



**2005 International Water Association Conference**

September 14, 2005

# The Water Balance Model for Canada: Improving the Urban Landscape through Inter-Provincial Partnerships

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**&**

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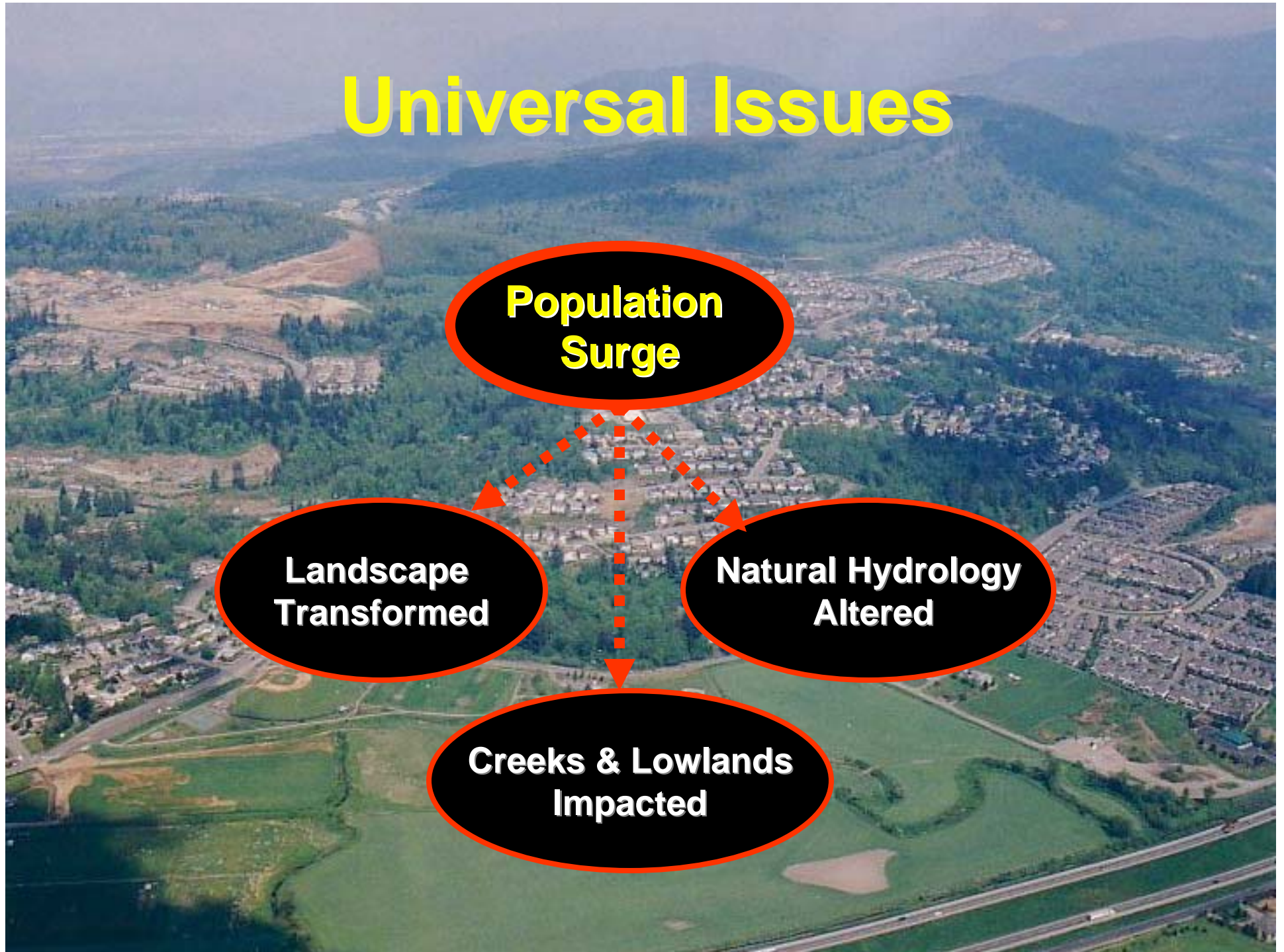
# Universal Issues

