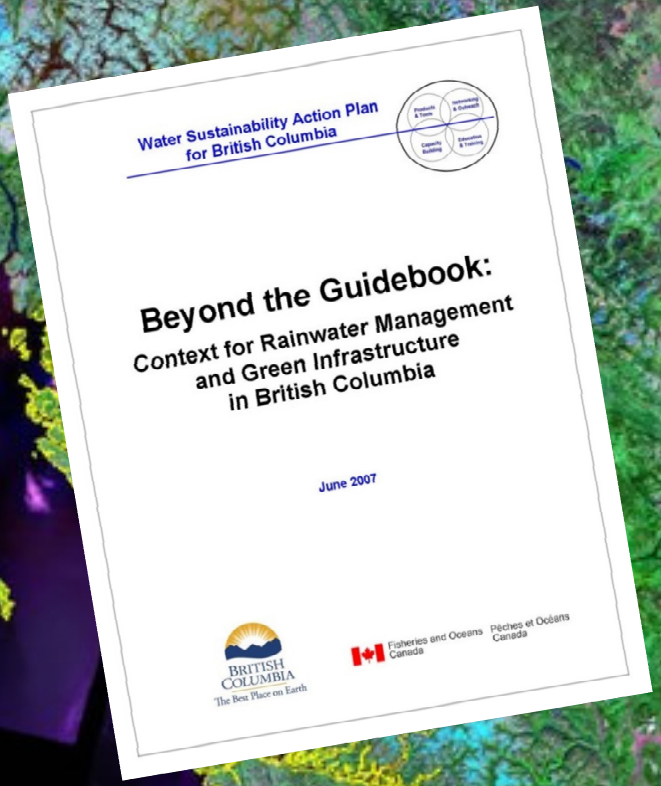
‘Beyond the Guidebook’ is about changing the way we develop land:



We call this *Designing with Nature*

To create livable communities & protect stream health

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Report from the Chair

- Project Overview
- The New Business As Usual
- Inter-Provincial Partnership
- Rolling 3-Year Plan

The New Business As Usual:

Visualize What We Want British Columbia to Look Like in 50 years

"What the cell is to the body, the site is to the region"

Patrick Condon, 1998
University of British Columbia

Format for the Day

- Part One: Demonstrate
- Part Two: Feed Back
- Part Three: Inform

Integrating the Site with the Watershed and the Stream…

This tool will help communities create neighbourhoods that integrate both good planning and innovative engineering designs

Integrating Rainwater Management to Create Sustainable, Livable Communities

Chris Jensen
Ministry of Community Services
&
Co-Chair, Vancouver Island Coordinating Team

Outline

1. MCS: Green Communities Initiative

- Rainwater Management
- Water Balance Model

2. Financial Incentives

- $ for planning
- $ for capital
- $ for recognition

BRITISH COLUMBIA
The Best Place on Earth

MINISTRY OF COMMUNITY SERVICES

Mandate: To promote sustainable, livable communities

How?

- Green Communities Initiative
  - Rainwater Management

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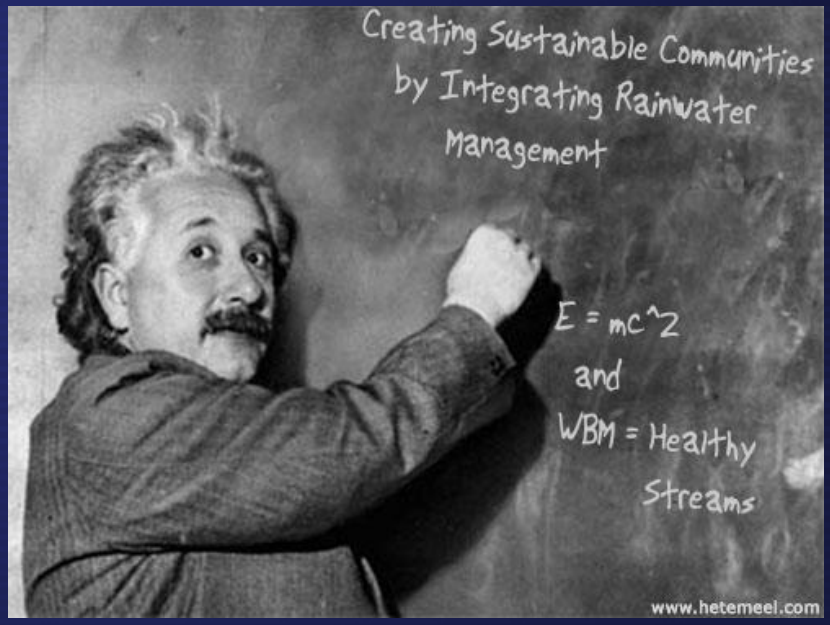
Water Balance Model

