

# Water Balance Methodology: Using Continuous Simulation to Protect Urban Watersheds & Stream Health



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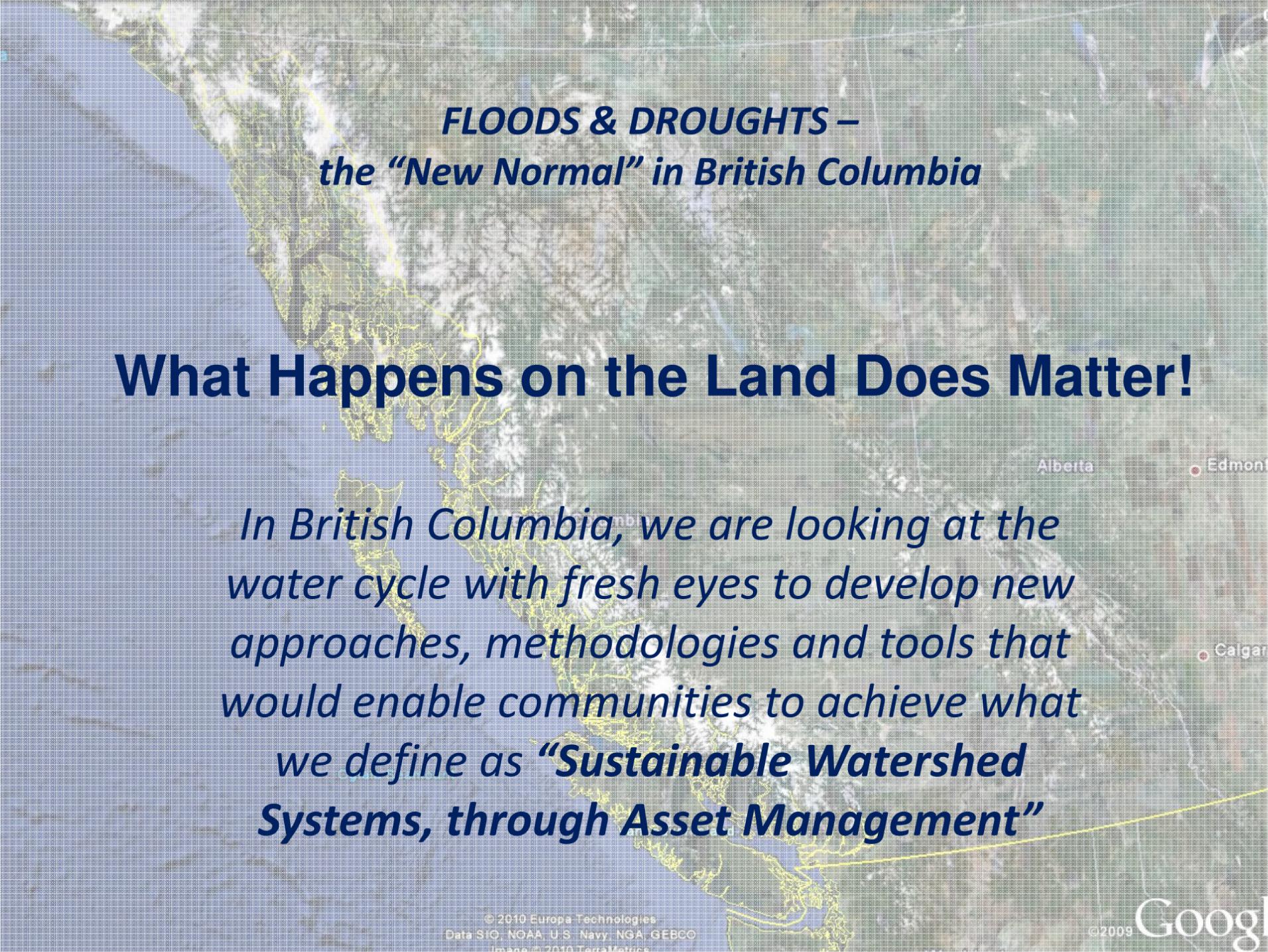
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A satellite map of Western Canada, specifically British Columbia and Alberta. The map shows the coastline of British Columbia on the left, with the Pacific Ocean. Yellow lines delineate various river networks and watersheds across the land. The terrain is a mix of green (forests) and brown (mountains or dry land). Labels for 'Alberta', 'Edmonton', and 'Calgary' are visible on the right side of the map.