**Population Surge**

**Landscape Transformed**

**Natural Hydrology Altered**

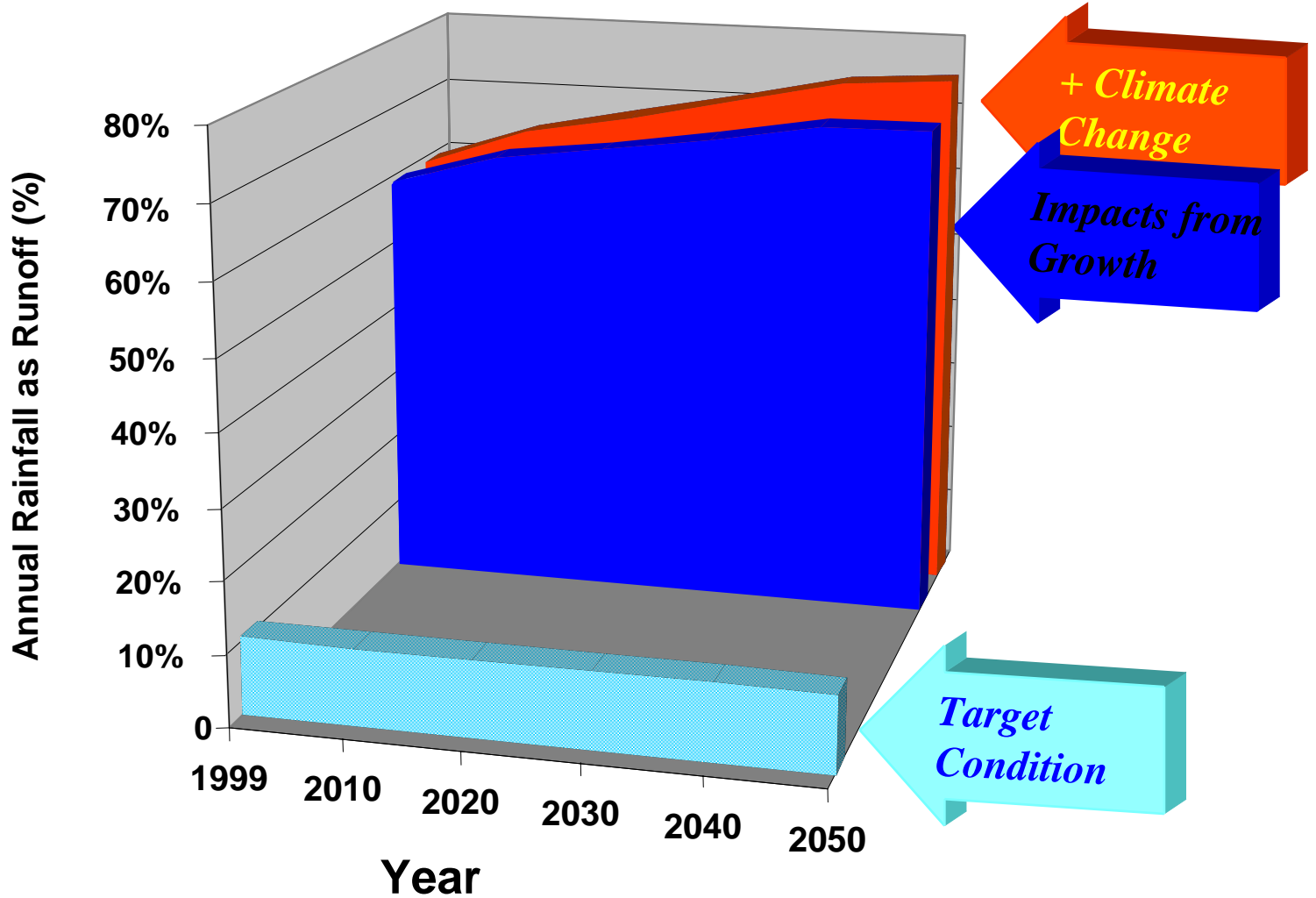
**Creeks & Lowlands Impacted**





# WATER Balance MODEL FOR BRITISH COLUMBIA

## The Watershed Picture: Without Rainfall Capture



# Mind Map

An aerial photograph of a city, likely Nashville, Tennessee, showing a river winding through the landscape and mountains in the distance. The text 'Mind Map' is overlaid on the top portion of the image.

- Looking Back**
- Where We Are Now**
- Looking Ahead**



# Drainage Planning in British Columbia Has Been Evolving Over the Decades

- 1960s: Pipe and Remove
- 1970s: Detain Peak Flows
- 1980s: Reactive Mitigation
- 1990s: Stream Stewardship  
(Proactive Management)
- 2000s: Rainwater Management  
(Sharing a Vision)

