the partnership
for water sustainability in bc

Towards Sustainable Watershed Systems

Call to Action / Context for EAP

The warming of the planet's atmosphere is causing water to move more quickly and disruptively through the global water cycle.

Flood, drought, fire, wind and cold – extreme events are becoming the norm. Impacts are magnified by human interventions.

BC has arrived at a fork in the road.

The situation calls for a whole-systems approach to managing the water balance distribution where people live.

The risks are too high, and the margins for error too small, to view water and watersheds only through narrow technical lenses.

Adapting to changes in the water cycle and restoring the water balance starts with communities rethinking their relationship with nature.

Funded by the governments of Canada and BC, the capacity-building program branded as *Sustainable Watershed Systems, through Asset Management* is designed to inform and educate local governments and stakeholders about the whole-system, water balance approach.

The program includes the **Ecological Accounting Process** (EAP) to value the 'water balance services' provided by nature. Demonstration applications for small watersheds in the Cowichan and Comox valleys have been undertaken to show how local governments would apply this unique approach.

A Core Message: EAP examines the investment of resources already made by many stakeholders, as well as their aspirations concerning the management (prevention of degradation to and work on enhancement) of ecological services in small watersheds (defined as 'creeksheds').

What is the EAP Methodology?

EAP looks at an entire watershed at the catchment and/or creekshed level. By reviewing historical land use impacts, it ascribes changes to the overall hydrology. It applies the Water Balance Methodology as the tool to assess the current conditions of the hydrology.

This analysis provides information needed to achieve two outcomes: understand the functioning condition of dependent ecosystems; and to propose maintenance and enhancement strategies.

The focus of EAP is on watershed hydrological conditions and the dependent ecological services provided, and which sustain natural systems and human settlement. EAP is not about engineering practices as the analytical starting point. Neither is it about managing hydrology through a land use, transportation, or other human settlement framework (or lens).

Why EAP is Useful

The goal of EAP is to establish what the definable benefits of ecological services derived from watershed hydrology are, what they may be worth to stakeholders, and how they may be maintained and enhanced to function in near optimal condition. This goal is completely compatible with official plans.

EAP looks at the history of stakeholder initiatives that concern the watershed as a description of their understanding about its ecological services and what those services may be worth. This perspective enables EAP to emphasize what the measures it proposes may offer in terms of environmental stewardship (protecting natural systems), providing drainage functions and other infrastructure needs of human settlement (social and aesthetic), protecting property values, and opportunities to reduce liability (loss of function and capacity) stemming from environmental degradation.

EAP is a deliverable for the "Sustainable Watershed Systems, through Asset Management" program,
Implemented under the umbrella of the Georgia Basin Inter-Regional Education Initiative

Stakeholder Decisions About Worth

EAP focuses on worth (value in use) rather than personal and social perceptions of value (inherent, imputed, and assigned) or market value (value in exchange).

Worth refers to likely returns for expenditures.

When considering ecological services, determining worth is based largely on experience.

Communities and stakeholders express worth about streams and riparian zones in many ways.

A Paradigm-Shift: *Looking through the 'worth lens' has led to a fundamental shift in the EAP approach: place less emphasis on* ***monetization of ecological services****; instead, focus on the* ***investment of resources*** *as well as aspirations of motivated stakeholders.*

Who Would Use EAP

EAP would help stakeholders / managers determine whether or not they should change practices and adopt new strategies regarding the ecological systems in the stream corridor, riparian zone and the entire watershed. EAP would contribute to a range of stakeholder interests and needs:

- A creekshed or watershed profile,
- A water balance analysis of the creekshed or watershed,
- An assessment of the condition of ecological services dependent on hydrology,
- A strategy to improve ecological services and support plans for specific projects which address statutory, mission-driven and social/cultural mandates.
- Adoption of a process whereby stakeholders, including local government departments, integrate policy and project initiatives in the creekshed.
- A management and maintenance plan to be undertaken by stakeholders,
- A process to calculate the worth of potential projects and works.
- An accounting of financial expenditures for projects as they are undertaken;
- A creekshed management strategy which supports the local government's strategy for aligning with the policy and regulatory framework for *Asset Management for Sustainable Service Delivery: A BC Framework*.

Taking action would depend on what they think the creekshed is worth. Participation in a management regime that integrates stakeholder effort in all creekshed areas would be a crucial step in enhancement and maintenance efforts.

