

A creek near author
Kim Stephens' property
on Bowen Island, B.C.



Photo: Kim Stephens

Watershed Moment

How British Columbia has incorporated watershed thinking into its asset management.

BY KIM STEPHENS

IN THE 1990s, Bill Derry, the founding chair of the Washington State stormwater managers committee, and I led a workshop program for B.C. municipalities, and provided cross-border sharing of stormwater research. Early access to the findings of two experts (Drs. Richard Horner and Chris May) allowed us to create what became known as the “fish pictures.” These graphics translated science and served as educational tools to create a common understanding, and informed decision-making by municipal, regional, and

provincial governments. The workshops fueled interest in the ecosystem-based approach to stormwater management. Several more events finally led to the Stormwater Planning Guidebook for B.C. and set the stage for British Columbia to move towards sustainable watershed asset management.

Hydrology rules

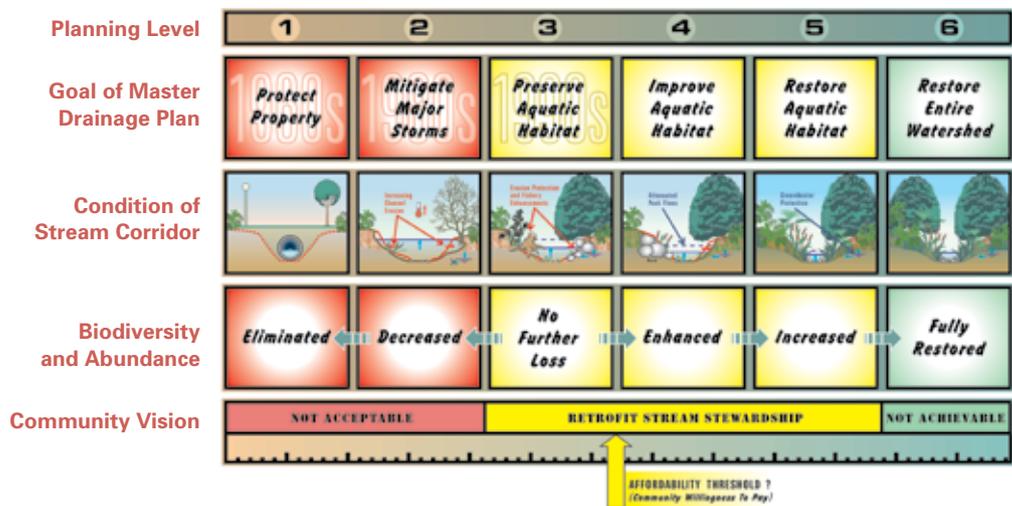
The goal in restoring the hydrologic integrity of a watershed is to forestall an unfunded taxpayer liability flowing from changes in hydrology. A cornerstone

of this approach is the legacy work of Horner and May. Their research made it clear that stormwater management is as much, or more, about land use decisions as engineering solutions. We also learned that we needed to address transportation choices. They taught us that changes in hydrology, not water quality, must be the primary focus of our efforts. If we get the hydrology right, water quality typically takes care of itself in a residential development.

“So many studies manipulate a single variable out of context with

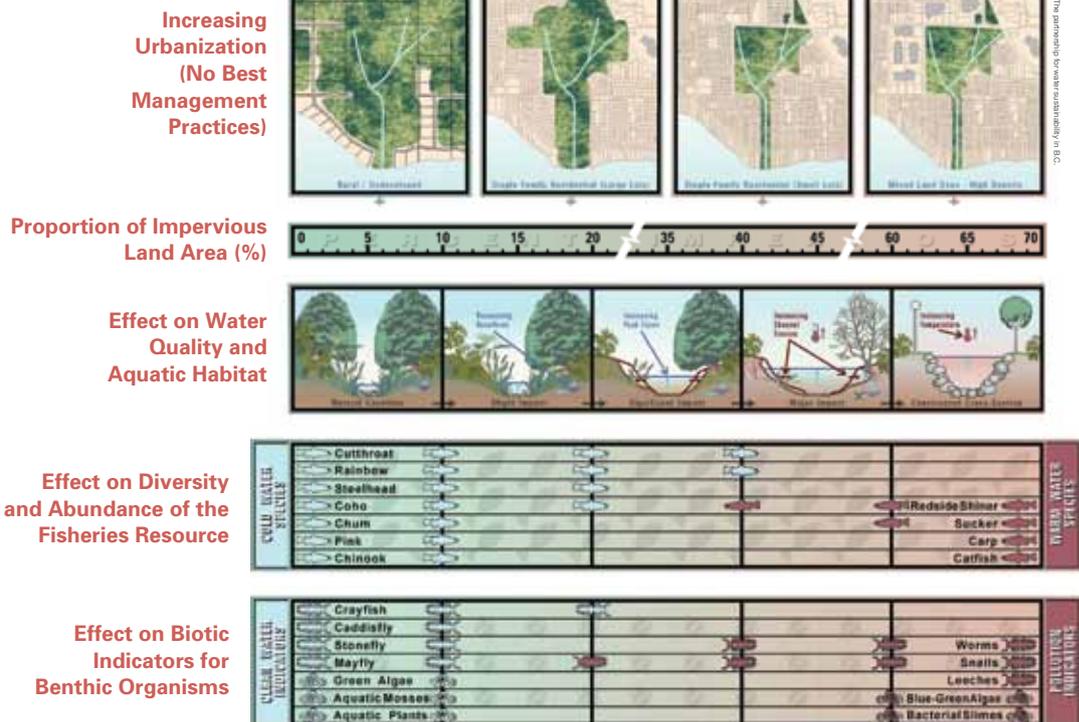
Alternative Visions for the Long-Term Environmental Health of Stream Corridors: Conceptual Framework for Selection of Master Drainage Plan (MDP) Level

