
Regional District of Nanaimo
Drinking Water & Watershed Protection
December 8th, 2022 // Technical Advisory Committee Meeting
AGENDA
INVITED PRESENTATIONS
ROUNDTABLE
Reports
PROJECT UPDATE PRESENTATIONS
NEW BUSINESS


AGENDA
Approval of the agenda
Adoption of minutes
• Minutes from September 20, 2022
Roundtable Updates
Invited Presentations
Reports
Project Updates
New Business
Adjournment
Regional District of Nanaimo


ROUNDTABLE
UPDATES
All committee members
REGIONAL
DISTRICT
OF NANAIMO


Invited
Presentation
• Vancouver Island Agricultural Water Supply Assessment
Foster Richardson
Regional District of Nanaimo


Watershed Performance Targets for Rainwater Manangement - French Creek Water Region
Phase 2: Implementation, Monitoring and Adaptive Manangement
Reports

Project Overview

Purpose: **Mitigate the effects of development by mimicking the natural water balance of a watershed**

- Two-phase project started in 2021
- Pilot study using French Creek Water Region
- Phase 1 - Hydrologic modelling and development of performance targets
- Phase 2 - Implementation, Monitoring and Adaptive Management
- Linked to Foundation-setting action 1 in the Regional Strategy for Rainwater Management

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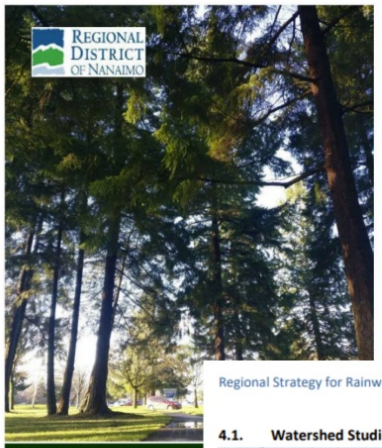

Regional Strategy for Rainwater Management - Regional District of Nanaimo

4.1. Watershed Studies to set Performance Targets

Foundation Setting Action 1: Conduct new, or review existing, watershed studies for the purpose of setting rainwater management performance targets specific to each water region and reach.

Understanding the current state of a watershed from a rainwater management lens can help identify the actions needed to ensure that development can occur while still maintaining the natural hydrologic function and ecological processes of that watershed. The natural watershed condition is identified as the 'Target Condition' in Figure 9, above and includes the maintenance or restoration of the natural hydrologic function of the watershed as was present prior to alteration of contours or vegetation. The functions of the watershed (from a rainwater management perspective) include the collection of rainfall, storage, and release of water during different seasons, and the conveyance of runoff to streams, rivers, and the ocean, while supporting healthy and diverse ecosystems. Watershed studies assess the current condition as well as the expected impacts of development growth on the hydrology of the contributing area and watercourses. They identify reach-specific performance targets necessary to mitigate impacts of development and restore hydrologic function to the natural watershed condition. The impacts of the changing climate are also considered in development of reach-specific targets intended to address the combined impacts of development and climate change impacts.

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Performance Targets (Phase 1)

Purpose: Mitigate the effects of development by mimicking the natural water balance of a watershed

Four performance targets are defined to help replicate the natural water balance and control flood peaks:

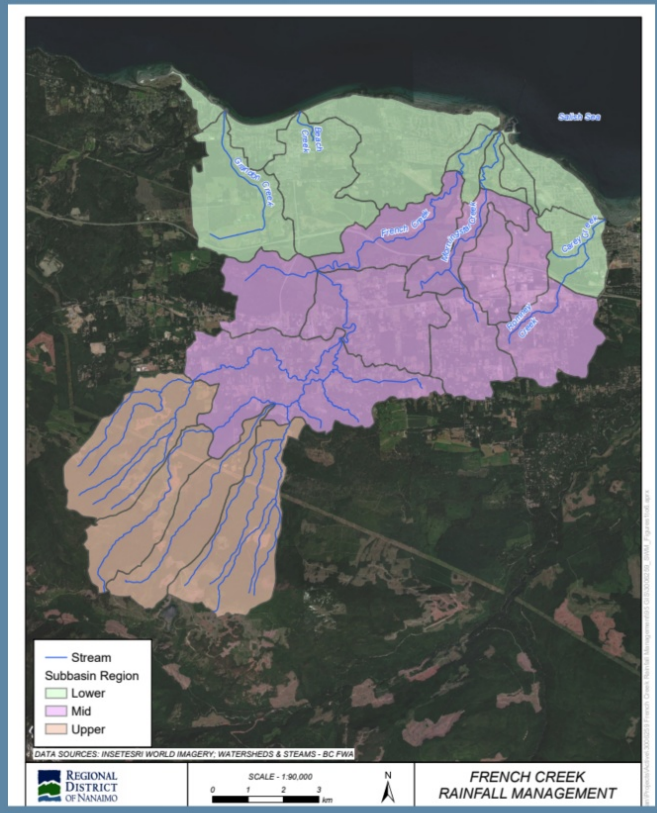
1. Baseflow release rate (L/s/ ha of impervious area)
2. Retention volume (m3/ha of impervious area)
3. Infiltration area (m2 / ha of impervious area)
4. Flood detention volume (m3 / ha of developed area)

The overall performance target objective is to ensure no increase in the magnitude of flood events while also maintaining the ground water compondent of the water balance

Performance Targets (Phase 1)

Performance Targets Notes:

- one set of performance targets for mid-region & one set for lower-region.
- only applied to flow from impervious areas.
- set assuming all existing development is eventually redeveloped or retrofitted instead of only mitigating impacts based on future impervious areas.
- a series of performance targets were developed to understand the stress of land use development on its own and land use development coupled with climate change.



Implementation (Phase 2)

Review and selection of targets:

	Option 1	Option 2	Option 3	Option 4
	Future land use to pre-development	Future land use and climate change to pre-development	Future land use to current development	Future land use and climate to current development
Mid Region and Upper Region				
Baseflow Release Rate (L/s/ha)	0.2	0.2	0.2	0.2
Retention Volume (m^3/ha)	450	900	150	850
Infiltration System Area (m^2/ha)	120	60	75	30
Flood Detention Volume (m^3/ha)	750	3000	450	1750

Implementation (Phase 2)

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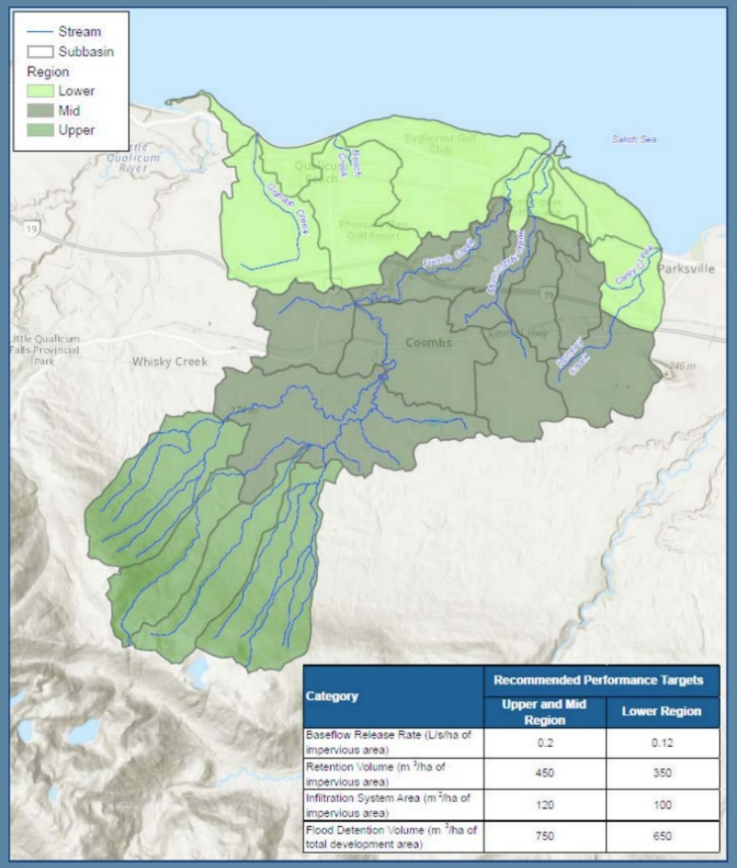
Flood Detention Volume (m^3/ha)	750	3000	450	1750

Implementation (Phase 2)

Recommended Performance Targets

Based on Option 1: Mitigate future land use development to pre-development (natural, forested) conditions

- Goal is to mimic **natural** hydrologic condition (i.e. pre-development)
- Provides practical targets to minimize applications for exemptions
- Performance targets intend to mitigate the effect of **land use** change



Category	Recommended Performance Targets	
	Upper and Mid Region	Lower Region
Baseflow Release Rate (L/s/ha of impervious area)	0.2	0.12
Retention Volume (m^3/ha of impervious area)	450	350
Infiltration System Area (m^3/ha of impervious area)	120	100
Flood Detention Volume (m^3/ha of total development area)	750	650

Application of Targets

Roles and Responsibilities

- Review of development applications:
  - City of Parksville
  - Town of Qualicum Beach
  - Ministry of Transportation & Infrastructure (MoTI)
  - RDN
- Close Communication/collaboration with RDN
- Tracking of feedback and target application
- Early involvement in development planning

Application of Targets

Reviewing Development Applications

Elements to check for in review:

- Summary of site conditions, land covers, impervious area coverage
- Acknowledgement of performance target values from this study
- Overview of rainwater features proposed and **how they meet performance targets**
- Presence of retention and detention facilities meeting volume requirements
- Presence of an outlet structure to meet baseflow release rates
- Inclusion of features that encourage filtration
- Justification of why recommended performance targets cannot be met, and what values of baseflow release, retention volume, infiltration area, and detention volume are achieved.

