









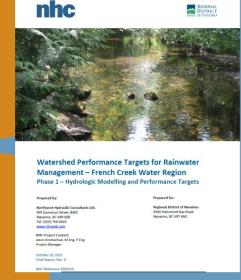
Rainwater Performance Targets for French Creek Water Region - Final Report

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

- Baseflow release rate (L/s/ ha of impervious area)
- Retention volume (m3/ha of impervious area)
- Infiltration area (m2 / ha of impervious area)
- Flood detention volume (m3 / ha of developed area)

The **performance target objectives** have been defined as:

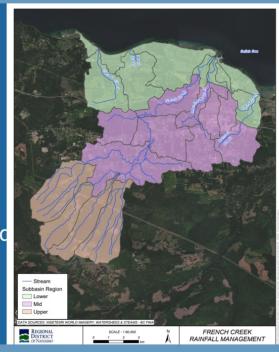
- No increase in the magnitude of flood events (2-year to 50-year flows)
- No increase in the duration of the 2-year event, and similar performance below the 2-year duration on a flow duraton curve
- Maintain the ground water component of the water balance.



Rainwater Performance Targets for French Creek Water Region

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 land use development on its own and land use development coupled with climate change.



Rainwater Performance Targets for French Creek Water Region

Table 4.1 Performance targets for mid region scenarios

Target	Mitigate future land use to pre- development	Mitigate future land use and climate change to pre-development	Mitigate future land use to current	Mitigate future land use and climate change to current
Baseflow Release Rate (L/s/ha)	0.2	0.2	0.2	0.2
Retention Volume (m³/ha)	450	900	150	850
Infiltration System Area (m²/ha)	120	60	75	30
Flood Detention Volume (m³/ha)	750	3000	450	1750

Table 4.2 Performance targets for lower region scenarios

Target	Mitigate future land use to pre- development	Mitigate future land use and climate change to pre-development	Mitigate future land use to current	Mitigate future land use and climate change to current
Baseflow Release Rate (L/s/ha)	0.12	0.12	0.12	0.12
Retention Volume (m³/ha)	350	550	75	200
Infiltration System Area (m²/ha)	100	60	30	10
Flood Detention Volume (m³/ha)	650	1800	250	470

Ideally, performance targets would be applied that would mitigate future land use and climate change impacts to pre-development conditions to negate changes to hydrology across the water region. However, this can result in onerous requirements for developers, which may not be implemented because they are too stringent. Ultimately, targets selected should balance improvements to watershed health with the practicality of implementing them widely within the context of development. The balance between practicality and watershed health will be explored during Phase 2 of this study. At that time, performance targets will be selected from the range of results developed in this study.

Rainwater Performance Targets for French Creek Water Region

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Rainwater Performance Targets for French Creek Water Region

Peak flows and flow durations from the **future development scenario** can be mitigated back to predevelopment and current levels. However, peak flows and flow durations from the **climate change** scenario are not fully mitigated to pre-development levels, nor current levels, especially in the mid-watershed.

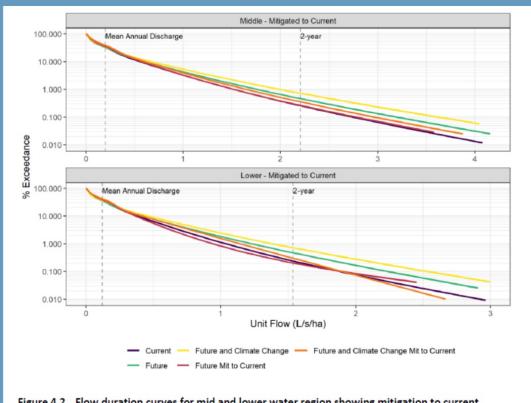


Figure 4.2 Flow duration curves for mid and lower water region showing mitigation to current conditions

