

Byrne Creek Watershed

Status Report – May 2004

Burnaby, B.C.



Prepared by

Byrne Creek Streamkeepers

www.byrnecreek.org

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Some of the gang at Edmonds Santa Parade



Display at Vancouver Aquarium

Report Contributors: David & Jane Burkholder, John Grange, Rick Harmer, Maho Hayashi, Paul Cipywnyk, Yumi Kosaka, Joan & Rob Carne; **Graphs and Charts:** David Burkholder; **Photographs:** Paul Cipywnyk, Yumi Kosaka, Maho Hayashi.

Byrne Creek Streamkeepers Contacts

Web: www.byrnecreek.org
E-mail: info@byrnecreek.org

Summary of Byrne Creek Watershed Health Indicators September 2003 — April 2004

Indicator	Rating	Comments
Spawners	☺ Chum ☹ Coho ☹ Spawning Channel	Number of spawners fell to 62 in 2003 from 72 in 2002. Only 6 coho returned in 2003. Spawning channel is silted up and fish are not using it to spawn.
Juvenile and Resident Fish	☺	Number of fry and juvenile fish is encouraging.
Water Quality: Sedimentation, Pollution, Erosion	☹	Better control of sediment flows from construction sites, though still occasional problems; ongoing road wash; oil trickle.
Water Quality: Invertebrate Surveys	☹	Water quality appears to be decreasing based on bug sampling.
Water Quantity: Creek Discharge	☹	Huge flows from watershed due to decreasing pervious surfaces and heavy rain causing erosion, sedimentation.
Habitat – Invasive Plant Species	☹	Discouraging spread of invasive plant species.

Suggested Solutions:

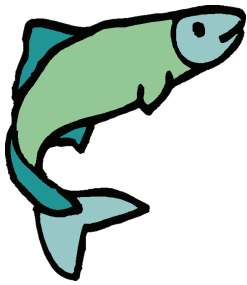
Spawners / Juvenile and Resident Fish: A modified and automated flap gate design at the Byrne Creek/Fraser confluence may allow for increased opening of the gate without increasing risk of flooding. Improve quality of spawning habitat. “Goofy” dog signs along the creek remind owners to keep dogs out.

Water Quality: Public awareness of storm drains, car washing, cars leaking oil and antifreeze, pesticide use. Enforcement of bylaws. Clean out sediment in spawning and rearing habitat.

Water Quantity – Creek Discharge: Include water retention in all developments, require a certain proportion of pervious surfaces. Construct SEA (street edge alternative) streets. Retain as much natural habitat and treed space as possible.

Invasive Plant Species: Streamkeepers would like to establish an ongoing program of invasive species removal, and replanting with indigenous plants and trees, with the support and assistance of the City of Burnaby. As an initial step, a dumpster could be placed in the spawning habitat for collection of invasive species. Continue public education about dumping grass, garden and shrubbery trimmings, and non-native plants, particularly for homeowners near ravine parks.

Introduction



Byrne Creek Streamkeepers is a community volunteer group dedicated to the restoration and protection of the Byrne Creek watershed. Streamkeepers undertake community projects and public education, and help monitor the creek's rejuvenated populations of coho salmon, chum salmon and cutthroat trout.

Streamkeepers want to share their successes and their concerns, and continue to strive toward solutions to watershed problems.

Byrne Creek Streamkeepers present this report to summarize the state of the watershed and to show that it is possible to have salmon-bearing streams in urban areas, that education and perseverance do pay off, and that with hard work we can preserve our amazing natural resources for future generations.

Volunteers meet once a month to plan activities and events. The group works closely with the City of Burnaby's engineering, planning and parks departments, and the federal Department of Fisheries and Oceans.

Byrne Creek's course has been redirected over the years and by the 1980s, flood control measures, habitat destruction and poor water quality had destroyed it as a fish-bearing watercourse. Streamkeeping activities began under the Vancouver Angling and Game Association (VAGA) in 1987 when members Ken Glover and Bob Fuller started doing cleanups of Byrne Creek, joined a few years later by Bert Richardson and Lloyd Longeway. They began to release and monitor juvenile coho salmon smolts, hoping to reestablish salmon populations. VAGA members also instigated the building of trails, stairs into the ravine, and a footbridge.

A catastrophic spill in 1998 that killed 5,000 fish galvanized a new generation of streamkeepers who joined with the VAGA members to form the Byrne Creek Streamkeepers on April 1, 1999.

A Short History of the Byrne Creek Watershed:

- 1960s: Wild salmon and trout disappear due to habitat destruction and water pollution
- 1980s: City of Burnaby constructed a new channel across the Fraser floodplain and a flood gate, improving lowland habitat and fish access to the river
- 1987: Vancouver Angling and Game assessment with Dept. of Fisheries and Oceans Canada
- 1989: Coho salmon stocking initiated
- 1997: Chum salmon stocking initiated
- 1998: Toxic spill into storm drain kills 5,000 fish
- 1999: Byrne Creek Streamkeepers founded
- 1999: Salmon spawning and rearing habitat constructed by City of Burnaby
- 2000: First Stream of Dreams Mural unveiled for Rivers Day
- 2002: Lowland reach re-excavated
- 2002: 72 spawners return to Byrne Creek (44 coho, 28 chum)
- 2003: 62 spawners return to Byrne Creek (6 coho, 56 chum)

Getting Located



The Byrne Creek watershed is located in the south slope area of Burnaby. The watershed can be thought of in three distinct parts: the Fraser lowland which includes the constructed spawning habitat, the ravine park section, and the “Creek Under the Streets” section in which the water flows predominantly in buried pipes.

