So they asked me to work with John to create what became the DWWP," recalls Mike Donnelly.

"Our task was to provide the Board with a path forward. Numerous conversations with Dave Bartram and Joe Stanhope fleshed out a balanced approach. These conversations helped us understand their thinking; and so ensured that they would support what we proposed. So often people in their position talk about what we should do, and never do. This was not the case with Kelly Daniels, Dave and Joe."

"We went back and forth with the Board. In 2006 we set up *Action for Water* and developed a plan for water and watershed protection that was foundational. We brought in as many different groups that we could think of, and still comfortably fit in a room. *Action for Water* took 1-½ years to develop. We presented it to the Board in 2007. They said: 'OK, now go out to the public and we will have a referendum in 2008'."

Overcoming Doubt: "There were times when some Board members would say that the RDN should not be doing this. They just could not wrap their minds around the idea of watershed protection. We supply water, the RDN is a utility – senior governments are responsible for watershed protection, they would say," recalls John Finnie.

"RDN is not a watershed entity to protect the watershed supply, they would argue. Not necessarily, was our response. We need to protect that source for our supply because we are responsible for that supply. Eventually a sufficient number of Board members supported this approach, and we moved forward."

Action for Water Video[6]: In 2008, the RDN produced the *Action for Water* video. It was compelling. **It explained the need for action through the local government mandates of land use planning and development standards.** "The video was a powerful communication tool during the very intense public consultation process leading up to the referendum in November 2008," concludes John Finnie.

[6] https://www.youtube.com/watch?v=aYu5vdNdzv8&feature=emb_logo

Stewardship lens for Action Plan 1.0

"In the first decade of DWWP it was essential to walk before we could run. The program's ultimate vision is on supporting land use decision making with local water information. But to get there, there needs to be a water literacy, awareness and stewardship ethic in the community that is supported by the RDN."

"Basically, the first challenge was to demonstrate and cultivate care about water stewardship --- water conservation and water quality protection – and enable this care to be acted upon on the individual level."

"So this was largely about education, outreach, workshops, resources – in other words, a public presence. Between 2009 and 2019 the region saw active interest and participation in water conservation and watercourse stewardship."

- Julie Pisani, July 2020

DWWP Action Plan 1.0 (2009 – 2019)

Paramount goals, and hence desired outcomes for Decade #1, were:

Build a foundation of education, awareness and stewardship: ***We Demonstrate Care about Water Stewardship and Enable Others to Do So***

Build local datasets: ***We Actively Learn about Water and Identify Priorities***

DWWP Program Has Built a Foundation of Education, Awareness and Stewardship: Julie Pisani reports that Decade #1 is defined by six areas of success:

Team WaterSmart – *with its focus on water conservation and water quality, with the latter encompassing both community water supply and stream ecosystem health*

Community Watershed Monitoring Network – *for surface water quality sampling, citizen science*

Volunteer Observation Well Network – *for groundwater aquifer level monitoring*

Water Budget Phase 1 – *for water supply and demand study*

Seed Funding – *for watercourse restoration*

Rebate Programs – *for Rainwater Harvesting & WaterSmart gardening (soil and vegetation*

Rainwater Harvesting: Rolled out in 2012, the Rainwater Harvesting Incentive Program was the first-of-its-kind in BC. It provides grants of up to $750 for homeowners. Also in 2012, the RDN published the Rainwater Harvesting Best Practices Guidebook. Julie Pisani explains:

"The RDN stepped back from a prescriptive 'how-to-do-it' approach and adopted a guidelines approach. The Guidebook was developed through an inter-departmental collaboration process that involved staff from long-term planning, water, building inspection and sustainability."

"The rebate program supports residential property owners in installing rainwater collection systems with a minimum of 1000 imperial gallons of storage. Predominantly these are outdoor systems, used to augment garden watering. Some are have gone further to include treatment as potable systems, on Gabriola Island for example."

Working Towards a Responsible Water Culture

"We always come back to the Drinking Water & Watershed Protection Action Plan vision."

"It is over-arching, outcome-oriented and lays out what we need to do to understand and manage water in our region."

"The program is a 'one-stop' source for local government initiatives on water stewardship."

"Cooperation with the four municipalities results in consistent messaging, efficient use of resources and a concerted effort to establish strong water-awareness and cultivate a responsible water culture in the Nanaimo region."

- Julie Pisani, November 2015

Team WaterSmart: "Between 2009 and 2019, the region saw active interest and participation in water conservation and watercourse stewardship," states Julie Pisani. "Team WaterSmart was out in the community delivering workshops and interactive event displays. The program focus was on minimizing water waste and preventing water contamination through backyard practices of residents."

DWWP Program Has Built Local Datasets: In addition to outreach programming, data collection was a key focus of DWWP efforts in the first decade. And, as reported by Julie Pisani:

"In 2011, the DWWP program partnered with the Ministry of Environment and 10 steward groups to implement the Community Watershed Monitoring Network. The Ministry provides the training protocols for the volunteers and analyzes/stores the water quality data. The RDN provides and maintains the equipment, coordinates the volunteers, and performs the data entry and reporting."

"The community network greatly expanded water quality sampling efforts across the region. By training volunteer stewardship groups to collect surface water quality data to provincial protocols, this Network has enabled monitoring at over 70 sites and over 40 watercourses."

"Fourteen stewardship groups participate to do the sampling each year in the low-flow and fall flush periods. The DWWP program has proved to be an important coordinating body, bringing together the contributions of volunteers, Provincial experts and forest landowners."

"The data collected on water temperature, dissolved oxygen, turbidity and specific conductivity are entered into the Provincial EMS database for use by decision-makers, professionals and the public. The network is in its tenth year, and trend analysis has been completed to interpret the data and prioritize efforts in response to the findings."

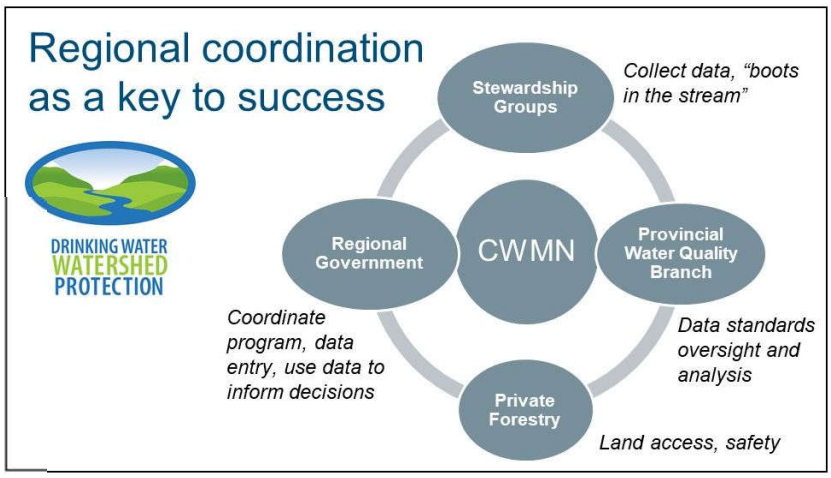
Do More with the Same Resources: "This partnership has allowed the Ministry to study watersheds over a greater geographic range and in more eco-regions across Vancouver Island, has resulted in strong relationships with local government and interest groups, has provided valuable input and local support, and, ultimately, has resulted in a more effective monitoring program," stated Rosie Barlak, the Ministry's Environmental Impact Assessment Biologist, in 2015.

Partnerships are central to Community Watershed Monitoring Network because:

- Stewardship groups collect the data
- Province provides data standards, protocols and data analysis
- Private Forestry provides land access in the upper watersheds and safety gear
- The RDN coordinates the program, manages the equipment, volunteer communications, data entry and reporting to community and decision makers

"The RDN demonstrates commitment to watershed initiatives and water sustainability by delivering this service with a long-term reliable funding source. This allows us to effectively leverage support from partners, because we are in it for the long came and we are coming to the table with some resources to get started. Not fund the whole thing, but get it off the ground and generate collaboration."

- Julie Pisani,
  Parksville 2019 Symposium



Murray Walters
Manager of Water Services

"Who knows better about what you are trying to do than you when you have had the program in place for ten years. One day Julie and I were talking about this when we realized: Let us just do it ourselves. We can do this. We can get the expertise when we need it to help us with decision-making, report writing and reviewing technical material. But ***let us just be the engine.****"*

"As a consequence, we have a really fine understanding of where we are going. Our work plan is very granular, as are our expectations. In the DWWP program, our position right now is enviable because we have a lot of internal knowledge."

DWWP Action Plan 2.0[7] (2020 – 2030)

The paramount goal in Decade #2 is to operationalize data to inform policy and planning. More specifically, the goal is framed thusly:

> **We collaborate to meaningfully shift policy and practices towards water sustainability in a changing climate.**

A Look Ahead: Julie Pisani foreshadows that, "The next ten years of DWWP will build on the foundational work in water outreach and data collection in the first decade. With longer datasets now available, trend analysis is possible, and interpretation of that data can more reliably be used for land and water management decisions."

"Water awareness and stewardship will continue to be important, as will continuing to operate monitoring networks and complete studies to better characterize local water resource impacts in a changing climate."

"Layered on top of this will be more effort and emphasis in data visualization and communication, policy advocacy, and integrating our understanding of regional water conditions into planning processes – both at the local government level and senior government level."

Let's Just Be the Engine: "The DWWP Action Plan 2.0 was a massive, massive undertaking and we did it all with internal resources. We believed that if we did it ourselves, we would be the experts. We would not have to defer to an outside consultant when questions are asked as to why we did this and that," Murray Walters proudly states.

"These ideas resulted from a collaborative process that included community and stakeholder input and involved interdepartmental committees. In hindsight, it is going to be a really good thing that the second 10-Year Action Plan was developed by people who were around for the first ten years, or part of it, and are going to be here for at least some of the years required to implement it."

"This is something that the people involved with the program are pretty proud about; and I believe that the RDN organization will develop more appreciation for that as the years go by."

[7] https://rdn.bc.ca/sites/default/files/inline-files/DIGITAL%20SINGLE%20PAGES_RDN-action-plan31.pdf

Focus for Decade #2

Incorporate rainwater management focus linked to the LWMP

Collaborate across jurisdictions & departments

Natural Assets & Green Infrastructure

Hydrologic Function / Watershed Performance Targets

Climate Resilience

Directly inform land use and water management decisions

Target Stewardship to Strategic Sectors such as Agriculture

Operationalize the Data

"At the beginning of the DWWP journey, we said land use planning needs good, solid data to move forward. The first decade of DWWP was getting that organized and getting it solid. Which we did! We got a lot of information in place that would help our colleagues on the land use side of RDN make up their minds about different programs and policies. In the second decade, let us see some changes!"

- Mike Donnelly
  July 2020

Operationalizing the Data to Inform Policy and Planning: When Mike Donnelly reflects on what 'operationalizing the data' means in practice, he shares this perspective drawn from his experience as the first DWWP program manager:

> "At the end of the day, the Board said in 2007, we can do all kinds of nice things around water use reduction. We can do the education piece, etc. **But where is the rubber hitting the road, they asked? It is land use planning that impacts on stream health**, they acknowledged. In a way, the first 10 years was the easy part. The second 10 years will be challenging because it is hard to change land use planning."