Rainwater Performance Targets for French Creek Water Region

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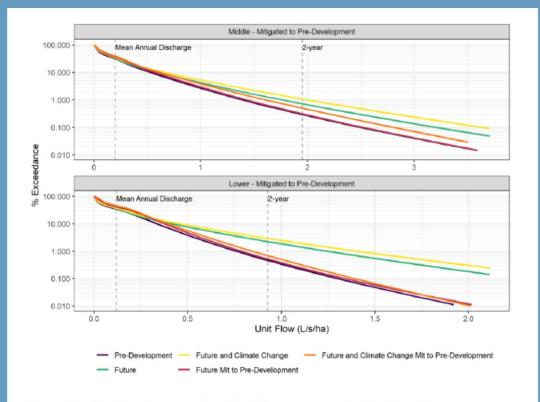


Figure 4.1 Flow duration curves for mid and lower water region showing mitigation to predevelopment conditions

Rainwater Performance Targets French Creek Water Region



Bottom line: Mitigation measures need to be applied to runoff from both pervious and impervious areas to meet pre-development conditions.

To do so, other mitigation and adaptation measures should be explored in conjunction with the performance targets for impervious surfaces, to address climate change impacts for rainwater management on a watershed scale. This includes maintaining natural assets (forests, wetlands), retaining and restoring riparian areas, integrating flood management into all land uses (incl. agricultural, parks).

Implementation, monitoring and adaptive management of the performance targets will be explored in Phase 2 of the project in 2022, following the adoption of the Regional Strategy for Rainwater Management.





DWWP Educational Video Series

- The Drinking Water & Watershed Protection program is engaged a with a communications and video production team, ZINC Communication Strategies and Fox & Bee Studios to create a freshwater awareness video series.
- The video series will be used to reach broader audiences with DWWP key messages and materials, promote initiatives, and inspire water awareness and stewardship in the region.

We are creating 6 educational short videos, 3 - 4 minutes in length, with themes including:

- What is a watershed, the source of your drinking water, water connects us, water challenges, water science and stewardship, and the water sustainable future.
 - Project timeline:
 - O March April: Draft scripts revised and edited
 - May June: Scripts finalized and filming schedule developed
 - June October: Filming, video and graphics production and delivery of draft videos 🖋
 - October November: Final video review & editing ONGOING
 - December 14th Final series delivery and launch! Online/social media/school distribution

Revised: Contract extension and revised budget, updated scope of work.



2021 Stewardship Seed Funding Program

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 program

Since 2016, DWWP has supported 19 habitat assessment, monitoring, and riparian and wetland restoration projects!



SSF Program Summary (2016 - 2020)

Year		Project	SSF
2016	Departure Creek	Habitat Assessment	\$ 1000
2016	MVIHES	Shelley Creek Water Balance Model	\$ 2000
2016	Walley Creek	Riparian Planting Phase 1	\$ 1000
2017	Departure Creek	Bank Stabilization	\$ 1000
2017	Walley Creek	Riparian Planting Phase 2	\$ 1000
2017	Fly Fishers	Millstone River Vegetation Fencing & Tool Library	\$ 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 Reach 2	\$ 2100
2019	MVIHES	Englishman River Estuary Water Quality Monitoring	\$ 2033
2019	NALT	Chase River Wetland Restoration & TWS Workshop	\$ 826
2019	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	Beach Creek Flow Monitoring Station	\$ 2000
2020	NALT	Chase River Wetland Riparian Restoration	\$ 3068
2020	Qualicum Beach	Little Qualicum River Estuary Restoration	\$ 1200
		Program Total	¢ 29 491

2021 Stewardship Seed Funding Program

1. Departure Creek - off-channel enhancement and restoration

- Departure Bay Neighbourhood Association with partners City of Nanaimo, Snuneymuxw First Nation, Nanaimo & Area Land Trust.
- · Construction of new intake pipe and riparian planting to enhance side-channel water quality and habitat.
- \$5000 allocated, \$4012.84 issued so far.

2. French Creek Estuary - water quality and quantity monitoring

- Save Estuary Land Society with partners MABRI, Friends of French Creek Conservation Society, MVIHES, Community Salmon Program.
- Water quality and quantity monitoring of creek flows to inform an estuarine restoration plan.
- \$1000 allocated.