Streamkeepers reference data collection to a set of numbered location tags. These tag numbers are used throughout this report to identify locations of survey points or features of interest.

A tag location map is included in Appendix A.



Returning chum spawner



Storm drain marking



Weir construction

Fish: Spawner Returns



Spawned out chum

The Byrne Creek Streamkeepers have counted returning adult salmon for five years. Before then, the Vancouver Angling and Game Association

monitored spawners from 1992. Between mid-October and the end of December, streamkeepers look for dead fish between Marine Way (Tag 505) and the bottom of the ravine stairs (Tag 521) on a daily basis. Volunteers count dead fish, measure their lengths, determine species, gender and whether they have successfully spawned. The bodies are cut in half to avoid double counting and are returned to the creek to provide food and nutrients for other plants and animals.

The graph below shows spawner survey results for the last five years. The number of returning salmon has increased significantly since 1999. The highest return was in 2002 with 72 returning spawners, while in autumn 2003, 62 spawners were counted returning to Byrne Creek.

The figure also shows that salmon started returning much earlier in 2003 than in previous years. This is primarily due to the introduction of chum salmon, which was started in 1997. Typically, the chum salmon return to the creek in early and mid November, while coho return in late November and early December. The creek has seen a significant increase in the number of chum salmon over the past two years. In 2003, 88% of returning salmon were chum and only 12% were coho.

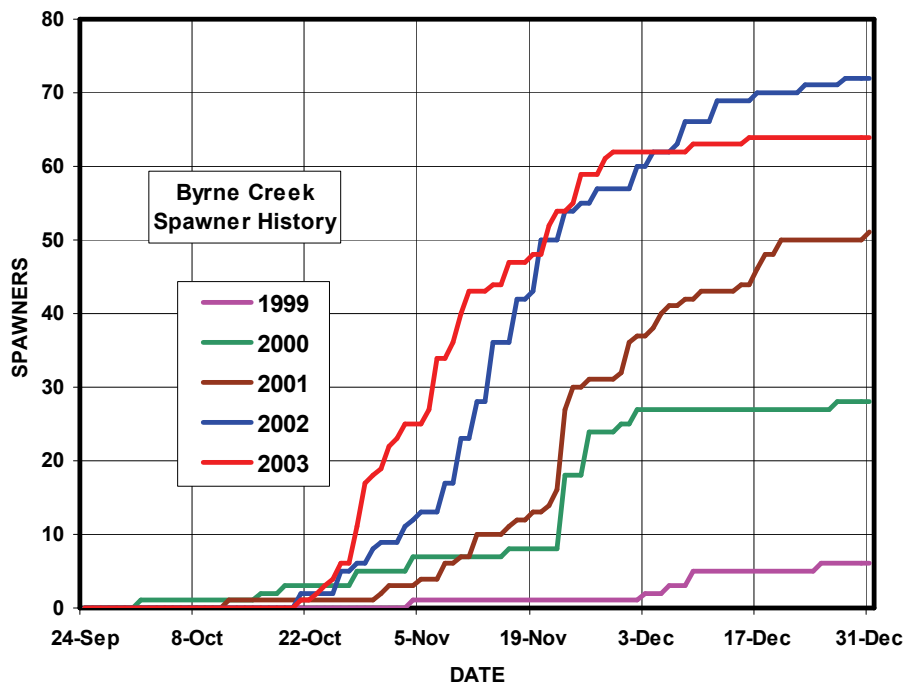
It is estimated that in 2003, 80% of females successfully spawned compared to only 29% in 2002.

Concerns: When the flood gate at the river is not chained open, fish access to the creek is restricted. The artificial spawning channel is silted up and fish don't use it. Dogs playing in the creek can damage eggs during the spawning season and while eggs are in the gravel.

Solutions: A modified flap gate design may allow for increased opening of the gate without increasing risk of flooding. Improve quality of spawning habitat. "Goofy" dog signs along the creek remind owners to keep dogs out.

Rating for 2003:

Chum 😊 Coho 😞
Spawning channel 😞



Fish: Juvenile and Resident Fish Counts



Coho fry born in Byrne Creek

Juvenile trapping is used to help indicate the number of young fish residing in the creek. Traps are baited with salmon roe, placed at regular locations along the creek and retrieved a day later. The trap location and the number, length and species of fish are recorded.

