



the partnership
for water sustainability in bc

IREI - Inter-Regional Education Initiative



Rainwater Management & Rain Gardens: Creating the Future in the City of North Vancouver

Integrating the Site with the Watershed, Stream and Groundwater Aquifer



October 2014

*This publication is the 3rd in the Partnership's
"Watershed Blueprint Case Profile Series"*

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Introduction

*In July 2014, French documentary film director Pierre Bressiant and his film crew visited British Columbia. His purpose – incorporate a segment about BC’s Water Sustainability Action Plan in a 3-part documentary series titled **Water: A Novel**.*

Scheduled for release in mid-2015, the storyline for the documentary series will weave segments from Canada, Europe, North Africa, South America and the United States. “The vision is to turn water into a movie star,” wrote Pierre in his Director’s Statement of Intent.

*In researching who is doing what around the world, Pierre’s team discovered our waterbucket.ca website. Intrigued by what they read, they wanted to know more. After contacting us, they quickly connected the dots between our story and their theme for Episode #3, which is: **Can Water and Man Make Up?** Pierre elaborated on his vision for the series by explaining that:*

“Man is capable of the worst; how can he be capable of the best? How is he being reintroduced into the water cycle; how can he adjust to it? Which solutions, best adapted to our planet’s biology, can women and men come up with around the world today?”

Television is a visual medium. How does one bring to life, in a visual and compelling way, a story about “collaboration” and “sharing & learning” and “designing with nature”? This was the challenge facing Pierre. Serendipity played a large part in terms of how things came together once Pierre and his crew arrived in BC.

*In conversation about all the good things that local governments in BC are doing to restore watershed health, the notion of **rain gardens** clicked with Pierre. “Can you show me one,” he asked. And that is why the City of North Vancouver’s rain garden program will be showcased in the documentary. The filming experience was memorable. The City’s fire department got involved and provided a steady flow of water to simulate rain garden function when it rains. Pierre got the visuals that he was seeking!*

In this third in a series of Watershed Blueprint Case Profiles, we tell the story of City of North Vancouver’s rain garden program in the words of those who are implementing it. Through the Inter-Regional Education Initiative (IREI), this will inform sharing and learning among participating local governments on Vancouver Island and in Metro Vancouver.



Kim A. Stephens, MEng, PEng,
Executive Director
Partnership for Water Sustainability in BC
October 2014



Incorporated in 2010 as a not-for-profit society, the Partnership embraces shared responsibility and is the hub for a “convening for action” network in the local government setting. The Partnership plays a bridging role between Province, local government and community; and is the steward for the Stormwater Guidebook.

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Water: A Novel

“Our planet is like an engine that runs on water. Just look at what happens whenever the machine malfunctions: droughts, floods, fires, storms, a rising sea level, the extinction of wildlife, declining harvests... When it comes to



climate change, it always seems to boil down to either ‘too much water’ or ‘not enough water,’” wrote Pierre Bressiant in his Director’s Statement of Intent.

Turning Water into a Movie Star

“The water cycle is hardly perceptible to us, as it occurs within landmarks in time and space which are either too big or too small for us to see. We shall therefore use the pertinent technology to make these phenomena visible.”

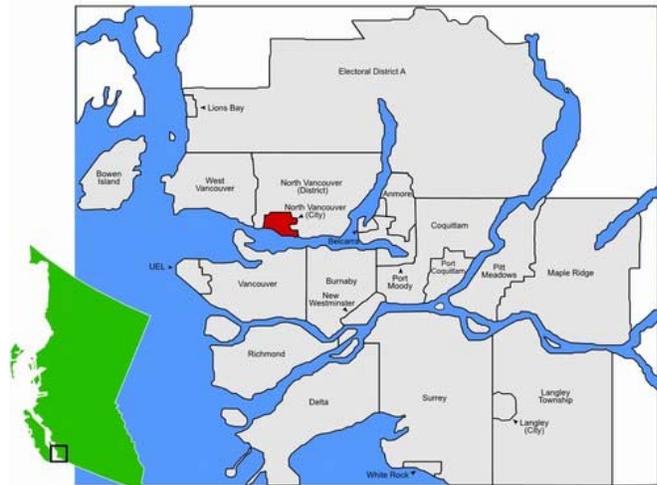
“Playing upon unexpected images, animation, special effects and models, we will have water and planet perform their magic act for the viewer. We wish to maintain a certain enchantment and wonder, never overly serious, in this overview of the political, social and environmental issues raised by the series.”