WATER Balance MODEL

Water Balance MODEL Powered By QUALHYMO



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FINANCIAL INCENTIVES

PLANNING: Infrastructure Planning Grants

CONSTRUCTION: Capital Grant Programs

RECOGNITION: Green City Awards

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Infrastructure Planning Grant Program

Successful Applications Look Like…

Burnaby:	Integrated Stormwater Management Plan
Cumberland:	Low Impact Development Planning
Victoria:	Rain Garden Study
Tofino:	Low Impact Engineering Specifications
Kamloops:	Low Impact Development DCC

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Capital Grant Programs

Capital Grant Programs support projects that:

- **Minimize hydrological footprint**
- **Mitigate and adapt to Climate Change**
- **Generate transferable knowledge**
- **Promote innovation**
- **Produce environmental benefits**

Towns for Tomorrow

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Success in View Royal

$7.4 MILLION for an innovative rainwater management project and to improve roadworks

Designing with Nature

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Success in the Capital Regional District

$296,000 for installation of a 630 m^2 green roof.

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Leveraging Change

TODAY: Strong preference given to **green** projects.

TOMORROW: Meeting a **green** standard will be a requirement for grant eligibility

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RECOGNITION: Green City Awards

- **$500,000** a year awarded to local governments
- Awarded to BC's most **SUSTAINABILE** communities
- Nominations close **April 18, 2008**

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**"The future has already arrived.
It's just not evenly distributed yet"**