Application of Targets

Development Scale

Site level: Source controls

- retention of pervious/vegetated areas
- rain gardens, greenways, bioswales, permeable pavers

Neighbourhood level: Source controls + centralized features

- multi-site attenuation, road run-off
- requires early planning to allow space for rainwater features

Subwatershed / community level: Dispersed flood detention

- applies to broader projects to be undertaken by QB, Parksville, RDN
- beyond performance targets, but can mitigate climate change impacts

Implementation Tools

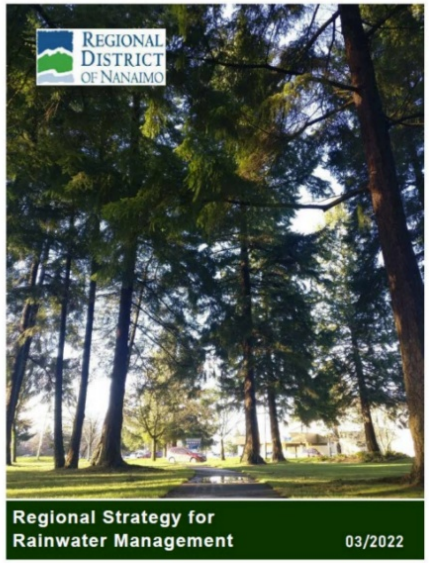


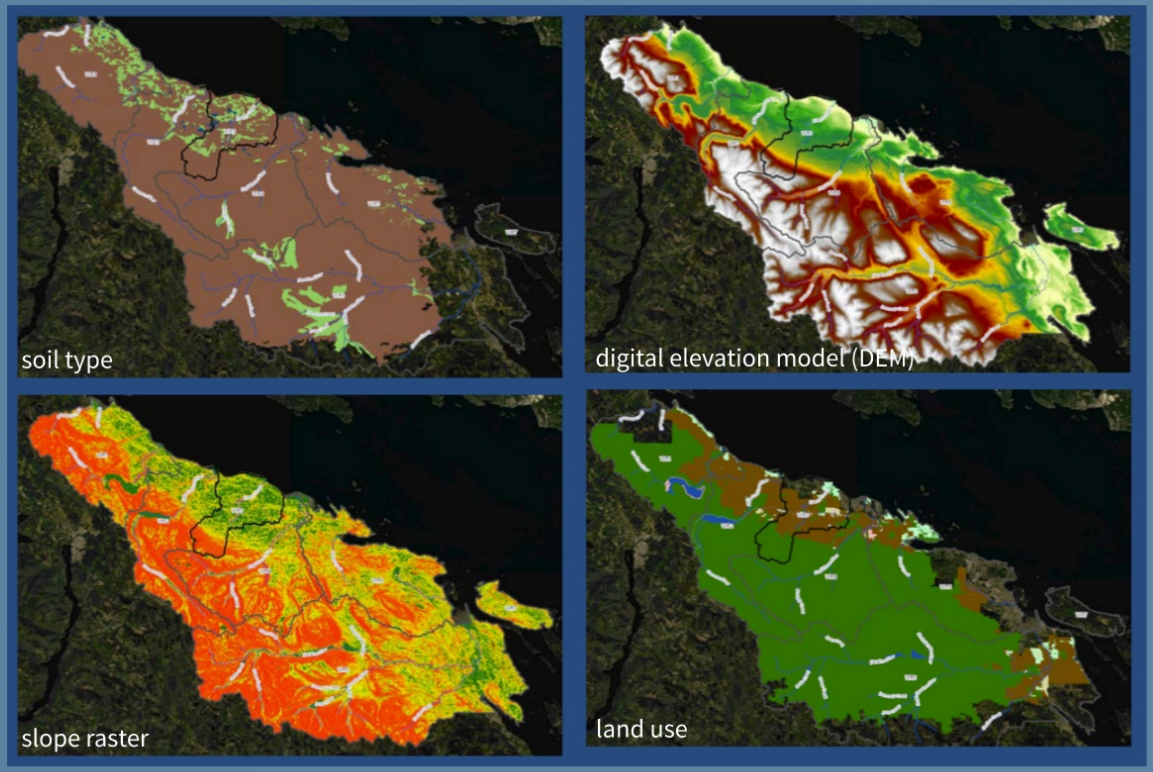
Table 2.5 Recommendations from the RSRM to support implementation of the pilot performance targets in the French Creek Water Region.

Category	RSRM Implementation Recommendation (EOR, 2022)
Policies	• T.14 Clarify roles and responsibility with MOTI regarding enforcement of new performance targets. • T.15 Create a memorandum of understanding with neighbouring municipalities (Qualicum Beach and Parksville) for applying rainwater management within the French Creek watershed. • T.16 Create an information sharing agreement with the province and Mosaic Forest Management to facilitate sharing of data for adaptive management.
Bylaws	• T.18 and T.19 – Amend the zoning bylaws to incorporate elements of better site design and more rainwater management friendly landscaping requirements. Bylaw 1285 is specific to Zone F within the French Creek Water Region and could be used as a pilot prior to amending Bylaw 500 which spans multiple regions.
Development Permit Applications	• T.21 – Amend the freshwater and fish habitat DPA to specify adherence to performance targets or amend the aquifer DPA for zone G, which is contained primarily within the French Creek Water Region.
Official Community Plans	• T.24 - Create draft wording around meeting updated rainwater management requirements for inclusion into OCPs when they are updated.
Strategic Planning	• T.28 – Create a rainwater strategy implementation group to oversee implementation of strategy across the region. This could be a scope of the current RDN rainwater working group. • T.29 – Regional Rainwater facility. Research feasibility of creating a regional facilities program to align with performance targets. • T.30 and T.31 – Continue to foster community partnership to help achieve watershed monitoring and continue to leverage community partnerships around education.
Development Approvals	• T.34 Conduct a review of development approvals process that require rainwater management within the RDN to clarify current procedures and identify and clarify all roles and responsibilities with respect to rainwater management and potential gaps in rainwater management requirements.
Asset Management Planning	• T.37 Identify co-benefits of parkland assets for rainwater management. To help to adapt to climate change, parkland assets could be considered as part of the rainwater management strategy.
Education and Outreach	• T.40 Host a workshop with the development community when new performance targets are implemented to provide clarity and justification.

Other Watershed Health Initiatives

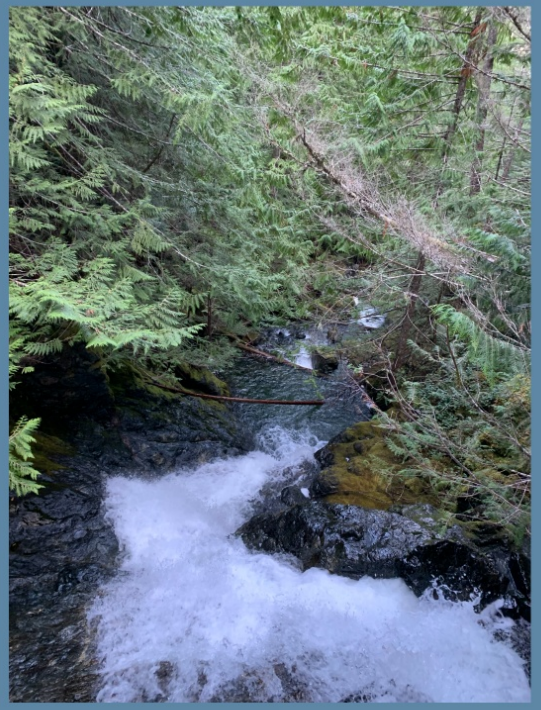
- Performance targets are tied to assumed development
- Rely on development occurring to be effective
- Parallel initiatives:
  - Vegetation retention and planting programs
  - Riparian corridor protection and setback enforcement
  - Remediation of bank erosion, water quality, instream habitat
  - Maintaining natural assets (forests, wetlands)
  - Integrating flood management into land use planning
  - Modelling and reducing agricultural and irrigation water demand

Application to Other Water Regions



Monitoring

- Hydrometric Monitoring
- Water Quality Monitoring
- Other items to track & monitor
  - Number of development applications received implementing / not implementing rainwater management
  - Feedback from land owners, developers, private industry
  - Site-level monitoring of rainwater management features, possibly with incentives for developers opting into the program
  - GIS data collection and analysis (high-resolution ortho photos, vegetative cover, intact riparian areas)
  - Tracking of watershed restoration initiatives



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1. **T QMean** - proportion of the year that daily discharge exceeds annual average discharge
2. **Low pulse count and low pulse duration** - Number of times daily discharge is less than half the mean annual discharge, and average duration of these events
3. **7-day summer low flow** - Average of daily discharge between July and September where rainfall in the prior 7 days is not more than 1mm
4. **High pulse count and high pulse duration** - Number of times daily discharge exceeds twice the mean annual discharge, and the annual duration of these events

adapted from: *Integrated Stormwater Management Planning within a Monitoring and Adaptive Management Framework*, Metro Vancouver, 2014

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  - Tracking of watershed restoration initiatives

- Water quality sampling conducted weekly over a 5-week period in both wet and dry seasons
- Benthic invertebrate sampling to determine the benthic index for biotic integrity (B-IBI) score

adapted from: *Integrated Stormwater Management Planning within a Monitoring and Adaptive Management Framework*, Metro Vancouver, 2014

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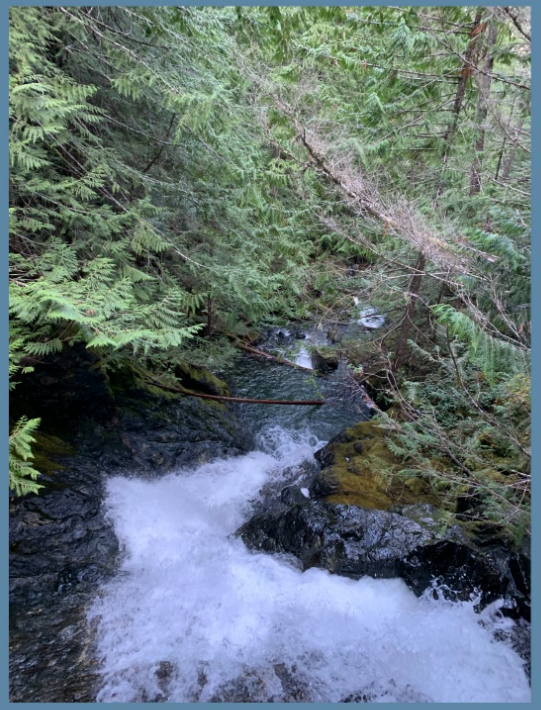
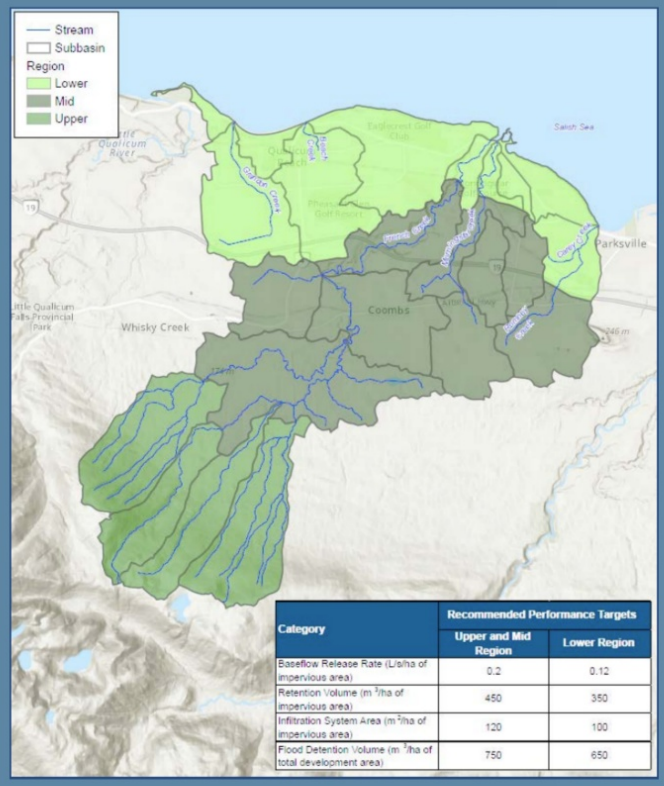


Adaptive Management

- Results from monitoring and effectiveness tracking should be periodically reviewed to determine if changes to the rainwater management are necessary
- Given the timeline over which development occurs, it will likely take several years for trends to be detectable in hydrometric and water quality data.
- If trends towards improvement are seen in WQ and hydrometric data are observed, performance target implementation is likely on track and effective.
- If adverse trends are observed (stream flashiness, reductions in baseflow, and increases in high and low pulse counts) it may indicate that performance targets are not effective or are not being implemented and adjustments should be made.
- Tracking development application variances can also be an indicator of whether there are practical challenges for developers in implementing targets; adjustments or increases in education and support for development community.

