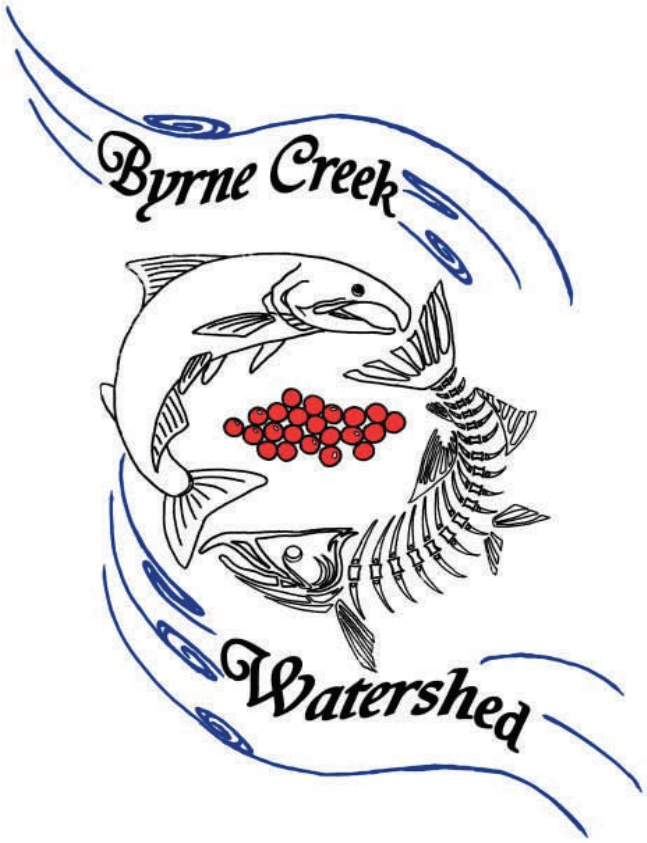
Byrne Creek Watershed

2010 Status Report

Burnaby, B.C.



Byrne Creek Streamkeepers

www.byrnecreek.org

March 31, 2011

Note to Readers:

Byrne Creek Streamkeepers produced annual "state of the creek" reports for 2004, 2005, and 2006, all of which are available for download as PDFs from our website at www.byrnecreek.org. This 2010 report incorporates data from those reports, and updates it with the intervening years.

Our group does not have any paid staff, so data collection and report writing are purely volunteer activities. We are excited to be back with a fresh annual report.

Byrne Creek Streamkeepers used a portion of a Public Involvement Program grant from the Department of Fisheries & Oceans toward printing this report.

Byrne Creek Streamkeepers thank the DFO, in particular our Community Advisor Maurice Coulter-Boisvert; the City of Burnaby Engineering, Parks, and Planning departments; and the Pacific Streamkeepers Federation for their guidance and assistance over the years.

This report proudly produced by 100% volunteer labour
—from data collection to writing, editing, photography, and layout—
in Burnaby, British Columbia, Canada!

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Maho Hayashi & Katy Burkholder

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Table of Contents

Summary of Byrne Creek Watershed Health Indicators

Byrne Creek has suffered badly over the last few years. Fish kills due to toxins entering the creek through street drains have been occurring year after year. Numbers of salmon returning to spawn have been steadily declining for five years. Unless dramatic action is taken—*now*—we see the already precarious health of Byrne Creek continuing to decline.

Streamkeepers urge the City of Burnaby to quickly and widely implement source controls such as roadside and median swales, rain gardens, and wetlands wherever and whenever possible to get rain back into the ground and filter out toxins washed off streets and parking lots. We also look to our government agencies at all levels to step up education and enforcement, and remind the public that:

All Drains Lead to Fish Habitat

In light of this disturbing, ongoing downward trend in the health of Byrne Creek, we assign a new icon to its overall status this year:

Indicator	Rating 2006	Rating 2010	Comments
Spawners	😐 Chum ☹ Coho	☹ Chum ☹ Coho	Both chum and coho numbers were down; however, more salmon used the artificial spawning channel. There was also a marked lack of male coho in proportion to female spawners.
Juvenile and Resident Fish	☹	☹	Fish killed by toxins through storm drains four times in last five years.
Water Quality: Pollution, Sedimentation	☹		Still problems with sediment flow from construction sites; ongoing road wash; and toxic spills into street drains.
Water Quality: Bug Surveys	☹	☹	Continuing toxic kills have affected bug quantities in the upper creek.
Water Quantity: Creek Discharge	☹ 😐 Spawning Channel	☹ 😐 Spawning Channel	Huge flows from watershed due to decreasing pervious surfaces continue to cause erosion and siltation.
Habitat – Invasive Plant Species	☹	☹	Invasive plant species continue to spread.
Storm Drain Marking	☺	☺	Volunteers continue to mark drains with yellow fish

Introduction

The Byrne Creek Streamkeepers Society is a 100% volunteer group with no paid staff that is dedicated to restoring and protecting the Byrne Creek watershed in southeast Burnaby, British Columbia.

Streamkeepers undertake community projects and public education, and monitor the creek's rejuvenated populations of coho salmon, chum salmon and cutthroat trout.

By the 1980s, flood-control measures, habitat destruction and poor water quality had destroyed Byrne Creek as a fish-bearing watercourse. Streamkeeping activities began under the Vancouver Angling and Game Association (VAGA) in 1987, with members organizing cleanups, fish releases and trail construction in Byrne Creek ravine. The City of Burnaby reconnected the creek to the Fraser River in the 1980s with a flap gate instead of a pump station, enabling the return of salmon to the creek.

A major toxic spill in 1998 that killed all life in the creek galvanized the wider community to establish a streamkeeper group in 1999 that included the VAGA volunteers. With initial assistance from the City of Burnaby, and ongoing training of new members in streamkeeping techniques by the Pacific Streamkeepers Federation, the group grew and established a reputation as one of the more active environmental NGOs in the City.

After over a decade of effort totaling some 20,000 volunteer hours, the group incorporated in 2010 as the Byrne Creek Streamkeepers Society (see page 20 for details).

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

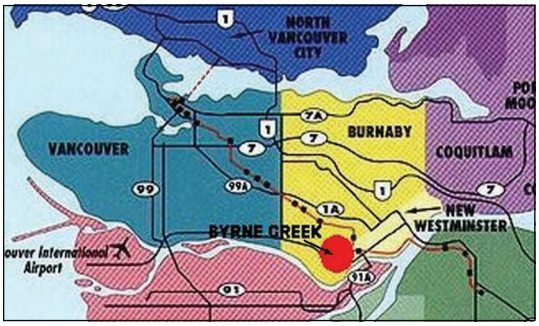
There have been four major kills in the last five years due to toxins flowing into storm drains. It takes concerted, ongoing effort by entire communities, and political will, to preserve natural gems such as Byrne Creek.

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, Fisheries and Oceans Canada (DFO), and the Pacific Streamkeepers Federation.

A Short History of the Byrne Creek Watershed:

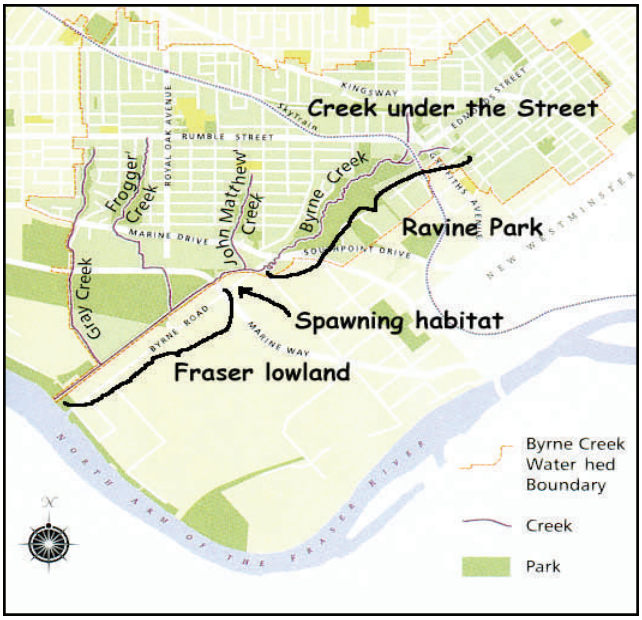
- 1960s: Wild salmon and trout disappear due to habitat destruction and water pollution
- 1980s: City of Burnaby builds a new channel across the Fraser floodplain and a flood gate, improving lowland fish habitat, and fish access between the river and the creek
- 1989: Coho salmon stocking begins; 1997: Chum salmon stocking begins
- 1998: Toxic spill into storm drain kills 5,000 fish
- 1999: Byrne Creek Streamkeepers founded
- 1999: City of Burnaby builds spawning & rearing habitat to compensate for road construction
- 2004: A post-rehabilitation **record 91 spawners** return to Byrne Creek (24 coho, 67 chum)
- 2006, 2007, March 2010, Nov. 2010: Major fish kills due to toxins flowing into storm drains—hundreds to thousands of fish die in each incident
- 2007: Spawner returns begin to decline, falling to just 10 salmon (6 chum and only 4 coho) in 2009, and 13 salmon (5 chum and 8 coho) in 2010.

Getting Located



Byrne Creek is located on the steep southern slope of Burnaby.

The watershed drains 805 hectares and is urbanized with single- and multi-family housing, industrial and retail areas, and green space. The map below shows green space including parks, undeveloped and agricultural land. There is 178 ha of green space in the watershed, or 22 percent of the total area.