Drivers for Changing Land Use Policy and Practices: The LWMP is a regulatory vehicle that has the ability to motivate change through a regional rainwater management strategy. Regulatory objectives and grant incentives that are linked to Asset Management for Sustainable Service Delivery: A BC Framework also provide motivation for stream protection outcomes that reduce life-cycle costs, financial liability and risks. This is explained in Part B on the Millstone River case study.

Land Use Planning is the Holy Grail: "For a program like DWWP, land use planning is the Holy Grail. Planners have a lot of things on their minds, one of which is 'watershed protection'," commented Murray Walters, the current DWWP program manager, when he mused about the challenge articulated by Mike Donnelly (in the box above).

"DWWP has developed to the point where we can provide meaningful input to land use planning. The difficult part is converting science into policy. There needs to be close collaboration between the planners and a program like DWWP, to ensure water resources are adequately protected in the long term."

KEY Reason for Success

"The DWWP is my focus and the focus of my team. That is possible because we have the funding mechanism to have long-term resources. We don't have to rely on the whimsy of grant funding."

"We always understood the importance of partnerships. It was once we understood the importance of relationships with First Nations, however, that we realized that being a stable and long-term presence is extra important. It takes time to build trust in relationships, in particular with First Nations."

"There is a legacy of challenges that we need to work through. Having a long-term funding source that can give us stability, not only in terms of funding projects, but also in funding people to be in charge of those initiatives, is THE KEY to being able to develop long-term relationships. Our programs are here and our people are here."

- Julie Pisani
  June 2020

The Challenge: Convert Science into Policy

"I believe we have a super plan. It is well-thought out. It is supported by elected officials. And across the region, it has broad support and a pretty high level of detail. It has good internal support from the other departments within the RDN. Planning and parks are really into being included in the plan," Murray Walters says proudly.

"We have a really, really good road map for the first five years of the 10-year plan. We intend that the plan will be adaptive so that the DWWP program can adjust to a changing world."

"The biggest challenge is going to be when we focus on converting science into policy. Looking ahead, the big thing in front of us over the 10-year period is coming out at the end of the DWWP process with good policy guidelines that are based on the science that the program has identified."

Education of Upcoming Generations: "The education side of the DWWP program is especially important, particularly with kids. We are trying to grow that, and is a long-term vision. It is different from converting science into policy. We just want young people to realize where the water comes from, and how come there is not water everywhere, so that they will understand matters such as sprinkling regulations or the cost of water."

Key Elements of DWWP Success: "At the end of the day, telling the story – whether it be about the progression and where it has gotten us, and where we are heading – is really about the key elements that have really made this program a success," Julie Pisani emphasizes.

"It is a success that is measured by the metrics of long-term engagement with key partners; stretching the abilities to think outside the box and collapse the silos a little bit; and working on a collaborative framework for matters that were previously fragmented in different departments and ministries, or there wasn't communication interdepartmentally or even inter-agency, or there had been but it had been fleeting, and there was not long-term continuity to keep conversations going.

"And not only the collaboration, but the financial commitment to do work to act on the recommendations that might come out of some of those collaborative processes."

Integration of Land and Water Planning

"As someone who was involved in the early years of collaboration between Vancouver Island local governments and the Partnership for Water Sustainability, I understand the relevance and importance of the water balance approach. And I am an enthusiastic supporter of the approach. Furthermore, I get it that rainwater management embodies integration of land and water planning. More and more communities will get on board as we show success," emphasizes Geoff Garbutt. He elaborates below:

Top-Down & Bottom-Up Alignment: "From the strategic and community planning perspective, we see the DWWP program as being key in three ways. First, it is providing information that we need to successfully implement the Regional Growth Strategy and achieve the goals of the RDN Strategic Plan. Secondly, water has always been super important in our region. This fact leads to the third consideration."

"Looking at the DWWP, Regional Growth Strategy and Strategic Plan as a whole package, they are all about climate change and resilience. As I reflect on where the RDN is currently at with these initiatives, it feels like everything is coming together. And we see enthusiasm and strong support from elected officials."

Collaborative Leadership: "The RDN is a dynamic organization. We have a strong foundation. We are learning how we can learn from and support one another in our respective areas of focus, and then bring the areas of focus together. That is what excites me about the future. We know that there are many challenges coming. By working together, and sharing these core strengths, it makes a solid foundation for whatever direction we are going to go."

"Within the RDN organization, staff want to work together. And staff take a lot of pride in what they do because they can drive around and see the fruits of coordination in the region. Great things are happening everywhere. Working collaboratively allows us to take on challenges and make sound decisions."

"There are actually two parts to the decision process: staff and politicians. The latter are using the information to make decisions. To me, that is the real test. Can we put this information together? Can we work together? Can we make good policy? Can we make good recommendations? The people who ultimately make the decisions are receiving the information, and they are making decisions using it."

Climate Change and Resilience

"The DWWP program is helping the Nanaimo region face emerging challenges and prepare for the future. We know that environmental challenges are coming – floods and droughts, sea level rise, and other climate-related emergency issues."

"All of them are in this basket that is the DWWP. The program has this backstop of information that we are building at the RDN through internal partnerships. Our collective success will flow from sharing goals, sharing information, and supporting good decision-making."

- Geoff Garbutt
  October 2020

Foundational Role of Partnerships

External Partnerships: *Strong & Lasting*

"Externally, we recognize that we are all in this together, and success depends on leveraging our resources with those of others to achieve our common goals," states Randy Alexander.

"The DWWP program has found that its natural role is to bring together diverse groups; and to identify what those common goals are so that we can efficiently pool our resources and focus our joint efforts to achieve results."

Figure 1 captures the essential elements of the partnership foundation for the DWWP.

External Partnerships

"Externally, we have been successful at forging, developing and maintaining strong long-term partnerships; and realizing that we are all in this together. Our success depends on our ability to leverage our resources with those of others to achieve common goals, and to understand what those common goals are."

- Randy Alexander
October 2020

Create an Environment for Success: "The program has forged strong, long lasting partnerships with senior government agencies, local governments, stewardship groups, industry, academia, water professionals and water purveyors. The list goes on and on, and they are sustained long-term partnerships."

"The DWWP program has been super successful externally – that is, by creating an environment where different agencies and groups can come together, figure out what is important, and determine how we can pool our resources to get things done."

What Success Looks Like: "I look at our TAC, Technical Advisory Committee, meetings which have representatives from all these groups. People keep coming to those meetings because they find value and importance in them to help them achieve their goals. Over time, that committee has become more and more successful."

"Some committee members have said to me in the past that they come to these meetings because this is where they find out what is going on in water. That is great and makes me feel we are providing broader value as well."

"Partnerships have created a springboard for all of us to be successful," concludes Randy Alexander.

Figure 1

The foundation for the RDN's approach to Drinking Water and Watershed Protection

"With so many watercourses, how can we attempt to understand the health of our surface water resources?

"Well, we need to collect data. Involve the community and be prepared to do so for the long term.

"This is a lofty proposition really only achieved through partnerships."

- Julie Pisani
  Parksville 2019 Symposium

Inter-Regional Collaboration

"The investment that the region has made in both our land use and regional growth management, as well as the backstop on water, has positioned the RDN to influence decision-makers at the provincial and federal levels of government. I believe we are able to do this because of the information that the RDN is generating through the DWWP program."

"The DWWP is also informing and inspiring other local governments. When regional districts on the east coast of Vancouver Island start to interconnect their land and water programs, for example, the outcome would be even more powerful than what has been experienced within the RDN."

- Geoff Garbutt
October 2020

External Partnerships: *Cultural Dimension*

"The BC culture is that we choose to work together. And when we do, having a long-term focus and commitment is important because it takes time to build a foundation upon which to erect a framework for action," explains Geoff Garbutt.

"**The partnerships that have been built up through the DWWP feels like a rising tide that floats all boats.** By having these partnerships - with a shared vision, with agreements for participation and for sharing information, and with shared decision-making – it means that together we will be moving forward into a positive place."

"Partnership success creates a competitive advantage for the region. We are continuing the leadership that the RDN has shown for several decades. There are neat things about to happen within the region. These will both test the foundation and rest on it at the same time." Next, Geoff Garbutt elaborates**:**

Backstop for Integrated Land and Water Decisions: "The RDN has created a framework for land use and development - where the region is going to grow, and where it is not. And because we have a framework, it allows us to focus the information that we need to assess choices. The DWWP is generating the information to inform and make the right decisions long-term as we look ahead 30, 50, 100 years."

"Use and management of water is what has driven our region for a long time. The DWWP *Action Plan 1.0* has driven a lot of the research that we have done together around the growth of our region. Now that we are getting a better handle on what is available, as well as water quality, this understanding is making our decisions better."

Harness the DWWP Research Findings: "The research is helping us get a better picture of what we need to do in order to go forward. In the next phase of DWWP, it is really important to harness the information and understanding flowing from that research."

"When you layer what the RDN has done with what the Province is doing in terms of the Water Sustainability Act and other investments, one can see that the collective effort is starting to create a really solid web, or net, to hold and backstop the work that RDN is doing."

"Without that backstop, and the information itself, it is really difficult to make the important decisions. Assurance of water availability and quality is becoming one of the bigger driving factors for the livability of the Nanaimo region."

Data Collection is a Key Focus

Partnerships are foundational to the way that the RDN approaches water management and watershed protection. Over-arching principles that guide the DWWP program are distilled as follows:

- Success is measured by the metrics of long-term engagement with key partners.
- Program continuity allows conversations and initiatives to keep going.
- A stable, long-term presence allows the necessary time to build trust in relationships.

Two data collection initiatives provide the partnership backbone, namely: the *Community Watershed Monitoring Network*; and the *Volunteer Observation Well Network*. Both were implemented in 2011.

Base Funding + Partnerships = Successful Program: In the sidebar, quotable quotes by Mike Donnelly (former RDN Water Services Manager) provide a perspective that is standing the test of time. He describes the value of partnerships in terms of this guiding philosophy:

> *"Within a partnership, you get to identify areas where you can work together. You make sure that your partners are achieving their goals as well as you achieving yours. This approach enrichens the whole experience in a highly effective way."*

The DWWP program is not a 'prescriptive plan' that tells the region what to do. Instead, it provides the supportive framework to enable a partnership approach that starts at the project level to bring the higher level vision for water sustainability to fruition. Projects in outreach, stewardship, monitoring, science, policy and planning are linked to the vision for healthy watersheds.

Collaboration is an intrinsic part of the DWWP program. A strength of the program comes from the working partnerships between the RDN and the four municipalities in the region – City of Nanaimo, City of Parksville, Town of Qualicum Beach and District of Lantzville.

Partners Bring Value to Each Other

"DWWP would not be that much of a success without the partners. It is the continued push for partnerships that makes it successful. This was the approach right from the beginning with Action for Water."

"Every step has been with partners, and they brought value. Actually, we bring value to each other. It is not just about us achieving our goals. It is all of us helping each other achieve goals."

"So many people think partnerships is just about bringing money to the table so that you can do what you want to do. But that is actually a very small part of it. The big part is that you get to understand another organization's point of view."

- Mike Donnelly
July 2020

Surface Water Quality Trend Analysis

For the years 2011-2017, statistical modelling of water quality in the summer and fall sampling periods indicated that land use types associated with human disturbance were important predictors:

When watersheds were <60 percent forested, changes in turbidity and conductivity were apparent.

Watersheds with >20% agricultural use generally have higher turbidity and lower dissolved oxygen.