Key take-aways

- The recommended performance targets to be applied to the French Creek Water Region are based on mitigating the effects of future development to pre-development (i.e. natural) conditions
- The recommended targets will provide some mitigation of the effects of climate change, resulting in an improvement of the water balance over current conditions. Further mitigation of climate change effects may be achieved through targeted restoration initiatives and regional flood detention systems
- Achieving these targets will require collaborative action between RDN, MOTI, Parksville, and Qualicum Beach
- It is recommended to initiate engagement and outreach programs to educate stakeholders on the pilot program and intent of the performance targets



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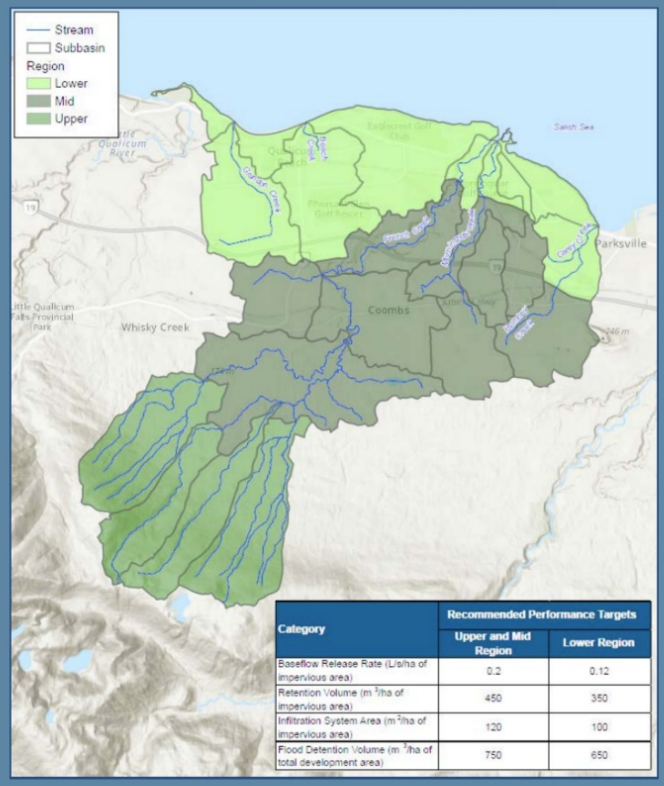
Key take-aways (continued)

- A monitoring program that tracks water quality, hydrometrics, and B-IBI should be established to develop the baseline conditions within the watershed and to track future changes
- In addition to quantitative data, it is recommended that the RDN track and catalogue feedback from stakeholders about successes and challenges in implementing the recommended performance targets, conduct GIS analysis of changes in the watershed, and catalogue all additional watershed restoration initiatives occurring in the French Creek Water Region
- Adaptive management will depend on the review and understanding of changes being observed in the watershed. Many trends will not be immediately apparent, as changes will rely on development being translated into a watershed response.



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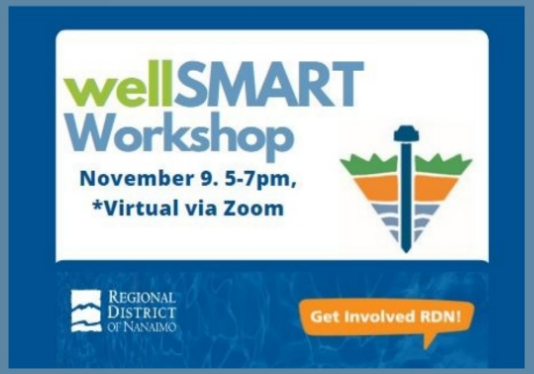
Awareness & Stewardship
Information & Science
PROJECT UPDATES
STAFF PRESENTATIONS
Policy & Planning Support
Action Plan Progress Indicators
Regional District of Nanaimo


Awareness &
Stewardship
WellSmart
Workshop
Water Purveyors
Working Group
Community Watershed
Monitoring Stewards Event
2022 Stewardship
Seed Funding
Program
2022 Rebate
Program Overview

2022 WellSmart Workshop



- Virtual Workshop held on Wednesday, November 9th
- Presentations from Island Health and Ministry of Forests and representatives from DrillWell attended
- 9 attendees out of 13 registered
- Workshop was recorded and posted to the RDN website
- Another WellSmart offering in Spring 2023

Water Purveyor Working Group

- The Water Purveyor Working Group started in 2010 and is meant to bring small water system operators from across the region together
- This year, it will be held on January 24th at the Parksville Community Centre
- We are partnering with Island Health, the BC Water and Waste Association and Province of BC to deliver a variety of presentations and discussions
- This year's topics will include Climate Change, Drought and Resources available to water purveyors

Community Watershed Monitoring Stewardship Event

A thank-you event and lunch to celebrate CWMN volunteers & introduce potential new members to the program!

- **Saturday, November 19th, 1:00pm to 3:00pm, at the McMillan Arts Centre**
- Over 40 attendees - mix of volunteers, partners, and public guests
- Stewardship group displays and presentations
- Lunch, volunteer gear, door prizes, networking and discussions

Future volunteer appreciation and recruitment events in the works for 2023 and beyond!

Water Stewardship Rebates

Rainwater Harvesting Rebate

- Maximum rebate of up to **$750** off the installation of 1000 imperial gallons or more of rainwater storage
- 3-step application process
- Currently open and accepting applications for 2022 projects
- 2022 Rainwater Harvesting Rebate Notification List

Rebate Applications:	Total Allocated:	Rebates Issued:	Total Issued:
38	$28,500.00	19	$13,742.93

Rebate Distribution by Electoral Area/Municipality:										
A	B	C	E	F	G	H	Nan	Lantz	Parks	QB
1	23	4	1	3	0	0	4	2	0	0

Application forms and program details available at **RDNrebates.ca**

Water Stewardship Rebates

Irrigation Upgrades & Soil Improvements Rebate

- Maximum rebate of up to **$675** for irrigation upgrades (sensors, control timers, drip irrigation, & MP rotators) and/or soil improvements (mulch, topsoil, & compost)
- 3-step application process
- Currently open and accepting applications for 2022 projects

Rebate Applications:	Total Allocated:	Rebates Issued:	Total Issued:
26	$5,925	21	$4,827.13

Rebate Distribution by Electoral Area/Municipality:

A	B	C	E	F	G	H	Nan	Lantz	Parks	QB
2	4	0	5	0	4	0	7	1	1	2

Application forms and program details available at **RDNrebates.ca**

Water Stewardship Rebates

Wellhead Upgrades Rebate

- Maximum rebate of up to **$650** for wellhead upgrades (secure well cap, well casing stick-up extension, & surface seal). Up to **$500** for well closure.
- 3-step application process
- Currently open and accepting applications for 2022 projects

Rebate Applications:	Total Allocated:	Rebates Issued:	Total Issued:
10	$3,550	5	$1,350

Rebate Distribution by Electoral Area/Municipality:

A	B	C	E	F	G	H	Nan	Lantz	Parks	QB
0	4	2	0	2	1	0	0	1	0	0

Application forms and program details available at **RDNrebates.ca**

Water Stewardship Rebates

Well Water Testing Rebate

- Maximum rebate of up to **$175** for full spectrum analysis from accredited lab.
- 2-step application process
- Currently open and accepting applications for 2022 projects
- 62 shared results with RDN. 48 shared results with Province.

Rebate Applications:	Rebates Claimed:	Total Issued:
70	48	$5,476.25

Rebate Distribution by Electoral Area/Municipality:

A	B	C	E	F	G	H	Nan	Lantz	Parks	QB
12	19	11	4	10	2	5	1	6	0	0

Application forms and program details available at **RDNrebates.ca**

2022 Stewardship Seed Funding

RDN's DWWP program supports efforts of stewardship groups to take community-level action to monitor, restore and enhance local waterways.

Seed funding of up to **$5,000** for up to 3 consecutive years for projects within the RDN that:

- Are led by a non-profit organization,
- Involve volunteers,
- Are jointly funded by other partners, donors, and/or in-kind contributions,
- Acquire all necessary permissions/permits,
- Actively enhance stream, river, lake, estuary, wetland health, hydrology, or function.

