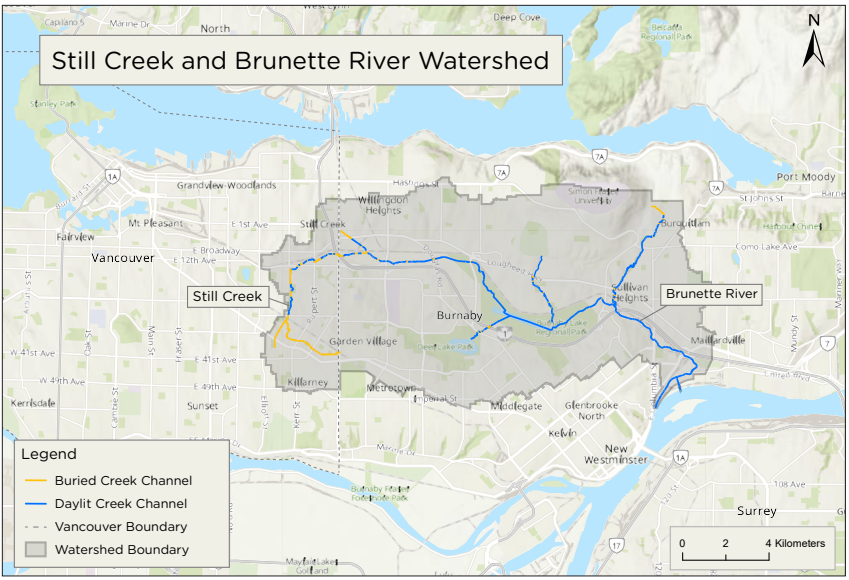
The Brunette River Watershed—Greater Burnaby Lake Ecosystem

The three following articles describe the history, natural diversity and stewardship of the Brunette River Watershed, also named the Greater Burnaby Lake Ecosystem (GBLE). The authors of the three articles, Stephen Partington, Utta Gagel and Robert Butler, offer a visionary pathway to ecological recovery and enduring conservation when individuals, stewardship groups, elected officials and city staff share a vision and work together in a respectful and cooperative manner.

The authors wish to acknowledge that the Greater Burnaby Lake Ecosystem is located on the unceded territories of the xʷməθkʷəy̓əm (**Musqueam**), Sḵwx̱wú7mesh (**Squamish**), səlilwətaɬ (**Tsleil-Waututh**), and kʷikʷəƛ̓əm (**Kwikwetlem**) Peoples. Each Nation has distinct histories and distinct traditional territories that fully or partially encompass the city. We encourage you to learn more about the host First Nations whose ancestors have occupied and used these lands, including parts of present-day Burnaby, for thousands of years.



Brunette River Watershed map. Emphasis is given to the watershed, such that not all parks, conservation lands and tributaries are shown. *Credit: Metro Vancouver Regional District, with thanks to City of Vancouver for base map; modified by Isabel Kunigk, Park Planner, Regional Parks*

The Green History of the Brunette River Watershed

by Stephen Partington

This is the story of the Brunette River Watershed, a drainage system comprising 75 sq km, located largely within the settler City of Burnaby's Central Valley. The basin of the watershed rises upslope onto adjacent ridges that extend into east Vancouver to the south and west, and Burnaby's Capitol Hill and Burnaby Mountain to the north and east. The watershed contains two bodies of standing water (Burnaby and Deer lakes at elevations of 12 m and 20 m, respectively) and six major tributaries (Still, Eagle, Stoney, Guichon and Ramsay creeks, and Deer Lake Brook). Portions of the area drained lie within the jurisdictions of Vancouver, Port Moody, Coquitlam and New Westminster, the latter surrounding where the Brunette River proper flows into the Fraser River.

The Brunette River's watershed has been completely transformed and degraded over the past two hundred years. Modern efforts to correct this commenced in the middle of the last century and are intensifying today.

In the Beginning

The Brunette River Watershed has very deep geological roots that penetrate planet Earth's 13.4 billion-year history. So much geological time has passed and so many huge events have contributed to the emergence of this drainage system. It has only been a blink of a geological eye since humans first came to live in this place. Even though that human occupation started 10–13 thousand years before today, in the human sense of history that still seems to us to be a very long time ago.

And so, our story here begins… as so many do…*Once upon a time*—a very special time—immensely long after the Big Bang, long after light appeared and lit up the cosmos, long after the universal galaxy seeds sprouted, long after our own solar system coalesced into planets, moons and asteroids, long after the Great Meteor Bombardment of Earth, long after liquid water settled on the planet, long after life found its invention, long after the first cells captured an internal space within a micelle[1] of lipid,

1. A micelle is composed of chemical-containing amphiphilic molecules that have both a water-repelling (fat-loving or hydrophobic) tail and a water-loving (hydrophilic) head. The dual nature of the molecules has many biological applications, including the formation of cell membranes.

long after the invention of photosynthesis, long after the Great Oxidation Event, long after the first Snowball Earth, long after living creatures came to share a symbiosis, long after the supercontinent that arose from the sea broke apart under the influence of global warming, increased vulcanism and tectonic plate drift, long after the asteroid that hit Earth wiped out all but a few dinosaurs—when Earth's most recent glacial period, the Pleistocene ice age, was coming to a close a mere 10–13 thousand years ago—there emerged a space, a very special space, alongside the mighty Fraser River close to the eastern shore of the biggest ocean on the planet.

The Brunette River Watershed is located in a geologically active area, influenced by volcanoes, glaciers and quaternary erosion processes. It is located on the Cascadia Subduction Zone, where the Juan de Fuca Plate subsides beneath the North American Continent plate, creating the coastal mountain complex of volcanoes including Mount Garibaldi and Mount Meager. The land was glaciated during the Pleistocene epoch. The glaciers were around 1 km deep, weighing an enormous amount. This weight caused the land to subside to a level under the ocean. Deglaciation occurred approximately 13,000 to 10,000 years ago, with the land rebounding as the weight of the glaciers retreated. The complex deposition and erosional environment of glaciers, ocean shoreline, deltas, lakes and rivers created a unique landscape. As

Chum salmon running the riffles, Brunette River. *Photo: Utta Gagel*

the glaciers retreated vegetation returned to the landscape creating quaternary organic deposits of peat bogs and wetlands surrounded by rain forests.

Some people came to live in this special space. Their townsite was beside the Fraser River, in what we now know as New Westminster. Looking eastward upriver, the Fraser drained the distant mountains and flowed through a long, flat outwash valley before passing by the community and spilling into the salty sea waters in the west. A small salmon-bearing river tumbled off nearby hills, passed through the community and flowed into the great river.

This was a place of extraordinary abundance. Immense trees filled the valleys, hills and mountains. Huge sturgeon and astonishing salmon runs filled the rivers and creeks. Waterfowl, beaver and muskrat were readily harvestable at the little glacial lake not far up that freshwater river that ran through the village. Likewise, resident mammals such as elk, deer, bear, hare, weasel, bobcat and cougar could be hunted in the forests, bogs and on the prairies. Terrestrial plants provided rich foodstuffs plus medicinal, building and clothing materials. Bounties of the sea rounded out a varied, nutritious diet.

Bobcat. *Photo: Utta Gagel*

Abundant food supplies allowed plenty of time for superb cultural complexity. People and place were one. Time stretched back immemorially and forward seven generations, and longer.

Then Something Awful Happened

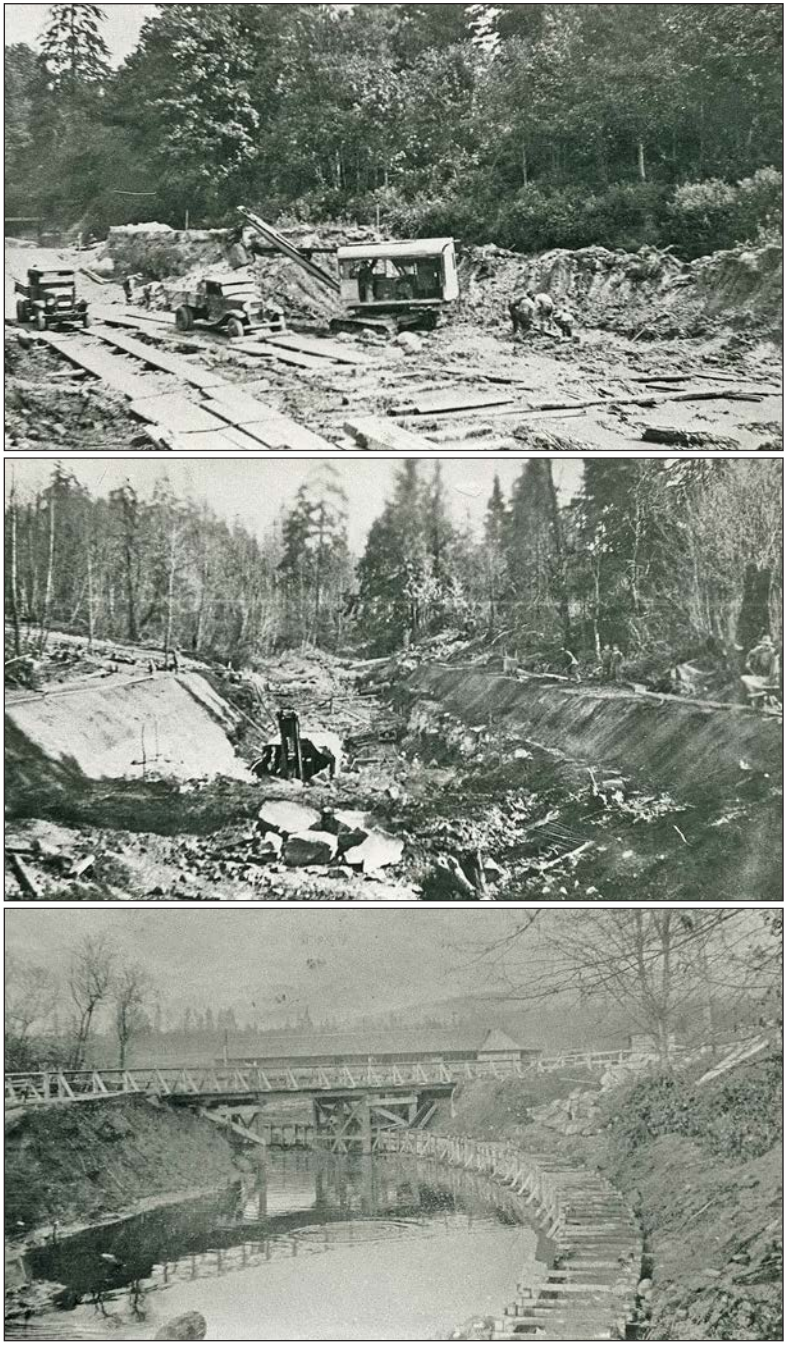
Strange, aggressive, self-proclaimed explorers appeared on the land. At first, they came down the great river, then they came from the sea. They soon set about claiming the community land for themselves and their own people.