“Our viewpoint is not that of a do-gooder seeking to arouse the viewer’s guilt, but that of someone committed. We shall start with the biological cycle of water and move on to the space and role which Man occupies in this cycle. We will then explore the environmental and political questions inferred by the topic, in keeping with a very descriptive outlook, similar to that of an ethologist examining the functioning of the planet and the functioning of Man in his relationship to water,” concluded Pierre Bressiant.

Context for Showcasing the City of North Vancouver

Compact and fully urbanized, the City of North Vancouver is a community of 48,000 people that is undergoing redevelopment to higher density land use. It is a case study illustration of how a “design with nature” ethic has taken root in local government in British Columbia.

Redevelopment creates opportunities to build a greener community, live water smart and adapt to a changing climate. The City’s rain garden program embodies those three objectives. It symbolizes a commitment to making a difference over the long-term. A desired outcome is to protect and restore the health of the City’s natural watercourses.



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Why the City has a Rain Garden Program

“About a decade ago, Tony Barber brought forward the vision for building rain gardens and enhancing the City’s streetscapes. He was the staff champion whose passion and commitment made the rain garden program a reality. This is part of his personal and professional legacy,” states Mayor Darrell Mussatto.



“An engineer, Tony understood the relationship between the hardening of the urban landscape and the consequences for the City’s small streams, in particular the loss of salmon.”

“Design with Nature” got a boost with Thain Creek Daylighting

“Tony Barber generated action. He successfully made the case that there had to be a better way. He initiated changes in the City’s design practices. When I look back, I believe the turning point in Tony Barber’s ‘rainwater management mission’ was the daylighting of Thain Creek. That gave the design with nature vision a huge lift, and Council embraced it.”



Project Overview: When it was completed in 1999, Thain Creek became the largest creek daylighting project in BC. The project restored Thain Creek to its natural state as a fish bearing stream. Creek daylighting has provided value to the community through the creation of a visually attractive and ecologically functional stream corridor. Benefits include public education about fish enhancement projects.

Making the Connection between Storm Drains and Stream Health

“On the North Shore, people are passionate about their creeks. Protection of salmon habitat is important to us,” continues Mayor Mussatto. “Yet not everyone recognizes and understands the connection between our actions on the land and the impacts on fish habitat.”

“Several years ago, I prepared a slideshow that featured catch basins and Wagg Creek. Then I met with a number of community groups. First, I would show the photos of the catch basins. ‘Do you know where the road runoff goes after it enters the storm drain system?’ I would ask my audiences. Often, there would be a lot of blank looks in the room.”

“Then I would show the photos of Wagg Creek. This is where the water goes and look at the consequences, I would say. Seeing images of erosion and channel bank instability would get audience attention. Light bulbs would go on. A common response would be: ‘I had no idea, but now I get it’. Once they saw the images, they understood cause and effect. After that, the next realization was understanding that we all can make a difference by designing with nature. The change starts with rain gardens.”