Priority given to stewardship groups involved in the Community Watershed Monitoring Network

Stewardship Seed Funding (SSF) Program Summary (2016 – 2022)

Year	Group	Project	SSF
2016	Departure Creek Streamkeepers	Departure Creek Habitat Assessment	$ 1000
2016	MVIHES	Shelley Creek Water Balance Model	$ 2000
2016	Walley Creek Streamkeepers	Walley Creek Riparian Planting Phase 1	$ 1000
2017	Departure Creek Streamkeepers	Departure Creek Bank Stabilization	$ 1000
2017	Walley Creek Streamkeepers	Walley Creek Riparian Planting Phase 2	$ 1000
2017	Island Waters Fly Fishers	Millstone River Vegetation Fencing & Tools	$ 475
2017	NALT	Plum Creek Wetland Restoration	$ 1340
2018	MVIHES	Shelley Creek Signage Support	$ 560
2018	NALT	Chase River Slope Restoration	$ 2100
2018	NALT	Knarston Creek Riparian Restoration	$ 2350
2019	NALT	Holden Creek Riparian Restoration	$ 2100
2019	MVIHES	Englishman River Estuary Water Quality Monitoring	$ 2033
2019	NALT	Chase River Wetland Restoration	$ 826
2019	Island Waters Fly Fishers	Millstone River Bioengineered Bank Stabilization	$ 1179
2019	NALT	Lower Knarston Creek Provincial Permit	$ 250
2020	NALT	Lower Knarston Creek Riparian Restoration	$ 3000
2020	Qualicum Beach Streamkeepers	Beach Creek Flow Monitoring Station	$ 2000
2020	NALT	Chase River Wetland Riparian Restoration	$ 3068
2020	Qualicum Beach Streamkeepers	Little Qualicum River Estuary Restoration	$ 1200
2021	Save Estuary Land Society	French Creek Estuary Water Quality Monitoring	$ 1305
2021	Departure Creek Streamkeepers	Departure Creek Off-channel Restoration	$ 4013
2021	BC Conservation Foundation	UV filter sampling in RDN swim lakes & rivers	$4999
2021	NALT	Cat Stream Riparian Restoration	$3004
2022	Gabriola Lands & Trails Trust	*Ongoing: Riparian Restoration at TBD Gabriola creeks*	—
2022	Fanny Bay Salmonid Enhancement	*Ongoing: Deep Bay Creek Mapping Project*	—
2022	Guardians of Mid Island Estuaries	*Ongoing: Little Qualicum River Estuary Restoration*	—
2022	BC Conservation Foundation	*Ongoing: Tire Wear Toxicant (PPDQ) Monitoring*	—
		Total SSF issued: $61,802	

Stewardship Seed funding closing December 15, 2022.
Will re-open for applications early 2023!

For program status and details, visit **www.rdn.bc.ca/stewardship-seed-funding**

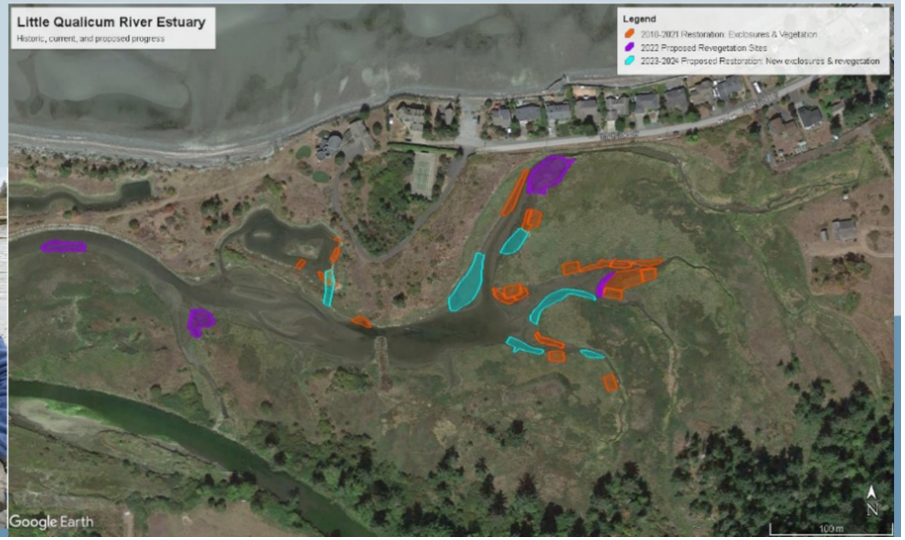
Since 2016, DWWP has supported 23 habitat assessment, monitoring, riparian and wetland restoration projects!

2022 Stewardship Seed Funding

1. Guardians of Mid Island Estuaries Society – Little Qualicum River Estuary Restoration & Research

- **WHO:** K'omoks First Nation Guardian Watchmen, Pacific Salmon Foundation, University of British Columbia.
- **WHAT:** Restoration of critical estuarine habitat and research to measure restoration success.
- First of 3-year project.
- **$5000** allocated for 2022

Photos courtesy of GoMIES



2022 Stewardship Seed Funding

2. Gabriola Lands & Trails Trust – Watershed Outreach & Riparian Restoration of Gabriola Creeks

- **WHO:** Gabriola Island Land Stewards Society, Good Earth Farm, Habitat Acquisition Trust, Islands Trust Conservancy, and Aquaparian Environmental Consulting.
- **WHAT:** Landowner riparian awareness and education campaign within 3 Gabriola watersheds; Goodhue Creek, Castell Creek, and Descanso Valley Creek. Mapping and riparian assessment to provide recommendations for future restoration efforts in 2023 and 2024.
- First of 3-year project
- *Project currently postponed*
- **$5000** allocated in 2022

Photo courtesy of GaLTT

2022 Stewardship Seed Funding

3. BC Conservation Foundation – Tire Wear Toxicant (6-PPDQ) Sampling in RDN Waterways

- **WHO:** Vancouver Island University, Pacific Salmon Foundation, Habitat Conservation Trust Foundation, and local streamkeepers.
- **WHAT**: Identify and measure tire wear particles (PPD quinone; class of compounds commonly used as tire preservatives) within RDN fish-bearing waterways. PPDQ's have been associated with 'urban run-off mortality syndrome' in aquatic species.
  - VIU recently developed an innovative method to directly measure tire wear toxins.
  - Monitoring effort to expand next year across East Coast of VI that aims to identify major sources of the toxin (hot spots), learn how concentrations change over time and space, and support nature-based solutions to protect urban streams.
- **$4,931.58** allocated for 2022

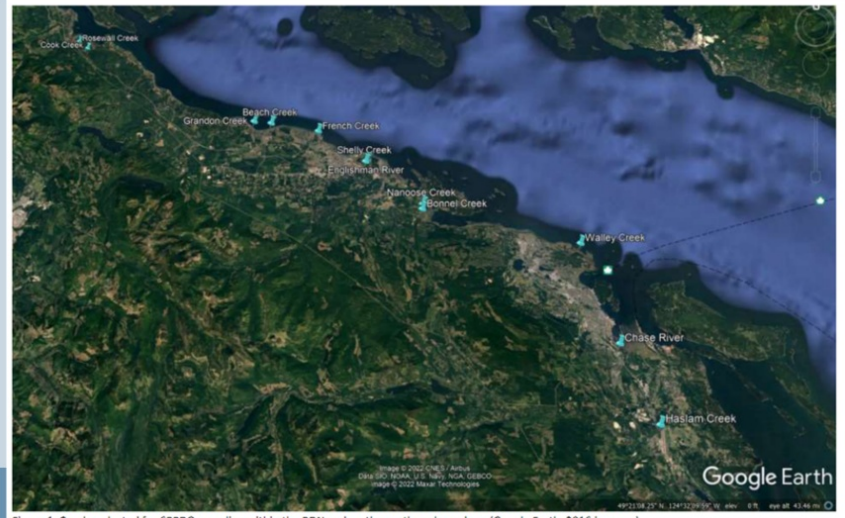


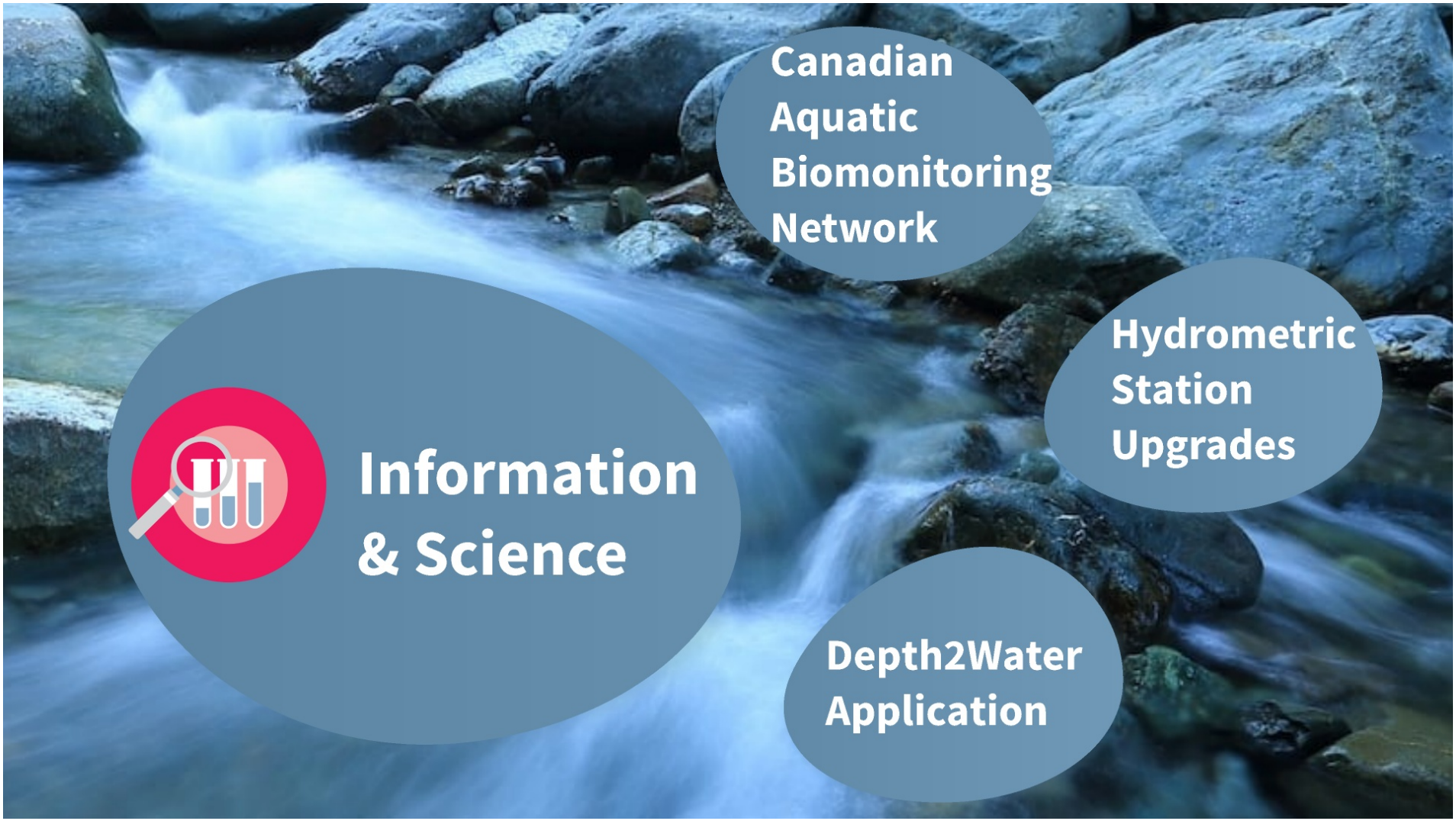
Figure 1. Creeks selected for 6PPDQ sampling within the RDN and on the northern boundary. (Google Earth, 2016 imagery)