This figure demonstrates how to apply figures 1 and 2 as a management tool for decision-making. It illustrates the consequences for stream corridor ecology as a function of the choice of MDP level.



Impact of Increasing Urbanization on Stream Corridor Ecology (Without Best Management Practices)

This figure demonstrates the impact of increasing impervious area on species diversity. Although it is based on research findings for lowland streams in the Puget Sound region of Washington State, the figure is intended for conceptual purposes only.



the whole and its many additional variables,” stated Richard Horner, now a professor emeritus at the University of Washington. “We [...] investigated whole systems in place, tying together measures of the landscape, stream habitat, and aquatic life.”

Mimic the natural water balance

“Unless and until land development practices mimic the natural water balance, communities cannot expect to restore the biological communities

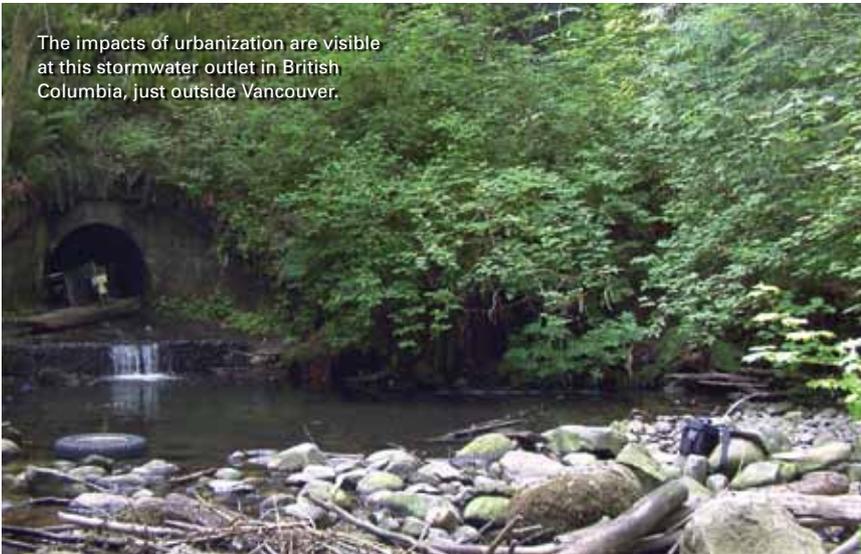
within streams. Simply put, hydrology hits first and hardest—one could pour an equivalent volume of distilled water into a stream, and the consequences for stream health would be the same as if it was urban runoff.”

“When the goal of land servicing practices is pre-settlement hydrology however, this reduces the quantity of urban runoff discharged into a stream. It also improves the quality of the remainder of that which is discharged. In short, mimicking the natural water balance has a dual benefit,” emphasized Horner.

“The key to the “whole systems approach” is understanding how rainfall reaches a stream via three flow paths in a watershed—surface runoff, lateral interflow in shallow soils, and deep groundwater. Unlock that key and we can successfully implement appropriate measures to mimic the natural water balance,” said Chris May, now the division directors of Kitsap County public works in Washington State.

“We have applied this whole systems concept to develop our strategy for watershed retrofit and rehabilitation.

Credit: Kim Stephens



The impacts of urbanization are visible at this stormwater outlet in British Columbia, just outside Vancouver.

County may be ‘holding the line’ in areas where development is occurring,” concluded May.

Whole system services

The water balance of a watershed needs to be protected and managed in the same way that engineered assets and the services they provide are managed. Failure to protect the hydrologic integrity of water balance pathways has financial, level-of-service, and life-cycle impacts, as well as implications for taxpayers.

A legacy of past community planning and infrastructure servicing practices is the water balance of urban watersheds is out of balance. Asset management is the lens for bringing land development and infrastructure servicing practice into line with science-based understanding. wc

[...] We know we need to work at multiple scales and multiple levels to improve conditions in our small stream watersheds—that’s our strategy.”

Patience plus time

“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

Kim Stephens is the executive director of Partnership for Water Sustainability in BC

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