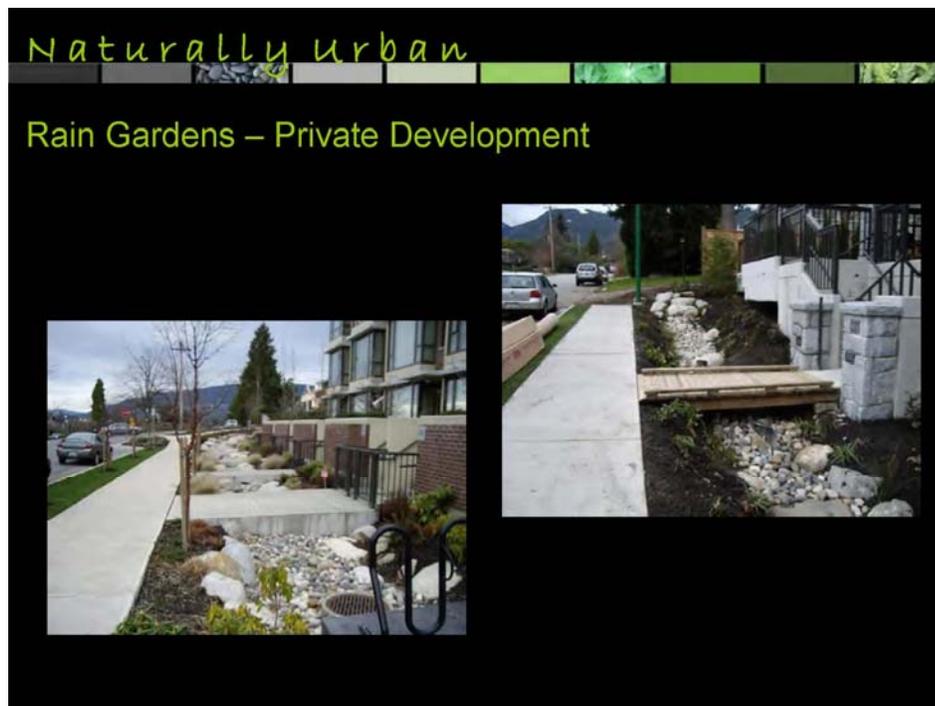
Tony Barber told the City’s story at a national conference in 2010

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Hardening of the urban landscape impacts stream health



Restoring stream health starts with capturing rain where it falls

Source: Presentation by Tony Barber at 2010 FCM Sustainable Communities Conference

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Recognize and Address the “Shifting Baseline”

“It had taken decades of urbanization to cause the progressive decline of the City’s creeks,” observes Mayor Darrell Mussatto [*on the page opposite, the images illustrate 1927 vs 2005 conditions*]. “A single rain garden will not make a material difference to conditions in Wagg Creek. But 1000 rain gardens would be a different story. These will take time to implement. The process will be incremental.”



“Restoring stream health requires a long-term commitment from the community, successive Councils and City staff. Yes, we can turn the situation around over time.”

“The work of Dr. Daniel Pauly provides a helpful picture to understand the decline of natural systems [*refer to the image below*]. Ecological expectations are lowered almost perceptibly over time because each new generation lacks knowledge of conditions before their time.”