What We Have Learned from the Demonstration Applications

The worth of a creekshed is a package of ecological services made possible by the hydrology. These inter-dependent ecological systems provide uses we call nature; examples are wetlands, ponds, riparian areas, woodlands, habitat for flora and fauna, etc. These systems add appeal and quality to parks, greenways, trails, as well as opportunities to focus on natural processes such as salmon spawning and nesting sites.

By providing a value for the land underlying the stream and riparian zone, stakeholders have a much more realistic idea of the worth of the ecological services supplied by environmental assets. This form of financial information can be used for asset management strategies related to the BC Framework (note: BC Framework sets a strategic direction that refocuses local government business processes on outcomes that reduce life-cycle costs and risks).

What Next

The next step is doing. A strategy is the path to success, and becomes our primary interface with the world. Find the leadership and opportunity within a creekshed to adopt a strategy, devise an implementation plan, and confirm the worth of undertaking enhancement and management.

To learn more, contact Tim Pringle, EAP Chair, Pringle@watersustainabilitybc.ca

Synopsis of Findings

The Town of Comox has managed and improved the functioning condition of the lower catchment through its long range plan plus strong collaboration with community partners and external funders.

In the middle and upper catchments, the hydrologic condition remains threatened and degraded.

Strategy plus Commitment:
In Comox, stakeholders decided that Brooklyn Creek was worth investment. A long-range enhancement plan has raised more than $780,000 over eleven years. Work began in 2005 and has been carried out as series of annual projects.

An approach integrating engineering and biology has implemented features designed to meet eco-system and settlement needs.

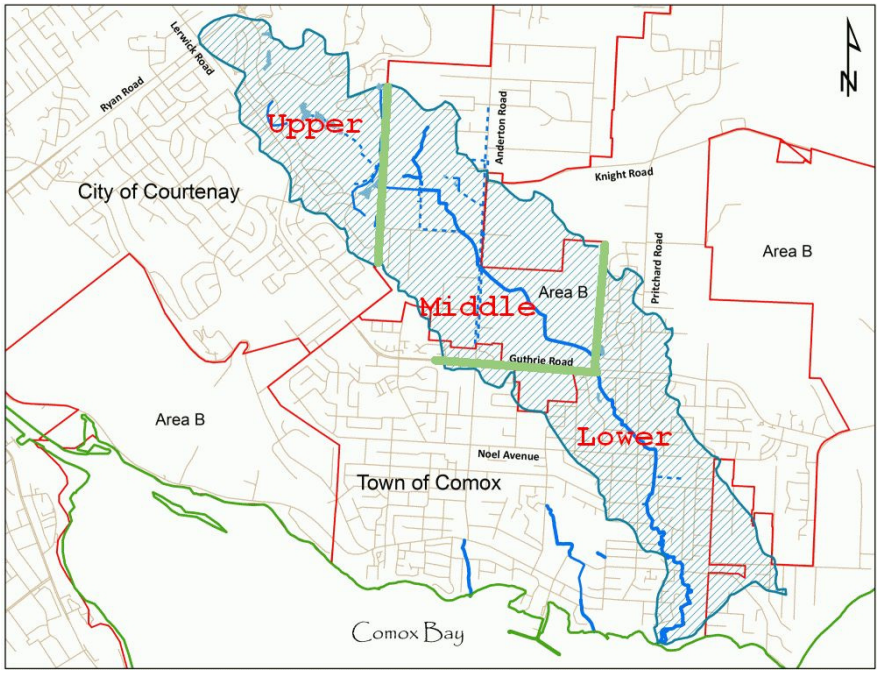
Brooklyn Creek Demonstration Application in the Comox Valley

Three local governments have jurisdiction over land use in the Brooklyn Creek watershed, creating three zones (catchments) as illustrated below. This results in three distinctively different land management strategies.

- **In the upper zone,** the headwaters catchment has been altered and made subordinate to engineered drainage design and construction.
- **In the middle zone,** large lot as well as dense rural subdivision has cut up the top metre of the landscape, thereby impairing natural hydrology.
- **In the lower zone,** the Town of Comox and collaborators have adopted and executed a long-range strategy to enhance and maintain the stream corridor and riparian zone.

