the partnership
for water sustainability in bc

Waterbucket eNews on March 28, 2023
https://waterbucket.ca/wscblog/

Living Water Smart in British Columbia:

History and application of a science-based road map for either protecting or restoring stream system integrity

Note to Reader:

Waterbucket eNews[1] celebrates the leadership of individuals and organizations who are guided by the vision for Living Water Smart in British Columbia[2].

The edition published on March 28, 2023 featured Dr. Chris May in a conversational interview about his ground-breaking research in the 1990s that correlated land use changes and the consequences for stream and riparian health.

The umbrella for Partnership initiatives and programs is the Water Sustainability Action Plan for British Columbia[3]. In turn, the Action Plan is nested within Living Water Smart, British Columbia's Water Plan.

Cover Image Credit: photo by David Mackenzie,
a *Lifetime Member* of the Partnership for Water Sustainability

[1] https://waterbucket.ca/wscblog/
[2] https://waterbucket.ca/wcp/wp-content/uploads/sites/6/2017/11/livingwatersmart_book.pdf
[3] https://www.waterbucket.ca/cfa/sites/wbccfa/documents/media/81.pdf

Editor's Perspective

Everyone learns through stories. The science of land use change has not changed. Communities ignore it at their peril. In this second in a series of three stories, we feature Chris May to both document and make real his oral history.

The ground-breaking work by Chris May et al was done in the pre-Internet era. Somewhere, as Chris chuckled when I interviewed him, his original work may still exist in paper archives. But nobody knows, he quickly added.

In that case, I suggested, a best-case scenario might be that the names Horner and May show up as footnotes in a research paper! In the absence of a record of the oral history, such as Waterbucket eNews provides, an understanding of both the context and the impact of their findings would be lost forever.

The enduring legacy of Richard Horner and Chris May is that they applied systems thinking, investigated whole systems in place, identified four limiting factors, and definitively established their order-of-priority.

With publication of the PhD dissertation by Chris May in 1997, the takeaway message for today's audiences is that local governments have a science-based and proven road map for corrective actions to protect and/or restore stream system integrity.

Benefits of cross-border collaboration

In BC, we translated Puget Sound science into a set of communication tools known far and wide as the "fish pictures". These are embedded in Stormwater Planning: A Guidebook for British Columbia.

Released in 2002, the Guidebook gained immediate recognition across North America for our innovation in building on the work of Horner and May to re-invent urban hydrology.

The top two factors limiting stream health are changes in hydrology (i.e., hardening of the land surface = more runoff and less absorption of water) and loss of riparian integrity (aka "the Riparian Deficit").

The consequences of changes in hydrology and loss of riparian integrity play out as degradation of aquatic habitat and deterioration of water quality.

Consequences of weak oversight are measurable

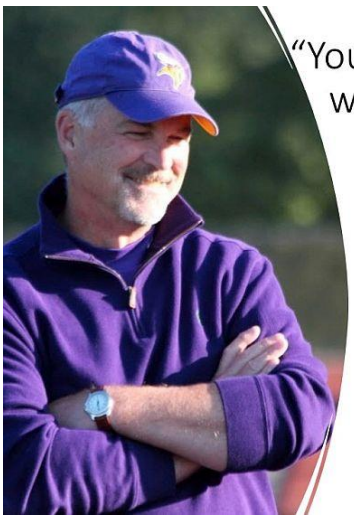
Guided by the Horner and May road map, the Partnership for Water Sustainability has stayed true to the science and has developed tools and resources for use by local governments. With the passage of time, however, many have not. And this is why urban streams continue to degrade.

In the report series, Striking a Balance, the BC Ombudsperson drew attention to the failure by local government to employ adequate oversight of stream systems. The **Riparian Deficit** shows the magnitude or measurable consequence of weak oversight and failure to manage stream corridors and adjacent riparian areas.

A look ahead to April 4th: In the third in the series, we introduce the recently formed EAP Partnership. Willing local governments are collaborating with Vancouver Island University to train next generations of local government staffs. There are parallels with Puget Sound experience three decades ago.

Kim A. Stephens, MEng, PEng (non-practising),
Executive Director
Partnership for Water Sustainability in BC
March 2023

One-Minute Takeaway



"You can do all the research that you want but you need good people in government to implement changes in engineering and development practices. They must be technically savvy and have the drive or desire to give back and do good work."