***FLOODS & DROUGHTS –  
the “New Normal” in British Columbia***

## **What Happens on the Land Does Matter!**

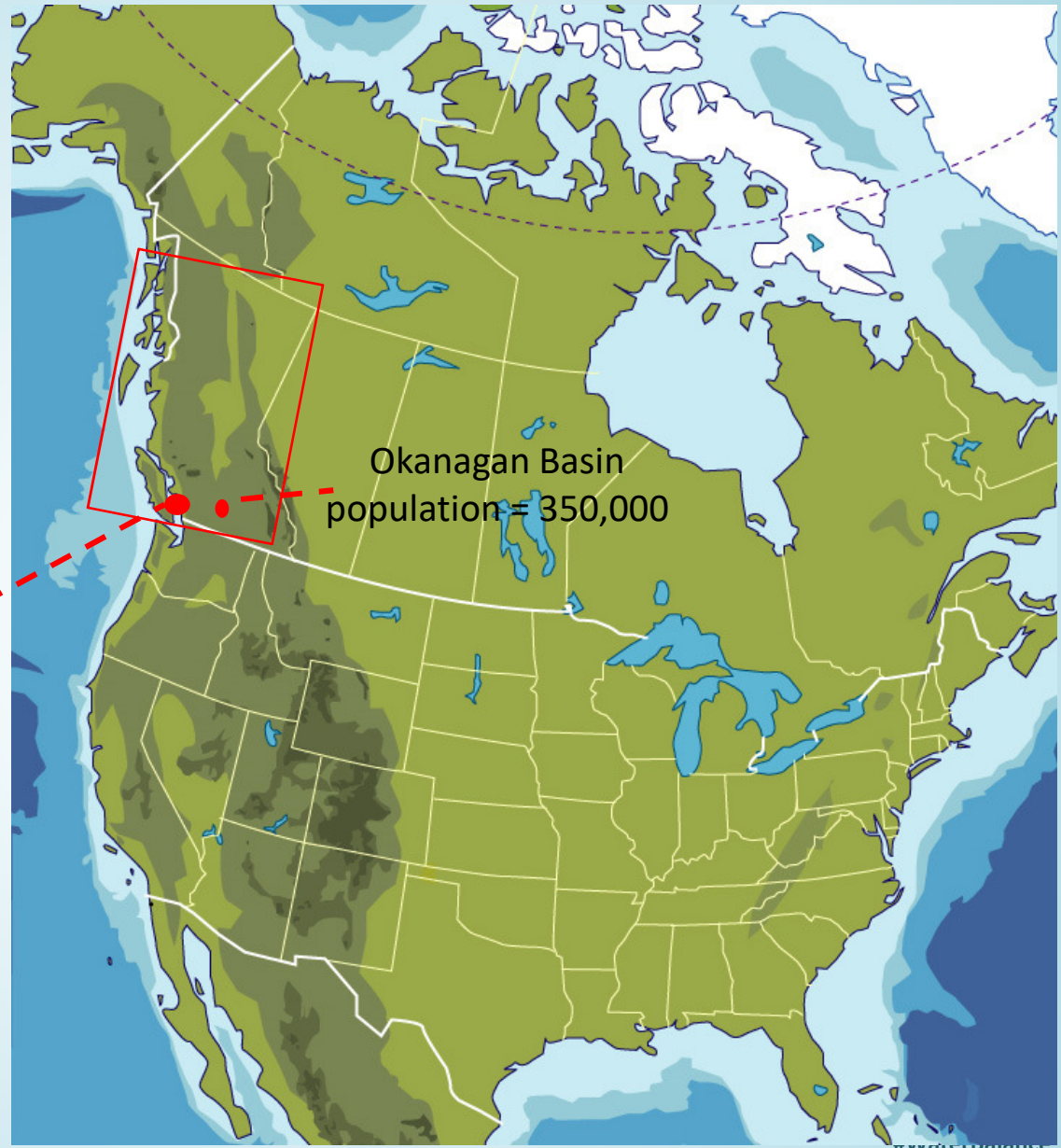
*In British Columbia, we are looking at the water cycle with fresh eyes to develop new approaches, methodologies and tools that would enable communities to achieve what we define as “**Sustainable Watershed Systems, through Asset Management**”*