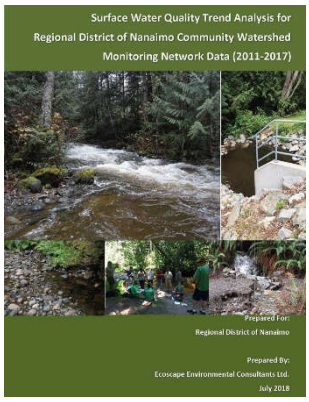
Watershed with paved road densities >0.002m/m2 were associated with increased conductivity and higher water temperatures.

Community Watershed Monitoring Network

The history, scope and value of the community watershed monitoring network were described in an earlier section. The network expands on the provincial database, collecting enough data to see watershed trends and raise watershed health awareness in local communities.

The long-term goal of the Community Watershed Monitoring Network program is to identify trends in water quality to assist in regional land use planning and restoration decisions.

Trend Analysis: In 2019, the RDN published the results of the *Surface Water Quality Trend Analysis* [8] for the period 2011-2017. Land use types associated with human disturbance are important predictors of dissolved oxygen, temperature, turbidity and specific conductivity. **The research confirmed the importance of intact riparian corridors and undisturbed forested lands to stream health in the Nanaimo region.**



Groundwater Observation Well Network

It is hard to manage what you do not measure - groundwater is one of those elusive things that is relatively hard to measure, but with the use of groundwater level monitoring equipment, water table depth measurements can be taken on an ongoing basis to observe if water levels are changing over time, to get early warning if supply may be impacted, and to better inform development that occurs in the Greater Nanaimo region.

Between 2011 and 2013, the DWWP program partnered with the Province and the Geological Survey of Canada to more than double the number of wells in the Observation Well Network, from 17 to the current 35, in the Nanaimo region.

To expand water level data collection in the region beyond the Provincial Observation Wells, the RDN has worked with 32 private well owners who volunteered to have groundwater level monitoring equipment (level loggers) installed in their wells in areas where there was previously not much groundwater data collected. The loggers record hourly level data.

[8] https://www.rdn.bc.ca/dms/documents/dwwp-reports/region-wide-reports/surface_water_quality_trend_analysis_cwmn_2011-2017.pdf

from 'Working' to 'Sustainable'

*"The most important thing when you are creating **working partnerships** is to understand the perspectives of the other partners. Listen to them. Spend time with them. Get to know them."*

*"Perspective is very important. Building an effective partnership is not about figuring out how the other person can help you get what you want done. It is about how you can figure out how you can help that person. That is how you build a **sustainable partnership**. Understand what their needs are to help them move forward."*

"Perhaps we do not have regulatory authority in various areas. But we can bring together scientists, government agencies, First Nations and others."

- Randy Alexander
  September 2014

Take the Time to Build Trust and Respect

Through experience, one learns that to build trust and respect, the process starts with a conversation. Conversations over time lead to dialogue; and dialogue leads to consensus.

What Communities Can Learn from First Nations: "In any discussion with First Nations, you realize how different their time perspective is compared to what we are used to. I like their perspective: *It will not happen right away, but it will happen*. You just keep moving in that direction," states Mike Donnelly.

"A lesson that I learned from my interaction with a local First Nations chief is to take the time to have a conversation. You explore topics. You get to know about each other. It is just talking. So relax."

Connect Land and Water: The relevance of the foregoing observations was underscored by Randy Alexander, in September 2014, in his opening remarks when local government staff from five regional districts gathered for an inter-regional collaboration session hosted by the Nanoose First Nations on their traditional territory:

> *"We are good at measuring, analyzing and planning. But we do not really understand much about what makes a watershed healthy, whether over 100 or 1000 years."*
>
> *"As we move forward with integrated watershed management in the Nanaimo Region, our hope is that we can work with the three First Nations communities in our region. They can help us understand what 'healthy watershed' means and bring their long-term understanding to our work."*

Interweave Indigenous Knowledge and Western Science: "The traditional knowledge and indigenous value of the land and the water is a realm of knowing that our scientific method does not touch. Water is a resource, but it is much more that that too. It is a life force; a spiritual force," wrote Julie Pisani in November 2015.

"We have started building relationships in an effort to foster trust and collaboration, and it always starts with stories. Conversations about what we care about, stories about the past which help us understand the present, and dialogue about the future and positive vision about what that may look like."

Englishman River walkabout with First Nations elders
(September 2014)

Interweave Indigenous Cultural Knowledge and Western Science

In 2014, the Partnership for Water Sustainability organized a series of five "inter-regional collaboration sessions". Metro Vancouver and four Vancouver Island regional districts provided the program content. The last in the series was hosted by the RDN; and held at the offices of the Nanoose First Nation and on the banks of the Englishman River.

"The participation of Nanoose elders resulted in a moment of deep reflection for all who participated. The experience was certainly transformational for me. In that moment, I realized the obvious value of a water-first approach that interweaves the best threads of Indigenous cultural knowledge and Western science into a stronger and more flexible system of knowledge."

"First Nations bring the spiritual dimension of water. When we are in tune with that way of reimagining water basics, it opens the door to reconnecting hydrology and ecology."

- Kim Stephens
  August 2020

PART B

Action Plan 2.0

The RDN's ultimate vision is to support land use decision-making with local water information. In the next decade, the DWWP program will further hydrology-focussed efforts and add the new lens of ecosystem financial valuation of natural watershed assets.

DWWP Action Plan 2.0 and Rainwater Management

Context for Action

When it rains - there is too much runoff, too fast. When there is no rain, there is too little streamflow. The consequences are:

- more flooding;
- more stream erosion;
- and less streamflow when needed most.

Why reconnect hydrology and stream ecology?

Less flooding.

Less stream erosion.

More streamflow when needed.

AND

Reduced life-cycle costs for drainage-based infrastructure.

Sustainable & resilient ecological services.

Actions on Land Have Consequences for Water and Streams

When released in 2002, the Stormwater Planning Guidebook introduced the whole-system approach to *'reconnect hydrology and ecology'*. This established a new direction for urban hydrology and drainage engineering. The Guidebook pointed the way forward by connecting the dots between what people do on land and how it impacts water and streams. It applied science-based understanding**:**

If we limit the runoff volume when we develop land, and in the process mimic the natural flow pattern in streams, then we can prevent increased stream erosion, prevent increased risk of flooding, and protect aquatic habitat.

If we manage volume, life-cycle costs will be reduced for drainage-infrastructure; as will costs for maintenance and management (M&M) of ecological systems and services.

The Guidebook introduced the **Water Balance Methodology** as a foundation piece for the whole-system approach. The methodology enabled setting of performance targets for rainfall capture, runoff control and groundwater recharge. Integrated application of the targets would achieve watershed protection and stream health outcomes.

Closing the Loop: The Guidebook is a metaphor for **connecting past, present and future** vis-à-vis rainwater management in the RDN. Two decades after the RDN was a Guidebook partner (past), execution of the LWMP regulatory requirement (present) makes it possible to close the loop and thus implement the whole-system approach (future). Julie Pisani provides this perspective on the time it takes to build the bridge between understanding and implementation**:**

"The objective and mission of the DWWP program has always been about connecting land and water management. But the RDN couldn't just leap straight there. We first had to build partnerships, trust, datasets and knowledge. We had to test ideas, learn, earn credibility, and deepen relationships across jurisdictions."

Rainwater management lens in Action Plan 2.0

"The next ten years of DWWP will build on the foundational work in water outreach and data collection in the first decade. With longer datasets now available, trend analysis is possible, and interpretation of that data can more reliably be used for land and water management decisions."

"Water awareness and stewardship will continue to be an important role for DWWP."

"While the first decade focused on water availability, water conservation and water quality protection, decade two will incorporate a focus on rainwater (stormwater) management that is committed to under the RDN's Liquid Waste Management Plan, amended in 2014. The updated LWMP document includes a program commitment for Rainwater Management / Drinking Water and Watershed Protection."

- Julie Pisani, July 2020

Whole-System, Water Balance Approach Reconnects Hydrology and Stream Ecology

The DWWP is integrated so that it achieves *Board Strategic Priorities* related to climate change, the natural environment, land-use planning, and asset management. This interconnectedness supports a whole-system approach that would reconnect hydrology and stream ecology.

Rainwater Management in the RDN

In DWWP Action Plan 2.0, it states that "the DWWP Program is also a vehicle by which to **efficiently deliver regulatory requirements** in the Liquid Waste Management Plan[9] related to regional rainwater management." Two key targets related to this commitment are:

- Develop a regional strategy on rainwater management in coordination with member municipalities; and
- Implement rainwater management objectives under *DWWP Action Plan 2.0*.

"These actions are now reciprocal, so both plans speak to each other directly," Julie Pisani points out.

A Stream as a System: Developing a regional rainwater management strategy requires a whole-system approach which is underpinned by core hydrology concepts as described in **Figure 2**. This image illustrates what a stream cross-section sees at one instant in time. However, the whole-system approach requires that the cross-section view be extended in time like a movie or video.

A key takeaway is that the stream and its discharges are dynamic and constantly changing. The important information in this more complete view of **a stream as a system** is the duration of flow over time, and how it changes with time.

A second key takeaway is that how water gets to a stream, and how long it takes, is not well understood, even among land and drainage practitioners. Simply explained, the flow of rainwater from cloud to stream is comprised of ***three water balance pathways: surface runoff, horizontal shallow interflow, and deep groundwater*** (aquifer discharge). Yet the latter two are routinely ignored by planners and designers. Time, a critical factor, is also ignored. These omissions have stream health consequences.

[9] RDN Liquid Waste Management Plan (https://www.rdn.bc.ca/liquid-waste-management-plan), 2014, Section 5.5.