A garrison was built to house and protect the military personnel from the so-called savages. Settler allotments were designated, then larger land surveys were initiated to aid in mapping a European-style city.

After a spell, a party was dispatched to explore the little salmon-spawning river that ran through the community. Incredibly, this adventure was undertaken by canoe using Indigenous labour. These local people must have laughed heartily at this mad expedition since they knew full well that the little river was near to impassable by boat due to all the rain forest with its giant fallen tree trunks naturally strewn across and within the waterway. What could have taken that exploratory party three hours or less on foot along forest trails to reach the peat bog lakeside of the waterfowl pantry, took three days of slogging up the little river with their canoes.

Futile efforts aside, what the European venture capitalists discovered during their three-day trip was the vast stands of monstrous timber logs just begging to be bucked up and floated to seaside by way of that river. Of course, all those woody obstructions had to be cleared, the river channelized, and the Cariboo Dam had to be installed at the outfall from what we now know as Burnaby Lake. The dam allowed Burnaby Lake to

People next to a large fallen tree, 1898. *Photo: Burnaby City Archives*



Cariboo Dam construction, 1931. *Middle photo:* Riverbed excavation. *Lower Photo:* Riverbank training. *Photos: Burnaby City Archives*

maintain sufficient headwaters to provide adequate water depth and flow rates for the floatation of timber to the Fraser River, the sawmill blades and the ocean-going export ships. The settlers chose to name this little river the Brunette River.

The Brunette River Watershed was Doomed

Time was accelerated; space was squeezed.

Relentlessly, the resource exploitation advanced roughshod over the special space so long inhabited by the native people. Settler-introduced diseases decimated Indigenous populations. Land was stolen and remnant communities destroyed. People were displaced, disenfranchised, confined to tiny reservations and stripped of their culture, human rights and dignity. Alcohol, readily available from the settlers, hijacked too many formerly free-spirited Indigenous peoples.

Mass export of timber was accompanied by mass catch and export of the Fraser River's salmon runs. The exploitive bonanza was matched, albeit ephemerally, by the insanity brought to bear when the yellow-metal siren played pied piper to thousands of fools who came running to scrabble at placer gold findings upriver on the Fraser. The results were more displacement,

Claude Hill beside a large fallen tree, 1900. *Photo: Burnaby City Archives*

more environmental desecration, more land stolen and more death by disease and murder.

Everything happened so fast. The blink of the geological eye became an increasingly shorter shutter speed. In a flash, the regional settlements became cities that merged, and Burnaby's Central Valley became an industrial complex. Land was cleared, toxins were dumped into the environment, neighbourhoods were built, most of the watershed creeks were channelized with portions piped underground, storm sewers were connected with waterways, and transportation routes (roads, highways, tramways, railways, pipelines) rendered ecological fragmentation upon the landscape.

Clearing Deer Lake frontage, 1891. *Photo: Burnaby City Archives*

Industry Thrived

By 1874 the Brunette Sawmill was starting operations at the convergence of the Brunette and Fraser rivers. By 1904 a crossing built for the Great Northern Railway spanned the Brunette River below the Cariboo Dam, and a BC Electric tramline was built along the southern side of the Brunette River Watershed to the Fraser.

Over the next three-quarters of a century the Brunette River Watershed hosted a smorgasbord of industrial ventures including a distillery, a slaughterhouse, a veneer and plywood manufacturing plant, automotive repair/salvage/wrecking, scrap metal processing/smelting, waste disposal (construction demolition, municipal, recycling, storage and dumping), petroleum product dispensing, and various chemical manufacturing/bulk storage/formulation/recycling trades. A whole suite of toxic chemicals entered the watershed. These included various metals, sulfur compounds, solvents (including benzene, toluene, ethyl benzene, xylene), polycyclic hydrocarbons (from diesel, oils, lubricants, creosote), phenols and chlorinated hydrocarbons, to name a few. The shift to lighter industries in the 1970s brought some relief to environmental toxin loading, but little remediation.

By 1950, the domestication of the Brunette River Watershed extended throughout. The entire drainage system was in large part compromised. All the tributaries in the watershed had

been channelized, piped underground and/or rerouted. Every watercourse had suffered massive erosion from increased peak flows due to the clearing of forested land. Complex flow-abating, bouldered streambeds were cleared of rocks and the gravel scoured. Massive siltation covered over the few remaining spawning gravel beds throughout the watershed. Few salmon ventured up the Brunette River, and none could get past the Cariboo Dam just below Burnaby Lake. Only a few fish could potentially spawn in the lower reaches of Stoney Creek, a tributary that joins the Brunette River downstream from the dam.

Then Something Wonderful Happened

The times, they were a-changing! The long-lagging, environmental consciousness-raising movement was beginning to spill over into mainstream popular culture.

As early as 1953 there was governmental interest in dedicating parkland in the Brunette River Watershed. This was reflected in a report titled Natural Background of Burnaby Lake. The lake's general peat bog ecosystem was recognized, and the increasing eutrophication of the lake-bog ecosystem was noted.

By 1969 the Sapperton Fish and Game Club was progressing with its efforts to rehabilitate

Chum and coho salmon, Brunette River. *Photo: Mike Pearson*

portions of the watershed through hatchery-raised salmon fry release and habitat restoration activities. In 1984, the salmon thankfully returned to the Brunette River after a lapse of more than thirty years.

Chum salmon male, Brunette River.

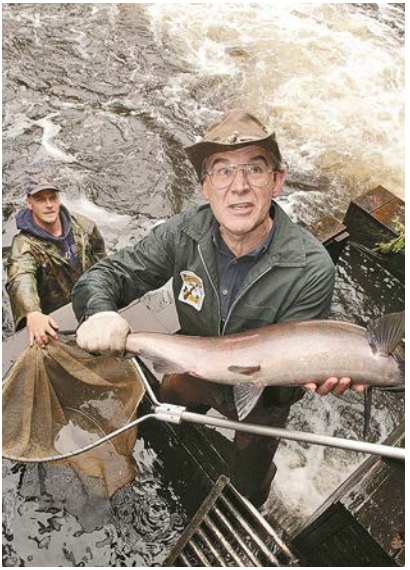
Chinook (top) and coho (bottom) salmon fry, Brunette River. *Photos: Mike Pearson*

By 1972, the group known as the Burnaby Lake Park Association (BLPA) morphed from 'The Group of 10', a citizen advocacy group that included the longstanding Nature Vancouver member Joe Sadowski. From the current (2025) BLPA website Joe, as a founding member, was quoted:

> In the late 1960s, Burnaby was running into problems with disposal of garbage. So the idea was that they would use this area as a garbage dump. Our group became very active politically; our plan was to preserve this lake. Our group became known as the Burnaby Lake Park Association. I've been volunteering in this park for about 45 years. It makes me feel good to see how the park is being used. I could not imagine it being a garbage dump. It is a very pleasant surprise to see the number of people using it.

In the spirit of another quote from the BLPA website, this one from Margaret Mead, "Never doubt that a small group of thoughtful, committed, citizens can change the world. Indeed, it is the only thing that ever has."

The BLPA founding members set about creating a Burnaby Lake park through stewardship, trail construction and habitat enhancement; in particular, the erection of Wood Duck nest boxes. Between the Sapperton Fish and Game Club and the Burnaby Lake Park Association, the public advocacy for habitat restoration in the Brunette River Watershed was accelerating. Time began stretching again toward the future and space



Elmer Rudolph and Bob Henderson helping a salmon through the fish weir at the Cariboo Dam, Brunette River, 2002. *Photo: Mario Bartel*

Cariboo Dam Fishway. *Photo: Utta Gagel*

was again beginning to expand. In 1981, these two groups combined in the creation of the first fish ladder bypass of the Cariboo Dam at the outfall from Burnaby Lake into the Brunette River.