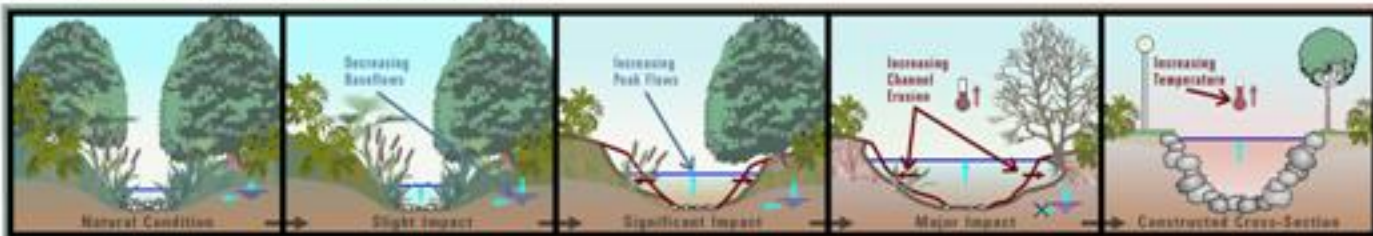
**INCREASING URBANIZATION (NO BEST MANAGEMENT PRACTICES)**



**PROPORTION OF IMPERVIOUS LAND AREA (%)**



**EFFECT ON WATER QUALITY AND AQUATIC HABITAT**



**EFFECT ON DIVERSITY AND ABUNDANCE OF THE FISHERIES RESOURCE**



**EFFECT ON BIOTIC INDICATORS FOR BENTHIC ORGANISMS**



**IMPACT OF INCREASING URBANIZATION ON STREAM CORRIDOR ECOLOGY**

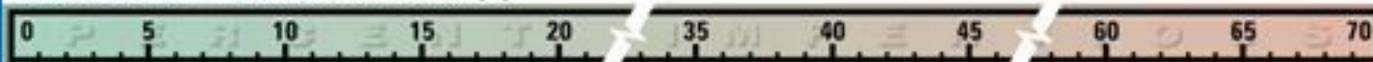
**(WITHOUT BEST MANAGEMENT PRACTICES)**

*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.*

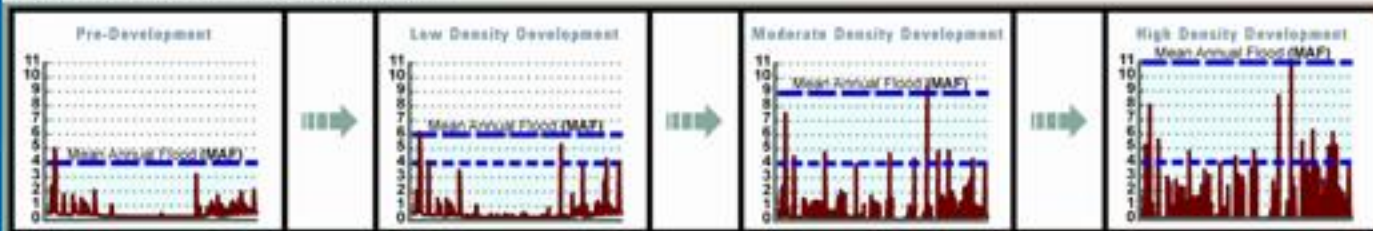
