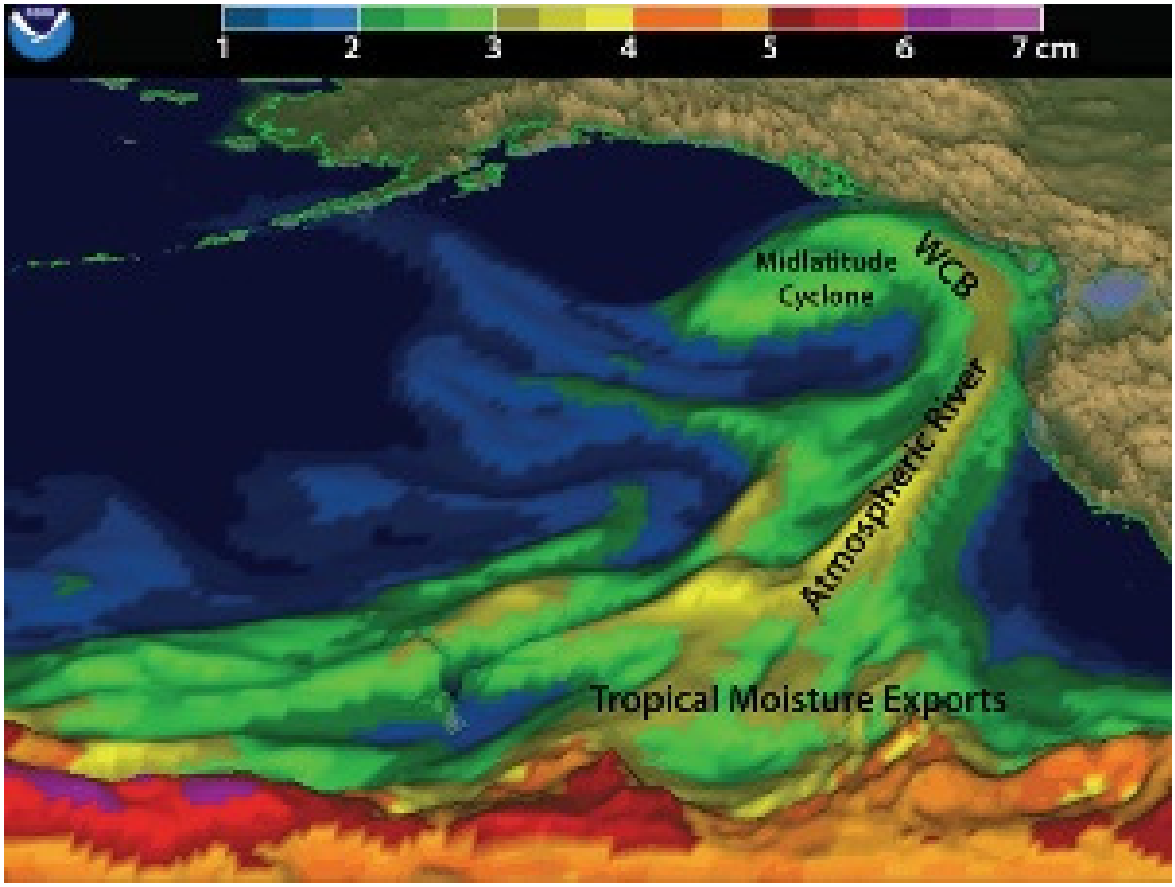
the partnership
for water sustainability in bc

Comox Valley Eco-Asset Management Symposium

– Discovering Nature's Infrastructure Potential



Water Sustainability Action Plan for British Columbia
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LOOK AT DEVELOPMENT DIFFERENTLY:

To protect watershed health, engineered infrastructure ought to fit into natural systems, rather than the other way around

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The Comox Valley on Vancouver Island is facing a long list of challenges as more frequent and intense winter storms and summer droughts overwhelm engineered infrastructure and natural systems (that have been degraded over time by land use activities). It is feast AND famine! Now, the four local governments in the valley are facing a total cost approaching $200 million for proposed engineered infrastructure solutions to these problems.

On March 14-15th 2017, the 22 environmental and ratepayer groups comprising the Comox Valley Conservation Partnership are hosting a symposium to explore less expensive 'design with nature' solutions. Sponsors include the City of Courtenay, Comox Valley Regional District, Village of Cumberland and Real Estate Foundation of BC. The symposium spotlight will be on the potentially powerful and cost-effective role that ecosystem services can play in an infrastructure strategy.