2022 Stewardship Seed Funding

4. Fanny Bay Salmonid Enhancement Society – Deep Bay Creek Mapping

- **WHO**: Department of Fisheries and Oceans Canada, Weaver Technical Corp, and D.R. Clough Consulting.
- **WHAT**: Mapping of watercourses (tributaries and ditches) within Deep Bay Creek, using Sensitive Habitat Inventory and Mapping (SHIM) standards.
  - Goal to determine water movement and fish habitat values within the Deep Bay Creek community, enhance environmental knowledge of the area, and improve resources available for development planning and restorative action.
  - SHIM works supplemented by fish sampling (trapping and dip nets).
  - Initial findings: several drainages not previously mapped, alteration of drainage via ditching, limited riparian vegetation, fish passage barriers, and fish presence.
- **$5000** allocated in 2022

Photo courtesy of FBSES


Canadian Aquatic Biomonitoring Network
Hydrometric Station Upgrades
Information & Science
Depth2Water Application

Canadian Aquatic Biomonitoring Network (CABIN)

- Ministry of Environment & Climate Change Strategy partnership
- Five sites selected based on recommendations from 2018 and 2021 Ecoscape reports
- Criteria: >20% agriculture upstream and CWMN exceedances

Sample Date	Site Location	EMS ID
Aug. 24, 2022	Beck Creek @ Cedar Rd	E290487
Aug. 24, 2022	Millstone River @ Biggs Road	E290478
Aug. 24, 2022	Beach Creek near Chester Road at Hemsworth Road	E288092
Aug. 31, 2022	Walley Creek 20m u/s beach	E306434
Aug. 31, 2022	Walley Ck 100 m d/s McGuffie Rd	E318233

CABIN 2023 and Beyond

- Through CABIN partnerships with ENV (2019 to present) and DFO (2020), 20 sites within the RDN have been sampled collaboratively for benthic invertebrates

- DWWP will continue biomonitoring in future years guided by technical experts (ENV and DFO), CWMN data, and future projects

Date	Site Name	EMS ID
2019	French Creek at Hwy	E243021
2019	Grandon Creek	E288090
2019	Annie Creek	E240141
2019	Catstream	E290486
2020	Nanaimo River 50m u/s of Wolf Creek	E320955
2020	Nanaimo River d/s of confluence w South fork	E320956
2020	Haslam Creek @ Hwy	E299174
2020	Nanaimo River @ lower RDN park	E320971
2020	Green Creek 600m u/s of Nanaimo River	E320952
2020	Nanaimo River 1km u/s of confluence w Fourth Lake outlet	E320951
2020	Nanaimo River 2km d/s of Fourth Lake	E320954
2020	Nanaimo River 200m d/s of Fourth Lake	E320953
2020	Nanaimo River @ end of Hemer Rd	E320972
2021	Chase River	E290479
2021	Holden Creek at Lazo Lane	E310147
2022	Beck Creek @ Cedar Rd	E290487
2022	Millstone River @ Biggs Rd	E290478
2022	Beach Creek near Chester Rd at Hemsworth Rd	E288092
2022	Walley Creek 20m u/s Beach	E306434
2022	Walley Creek 100m d/s McGuffie Rd	E318233

Lake Station Upgrades

- Northwest Hydraulic Consultants Ltd (NHC) engaged to complete Oct. 6 site upgrades with RDN staff
- Upgrades based on recommendations in 2020 Operations, Maintenance, and Surveillance Manual
- Purpose to have lake monitoring meet RISC standards
- Two sites: Quennell Lake and Holden Lake

nhc

Regional District of Nanaimo

Cedar Hydrometric Monitoring:
Operations, Maintenance, and Surveillance Manual

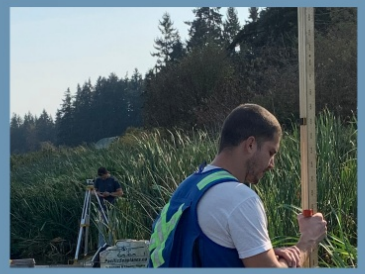
Prepared by:
Northwest Hydraulic Consultants Ltd. (NHC)
405 – 495 Dunsmuir Street
Nanaimo, BC, V9R 6B9

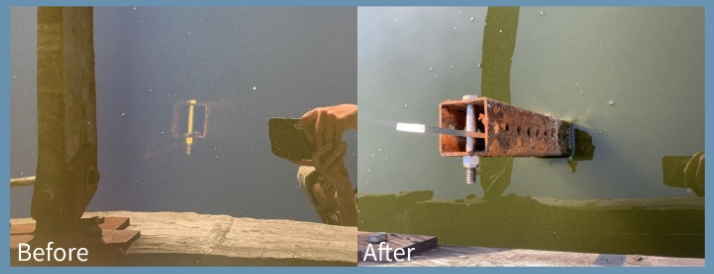
Prepared for:
Regional District of Nanaimo (RDN)
6300 Hammond Bay Road
Nanaimo, BC, V9T 6N2

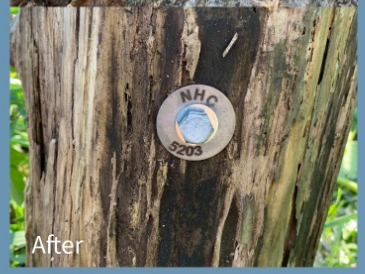
Cover page photo credits clockwise from bottom left: Telespar pipe with levelogger at Quennell Lake (NHC, 2017); Quennell Lake (NHC, 2017); Barologger at Holden Lake (NHC, 2017); Quennell Lake at Ritten Road boat launch (NHC, 2017)

Upgrades Completed

- Replaced existing logger cables with steel bars to prevent movement
- At Quennell site, installed an extended bar to increase accessibility
- Surveyed existing benchmarks, two at Holden and one at Quennell
- Installed and surveyed new benchmarks, one at Holden and two at Quennell



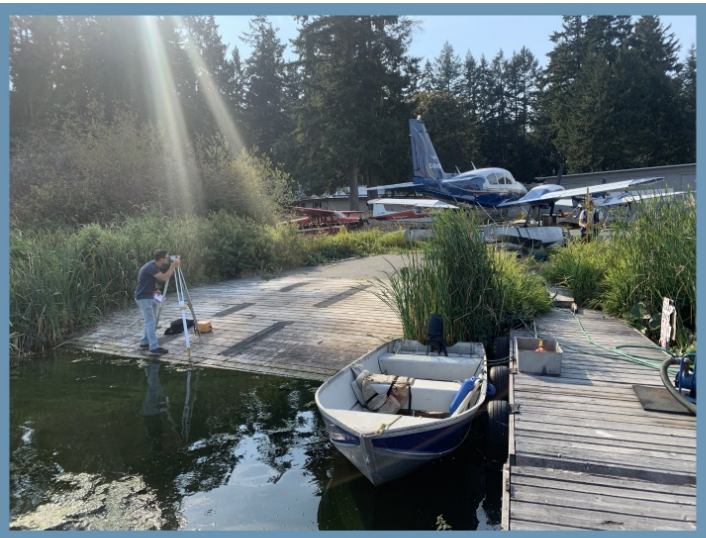


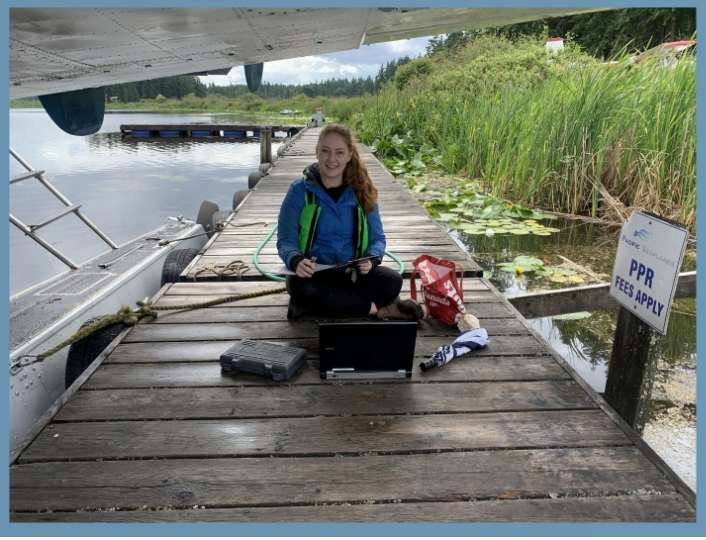


2023 - Next Steps

- NHC
  - Review and analysis of data Nov. 23, 2017 to Oct. 6, 2022
  - Spring 2023 training session for RDN staff on how to perform level surveys and data validation

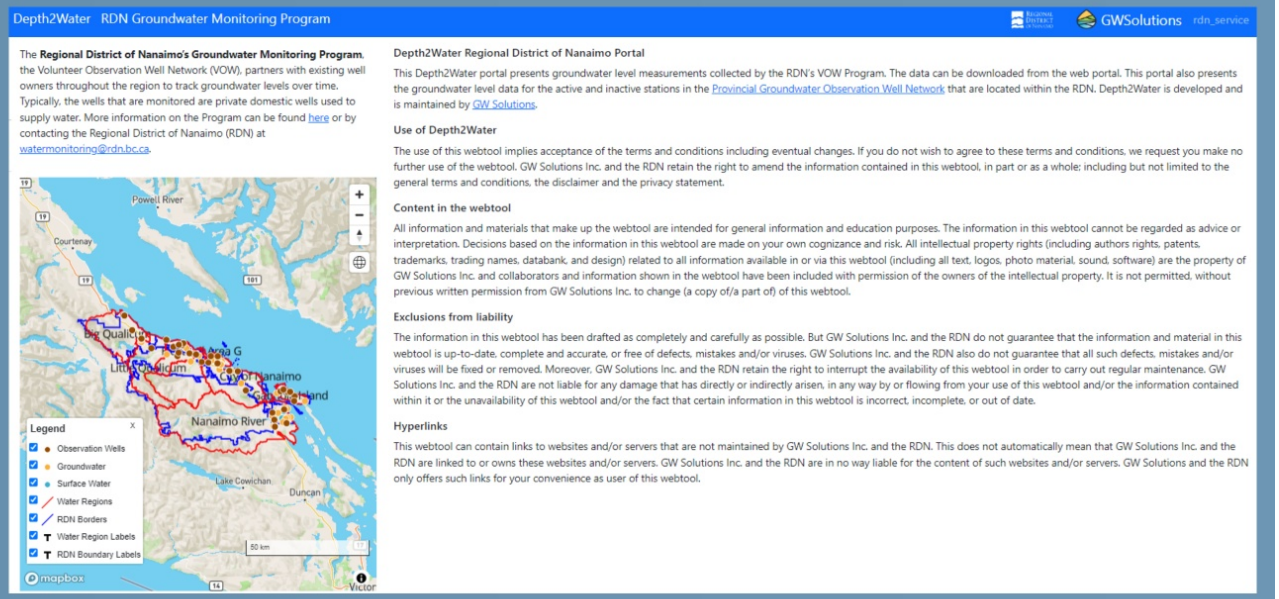
- RDN
  - Source and purchase level survey equipment
  - Upload validated data provided by NHC to PostGres database
  - If recommended, upload validated data to provincial Aquarius database