Trapping results in the ravine area for the past two years are summarized below. The table shows that the number of trapped salmonids in winter 2004 fell significantly from the previous two surveys. While this is a bit concerning, further trapping needs to be done in summer 2004 before suggesting that this is a trend. At some locations, several fish could be seen in the pools but no fish were caught in the traps, and many fish were seen in the sediment pond. It is encouraging that salmonids continue to be found throughout the entire reach between Marine Drive (Tag 515) and Edmonds Skytrain Station (Tag 539).

Cut-throat trout typically stay in the creek for their entire life cycle. Coho remain in the creek a full year before going out to sea. Chum fry only remain in the creek a few weeks, and are not normally available during the two trapping periods. Cut-throat trout were the predominant salmonid species in the ravine area, representing 87% of the total number of fish trapped. The remaining 13% of the fish were coho.

Volunteers netted, photographed and released both coho fry and chum fry born in the ravine in spring 2004.

Salmonid Trap Distribution				
Trap	Location	2003		2004
		Winter	Summer	Winter
1	T515	10	9	1
2	T519	5	6 (2)	8
3	T521	2	3	6
4	T522	4	3 (3)	2
5	T524	4	5	2
6	T527	5	6 (2)	1 (1)
7	T530	8 (2)	5 (3)	6 (2)
8	T534	8	2	3
9	T535	2	0	1
10	T539	1	1	0
Total		49 (2)	40 (10)	30 (3)

Figures in (brackets) indicate coho, others are cut-throat

Concerns: Poor water quality, restricted fish access to river, increased sedimentation.

Solutions: Public awareness, environmentally friendly flap gate, increased water retention.

Rating for 2003, spring 2004:



Fry release with schoolchildren, DFO

Water Quality: Sedimentation, Pollution, Erosion



A massive flow of sediment pumped from a construction site into storm drains entered Susan's Pond (Tag 544) above Griffiths Ave. in autumn 2003.

Sediment damages good spawning areas and potentially smothers salmon eggs.

Streamkeepers called in City of Burnaby environmental staff who traced the source and demanded corrective measures.

Road runoff carrying pollutants such as oil and anti-freeze from leaking vehicles, soap from car washing, and numerous other toxins can kill fish and other wildlife.

Hundreds of sensitive coho smolts that schoolchildren released into the creek in May 2003 died a few days later following the "first flush" rainfall.

Thankfully indigenous fish that are used to higher pollution levels survived.



Decreasing rainwater retention in the upper watershed is causing huge flows from storm drains into the creek.

A heavy rain in late November 2003 resulted in flows so heavy that there was a major slide in the creek (just below Tag 517) that changed its course.

There was so much water in the system that it almost overflowed the bridges on Meadow Ave. and Byrne Road (adjacent Tag 507).

Deposition of material downstream of the slide covered spawning areas and smothered salmon eggs. In spite of these adversities, the population of salmon fry emerging from the spawning beds in February and March was encouraging.

Concerns: Pollution and sedimentation from storm drain runoff.

Solutions: Public awareness of storm drains, car washing, cars leaking oil and antifreeze, and pesticides. Enforcement of bylaws. SEA (street edge alternative) streets. Daylight the creek and create wetlands (Ernie Winch Park?) to retain and filter water, and increase public awareness of water quality issues.

