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Session No. 2

The Current Status of Stormwater Management Planning in BC

Laura Maclean
Environment Canada
Vancouver, BC

October 19, 2004
Kamloops, BC

Ministry of Water, Land and Air Protection

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Presentation Roadmap

- Evolution of Stormwater Policy in BC
- Stormwater in the LWMP Process
- The Stormwater Management Challenge
- Stormwater Planning Guidebook
- Water Balance Model for BC
- Case Study Examples

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Development of Stormwater Policy

- 1992 LWMP Guidelines and Urban Runoff Quality Control Guidelines published
- Urban Stormwater Runoff always considered a component of a LWMP
- Initial emphasis was on water quality: stormwater as Non-Point Source Pollution
- Mid-1990's: research from Washington State demonstrated impacts from stormwater on fish habitat at low levels of development where water quality impacts would not be noticeable
- Stormwater quality and quantity issues can not be separated
- Effective stormwater management requires an integrated approach

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Integrated Stormwater Management Planning

From TRADITIONAL to		INTEGRATED:
Drainage Systems	→	Ecosystems
Reactive (Solve Problems)	→	Proactive (Prevent Problems)
Engineer-Driven	→	Interdisciplinary Team-Driven
Protect Property	→	Protect Property *and* Habitat
Pipe and Convey	→	Mimic Natural Processes
Bureaucratic Decisions	→	Consensus-Based Decisions
Local Government Ownership	→	Partnerships with Others
Drainage Focus Only	→	**Stormwater Integrated with Land Use**

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Stormwater Policy

- Not a regulatory approach
- LWMPs are optional
- A LWMP is an opportunity to address stormwater issues
- There are tools that exist to assist local governments in doing this
- If a local government has produced a LWMP it may or may not include a stormwater component

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What has been achieved?

LWMPs (* Updated, *** Amended)

CSRD - South Shuswap
CSRD - North Shuswap
Village of Chase
City of Kamloops
City of Merritt
District of Salmon Arm
CRD - Core Area
(Victoria, Oak Bay, Saanich, Esquimalt)
CRD - Saanich peninsula
(Sidney, N. Saanich, Central Saanich)
CVRD - South Sector
(Mill Bay, Cobble Hill, Shawnigan Lake)
CVRD - Central Sector
(Duncan, North Cowichan)
CVRD - West Sector
RDN - Nanaimo
RDCS - Union Bay
RDCS - Cumberland
District of Campbell River ****
RDMW - Port Hardy
RDAC - Tofino
City of Port Alberni
Kimberley

RDKB - Greater Trail Area
City of Vernon *** *
City of Armstrong
District of Coldstream * *
District of Spallumcheen *
NORD - Areas A, B & C
NORD - Kingfisher
City of Penticton
Town of Osoyoos *
Town of Oliver *
RDOS- Areas E and F
(Naramata & West Bench)
District of Summerland ***
RDOS - Areas A, C and D
(Rural Osoyoos, Rural Oliver & OK Falls)
City of Kelowna
CORD - Areas G & H *
(Westbank)
District of Lake Country *
District of Peachland ****
Fintry Delta
Village of Midway
Valley Wide Master Plan

PRRD - Charlie Lake Area
Ft. St. John
Whistler
GVS&DD
SCRD - West Howe Sound
SCRD - Secret Cove/Sgt. Bay
FVRD - Abbotsford/Mission
Powell River
Sechelt/Sechelt IGD

- Communities with LWMPs completed or underway.....47
- LWMPs completed, or underway, or being updated or amended 60

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What has been achieved?

LWMPs (* Updated, *** Amended)

City of Kamloops

CRD - Core Area
(Victoria, Oak Bay, Saanich, Esquimalt)

RDN - Nanaimo

District of Campbell River ***

City of Port Alberni

City of Vernon *** *

City of Kelowna

Ft. St. John

GVS&DD

- LWMPs completed or underway 47
- LWMPs completed, or underway, or being updated or amended 60
- LWMPs with Stormwater component...9

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Local Government Survey 2003

- Not a complete survey for BC
- Reasonably representative sample
- Targeted local government with populations > 10,000

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Examples of Local Government Comments