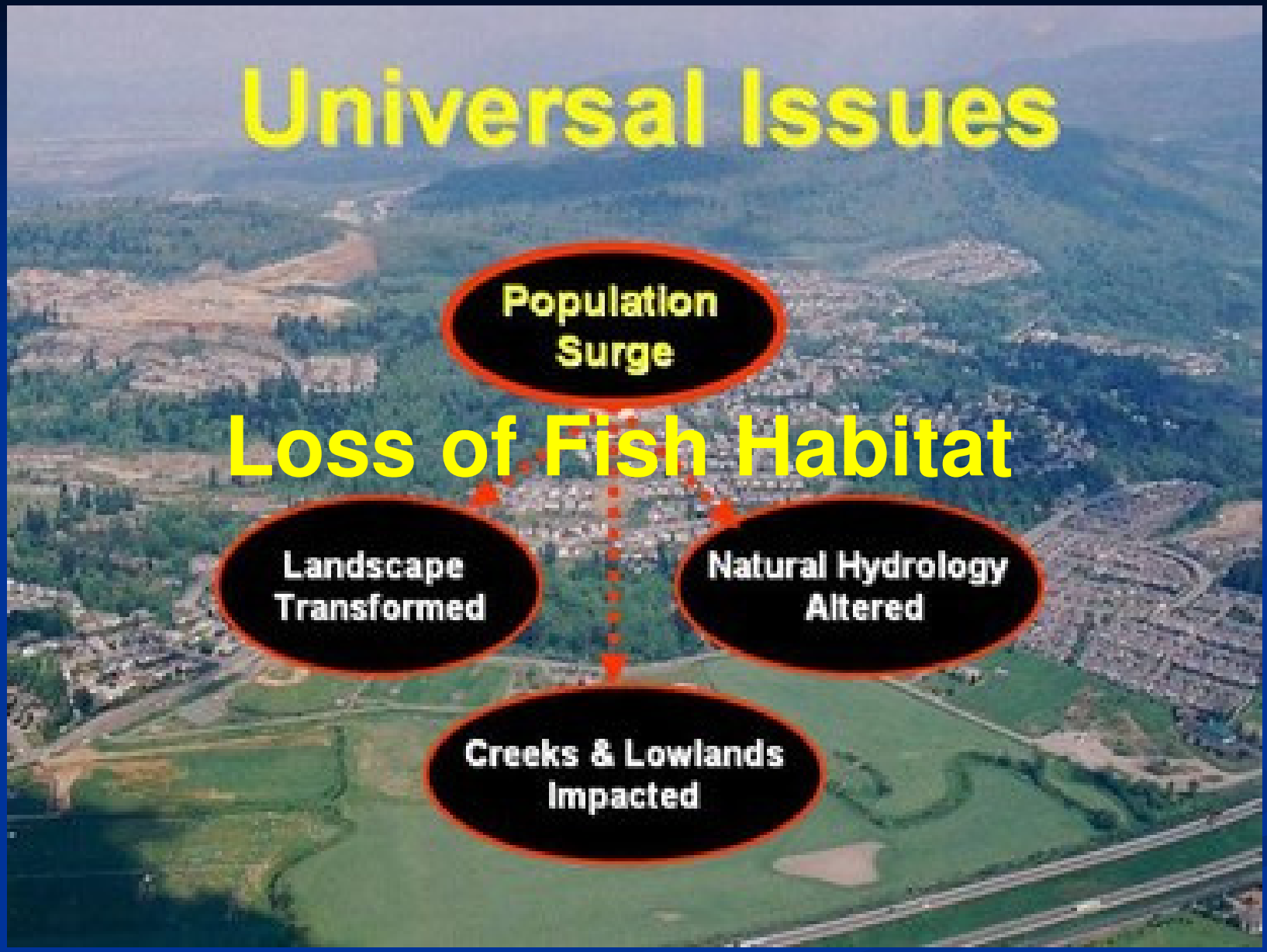
William Gibson

The Water Balance Model Partners Forum

Beyond the Guidebook: The New Business as Usual

Corino Salomi
Fisheries and Oceans Canada
Lower Fraser Area

February 29, 2008


Universal Issues
Population Surge
Loss of Fish Habitat
Landscape Transformed
Natural Hydrology Altered
Creeks & Lowlands Impacted

In BC, we have building on the work of Horner & May of Washington State a decade ago when they defined the order-of-priority for factors affecting stream health

☑ Changes in Hydrology

- Disturbance and/or Loss of the Riparian Corridor
- Degradation and/or Loss of Habitat within the Stream
- Deterioration of Water Quality

The Shift From Stormwater to RAINwater

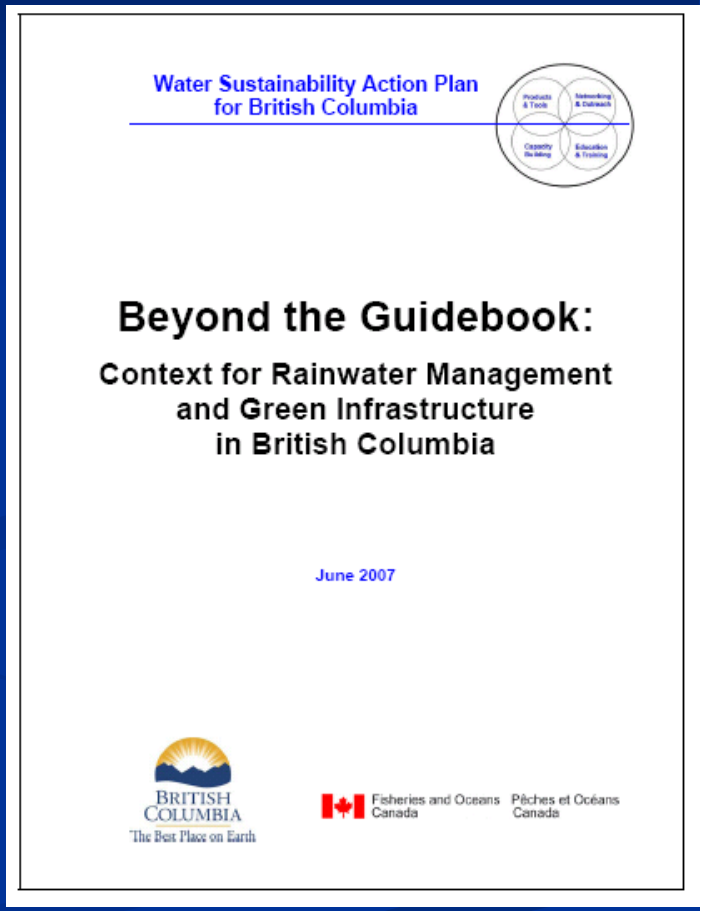
- 2001 DFO Urban Storm Water Guidelines
- 2002 Stormwater Planning: A Guidebook for BC
- The Water Balance Model
- GVRD Integrated Stormwater Management Planning
- 2005 GVRD Source Control Design Guidelines
- 2007 Beyond the Guidebook