The EAP analysis established that stakeholders involved in management of three catchments of the Brooklyn Creekshed have very different views of the worth of its ecological systems. Past and continuing land use (development) practices have considered hydrology only in a superficial manner - that is, what can be done with rainwater runoff that affects rural lots, agriculture, urban development, roads, ditches, parks and other features of the built environment?

As is the case in most small watersheds, historic standards and regulation of design and construction of drainage systems have failed to prevent degradation of the hydrology of the Brooklyn creekshed and the dependent ecological systems.



The Brooklyn Creek Watershed has 3 distinctive zones

Synopsis of Findings

Stakeholders involved in Sh-hwuykwselu enhancement and remediation projects have spent more than $150,000. In addition, streamkeepers have helped with this work as well as other educational and project activities (well over 1000 hours since 2001).

The upland area of the creekshed has lost most of its wetlands and retention capacity.

A Potential Strategy: *Three wetlands could be restored in their original locations, resulting in a number of enhancements to the ecological services.*

This strategy would serve natural systems (e.g. wetland environments, riparian zones, nutrient flows to the estuary, longer flow duration in the summer).

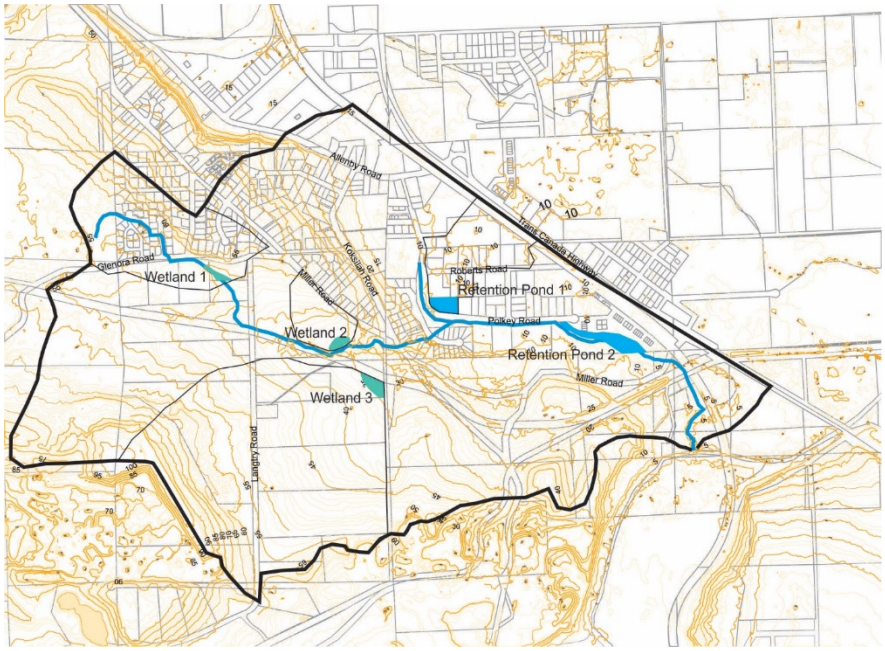
It would also accomplish several community objectives: water options for farms, attenuation of peak seasonal flows and potential flooding, enhanced riparian areas along proposed trails.

Busy Place Creek Demonstration Application in the Cowichan Valley

Busy Place Creek (Coast Salish: Sh-hwuykwselu) is situated south of Duncan. Ecological services are provided to the regional community, local government, Cowichan Tribes and other stakeholders. Yet the worth of these drainage-related ecological services has never been determined. Also, the water balance capacity to support key ecological systems such as wetlands and riparian areas has not been assessed previously.

With a view to improving the creekshed hydrology, the EAP analysis shows that the most valuable investment that could be made would involve enhancing the upland retention and infiltration of rainwater by restoring three wetlands (about 2.7 hectares total) as shown on the map below. These were previously drained or altered for agricultural use. The soils are such that infiltration would lessen peak flows, and the interflow (shallow sub-surface flow) would moderate and extend the seasonal flow duration.

In addition to the benefits noted in the sidebar, **the stakeholders have an opportunity to build a strong collaboration around the focus on hydrology, one which offers future management gains for all.** More predictable and dependable flows would attenuate local flooding (important to the Cowichan Valley Regional District) and enhance fisheries habitat (important to the Cowichan Tribes). Enhanced riparian areas would be of value to proposed parks trails and the nearby rural subdivision. Finally, groundwater aquifer recharge would be achieved.



Opportunities for restoration of the natural water balance in the Busy Place Creek Watershed

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