1. Municipality X's LWMP has no reference to stormwater
2. The LWMP process is for sewage only
3. In our city there is a sewage department and a stormwater department… they are separated in the building and so separate in their studies
4. We *(the stormwater people)* aren't familiar with the LWMP process

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Results of Survey

- 18 OCPs reference stormwater
- 13 Liquid Waste Management Plans
- 11 Bylaws (re: stormwater)
- 4 Stormwater Management Plans
- 2 Design guidelines
- 11 (useful) Local Government contacts
- 7 Regional Office contacts

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Land Use Change Drives Stormwater Management

- **Population Projections:** (2000 – 2023)
  - **East Coast of Vancouver Island**
    - 2000 = 697,130
    - 2023 = 874,478 (+25 %)
- **The supply of land is limited:**
  - **allocated to other uses**
  - **not safe for development**
  - **has high environmental protection values**

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Do we have a stormwater management crisis in the Okanagan?

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Do we have a stormwater management crisis in the Okanagan?

- population growth, land scarcity
- loss of habitat quantity and quality
- rising cost of infrastructure
- flooding and liability concerns
- climate change, water scarcity

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The Science Behind Integrated Stormwater Management

Factors that Limit the Ecological Health of Urban Streams (in order)

1. **Changes in Hydrology-**
   Greater volume and rate of surface runoff caused by increased impervious area and densification of the road network.

2. **Disturbance and/or Loss of Integrity of the Riparian Corridor –**
   Clearing and removal of natural vegetation in riparian (streamside areas)

3. **Degradation and/or Loss of Aquatic Habitat within the Stream –**
   Caused by erosion and sedimentation processes, bank hardening and removal of large organic debris; aquatic habitat is a direct result of changes in hydrology (factor #1).

4. **Deterioration of Water Quality –**
   Increased sediment load due to more runoff volume causing channel erosion. Pollutant wash-off from land uses, deliberate waste discharges and accidental spills.

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The Stormwater Challenge:

Facilitate this...

Prevent this...

Preserve this...

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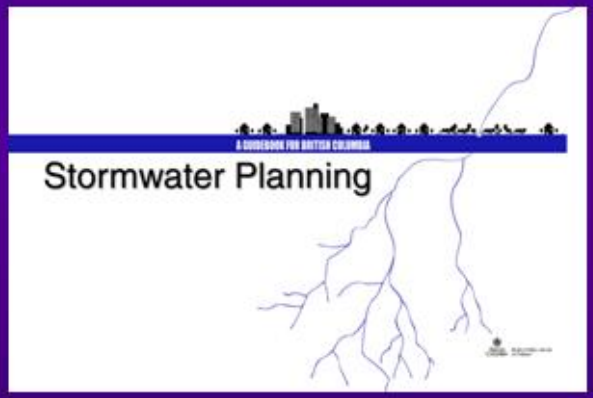
Stormwater Planning: A Guidebook for British Columbia (2002)

A partnership project by:

- BC Ministry of Water, Land and Air Protection
- BC Ministry of Community, Aboriginal and Women's Services
- Environment Canada, and
- Regional District of Nanaimo



http://wlapwww.gov.bc.ca/epd/epdpa/mpp/stormwater/stormwater.html

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Guidebook Audience:

- local government **senior managers** who must make the case to Council to fund stormwater planning
- local government **engineers and planners** developing the stormwater component of an LWMP or stormwater clauses in an OCP
- **developers and the consulting community** who design and implement site specific stormwater solutions

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Guidebook Structure:

Part A - The Problem (Why?): written for elected officials, senior managers, and those wanting a general introduction to stormwater issues

Part B - The Solutions (What?): providing answers and examples at both planning and site levels - written mainly for engineers and planners

Part C - The Process (How?): defining roles, methods, means and timing - written for administrators and the complete range of stakeholders who will be involved in making the move from planning to action

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Guidebook Principles: ADAPT

- Agree that Stormwater is a Resource
- Design for the Complete Spectrum of Rainfall Events
- Act on a Priority Basis in At-Risk Drainage Catchments
- Plan at Four Scales – Region, Watershed, Neighbourhood, Site
- Test Solutions and Reduce Costs over time using Adaptive Management