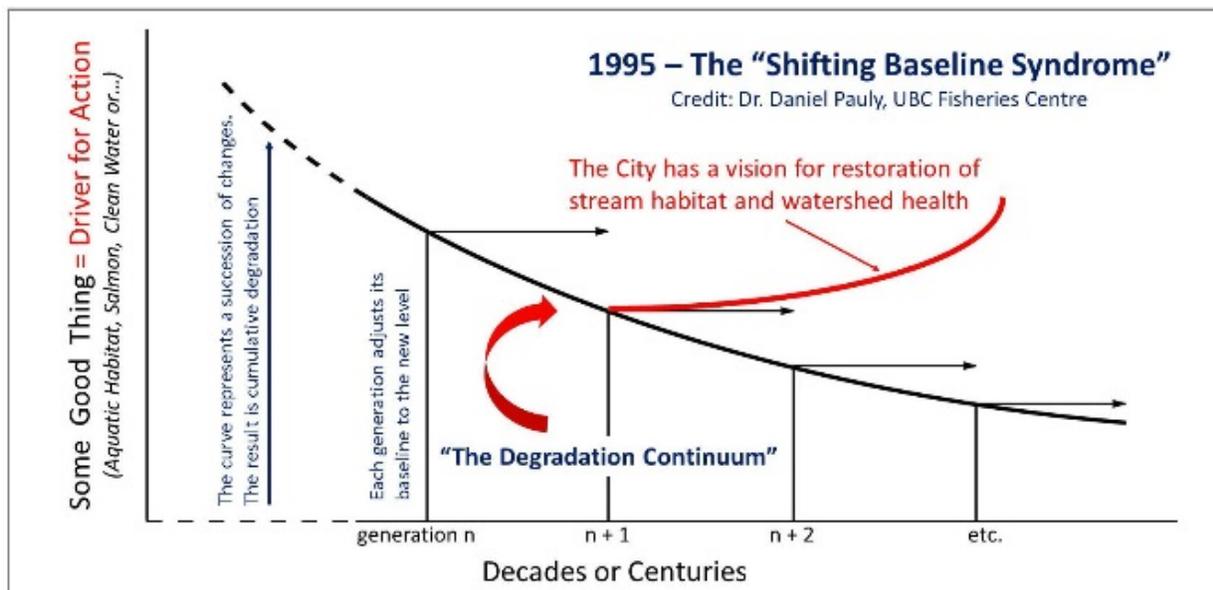
Next: Community Engagement

“The City’s rain garden program is a significant achievement over the past 10 years,” emphasizes Mayor Mussatto. “Before, the City’s mindset was out of sight, out of mind. Now, we celebrate rain. We recognize that rain gardens have ecological importance. All those rain gardens add up.”

“Now that we have success stories to share, the City is poised for the next leap forward. We are ready to engage the community in a broader conversation about rainwater management and where future rain gardens could be located.”

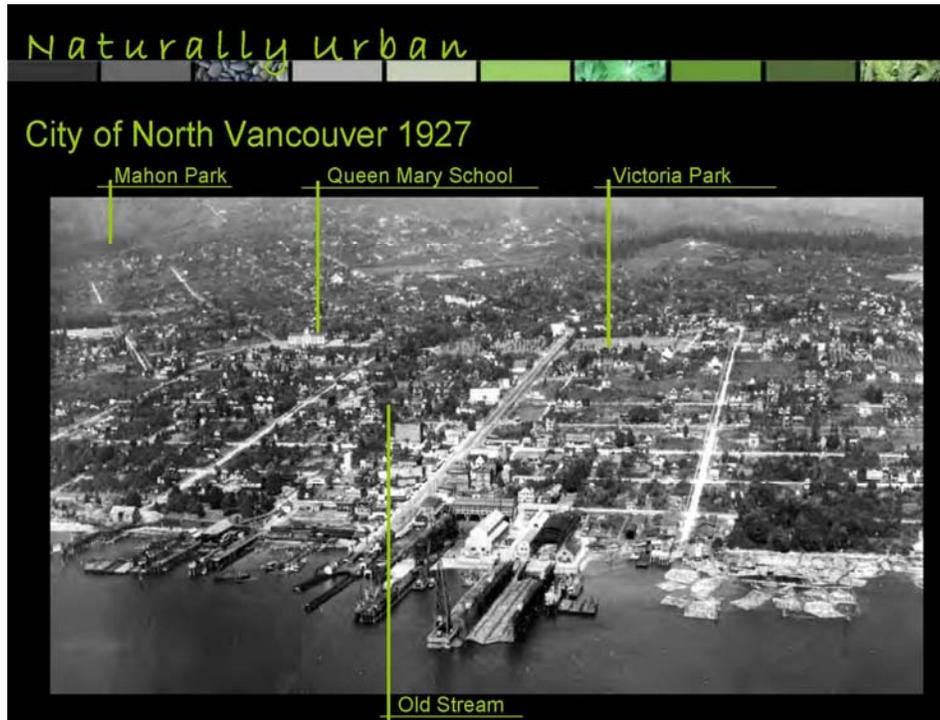
“Neighbourhoods that were initially doubtful have experienced the benefits of softened streetscapes where traffic is slower and streets feel more liveable. People tell me that they love the rain gardens.”

“We would like neighbourhoods to get involved in the design of *their* rain gardens. When citizens are engaged in projects such as this, it enriches our sense of community and encourages a greater connection to the local environment.”