At the turn of the century, three important governmental documents were published that set the stage for the initiation of further remediation efforts within the Brunette River Watershed. In 2001 the Greater Vancouver Regional District (GVRD) produced an information sheet outlining a Brunette Basin overview. This was followed by the City of Vancouver in 2002 undertaking a Still Creek Rehabilitation and Enhancement Study. Later an undated Still Creek Integrated Stormwater Management Plan was published, followed in 2006 by a report on sedimentation throughout the Brunette Basin.

A huge leap forward in Brunette River Watershed remediation came in 2011 with the Cariboo Dam fish ladder replacement. Northwest Hydraulic Consultants teamed up with Metro Vancouver to design and construct a flume with 12 internal step-pools and three upstream slotted weirs. These structures allowed fish to climb around the three-metre rise of the dam at all lake levels. In 2012, chum salmon were spotted in Still Creek for the first time in 80 years.

Coincidental with the renewed fishway project at Cariboo Dam was the construction by The Transportation Investment Corporation of the Upper Brunette River Mainstem Habitat Enhancement Project (BMEP) and the Upper Brunette Perched Pond Habitat Enhancement Project (PPEP). These two related projects were Department of Fisheries and Oceans conditional considerations for authorization of the Port Mann/Highway 1 Improvement Project. The BMEP and PPEP resulted in enhancement of approximately 4,480 sq m of instream and 1,275 sq m of riparian fish habitat. Included in the instream component was the creation of 1,165 sq m of Nooksack dace habitat. Construction of the PPEP was completed in fall 2011 and the BMEP was completed in fall 2012. Follow up remediation assessment of these efforts was contracted to the Pacific Salmon Foundation who retained Pearson Ecological Inc. to undertake this work. The outcome of six years of results from these two projects were mixed. There were some positive results regarding habitat in the mainstem, but fewer for the perched pond system.

The undertaking of BMEP and PPEP, as well as the renewed fishway project, led the way for the rising ecological prominence

From the top: 1) BC red-listed endangered Nooksack dace. 2) Nooksack dace, for the count. 3) Gravid (with eggs) Nooksack dace. *Photos: Mike Pearson*

in more recent times of the Cariboo Heights Forest Preservation Society and the Stoney Creek Environment Committee. Combined, these two non-governmental organizations have greatly impacted municipal

Prickly sculpin, a common freshwater ambush predator. *Photo: Mike Pearson*

politics in the City of Burnaby. In Vancouver, the Still Moon Art Society has helped with restoration work and public interests along the headwaters of the Brunette River, Renfrew Ravine and Still Creek.

Later yet, in September of 2025, Metro Vancouver put out a call for public engagement in the development of the Burnaby Lake Regional Park Management Plan. For more information and to sign up to receive updates: **https://metrovancouver.org/services/regional-parks/burnaby-lake-regional-park-management-plan**

With time, a special place of extraordinary abundance is emerging again in the Brunette River Watershed.

Stephen studied botany, agriculture and microbiology, then did research in healthcare sciences after earning a MSc at Queen's University. He joined Nature Vancouver in 1987 and soon co-chaired the Conservation Committee with Kevin Bell and helped with establishment of Surrey Bend Regional Park. His volunteer work with nature organizations includes Boundary Bay Conservation Committee, Friends of Cypress Provincial Park, Stanley Park Ecology Society and NatureKids BC (he's an honourary life member of the latter two). He has served on the BC Naturalists Foundation since 2016 including as president for five years and currently serves on Nature Vancouver's Finance and Scholarship Committees.

The Greater Burnaby Lake Ecosystem:

Stewardship Work in the Central Valley—the Green Heart of Burnaby

by Utta Gagel

The combination of strong nature-based advocacy, receptive municipal politicians and supportive residents since the 1960's, has resulted in the City of Burnaby being one of the greenest cities in Canada. Citizens are justifiably proud that one-fourth of Burnaby's area is protected as park and conservation lands. The 2,400 hectares of parks cover an area six times the size of Vancouver's Stanley Park.

Many of the larger parks are in Burnaby's Central Valley—a large landscape basin with Burnaby Lake at its centre and the rim following the height of land along Hastings Street and Burnaby Mountain to the north and 10th Ave and Kingsway to the south. Most parks are adjacent to each other and create a large connected natural area centered around Burnaby Lake. One can refer to this area as the *Green Heart* of the Greater Burnaby Lake Ecosystem (GBLE), the latter extending into the municipalities of Vancouver, Coquitlam, Port Moody and New Westminster. This natural area in the middle of Metro Vancouver is large enough to support populations of black bear, bobcat, beaver, river otter, mink and endangered Washington snowshoe hare. More than 200 species of birds have been documented in the Central Valley and a significant number of migrating waterfowl and shorebirds rest and feed using the lakes and wetlands in this area.

People assume that city leaders, following incorporation in 1892, recognized the significance of remarkable natural areas such as Burnaby Lake, Burnaby Mountain and the Brunette River, and that the city leaders designated them as parks. Nope! At the time, settlers in the area saw only trees to cut, fish and game to harvest, land to farm and places to dump waste. These special places are protected today because passionate conservationists in the past saw beyond their degradation. Small groups of citizens worked tirelessly to lobby councillors and city staff to designate these areas as parks. These same groups also removed garbage and invasive plants to allow nature a chance to regenerate.

Burnaby's Central Valley is also critical and essential for human activity. Over 100,000 people live here.

Burnaby Lake with Lougheed Mall towers in the distance. *Photo: Utta Gagel*

Two major transportation corridors bisect the natural 'Green Heart' areas in the Central Valley. Trans-Canada Highway 1 is used by more than 150,000 vehicles daily and the CN Railway runs 15–25 trains a day, moving 40 million tonnes of export cargo annually.

There are also three energy corridors in the Central Valley: the twinned Trans Mountain Pipeline (TMX) leading to the Burnaby Mountain tank farm, a jet fuel pipeline to the Vancouver International Airport (YVR) and a BC Hydro high voltage transmission corridor. The tank farm consists of twenty-six tanks, halfway up the southwest side of Burnaby Mountain, surrounded by forest on one side and residential neighbourhoods on the other. The tank farm stores up to 5.5 million barrels of fossil fuels from the Alberta tar sands which have been pumped through the TMX pipeline. For context, 5.5 million barrels would fill 29,000 average fuel tanker trucks. Most of the product is diluted bitumen along with some light crude and gasoline. The stored fuels are either delivered to the Parkland Refinery for processing, or shipped by tankers out of Westridge Marine Terminal for foreign export.

Much of Burnaby's industrial land is also found in the Central Valley along the north side of Burnaby Lake and both sides of Still Creek. As well, two large post-secondary campuses are located here: the British

Volunteers plant native plants after removing the invasive intruders.
Photo: Utta Gagel

Columbia Institute of Technology (BCIT) along Guichon Creek on the south side of the valley and Simon Fraser University (SFU) to the north on top of Burnaby Mountain.

The Central Valley is a busy place for both nature and people! City of Burnaby staff and council are tasked with protecting nature and operating a large city to meet human goals that include increasing the supply of affordable housing, providing space for recreation, and supporting the economy by retaining industrial lands and transportation corridors. All of this against the backdrop of increasing effects of climate change and economic challenges.

Stewardship and streamkeeper groups are key partners with municipal staff to protect nature. Volunteers spend thousands of hours each year in the Central Valley. They support research at the University of British Columbia (UBC), SFU and BCIT. Volunteers monitor water quality in local creeks, survey benthic invertebrates and juvenile fish, count spawning salmon, participate in Christmas bird counts, and remove invasive plants to plant native ones.

Most importantly, these groups endeavour to educate and engage the digitally-obsessed public with nature so that more people care about the natural world around them.

The following sections describe how citizens in the GBLE have: helped protect an outstanding forest (Cariboo Heights Forest), restored habitats after encampments, monitored the extent of road salt contamination in local streams, focused academic and public attention to its effects on

stream ecosystems, and worked with development companies and municipalities to reduce spills into storm drains and fish-bearing streams.

A Forest Worth Preserving

The Cariboo Heights Forest, Burnaby's "Secret Forest" will soon be the newest park in Burnaby. This 100-year-old second growth forest is located south of the Brunette River, east of Cariboo Road and west of North Road. Formerly a forest of towering Douglas-fir and western redcedar, it was logged at the turn of the last century and still contains the stumps of giants, notched with springboard marks. Now covered in a mix of stately bigleaf maple, black cottonwood, western redcedar and western hemlock, the Cariboo Heights Forest holds the last traces of the Burnaby Lake line of the BC Electric Railway. This line was completed in 1911 to connect Vancouver and New Westminster and ran along the south shore of Burnaby Lake, where Highway 1 is now located. Interurban cars operated on this line for 40 years, moving commuters, freight and produce. Imagine—electrified public transit built more than a century ago!