3. RDN Swim Lakes - UV filter contamination monitoring

- British Columbia Conservation Foundation with VIU, BC Ministry of Environment, and local streamkeepers.
- UV filter contamination investigation at several swim lakes within the RDN.
- \$5,000 allocated.

4. Cat Stream - invasive species control and restoration planting

- Cat Stream Streamkeepers with partners Nanaimo & Area Land Trust and Snuneymuxw First Nation
- Removal and control of invasive species, including Himalayan blackberry, English Ivy, and Reed Canarygrass.
- \$3361.12 allocated.





Stewardship Seed funding now closed for 2021, will re-open for applications early 2022!

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

Rainwater Harvesting Rebate

- Maximum rebate of up to \$750 off the installation of 1000 imperial gallons or more of rainwater storage
- Currently closed due to full subscription and no longer accepting applications for 2021
- Notification List for 2022 Rainwater Harvesting Rebate
- 3-step application process: Pre-approval, 90-day completion of work, Claim application



Rebate Applications:	Total Allocated:	Rebates Issued:	Total Issued:
38	\$28,387.50	20	\$14,809.17

Issued Rebate Distribution by Electoral Area/Municipality:										
Α	В	С	E	F	G	Н	Nan	Lantz	Parks	QB
4	12	2	3	6	4	1	4	1	0	1

Irrigation Upgrades & Soil Improvements Rebate

- Maximum rebate of up to \$675 for irrigation upgrades (sensors, control timers, drip irrigation, & MP rotators) and soil improvements (mulch, top soil, compost).
- Currently open and accepting applications for 2021 projects
- 3-step application process: Pre-approval, 90-day completion of work, Claim application



Rebate Applications:	Total Allocated:	Rebates Issued:	Total Issued:	
33	\$7,600	29	\$5,106.26	

Issued Re	bate Distri	bution by E	lectoral Ar	ea/Munici _l	pality:					
Α	В	С	E	F	G	н	Nan	Lantz	Parks	QB
0	1	1	2	1	2	2	14	2	3	5

Wellhead Upgrades Rebate

- Maximum rebate of up to \$650 for wellhead upgrades (secure well cap, well casing stick-up, surface seal). Up to \$500 for the well closure.
- Currently open and accepting applications for 2021 projects
- 3-step application process: Pre-approval, 90-day completion of work, Claim application



Rebate Applications:	Total Allocated:	Rebates Issued:	Total Issued:
11	\$4,150	7	\$1,650

	Issued Rebate Distribution by Electoral Area/Municipality:									
Α	В	С	E	F	G	Н	Nan	Lantz	Parks	QB
3	3	3	0	1	0	0	0	1	0	0

Well Water Testing Rebate

- Maximum rebate of up to \$175 for full spectrum analysis from accredited lab.
- Currently open and accepting applications for 2021 projects
- 2-step application process: Pre-approval, sample drop-off upon receival of voucher.

Rebate Applications:	Rebates Issued:	Total Issued:
99	71	\$7,375.69



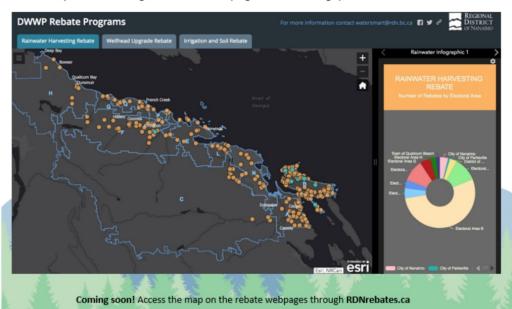
Issued Re	Issued Rebate Distribution by Electoral Area/Municipality:									
Α	В	С	E	F	G	Н	Nan	Lantz	Parks	QB
10	40	15	7	13	5	1	1	7	0	0

NEW! Water Stewardship Rebate Uptake Mapping App

Objective: to meet community-based social marketing strategy as suggested by *Beyond Attitude* in recent program review and aid in internal/external rebate program reporting.