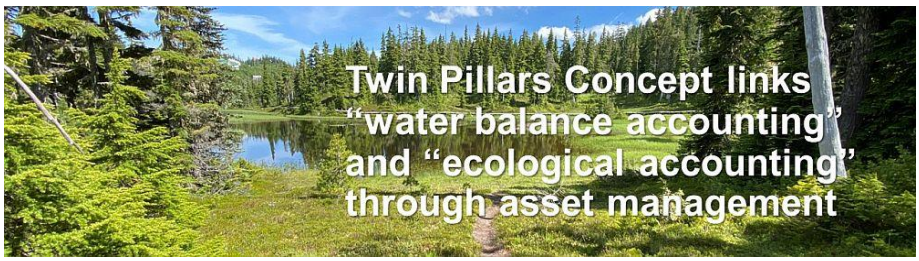
Dr. Chris May

retired Surface & Stormwater Division Director, Kitsap County Public Works in Washington State

The **Road map for Stream System Integrity** (see image on page 2) has its origin in the 1990s "salmon crisis". Listing of Coho salmon as an endangered species in Puget Sound was a catalyst for cross-border collaboration between BC and Washington State.

Puget Sound research correlated land use changes with impacts on stream system condition. This was the springboard for BC to develop methodologies and metrics for science-based solutions. It led to the Twin Pillars Concept for restoring creeksheds and stream corridors.

"Working at multiple scales is a must to restore urban streams. You have to go back and address the impacts of legacy development. To move the needle, communities must restore riparian areas."



The Road Map was an outcome of the seminal research program led by Richard Horner and Chis May at the Center for Urban Water Resources Management in Seattle.

This powerful Washington State precedent exemplifies the benefits to local government of outcome-oriented collaboration with academia. A group of local governments initiated a university-based research centre, secured seed funding for it, and then framed eight key questions for investigation.

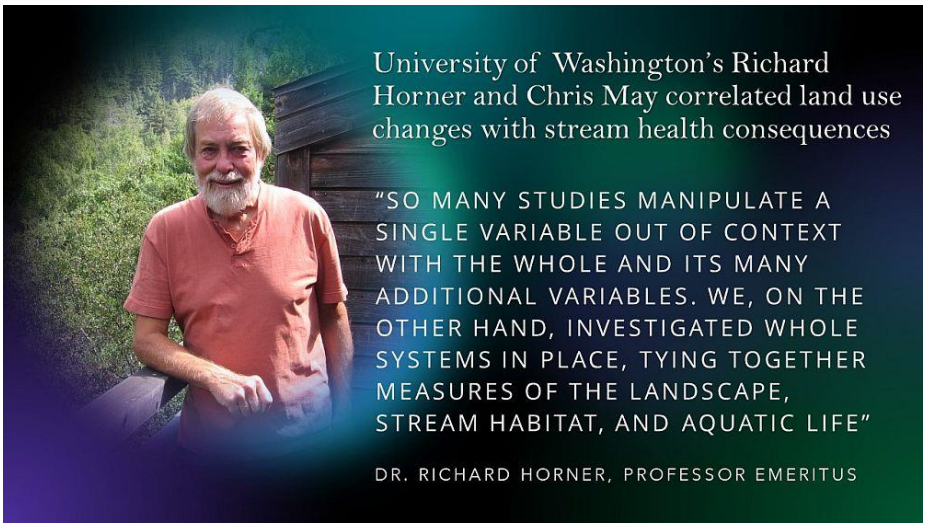
The eight questions defined areas of research by a team of graduate students under the guidance of Richard Horner. Chris May led the team and pulled together this original research in his PhD dissertation. His doctoral work is the foundation that the Partnership for Water Sustainability in BC continues to build on as understanding of the science grows.

For two decades, Chris May had a leadership position in Washington State local government – first with the City of Seattle and then with Kitsap County. The latter was his living laboratory. Because he was Director of the Surface & Stormwater Division, Chis May could put science into practice.

In sharing his story behind the story, **Chris May reflects on what it means to effect change and make things better**. That was his goal as a senior manager in local government – have a positive impact on the community where he lived and worked.

STORY BEHIND THE STORY:

History and application of a science-based road map for either protecting or restoring stream system integrity - conversational interview with Chris May