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Chapter 4: Policies for Integrating Land Use Planning and SWM

- Policy tools
  - Official Community Plans (OCPs)
  - Liquid Waste Management Plans (LWMPs)
- OCP provides the foundation for a LWMP
  - Local government bylaw will form the basis of LWMP
  - Purpose of LWMP: minimize the adverse environmental impact of OCP

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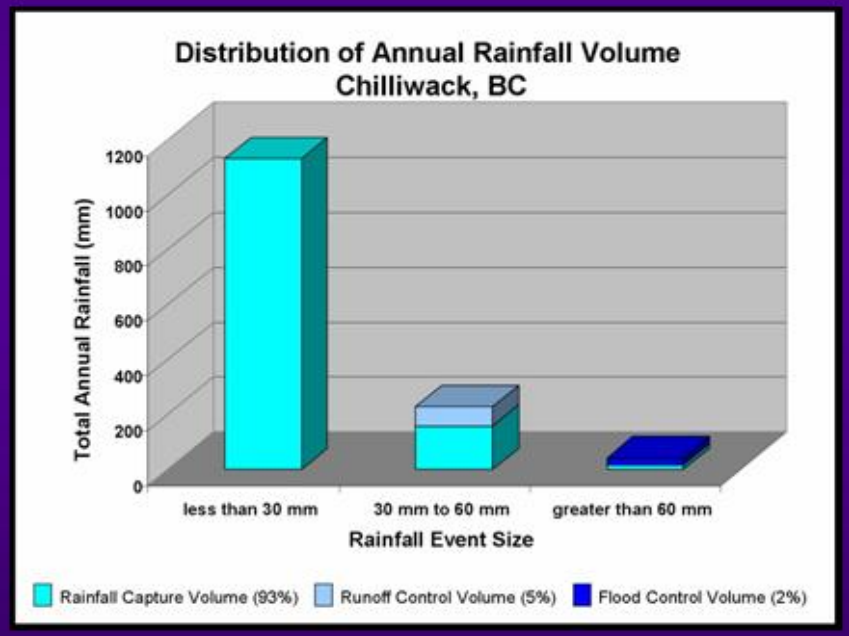
Chapter 6: Managing the Complete Spectrum of Rainfall Events



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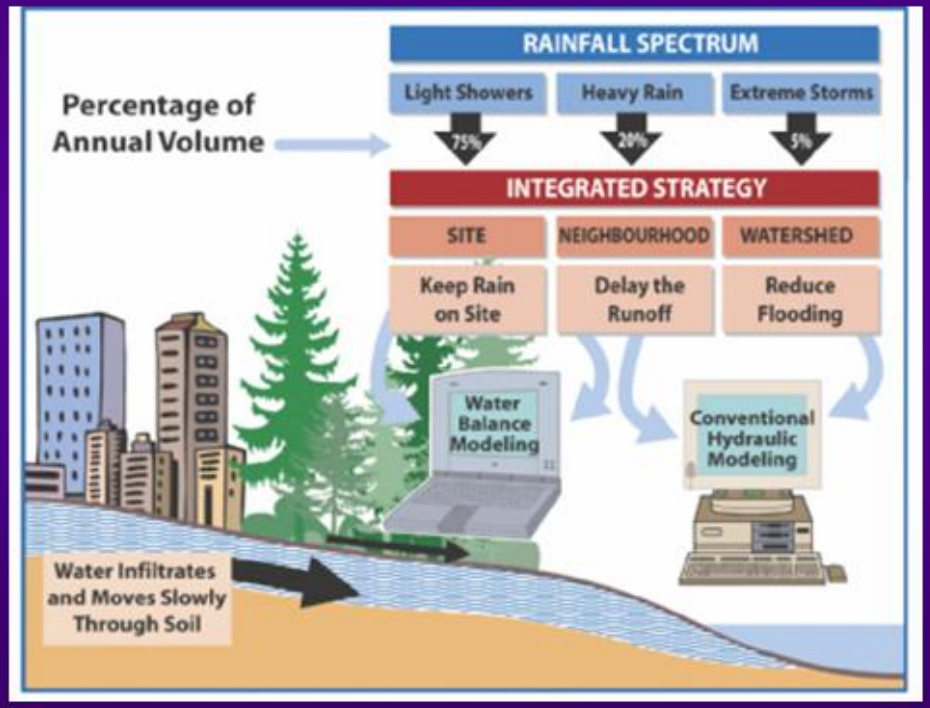
Chapter 6: Managing the Complete Spectrum of Rainfall Events