**INCREASING URBANIZATION (NO BEST MANAGEMENT PRACTICES)**



**PROPORTION OF IMPERVIOUS LAND AREA (%)**



**EFFECT ON TYPICAL YEAR HYDROGRAPH**



**EFFECT ON WATERCOURSE EROSION**



**NUMBER OF STORM EVENTS AT OR ABOVE PREDEVELOPMENT MEAN ANNUAL FLOOD**



**RATIO OF MEAN ANNUAL FLOOD TO WINTER BASE FLOW**



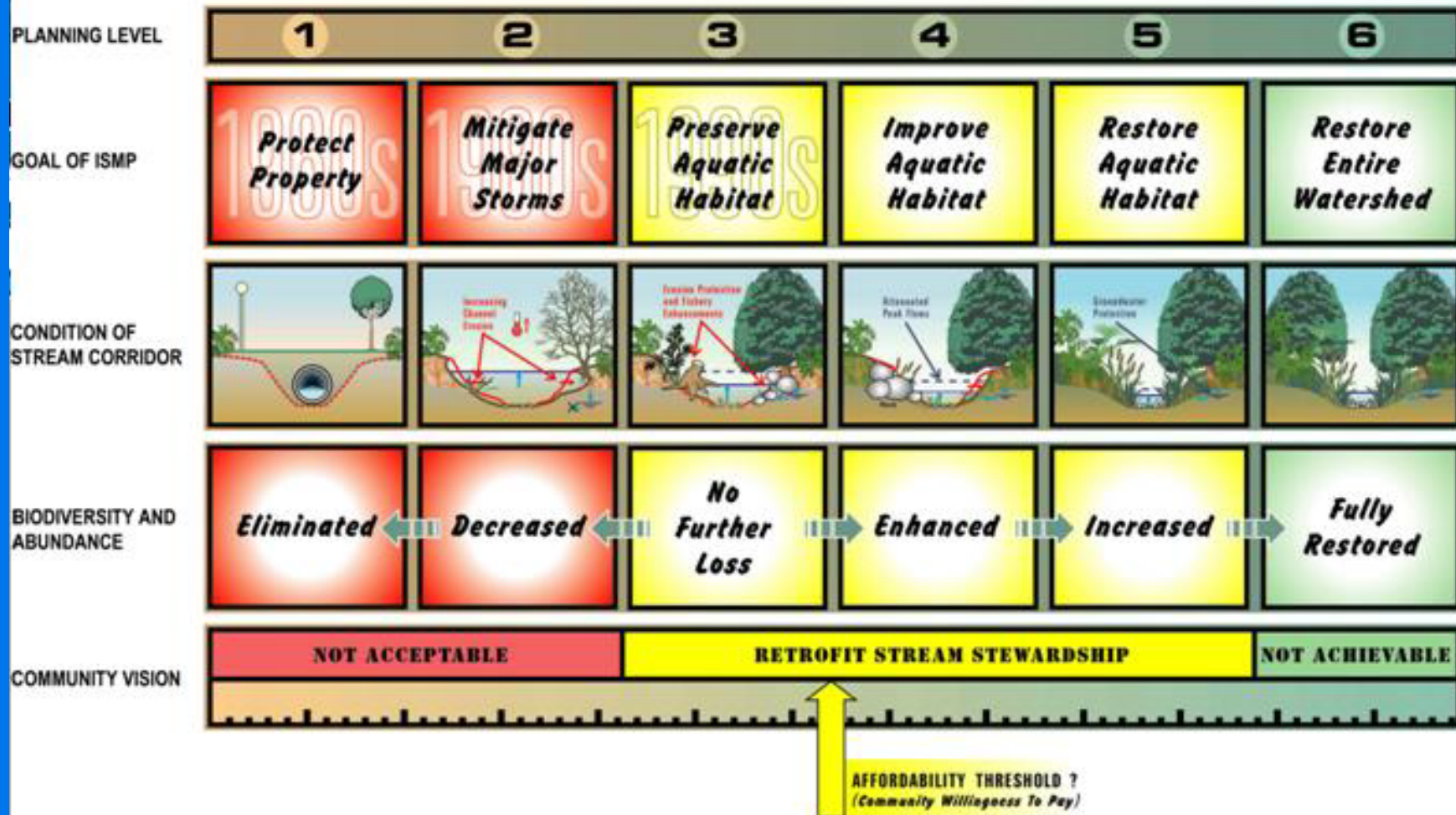
**IMPACT OF CHANGES IN HYDROLOGY ON WATERCOURSE EROSION AND BASE FLOW RELATIONSHIPS**

**(WITHOUT BEST MANAGEMENT PRACTICES)**

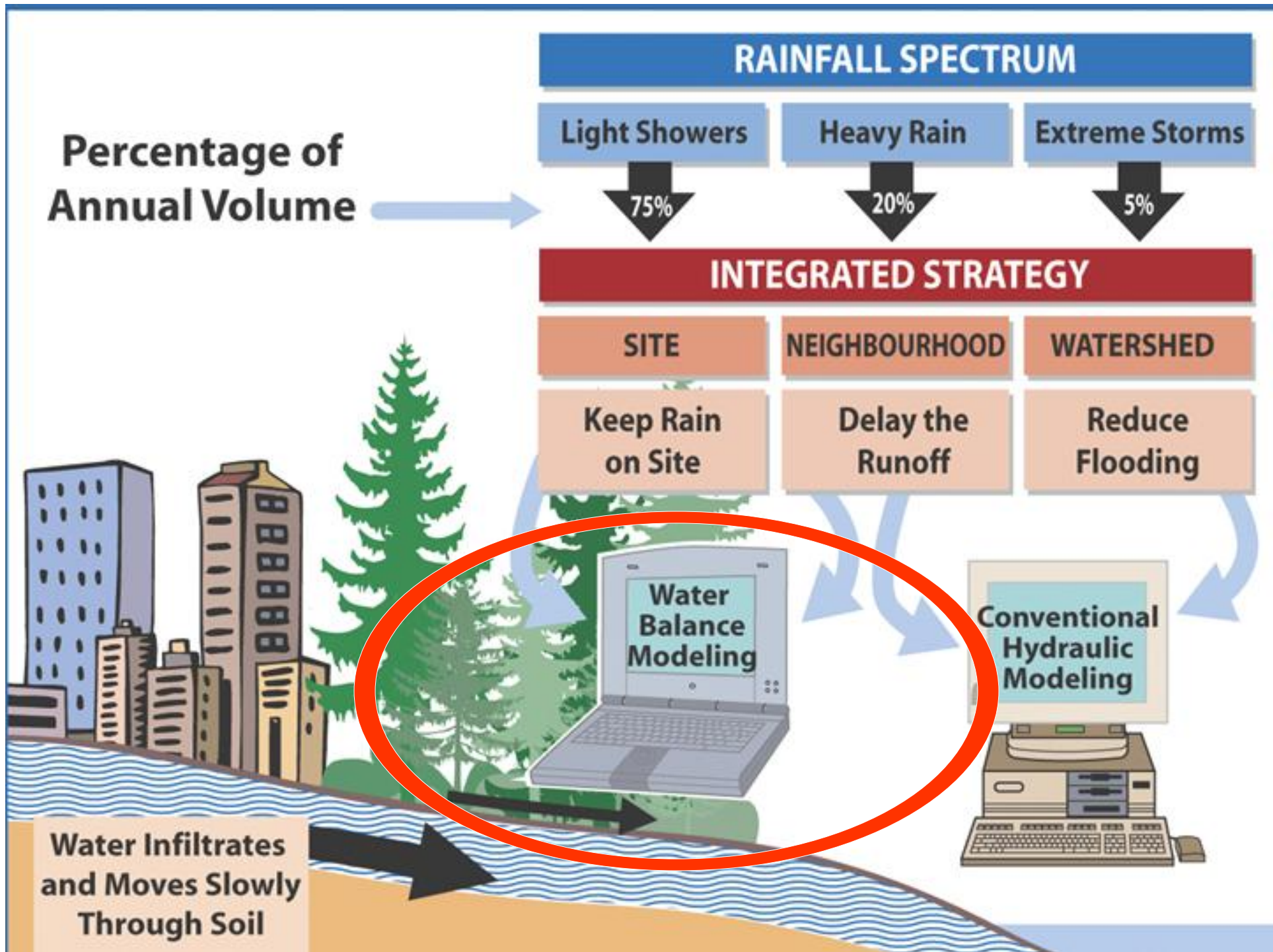
*This figure demonstrates the impact of increasing impervious area on the number of erosion-causing events, and increased peak flow impacts on channel stability. Although it is*