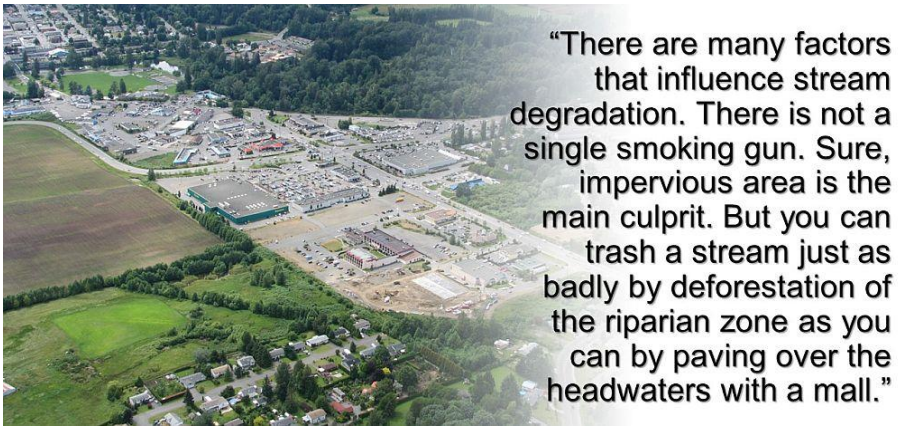
Chris May always wanted to be a forest ranger and was on a path to a career in forestry when he was awarded a scholarship to Cornell University. But when he was also offered the opportunity to attend the Annapolis Naval Academy, it was too good to pass up.

"So, I switched to nuclear engineering and served in submarines for 10 years," explains Chris May. "After retiring from the navy in 1988, I worked as a research engineer in the Applied Physics Laboratory at the University of Washington. We did project work for the US Navy in the Arctic."

Why streams are degrading & salmon stocks are declining

"It was when I decided to take advantage of a Fellowship Program to do my PhD that I hooked up with Rich Horner. This was at the start of the Puget Sound research project and proved to be good timing. We looked at why salmon stocks were declining in Puget Sound."

"The research team included a number of master's students as well as undergraduate students. It was an omnibus-type project, and I was the lead grad student. My leadership and organizational skills from my time as an officer in the navy came into play."



"When we started the research project, one of the hypotheses was that it was all about water quality and that everything bad was the result of bad water quality. But we found that it is the changes in hydrology that hit streams first and hardest. The changes in hydrology rip apart streams."

"Also, the loss of riparian and watershed land cover has a real impact before water quality does. And you do not see the acute impacts of water quality problems until you get into the higher levels of urban development and impervious area."

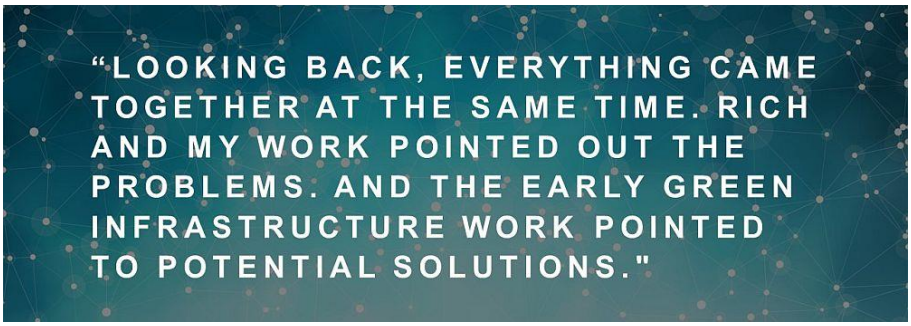
"That led to people doing work on the pre-spawn mortality issue. Salmon that were coming back to restored streams were dying before they spawned. Now the research shows that it is actually the wear from tires that kills the fish."

"It does not take a rocket scientist to explain that it is changes in hydrology and habitat damage that takes the first swipe at the fish populations. But you ignore water quality at your peril if you lead fish back into a toxic stew in highly urbanized areas."

"As Rich Horner says, if you do not do all of them, one will come back to bite you. If you do not do everything, the necessary but not sufficient, you may not see any results because there are so many factors conspiring against you."

Timing is Everything: A life lesson

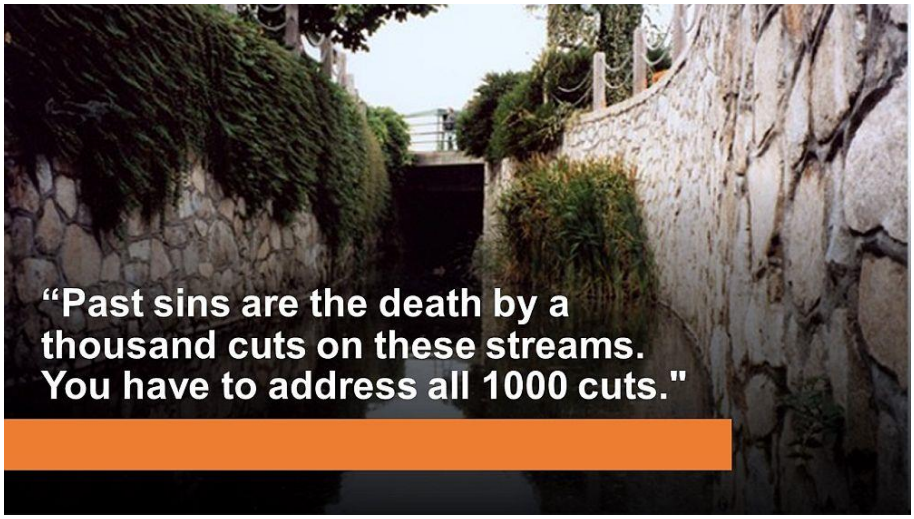
“Timing is everything. You learn that as you go through life. It was good timing because everyone was crying out, what is wrong and what can we do. In the 1990s, we were able to come up with some pretty good data and our conclusions are standing the test of time."