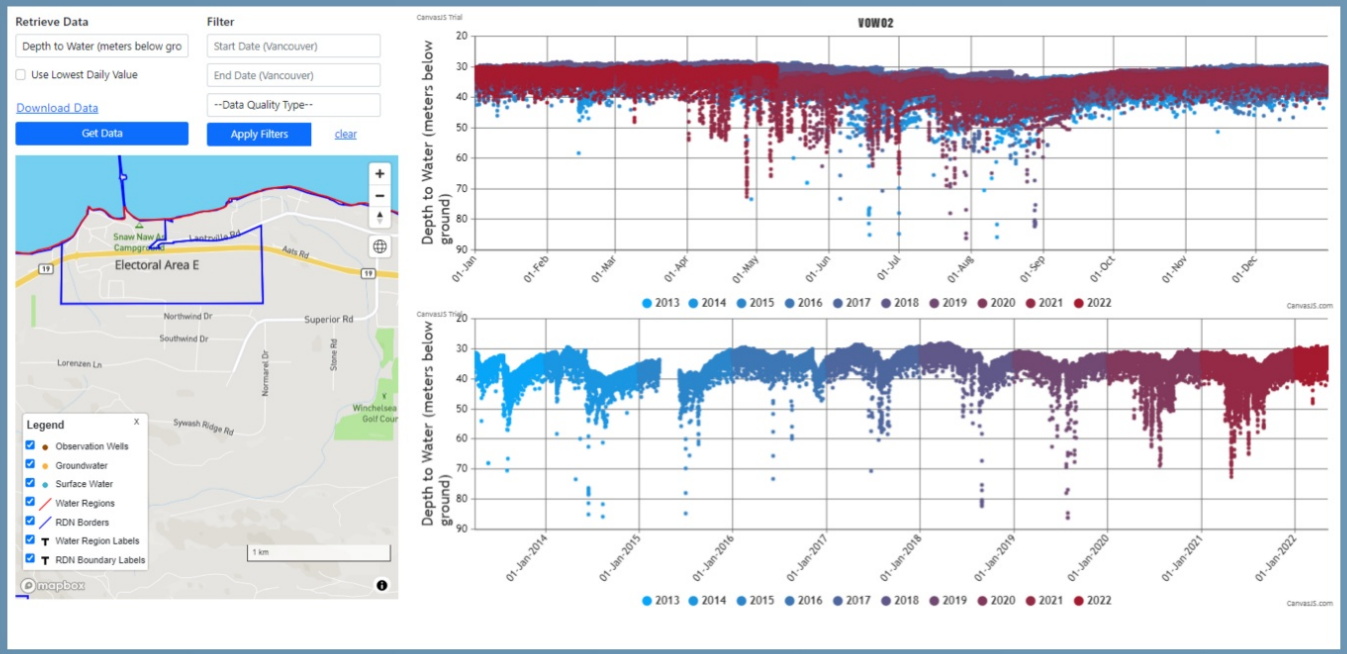
Depth2Water Application

- Webtool to support volunteer access to well data and aid in their groundwater management
- Only those with URL can access
- Sites disappear at property level
- Data is live as soon as it's uploaded to PostGres
- BC OW data within the RDN included



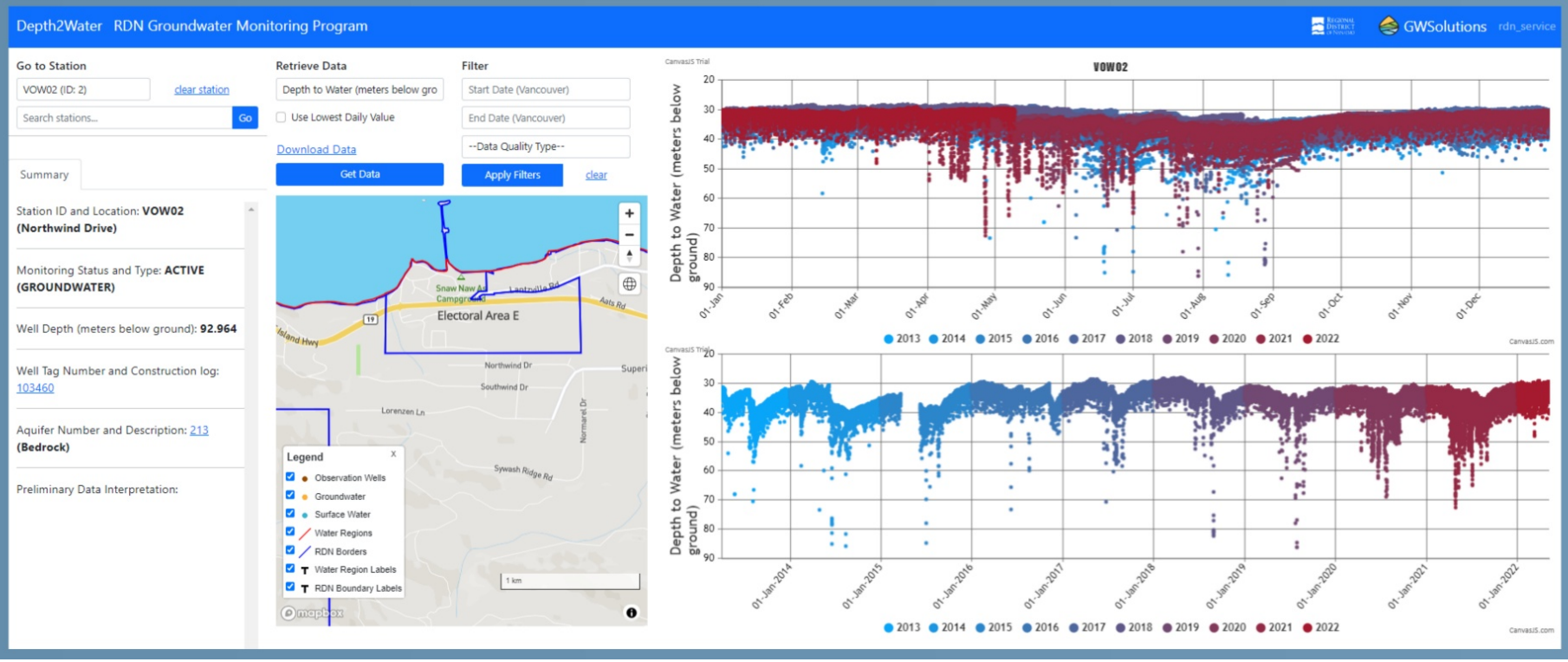
Webtool Functions

- Year over year graph (seasonal comparison)
- Continuous graph to show changes over time (historical chart)
- Lowest daily value in a day
- Download csv data
- Filter to a specific date range
- Sort by data quality type



2023 - Next Steps

- Metadata on left sidebar menu
- Laptop friendly version
- Volunteer how-to webinar




Rainwater Items
Water Supply for Climate Resilience
Policy & Planning Support
Ecological Accounting Process Partnership

Rainwater Items

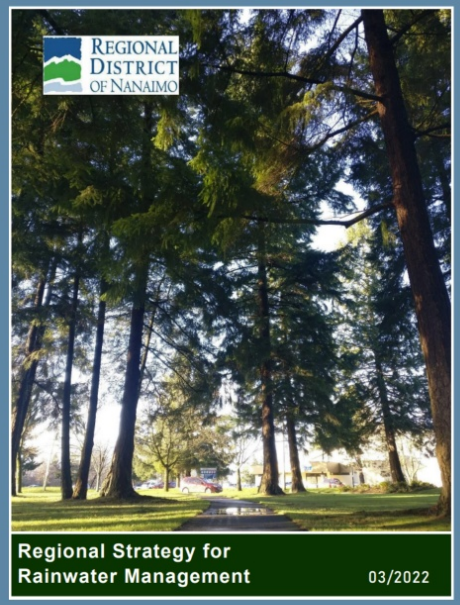
1. Watershed Performance Targets for Rainwater Manangement
2. Regional Climate Change Assessment

Key Recommendations

Foundation Setting Studies & Assessments
Watershed studies, monitoring, regional climate change assessment, funding options assessment

Development of Performance Targets
Release rate, retention volume, recharge volume, water quality

Implementation tools
Design standards and specifications, guidance documents / manuals, policies, bylaws, DPAs, strategic planning tools.



Regional Climate Change Assessment

Suggested Action in RSRM: Develop regionally accepted climate change precipitation models

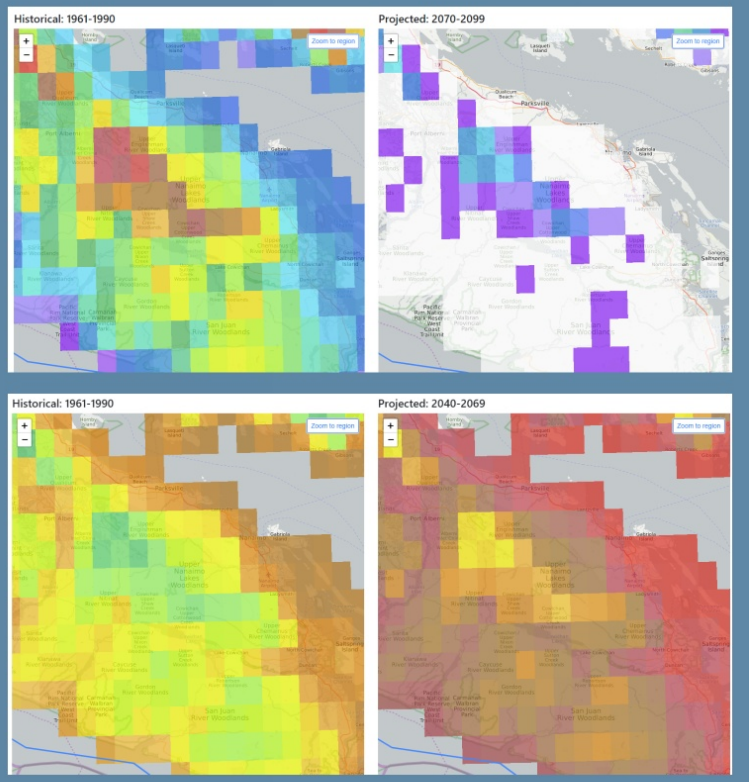
Project Objectives:

- Downscaling of climate data projections from Pacific Climate Impacts Consortium in a useable format (GIS, exportable)
- Concise report with highly useable/extractable images and messages
- Communications documents for municipal stakeholders & RDN departments

Regional Climate Change Assessment

Desired Outcomes

- RDN elected officials, residents, and staff, and stakeholders have access to accurate information on expected effects of climate change in the Regional District of Nanaimo
- Project outputs are easily useable for other RDN and stakeholder applications, meeting data formatting and accuracy requirements
- Project outputs allow easy transition into risk identification and mapping at both the community and facility level

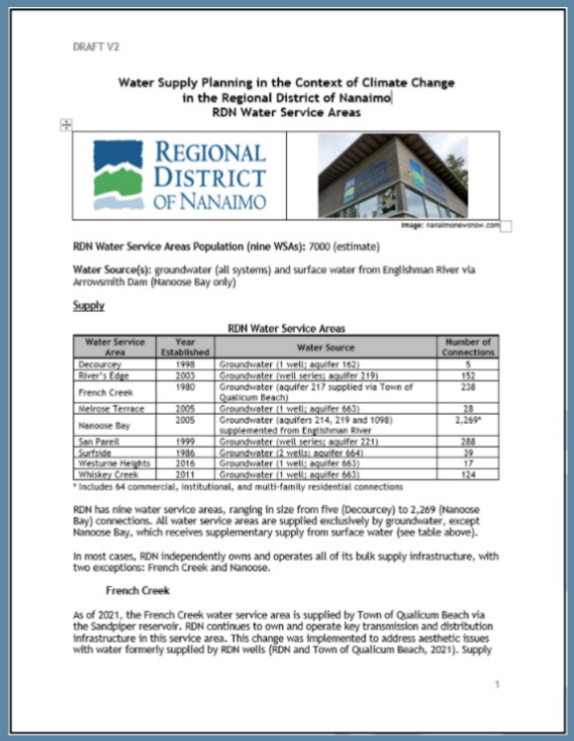


Plan2Adapt Tool, PCCIC

Water Supply Planning for Climate Resilience

Project Goals

- Develop set of best practices for climate-informed water supply planning
- Document current state of supply planning (both with water purveyors and non-serviced areas with private wells)
- Identify where additional planning may be needed
- Create resources for the public to better understand water supply planning in their community



DRAFT V2

Water Supply Planning in the Context of Climate Change in the Regional District of Nanaimo
RDN Water Service Areas

REGIONAL DISTRICT OF NANAIMO

Image: nanaimonewsnow.com

RDN Water Service Areas Population (nine WSAs): 7000 (estimate)

Water Source(s): groundwater (all systems) and surface water from Englishman River via Arrowsmith Dam (Nanoose Bay only)

Supply

RDN Water Service Areas

Water Service Area	Year Established	Water Source	Number of Connections
Decourcey	1998	Groundwater (1 well; aquifer 162)	5
River's Edge	2003	Groundwater (well series; aquifer 219)	152
French Creek	1980	Groundwater (aquifer 217 supplied via Town of Qualicum Beach)	238
Melrose Terrace	2005	Groundwater (1 well; aquifer 663)	28
Nanoose Bay	2005	Groundwater (aquifers 214, 219 and 1098) supplemented from Englishman River	2,269*
San Pareil	1999	Groundwater (well series; aquifer 221)	288
Surfside	1986	Groundwater (2 wells; aquifer 664)	39
Westurne Heights	2016	Groundwater (1 well; aquifer 663)	17
Whiskey Creek	2011	Groundwater (1 well; aquifer 663)	124

* Includes 64 commercial, institutional, and multi-family residential connections

RDN has nine water service areas, ranging in size from five (Decourcey) to 2,269 (Nanoose Bay) connections. All water service areas are supplied exclusively by groundwater, except Nanoose Bay, which receives supplementary supply from surface water (see table above).

In most cases, RDN independently owns and operates all of its bulk supply infrastructure, with two exceptions: French Creek and Nanoose.

French Creek

As of 2021, the French Creek water service area is supplied by Town of Qualicum Beach via the Sandpiper reservoir. RDN continues to own and operate key transmission and distribution infrastructure in this service area. This change was implemented to address aesthetic issues with water formerly supplied by RDN wells (RDN and Town of Qualicum Beach, 2021). Supply

1

Water Supply Planning for Climate Resilience

Project Updates

- Consultant team (Econics) presented out on project on September 20th TAC meeting
- Best Practices guide is being revisited; regional collaborative lens applied to document
- Conversations/input on Best Management document and communications support
- Invitation to Water Supply Providers for workshop in late January

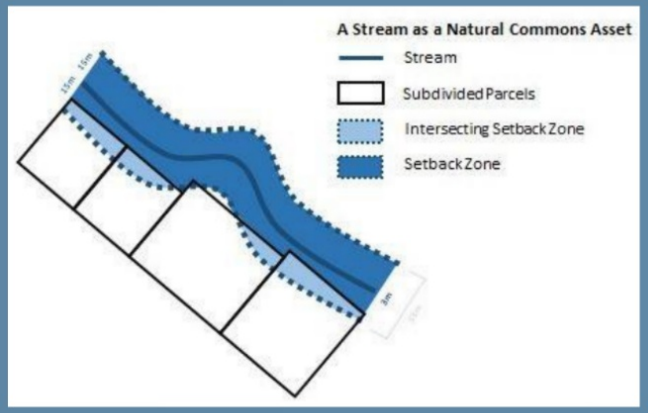
Ecological Accounting Process Partnership

- The Ecological Accounting Process (EAP) is a methodology and set of metrics that can help local governments operationalize **maintenance** and **management** of natural assets such as streams

- Stream systems are considered a **natural commons** asset in that they provide a range of uses or ecological services to the community at-large (ecological, social, and financial values)

- The EAP informs communities about the condition of their natural commons, the investment that has been made, and the value of the land underlying these spaces.

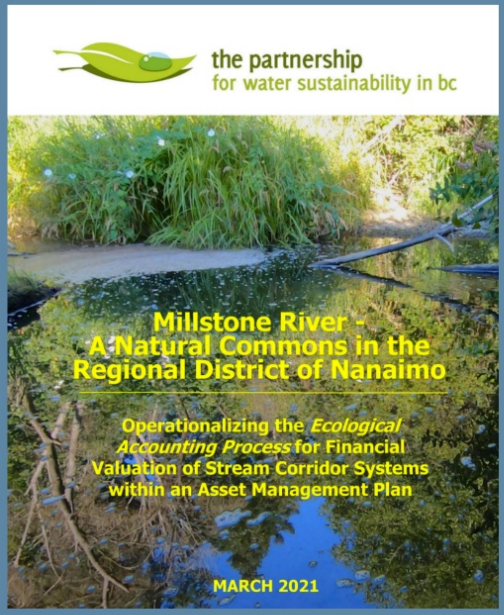
- From an asset management point of view, the stream has value as a land use. Depending on its functioning condition, it may enhance or degrade the social and financial values of land uses along its course.



Ecological Accounting Process Partnership

The EAP has been developed by the Partnership for Water Sustainability in British Columbia (PWSBC) and has been piloted through nine trials with municipal partners including the **Millstone River EAP (2021)**

The process has demonstrated to be an effective and efficient measure for monetizing commitments to supporting riparian areas for ongoing maintenance and management.



Ecological Accounting Process Partnership

Beginning in 2023, the RDN (along with other municipal partners City of Nananimo and Municipality of North Cowichan) will collaborate with PWSBC, MABRRI, and VIU to embed the EAP principles and core knowledge into MABRRI (and VIU).

Ensure knowledge of EAP is maintained and passed on to the next generation of planners and municipal staff **and** provides an opportunity for local and regional governments to leverage the process to operationalize natural asset management.

As part of the commitment and partnership, MABRRI will complete one EAP study each year with each of the local government partners.

DWWP program will provide support through:

- funding from operational budget,
- staff time to prioritize and determine individual EAP study sites,
- co-development of EAP research questions,
- and support data generation.

the partnership for water sustainability in bc

VIU

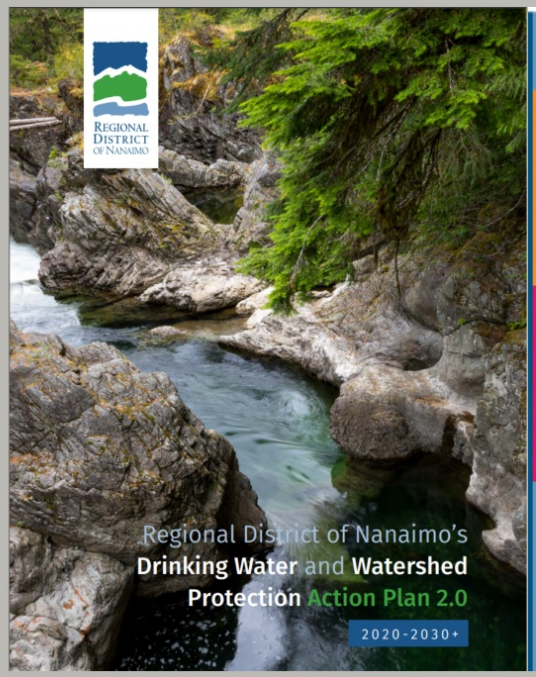
MABRRI
Mount Arrowsmith Biosphere Region Research Institute

Regional District of Nanaimo

Municipality of North Cowichan

City of Nanaimo
The Harbour City

DWWP Progress/Performance Indicators



Theme	Progress Indicator 1	Progress Indicator 2	Progress Indicator 3	Progress Indicator 4
Water Awareness and Stewardship	Reduction of metered water use over time	Number of restoration projects completed	Market research survey response indicating improved awareness	Improving trends in groundwater level and surface water quality
Water Information and Science	Number of sites with long-term (>3 years) datasets hosted on open Provincial platforms	Completion of numerical water budget models for priority watersheds and aquifers	Continued participation of community volunteers in citizen science efforts	Number of publications communicating water science
Water-centric Planning and Policy Support	Number of planning documents and processes informed by DWWP actions/ information	Number of watershed performance targets developed	Implementation of innovative rainwater management policies and practices	Successful advocacy with outside agencies