Reconnect Hydrology & Stream Ecology

Outcomes of the Whole-System Approach: *Water (Cycle) Balance Restored, Stream Erosion Prevented, Summer Base Flows Enhanced, Fish Survival Ensured*

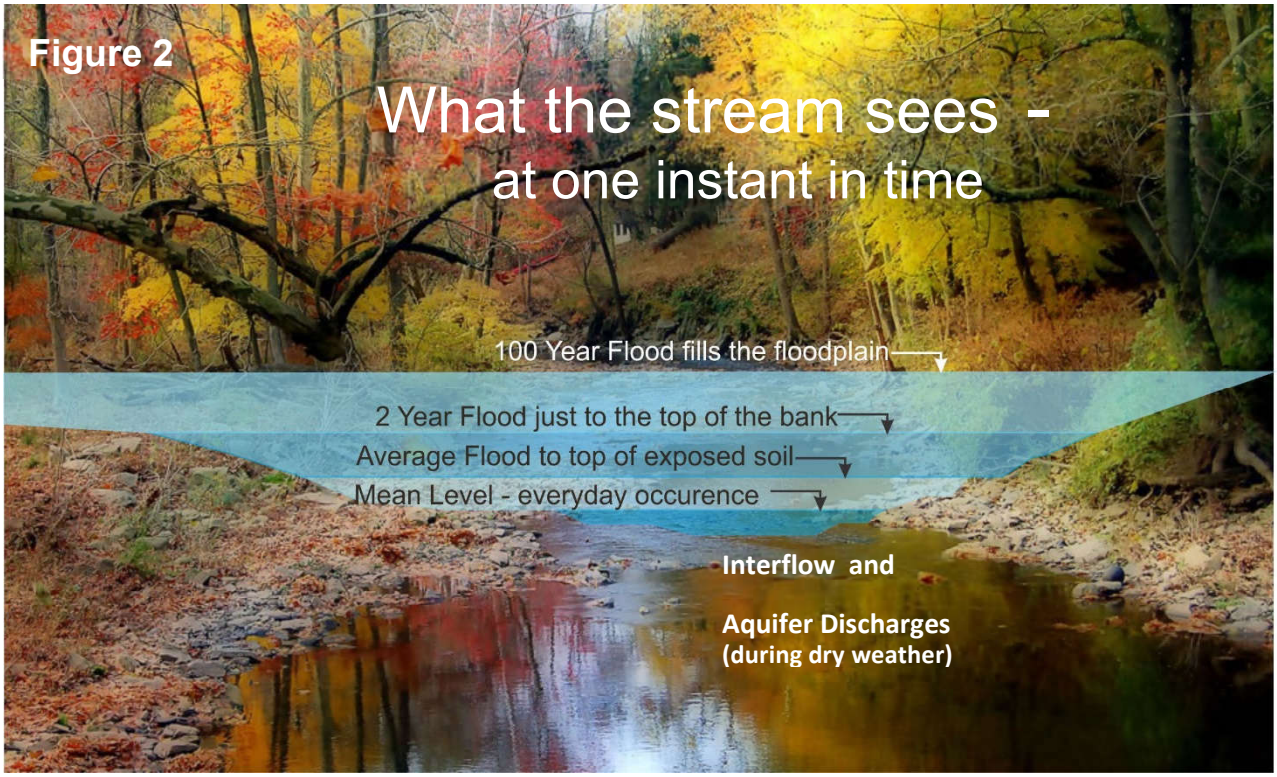


Image Credit: Jim Dumont, P.Eng.

What the Stream Sees:

Water levels corresponding to various flow conditions, both high and low, are superimposed on the image.

The complete story requires *the view to be extended in time like a movie or video. The stream and the discharges are dynamic and constantly changing. The important information in this more complete view is the duration of flow over time, and how it changes with time.*

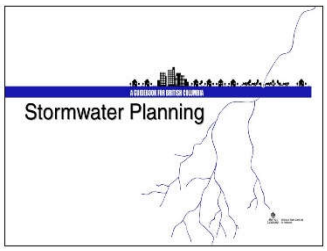
Standard engineering practice is preoccupied *with the peak rates of flow for extreme events. These happen infrequently. This focus is the traditional design mindset for flood conveyance and protection. This single-purpose engineering objective does not account for the cumulative environmental impacts of all the other rainfall-days in a year. Most stream erosion is caused by comparatively small flow rates. These happen frequently and usually range between the mean annual flood and the 2-year flood event.*

Because the changing climate is altering *the distribution of the seasonal water balance, and hence seasonal flow patterns (and related processes), this has both high-flow and low-flow consequences for streams:*

- ***Warmer, wetter winters & high-flow periods*** *= reduced snowpack / accumulation (in high elevations) and less water in storage = more runoff volume for longer periods of time = stream channels erode = aquatic habitat degrades; and*
- ***Longer, drier summers & low-flow periods*** *= as the landscape dries out, discharges from both interflow and groundwater diminish = little or no flow in streams = streams may be unable to sustain human and/or fish needs.*

Reduced dry weather flows over longer periods of time result in numerous potential impacts, including: elevated water temperatures, isolation from riparian fringe, reduced water quality, discontinuation of channel flow, and habitat isolation.

Verifiable Performance Targets[10]



"Performance targets provide the foundation for implementing common sense solutions that eliminate the source of rainwater-related problems."

- from the Guidebook, page 6-1

Keeping the three flow paths in balance – by not infiltrating too much, while allowing interflow to occur and to discharge the water to the stream within a season – is the reason for setting performance targets.

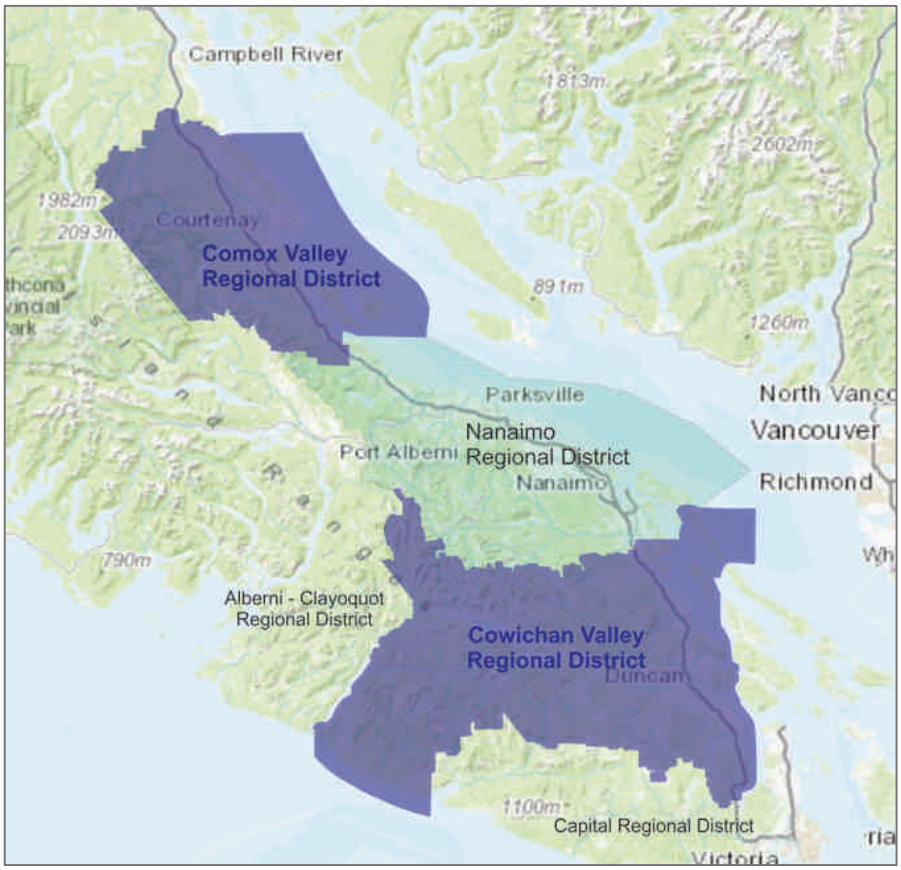
The Partnership's *Beyond the Guidebook* initiative has applied an understanding of hydrology fundamentals to establish verifiable targets for site design. In 2016-2017, the RDN and the Partnership, along with the City of Parksville and Pacific Salmon Foundation, co-funded the Shelly Creek Water Balance and Sediment Reduction Plan. This was the third of three demonstration applications.

These case studies constitute a comprehensive picture of the **annual Water Balance Distributions characteristic of watersheds** along the east coast of Vancouver Island. They show how to apply the *Water Balance Methodology* at a regional scale, and then downscale water balance performance targets to the site scale. The methodology accounts for all three flow paths. Each flow path is associated with one of these three design parameters: *volume, area* and *flow.*

Cowichan Valley Regional Water Balance Analysis, 2013

Comox Valley Regional Water Balance Analysis, 2015

Shelly Creek (Nanaimo Region) Water Balance Analysis, 2017



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

Sustainable Service Delivery

Released in December 2014 by UBCM and the Ministry of Municipal Affairs & Housing, ***Asset Management for Sustainable Service: A BC Framework*** *makes the link between local government services, the infrastructure that supports the delivery of those services, and stream health.*

Released in September 2019, the ***Primer on Integrating Natural Assets with Asset Management*** *emphasizes that: "By considering natural assets within asset management processes, local governments can decrease capital, operations, and maintenance costs; increase levels of service; enhance their ability to adapt to climate change; and reduce the community's unfunded liabilities – all while protecting or enhancing the multitude of other benefits that natural asset bring to communities."*

Connecting Land and Water

The DWWP program has always been about connecting land and water management. In 2007, a previous RDN Board acknowledged that land decisions are relevant to stream health - when the first DWWP Action Plan was adopted and the RDN proceeded with the referendum to establish a service area to implement the Action Plan.

It is good to understand the importance of connecting land and water in local government planning, but that is only the first step. As Murray Walters noted, **the difficult part is converting science into policy**.

Living Water Smart Connected Land and Water: An eligibility requirement for senior government grants is conformance with Asset Management for Sustainable Service Delivery: A BC Framework. **As of 2019, the BC Framework specifically addresses natural assets in connecting the built and natural environments within a local government asset management strategy.** This is game-changing.

Asset Management Continuum: **Figure 3** conceptualizes the asset management journey as a continuum of steps. The RDN finds itself in a unique position relative to most other local governments. While the RDN is early in the process of developing an asset management strategy for its core services (Step One), the DWWP program has positioned the RDN to also enter the Asset Management Continuum in Step Three and work from two directions.

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

Starting Point for a Rainwater Management Strategy: **Table 2** is a synthesis of what is necessary to reconnect hydrology and ecology. It would provide the RDN with a helpful process framework when developing a regional rainwater management strategy that achieves the three objectives specified in the LWMP**:** *use rain as a resource; promote maintenance of hydrologic function; and protect water quality*.

Table 2 is a **What / So What / Now What / Then What** mind map. It builds on the Guidebook foundation, distills what has been learned over two decades, and factors in sustainable service delivery. It conceptualizes considerations that shape a **strategy for moving from stop-gap remediation to long-term restoration** – by connecting land and water and restoring water balance in altered landscapes.

Figure 3

Sustainable Creekshed Systems and the Asset Management Continuum

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

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

STEP ONE: Embrace **BC Framework**. Focus first on constructed assets (pipes & buildings). Implement Asset Management Strategy / Plan / Program.

STEP TWO: Life-cycle approach and **Sustainable Service Delivery** are standard practice for maintenance and management of constructed assets.

STEP THREE: Apply the **Ecological Accounting Process** to determine Natural Commons Asset values and establish budgets for stream corridor maintenance and management. Account for Water Balance services. Integrate climate adaptation.

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

TABLE 2	**RECONNECT HYDROLOGY & STREAM ECOLOGY: "Whole-System Approach" (4 Steps) to Integration of Built & Natural Environments**			
	1. WHAT is the issue? – **"Call to Action"**	*2. SO WHAT can be done? –* **"Core Building Blocks"**	*3. NOW WHAT can we do? -* **"Desired Outcomes"**	*4. THEN WHAT? –* **"Mainstreaming"**
Under each step, Cascading Key Messages define "What Really Matters"				
	Success in Solving "In Your Face" Problems Would Mean:	***Integrating Natural Assets into Asset Management Relies on Understanding that:***	***There are Paybacks When a Community "Gets it Right":***	***Restorative Development Results in Sustainable Stream Restoration:***
1	Less flooding	Hydrology is the engine that powers ecological services	AVOID an unfunded and unaffordable financial liability for drainage infrastructure	Require 'design with nature' standards of practice for drainage and servicing of land
2	Less stream erosion	Three pathways by which rainfall reaches streams are "infrastructure assets" that provide "water balance services"	ADAPT to a changing climate to restore the water balance and reduce risks	Shrink the destructive footprint while growing the restorative footprint
3	More streamflow when needed most	Taking action depends on what a community thinks a creekshed is worth.	REDUCE life-cycle costs for drainage infrastructure	Demonstrate what is achievable thru a restoration imperative
Below, each "Problem Statement" establishes Context & defines the Central Issues in the 4-Step Process				
	Recognize that it is necessary to "get it right" with respect to planning, engineering and asset management standards of practice – especially as they relate to and impact upon creekshed health and restoration - because "getting it right" would mean the sustainable and cumulative "community benefits" would then ripple through time	**Acknowledge** that there is a problem with current standard practices for servicing and drainage of land - and that these practices are the root cause of degraded urban streams – because "getting it wrong" results in an unfunded and unaffordable infrastructure liability that is then a financial barrier to restoration of creekshed function	**Re-focus** local government business processes on outcomes so that they align with provincial policy, program and regulatory framework for **Living Water Smart** - which encompasses both the *Whole-System Approach* and *Sustainable Service Delivery* - and thereby achieve desired outcomes that would have tangible community and financial benefits	**Get it right**, province-wide. B.C. is one of the last places on the planet where it is still possible to transcend the climate debate and lead by example. B.C. has enough remaining natural capital to protect and restore its way back to true sustainability; and Improve where people live.