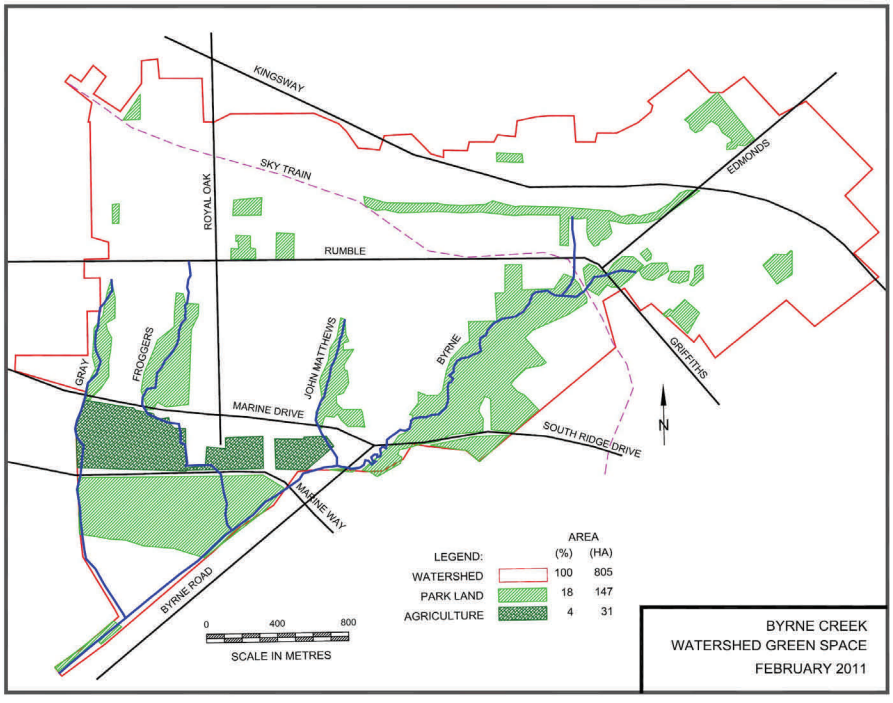


The watershed can be divided into three distinct parts:

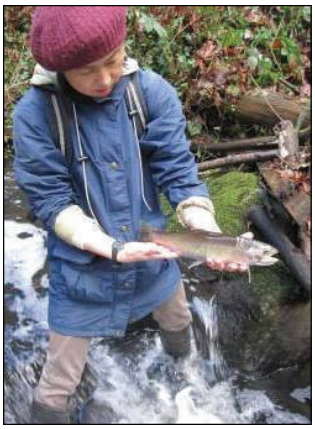
- the urbanized “Creek Under the Street” in which the creek has mostly been covered up and rainwater flows into drains on streets and through pipes.
- the relatively natural Byrne Creek Ravine Park section
- the Fraser lowlands, including the artificial spawning habitat

There are three tributary creeks in the watershed which all join Byrne Creek before flowing into the Fraser River: Gray, Froggers, and John Matthews. Each of the four creeks has its own ravine park. It is fortunate that the City of Burnaby decided decades ago to preserve ravines and no longer put creeks into pipes, as happened to nearly all of Vancouver’s creeks.

Streamkeepers reference data collection to numbered location tags. These tag numbers are used along with descriptive names throughout this report to identify locations or features of interest. A tag location map is included in Appendix A.



2007-2010 in Review



Dead fish Nov. 2010

Four fish kills in five years

Byrne Creek has suffered four fish kills in five years since the last Watershed Report in 2006, and three of those happened in three consecutive years. Unfortunately, that sums up what's been having the greatest impact on the creek. Despite ongoing educational efforts by streamkeepers and the City of Burnaby, some people still don't understand that:

All Drains Lead to Fish Habitat.

Mother Nature is amazingly resilient, as are the trout and salmon that populate BC's lower mainland streams. But when a creek gets hit again and again by toxins entering through the storm-drain system, it gets very quiet.

Two generations of coho salmon —fry & smolts— wiped out in one kill

One fish kill in spring 2010 wiped out not only the coho salmon smolts (yearlings) that live in Byrne Creek for a year after emerging from the gravel before going out into the Pacific, it also killed the coho fry (new babies). That's two generations of coho killed in one toxic event, not to mention the resident cutthroat trout and other species of fish and aquatic wildlife.

Byrne Creek Streamkeepers become a registered BC Society—see page 20 for details

The Downside ☹	The Upside ☺
There is still no easy way for citizens and groups to help control **invasive plants** that are taking over natural areas.	Burnaby Parks Department has added a person to address invasive plants in Burnaby.
Southpoint Rain Garden needs monitoring and a report on the success of its design with respect to costs and goals.	The rain garden was built to create a rainwater treatment pond on Southpoint Dr. It aims to filter runoff and reduce peak flows to Byrne Creek when it rains. It provides a wetland habitat between Taylor and Byrne Creek parks.
Four **creek poisonings** resulting in fish kills in five years. In addition there is ongoing low-grade soapy pollution in John Mathews Creek that has been documented for several years.	Despite repeated fish kills, fish continue to return, albeit more slowly and apparently in smaller numbers. Nature is resilient.
Streamkeepers are **burning out**. Despite all the volunteer hours many feel we are not making much progress on the health of the creek.	Byrne Creek Streamkeepers are now a BC Society, and new members are joining.
Senior agencies, in particular **Environment Canada**, are shirking their duty to enforce the Fisheries Act.	City of Burnaby is now able to issue tickets to polluters on site—a much-needed enforcement tool.
Burnaby seems to be lagging in **green development techniques** and isn't using opportunities to absorb rain along roads. It is requiring "pilot projects" despite well-proven methods already in use. The Byrne Creek ISMP, in process for four years, is still not approved and seems to focus on diversions rather than rainwater source controls.	Developers are keen to use green development techniques to absorb water and protect creeks—note rain garden treatment of the office/warehouse at 5489 Byrne Rd.
Spawning salmon numbers have been falling steadily since 2004.	The few salmon that still return delight people who walk the Byrne Creek trails and provide educational opportunities.

Byrne Creek Watershed Integrated Stormwater Management Plan

All Drains Lead to Fish Habitat!

Oil accumulated on Southridge Dr. is washed by rain into a drain that leads directly to Byrne Creek

The City of Burnaby began work on an ISMP (integrated stormwater management plan) for the Byrne Creek watershed in early 2007. Byrne Creek Streamkeeper volunteers were invited to a series of stakeholder meetings in the initial phase several years ago and received an update from City staff in 2010.

Paint that someone has poured down a storm drain empties into the creek

The two main issues facing the creek in terms of urban planning are water quality and water quantity. As the city develops and loses green space, the percentage of impermeable surfaces (hardened surfaces that keep rain from soaking into the ground) rises with more roads, parking lots and buildings. Since all the rain that falls in the watershed is conveyed by the storm-drain system directly into the creek, this results in a constant flow of pollutants such as gasoline, oil and antifreeze drippings, brake-lining dust, and anything else that ends up on roads and parking lots. This also means that the creek becomes very flashy—the volume of water rises swiftly and dramatically when it rains, leading to erosion and scouring.

Streamkeepers feel that the best way to reduce both the volume of water, and the pollution, is to get as much rain back into the ground as possible. The ground is a natural sponge and filter. It slows water flow, and it removes pollutants. So we strongly support the quick and widespread implementation of source controls such as roadside swales and rain gardens. Such technology is well proven and there are many examples that can easily be copied for use in this watershed. We also support stronger building bylaws to prevent builders from paving over entire lots.

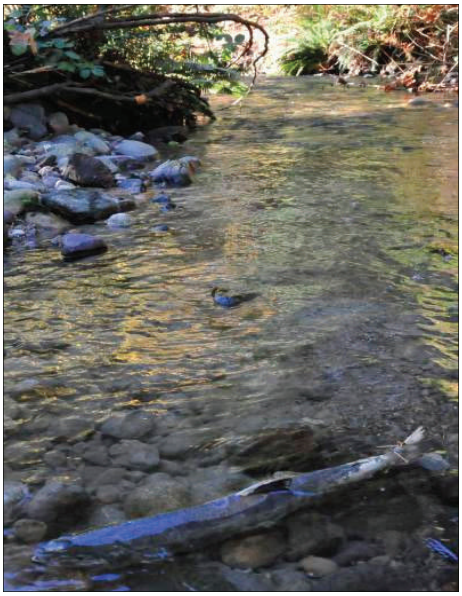
The City of Burnaby has replaced that oily drain at top left with this rain garden!

Streamkeepers oppose other options, such as the possibility of building additional pipes to bypass portions of the creek. We feel more pipes are not the solution, and they do nothing to help reduce the impact of pollution.

Streamkeepers are also concerned about some of the timelines that are being discussed. If we wait ten or twenty years to aggressively implement source controls, much more damage will have been done to the creek. We feel that the City has already missed several opportunities to implement source controls in conjunction with roadwork that has been done in the watershed in the last few years. We do not understand why swales could not have been incorporated into such projects.

In conclusion, we feel that the City should strongly consider source controls whenever it does any roadwork, parks development, bicycle and walking trail development, schoolyard projects, etc. There are many opportunities to get rain back into the ground, where it belongs. We just need the will to do so.

Fish: Spawner Returns



Byrne Creek Streamkeepers have been counting salmon that return to spawn in the creek for twelve years. The spawning season runs from mid-October to the end of December, with chum salmon returning first and coho generally not appearing until closer to mid-November.

Streamkeepers look for fish from the Byrne Road & Meadow Ave. intersection (Tag 507) to the bottom of the wooden stairway into the ravine (Tag 521) three to four times per week during the spawning period. Volunteers count the dead fish, measure their lengths, and determine their species, gender and whether they have successfully spawned. The bodies are then cut in half to avoid double-counting and are returned to the creek to provide nutrients for other plants and animals. Streamkeepers also observe the number and location of any live spawners.

The charts below summarize spawner survey results. The highest return was in 2004, when 91 spawners returned to Byrne Creek. During 2010, only 13 returning fish were observed. This is particularly disheartening given the record number of sockeye returning to the Fraser River earlier in the year, and that DFO together with streamkeepers release around 25,000 chum fry and 3,000 to 4,000 coho smolts into the creek each spring.