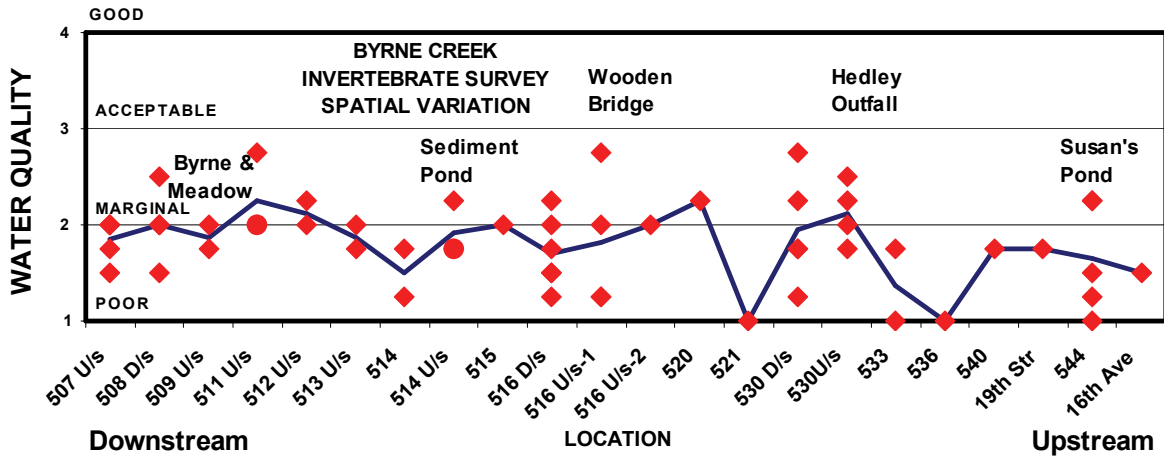
Rating for 2003: 😊

Water Quality: Invertebrate Surveys

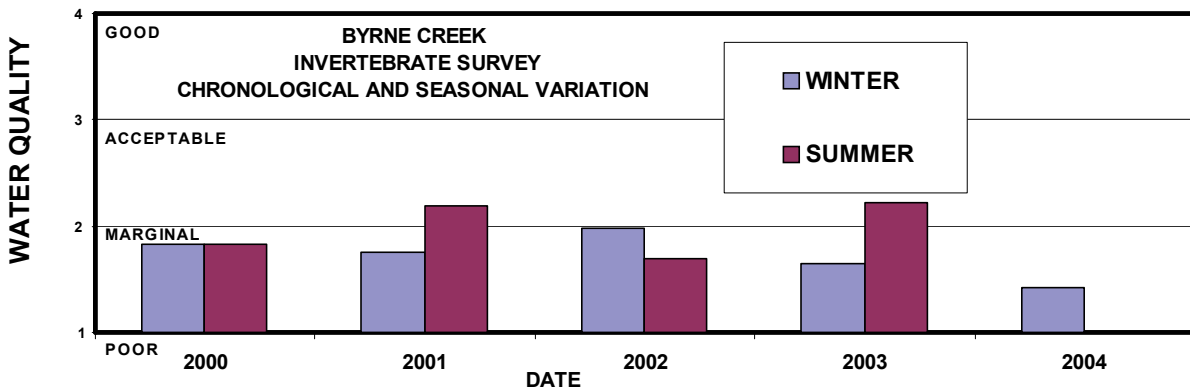


Aquatic bugs give a reasonably accurate indicator of water quality. Some species, such as caddisflies, require good water quality, while other species, such as aquatic worms, are more tolerant of poor water.

Streamkeepers have counted bugs for the past 4 years in winter and summer. Locations extend from Byrne Road & Meadow (Tag 507) to 18th Avenue & 18th Street (Tag 544). Variations along the creek are shown below. Diamonds indicate individual readings and the line shows average readings. No specific spatial trend has been identified, except that all readings are below the acceptable water quality level based on streamkeeping assessment.



Chronological and seasonal variations in water quality have also been analyzed. The figure below shows the average winter and summer readings for the past four years. All readings are in the “marginal” to “poor” range. The 2004 winter results are significantly lower than previous readings.



Concerns: Poor water quality due to pollution.

Solutions: Public awareness of storm drains, car washing, cars leaking oil and antifreeze, and pesticides.

Rating for 2003: ☹️

Water Quantity: Creek Discharge

The figure below shows creek discharges recorded intermittently from July 2002 – April 2004. The readings are recorded manually at the sediment pond using staff gauge measurements and known gate openings. The calculated discharge includes both the low flow through the gate into the spawning habitat and the high flow over the weir into the flood by-pass channel. Readings tend to be concentrated around high discharge events. Depending on the timing of readings, the highest recorded value for a given storm may be significantly less than the maximum instantaneous discharge.

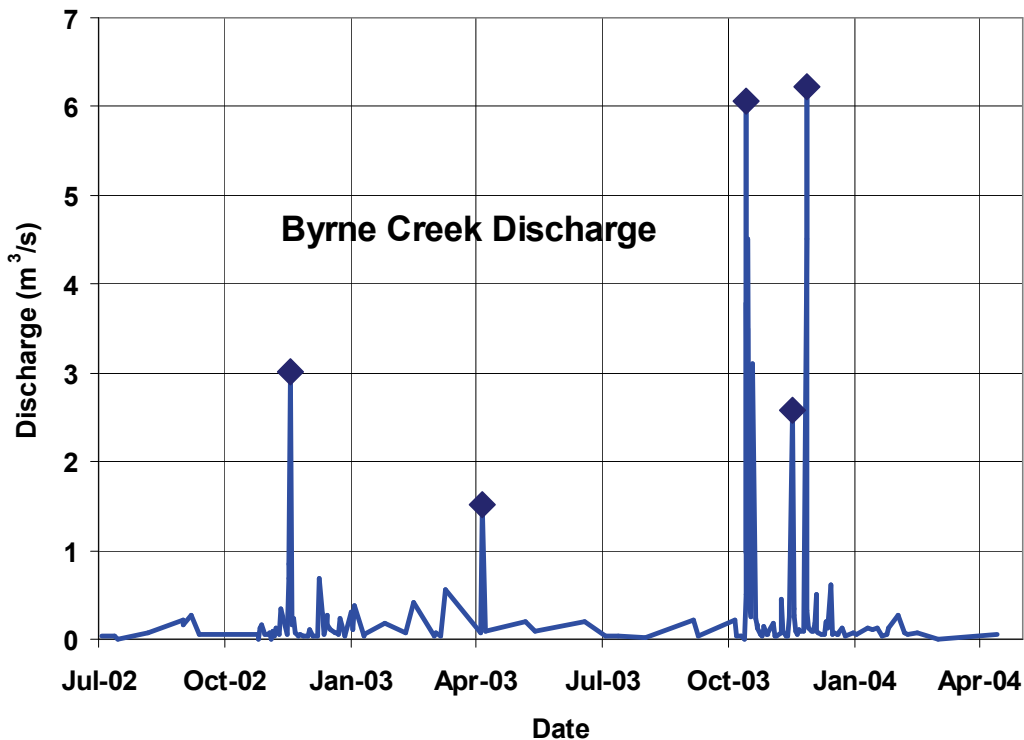
The highest recorded values are 6.1 m³/sec on 16 October 2003 and 6.2 m³/sec on 28 November 2003. The increased erosion and sediment in the creek over the autumn period can be directly attributed to these large storms.