DWWP ACTION PLAN 2.0 Progress / Performance Indicators 2022

Theme	PI #1	*2022 Comments*	PI #2	*2022 Comments*	PI#3	*2022 Comments*	PI #4	2022 Comments
Water Awareness and Stewardship	**Reduction of metered water use over time**	Across all 9 RDN Water Service Areas, an 8.8% reduction in annual average per capita water use was observed from 2019 to 2022. Across all 9 RDN Water Service Areas, a 9.6% reduction in summer average per capita water use was observed from 2019 to 2022.	**Number of Restoration project completed**	Four community-level restoration and research projects supported through Stewardship Seed Funding in 2022.	**Market research survey response indicating improved awareness**	2021 benchmark, to be re-assessed in 2025	**Improving trends in groundwater level and surface water quality**	GW Level: Regional analysis identified increasing or stable trends in 9 / 18 aquifers; 5 / 18 aquifers had spatially variable trends with wells ranging from a large decline to increasing. SW Quality: Trend analysis was not completed in 2022, it will be completed again in 2023.
Water Information and Science	**Number of sites with long-term (>3 years) datasets hosted on open Provincial platforms**	Groundwater monitoring (VOW): 30 sites; Surface water quality (CWMN) 68 sites; Hydrometric stations 3; Climate stations 2. TOTAL = 84 sites	**Completion of numerical water budget models for priority watersheds and aquifers**	French Creek Water Region complete	**Continued participation of community volunteers in citizen science efforts**	Wetland Monitoring - 3 groups; CWMN - 1 new group, 1 group paused site, 1 group supported in changing focus to lake monitoring, 12 continuing groups	Number of publications communicating water science	new WaterSmart yard signs, DWWP program postcard sized handout, Rebates program handout, Streamside Land Owners brochure and Indoor and Outdoor household Leaks brochure were all completed this year
Water-centric Planning and Policy Support	**Number of planning documents and processes informed by DWWP actions / information**	Area F OCP; Regional Strategy for Rainwater Manangement	**Number of watershed performance targets developed**	French Creek Water Region Performance Targets - Implementation, Moniotring, and Adaptive Manangement	**Implementation of innovative rainwater managment policies and practices**	Regional Strategy for Rainwater Manangement endorsed by RDN Board	**Successful advocacy with outside agencies**	

2022 Workplan Review

DWWP Theme	DWWP Initiative (* = continuing; ^ = new)	Action Detail 2022	Complet	2023	Comment
Water Awareness and Stewardship	5.1.1 Community Based Social Marketing (CBSM) review / redesign of outreach programs ^	Implement			ongoing
	5.1.1 Public research survey for benchmarking on water behaviours, perspectives and priorities ^	**Benchmark survey completed in 2021**			
	5.1.1 Multimedia outreach^	**Update brochures**	✓		
	5.1.1 Demonstration sites / interpretive signage^	**Admin building**		✓	Planning complete, installation in spring 2023
	5.1.1 Youth water leadership engagement^	Pilot		✓	
	5.1.1 Team WaterSmart tours, community events, workshops, school materials, irrigation check-ups*	With CBSM re-design	✓		
	5.1.2 Expand existing rebate programs*^	Another increment increase	✓		
	5.1.2 Explore new rebate for water flow meters for wells^	Push out to 2023 or 2024 >>			
	5.1.3 Agricultural sector outreach^	Develop			Supported other agri prgms
	5.1.3 ICI sector outreach^	-	-	-	-
	5.1.4 Expand seedfunding for restoration projects*^	15% increase	✓		
	5.1.4 Water stewardship organizations networking opportunities^	Pilot	✓		CWMN Stewardship Event
	5.1.5 Support regional water conservation plans*	-	-	-	-
	5.1.5 Coordinate regional watering restrictions communications	Staff Time	✓		
	5.1.5 Support small water systems with annual working group session*	Annual Event	✓		Event scheduled for January 2023
	5.1.6 Participate in and coordinate advisory committees*	-	✓		
Water Science and Information	5.2.1 Maintain regional surface water (CWMN) and groundwater (VOW) monitoring*	Equip. replacement plan	✓		
	5.2.1 Hydrometric and climate monitoring partnerships*	>>	✓		
	5.2.1 Data management *^	GW Data Management System	✓		
	5.2.1 Explore potential for Benthic Invertebrate Monitoring (ie. CABIN)^	**Cont. pilot**	✓		sampled sites in partnership with ENV
	5.2.1 Wetland monitoring and mapping *^	**Citizen science**	✓		
	5.2.2 Water budget phase 3*	French Creek Phase 3 WB	✓		
	5.2.2 Surface water trend analysis*	-			
	5.2.2 Groundwater trend anaylsis*		✓	-	Regional analysis identified increasing or stable trends in 9 / 18 aquifers; 5 / 18 aquifers had
	5.2.2 Quantifying ecosystem services via ecological accounting pilot (in partnership with PWSBC)^	Regional Riparian Review	✓		EAP Partnership inititated
	5.2.2 Snowpack modelling^	Yr 3	✓		
	5.2.2 Water balance modelling (rainwater management) Linked to 5.2.4	French Creek Phase 2	✓		
	5.2.3 Interactive water map(s)*^	Update DWWP Website watershed map	✓		Regional Riparian Analysis Interactive map on website
	5.2.3 Data visualization through dynamic graphs^	Groundwater level graphs	✓		
	5.2.3 Publications*^	Push out 1 yr >>		✓	Bumped to 2023
	5.2.4 Develop watershed perfomance targets for priority water region^	French Creek Phase 2	✓		
Water-centric Planning	5.3.1 Integrating water information into key long-range planning processes*^	Ongoing Area F OCP, RGS	✓		
	5.3.1 Provide regional water information to inform referrals from Current Planning and the Province*	Staff Time	✓		
	5.3.1 Provide regional water information to inform Emergency Services operations*	Staff Time	✓		
	5.3.1 Develop a regional rainwater management strategy^	Complete	✓		
	5.3.2 Best practices and policy research*^	Water governance	✓		Ongoing dialogue, participation in working groups, part of other projects etc.

2023 DWWP Proposed Workplan Highlights

In addition to ongoing projects and operations...

New Projects & Operations

- Ecological Accounting Process Partnership
- Initiate Phase 3 Water Budget for Cedar-Yellowpoint
- Communications/education material for Water Supply Resiliency Project (in partnership with LRP dept.)
- Regional Climate Change Assessment (in partnership with LRP)
- Expand Demonstration Site and Interpretive Signage Program
- Lake Site Monitoring Training
- VOW Webtool Workshop
- Youth water leadership engagement
- Expand Watershed Field Trips to pre-COVID attendance
- Continue equipment upgrade program
- Updates to Riparian Spatial Analysis map


New 2023 Projects / Proposed Workplan Overview
New Business
2023 DWWP TAC Meeting Dates

2023 DWWP Proposed Workplan Highlights

In addition to ongoing projects and operations...

New Projects & Operations

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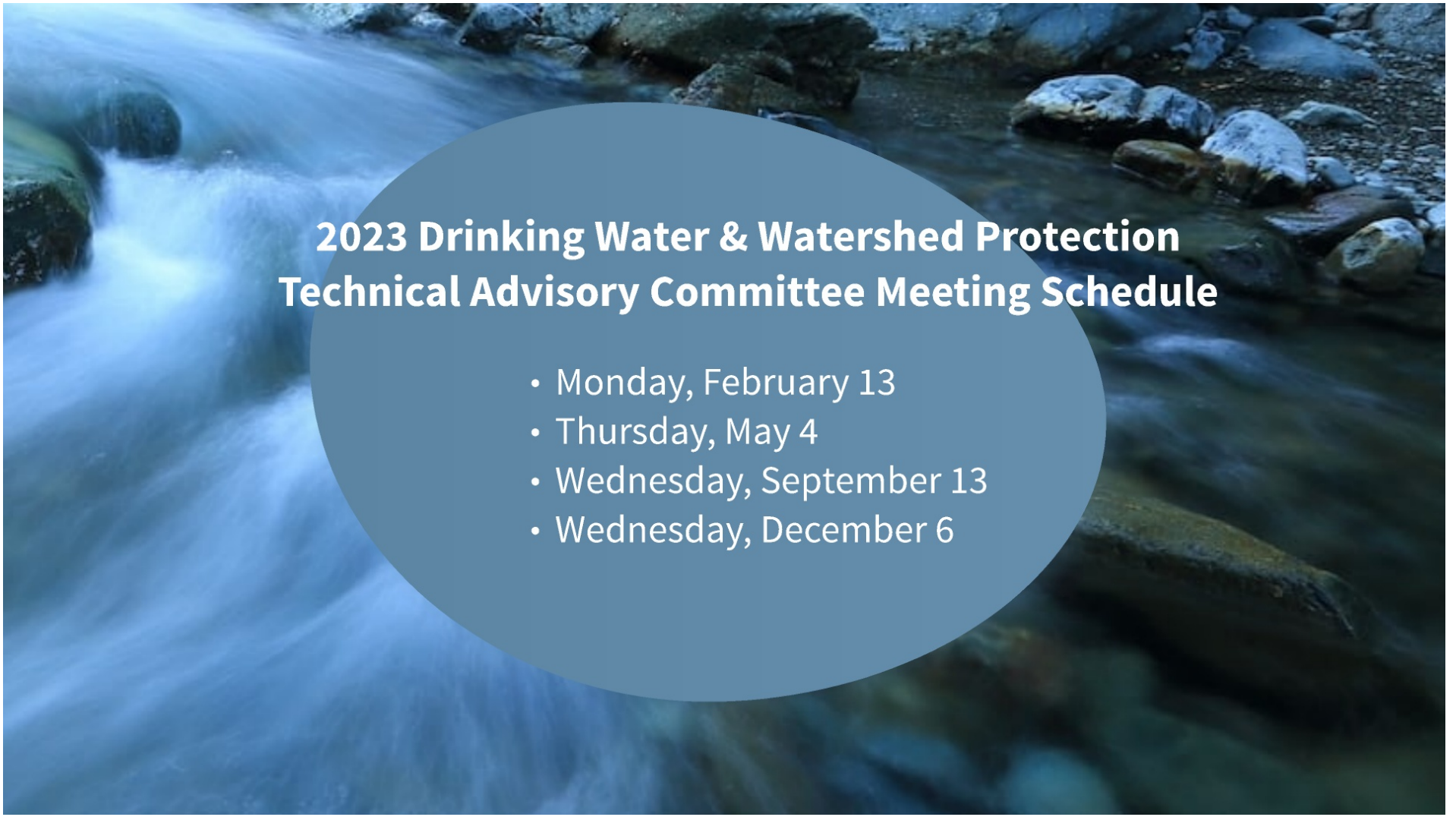
2023 Drinking Water & Watershed Protection
Technical Advisory Committee Meeting Schedule
• Monday, February 13
• Thursday, May 4
• Wednesday, September 13
• Wednesday, December 6

Thank you & see you in the new year!

next meeting: February 13, 2023

REGIONAL DISTRICT OF NANAIMO