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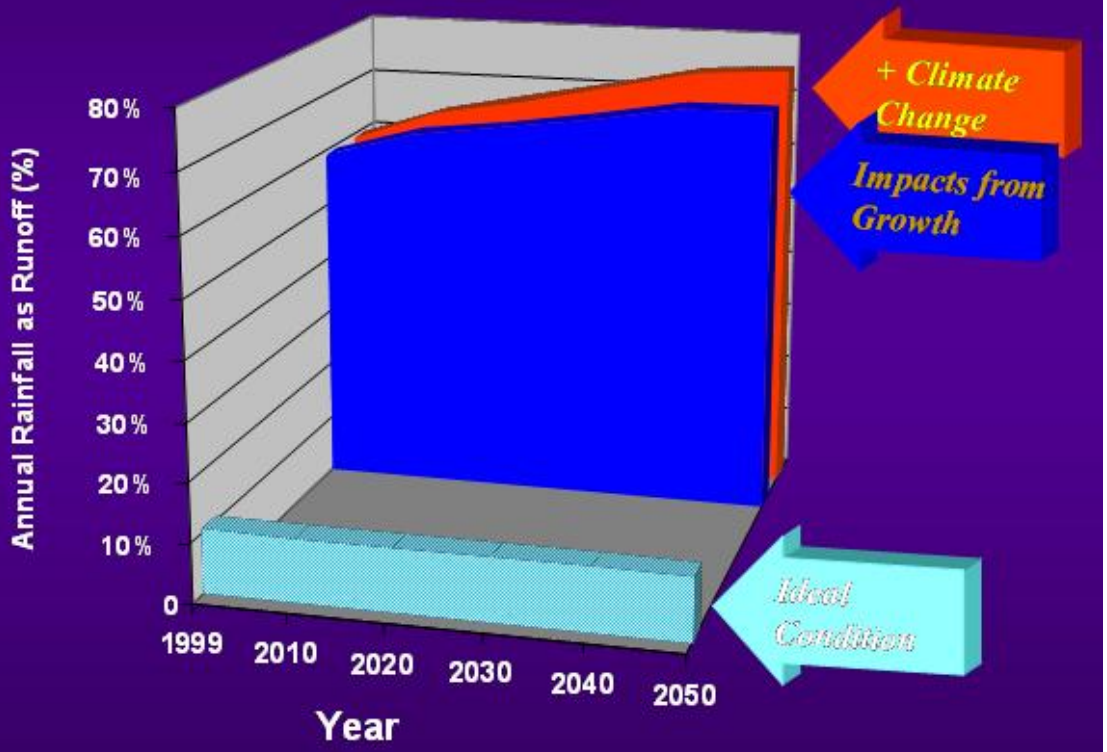
Chapter 6: Setting Performance Targets