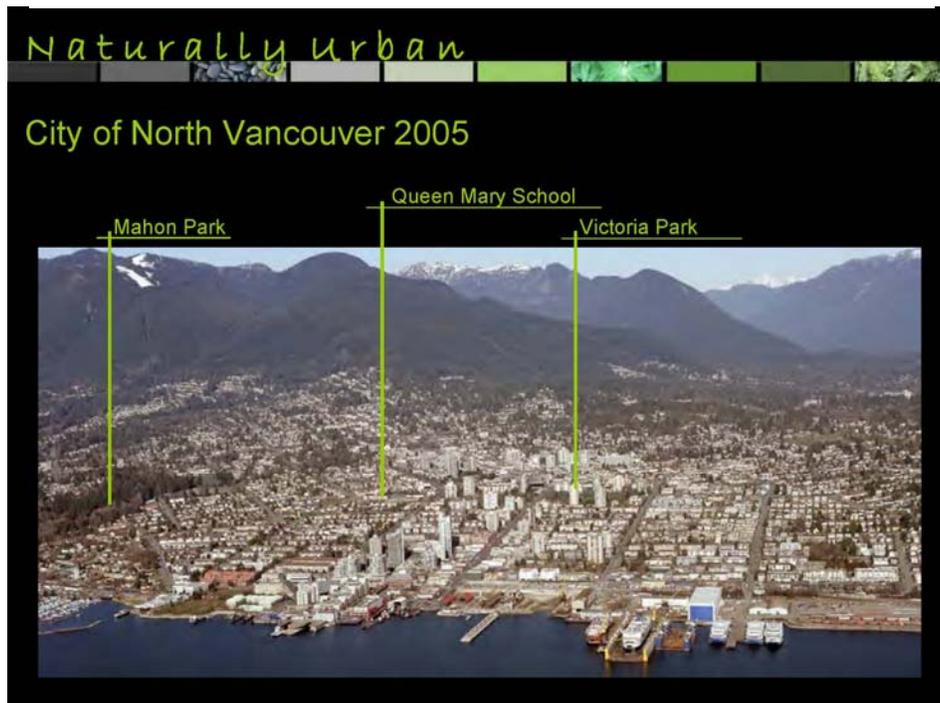


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*The landscape has been transformed and hardened over decades.
Similarly, restoring the effective absorbency of the landscape
through a City-wide rain garden program will also take decades*



Source: Presentation by Tony Barber at 2010 FCM Sustainable Communities Conference

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Enhancement of the Lonsdale Corridor

“Rain gardens have been included in the new bus bulges on Lonsdale to minimize the impact of the built environment on the City’s small streams (in this case Wagg Creek). But this is just part of the picture,” stated Tony Barber in a 2008 story posted on the Partnership’s waterbucket.ca website. At the time, he was Manager of Engineering Planning and Design



“The rain gardens also help to sustain the adjacent street trees and make the streetscape a more comfortable and attractive environment for walking. Studies have shown that appealing streetscapes also improve the viability of adjacent businesses.”

“As far as the bus bulges themselves, they reduce transit dwell times and therefore help to make transit a more attractive alternative. So to sum it up, these bus bulges help to contribute to the social, economic and environmental aspects of the sustainability of the City of North Vancouver.”

The drainage features were praised by Corino Salomi, Area Manager with the Department of



Fisheries & Oceans. “Not only do the features appear functional, they are visually appealing and interesting. Installing features like these on

a busy street like Lonsdale takes dedication and in my opinion demonstrates the kind of leadership needed to bring about improvements in how rainwater is viewed and managed.”



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Regulatory Context for Rainwater Management

In 2001, Metro Vancouver and its member municipalities recognized the benefits of a watershed-based approach to integrating drainage, ecology and land use planning. Watersheds were acknowledged as a fundamental and natural management level for the protection and use of water. Stormwater was recognized as a resource, as was the need to protect small fish-bearing streams.

The region made a commitment to the Province to have watershed-based plans in place by 2014. This commitment is a requirement in the region's *Integrated Liquid Waste & Resource Management Plan*, approved by the Minister of Environment in May 2011.

"One Water" Approach

"Through the development of our watershed management plan, known to some by the acronym ISMP, the City will be making a strong commitment to rainwater management. The ISMP will direct how we will do new developments in the City," states Peter Navratil, Deputy City Engineer.