# ALTERNATIVE VISIONS FOR THE LONG-TERM ENVIRONMENTAL HEALTH OF STREAM CORRIDORS

## Conceptual Framework for Selection of ISMP Level







# Mind Map

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- ☑ **Looking Back**
- ☑ **Where We Are Now**
- ☑ **Looking Ahead**



**WATER**  
**Balance**  
**MODEL**  
FOR BRITISH COLUMBIA

## Inter-Governmental Partnership: Vision

To promote changes in land development practices so that:

- The built environment will preserve and/or restore the natural water balance over time
- Performance targets will be achieved for rainwater runoff volume and flow rate reduction at the source, *where rain falls*



## The Water Balance Model is...


A tool that quantifies the benefits –  
in terms of reducing **rainwater runoff volume**  
- of installing source controls under different  
land use, soil and climate conditions

**Partners**



City of Chilliwack

Visit  
City of Chilliwack



**TRY THE MODEL**

1. Enter the area of your site, add existing soil conditions, and land use information.
2. Create a graph of rainwater volume summaries and see how well your site performs.
3. Add a Green Roof or a Rain Garden or similar rainwater source control and compare before and after results.

**Organizations** +

Recent Additions...

[British Columbia Ground Water Association](#)

[Canadian Water Resources Association](#)  
The Canadian Water Resources Association is a national organization of individuals and organizations interested in the management of Canada's water resources. The membership of the Association is composed of private and public sector water resource professionals including managers, administrators, scientists, academics, students and users. It has branch organizations in eight provinces and members throughout Canada and beyond.

[Watershed Report Card](#)

**Key Message:**  
**Anybody with a computer and internet connection can access the model**

**Events**

Jun 2005

Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

Add an event

primary purpose is to provide province-wide guidelines for the maintenance of environmental values .....More

[www.waterbalance.ca](http://www.waterbalance.ca)