Concerns: Silt buildup in the artificial spawning channel discourages fish use; dogs or people walking in the creek can damage salmon eggs; high creek flows due to increases in impermeable surfaces in the watershed can increase siltation and disturb fish nests (redds).

Solutions: Improve habitat quality by cleaning gravel in the artificial spawning habitat. Post dog signs to remind owners to keep dogs out of the creek during the sensitive spawning and incubation period. Promote construction of infiltration swales and rain gardens, such as the one being completed by the City of Burnaby along Southpoint Drive.

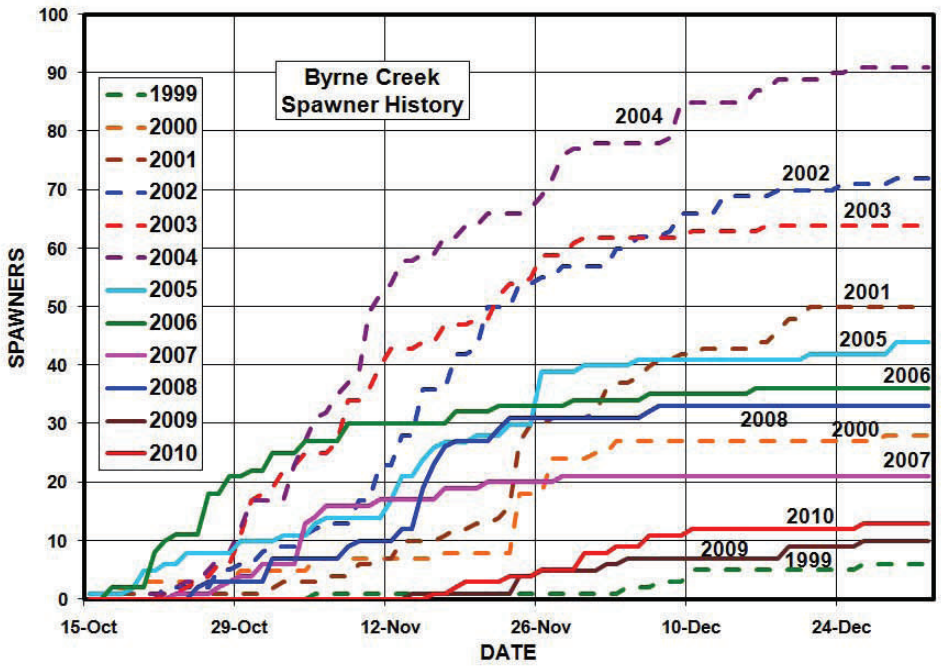
2010 Rating:

Chum ☹ Coho ☹

Spawning channel 😐

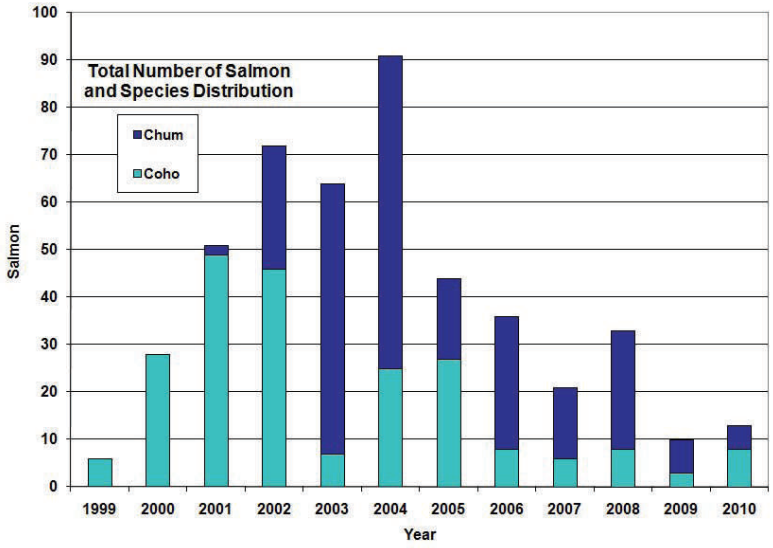
Spawning Success:

Perhaps even more discouraging is that only about half of returning fish successfully spawn. During 2010, the success rate was even lower. Reasons for this may be due to poor water quality, build up of mud where salmon spawn, high water temperatures and lack of mates (gender disparity).

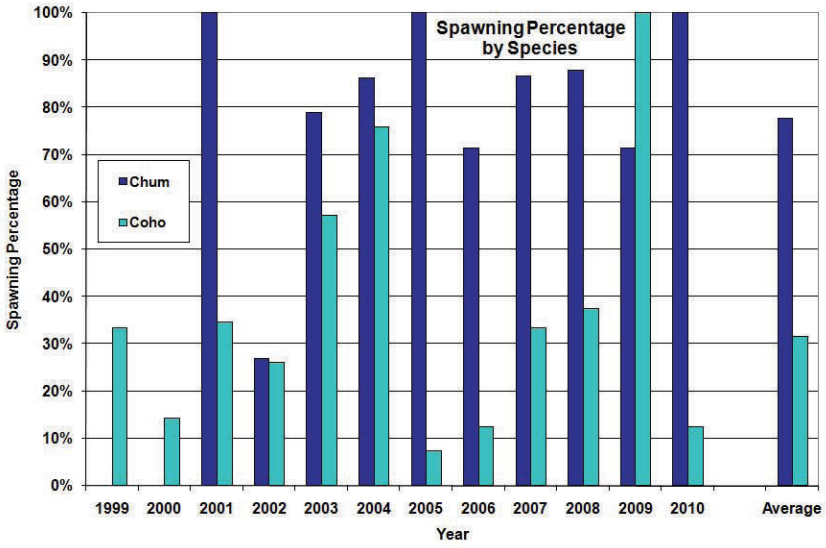


Spawner Returns Cont'd.

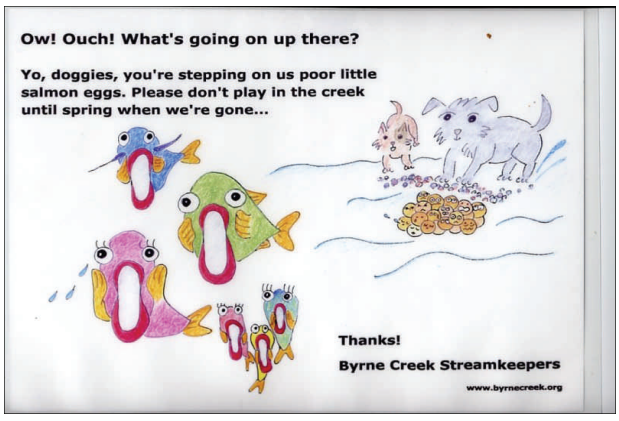
To help improve rearing habitat quality, in 2009 the City of Burnaby began periodically removing excess silt and organic sediment from pools in the spawning habitat. It is hoped that a tool currently being fabricated by UBC Engineers (see p. 13) will also allow Byrne Creek Streamkeepers to further improve the habitat for spawners. Streamkeepers have been loosening the spawning beds manually with rakes and shovels during the summer "fish window" with DFO permission.



Streamkeepers annually prepare and post friendly, cartoon-style dog signs along Byrne Creek to remind owners to keep dogs out of the creek during the particularly sensitive period between October and March when salmon are spawning and when their eggs are still in the gravel.



Whimsical dog posters we put along the creek in the fall/spring season:



Fish: Juvenile and Resident Fish Counts

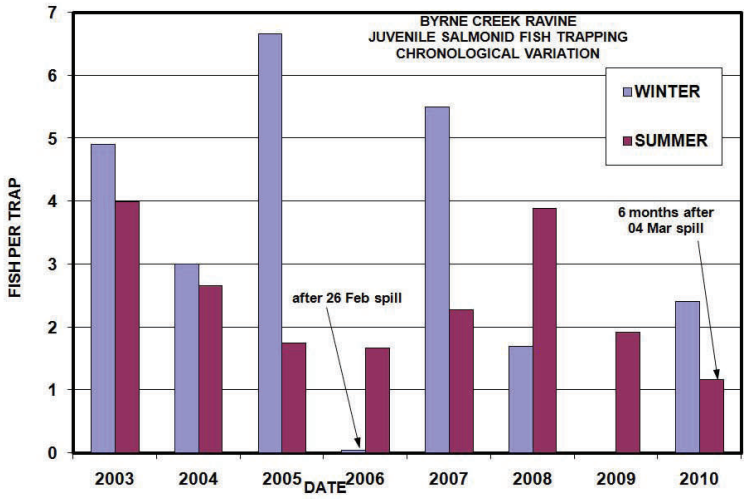
Fry that hatched in Byrne Creek

Concerns: A reduction in resident salmonid populations due to toxic spills, poor water quality, degenerating habitat and increased sedimentation.

Solutions: Increase public awareness of proper disposal of toxins and promote stormwater source controls.