“Around 2000, I worked with Neil Weinstein and Larry Coffman of the Low Impact Development Centre in Maryland on a green infrastructure project as part of the revitalization of the Washington Navy Yard, an historical facility."

"That was about the same time as Tracy Tackett was doing rain gardens in Seattle as part of the pilot Street Edge Alternatives Project (SEA Streets)."

"In 2007, after a 4-year stint with the Pacific Northwest National Laboratory at Battelle near Port Angeles, I joined the City of Seattle as urban watershed manager. That is when I got involved with urban stream restoration which brought me back full circle to when I wanted to be a forest ranger!"

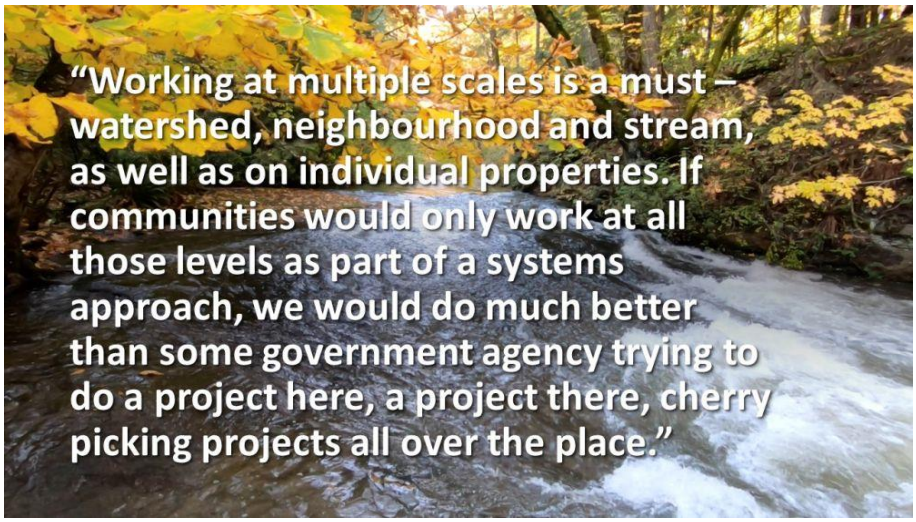


Working at multiple scales is both essential and a challenge

“We figured out that you can do all you want with stormwater runoff to restore the water balance, but you still were not going to restore the aquatic resources to where they needed to be.... unless you actually jumped into the streams and riparian areas and did restoration there."

“So, that is what I did. I led a group that worked on all the streams in the City of Seattle. We did riparian restoration, in-stream restoration, floodplain restoration, and culvert replacement to complement stormwater engineering. We learned through experience that you cannot do just stormwater or restoration. You have to do both. You cannot do one without the other."

“Working at multiple scales and multiple levels is really key. But, so many people in local government are just too busy these days to even contemplate what needs to be done to repair and restore at multiple scales and levels. As a result, in the big urban cities it is just too difficult for local government staff to work concurrently at multiple scales.”



Kitsap County is at a manageable scale to effect change

“After years of commuting by ferry from Kitsap to Seattle, the opportunity came up to run the Stormwater Program at Kitsap County. That was in 2010. It is nice to work where you live and give back to your community."

“I had a good team at Kitsap and implemented a Green Stormwater Solutions Program which included public education. Kitsap is at a manageable scale. The County is big enough to effect change and make things better. That was our goal – have a positive impact on the community!”

"We knew we needed to work on multiple scales and on multiple fronts to improve conditions in our small stream watersheds – that was our strategy. It is not sufficient to do only a single or even a few things – it is necessary to do everything!"

Outreach and education build traction: “Something that often goes unreported is that you have to do education and outreach. You can do all the work you want, but if people are not aware of what they are doing wrong, you miss that scale of the individual household where you can get some traction."