Tools and Resources Exist

- The Provincial Stormwater Guidebook
- Water Balance Model with QUALHYMO
- Low Impact Development guides
- Stormwater Source Control Design Guidelines
- Green Infrastructure Guides
- Local government powers
- Case studies and working examples
- Waterbucket.ca

Beyond The Guidebook:
The New Business as Usual

- **Protection and Improvement of Stream Health**
- Broader understanding, integration, and planning efforts
- **The Water Balance Model powered by QUALHYMO**
- Assessment of Stream Impacts
- Assessment of Solutions



Legislation

- ***Fisheries Act***
  - Section 36 prohibits deposit of deleterious substances
  - Section 35 prohibits harmful alteration of habitat

- Canadian Environmental Assessment Act (CEAA) - identify, avoid, mitigate, assess

- Species at Risk Act (SARA)
  Critical Habitats & Prohibitions

Policy and Planning

- No-net- loss and net-gain
- Greater emphasis on Watershed Planning
- Wild Salmon Policy
- Environmental Process Modernization Plan
  - Focus on high risk higher impact issues
- Habitat compliance modernization
  - Increased Monitoring and Enforcement
- Increased role for partners

Beyond the Guidebook

New Business as Usual

March 5, 2008

CHANGE

- Our knowledge is increasing as we gain a better understanding of hydrology
- We can adapt our guiding framework to reflect our understanding
- ADAPTIVE MANAGEMENT

Beyond The Guidebook - Now

- First was unrestricted development and drainage
  - result flooding and stream erosion
- Next was detention ponds to reduce flooding
  - result was continued stream degradation
- Then came the Guidebook to focus on volume control
  - result was innovation in retention to allow volume controls
  - ASSUMED to be beneficial to the stream
  - projected capital cost savings were not realized
  - unintended consequences to streams
- Now - "Beyond the Guidebook"
  - focus on streams and the watershed
  - incorporating all the lessons learned to date
  - next step in the progression of our understanding of stream impact prevention