Commitment & Perseverance

"Adapting land use, infrastructure servicing and asset management practices to sustain and enhance ecological (water balance) services requires perseverance by a committed local government staff."

- extract from page 24, "Town of Comox – A Beacon of Hope", published Sept 2019

"The Town of Comox experience is that the weak link in drainage analyses is always the assumptions. The Town now requires that assumptions be stated and explained. We are saying WHAT is your assumption, and WHY.

"The result is an approach where there is mutual agreement as to applicability of assumptions to site characteristics and rainwater management objectives."

- Shelley Ashfield, P.Eng. Municipal Engineer (quote from p. 15)

A Stream System as an Infrastructure Asset

In the two decades since the Province released the Guidebook, progress has been made in changing the land and drainage practitioner culture. Yet urban streams continue to flood, erode, go dry and degrade due to legacy land servicing practices that continue to have cumulative impacts on hydrology. Why is this the case?

Nature of the Educational Challenge: **Figure 4** conceptualizes the evolving nature of the educational journey, commencing with release of the Guidebook. It applies equally to Guidebook uptake and DWWP experience in illustrating how it takes decades to bridge gaps, in particular - *knowing what should be done versus actually doing it*.

The graphic also draws attention to the EAP paradigm that **a stream system is a natural infrastructure asset (natural commons), and provides a package of ecological / water balance services.**

The RDN's DWWP program is at a tipping point: The foundational work has been completed. The program is positioned to provide meaningful input to land use planning and development practices. A lynch-pin goal would be to 'get it right' in the stream channel. The challenge in 'getting it right' is to move from stop-gap remediation of problems to long-term restoration of a properly functioning creekshed.

Community Benefits:[11] Implementation of a whole-system, water balance approach, founded on the twin pillars of the Water Balance Methodology and EAP, would result in these desired outcomes**:**

ENHANCE the natural commons to create high value public assets.

AVOID an unfunded liability (by limiting stream erosion, preventing flooding, improving water quality).

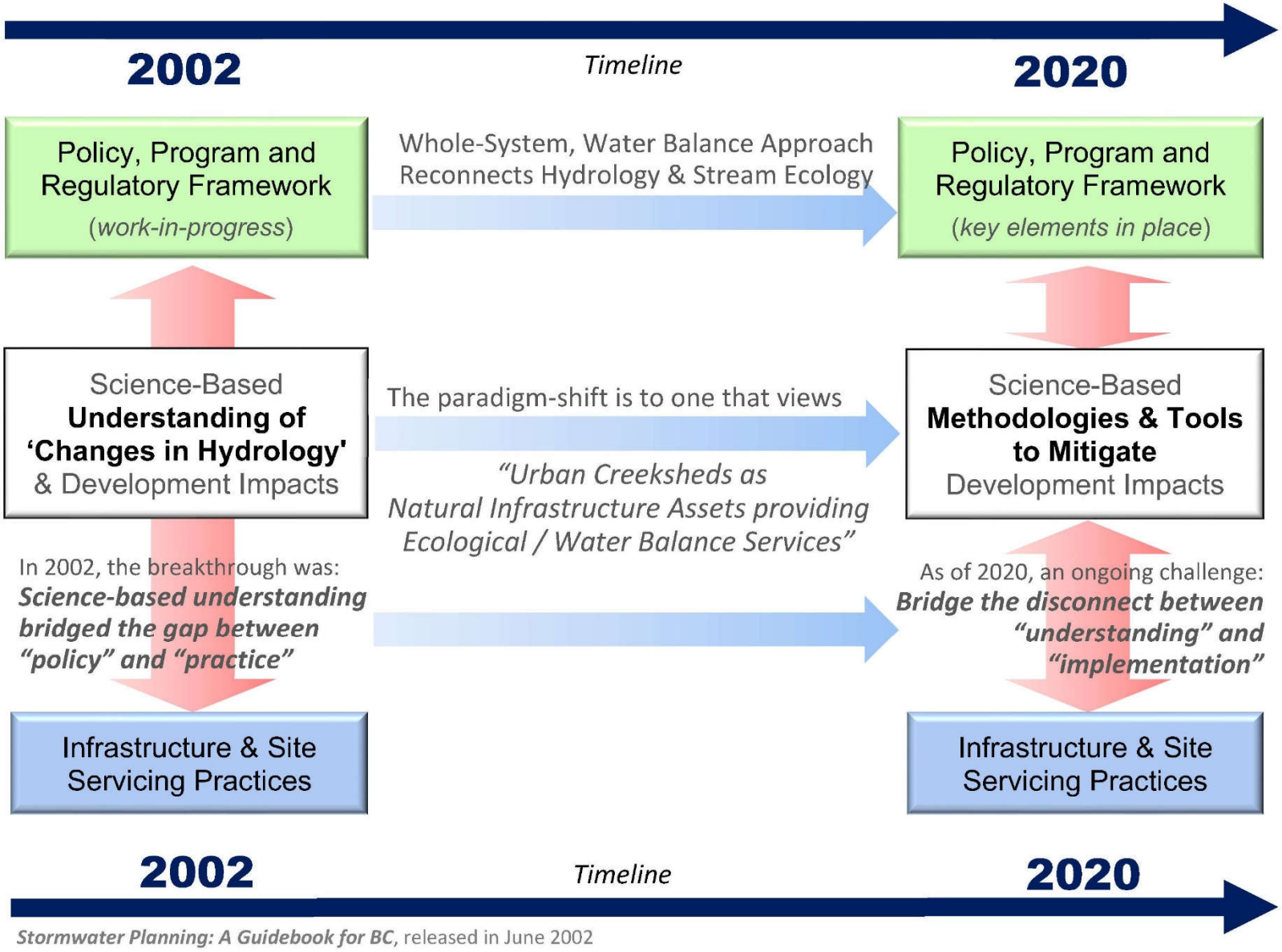
ADAPT to a changing climate.

REDUCE life-cycle costs for drainage infrastructure.

Reconnecting hydrology and stream ecology - and adapting to the 'new reality' of *warmer, wetter winters; longer, drier summers* - depends upon 'top-down & bottom-up' processes that align and accelerate implementation of reinforcing provincial, regional and local actions. The goal: improve creekshed conditions where people live.

[11] https://waterbucket.ca/rm/wp-content/uploads/sites/5/2019/09/Comox-Beacon-of-Hope_Sep2019.pdf

Figure 4 – It Takes Decades to Change the Practitioner Culture



Stormwater Planning: A Guidebook for BC, released in June 2002

Regulatory Significance of LWMP / DWWP Commitments

"In DWWP Action Plan 2.0, we have encoded more emphasis on rainwater management. This was not the case in the first plan. A key linkage was that in 2014 the LWMP was updated and made the connection back to the DWWP.

"Now, with our 2020-2030 action plan, we have reciprocated that link back to the LWMP commitment for rainwater management.

"In the next decade, we have an opportunity to build the hydrology-focussed, rainwater management-focussed efforts into DWWP Action Plan 2.0. The Millstone EAP represents one stepping stone in that direction."

- Julie Pisani
July 2020

Complete the Circle / Look Ahead

The LWMP regulatory requirement for a regional rainwater management strategy is the mechanism for closing the loop on the RDN's long-term process described in the sidebar. The process had its genesis in a Guidebook case study some twenty years ago.

Land Use Planning is the Holy Grail: The DWWP program's ultimate vision is on supporting land use decision-making with local water information. In the second decade of DWWP, that vision is within reach. Julie Pisani provides this closing perspective**:**

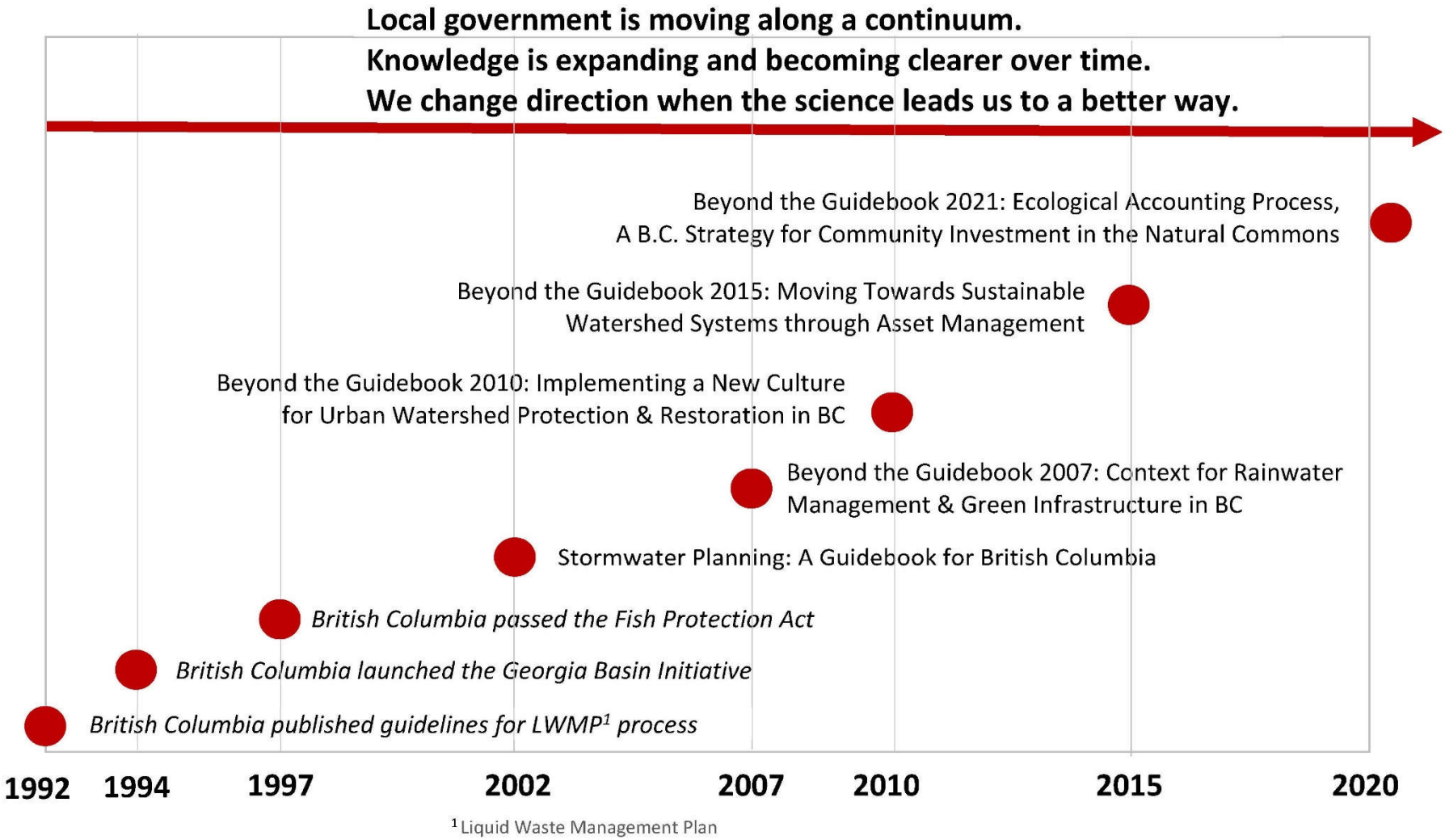
> *"Prior to codifying rainwater management in the Action Plan, it was a side of the desk thing because it was not explicitly in the DWWP mandate. It was though half the circle was drawn, and now we have drawn the other half. We can actually connect those things!"*
>
> *"A key part of the DWWP story is to connect those elements for others who have aspirations to do some of this work - whether it involves education, or technical or planning implementation. It is about the process to get to a place where, not only do you have the desire, you have a plan and a way to implement that. It is a full circle to draw."*