**British Columbia**  
**Population = 4.6 million**

75% live in the southwest corner in the Georgia Basin, including Vancouver Island.

Another ~8% reside in the Okanagan Basin in the southern interior

Georgia Basin  
population = 3.5M

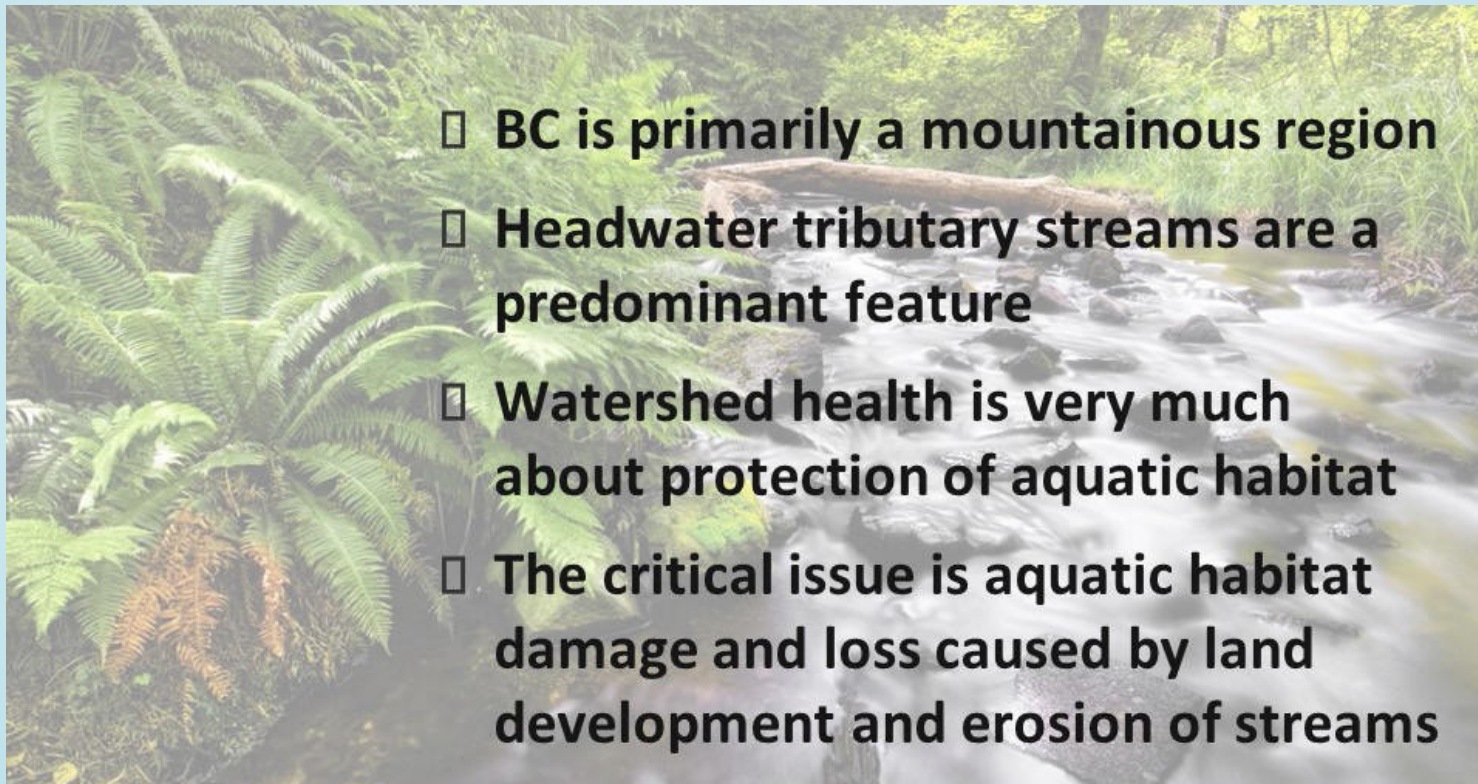


Home to 3½ million people,  
the Georgia Basin encompasses the east coast of Vancouver Island  
and the Lower Mainland Region (including Metro Vancouver)



Key Message:

*British Columbia's **Watershed Health Goal** differs from other regions because.....*



- ❑ BC is primarily a mountainous region
- ❑ Headwater tributary streams are a predominant feature
- ❑ Watershed health is very much about protection of aquatic habitat
- ❑ The critical issue is aquatic habitat damage and loss caused by land development and erosion of streams

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# Linking Rainfall, the Landscape, Streamflow, Groundwater and **Sustainable Service Delivery** has been a building blocks process