Flows during storms are characterized by steep rising limbs and steep recessions. This behavior will likely continue in the future as more urban development takes place, and as the watershed impervious surface area increases and water retention decreases.

Concerns: Single-family housing is being replaced by higher-density development with less pervious surfaces.

Solutions: Include water retention in developments, require a certain proportion of pervious surfaces, and encourage development of SEA (street edge alternative) streets. Promote use of rain collector barrels.

Rating for 2003: ☹️



Habitat – Invasive Plant Species

Volunteers completed a survey on April 18, 2004, between Marine Way (Tag 505) to the bridge at Meadow Ave. (Tag 507). Plot points were set at 50-meter intervals, photos were taken, and three levels of incursion for various species were assigned: low, medium and extreme. The area in the ravine from the base of the Brynlor stairs (Tag 521) to Southridge Dr. (Tag 515) was assessed earlier on March 29.

Six invasive species occur in the lowland and ravine areas in moderate to extreme levels. Himalayan Balsam (*Impatiens glandulifera*) AKA Policeman's Helmet; Japanese Knotweed (*Polygonum cuspidatum*); Himalayan Blackberry (*Rubus armeniacus*); English Ivy (*Hedera helix L.*); Lamiastrum (*Lamiastrum galeobdolon*); and Scotch Broom (*Cytisus scoparius L.*).

A major problem is developing with Policeman's Helmet, a highly invasive annual that can choke the streambed. Urgent attention should be directed at this plant with complete removal, including root systems, by mid-July or sooner. Failing this, the flowers should be harvested and destroyed before they have a chance to form seedpods. This should be done through two seasons for effective control.

Japanese Knotweed is another serious concern in the creek. It is a fast-growing plant that is very difficult to eradicate, and will overshadow and out-compete all other nearby plants.

See invasive plant species maps in Appendix B for the lower ravine area and Appendix C for the lowland area.

Concerns: Invasive species are choking the creek and overpowering indigenous plants.

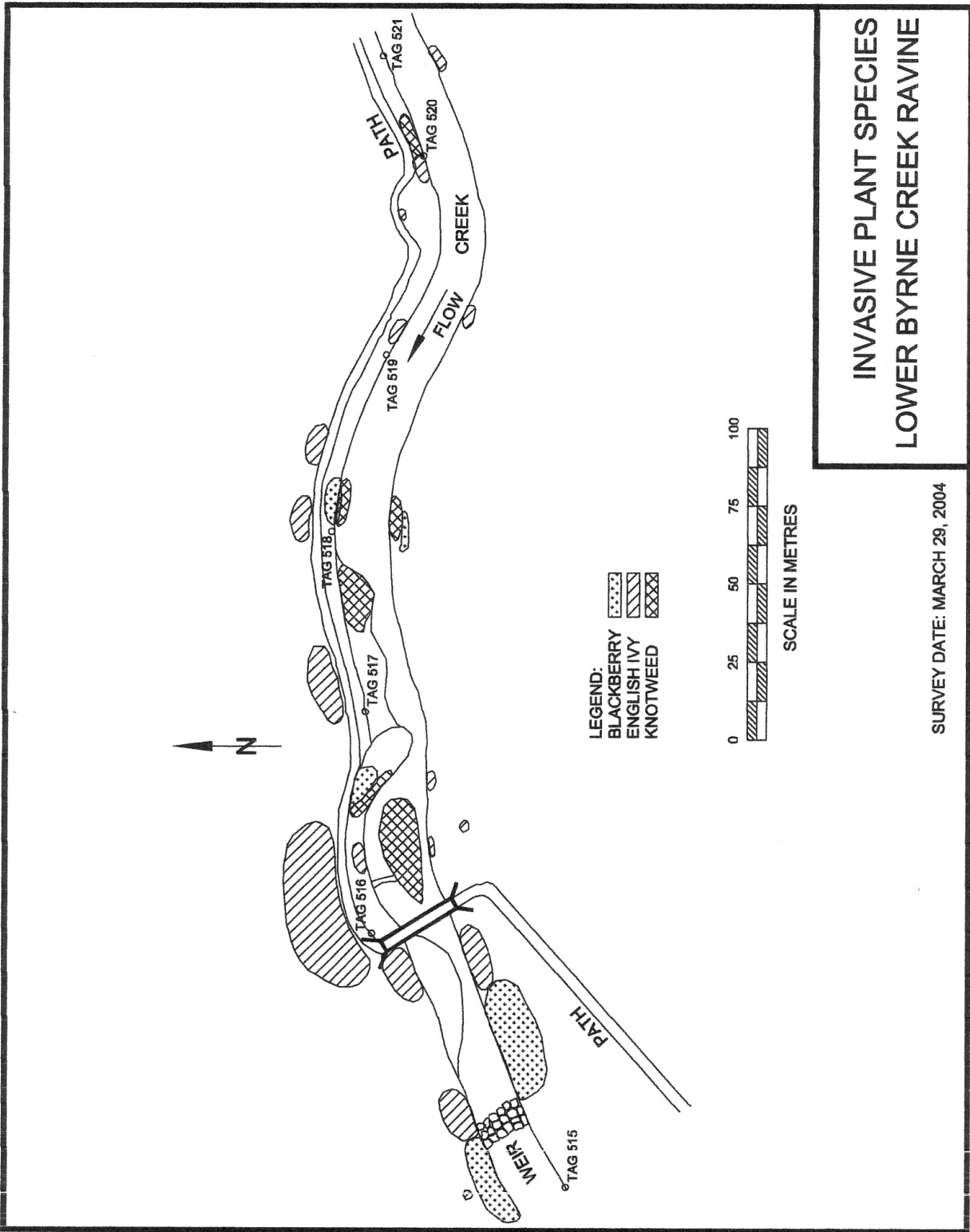
Solutions: Streamkeepers would like to establish an ongoing program of invasive species removal and replanting with indigenous plants and trees with the support and assistance of the City of Burnaby. As an initial step, a dumpster could be placed in the habitat for collection of invasive species.