By 1950 the BC Electric Railway was faced with the cost of modernizing its aging tracks, trolleys and electrical lines. Instead, they decided to purchase electric trolley buses to run on roads and decommissioned the

Cariboo Heights Forest. *Photo: Utta Gagel*

existing interurban rail lines throughout Metro Vancouver. The railway ties and overhead power cables in the Cariboo Heights Forest are long gone but the moss-covered stumps of power poles and wooden culverts can still be seen along the right-of-way trail, where the occasional rusty railroad spike is uncovered during winter rains.

BC Hydro built a high voltage transmission line through the Cariboo Heights Forest in the early 1950s. More recently, the forest was largely forgotten except for adventurous kids who built forts, hunted crayfish in the creeks and rode their bikes on dirt trails. Artesian springs bubbled up through sandy pools in several spots—water clean enough to drink right out of the ground.

In the 1980s, the City of Burnaby looked at the forested lands on the south rim of the Central Valley and saw an opportunity to create new subdivisions. Development plans for housing and roads were overlaid on maps without consideration for the topography, drainage or effects on the Brunette River. The city approved development plans in 1987 for the north side of Cariboo Hill to within a 50 m setback of the Brunette River.

The Sapperton Fish and Game Club are longtime stewards of the Brunette River. Although the river was considered dead, they began removing garbage from the river in 1969 and then in the 1970s worked with the Department of Fisheries and Oceans (DFO) to take legal action against industrial polluters. The water became clean enough for spawning coho salmon to return in 1984. Sapperton Fish and Game Club were very concerned about the effects of Burnaby's planned development. They

Ancient Grove Creek still flows through a durable wooden culvert which was installed in 1911 under the Burnaby Lake Interurban Railway. The reddish tinge of the creek water is from small living tree roots. During summer droughts, these roots absorb water from the creek. *Photo: Utta Gagel*

informed the city of a group of old-growth trees along an old oxbow of the river that had survived logging—large Sitka spruce and western hemlock that are now about 200 years old. You can see these trees today if you walk along the Central Valley Greenway (also known as Metro Vancouver's Brunette-Fraser Regional Greenway) and look south across Brunette River. Consultants hired by the city to document the trees found that these were healthy, large trees, protected from windstorms by the surrounding forest and sustained by seepage from the forested slopes above. They noted that low elevation trees of this size were rare in Metro Vancouver and probably otherwise limited to Stanley and Lighthouse parks. Burnaby Council recognized that these trees needed to be protected and instructed staff to revise the development plans to provide a greater buffer zone.

Sapperton Fish and Game Club members were also concerned that development would increase the 'flashiness' of the local creeks; that is, how quickly a creek's water level rises and falls in response to rainfall. As a watershed is developed and forest is replaced with impervious surfaces such as roads, homes, driveways and sidewalks, much greater volumes of water are funneled through storm drains into local creeks when it rains. Greater amounts of water undercut stream banks, destabilize trees along the banks, wash away aquatic invertebrates and increase siltation in the Brunette River. All of which combined is very detrimental to the survival of salmon eggs in the river gravel and coho smolts that live in the river for their first year.

Another issue was that development on Cariboo Hill would result in more human activity along the south bank of the Brunette. People would create new trails, trample vegetation, compact soils, inadvertently spread invasive plants, and bring their dogs to play in the river disturbing wildlife, especially trout and salmon resting under shady banks on the river's south shore.

The City of Burnaby committed to addressing these concerns and worked with the DFO and provincial Fish and Wildlife staff as they approved a revised plan that designated a smaller area (27 hectares) of forest for housing development.

Development took place in the 1990s but only on the upper half of Cariboo Hill. Fortunately, the development closer to the river never proceeded, although the development plan stayed on the books until 2025. As people moved into the new homes in the subdivisions and drove along Cariboo Road, they mistakenly

assumed that the remaining forest was protected parkland.

In 2015, a small group formed Cariboo Heights Forest Preservation Society (CHFPS) with the goal of advocating for the protection of the remaining forest. Members collected hundreds of signatures in favor of preserving the forest as a park and presented the petition to Burnaby's Planning and Development Committee in 2017, but the committee was unmoved. A senior staff member, who watched the presentation, suggested that the CHFPS could make a stronger case for preservation by documenting biodiversity and increasing public awareness of the ecological importance of this area.

Political change was in the air in 2018. Derek Corrigan had served as Mayor of Burnaby for 16 years, but residents were upset by the evictions of renters from affordable older apartment buildings around Metrotown to make way for the construction of condo towers. Rent in the new towers was unaffordable for many vulnerable people who struggled to find alternate housing. Mayor Mike Hurley and Green Party candidate Joe Keithley (DOA punk rock band) were elected with a mandate of stopping renovictions and creating more affordable housing.

CHFPS board, under the leadership of Co-presidents Aruna Khan (artist and community advocate) and Utta Gagel (retired elementary school teacher) worked hard to create positive relationships with Mike Hurley, Joe Keithley, Alison Gu and other councillors. Mayor Hurley saw the value in protecting the Cariboo Heights Forest and reminded our board that politicians need public support and pressure to make big decisions to protect land worth hundreds of millions of dollars if developed.

Pacific jumping mouse, Cariboo Heights Forest. *Photo: Utta Gagel*

Over the last seven years CHFPS has been focused on documenting biodiversity, raising public awareness and support for forest preservation. Grants from the BC Naturalists'

Foundation funded the development of the CHFPS website and the purchase of two wildlife cameras. The videos captured of bobcat, coyote, black bear, raccoon, flying squirrel, short-tailed weasel and Pacific jumping mouse are amazing!

Most notably, the cameras documented the presence of the endangered Washington snowshoe hare (BC red-listed).

This subspecies of snowshoe hare retains its brown coat in the winter instead of molting to white fur. They live in low elevation forests along the Washington and Oregon coast, and the Fraser Valley is the northernmost part of their range. Development and resulting loss of habitat has caused it to be extirpated from most of its former range. Burnaby's only previously known population of Washington snowshoe hare was at Burnaby Lake Regional Park, with sightings on the northeast and southeast sides.

Our iNaturalist "Cariboo Heights Forest Biodiversity Project" has compiled more than 3,200 observations, documenting the presence of 526 species. The CHFPS also partnered with BCIT Fish Wildlife and Recreation program to support two student capstone[1] projects here. One of the projects, "i-Tree Ecosystem Services and Baseline Inventory of Small Mammals, Vegetation and Fish in Cariboo Heights", documented the value of ecosystem services provided to the city by this forest.

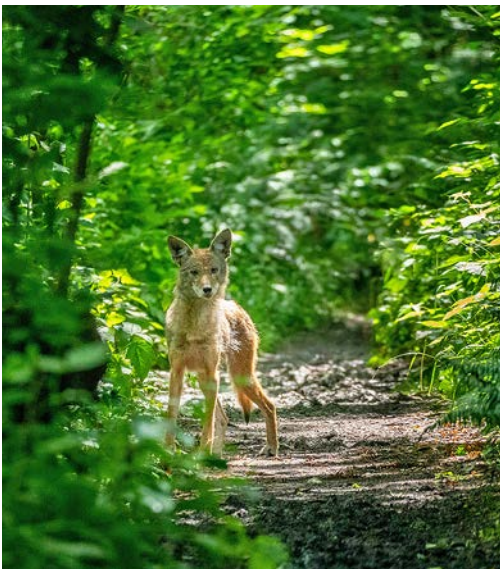
The Environment Committee at the City of Burnaby contracted a consultant in 2023 to write an environmental assessment on the Cariboo Heights Forest. Their report included all

1. Capstone: a student research project designed to put in practice the knowledge and skills acquired throughout their academic careers to solve real-world problems or issues.

Washington snowshoe hare, Cariboo Heights Forest. *Photo: Utta Gagel*

of the biodiversity data. This report was key to the Environment Committee's recommendation to City Council that all of the Cariboo Heights Forest be protected.

In response to the lack of affordable housing and BC's projected population growth, the provincial government passed two bills in 2023: Bill 44-the Housing Statutes Amendment, and Bill 47-Housing Statutes (Transit-Oriented Areas) Amendment Act. These two pieces of legislation aimed to increase affordable housing by increasing density, particularly within 800 m of Skytrain stations, and allowing multi-unit housing in areas previously zoned for single-family homes. Burnaby undertook the "Burnaby 2050 Project" to update its Official Community Plan and land use maps to conform to the legislation. The renewed OCP was officially approved in December 2025 and will manage the City's growth over the next 25 years setting forth goals and policies especially to deal with the challenges of housing affordability, climate change and adaptation.



Coyote pup on the Interurban Trail through the Cariboo Heights Forest. *Photo: Utta Gagel*

Concurrently, Metro Vancouver's Climate 2050 Road Map set a goal to protect 50% of the region for nature; currently 40% is protected. The goals are to protect green infrastructure, stormwater management and carbon sequestration, preserve native biodiversity, increase canopy cover to cool urban areas, and to promote human health and well-being. All municipalities in the region are expected to do their part to protect more of nature in its natural state to achieve this goal.

All these threads came together and made it possible for the City of Burnaby to propose protecting the Cariboo Heights Forest as part of the draft OCP. Concentrating increased density around Skytrain stations and allowing greater density in all neighbourhoods has reduced the pressure to develop this forest for housing.

The documented biodiversity in the forest, the importance of the forest to maintaining healthy fish populations in the Brunette River and its connectivity to other parks in the Central Valley all pointed to the importance of its preservation.