**Poll**

A poll is not available

Adapting the Australian Experience



WSUD:  
 BASIC PROCEDURES FOR  
 'SOURCE CONTROL' OF STORMWATER



**How Water Moves Through Soil**



**WATER**  
**Balance**  
**MODEL**  
FOR BRITISH COLUMBIA

## Simplifying the Technical Language!

### **Basic Source Control Types:**

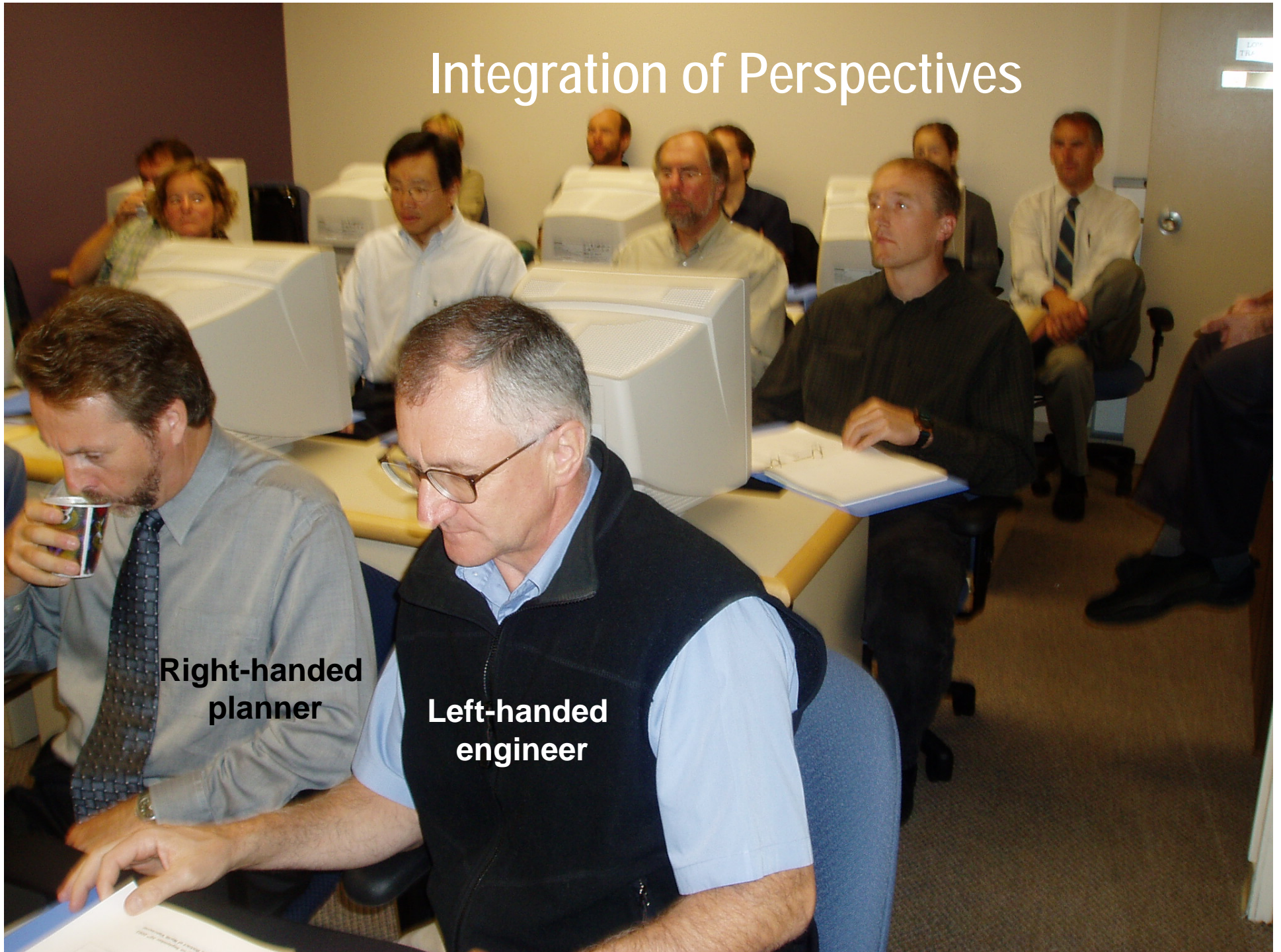
- Absorbent Landscape
- Rain Gardens
- Infiltration Swales
- Pervious Paving
- Green Roof

# Water Balance Model promotes Integration of Perspectives

- **Planners:** Tool for Better Use of Space
- **Engineers:** Tool for Pre-Design
- **Landscape Architects:** Tool for Green Solutions
- **Ecologists:** Tool for Watershed Function
- **Educators:** Tool for Social Marketing



# Integration of Perspectives



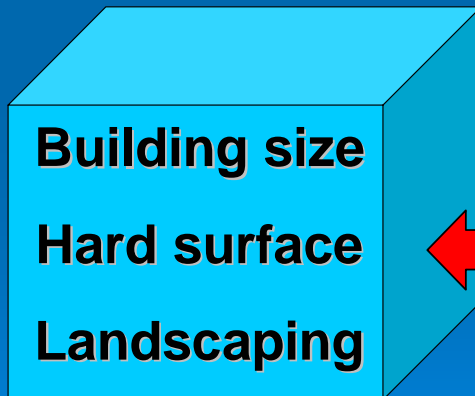
**Right-handed  
planner**

**Left-handed  
engineer**

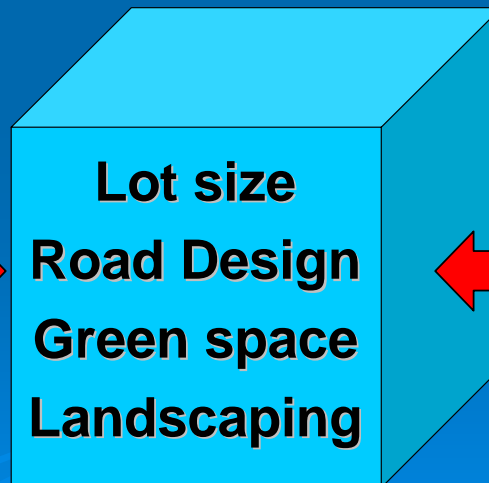
## Key Message:

# Integrate Actions at Three Scales: Improve Site Practices to Enhance Community Livability

Site



Neighbourhood:



Watershed:



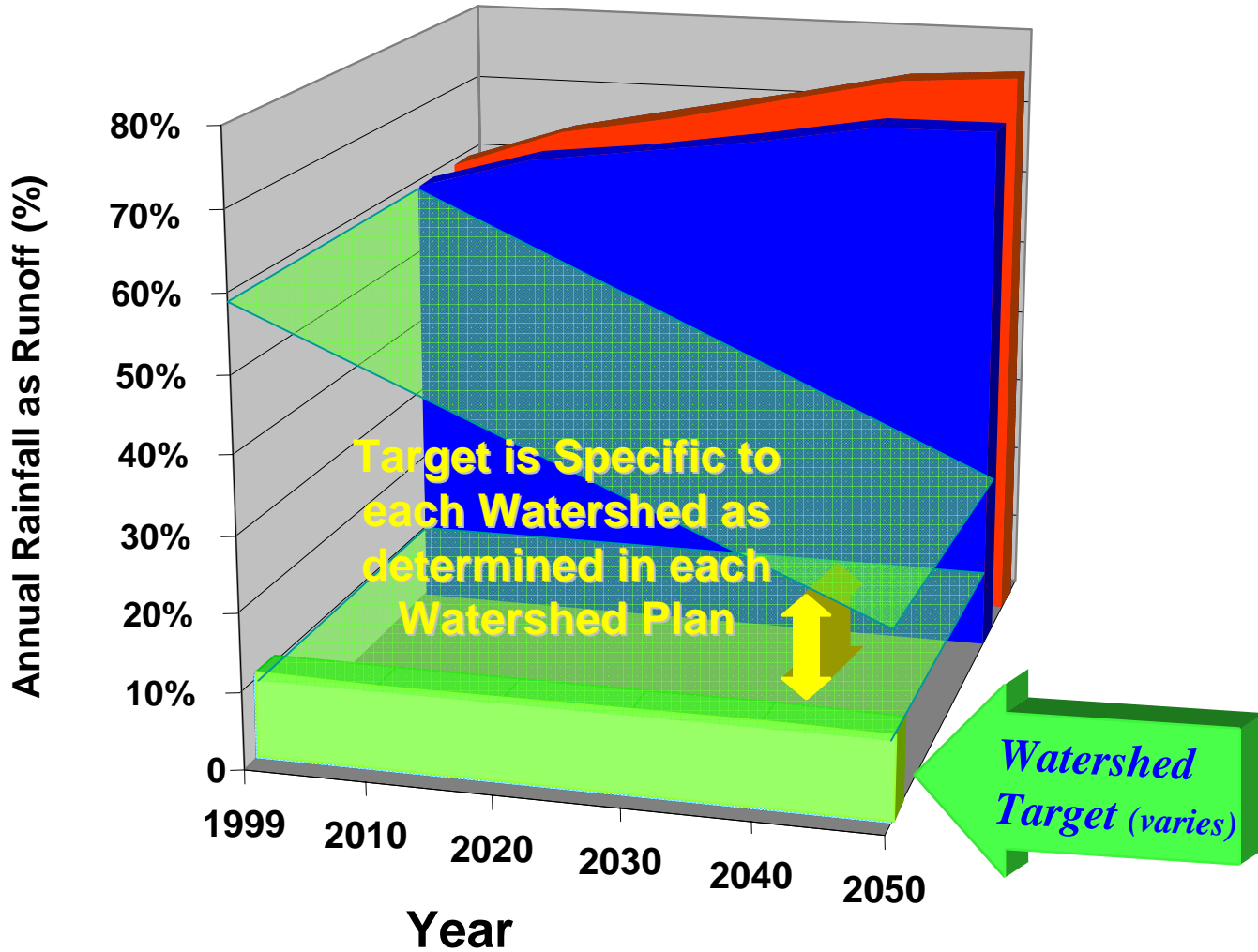
# How the Water Balance Model is being used to make better decisions:

- **Local Governments** -  
when communicating with the public
- **Planners and Engineers** –  
when setting performance targets
- **Developers and their Consultants** -  
when testing scenarios
- **Environmental Agencies** -  
when monitoring watershed health



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# The Alberta Story - 1

Low Impact Development Workshop in Okotoks, Alberta – September 2004

Initial reactions were mixed – planners and architects are open minded (LEED) while engineers are cautious until they realize that they need each other to implement change

Actually, brought people together who shared a common vision



**WATER**  
**Balance**  
**MODEL**  
FOR BRITISH COLUMBIA

## The Alberta Story - 2

Universality

Exchange of ideas and information

Do not get stuck on particular methods  
but look at the entire toolbox available,  
and allow it to evolve