Rating: ☹️

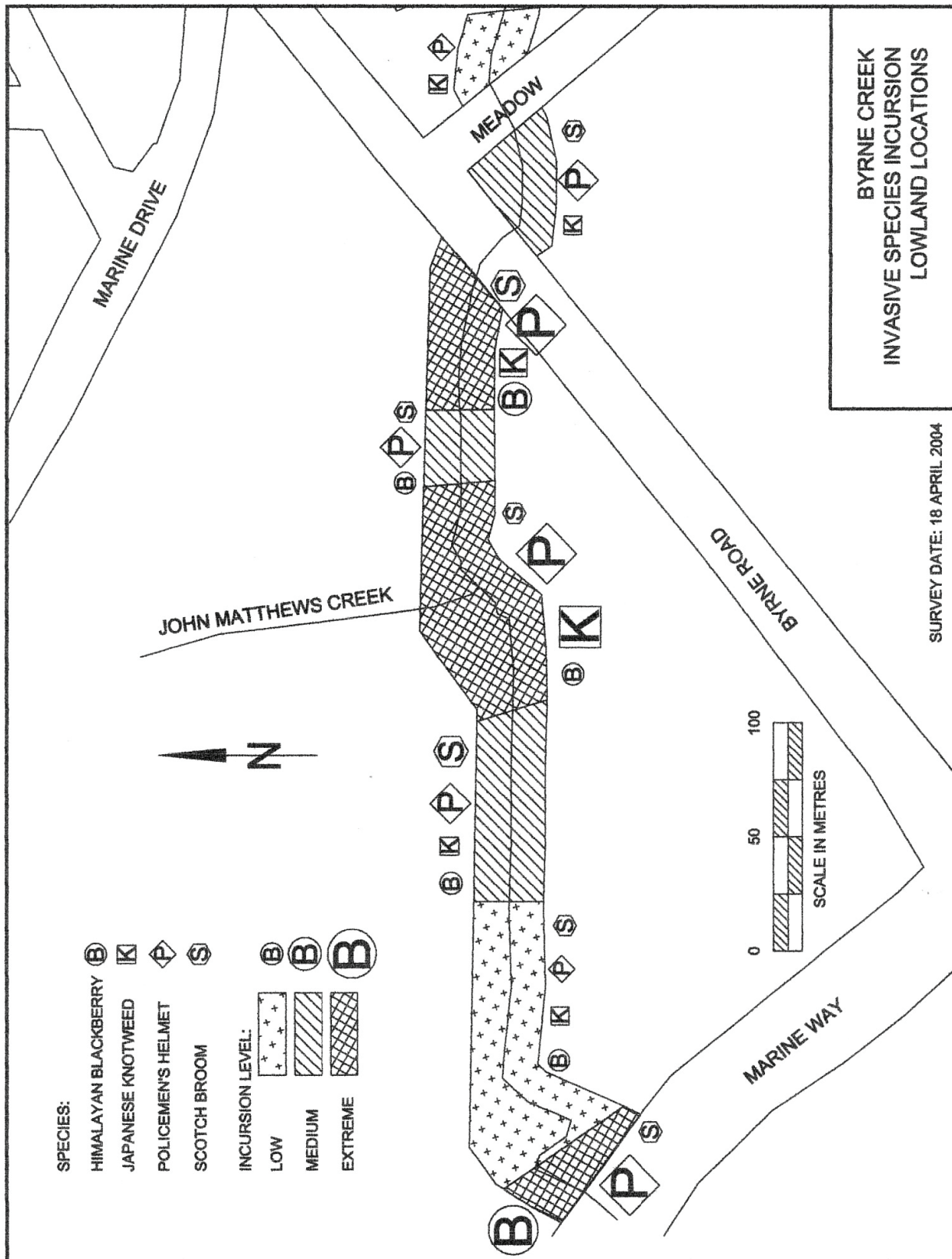


These stands of knotweed beside the creek grew over 2 meters in a month.