Beyond the Guidebook: **Figure 5** provides historical perspective by identifying milestones in a provincial process that began in 1992 with publication of LWMP guidelines. In 1992, the description of the requirements for the rainwater (stormwater) component was broad-brush. Within a decade, and under the Georgia Basin umbrella, the Province released the Guidebook to provide **science-based direction with respect to a guiding philosophy and methodology**.

Two decades after the RDN was the Guidebook partner, the RDN experience continues to inform the content within the *'Beyond the Guidebook Series'* of guidance documents. The series records the progress of local governments in applying science-based practices to achieve the watershed health goal. Every 5 years, the titles reflect incremental progress: **know the context for action; change the culture and instil a new ethic; create a legacy**.

This Watershed Profile story of the DWWP journey is a foundation piece for Beyond the Guidebook 2021, to be released in 2021.

Figure 5


Local government is moving along a continuum.
Knowledge is expanding and becoming clearer over time.
We change direction when the science leads us to a better way.
Beyond the Guidebook 2021: Ecological Accounting Process, A B.C. Strategy for Community Investment in the Natural Commons
Beyond the Guidebook 2015: Moving Towards Sustainable Watershed Systems through Asset Management
Beyond the Guidebook 2010: Implementing a New Culture for Urban Watershed Protection & Restoration in BC
Beyond the Guidebook 2007: Context for Rainwater Management & Green Infrastructure in BC
Stormwater Planning: A Guidebook for British Columbia
British Columbia passed the Fish Protection Act
British Columbia launched the Georgia Basin Initiative
British Columbia published guidelines for LWMP[1] process
1992
1994
1997
2002
2007
2010
2015
2020
[1] Liquid Waste Management Plan

Millstone River EAP Application

EAP in a Nutshell

"The EAP philosophy, methodology and metrics recognize the importance of the stream system in the landscape. Because the Millstone watershed is a shared jurisdiction, both the City of Nanaimo and RDN have a long-term strategy for their respective parts of the system."

"Each one is applying the strategy in annual or periodic programs and initiatives. Each realizes that there is a need to understand what their investment in protecting or restoring stream condition is worth to the community."

"The logic behind EAP is quite straightforward. Apply the methodology to get the numbers, tie the numbers to other research, and then say - we have this asset, it is worth X, we should invest Y each year to maintain and manage it, and this is why."

- Tim Pringle,
EAP Chair, Dec 2020

Asset Management for Sustainable Service Delivery

Figure 6 presents an overview of the Millstone River system. It is the jewel of the City of Nanaimo greenway and parks system. As an ecological system altered by historical land use, the Millstone stream corridor requires maintenance and management (M&M) to sustain its ecological services. The strategic significance of the **Millstone River EAP Project** is three-fold:

First, it pulls the thread of collaboration, community outreach and stream stewardship from the DWWP's first decade through to the second decade.

Secondly, it adds the **new lens of accounting for natural (ecological) assets and ecosystem valuation.**

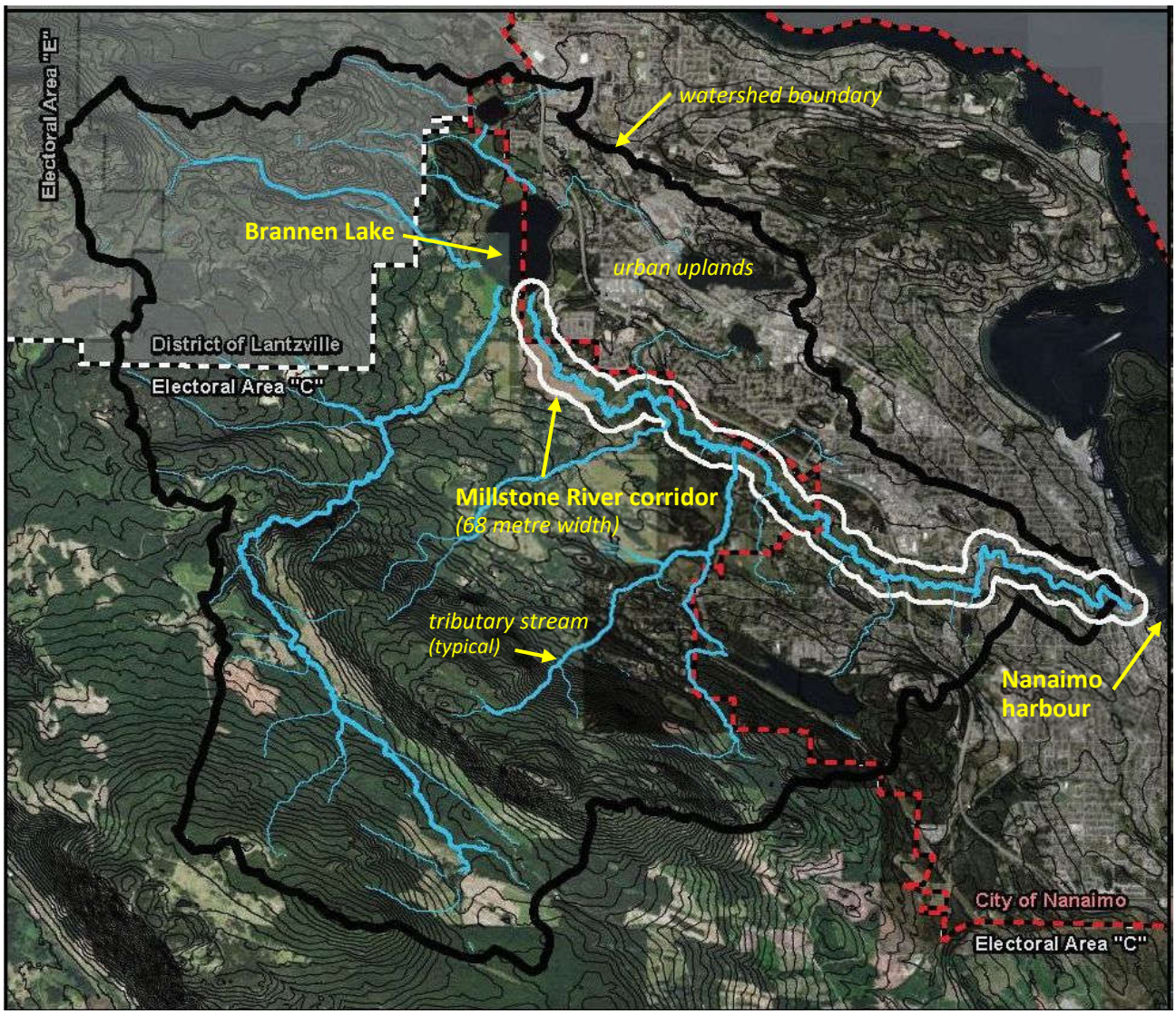
Thirdly, it is a provincial demonstration application of how EAP, the Ecological Accounting Process, bridges a gap and supports implementation of Asset Management for Sustainable Service Delivery: A BC Framework.

Whole-System Approach to Land and Water Management:
The Millstone project is the flagship application for the EAP program. It provides the RDN, the City of Nanaimo and Island Waters Fly Fishers with the data they need to get a real measure of how far they have advanced (M&M) of the Millstone stream system over the past decade. They knew it intuitively but did not have the numbers to make the case. Now they do.

What happens on the land (changes in hydrology) matters to stream corridor ecology. EAP bridges a gap because it provides local governments with a philosophy, methodology and metrics to make the case for including stream systems in Asset Management Plans.

Figure 7 conceptualizes the interconnection of activities inside and outside a stream corridor system. EAP is a pillar of the whole-system, water balance approach to M&M of the built and natural environments as components of **one system**.

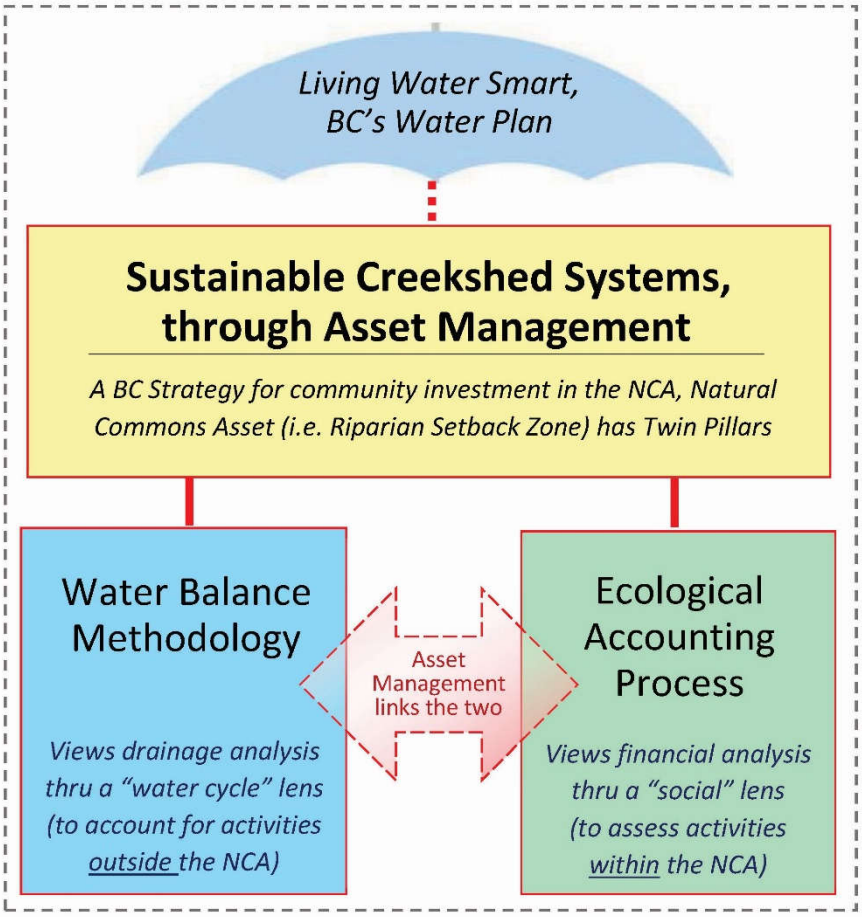
Figure 6



Study Area for the Millstone River EAP Project

Figure 7

Twin Pillars of Whole-System Approach



EXPLANATORY NOTE:

By definition, a creekshed is a 1st order stream. This means it has no flowing tributaries.