Need regulatory framework and why we  
would be interested in doing this

## There are parallels between the 1998 British Columbia Strategy & Alberta's Water for Life initiative



water for life

alberta's strategy for sustainability

**ALBERTA'S DESIRED OUTCOMES:**

- ☑ Safe, secure drinking water supply
- ☑ Healthy aquatic ecosystems
- ☑ Reliable water quality supplies for a sustainable economy

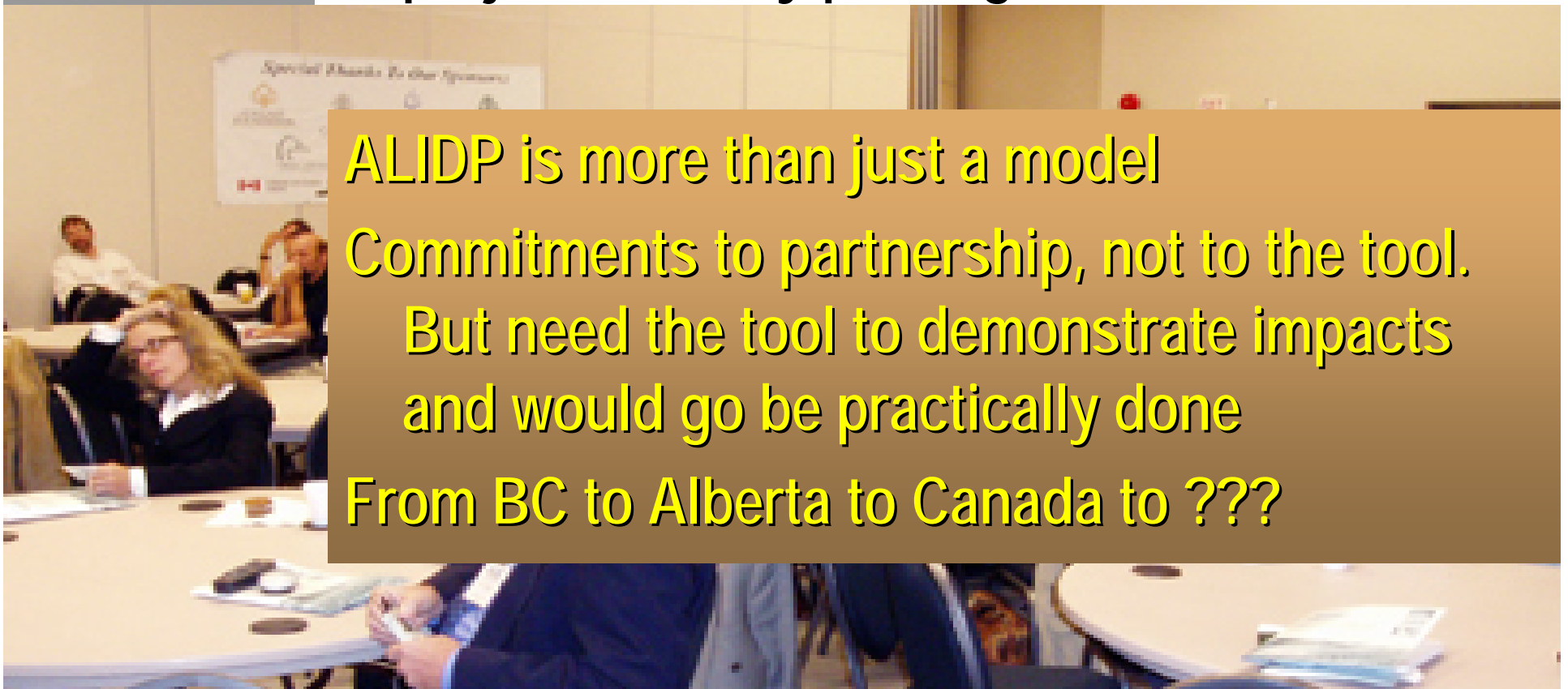
Alberta  
GOVERNMENT OF ALBERTA





## The Alberta Story - 3

Need first of all public education and outreach  
Provides impetus for further research, pilot projects, etc. by pooling resources



ALIDP is more than just a model

Commitments to partnership, not to the tool.

But need the tool to demonstrate impacts  
and would go be practically done

From BC to Alberta to Canada to ???

# The Mission is to Create a Legacy

**Influence choices by individuals and organizations**

**Use the term “sustainability” as a lens for  
considering approaches that influence choices**

# Water Balance Model For Canada

Alberta Impact Development Partnership    British Columbia Inter-Governmental Partnership

Promote changes in land development practices so that they are designed to mimic the natural hydrologic conditions

[www.waterbalance.ca](http://www.waterbalance.ca)

Please feel free to visit us at the booth!