CAUSE-AND-EFFECT: City of Courtenay Flood, Dec 2014. This photograph shows the result when an "atmospheric river" event, land use and resource development impacts combine.

Discovering Nature's Infrastructure

David Stapley
Program Manager

Comox Valley
Conservation Partnership

"The VALUE of watershed ecosystem services is not well understood. Therefore, these services are not currently considered in land use planning decisions."

"The stewardship and conservation sector has traditionally focused on habitat restoration and protection of lands with high ecological values," states David Stapley, Program Manager with the Comox Valley Conservation Partnership.

"With cumulative impacts from climate change, urban and resource development escalating, these groups have now become community leaders in educating and supporting improved land use practices."

"To address these escalating challenges, the Eco-Assets Symposium will promote measures that capture the value of ecological assets to address infrastructure and climate change issues by integrating them into land use planning and practice."

Moment of Truth for a Changing Climate

Bob Sandford

EPCOR Chair for Water
& Climate Security

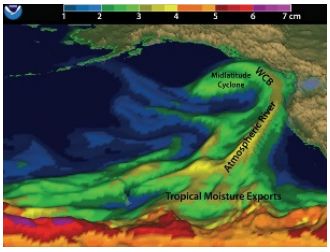
United Nations University
Institute for Water,
Environment and Health

One of the Symposium keynote speakers is Bob Sandford. He is the Chair for Water and Climate Security, United Nations University Institute for Water, Environment and Health. Bob will describe the changing climate and provide suggestions as to what effects we can expect in a future Comox Valley climate.

"To make the right choices moving forward, we must understand how and where the rhythms of water are changing. Then we can apply ecosystem-based understanding to adapt our practices to suit a changing climate," wrote Bob Sandford in a recent Op-Ed article published in the Vancouver Sun newspaper.

"Time is of the essence. Recently identified and potentially dangerous phenomena, such as atmospheric rivers, demand our full attention. An atmospheric river is a narrow corridor of concentrated water vapour aloft. The best known of these great rivers is the famous Pineapple Express."

"Until we stabilize the composition of the Earth's atmosphere, phenomena such as **atmospheric rivers** are likely to cause greater flooding and related economic damage widely - forever making sustainability and adaptive resilience a moving target. So what will we do?"



THINK GLOBAL & ACT LOCAL:

Warming of the atmosphere increases the volume of vapour conveyed by "atmospheric rivers" such as the Pineapple Express.

The physics are straightforward: 7% additional water volume for each degree of temperature rise. This is the global part.

At the local level in BC, climate change adaptation is very much about water management on the ground.

If communities are serious about ensuring RESILIENCY, then the critical strategies and actions are those that relate to water.

Development that is both Sustainable AND Restorative: "What is important about the UN's global *Transforming Our World* agenda is that at last we have a universally understood and accepted definition for what sustainability really means and a common timetable for implementation of clear goals aimed at achieving measurable targets at both global and national levels," adds Bob Sandford.

"The 2030 *Transforming Our World* agenda makes it very clear that sustainable development can no longer simply aim for environmentally neutral solutions."

"If we are to achieve any meaningful level of sustainable development all development has to not only be sustainable, but restorative. We can no longer simply aim to slow or stop damage to the Earth system; we have to thoughtfully restore declining Earth system function."

"We face so many overlapping and intersecting crises we can no longer afford to fix them one at a time or in isolation of one another. All future development must seek double, triple if not quadruple benefits in terms of the restoration of fundamental Earth system function as reflected in biodiversity stability, efficient water use, soil vitality, carbon storage and human and planetary health."

"In order to achieve these goals it is important to further incentivize acceleration of advancements in both engineering and planning toward which everyone I am sure aspires."

Get it Right This Time: "What we are essentially talking about is RECONCILIATION: going back to the headwaters of where we got our relationships with water and with one another wrong; and then starting back down the river of time – this time together – with a full understanding of the importance of embracing a water-first approach to planning human interventions in the environment," concludes Bob Sandford.

Sustainable Watershed Systems, through Asset Management

In BC, a water-resilient future would be achieved through a whole-system, water balance approach branded as

Sustainable Watershed Systems, through Asset Management.

This builds on the vision for Asset Management for Sustainable Service Delivery: A BC Framework, released by the Province and Union of BC Municipalities in Dec 2014.

The Symposium will introduce participants to a whole-system, water balance approach for restoration of watershed health. *Sustainable Watershed Systems, through Asset Management* is based on this premise: natural watershed systems are infrastructure assets – we must manage and protect them as such.