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2002 – How to reduce runoff volume

2007 – How to mimic flow-duration

2012 – How to sustain deep infiltration

2013 – How to integrate performance targets

2014 – How to downscale targets to a site level

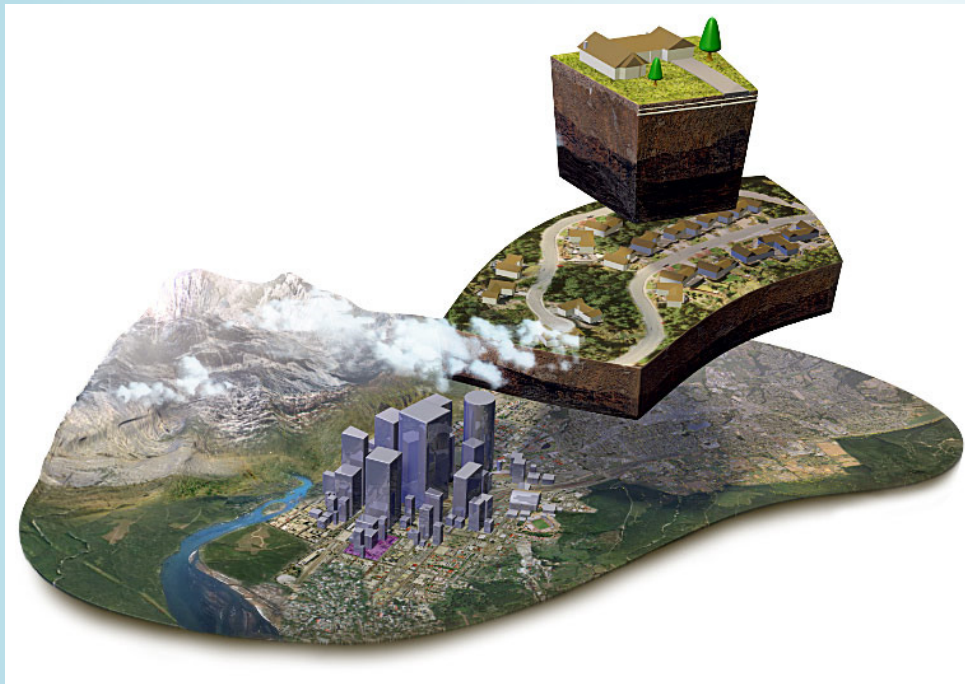
2015 – How to view water balance pathways as infrastructure assets providing services

*Science-based understanding becomes clearer over time*

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# INTRODUCING THE NEW PARADIGM – *“Watersheds as Infrastructure Assets”*



## **The 3 pathways are:**

- *over the land surface*
- *shallow horizontal (interflow)*
- *deep vertical to groundwater*

A watershed is an **integrated system**.

The **three pathways** by which rainfall reaches streams are ‘infrastructure assets’.

The three pathways provide ‘**water balance services**’.

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