Interactive webmap that highlights rebate uptake distribution and stats for the Rainwater Harvesting, Wellhead Upgrades, and Irrigation & Soil rebates:

- Includes infographics that visually depict rebate distribution by Electoral Area/municipality, year, and type, as well as the total funding issued so far and more!
- Rebate data will be updated quarterly moving forward
- · Easily customizable to grow with the rebate programs and encourage public interest



School Program Update

- Teachers at Coal Tyee Elementary are testing the materials in classrooms and will provide feedback by mid-December
- Learning Coordinators in both D68 & 69 are reviewing materials and sharing with interested teachers
- Applications for Feb 2022 Pro-D days have just opened and are in progress
- NALT and RDN signed contract for delivery of inclassroom & on-stream School Water Steward Program for 2022



Water Purveyor Working Group

Water Purveyor Working Group

December 9th, 2021 9:30am-12:30pm virtual via Zoom

Awareness and Use of Online Resources for Water Purveyors

- Small Water Systems Community Network Marian Hands BCWWA
- BC Groundwater Association online resources Dave Mercer BCGWA
- How to use the online Canadian Water Directory Tiegan Lange, SIS

Preparation for Emergencies and Climate Change Effects

- Online availability of Insurance Protection Paula Garrecht, CapriCMW insurance
- Planning for emergency preparation and response SIS
- <u>2021 drought survey results and emergency response and water</u> <u>conservation planning</u> – Rory Beise, Island Health

Irrigation Industry Association of BC - Training Sponsorship

Sponsored Courses for 2022

- The RDN will offer up to 12, \$100 discounts to Irrigation Professionals operating within the RDN
 - Certified Irrigation Technician Level 1
 - Certified Irrigation Technician Level 2 Landscape
- On IIABC and RDN Website, Social Media







Volunteer
Observation
Well Network
installation
upgrades

Interactive Water Regions Map

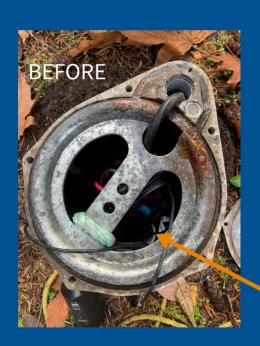
> Agricultura Nutrient Monitoring

Information & Science

Groundwater
Data Mgmt
System



Volunteer Observation Well Installation Upgrades



Project:

 Upgrade VOW logger housing set-up

Purpose:

- 1. Safety improvements
- 2. Data validity



Sounder tube

Volunteer Observation Well Installation Upgrades

BEFORE

AFTER





Purpose (continued):

- 3. Equipment security
- 4. Best practices

Sites:

- 2021 10 sites
- 2020 3 sites
- 2019 3 sites

Water Quality Lab Analysis:

- Before full spectrum analysis
- After microbiology sample







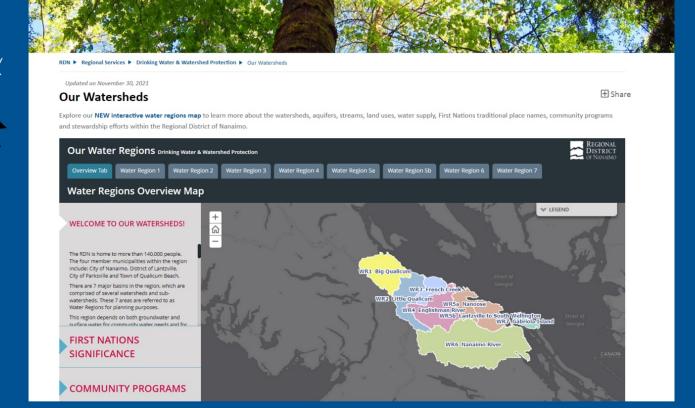
Groundwater Data Management System

Update from Antonio Barroso, Hydrogeologist



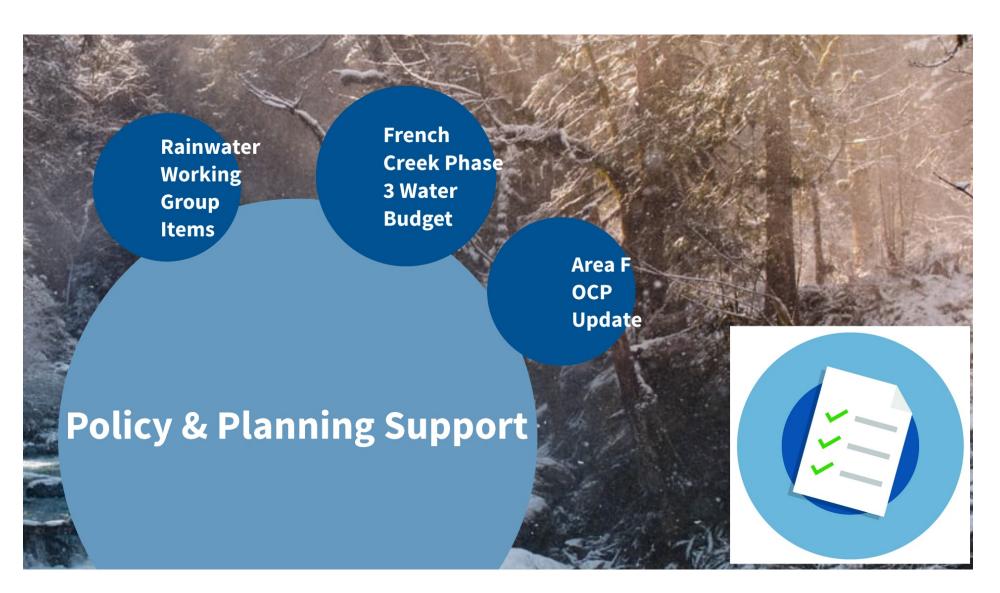
ArcGIS Online - Interactive Water Regions Map

https:// www.rdn.bc.ca/ watersheds



Agricultural Nutrient Monitoring Partnership

Update from Kyle Fukui, Ministry of Environment & Climate Change Strategy



Rainwater Working Group Items

2 main projects this year:

- Rainwater Performance Targets for French Creek Water Region
- Regional Strategy for Rainwater Management



Regional Strategy for Rainwater Management

Regional Strategy for Rainwater Management



Have your say on rainwater management in the region!

WHAT IS RAINWATER MANAGEMENT? It's the management of precipitation and associated strategies to protect the health of watersheds and maintain a predevelopment water balance. Synonymous with 'Stormwater Management. Focused on managing all rain events, not just storms; looks at managing on a watershed scale, for cumulative effects.

WHY IS IT IMPORTANT?

- · To maintain groundwater recharge
- · To mitigate flooding
- · To protect water quality
- · To enhance climate resilience

WHERE DOES THE REGIONAL STRATEGY COME IN?

The objective of the Regional Strategy for Rainwater Management is to provide a collaborative framework to coordinate actions across jurisdictions to effectively use rain as a resource, promote the maintenance of natural hydrologic function and protect the quality of water. This is a regulatory commitment for the RDN, under the Liquid Waste Management Plan. The RDN's <u>Drinking Water and Watershed</u>
Protection program provides the implementation mechanism for strategy and other rainwater related commitments.

HOW CAN YOU GET ENGAGED?

- . Register using the tab at the top of this page
- First: Watch our two **videos** introducing the project
- View our background documents to learn more
 - For more in-depth reviewers: the recommendations PDFs contain fillable areas to



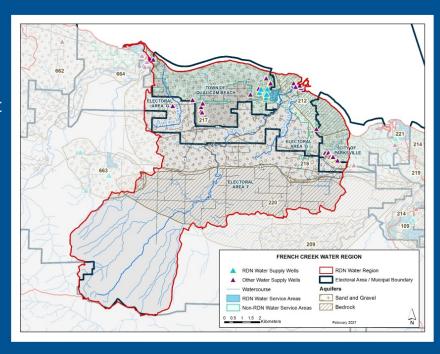


FRENCH CREEK WATER REGION - WATER BUDGET PHASE 3

Update:

- Engaged Golder Associates as the lead consultant
- Next: Meetings with First Nations to initiate project
- Data sharing taking place over the next couple months
- Model development this spring
- Water budget analysis to follow