Peter Navratil is also overseeing development of the City's water conservation strategy. "Our communication strategy needed to take a 'One water approach – from watershed to receiving water.' By looking at it this way, all aspects of water use are considered."

"Tony Barber's rainwater management legacy – he sought to achieve a balance between the public and private side management."

An Overview of the Current Rain Garden Program

The City is well-positioned to fulfil regulatory objectives related to rainwater management. This means protect and restore hydrologic function. In turn, this maintains the three pathways by which rain reaches streams, namely: surface runoff, horizontal flow in shallow soils, and deep groundwater.

Development Requirements: "Rain gardens installed within bumpouts are already a standard requirement of all developments," continues Peter Navratil. "Within our own budgets, all of our major transportation or greenway projects include the provision of rain gardens, and landscaping within the bumpouts."

"The benefits go well beyond rainwater management, addressing safer pedestrian movements and aesthetically pleasing streets."

"Simply put, an enhanced streetscape is a requirement for re-development. Thus, the Silva Cell modular suspended pavement system is now the standard for street trees. This system gives more room for a tree to grow. Over time, this enhances the tree canopy for rainfall interception."

What the City Has Learned: "Once you get started with any new process, you get feedback that generates 'collisions of ideas'. The processes get better and the products become stronger. And that is what we are seeing in the City. Push-back from developers declined once they saw what a rain garden looked like for the first time. From all perspectives, it gets easier and easier with each successive installation," concludes Peter Navratil.

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Showcasing the “Design with Nature” Approach

The City of North Vancouver is a charter member of the Partnership for Water Sustainability.

“When Kim Stephens asked for the City’s assistance in hosting the French film crew, we were happy to help out,” reports Doug Pope, City Engineer.



“It was a great opportunity for us to showcase what the City’s ‘design with nature’ approach to rainwater management looks like on the ground. We immediately decided that it would be best to take the film crew to the Queen Mary Rain Garden. This is our flagship project.”

“By all accounts, the Queen Mary location provided a memorable setting for the water documentary. On a sunny day in summer, a rain garden looks just like a garden. A crew from the City’s fire department made the day memorable for our visitors by providing a supply of water. Then they were able to film the rain garden in action. We fully expect to see the fire truck featured prominently in the documentary!”



Vision for “Green Infrastructure”

“Rain gardens are a form of urban green infrastructure,” continues Doug Pope. “In this context, the City’s vision is that we can enhance and elaborate the interface between urban and natural states. For more than a decade, the City has been demonstrating how to do this.”

“In doing this work, we are not re-creating pristine natural conditions. Rather, by designing with nature we are creating an informed and intentionally designed urban landscape.”

“The City is prepared to take a chance in doing business differently. Yes, there will be growing pains and sometimes there will be mistakes. Yet, this is what leads to innovation and efficiencies.”

Implementation at the Site Scale: “A guiding principle on the part of the City is to achieve a balance between rainwater management on public and private lands. Initially, this resulted in rain gardens being constructed as part of the landscaping requirements for high density redevelopment projects,” reflects Doug Pope.

“Now, we are working on material for home builders to simplify the design of on-site rainwater management infrastructure. In 2015, we hope to have available sample drawings for absorbent landscaping, soil infiltration facilities and rain gardens that homeowners could easily tailor to their specific conditions.”

“The visit by the French documentary crew has allowed us to take a step back and reflect on all that we have accomplished over the past decade. I am completely supportive and proud of the direction and leadership shown by the City,” concludes Doug Pope.

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*Queen Mary Rain Garden
at the intersection of
Keith Road and 13th Street*

*(Note: located downhill from
Queen Mary Elementary School)*



*On a sunny day during an
extended period of rain-free
weather, the City's Fire
Department helped out by
providing a steady flow of
water to simulate how a rain
garden works when it rains.*



*The visiting 3-man film crew
from France flank their hosts
during an on-location interview:*

*Pierre Bressiant (director) and
Jean-Yves (sound) on the left; and
Nagib (camera) on the right.*

*In the middle: Kim Stephens (L) and
Mayor Darrell Mussatto (R)*