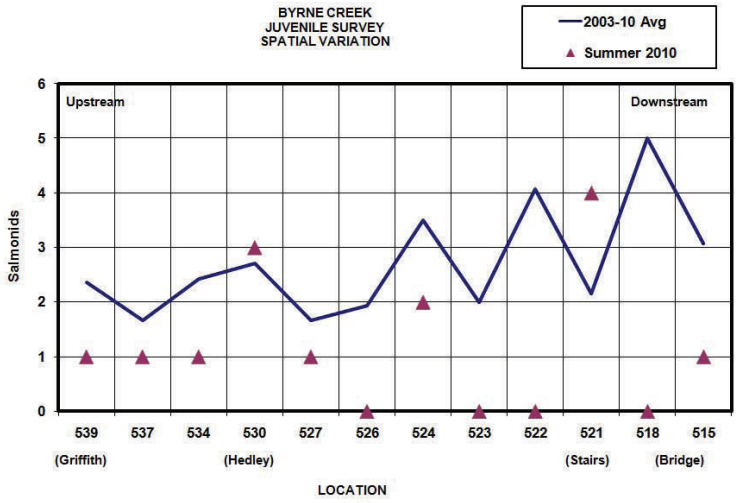
2010 Rating: ☹

Byrne Creek Streamkeepers have been doing juvenile fish trapping surveys twice a year since 2003. Traps baited with salmon roe or dry dog food are placed in pools along the ravine and retrieved a day later. The number, length and species of trapped fish are recorded along with trap location. The fish are released unharmed. Surveys are performed when no rain is predicted because trapped fish can be injured by fast water.



Though there are variations in data due to the sporadic nature of trapping, the surveys do show fish resident in Byrne Creek.

The two charts illustrate temporal and spatial results. The first chart shows that the number of fish per trap has significantly decreased in recent years, from a peak of 6.6 in winter 2005, to only 2.4 in winter 2010. The second chart shows how the juvenile fish population varies by location, and indicates that population increases at the bottom of the ravine.



Of the 430 salmonids trapped since 2003, 91% were trout and only 9% were coho. Periodic toxic spills have devastated fish populations. The 2006 winter survey taken immediately after the Feb. 26, 2006 spill yielded no fish at all. The 2010 Summer survey 6 months after the March 4, 2010 spill yielded just 1/3 normal survey results. However, the 2010 summer results were still encouraging because they showed that the fish population had partially recovered and that fish were residing in all locations along the ravine.

Water Quality: Pollution, Sedimentation

Byrne Creek suffered major fish kills in February 2006, October 2007, March 2010, and November 2010. All of these were the result of toxins flowing into the creek from street drains. Drain marking and ongoing public education are focused on reducing such impacts.

Concerns: Pollution, erosion and sedimentation from storm-drain runoff kills fish and destroys habitat.

Solutions: An ISMP that includes green roofs, SEA (street edge alternative) streets, rain gardens and creek daylighting (Ernie Winch Park?) to reduce runoff. Increase public awareness of water quality. Streamkeepers are promoting "rain drain" in place of "storm drain" so the public becomes more aware that all runoff enters local waterways.

2010 Rating: ☹

Streamkeepers are encouraged that the City of Burnaby began developing an integrated stormwater management plan (ISMP) for Byrne Creek in early 2007. The plan will likely be done in 2011 and aims to address the following:

- Identify areas prone to flooding, erosion and sedimentation, and measures needed to reduce the risk of damage;
- Explore all stormwater source control management options, including online and offline detention systems;
- Review land use plans to improve stormwater management and protect the environment;
- Provide enhancement opportunities for aquatic and wildlife habitats; and,
- Reduce pollutant loadings, including inappropriate discharges, and improve water quality.

More information about the ISMP can be found on page 7 of this report.

Foam comes down the fish ladder at Griffiths Pond following a house fire in Nov. 2010. Though firefighing foam is said to be non-toxic, a combination of chemicals stored in the house appear to have killed hundreds of fish in the creek

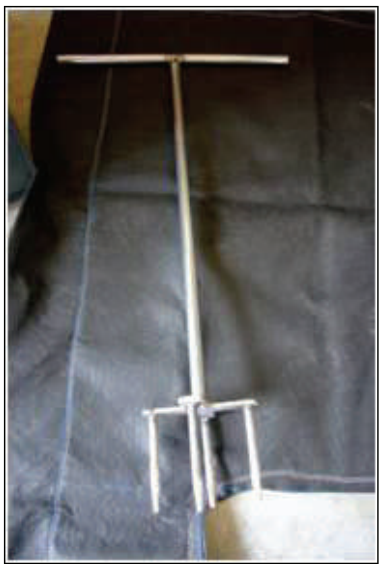
Byrne Creek Streamkeeps found some fish barely alive following this Nov. 2010 incident, and attempted to revive them in clean water drawn from another south slope creek, but unfortunately they all eventually died

UBC Students Community Service Learning Program

In 2010 BCSS was contacted and asked to participate in a program which connects first-year UBC engineering students with community groups and tries to solve a particular problem through discussion, problem solving, design and construction/fabrication.

BCSS asked the students to try to develop a tool to assist in removing silt sediment from gravel and cobble in the artificial spawning channel.

Working with the students was interesting and exciting as they brought "fresh eyes" to the problem and were able to prepare several concepts that were potential candidates for a prototype. As we worked through the concepts we narrowed them down to one which can be described as a manual "agitator," containment box and silt-extraction device.



Agitator and silt filter bag

As of February 2010, the fabrication part of the project had just been completed and it had been tested in the UBC hydrologics laboratory. Eventually the device will be tested in the spawning habitat following the receipt of necessary permits from various agencies and levels of government.

The agitator is a hand-powered tilling device that stirs up gravel in the streambed. The containment box is a bottomless tub which is placed in the stream and the agitator work is done inside the box. A neoprene skirt on the bottom of the box creates a seal. The containment box also has a hose connection which is attached to a silt extraction device. The device consists of a gasoline-powered trash pump and dewatering filter bag. The pump sucks the silty water out of the containment box and discharges it into the filter bag where the silt is stockpiled. The clean filtered water then drains safely into the ground on shore.

Containment box

The following program description is from the UBC Community Service Learning website:

"Community Service-Learning" or "Service-Learning" refers to a model of experiential learning that combines classroom learning with volunteer work designed to achieve community goals. Students' real-life experiences in the community are linked to academic content through processes of critical reflection such as journal writing, small group discussion, and the writing of analytical papers

Water Quality: Invertebrate Surveys

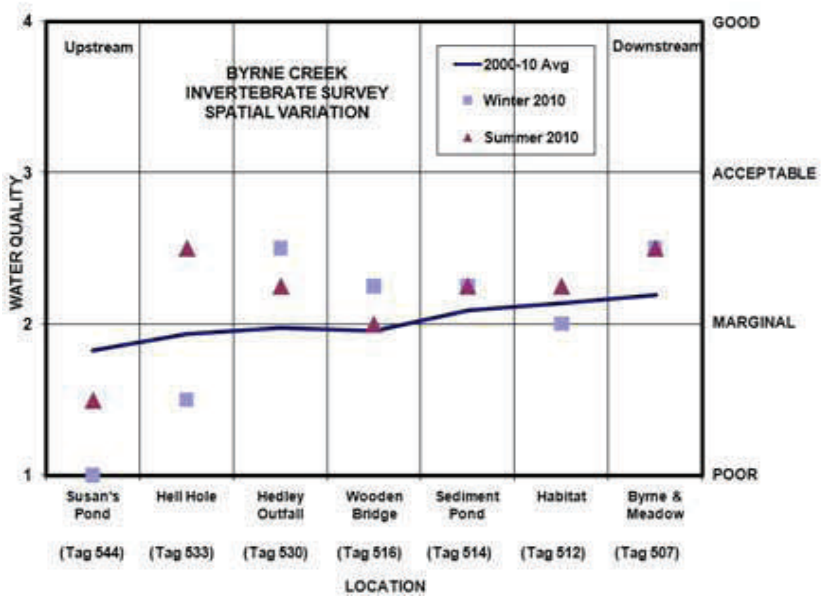
Kinds and numbers of aquatic bugs (invertebrates) indicate stream health. Some species are very sensitive to pollution. Others, such as aquatic worms, can tolerate poor water quality.

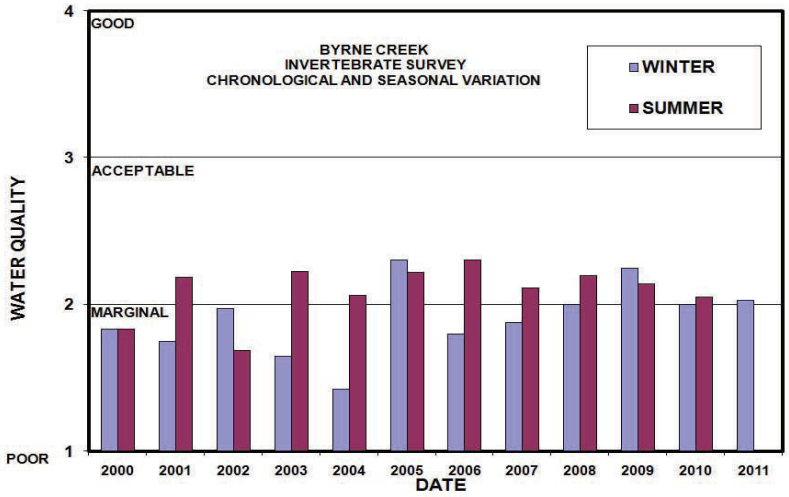
For the past 10 years, Byrne Creek Streamkeepers have done invertebrate surveys twice a year (winter & summer) following the methodology in the *Streamkeepers Handbook* (www.pskf.ca).

Concerns: Too much pavement, loss of forest and natural spaces leads to poor water quality as toxic substances enter the creek from drains.

Solutions: Use rain gardens as source controls to filter pollutants. Reduce paving and concrete boulevards. Increase public awareness of rain drains, car washing, cars leaking oil and anti-freeze, and pesticides.

2010 Rating: ☹





Findings: The water quality in the upper part of Byrne Creek is almost always poor to marginal as it is surrounded by residential and industrial areas with lots of pavement and roofs that direct rain into the storm-drain system, carrying toxins along.

There is little natural area left along the creek in the upper part of the watershed. Toxic spills causing fish kills tend to come from the upper watershed.

Urban runoff into street drains includes vehicle-related pollutants from roads, fertilizers and pesticides from gardens, industrial effluent, chemical substances, etc.