Area F Official Community Plan Update



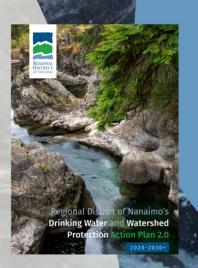
- The Board has passed a motion to restart the Electoral Area F Official Community Plan Review and resume public engagement after being on hold due to COVID
- Policy options are currently being drafted by Planning staff. DWWP staff and reports will be consulted to ensure up-to-date water information is considered and included.
- Examples of policy options include:
 - Aquifer Protection Development Permit Areas
 - Stormwater Management Development Permit Areas
 - Natural Asset Management Bylaws

Public engagement to resume winter 2022

Review of 2021 Workplan

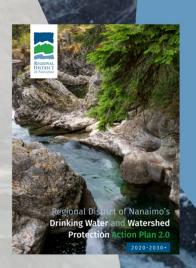
						A 201 (10 to 10 to	and the second second	Section 1
DWWP	DWWP Initiative	Action Detail	Complete	2022	Comment			400
Theme	(* = continuing; ^ = new)	2021						
	5.1.1 Community Based Social Marketing (CBSM) review / redesign of outreach programs ^	Complete & Implement					Action Plan	
	5.1.1 Public research survey for benchmarking on water behaviours, perspectives and priorities ^	Benchmark survey						
	5.1.1 Multimedia outreach^	Video series					Progress	
	5.1.1 Demonstration sites / interpretive signage^	Admin building, Craig Creek, Millstone		_				農
	5.1.1 Youth water leadership engagement [^]	Pilot					Indicators	A SECTION AND ADDRESS OF THE PERSON ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON ADDRESS OF THE PERSON ADDRESS OF THE PERSON ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON ADDRESS OF THE PERSON AN
	5.1.1 Team WaterSmart tours, community events, workshops, school materials, irrigation check-ups*	With CBSM re-design		_			mancators	4
	5.1.2 Expand existing rebate programs*^	Another increment increase					_	45.00
	5.1.2 Explore new rebate for water flow meters for wells^	Push out to 2022 or 2023 >>		_			-	Service of
and Stewardship	5.1.3 Agricultural sector outreach^	Develop			Supported other	agri prgms		100
	5.1.3 ICI sector outreach^	-	-	-	-		1/24	
	5.1.4 Expand seedfunding for restoration projects*^	15% increase					6.00	100
	5.1.4 Water stewardship organizations networking opportunities^	Pilot		_				100
	5.1.5 Support regional water conservation plans*	-	-	-	-			
	5.1.5 Coordinate regional watering restrictions communications	Staff Time					VI.	
	5.1.5 Support small water systems with annual working group session*	Annual Event						-103
	5.1.6 Participate in and coordinate advisory committees*	Update Terms of Ref.					1000	633
								1
	5.2.1 Maintain regional surface water (CWMN) and groundwater (VOW) monitoring*	Equip. replacement plan					The state of the s	
	5.2.1 Hydrometric and climate monitoring partnerships*	>>						158
	5.2.1 Data management *^	GW Data Management System						
	5.2.1 Explore potential for Benthic Invertebrate Monitoring (ie. CABIN)^	Cont. pilot					100	
	5.2.1 Wetland monitoring and mapping *^	Citizen science transition						
	5.2.2 Water budget phase 3*	French Creek Phase 3 WB / Oceanside 100 Yea	r Water Strate	g			1/6	5
Makan Calanaa and	5.2.2 Surface water trend analysis*	Trend Update						373
Water Science and	5.2.2 Groundwater trend anaylsis*	-	-	-	- 1			A >
Information	5.2.2 Quantifying ecosystem services via ecological accounting pilot (in partnership with PWSBC)^		-	-	-		100	1000
	5.2.2 Snowpack modelling^	Yr 2						1000
	5.2.2 Water balance modelling (rainwater management) Linked to 5.2.4	See below in 5.2.4						\boldsymbol{w}
	5.2.3 Interactive water map(s)*^	Update DWWP Website watershed map					24	100
	5.2.3 Data visualization through dynamic graphs^	Groundwater level graphs					1-40	13-
	5.2.3 Publications*^	Push out 1 yr >>			Bumped to 2023		660	7 Dec
	5.2.4 Develop watershed perfomance targets for priority water region^	Start and Finish Project for French Creek					56,40	5
	,							4
	5.3.1 Integrating water information into key long-range planning processes*^	Ongoing Area F OCP, RGS	_				0.50	200
	5.3.1 Provide regional water information to inform referrals from Current Planning and the Province*	Staff Time						100
	5.3.1 Provide regional water information to inform Emergency Services operations*	Staff Time						* 34
	5.3.1 Develop a regional rainwater management strategy^	Develop						200
	5.3.2 Best practices and policy research*^	DETECOP				e, participation in working groups, pa		- Contract