Appendix B — Invasive Plant Map, Ravine



Appendix C — Invasive Plant Map, Byrne Rd. to Marine Way



Appendix D – Byrne Creek Streamkeepers Activities

Sept. 1, 2003 – April 30, 2004

Sept. 1, 2003	A Taste of Edmonds: The information booth was set up at Southside Community Church near the original Stream of Dreams at the corner of Kingsway and Edmonds. Volunteers began repainting some of the faded fish on the fence, trying to match the original designs painted by schoolchildren as much as possible.
Sept. 11, 2003	Regular Meeting: Scheduling weir construction, Japanese writer/photographer tour preparation, creek survey.
Sept. 13, 2003	Weir Construction: Streamkeepers built a weir designed by engineers and approved by government agencies to provide better habitat for fish. It was placed on a long stretch of the creek just above a culvert that passes under Southridge Dr. All work was done by hand, keeping impact on the riparian zone to a minimum. In late October 2003, streamkeepers saw several pairs of chum salmon spawning just above the new weir.
Sept. 20, 2003	Night of 2003 Lights: The group displayed fish lanterns at the Night of 2003 Lights near the Shadbolt Centre for the Arts at Deer Lake Park.
Sept. 22, 2003	Japanese Writers/Photographers Tour: Five Japanese travel writers and photographers toured the creek, the habitat, and the original Stream of Dreams fence. Japanese-speaking volunteers prepared Japanese-language handouts and assisted with interpreting.
Sept. 28, 2003	Rivers Day: The info booth was set up for Rivers Day in the Fraser Foreshore Park.
Oct. 9, 2003	Regular Meeting: Scheduling daily spawner patrols. Ordered computer microscope and insect book for the bug team.
Nov. 1-2, 2003	Vancouver Aquarium SalmonFest: Streamkeepers set up their information booth at this two-day event and met lots of people.
Nov. 8, 2003	GVRD Super Saturday 2003: Several streamkeepers attended this GVRD Regional Parks Forum for volunteers at BCIT.
Nov. 13, 2003	Regular Meeting: Updating the group library.
Nov. 15, 2003	Tynehead Hatchery Tour: The hatchery in Surrey raises coho, chum and chinook salmon that are released into the Serpentine River.
Nov. 29, 2003	Lions Club Burnaby Santa Claus Parade: Streamkeepers took part in this first Christmas parade in the Edmonds area of Burnaby – and won a trophy for the most creative entry!
Dec. 8, 2003	Burnaby Streamkeepers Roundtable: About 20 representatives from streamkeeping groups met and shared information on spawner returns and discussed a sedimentation study being done in Burnaby Lake. BCIT and GVRD representatives talked about invasive plants.
Dec. 11, 2003	Regular Meeting: Larry Morgan from Canada Lands Company and Ian Whyte of ECL Envirowest Consultants Ltd. talked about development in Glenlyon Business Park where Byrne Creek meets the Fraser River. We discussed installing an automated flood gate to allow Fraser tides to flush the lower reaches of the creek, and give improved access for spawning salmon and ocean-going fry and smolts. They also welcomed streamkeeper input in planning and planting native vegetation along the creek.
Dec. 13, 2003	Ravine Cleanup: Volunteers cleaned up debris deposited in the creek and along the banks in the ravine park during the last several rainstorms. Bottles, styrofoam, plastic bags, broken glass, paper cups, wrappers, tennis balls, parts of a scooter, a shopping cart and several tires were collected.