This situation is representative of most creeks in settled areas.

EAP uses the term 'creekshed' because it is relatable to a local context and a sense of place.

Hydrology is the Engine that Powers Ecological Services

Twin Pillars of the Whole-System, Water Balance Approach to Maintenance & Management (M&M) of Riparian Ecological Assets in the Natural Commons

Millstone River EAP Project

The Millstone River and EAP project are a microcosm (or vignette) of the bigger mandate and key pillars of the DWWP. **Both demonstrate project level partnerships with stewardship groups; as well as partnerships across local government jurisdictions.** Next, Julie Pisani describes relevant context for the Millstone River EAP Project**:**

Steering Committee: "The RDN, Island Waters Fly Fishers (IWFF), City of Nanaimo, Vancouver Island University, and Partnership for Water Sustainability were on the project steering committee, to make sure the project was inclusive. This will help to ensure best utilization of the results of the project, to further the shared interests in watershed protection, restoration and water-centric policy."

Study Area: "The Millstone River is a great example of a stream that flows through jurisdictions: RDN Electoral Area C in the upper watershed; and the City of Nanaimo in the lower watershed. The upper watershed is characterized by rural residential and agricultural land uses, while the lower watershed is more urban and suburban residential, with a significant city park."

"Development has taken place at varied timelines, and in different manners in the rural and urban settings, but all properties along the stream share the stewardship for that corridor of water and vegetation."

"The Ecological Accounting Process will help to determine what financial value could be attributed to the riparian areas and stream channel, to provide a monetary justification for investment in maintenance and restoration for these 'natural commons'."

Island Waters Fly Fishers: "The partnership with the IWFF, active stewards of creeks in this part of the region, proves to be a long-thriving thread of collaboration between RDN DWWP and the community."

"Data collected by IWFF in the RDN's *Community Watershed Monitoring Network* shows that there are some concerns with temperatures, turbidity and dissolved oxygen levels in certain reaches of the Millstone. This points to the need for restoring stream health."

"Some restoration work has been supported by DWWP to-date through the *Stewardship Seed Funding* initiative. Where the EAP comes in is providing the financial rationale for investing in restoration and maintenance of riparian and stream values on a larger scale."

Island Waters Fly Fishers

"The stewardship thread that is being pulled through the Millstone project speaks to the involvement of Bernie Heinrichs. His group, Island Waters Fly Fishers, has been involved in our water quality sampling program since 2011."

"There was little data at the start, but as data comes in, we start to see trends and are able to say here is the status of these different creeks."

"But then it directs efforts – for example, we need more education for farmers, streamside land owners. Then it leads to restoration!"

"Now EAP represents the potential for policy ramifications because the accounting aspect is novel. That is not something that we have engaged with until now."

- Julie Pisani
July 2020

Power of EAP

EAP is an application of systems thinking to quantify worth and value using real numbers, in particular BC Assessment data. The ultimate power of the EAP approach is its intrinsic integration of social, financial and environmental perspectives.

Stream corridors are Natural Commons Assets. EAP, through use of real numbers, validates strategies for ongoing annual investments to maintain and manage stream corridors.

Central Ideas of the EAP Methodology

EAP considers **use and conservation of land** to be equally important values for prosperous human settlements. The Millstone River EAP Project introducee some uncommon concepts about the use and conservation of land as applied to natural asset management:

The First Big Idea: Streams are **Natural Commons**, systems that provide ecological services (uses) that the community can access and enjoy.

The Second Big Idea: A stream in settled areas is a **Land Use**, aside from its importance as source of ecological services needed by intrinsic nature.

The Third Big Idea: A stream is an ecological system that has **Worth**, described by the investment the community has made to maintain and manage the stream.

Use and Conservation of Land: The City of Nanaimo and the RDN have, for at least two decades, understood the Millstone River in both jurisdictions to be a riparian system offering important ecological, social and financial values. They continue to support long-term, strategic plans to maintain (prevent degradation) and manage (enhance) the stream. Involvement of the stewardship sector is an essential aspect.

Research Questions:

What influence does the stream as an ecological system (as a natural commons) have on urban and rural land use near the stream system; and does the stream influence the utility and financial value of parcels?

Research Objectives:

1. Establish a measure of stream corridor **worth** to the community.
2. Quantify the **financial value** of the stream corridor as a Natural Commons Asset (NCA).
3. Determine whether the stream influences the assessed values of parcels that abut or are adjacent to the stream.

Context for Operationalizing EAP by Design

Stream systems support drainage of residential and agricultural lands for human uses.

Once local governments embrace a guiding philosophy that ecological services and use of land for development are equally important, then the next step is for them to include M&M budgets for stream systems in their Asset Management Plans.

This would begin the process of operationalizing EAP and reconnecting hydrology and ecology by design.

Millstone River Natural Commons Asset

Figure 8 is a key visual aid. It depicts three categories of 'commons'. The Natural Commons Asset is the portion of the stream corridor that lies within the regulatory setback zone. Table 3 synthesizes the results of the various analyses completed as part of the Millstone EAP Project.

Stream Corridor Worth to the Community: The scale and magnitude of community investment in maintenance and management is a demonstrable measure of "willingness to pay" - and thus the worth to the community, over time, of the Millstone stream corridor as a Natural Commons Asset.

Annual M&M: Over the past decade, the combined annual investment by the RDN and City of Nanaimo is estimated to be at least $590,000 on average. This is a tangible measure of the worth of the ecological system to the community. This is three-quarters of the baseline amount suggested by the EAP analysis and presented in Table 3.

Financial Value of the Natural Commons Asset: If the stream did not exist, the land it occupies would be used for nearby (residential or agricultural) development. Thus, the EAP methodology uses BC Assessment data to describe the financial value of a natural commons such as a stream.

Influence of Stream on Parcel Values: Assessed values for parcels that abut streams in the Bowen Park and Buttertubs Marsh areas of the City are 4% and 8% higher than the assessed values of parcels that are distant from and adjacent to the stream, respectively. The findings are inclusive for land within the RDN.

Table 3

Section of Millstone Corridor	Stream Length (km)	Natural Commons Asset (NCA) Values		Budget for Annual Stream M&M ($ per year)	
		Total $	$ per km	Guideline is 1% of NCA Value	Compared with Average Investment Over Past Decade
within City	7	$68.2M	$9.6M	$680,000	$500,000
within RDN	8	$11.5M	$1.4M	$115,000	$60,000
Combined	15	$79.7M	$5.5M	$795,000	$560,000

Figure 8

The image above is used for illustrative purposes simply because all three types of commons are situated within a short distance of each other. This location is in North Vancouver.

Foundational concepts that underpin EAP, the Ecological Accounting Process		
Natural Commons	**Constructed Commons**	**Institutional Commons**
As defined by the EAP, a **Natural Commons** is an ecological system that provides ecological services used by nature and the community.	Communities rely on a range of services such as roads, underground utilities and parks to support life-style and property enjoyment. These are **Constructed Commons**. Through taxation, they are maintained and managed in order to ensure the availability of desired services.	Services such as fire protection and schools are a related kind of constructed commons.

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PART C

A Strategic Service

The work of the DWWP is strategic, community based, and regional. DWWP is a strategic service because it supports RDN and municipalities operate their core services in a way that aligns regional initiatives to watershed and aquifer contexts.

Strategic Nature of the DWWP Service within the RDN

A Beacon of Hope

The Partnership believes that water sustainability will be achieved when urban and urbanizing communities in British Columbia go back to basics to truly reconnect hydrology and ecology, create greener communities, and adapt to a changing climate. Viewed in this context, **the DWWP program is a 'beacon on hope'**.

Beacon of Hope

"We hope readers are inspired by what they learn from this Watershed Case Profile. We further hope there will be ripple effects because others embrace collaborative leadership and proceed down pathways that bridge the gaps between science, policy and standards of practice in their communities."

- Kim Stephens
November 2020

Research Lens for the DWWP Story: In sharing the 'story behind the story' of the DWWP program, this Watershed Case Profile has connected dots, both through time and concurrently happening in time.

Synthesizing the historical flow of how processes and events have unfolded is necessary and important. This provides the reader with vital context that enhances understanding. Furthermore, our primary goal is to help the reader connect the dots to what is happening right now in the RDN with respect to DWWP.

In this concluding section, we present some reflections by Julie Pisani on the strategic nature of the DWWP Service. Her perspective is the lens of her Master's research. Context for her reflections is provided by repeating this Julie Pisani quote**:**

> *"A key point is that the work of the DWWP is strategic. It is community based, and makes links interdepartmentally and with external agencies. And that in itself is the super power of what we do. It does not fit into a box of what a usual local government service is or does."*

What's In a Name: "Even in the DWWP name, drinking water and watershed protection has always included the emphasis on both community water for human use and the ecological and land-based water for habitat values. Through land use planning with a water-centric lens, we can protect some of those values," notes Julie Pisani.

Roles, Responsibilities and Relationships

Julie Pisani's view of her DWWP world is shaped by an interesting and unique career path that combines program delivery experience with an academic pursuit. A trail-blazer in her own right, Julie Pisani is completing her Master's Degree through the Environment and Management program at Royal Roads University.

Her thesis addresses ingredients that go into the mix for organizational arrangements for watershed governance on Vancouver Island. Her applied research is central to the DWWP story, and goes to the heart of collaborative leadership. Next, Julie summarizes her research**:**

Organizational Inter-relationships: "The focus of my research is on organizational arrangements for watershed governance. What is of interest to me is how organizations can identify with and inhabit a niche or a role, be adaptive, and understand how they fit within the bigger network of other organizations working on watershed-related initiatives."

"Through my research, that is one of the main questions that I am exploring through interviews with individuals reflecting on the organizations they work with, and how the organizations see themselves in relation to other groups, what their motivations are, how they see the relationships between groups, and what outcomes have been generated through those relationships."

Niche for Regional Government: "My research reflects on roles because you can look at something one-dimensionally on paper (e.g. the province as the regulator), but when you actually speak with the people who are engaged in day-to-day aspects of water and watershed management, a richer picture starts to emerge of what are the roles, responsibilities and relationships."

"What I am striving to find are patterns that help identify here where we can leverage roles and relationships to be more effective, or improve the outcomes. My focus is on regional government and what niche it can fit into, understanding that could change depending on the geographical context or social context of what's going on within a particular region."

"The continuity piece is related to an organization reflecting on its own role, and seeing the role not as rigid but something that can be shaped in collaboration with the other groups that it is working with, and cater to the most unique and valuable aspect that it can bring to watershed management."

Regional Districts Have a Unique Role to Play

Julie Pisani's research extends beyond the RDN to include two other Vancouver Island regions. Below, she elaborates on her search for patterns, and circles back to the DWWP and its potential**:**

Visualizing of Relationships & Collaboration

"A big part of my research is how to visualize the informal dimensions and to have people draw the different arrangements they are working with, and why, and how."