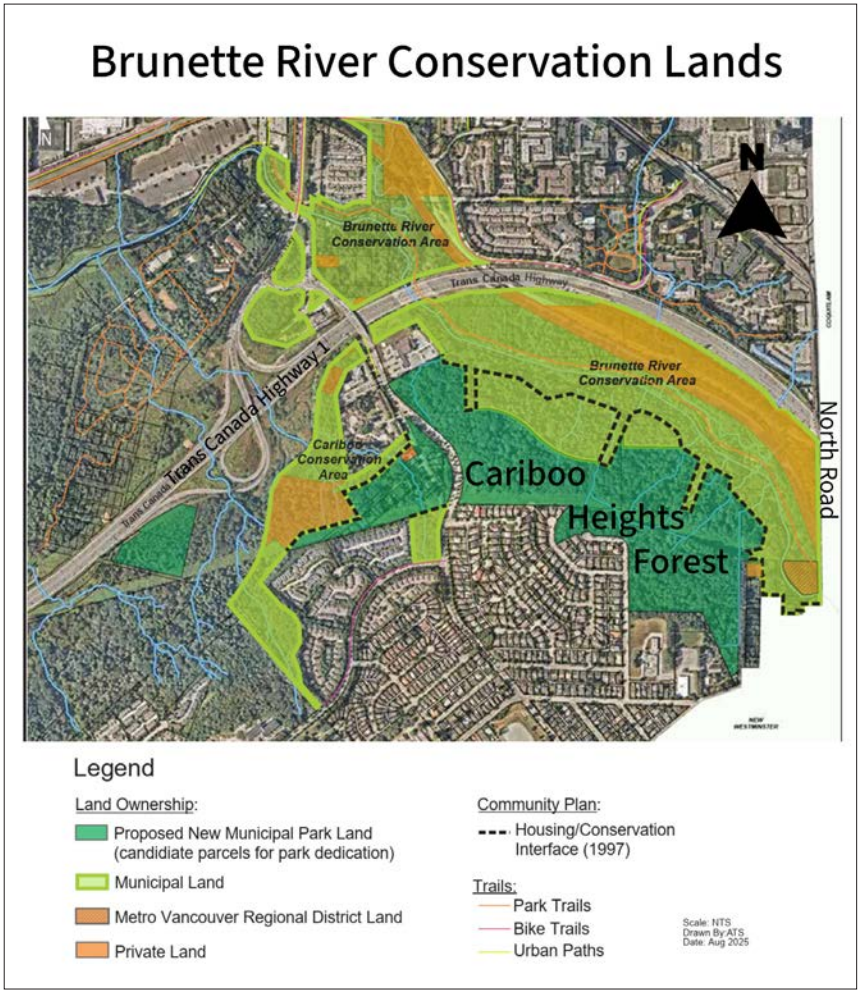
Planning staff in the City of Burnaby told the CHFPS that the council needed to hear "loud and clear" that the public supported preservation. We used our booth at public festivals such as Burnaby Blooms, Burnaby River's Day and the Great Salmon Sendoff to inform the public. Families were engaged at our craft table where children created a nature necklace while we chatted with parents. We encouraged people to write postcards and emails to the city in favor of preserving the Cariboo Heights Forest. The city received hundreds of messages in support!

ALL THIS WORK PAID OFF! At the City of Burnaby council meeting on 9 September 2025, Mayor Hurley made a motion to direct staff to undertake the necessary steps required to dedicate additional portions of the Brunette River Conservation Area as park for long-term protection. Council voted unanimously in favour of preserving these lands for their ecological, recreational and cultural benefits to current and future generations!

Public post card to City of Burnaby Mayor. *Photo: Utta Gagel*

Restoring Habitat After Encampments

For those people who are facing challenges of unemployment, mental health and substance abuse, it is an almost insurmountable problem to find safe, affordable housing. Eschewing shelters and Single Room Occupancy housing, many of these people find refuge in the natural areas throughout Metro Vancouver. Some are single people in tents, while others form encampments. The environmental impacts are



City of Burnaby map. *Graphic work: Utta Gagel*

large. Shrubs and trees are cut down to make space for tents and tarp shelters. Soils become compacted and are easily eroded in heavy winter rains. Human waste causes surface and groundwater contamination, and campfires increase the risk of wildfires. People living in the encampments amass a lot of stuff and garbage, most of which is left behind when they move on.

The City of Burnaby has formed a Mayor's Task Force and implemented a homelessness strategy. Intervention Support workers connect unhoused people with resources and assist with finding shelter or housing. In collaboration with various agencies

and other levels of government, Burnaby is addressing homelessness, closing and cleaning up encampments. However, people have been living in Burnaby's green spaces for a long time and there are many abandoned camps that the city doesn't know about.

Carl Ronka is a Coquitlam resident and organic Master Gardener. He spends a lot of time foraging plants and fungi in Metro Vancouver's green spaces. These explorations led him to discover many trash dumps in local forests. Some trash is illegally dumped construction waste, but much is the detritus of abandoned homeless encampments. These discoveries solidified his belief that wildlife deserve to live in healthy habitats and that he needed to do something about it. At first, Carl worked on his own to pull garbage out of the woods but soon realized that he needed help. He started a small not-for-profit called "Web of Life" where he shares his work on social media to recruit volunteers to help with cleanups. He relies on donations to buy work gloves and trash bags. Recently he has partnered with another charity, Captain Scott Legacy Society, in his mission to clean up local ecosystems.

Carl and volunteers have cleaned up more than 15 encampments along the Brunette River, Deer Lake, Robert Burnaby Park and the Cariboo Conservation Area. Several of these abandoned encampments have been there for decades, as observed in 2008 satellite photos. It is grueling work to free up old, tattered tarps, sodden mattresses and sleeping bags, clothing, coolers, propane tanks, broken glass, needles, burnt wires, electronics, and an overwhelming amount of plastic garbage.

Encampment trash.
Photo: Carl Ronka

Sites that have been abandoned for years are covered with leaf litter and fallen branches which need to be moved before the trash can be pulled out. Smaller items are bagged and then dragged through the forest to the nearest roadway so that municipal staff can take it to the transfer station.

Bagged trash after clean-up. *Photo: Carl Ronka*

Carl estimates that he has removed about 2,000 kg of trash from the Central Valley, but the work is not yet finished. There remain at least eight sites along Still Creek that are on the list to be cleaned up.

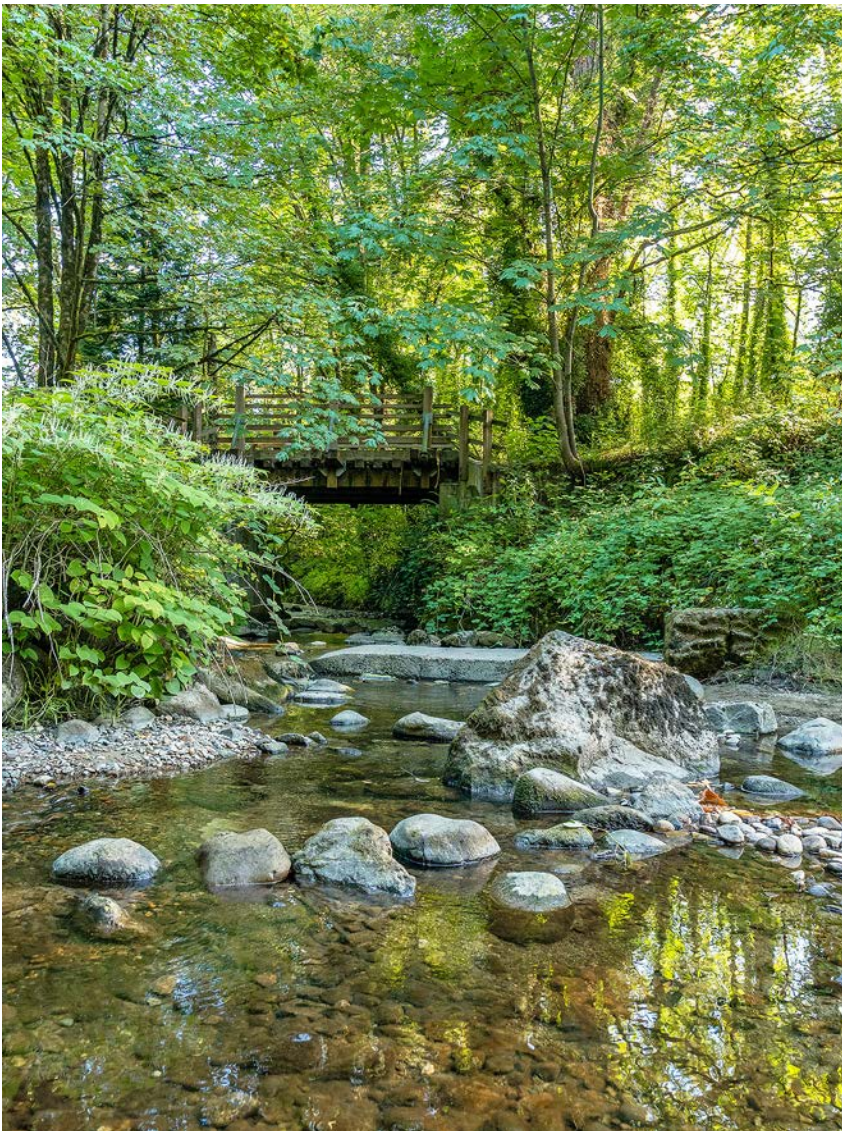
Years ago, Carl took a temporary construction job. Partway through a mind-numbing workday, he just walked away from the worksite, pulled by the desire to check out the plants growing along a nearby forest trail. That experience was a sign for Carl that he needed to work in nature rather than at a traditional job. He dreams of being able to create a youth employment organization that focuses on cleaning up nature and restoring ecosystems.