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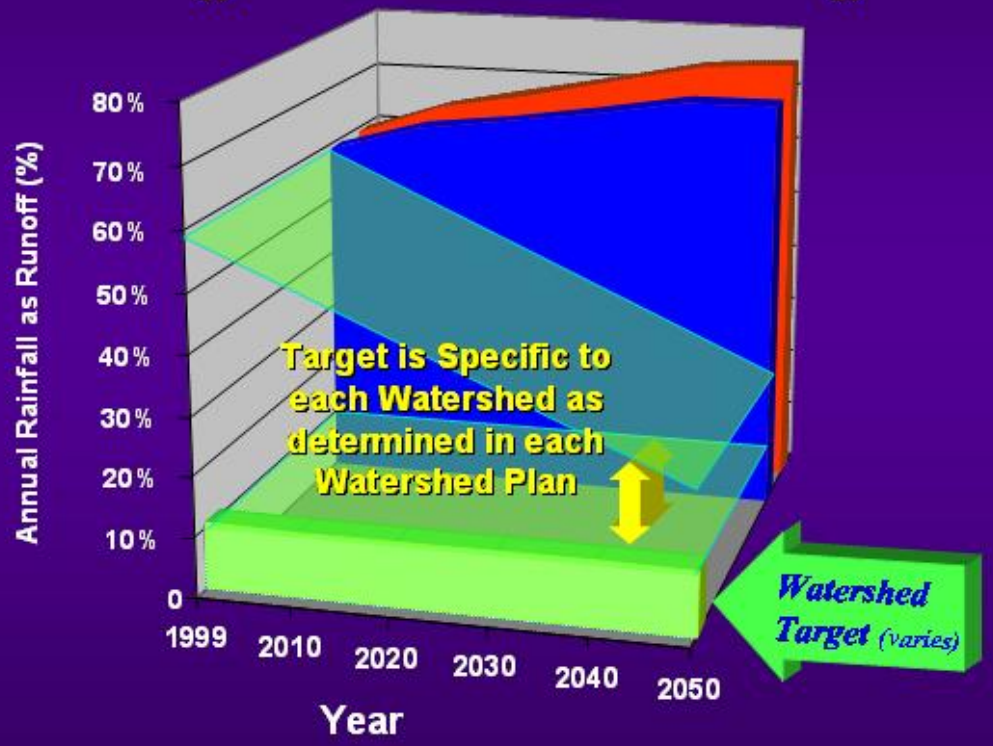
Chapter 6: Setting Performance Targets



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Chapter 7: Site Design Solutions For Achieving Performance Targets

1. Roof Downspout Disconnection
2. Terraced Landscaping
3. Rain Gardens
4. Infiltration Soakaways
5. Runoff Dispersal
6. Permeable Pavements
7. Soil Layer Thickness
8. Stormwater Re-Use

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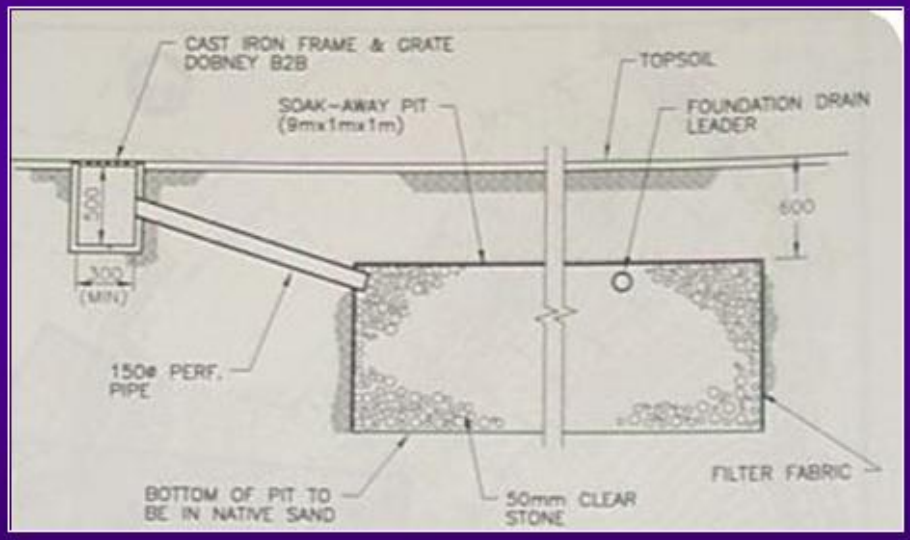
4 – Infiltration Soakaway



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8 – Stormwater Re-Use

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Following from the Stormwater Planning Guidebook:

The Water Balance Model for BC

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Inter-Governmental Partnership:
Steering Committee and Development Team

Co-Chairs
BC Ministry of Agriculture, Food & Fisheries
Environment Canada

Focus Group
City of Chilliwack
City of Surrey
District of North Vancouver
Greater Vancouver Regional District

Project Team
KSA Consultants Ltd
CH2M HILL Canada Ltd
Lanarc Consultants Ltd

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Inter-Governmental Partnership:
Vision

To promote changes in land development practices so that:

- sites and subdivisions will be designed to function to mimic the natural hydrologic condition to the extent possible
- performance targets will be achieved for runoff volume and flow rate reduction