Kim Stephens, another keynote speaker, will speak to this approach. He is Executive Director, Partnership for Water Sustainability in BC.

Starting in November 2015, the Partnership has presented the vision for *Sustainable Watershed Systems, through Asset Management* to an array of audiences in variety of forums and media.

Upper, Mid and Lower Comox Valley Watersheds: "The purpose of the Symposium is to build local knowledge and interest in how to apply eco-asset management principles at the local level," states Tim Ennis, Executive Director, Comox Valley Land Trust.

"The Symposium is very much about setting in motion a mind-set change. It is therefore essential that everyone steps back and sees the big picture."

"The climate is changing and the valley is at a cross-roads. An over-arching issue is the impact of various land uses on the natural water cycle. In the upper watershed, it is due to resource-based activities. Moving down the watershed, impacts result from agriculture and urban development, respectively."

"The Symposium is structured around a series of workshop segments that will assess natural systems opportunities in the upper, mid and lower watersheds. The Symposium will be a success if participants understand the concept to 'think like a watershed', believe that it can be done, and commit to playing a role so that it will happen."

Tim Ennis
Executive Director
Comox Valley Land Trust

Kim A Stephens
Executive Director
Partnership for Water Sustainability in BC

"Resetting the ecological baseline would take time, inter-generational commitment, and perseverance. This is the essence of 'cathedral thinking' which describes our BC vision for ***Sustainable Watershed Systems****."*

"The foundation for cathedral thinking is a far-reaching vision, a well thought-out blueprint, and long-term implementation."

Benefits of Whole-System, Water Balance Approach: "In community drinking watersheds, logging is accelerated as harvest rotations shorten," continues Tim Ennis.

"The reduced ability of forests to capture winter rain and slow snowmelt leads to increased spring runoff, resulting in more flooding and source drinking water quality issues."

"If the long-term value of forest ecosystem services was taken into account when community development is planned, more forested areas would be retained to capture rainwater.

"The pressure on drainage conveyance systems would then be reduced, natural streamflow patterns would be maintained, and water quality would be protected."

"Benefits of the whole-system approach would include less flooding, less stream erosion, and more streamflow during dry weather when needed most. These water balance benefits ultimately translate into lower life-cycle costs and a water-resilient future!"

Collaboration across Sectors: Understanding and valuing ecosystem services is a key component in moving forward with the vision for *Asset Management for Sustainable Service Delivery: A BC Framework*.

Local government collaboration through the Georgia Basin Inter-Regional Educational Initiative is producing tools and resources that will help communities integrate water balance solutions into land use decisions.

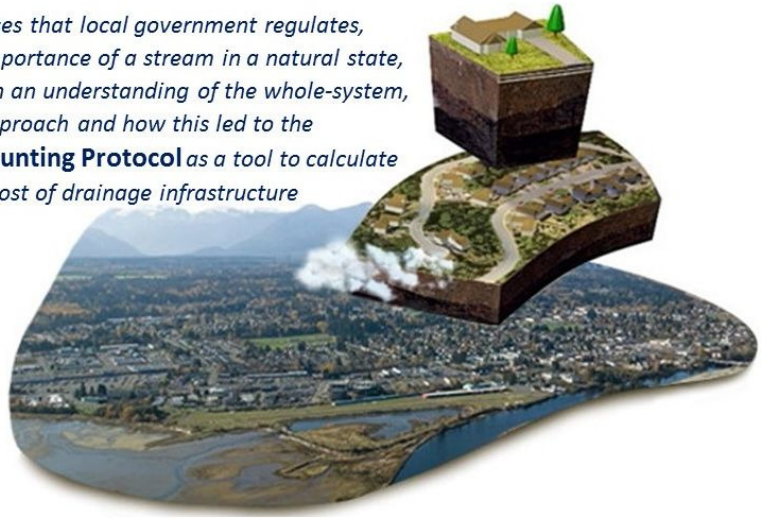
"Broadening collaboration to include the stewardship, conservation and industry sectors would build understanding and improve practises in the field," concludes David Stapley.

"The Eco-Asset Symposium will provide an opportunity for land use professionals, stewards, local governments, First Nations and Industry to come together to learn, collaborate and identify actions to move water balanced, whole system, eco-asset management solutions forward," he says.

By 2017, an educational goal in British Columbia is that everyone involved in land use and drainage would understand the vision for.....