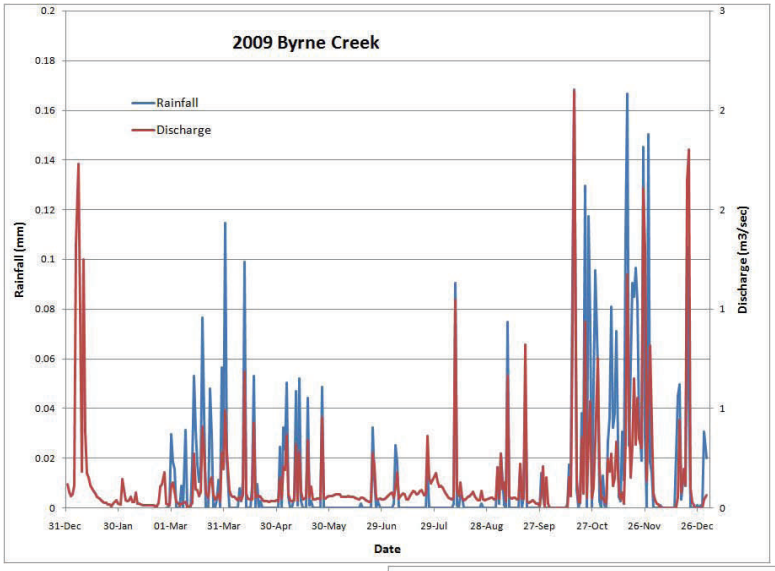
Although the water quality improves slightly moving downstream, the rating still remains between marginal to acceptable. The reason the quality improves is due in part to natural filtration as rainwater percolates through the ground and into the creek.

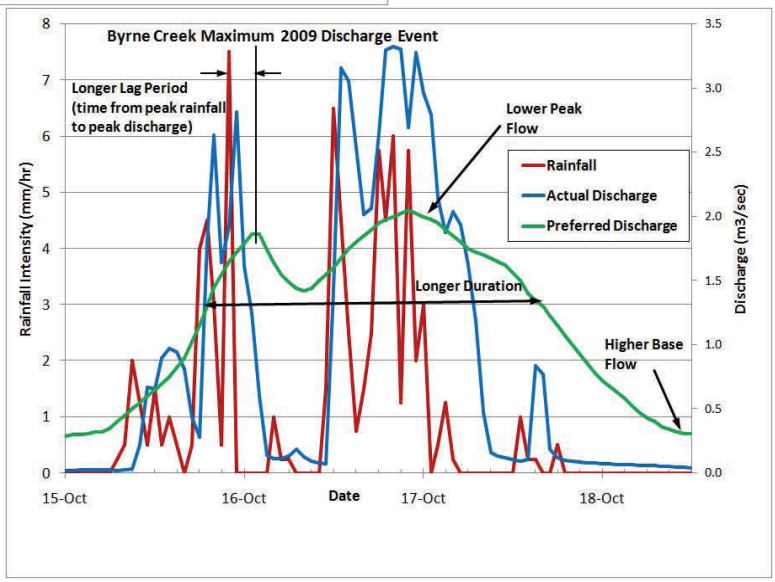
Water Quantity: Creek Discharge

The first chart shows daily average rainfall and flow in Byrne Creek during 2009. The second chart shows the heaviest rain in 2009.

Because of its urban environment in which all drains on roads and parking lots lead directly to the creek, Byrne Creek responds very quickly to rain and has high peak flows. After a rain ends, the creek quickly returns to its low base flow. This "flashy" stream behaviour is due to the large areas of pavement surrounding the creek.

A more natural flow during rains is shown by the green curve in the second chart, where a watershed has less pavement and more source controls such as swales and rain gardens to direct rainfall into the ground rather than into pipes. A natural flow causes less erosion and provides better fish habitat.





Concerns: The watershed is becoming increasingly paved and built on, leading to higher peak discharges. Single-family homes are being replaced by larger houses with a larger footprint on each lot, or by higher-density development. We continue to lose urban forest areas, and lawns and gardens, in the upper watershed.

Solutions: All new single-family residences and multi-family developments should retain green space and include source controls. Encourage SEA (street edge alternative) streets and rain gardens (such as the one being completed by the City of Burnaby along Southpoint Dr.). Support green roofs and rain barrels. Reduce pavement and plant more trees throughout the watershed.

2010 Rating: ☹

Thanks to the City of Burnaby and Kerr Wood Leidal Associates Ltd. for access to the data used to make these graphs.

Habitat: Invasive Plant Species

Five species of invasive plants are a serious problem in much of the Byrne Creek watershed: Japanese Knotweed, Himalayan Blackberry, English Ivy, Policeman's Helmet, and Scotch Broom. Other invasive plants present include Morning Glory and Lamiastrum. The map below shows the distribution of five species along the major trails in the ravine park.

Example Species: Policeman's Helmet

It spreads quickly and thickly in wetland areas like creeks, ditches, ponds and lakes, and poses a problem by:

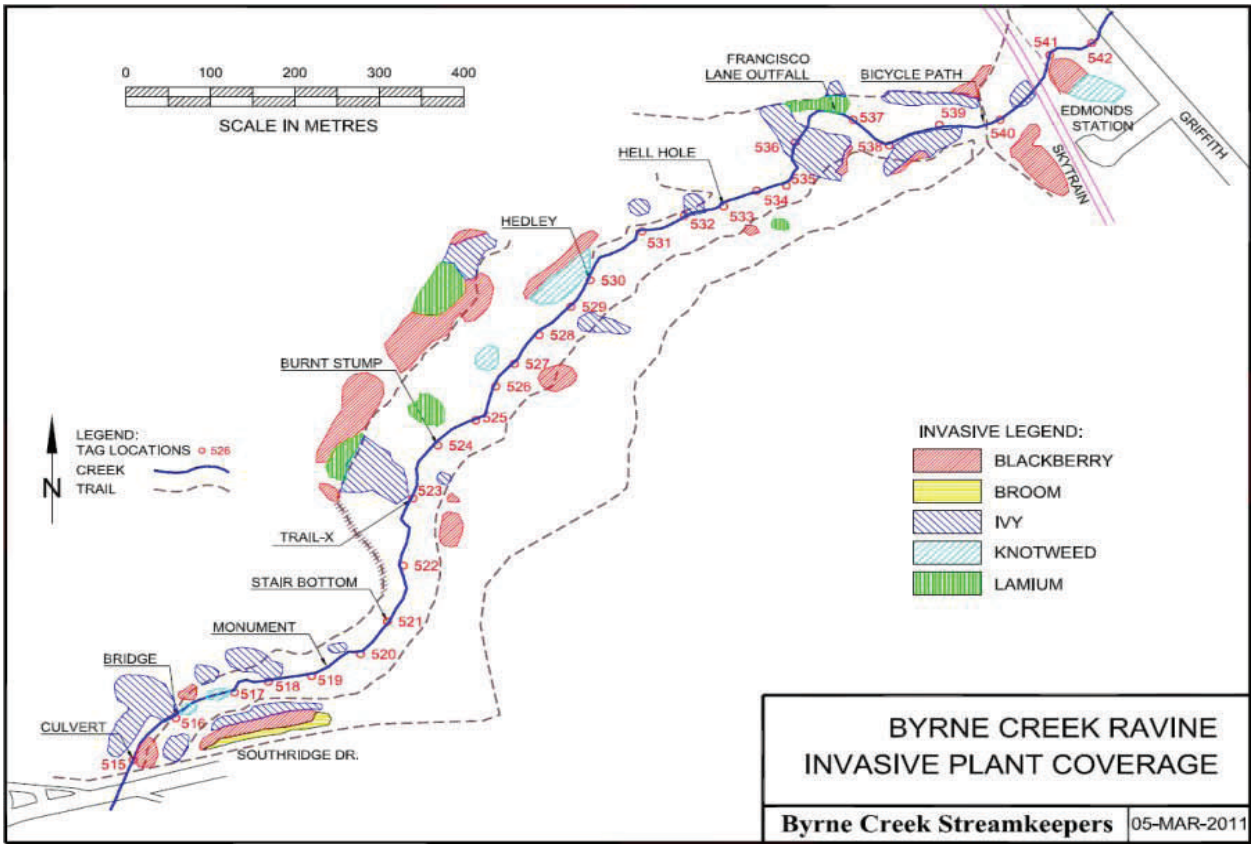
- smothering native plants by denying them light
- spreading swiftly and densely, with the ability to literally choke shallow areas of creeks and still water
- Becoming a monoculture—a single species occupying large swaths of territory

Policeman's Helmet is prevalent along the lower reaches of Byrne Creek. Hundreds of hours of volunteer time have been spent during the spring and summer several years in a row to remove this plant in and along the creek between Meadow Ave. and Byrne Rd., and as far downstream as the confluence of John Mathew's Creek and Byrne Creek. This is an ongoing struggle, and Policeman's Helmet is running wild further downstream.

Concerns: Invasive plant species are choking the creek and displacing native plants in the watershed.

Solutions: An integrated invasive plant species control program needs to be established in which the City engages volunteers to combat this escalating problem, in combination with replanting with native species of plants, shrubs and trees. A dumpster placed in the habitat would aid in the collection and proper disposal of invasive species. Increased public education and enforcement are required to stop dumping of organic matter in ravines and parks.

2010 Rating: ☹



Rain Drain (aka Storm Drain) Marking

Concerns: Uninformed people periodically dump toxic materials down drains, killing fish and other life in the creek.

Solutions: Drain marking is an integral part of our continuing public awareness program to educate people about appropriate watershed management practices. Streamkeepers are encouraging the use of "rain drain" in place of "storm drain" so the public becomes more aware that all runoff enters local waterways.