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A scenario modeling tool for planners, engineers and developers that can be used to…

- evaluate the effectiveness of various combinations of source controls
- visualize the 'how to' details of source control implementation
- model scenarios at the site, neighbourhood and watershed scales
- make decisions through a scientifically defensible, interactive, and transparent process

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Water Balance Model Inputs:

- **continuous rainfall data** (any time increment)
- **evapotranspiration data**
- **extent and distribution of land use types** (road width, rooftop coverage, parking coverage, etc.)
- **site design parameters** (vegetation rooting depth, porosity, hydraulic conductivity, water level)
- **soil and groundwater information**
- **stormwater source control design criteria**

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PROJECT DESCRIPTION | SOILS | LAND USE | SOURCE CONTROL | MODEL PROJECT

(Sidebar)

Assign Land Use to Soil Types

You can use this section of the model to describe the native soil conditions of the area you are modeling. Identify the most appropriate soil type from the list below.

		Sandy Loam	Clay	Till				
Square Metres.		4700	3800	1500				+/-
Single Family Residential	3400							
Commercial	2200							
Agriculture	3100							
Parks and Open Space	700							
Undetermined	600							
	+/-							

Refresh +/- | View Assignments Graphically

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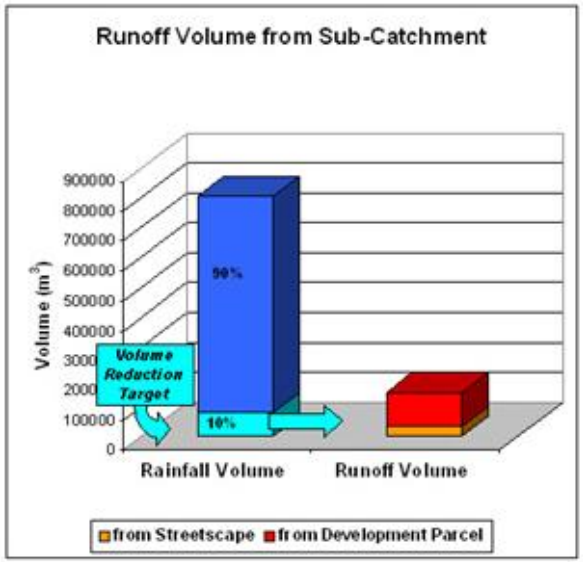

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Upcoming Training Workshop:
Kelowna, BC

In partnership with:

UBI

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If we think of the stormwater component of your LWMP as a roadmap…

Where are we trying to get to?
How will we know when we get there?
How long should it take?

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Where are we trying to get to?

- 10% target
- maintain or restore the natural water balance

Should performance targets be the same for all watersheds? Should the solutions be the same?

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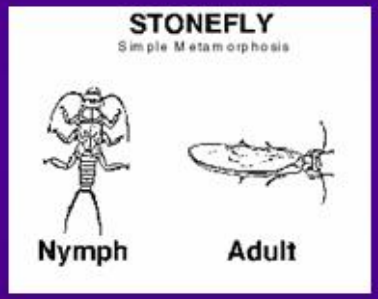
How will we know when we get there?

Possible performance indicators:

- rainfall-runoff response
- stream baseflow
- benthic community health (B-IBI)
- water quality objectives
- economic indicators



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How long should it take?

- 12 years to develop ISMPs in GVRD LWMP
- 50 year time horizon

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Are stormwater management targets achievable?

Is the development community ready?

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Vancouver Island Technology Park
Saanich, BC

- 100% on-site stormwater capture
- grass pave parking lots
- water efficient landscaping
- infiltration ponds built well before development

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Burnaby Mountain "UniverCity"
Burnaby, BC

- housing for 10,000 people
- annual rainfall >2,000 mm/yr
- 90% rainfall volume capture target

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tekmar™ Control Systems Head Office
Vernon, BC

- 100% on-site stormwater capture coupled with ground source heat pump
- roof flooded with rainwater saves 25% on summer cooling costs

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How do we get there from here? Recommendations…

- Strengthen links between land use planning (OCPs) and engineering (LWMPs)
- Set achievable targets
- Focus on achieving cumulative benefits (environmental and economic) over time

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