“We did a partnership program with the conservation district. We gave them seed money. And they worked with homeowners to put in rain gardens. The target was about 100 per year. We also did a small-scale backyard riparian restoration program where homeowners had streams running through their property."

"People had to have skin in the game, either cash or sweat equity."

Manchester Stormwater Park in Kitsap County. Completed in 2015.

Implement holistic solutions with tangible benefits

"We also came up with the concept of a **stormwater park**. No more stormwater prisons! Make runoff a contributing member of society! Combine infrastructure projects with green space or amenities."

"In Manchester, a small village of 5000 in south Kitsap, we created a community gathering space to meet a local need. Other communities have followed Kitsap's lead in building stormwater parks."

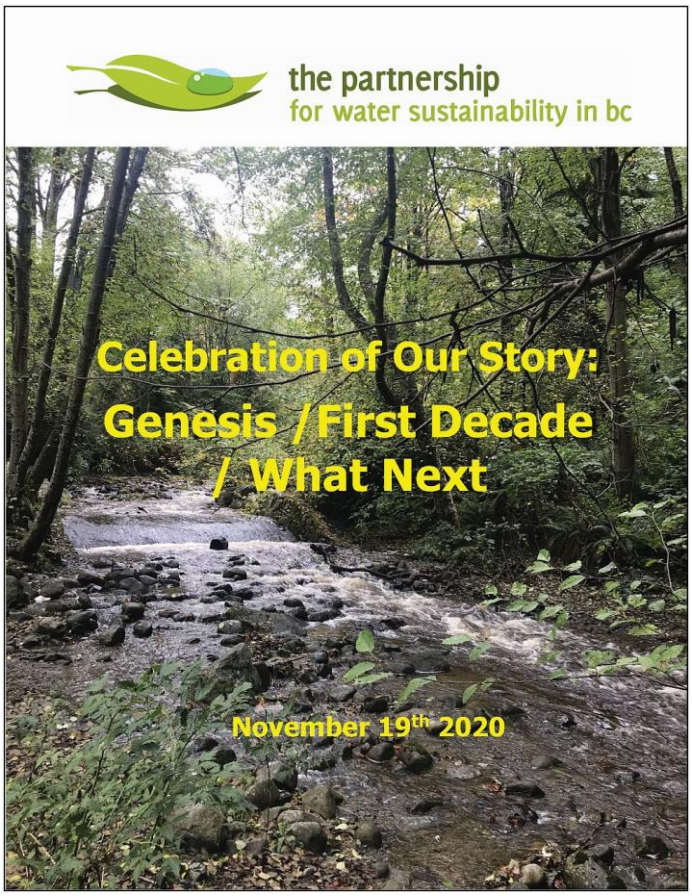
"The Manchester Stormwater Park project came about because an aging and undersized stormwater outfall pipe in Manchester needed to be replaced. Kitsap County took a holistic approach to the problem, and rather than just replace the outfall, sought a solution to address stormwater issues upland, improve water quality, alleviate flooding, and create a park for the community."

Closing perspective by Chris May

"Now it is a matter of wait and see in order to be able to show the positive effects of the retrofit program. Everyone wants instant gratification, but realizing the benefits takes time. It took 100 years to get here. It will take 100 years to turn the situation around."

"The initial signs are good. The monitoring shows that Kitsap County may be **'holding the line'** in areas where development is occurring," concludes Chris May.

All across Puget Sound, local governments are seeing diverse benefits to helping private landowners build rain gardens. Generous incentive programs continue to be rolled out. Washington State University and Stewardship Partners are leading a groundbreaking campaign to install 12,000 rain gardens in the Seattle/Puget Sound Region. To learn more, visit http://www.12000raingardens.org/



TO LEARN MORE, VISIT:
https://waterbucket.ca/about-us/

About the Partnership for Water Sustainability in British Columbia

Incorporation of the Partnership for Water Sustainability in British Columbia as a not-for-profit society on November 19, 2010 was a milestone moment. Incorporation signified a bold leap forward.

Over two decades, the Partnership had evolved from a technical committee in the 1990s, to a "water roundtable" in the first decade of the 2000s, and then to a legal entity. The Partnership has its roots in government – local, provincial, federal.

The Partnership has a primary goal, to **build bridges of understanding** and pass the baton from the past to the present and future. To achieve the goal, the Partnership is growing a network in the local government setting. This network embraces collaborative leadership and **inter-generational collaboration**.

The Partnership believes that when each generation is receptive to accepting the inter-generational baton and embracing the wisdom that goes with it, the decisions of successive generations will benefit from and build upon the experience of those who went before them.

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