"Research shows that, in terms of the cognition of how you think about relationships and collaboration, if you visualize it, then you are better able to articulate those connections than you are just verbally. Having a visual component is a big part of it."

- Julie Pisani
  April 2020

Is the RDN DWWP Experience Replicable: "Things have worked really well for the RDN in some aspects. We have struck gold in some ways with our approach. So, I wondered, is this replicable and why does it work here? In researching watershed governance theory, it is clear that the best approach is not to come up with a model per se. Rather, seek patterns in different geographies; and in different social/ecological systems."

"Do different arrangements emerge? What are the conditions that explain why certain arrangements or partnerships or governance patterns emerge in one area and not in another? And what are some of the conditions needed to cultivate that in other areas? There are so many variables in play – who is engaged, what the geography is, where the water sources are, etc."

"The focus of my research is constrained to organizations, not champions within organizations, because of the aspect of continuity. If it depends on one individual, what happens to all the relationships that have been developed if the key individual goes elsewhere?"

How Can Organizational Continuity Be Cultivated: "For an appropriate analogy, consider the human body. After a number of years, all the cells are completely new, but you are still the same person. How can you maintain the continuity of an organization or program and an identity that still evolves and changes, and grows and gets new life breathed into it over time; yet has enough consistency to be effective and reliable?"

"It might be valuable to continuity if there is self-reflection at the top of the organization to say: **We identify as having this role in watershed protection and collaboration because at the regional level it is matched nicely with the watershed scale**."

"Geographically, hydrologically, regions (regional districts) are more aligned with watershed boundaries. Therefore, it is something that hopefully regional districts can start to identify with more. And then accept that it is part of the regional governance role. If we are involved with land use planning and decision-making within this land base, shouldn't we have more of a role in influencing decisions that affect regional water?"

How the Organization identifies with the Outcome: "Regional districts are in a unique position to coordinate and bring groups together – whether it is the member municipalities within the region; or the external agencies.

"And internally too – interdepartmental coordination is an important piece that we cannot overlook when connecting decisions around land and water. It comes back to the organization itself identifying that:

> **Yes, this is something that we do and therefore we fund it, we resource it, we support it. It evolves over time, and we support that evolution.**

Coming of Age and Advocating Up

Next, Julie provides insight about what is involved in building a program that has the continuity necessary to evolve and adapt over time**:**

Looking Back: "The initial 5 years of the first decade of the DWWP was a period of experimentation, testing what works and what doesn't. Who to work with? What are all the moving parts that we need to align to advance the DWWP mandate?"

"The latter 5 years of the first decade, the coming of age, has been about securing and deepening the relationships that we started in the first 5 years. We started to operate at a higher level with the partners in terms of regular operations – for example, with monitoring and education programs."

The Foundation is in Place: "We could not jump straight into telling the planners and policy makers what we would advise on water sustainability. We basically had to lay the groundwork, engage the community and cultivate that awareness and stewardship ethic. Based on data and science, we could then begin to advise planning processes. We could circle back to bring the science into our education programs."

Story Behind the Story

"We started to go deeper and look more strategically at connecting more dots. We advance more aspects of the Action Plan as time goes on."

"We built the foundation. We started with the education program. And then we layered on our monitoring program, and started collecting data about water resources in our region."

"Only after completing both of those foundational pieces were we able to move more into policy and planning support."

- Julie Pisani
  April 2020

Advocating Up

"We began to funnel information up to senior government because we had built up a level of credence, both at the local and senior levels, to advocate for our region by providing sound local data to provincial decision-makers in a broader context."

- Julie Pisani
April 2020

Time provides Perspective

The Stormwater Planning Guidebook is a focal point in the DWWP story. And the DWWP story is nested within the Beyond the Guidebook series of guidance documents. Common to both are an emphasis on the importance of time plus commitment in laying the groundwork for transformative change.

Inform and Influence Provincial Decision-Makers: "The quantum leap was, not just looking at our region, but then looking at our region in the context of decisions beyond those which are made at the Regional Board level."

"It is advocating for decisions that are made outside of the RDN Board itself. But it is balancing both. People often get confused. They think we are just talking about water operations, and engineering and utilities. But we are also talking about planning and development, and those things are in the regional/municipal sphere of service."

Bottom-Up Accountability: "Beyond that it's about understanding the ecosystem impacts of what we are doing. That is not necessarily local government jurisdiction, although there is language in regional and community plans to support protecting ecosystem health. But in a regulatory sense, it all falls to the Province."

"So, it is a matter of flipping around the perspective to say that: It is not that the Province is downloading to us; rather, we are advocating up to the Province to ensure that provincial staff consider local conditions and concerns, and provide the necessary level of oversight."

"It is as though we are keeping them accountable by engaging them in that space. If we back off, and don't contribute, then the Province would move too slowly for the desires of the local community who want to see water stewardship advancing, and who want to get protective measures or restoration projects happening based on data. That is the gap that we have been trying to fill in the last 5 years."

Decadal Timeline: The importance of time is a theme flowing through the DWWP story, with *cultivating organizational continuity* being a central tenet. Julie Pisani observes that:

"When we widen our blinders to view things on the decadal scale, we see that drinking water and watershed protection is complex. There are many factors, and it takes time to crystallize, learn and act together."

DWWP Supports Core RDN Services

In local government, there is a tendency to view **core services** through the traditional engineering lenses of water, sewer, solid waste and roads. Yet, there is a growing recognition among local governments that natural assets support the delivery of core local government services, while doing so much more. This paradigm-shift is explained in the discussion about the Millstone River application of EAP, the Ecological Accounting Process. Julie Pisani offers this perspective**:**

Value of Strategic Linkages: "DWWP can be framed as a strategic service because the program helps the RDN operate our core services better over the long-term. People would still get their basic utility services met if DWWP did not exist."

"DWWP assists the core service of water provision by leading conservation and stewardship efforts, collecting data on regional water sources, and strategizing for the future. DWWP goes further to link the regional services within the provincial context and within the community context."

"So we are connecting even outside of the RDN organization. Unlike other core services, DWWP links the RDN to industry, to senior government, to local community groups in ways that you could not point to another core service doing."

Building Trust Starts at the Project Level: The DWWP is a long-term program that positions the RDN to continue down the long journey of building trust in relationships. The mechanism the DWWP provides is simple, yet strategic.

"Each project, even if it is just sharing of information, is incrementally a step in the right direction. The origin story of the funding mechanism is part and parcel of what sets us up for future success with building relationships with others. Those relationships are of utmost importance if we are looking at the long-term view," concludes Julie Pisani.

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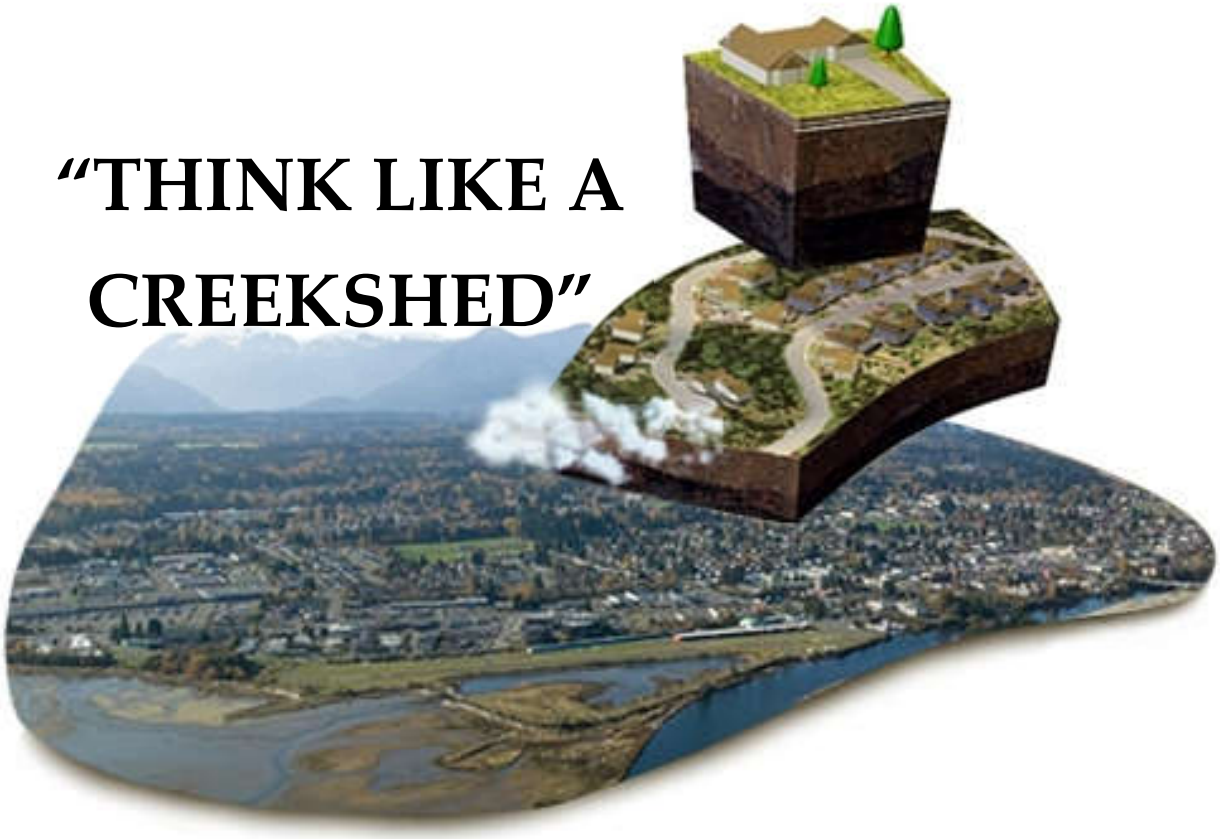
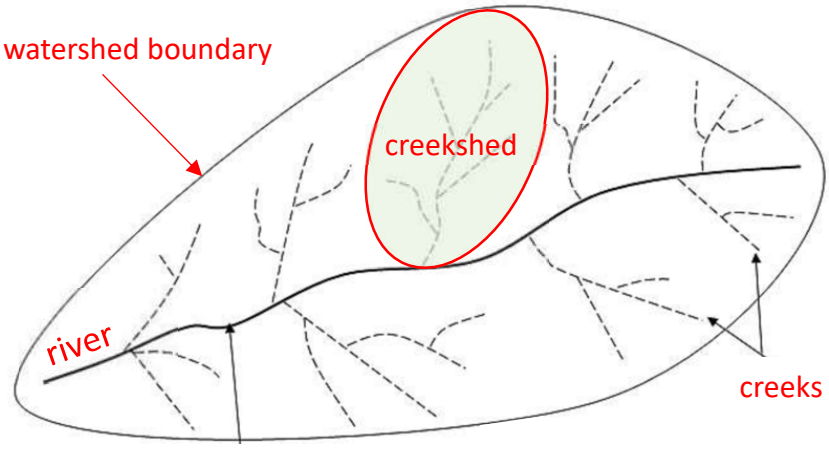
"THINK LIKE A CREEKSHED"



A creekshed is an integrated system:

The need to protect headwater streams and groundwater resources in BC requires that communities expand their view - from one that looks at a site in isolation - to one that considers HOW all sites, the creekshed landscape, streams and foreshores, groundwater aquifers…and PEOPLE….function as a **whole system**.



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