Carl thinks that there should be a two-tiered approach to managing homelessness. People need safe housing options and addiction treatment. There must also be support and incentives for people living in encampments to remove waste and minimize their impact on nature. Potentially, unhoused people could be offered training and meaningful work in ecological restoration.

When Road Salt Meets the Stream: Salmon at Risk

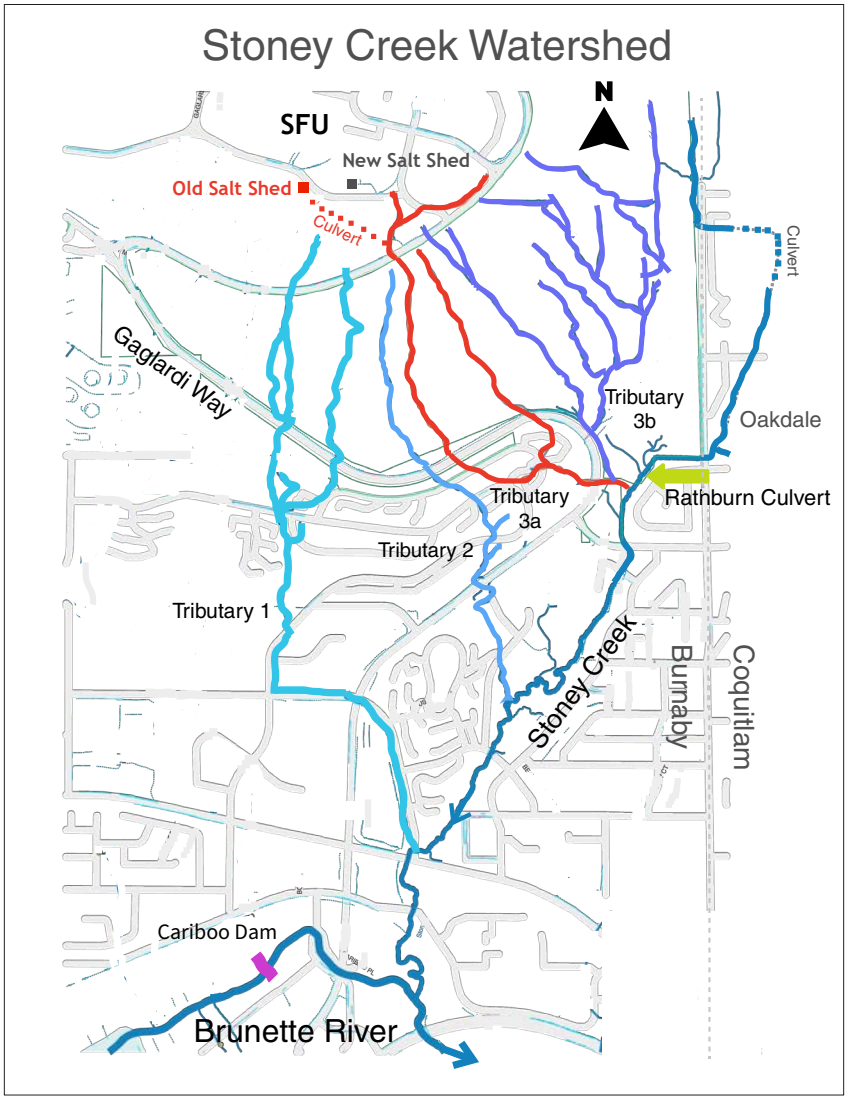
Stoney Creek is a major salmon spawning and rearing creek that empties into the Brunette River. The creek drainage covers 26 sq km spread over parts of three municipalities: Burnaby, Port Moody and Coquitlam.

Today, Stoney Creek is home to the endangered Nooksack dace, western brook lamprey, three-spined stickleback, cutthroat trout, spawning chum and coho salmon, as well as coho fry during their first year of life. This is an amazing fish diversity, especially when considering that salmon had been absent from this creek for almost 50 years until their return in 2004. Much of the



Stoney Creek. *Photo: Utta Gagel*

credit for their return goes to Jennifer Atchinson, an Early Childhood Educator, volunteer coordinator and avid bird watcher. She loved the Stoney Creek watershed and after her retirement in 1994, she focused her energy on remediating the creek's degradation. It irked her that the many parties who had rights-of-way and other interests in the watershed were not considering their impacts on



City of Burnaby Map of Stoney Creek with tributaries.
Adapted map: Alan James and Utta Gagel

Stoney Creek. [See Society links at end of article]

Stoney Creek Environment Committee (SCEC) came into being in 1995 through her efforts. Jennifer brought together a team composed of volunteers from the community and students from local schools. She drew people in with her irrepressible enthusiasm and then quickly took stock of their abilities to assess how they could help her achieve her goals to protect and restore Stoney Creek. One of these volunteers was Vladimir Soukhatchev, a fish biologist.

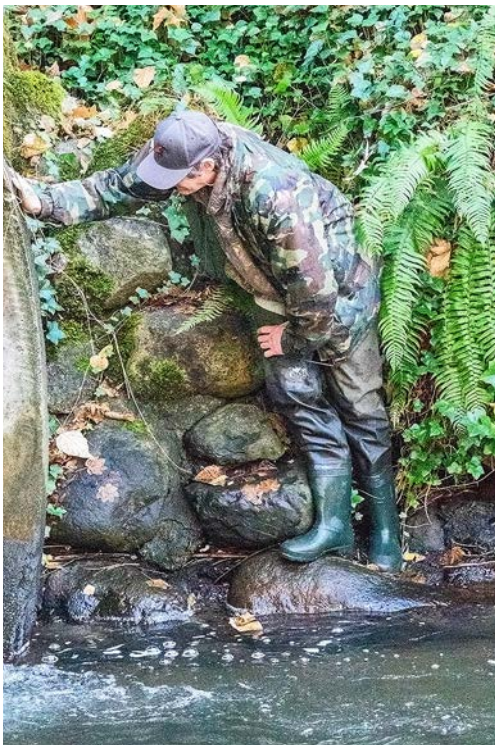
He was concerned about water quality in Stoney Creek and took water samples over four months at 19 locations. He found that one tributary of Stoney Creek had consistently high conductivity levels. Conductivity is a measure of the amount of dissolved salt ions in the water. Some sleuthing led him to the SFU road salt storage shed as the source of the salt. The ground around the shed was saturated with salt. Every time it rained, dissolved salt would flow through cracks in the concrete pad around the shed into the groundwater. SFU wasn't convinced by Vladimir's work that salt contamination was a big environmental problem, certainly not enough to warrant the cost of rebuilding the salt shed.

Vladimir then conducted an instream study using chum eggs. One set of trays was placed in a "clean" tributary with low conductivity levels. The other trays were placed in the tributary draining from the salt shed (tributary 3a). The alevins that hatched from the eggs in the contaminated tributary hatched earlier, had greater mortality and were smaller in size compared to the alevin in the clean tributary. Concurrently, Vladimir measured conductivity with a data logger and found that there were many spikes in conductivity that exceeded the BC Water Quality Guidelines for Sustaining Aquatic Life. His work paid off in 2009 when the BC Ministry of Environment ordered SFU to take action to prevent further contamination of Stoney Creek.

In 2011, SFU spent $1 million to build a new impervious salt shed at a different location and adapt its snow and ice removal to reduce salt contamination. As a result, SFU was able to use significantly less salt. From 2011–2016, they used an average of 253 tonnes of road salt per winter, compared to the average of 955 tonnes of salt used each winter from 2005–2009. However, SFU still uses a lot of road salt in winters with heavy snowfall. During the winter of 2017, 759 tonnes of road salt were used on campus roads and parking lots. This is a lot of salt and all of it

dissolves in the rain, to then be washed into local creeks and streams where it impacts aquatic life.

Sadly, after two decades of leadership, the Stoney Creek community lost Jennifer Atchinson to cancer in 2010. John Templeton, a volunteer with SCEC since 2004, stepped forward to take over as president. John grew up in Northern Ireland and loved fishing through outings with his dad. In 1992, he moved to a Burnaby neighbourhood adjacent to a tributary of Stoney Creek and soon became involved in streamkeeping with SCEC. He took over water quality monitoring from Vladimir. Over the next five years, John took daily conductivity and temperature measurements from tributary 3a.



John Templeton monitoring Stoney Creek. *Photo: Utta Gagel*

He collected a total of 1,400 samples. This data showed that salt contamination was ongoing. The typical pattern was low conductivity measurements during the rainy fall and spring, high spikes in the winter that exceeded guidelines for acute chloride (600 mg/L Cl^-), as a result of salting roads (BC Guidelines for Chloride). During the summer, conductivity was high (near or exceeding BC's chronic guideline for chloride of 150 mg/L Cl^-) and steady, indicating salt contamination of groundwater. Worryingly, groundwater contamination seems to be increasing. SCEC believes that the salt contamination comes from three sources: road salt used in the winter, salt leaching out of the ground around the old salt shed and salt in the soil around all the parking lots.