2010 Rating: ☺

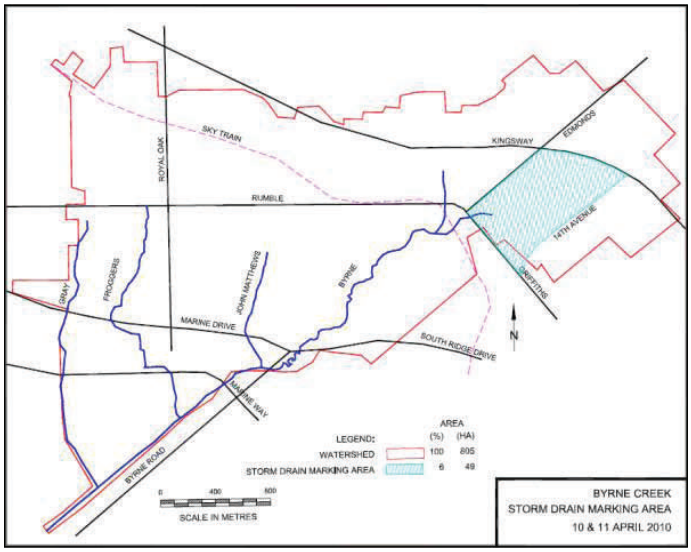
As a positive response to the devastating March 4, 2010, spill that killed thousands of fish in the creek, the Byrne Creek Streamkeepers marked street drains in the entire area in which the toxin was thought to have been dumped down a street drain. On April 10 and 11, 2010, 12 volunteers worked a total of 42.5 hours marking drains and delivering pamphlets. The targeted neighborhood from Edmonds to 14th Avenue, and from Griffiths to Kingsway has an area of 49 ha, or 6% of the entire watershed.

The Department of Fisheries and Oceans provided Byrne Creek Streamkeepers with enough vinyl fish, glue and door-hanger pamphlets to cover the entire area. On July 22 and Aug. 15, the Byrne Creek Streamkeepers did another 10.5 hours of drain marking.

In recent years, Byrne Creek Streamkeepers have replaced traditional painted fish with vinyl fish which are glued to the pavement—a much more permanent solution. Many of the vinyl fish are still vibrant after 5 years or more, while painted fish often fade after just 1 - 2 years. The vinyl fish are much faster to apply, and kids and adults enjoy "beating" the vinyl fish with rubber hammers as part of the application process.

Drain marking helps remind people that water entering these drains flows directly into Byrne Creek. Ignorant or thoughtless people sometimes dump toxic household wastes, such as paint and pesticides, down drains, killing fish and other creek organisms.

Distributing brochures is key as they explain the yellow fish and provide home-based tips for stream care. Marking helps educate people to stop harmful actions, while providing alternate suggestions.



Area marked by volunteers on April 10 & 11, 2010

Community Involvement

Taking MP, RCMP, City Councillors on creek tour—streamkeepers regularly invite politicians and staff from several levels of government to tour the creek and learn about how to keep it healthy

One of the primary goals of streamkeepers is to educate the public about their local watersheds, the importance of backyard creeks to urban biodiversity and our own health and well-being, and how to protect them.

Appreciating Earth Day donation from Choices Markets

The Byrne Creek Streamkeepers organize or participate in a wide variety of events throughout the year where we set up our information booth and talk to the public about local environmental issues. We try to educate in a friendly manner, and teach folks of all ages about the Byrne Creek watershed.

We always take part in the spring and autumn Clean Sweeps as partners with the Edmonds Business & Community Association. Other events we take part in include the annual Alta Vista Park picnic, the Stoney Creek Great Salmon Send-Off where the public are invited to release fish into the creek, the City of Burnaby's Environment Week, Canada Day celebrations, etc.

An event that we attended regularly and greatly enjoyed was the annual Night of Lights lantern festival at the Shadbolt Centre, where we displayed our salmon lanterns. While this event appears to have gone fallow, if it returns, so will we!

Streamkeeper volunteers at the Edmonds Clean Sweep

Of course a key event for all streamkeepers is Rivers Day on the last Sunday in September every year, and our group has been very active in the Burnaby event for over a decade

Hemlock Printers staff & family members joined streamkeepers in the May 2010 Edmonds Clean Sweep

Engaging Youth and Schools

Volunteer orients kids to the creek

Encouraging youth involvement in streamkeeper events is an ongoing activity. Educating youth about environmental issues makes them more likely to lead environmentally conscious lives in the future.

Byrne Creek Streamkeepers maintain connections with youth groups who want to help. We work with Girl Guide and Scout groups to mark drains in our watershed to show that they connect directly to local streams. We continue to invite elementary school classes to annual releases of chum fry and coho smolts into Byrne Creek.

BCIT students use the creek for field trips

Streamkeepers have attracted several youth members from the Leos Club at Byrne Creek Secondary School, and we value their enthusiasm. We also continue to participate in educational tours of the watershed with older students from BCIT.

Community Fish Releases by Elementary Schools

Byrne Creek Streamkeepers have been releasing salmon fry and smolts into Byrne Creek since 1990.The Department of Fisheries (DFO) brings the baby salmon from the Bell-Irving Hatchery at Kanaka Creek. The release dates are set by DFO and are the last week of April for 20,000 to 25,000 chum fry and the first week of May for 3,000 to 4,000 coho smolts (yearlings).

As part of our community education programs, we involve elementary schools in the Byrne Creek watershed in the releases. Over the years we've included Chaffey Burke, Clinton, Glenwood, Kenneth Gordon, Nelson, South Slope, Stride Ave., Suncrest, and Taylor Park elementary schools.

Elementary schoolkids enjoy releasing young salmon into the creek

DFO Community Advisor Maurice Coulter-Boisvert makes an educational presentation at each release. The children all receive a color fish identification poster and a fish ID keychain. Over 700 grade 3 to grade 7 students have been involved since 2000.

We also assist teachers and students who want to release their "Salmon in the Classroom" chum fry every spring.

Byrne Creek Streamkeepers Become a Registered BC Society

Volunteer restoration work began on Byrne Creek in the late 1980s, led by a dedicated group from the Vancouver Angling & Game Association (VAGA).

Byrne Creek Streamkeepers was founded in 1999, following a toxic spill into a street drain that went into the creek and killed thousands of fish and other wildlife.

We functioned perfectly well as a merry band without a constitution or any formal organizational structure for over 10 years! We liked to call ourselves a "jazz band," within which any person could take the lead on any particular activity.

Eventually we could no longer qualify for streamkeeper insurance unless we incorporated as a BC Society, so we did so in 2010.

The inaugural Byrne Creek Streamkeepers Society (BCSS) Board of Directors named **Bert Richardson**, **Bob Fuller** and **Lloyd Longeway** as Honourary Lifetime Members of the Society, for their dedication to the creek from the original VAGA days. The contributions of another "original," the late **Ken Glover**, were acknowledged by a monument in the ravine park years ago.

The BCSS board also recognized **Joan Carne** with a *Leadership Certificate* for her role as our informal yet indefatigable chair for over ten years.

Membership:

Membership is only $5.00, and we welcome people of all ages and backgrounds. We have always operated on the philosophy of "participate as much as you want, in what you like to do."

Here's to the many dozens of volunteers who have worked on Byrne Creek over the last 20+ years, racking up tens of thousands of volunteer hours! (see pages 24, 25)

Inaugural BCSS Board of Directors 2010-11:

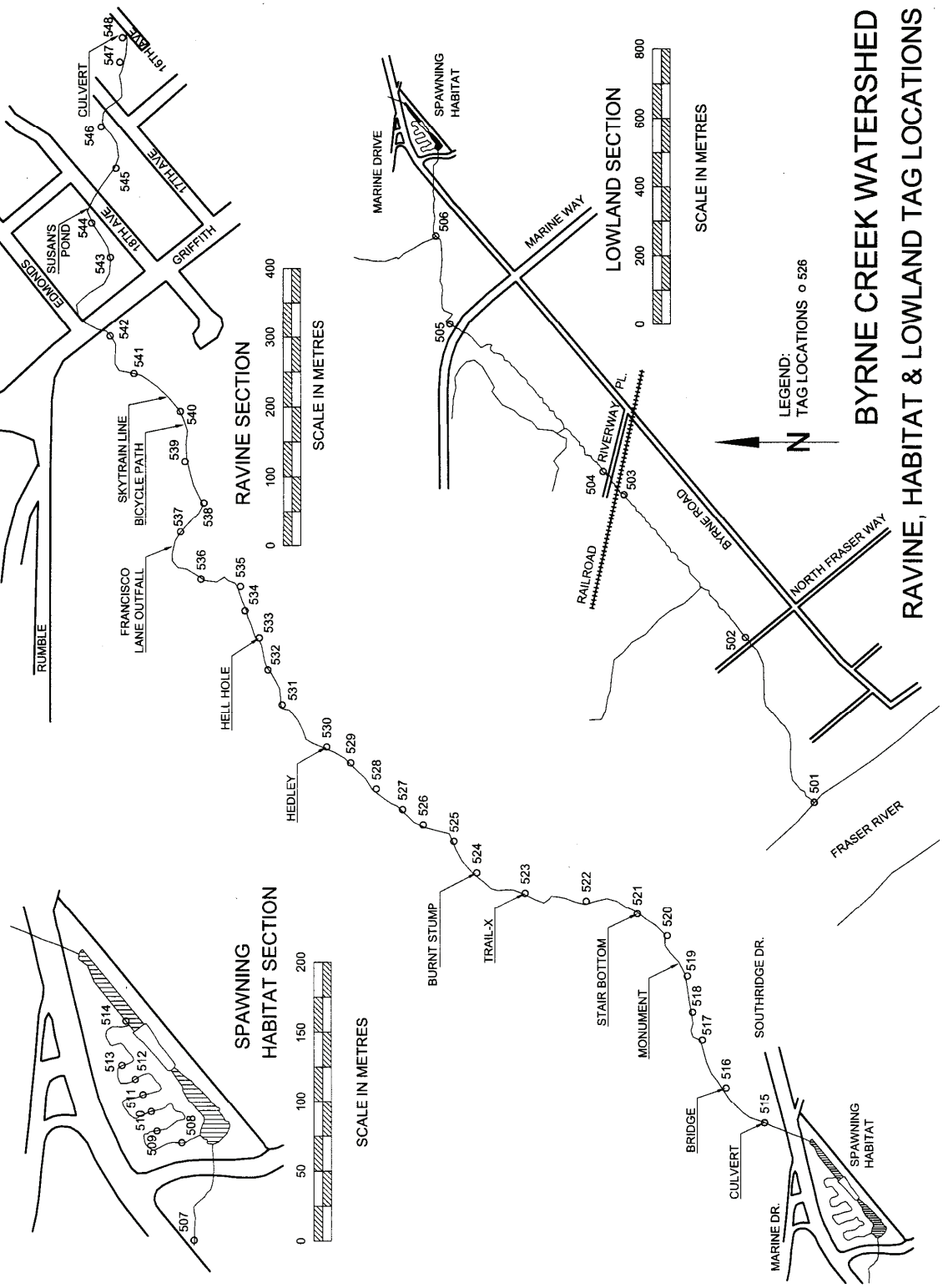
Paul Cipywnyk, president
Frank Williams, vice president
Dave Burkholder, treasurer
Abby Schwarz, secretary
Maho Hayashi, director at large
Joan Carne, honourary past president, director at large