HOW

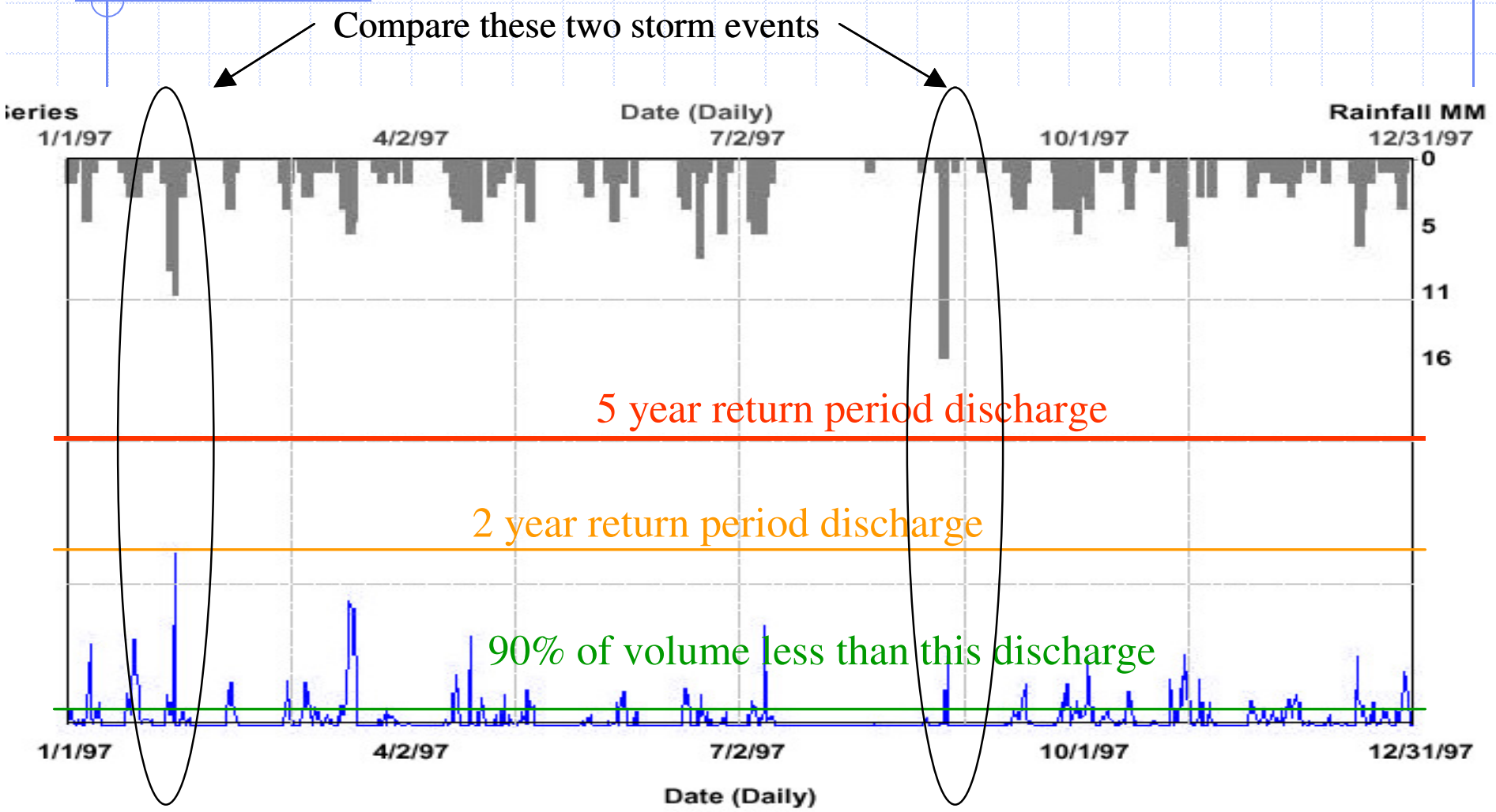
- Simple Methodology
- Integrated process
  - Establish Targets
  - Hydrologic Impact Assessment
  - Optimize Systems to Achieve Targets
  - Build and Monitor
- Include Planners, Recreation, Environment, Engineers, Stakeholders, etc, etc

TARGETS

- Optimize for a watershed
  - Site specific
- Better solutions
- Not universal
- Reason
  - It is not about how much rainfall is captured, it is about how much water is in the stream