Alan James is another energetic member of SCEC. Born in 1939, it's hard to guess his age when meeting him. Alan still regularly walks 12 km around Burnaby

Lake and works out at a gym. He is a retired geophysicist and computer consultant who worked for the oil industry in Alberta, doing seismic surveying where he had a firsthand view of the environmental damage done by oil exploration. When Alan moved to Burnaby in 2000 to be closer to family and his grandchildren, he was quickly recruited by Jennifer Atchinson to assist with processing the conductivity data that Vladimir and John were collecting. Searching through scientific literature, Alan found that road salt contamination isn't just a local problem; the amount of road salt used is increasing around the world. In 2001, Environment Canada listed road salt as a toxic substance under the Canadian Environmental Protection Act. However, due to lobbying from the industry and concerns about public safety, the federal government did not ban the use of salt. Instead, Environment Canada collaborated with industry to introduce a Voluntary Code of Practice in 2004. Environment Canada wants road maintenance organizations to identify areas that are vulnerable to salt and prepare action plans to protect these areas, but to date, only about 20% of organizations have complied.

Alan discovered that there were few studies that had researched the effect of salt pulses on Pacific salmon. He reached out to researchers at UBC, SFU, BCIT, DFO and the Pacific Science Enterprise Centre (PSEC). Dr. Chris Wood at UBC led a consortium to submit a research proposal to the National Science and Engineering Research Council of Canada (NSERC) Alliance program. The proposal, "The Impact of Road Salt on Pacific Salmon Success", was supported by seven researchers, nine graduate students, and 13 stewardship groups (four of which are based in Burnaby's Central Valley). The application was successful and awarded five years of funding.

The project's goal is to determine the impact of road salt on the development and physiology of coho and chum salmon and the benthic invertebrates on which they feed. The group has deployed 37 automatic conductivity loggers in 28 creeks across the lower mainland. The stewardship groups monitor the data loggers and conduct semiannual benthic invertebrate and larval fish surveys. Researchers at the three institutions are conducting field and laboratory experiments to determine the toxicity and effects of salt pulses on developing salmon and benthic invertebrates. Their results show that ~40% of the salt pulses in local streams exceeded the BC acute water quality guideline. The largest

salt pulse that occurred in local streams was 11 times the acute water quality guideline (almost equal to ⅓ the salinity of seawater). The high salt pulses lasted for a day on average.

Researchers mimicked the salt pulses and exposed coho eggs to a 24-hour salt pulse, shortly after fertilization. They exposed eggs to pulses between the acute guideline for chloride (600 mg/L Cl^-) and eight times that (4,800 mg/L Cl^-). At salt concentrations of eight times the guideline limit, more than 70% of the eggs died. A salt pulse of three times the recommended maximum level caused severe deformities in 4% of the embryos that survived the salt pulse.

What is clear from these results is that the current amount of salting on roads in November and December, when coho and chum salmon are spawning and their eggs are developing, can have serious consequences. Ongoing studies will investigate how high salt pulse levels affect their growth and if there are any genetic effects.

There is no consequence-free substitute for road salt. Beet juice is used by several Canadian communities as an alternative to salt. However, the sugars in beet juice stimulate aquatic microbes to multiply in streams and ponds, taking up oxygen, and depleting the amount available to fish and benthic invertebrates.

Spinal deformity in coho exposed to a 24-hour pulse of 2,400 mg/L chloride at the egg stage.
Photo: Clare Kilgour

One of the project's goals is to raise public awareness of the effects of road salt use and improve application practices. Ideally, Alan James would like municipalities to catch and slow salty roadside run-off to prevent large pulses from entering streams. He also wants all people who apply road salt to undergo mandatory training on best practices, like the training required for people applying pesticides.

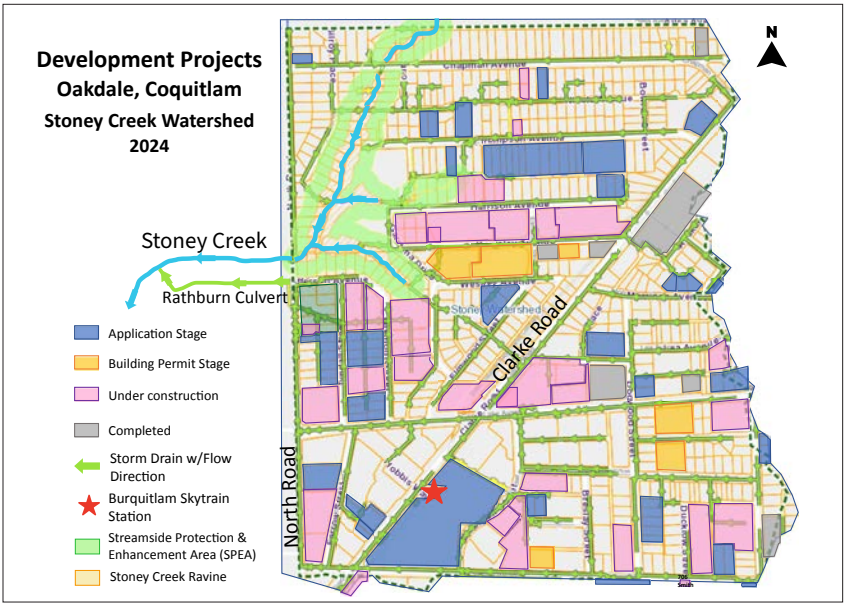
Building Up Affordable Housing Versus Breaking Down Stoney Creek

A tributary of Stoney Creek runs through Janice McAndrew's backyard in the Oakdale neighbourhood of west Coquitlam. She has lived here for years and is a

longtime director of the Oakdale Neighborhood Association. This was a quiet, little known 1960s era neighbourhood of single-family homes between Burnaby Mountain Conservation Area and the busy North Road/Clarke Road corridor. Development pressures escalated once the Burquitlam Skytrain station was completed in 2017 as part of the Evergreen Extension to Coquitlam Centre. Almost one-third of the homes in Oakdale have been sold to developers, and the area is undergoing a jarring transition to higher density marked by towers and townhouses.

The Oakdale Neighbourhood Association was originally formed to build and promote community and organize neighbourhood craft fairs. Now they speak out for residents dealing with the consequences of the many construction projects in their area: noise, dust, lack of parking, road safety issues and contaminated water flowing into the storm drains and Stoney Creek. Almost three years ago, Janice joined SCEC as a liaison between the two organizations to more effectively deal with the ongoing spills into Stoney Creek.

The Rathburn Culvert collects stormwater from 42 hectares in Oakdale including the area near the Burquitlam Skytrain. It is the source of more than 90% of the pollution incidents in Stoney Creek. Stoney Creek has a



City of Coquitlam map of Oakdale developments.
Adapted map: Janice McAndrew and Utta Gagel

"Watch and Report" page on their website with a fillable form for people to report a spill.

George Kovacic and his son Luka spend a lot of time monitoring the creek. Luka is passionate about protecting aquatic life in the creek. Their diligence in noting and reporting spills are invaluable to Janice. Janice monitors these reports, visits the creek to confirm details and then sends emails reporting the spills to all the bureaucracies concerned with streamside protection of fish bearing streams: Coquitlam Environmental Protection Department, Coquitlam Construction Bylaw officers, City of Burnaby, BC Fish and Wildlife and DFO.

Historically, the province managed streamside protection but has offloaded that onto municipalities. Municipalities regulate streamside protection through bylaws but are understaffed, under-resourced and do not have enough powers to adequately do this job. The maximum fine that can be imposed for a bylaw infraction is $500 (the limit is set by Provincial legislation) but $500 is pocket change for the developer of a multimillion-dollar project. The City of Burnaby put forward a resolution at the 2024 meeting of the Union of BC Municipalities to allow local governments to impose higher fines for dumping and discharge to protect waterways. The recommendation was approved and forwarded to the provincial government, but a year later the province has not responded.

Burnaby and Coquitlam municipal staff do respond to reports of spills, but Janice often gets little response from the other bureaucracies that she emails. She is very frustrated trying to get the people responsible for protecting streams and fish to do their jobs.

Janice, a business analyst, has created a database to track all the reported spills. She can categorize spills by street, by development project, by description (colour, turbidity, pH and odour). Some 225 spills were reported to SCEC in 2024 and 167 more by the end of July 2025.