DWWP Progress / Performance Indicators



224012			0.00	TO SHOW AND A SECOND
Theme	PI #1	2021 Comments	PI #2	2021 Comments
				8
		Across 9 RDN Water		-
		Service Areas, a 5.8%		
		reduction in average		2
		water use was		6
		observed from 2019		
		to 2020. Summer		ř.
		water use from 2019		E .
Water Aware	eness Reduction of metered wat	ter to 2021 increased by	Number of Restoration	ě
and Stewards	ship use over time	0.17%	project completed	Four this year
				8
				8
				5
	Number of sites with		Completion of numerical	
	long-term (>3 years) datas	cote	water budget models for	
Water Inform	nation hosted on open Provincial		priority watersheds and	French Creek Water
and Science	platforms	Same as last year		Region initiated
una science	pidioiiiis	Same as last year	uquiicis	negron medica
		Parks & Trails		
	Number of planning	Strategy; Regional		
Water-centri			Number of watershed	French Creek Water
Planning and			performance targets	Region Targets
Policy Suppo	rt information	Management	developed	Developed

DWWP Progress / Performance Indicators



ON THE REAL PROPERTY.				100	THE PARTY OF THE PARTY	THE RESERVE	
Theme		PI#3	2021 Comments	PI #4	2021 Comments		
					GW Level: Regional		
						SW Quality: 1 site	
					improving or stable	improving	
					trends in 8 / 18	turbidity; 4 sites	
					aguifers; 4 / 18	improving DO;	
						78% of sites with	
		Market research survey		Improving trends in	variable trends but	10 years of data	
Water Av	vareness	response indicating		groundwater level and	some wells were either	stable or	
and Stew		improved awareness	providing benchmark		increasing or stable.	improving.	
and stew	diasinp	improved divareness	providing benefitiars	surface water quanty	mereasing or stable.	improving.	
		Continued participation	Wetland Monitoring -				
		of community	3 groups; CWMN - 1	Number of publications	Educational video series	; Factsheet on	
	formation	volunteers in citizen	new group, 14	communicating water	FireSmart/WaterSmart; So	chool Freshwater	
and Scien	nce	science efforts	continuing groups.	science	Education Mo	dules	
			Regional Strategy for				
			Rainwater				
		Implementation of	Management - under		ENV creating a "Stewardship Framework" to		
Water-ce		innovative rainwater	development during		formalize support for community based		
Planning		managment policies and	2021 to be completed		water quality monitoring, modelled after		
Policy Su	nnort	practices	March 2022	with outside agencies	our multi-year pai	at a a sa la la	



NEW PROJECTS

- Riparian Restoration Spatial Analysis
- Implement rainwater performance targets for French Creek Water Region (along with Regional Strategy for Rainwater Management)
- Water Supply Resilience Study (support; led by LRP dept.)
- Environmental Flow Needs Study for Nanaimo R (proposed; requires partnerships to proceed)

2022 DWWP Proposed Workplan Highlights

In addition to ongoing projects & operations.....

NEW OPERATIONS

- Replace turbidity meters (CWMN)
- Water Steward Ambassadors develop pilot
- Research options for new rebate for well flow meters
- Rainwater management related outreach / education

2022 TAC Meeting Dates