"Sustainable Watershed Systems, through Asset Management"

Applies to land uses that local government regulates, recognizes the importance of a stream in a natural state, and is founded on an understanding of the whole-system, water balance approach and how this led to the **Ecological Accounting Protocol** *as a tool to calculate the opportunity cost of drainage infrastructure*



Asset Management Continuum

Asset management for sustainable service delivery occurs alongside associated evolution in community thinking. It is a continuous quality-improvement process, and incremental.

A local government would experience the asset management process for sustainable service delivery as a continuum leading to a water-resilient future.

***Sustainable Watershed Systems** would be the outcome in Step Three*

Asset Management Continuum for Sustainable Service Delivery

GROUND ZERO: In the beginning, no **Asset Management Plan** exists. A consequence is 'unfunded infrastructure liability'.

STEP ONE: Local governments embrace the BC Framework, with an initial focus on core engineered assets (water supply, sewage, roads) and embark on an **Asset Management Strategy / Plan / Program** process.

STEP TWO: Local governments start thinking holistically and implement a life-cycle approach to infrastructure decision-making so that **Sustainable Service Delivery** for engineered assets becomes standard practice.

STEP THREE: For drainage function, local governments will integrate natural systems thinking and climate adaptation into asset management and account for the **Water Balance Services** provided by watershed systems.

As understanding grows, local governments will progress incrementally along the **Continuum**

THE OUTCOME:
A Sustainable Watershed System

ANNOUNCEMENT:

Partnership for Water Sustainability publishes Primer to support vision for "Sustainable Watershed Systems, through Asset Management"

By Kim Stephens, M.Eng., P.Eng, Executive Director
Partnership for Water Sustainability in BC

Released in September 2016, *Sustainable Watershed Systems: Primer on Application of Ecosystem-based Understanding in the Georgia Basin* is written in a magazine-style to appeal to technical and non-technical readers alike. TO DOWNLOAD A COPY, VISIT:

http://waterbucket.ca/rm/files/2016/09/Primer-on-Application-of-Ecosystem-based-Understanding_Sept-2016.pdf

The Primer serves as a refresher on core science-based concepts that underpin the vision for *Sustainable Watershed Systems, through Asset Management*, a guidance document released by the Partnership for Water Sustainability in November 2015.

A watershed is an integrated system. The need to protect headwater streams and groundwater resources in BC requires that communities expand their view from one that looks at a site in isolation to one that considers all sites, the watershed landscape, streams and foreshores, groundwater aquifers, and so on, as an integrated system.

Ask the Right Questions

Everyone learns about the water balance (water cycle) in elementary school, but by high school most have forgotten what they learned. So what does this mean for communities, the reader might well ask? Consider that: A legacy of community and infrastructure design practices has failed to protect the natural water balance (hydrologic integrity). Failure has financial, level-of-service and life-cycle impacts and implications for local governments, and hence taxpayers. Consequences include expensive fixes.

Local governments are starting to recognize that natural assets have value, ecosystem services have a role in municipal service delivery, and so need to be integrated into their asset management programs. Hence, the sixth in the Beyond the Guidebook Primer Series is written to help multiple audiences – whether elected, technical or stewardship – ask the right questions and ensure that "science-based understanding" is applied properly and effectively to implement practices that restore the hydrologic integrity of watersheds.

Vision: Re-Set the Ecological Baseline

The vision for Sustainable Watershed Systems is the culmination of a building blocks process which cross-pollinated Washington State and BC experience. In the mid-1990s, Washington State research established the **primacy of hydrology** in either protecting or impacting stream health. In BC, this finding spurred development and evolution of the Water Balance Methodology. Twenty years later, a convergence of initiatives and ideas is the catalyst for taking stock of past and current research.

In 1995, Dr. Daniel Pauly coined the phrase "shifting baseline syndrome" (Figure 1) to describe why each new generation lacks direct knowledge of the historical condition of the natural environment, and how this lack of understanding plays out as a failure to notice change.

The flip side of an impact, however, is an opportunity. Over the past two decades, a series of teachable moments has set the stage to reverse the sliding baseline in the Georgia Basin. Communities could re-set the ecological baseline IF they would implement standards of practice that truly replicate and restore a desired watershed condition. This outcome requires a 'whole systems' approach to community planning and infrastructure servicing.

Watersheds are Infrastructure Assets

BC has a provincial policy, program and regulatory framework that enables local governments to move from UNDERSTANDING to IMPLEMENTATION of a "whole systems" approach keyed to the primacy of hydrology.