She is on a first-name basis with the bylaw officers, many developers and construction site superintendents. Janice's priority is to solve environmental problems rather than to punish developers. As developments in the Oakdale area are often marketed as being close to nature and the trails along Stoney Creek, Janice reminds developers that they want to be part of protecting this creek, not harming it. She works to build relationships with superintendents at the big construction sites and invites them to help find solutions. Janice starts by offering a personal walking tour of Stoney

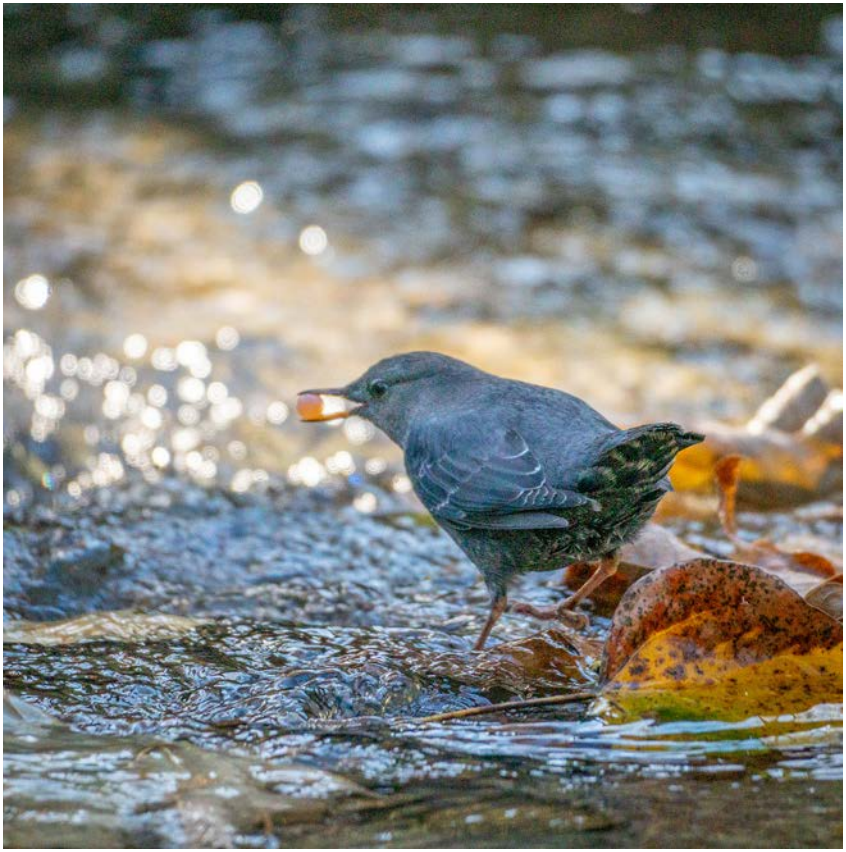
Creek (15 have taken her up on it). Most of them have never visited Stoney Creek before and have only an abstract idea of life in the creek. Seeing coho fingerlings in the creek, and Great Blue Herons feeding on them, changes how the site bosses view the water that leaves their projects and flows into storm drains.

When Janice sees discharge coming from a specific site, she calls the superintendent directly and they usually take immediate action. A couple of superintendents have taken the initiative to help protect the creek. One has put inserts into catch basins around his site to intercept fuel spills, gravel and sand that would otherwise run into the storm drain. Another sends staff down to the creek each week to pick up garbage.

Large construction sites are required to use large tanks to store stormwater so it can be slowly released into the storm drain. 'Flowlink' is a real-time water monitoring and control system that is used to prevent wastewater with high sediments, undesirable pH and other construction pollutants from being released into the storm drain system. Once thresholds for pollutants are reached, the system shuts off valves and prevents water from leaving the site. When Janice learned about Flowlink she approached a supportive developer and asked if they would consider using it on their site. The project developer decided that it made sense both to protect Stoney Creek from pollutants and to protect themselves from the risk of non-compliant water discharge. Other developers followed suit. In fact, many developers in Oakdale had agreed to use the Flowlink system before the Coquitlam City Council mandated its use in 2024 for all large construction projects.

Great Blue Heron, Stoney Creek. *Photo: Utta Gagel*

Pollutants entering the creek vary with the work taking place at the sites. When projects are doing big concrete pours, dozens of trucks arrive and are lined up to deliver concrete. All these



American Dipper with salmon egg, Stoney Creek. *Photo: Utta Gagel*

trucks must wash their tires and chutes and are supposed to do so on site. Sites don't have enough room for many trucks, so the drivers stop on residential streets and wash there. Best practice is to collect the washout into a large container and then pump it back into the trucks for safe disposal at their plant, but often they allow the wash water to drain onto the street. So far in 2025, residents have reported 13 concrete wash incidents and Janice is certain that there are many more that haven't been documented. Despite the public providing photos and videos of the drivers and concrete truck companies responsible for improper truck wash, the City of Coquitlam has not issued fines for these incidents.

Concrete wash water is a major problem—it is highly turbid and has high pH (10.5–12). It clogs and damages the gills of fish and invertebrates and damages aquatic plants and algae. Another

concern with concrete wash water is that it contains hexavalent chromium, a carcinogen and toxic compound found in Portland cement. Salmonids and aquatic invertebrates are particularly sensitive to hexavalent chromium.

At the end stage of construction, windows and the exterior of buildings are washed using detergents to clean off the dust and grime off balconies and windows. All detergents, including biodegradable ones, can be poisonous to aquatic life. Most fish die when concentrations reach 15 ppm. At lower concentrations, detergents damage the external mucous layers that protect fish from bacteria and parasites, as well as damaging their gills. Concentrations as low as five ppm can kill fish eggs. A sudsy discharge into Stoney Creek on 6 May 2025 killed 100 young coho.

The final stage of development involves landscaping around the projects. Truckloads of mulch and soil containing manure and fertilizers are loaded into garden beds. The newly planted trees and shrubs are then thoroughly watered for weeks. The resulting smelly brown drainage running into the storm drains contains fine sediment which settles in the creek and can suffocate benthic invertebrates. This water is high in nitrogen and other nutrients which triggers algae blooms and depletes oxygen in the creek. In August 2025, water samples from Stoney Creek were tested for the presence of ammonia and *E. coli* bacteria and showed exceedingly high levels of both. It is very difficult to determine the source of this type of discharge and it often continues for many days.

As a result of lobbying by SCEC, the City of Coquitlam has installed a "Jellyfish" stormwater filtration system to clean stormwater coming from one part of the Oakdale area. This $2 million system removes trash, oil and fine particulates; however, it doesn't treat high pH or remove dissolved toxins. Coquitlam has also installed two real-time water quality monitoring systems and a camera into Stoney Creek to provide the city with by-the-minute water quality data.

Despite the use of Jellyfish and Flowlink monitors and increased patrols by Coquitlam bylaw enforcement officers, spills continue to affect Stoney Creek. SCEC conducts juvenile fish trapping surveys at several locations in Stoney Creek during May and September each year. In September 2025, traps downstream of the Rathburn Culvert were empty and covered in an algal slime. In comparison, traps upstream of the culvert were clean and contained many healthy coho, cutthroat trout and crayfish.

John Templeton and many others are extremely frustrated with the municipalities, the provincial and federal agencies responsible because they are not taking effective action to protect water quality and fish. Despite the endless monitoring and reporting that he and Janice do, the spills continue and aquatic life in the creek is being decimated. John says that housing developments can be built without catastrophic impacts on creeks and points to the development of the UniverCity residential area on Burnaby Mountain which was completed without any spills into Stoney Creek.

The rush to build more housing is occurring throughout Metro Vancouver. Conservationists need to push back against developers and politicians who propose reducing building costs by faster approval processes and relaxed environmental regulations. We need to help existing streamkeeper groups as they need donations and

From top to bottom: 1) The clear waters of Stoney Creek upstream of the Rathburn Culvert. 2) Rathburn Culvert (right-hand side) where the heavy growth of algae in the water flowing out of the culvert is visible. The almost vertical grey pipes in front of the culvert connect to the Flowlink unit for continuous water sampling. 3) Close-up view of the growth of algae on creek substrate below the culvert. *Photos: Utta Gagel*

more volunteers. It is important to amplify the voices of these stewardship groups. Be proactive and write to your provincial representatives and insist that the province increase the fines that municipalities can levy for bylaw violations. Contact your local councillors and let them know that you expect your municipality to enforce regulations to protect streams and creeks.

Acknowledgements

Many thanks to the following people who generously gave their time to explain the conservation issues in the Brunette River basin and the work that they do to protect nature: Burnaby City Councillor Alison Gu, Alan James, Clare Kilgare, Janice McAndrews, Carl Ronka and John Templeton. Any errors in this article are entirely my own. There are many people involved in key stewardship work in this area who contribute a great deal and weren't mentioned because of lack of article space. More details can be found at the following websites:

Cariboo Heights Forest Preservation Society: **https://cariboohightsforestpreservation.org/**

eBird list for Burnaby Lake Regional Park (general): **https://ebird.org/hotspot/L297236/bird-list**

iNaturalist Cariboo Heights Forest Biodiversity Project: **https://www.inaturalist.org/projects/cariboo-heights-forest-biodiversity**

The Road Salt and Pacific Salmon Success Project: **https://www.theroadsaltproject.com/**

Stoney Creek Environment Committee: **http://scec.ca/**

Web of Life Society on Instagram: **https://www.instagram.com/weboflife.ca/?hl=en**

Utta Gagel is a former park naturalist in Jasper and Kootenay National parks and retired elementary school teacher. She is passionate about nature photography and stewardship, and serves as Co-president of Cariboo Heights Forest Preservation Society. Utta leads forest walks and visits classrooms to engage students with nature. She is part of the Road Salt and Salmon Success Project education committee where she played a key role in creating "Stream Scientists", a Grade 3–7 teaching kit to introduce students to stream ecology and the impacts of pollutants such as road salt.