Bert Richardson

Lloyd Longeway (l) and Bob Fuller (r)

Ten-year chair Joan Carne receives leadership certificate from new BCSS president Paul Cipywnyk

Appendix A: Byrne Creek Tag Locations



Appendix B: Byrne Creek Ravine & Meeting Locations

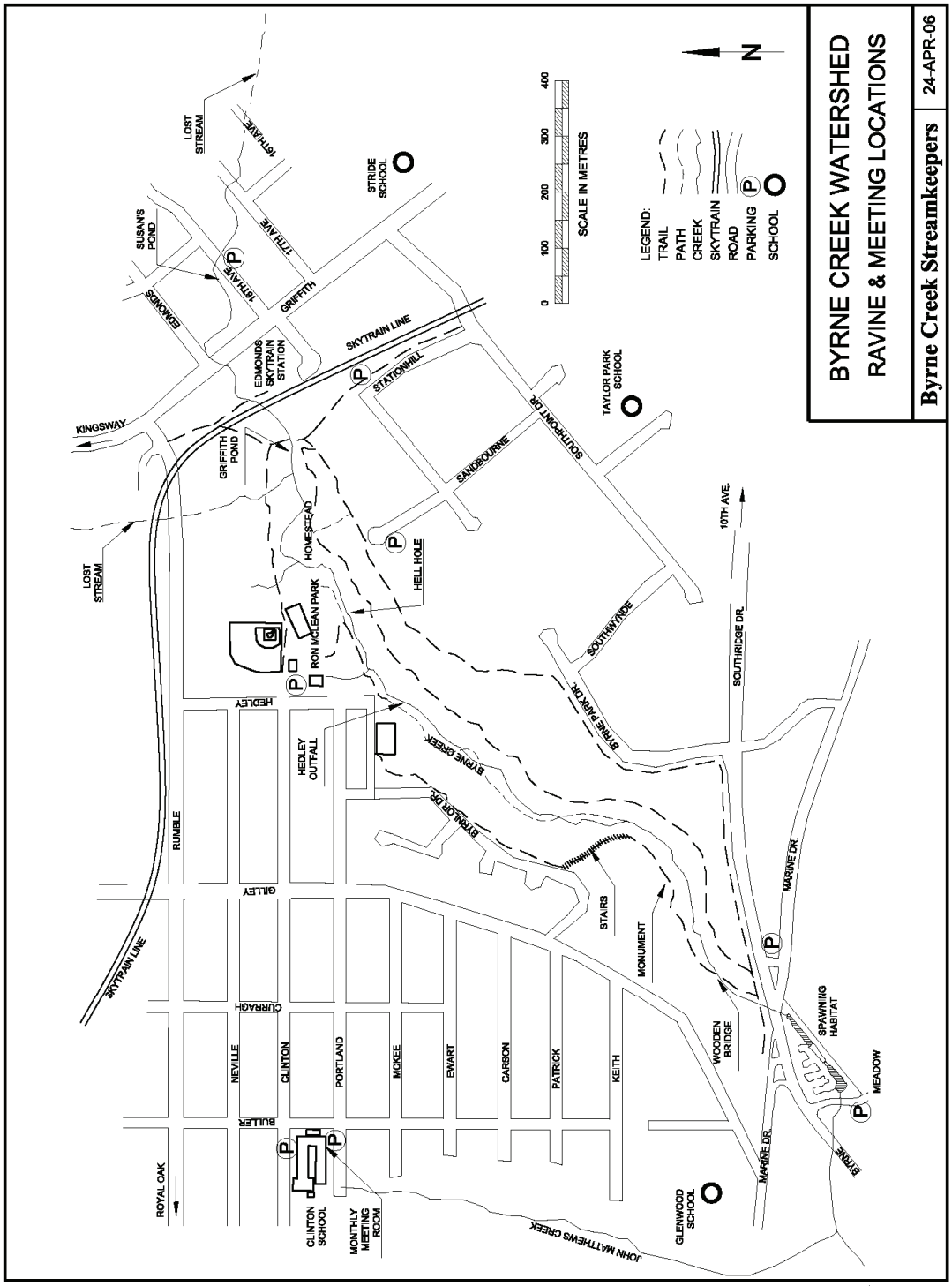


FIGURE 2

Appendix C: Byrne Creek Lower Ravine, Habitat & Lowland Locations

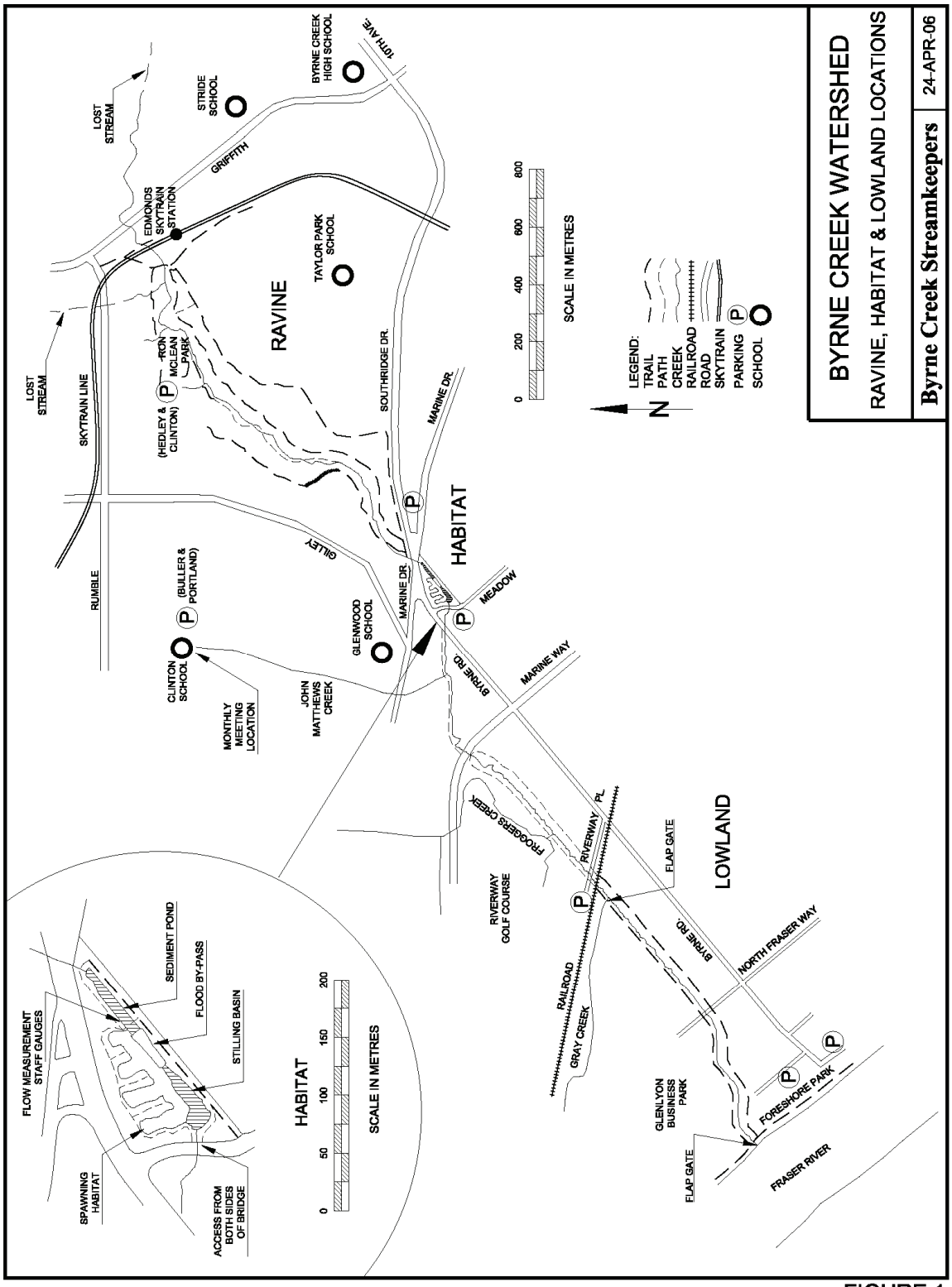
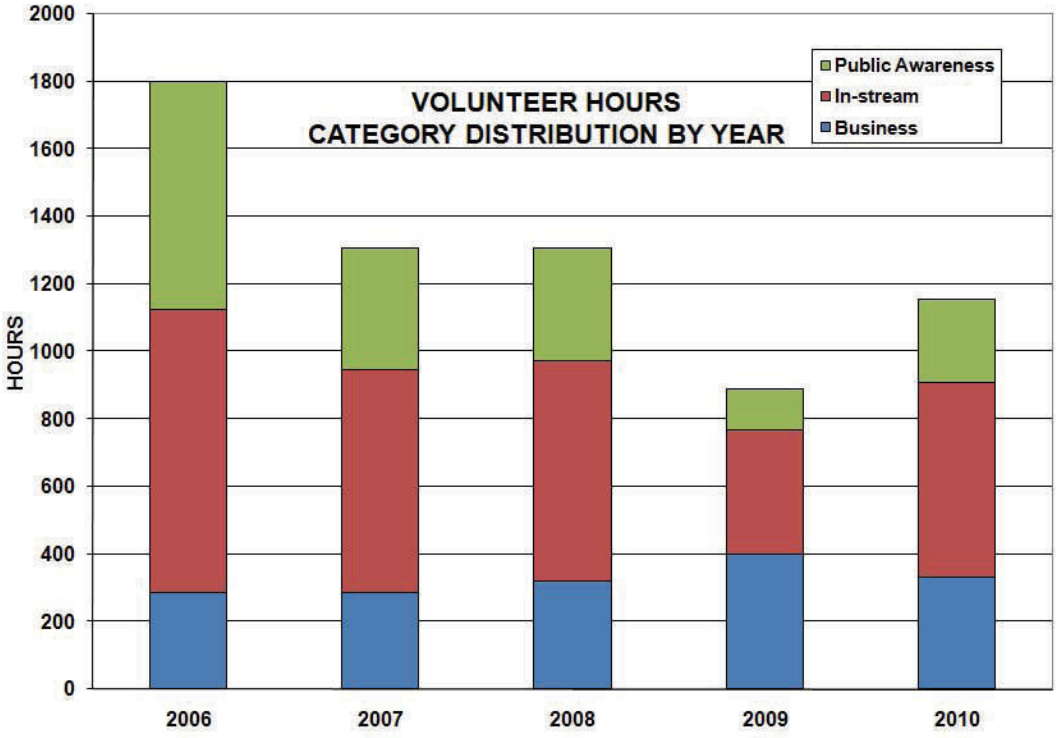
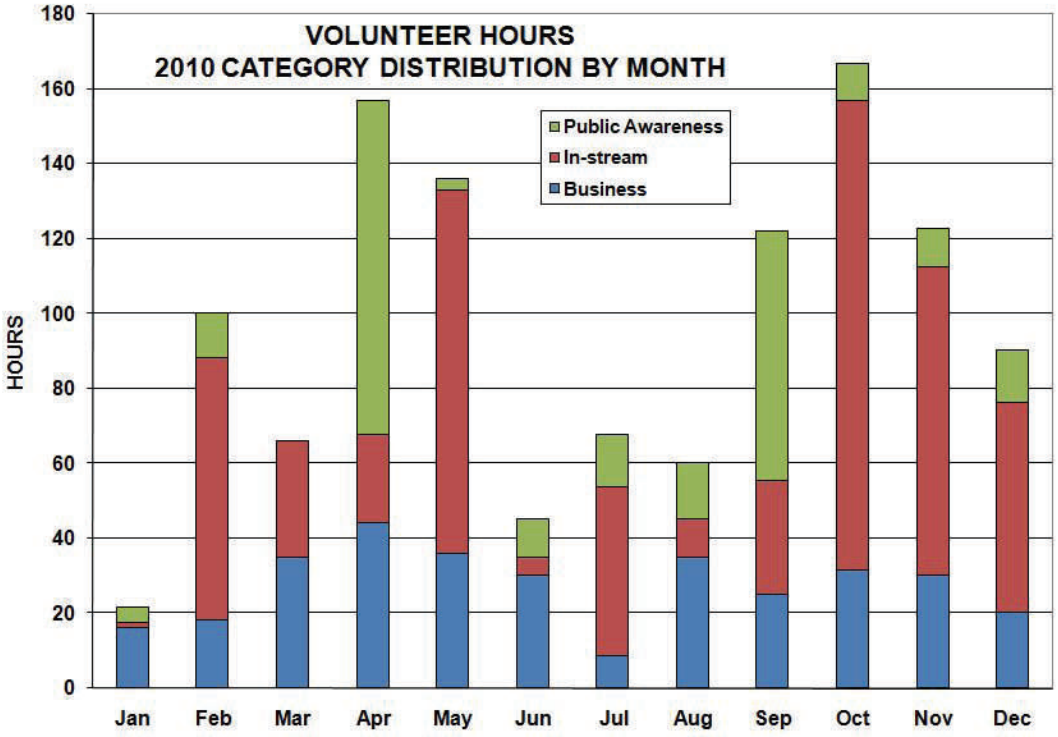


FIGURE 1

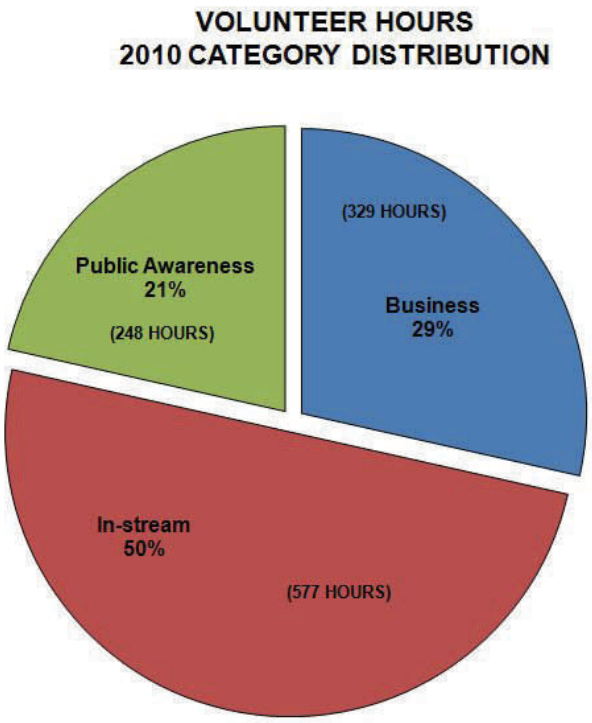