The new Water Sustainability Act ("the Act") plus ***Asset Management for Sustainable Service Delivery: A Framework for BC*** are lynch-pins for looking at water and watersheds differently. The Act connects land and water, and makes the link to desired water balance outcomes. The BC Framework is a powerful tool for local governments to focus their community planning and infrastructure decision processes on beneficial life-cycle outcomes.

Asset management has traditionally been about hard engineered assets such as waterlines, sanitary and storm sewers, and roads. Yet, watershed systems are also "infrastructure assets". Trees, soil, green spaces and **Water Balance pathways** contribute to a municipal service function. These assets provide *hydrologic integrity* for a healthy watershed system. This desired outcome is a driver for protecting and managing nature's services in the same way that engineered assets (and the services they provide) are managed.

Whole Systems Approach

Restoring hydrologic integrity, and thus the water balance, is key to achieving a water-resilient future in urban areas. A key message in the Primer is the necessity of "staying true to the science" IF communities are to achieve a vision for *sustainable watershed systems*.

The Partnership hopes that readers will be inspired to learn more about the science behind the Water Balance Methodology. Four themes are introduced (in the box below).

Achieving sustainable watershed systems through asset management will require long-term commitment by communities, successive municipal councils and regional boards, and generations of land and water professionals.

Harness nature to adapt to a changing climate: Part 1 introduces new ecosystem-based adaptation (EbA) research in BC that may inspire a new generation to "think and act like a watershed".

Get the hydrology right and residential water quality typically follows along: Part 2 celebrates the 20th anniversary of publication of the seminal Washington State research by Dr. Richard Horner and Dr. Chris May on the primacy of hydrology.

A journey to a water-resilient future starts with the first rain garden: Part 3 showcases breakthrough rain garden water quality research by Dr. Jenifer McIntyre at Washington State University that builds on the work of Horner and May.

Water balance pathway to a water-resilient future: Part 4 introduces the parallel journeys of Washington State, California and BC; and how the Water Balance Methodology is the foundation for an ecosystem-based approach to protection of hydrologic integrity.

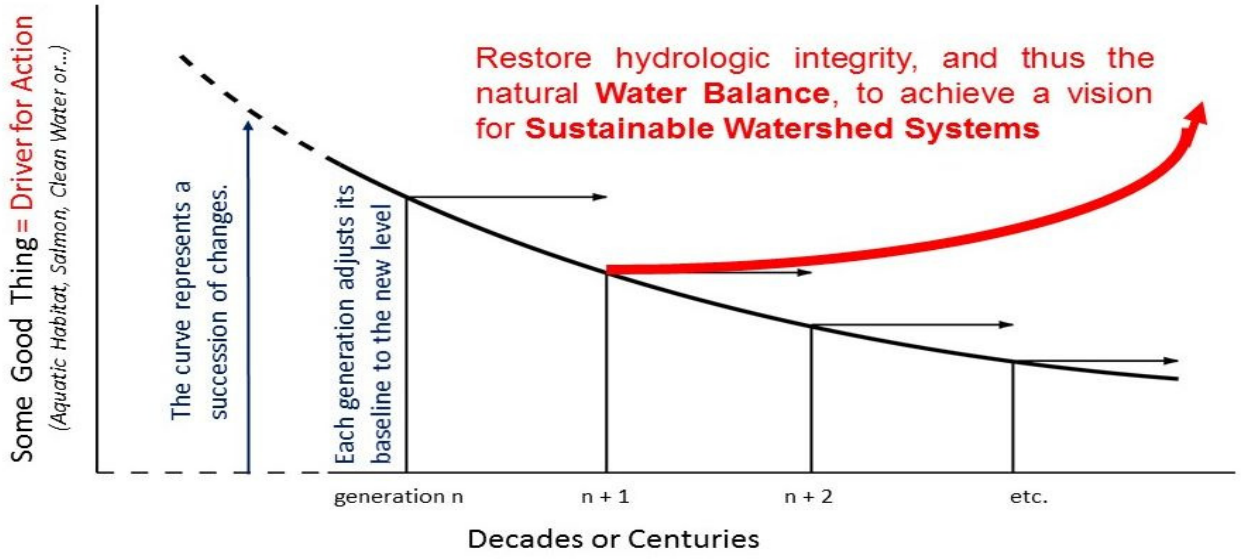


Figure 1 – Re-Set the Sliding Ecological Baseline