Oct. – Dec. 2003	Daily Spawner Monitoring: Streamkeepers patrolled the creek and spawning habitat daily to watch for returning salmon. Deceased spawners were measured and cut open to see if they had released their eggs or milt.
Jan. 8, 2004	Regular Meeting
Jan. 31, 2004 Feb. 7, 2004	Refreshing Creek Location Tags: Streamkeepers re-set, re-flagged, and re-documented tags that indicate locations along the creek.
Feb. 12, 2004	Regular Meeting: Ian Wasson and Jennifer Kay from the city gave a presentation on CPTED (Crime Prevention Through Environmental Design) and development plans in the Edmonds/Byrne Creek Ravine area.
Feb. 16, 2004	Safety In Our Community Meeting: Volunteers spoke with RCMP and city planners about concerns with CPTED measures destroying riparian habitat.
Feb. 21 – 22, 2004	Juvenile Fish Trapping: Placing Gee traps to identify fish before new fry hatch.
Mar. 11, 2004	Regular Meeting: Planning for 5th anniversary party on April 1.
Feb./Mar., 2004 Weekends	Bug Counting: Volunteers met five Saturdays in a row to collect samples from the creek, and classify and count bugs to assess water quality.
Mar. 28, 2004	Invasive Plant Species Workshop: A group representative attended GVRD workshop in conjunction with the Burnaby Lake Park Association.
Mar. 29, 2004	Invasive Species Mapping: Mapping invasive species in the ravine section of the creek.
Apr. 1, 2004	Byrne Creek Streamkeepers 5th Anniversary: Nearly 50 people gathered at the Edmonds Community Centre for this celebratory potluck bash. Streamkeepers honoured Maurice Coulter-Boisvert, our Department of Fisheries and Oceans advisor for his ongoing support, and Bob Fuller, Bert Richardson and Lloyd Longeway, the "old timers" who got the ball rolling decades ago.
Apr. 3, 2004	Glenwood Elementary Flea Market: Volunteers set up our information booth.
Apr. 5, 2004	Burnaby Streamkeepers Roundtable: Streamkeeper groups gathered to share information at the Stoney Creek Environment Centre. Langley Environmental Partners Society presented information about invasive species.
Apr. 7, 2004	South Slope School Fry Release: Streamkeepers helped grade 1 and 2 students from South Slope Elementary release about 50 chum fry that the kids had raised in their classroom.
Apr. 8, 2004	Regular Meeting
Apr. 10, 2004	PhotoPoint Monitoring Workshop: A group representative attended a workshop organized by Bowen Island Stewards with a trainer from the BC Ministry of Water, Land and Air Protection to learn about making archival photo records for monitoring erosion, streambed changes, human impact and other changes in habitat.
Apr. 15-17, 2004	Fry Trapping: Identifying indigenous fry before schoolchildren assist in major releases of chum fry and coho smolts in the following weeks.
Apr. 25, 2004	Garbage Mapping: Volunteers mapped major garbage sites in the upper watershed in preparation for the Edmonds Cleanup on May 8.
Apr. 27, 2004	Chum Fry Release: Children from Nelson Elementary released 20,000—25,000 chum fry into the creek with the assistance of streamkeepers and the Department of Fisheries and Oceans.

Appendix E

Byrne Creek Appears in Japanese-Language BC Tourism Guide



PICK UP! 隠れた大自然と出会うキーワードはRavine
バーン・クreek
Byrne Creek Ravine Park

バンクーバーのダウンタウンからスカイトレインで約20分、Edmonds駅の周辺は静かな住宅街だ。駅の南側へまわり、ダウンタウン方向へ少し戻るように歩いて行くと、Byrne Creek Ravine Parkの看板が見えてくる。「ラビーン」とは、狭く切り立った小さな渓谷のこと。普通の住宅街の中に突然うっそうとした木立が現れ、切り立った崖の下に美しい小川が隠れているので、まるで魔法の森に迷い込んだような気分になる。

このバーン・クreek渓谷公園は、一周45分ほどで崖の周辺から谷底へ降り、また駅に戻る事ができる。この小さな川にも、秋になるとカッツスロート・トラウトやコーホー・サーモンなどが産卵のために遡上してくる。このため、周辺の住民は汚れた水が流れ込まないように普段から注意をおこたらず、夏の終わりには川周辺の掃除をして、鮭を守ろうとしている。

鮭の産卵期だけではなく、この渓谷の周辺には野草の花も多く、サーモンベリーやブラックベリーなどのベリー類もたくさん見ることができ、木の実を求める野鳥たちの声もすがすがしい。リスやアライグマ、時にはコヨーテの姿まで見かける。これも市民達の日常生活の一部なのだ。

このラビーンでなら、観光ポイントで出会う自然とは一味違う、さりげないエコツアアを体験できるだろう。

Translation:

"Ravine" is the Keyword to Discovering a Hidden Piece of Nature

Byrne Creek Ravine Park

There is a quiet residential area around Edmonds Skytrain station, which is about a 20-minute ride from downtown Vancouver. If you exit Edmonds Station on the south side and walk back in the direction of Vancouver, you can see a sign indicating Byrne Creek Ravine Park. A ravine is a narrow valley. A thickly wooded area suddenly appears in the middle of an ordinary residential area, and a beautiful stream is hidden at the bottom of steep slopes, making you feel like you are wandering into some magical woods.

You can make a 45-minute walking loop in this park by walking along the sides of the ravine to the bottom, and then return to the station. Cutthroat trout, coho, and other salmon return to spawn in this small creek in autumn. People in the neighborhood are careful not to let polluted water run into the stream, and volunteers clean up along the creek at the end of summer and protect salmon.

This creek is a highlight not only in the salmon spawning season, but also throughout the year. There are many wild flowers and fruit such as salmonberries and blackberries in the ravine. Birds try to find seeds and fruit on trees, and their calls are refreshing. You can also see squirrels, raccoons, and even coyotes sometimes. These scenes are part of people's daily lives.

You can enjoy a casual eco-tour in this ravine, which is different from the nature you can encounter at well-known tourist sites.