Appendix D: Volunteers Rock!

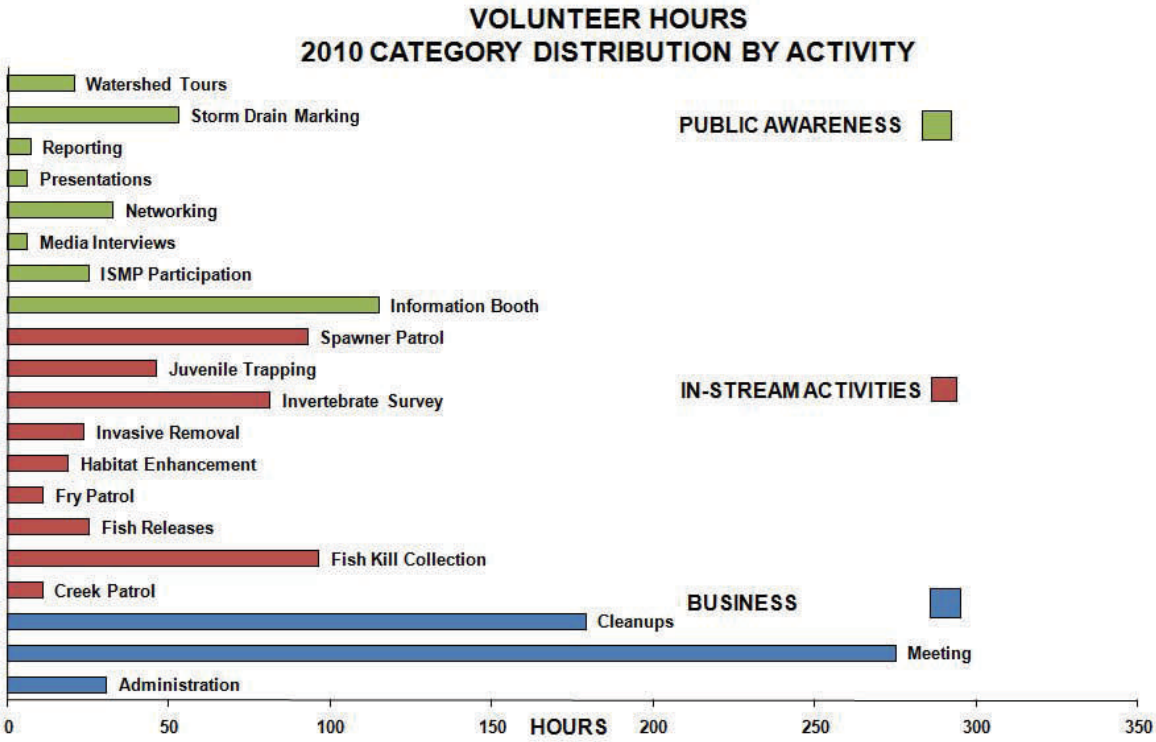
Byrne Creek Streamkeepers chalked up 1,154 volunteer hours in 2010





Appendix D: Volunteers Rock! — Continued





If you ain't havin' fun, there ain't no point! :-)

Counting bugs in comfort on a member's deck

Celebrating a cleanup day

Streamkeepers trap and release fish to ascertain species living in the creek

Volunteers hard at work at our meeting place in the Clinton Elementary School library. Thank you Clinton staff!

A gorgeous sunrise in the ravine