Retain 90% Volume: can be done without reducing discharge rates

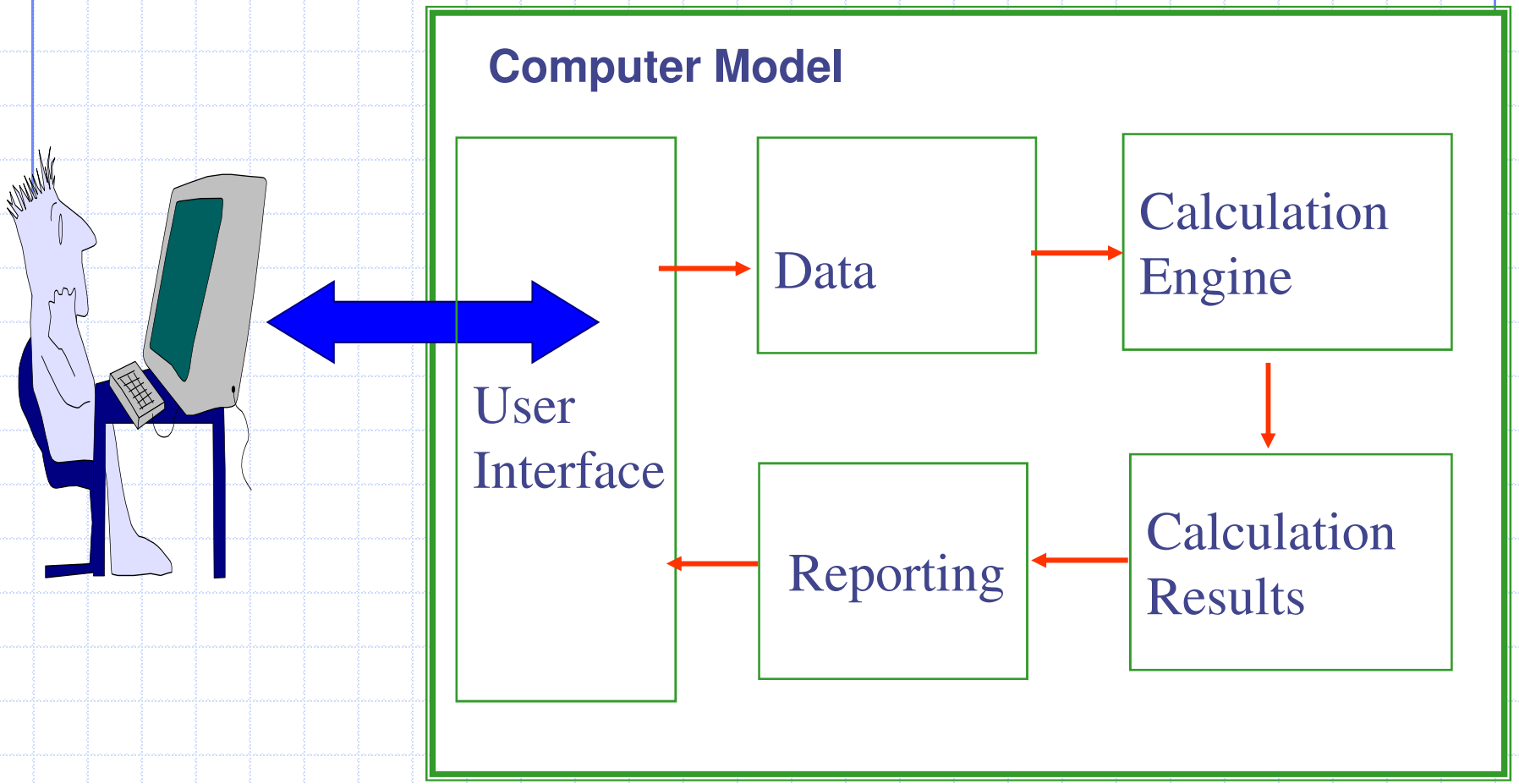
Typical Year



ADDITIONS

- Adding QUALHYMO
  - Hydrology calculation engine
- Enhancing the WBM interface
  - Does many calculations
  - Intelligent System

Computer Modelling



ADDITIONS

- Enhanced Water Balance includes:
  - Evaporation
  - Watershed / Site Infiltration
  - Stream Discharge from surface and ground
- Stream Erosion Index
  - Compares scenarios
- Mitigation Systems With Underdrains
- Long term, multi-year simulations
  - Includes ALL; wet and dry and average

Beyond the Guidebook

New Business as Usual

March 5, 2008

PART B – FEED BACK

Applying the Water Balance Model to Change the Way We Develop Land:

What Else Would You Like to Know or Share?

Showcasing Green Infrastructure
Innovation in British Columbia
In 2007, there were parallel series
in Greater Vancouver and on
Vancouver Island
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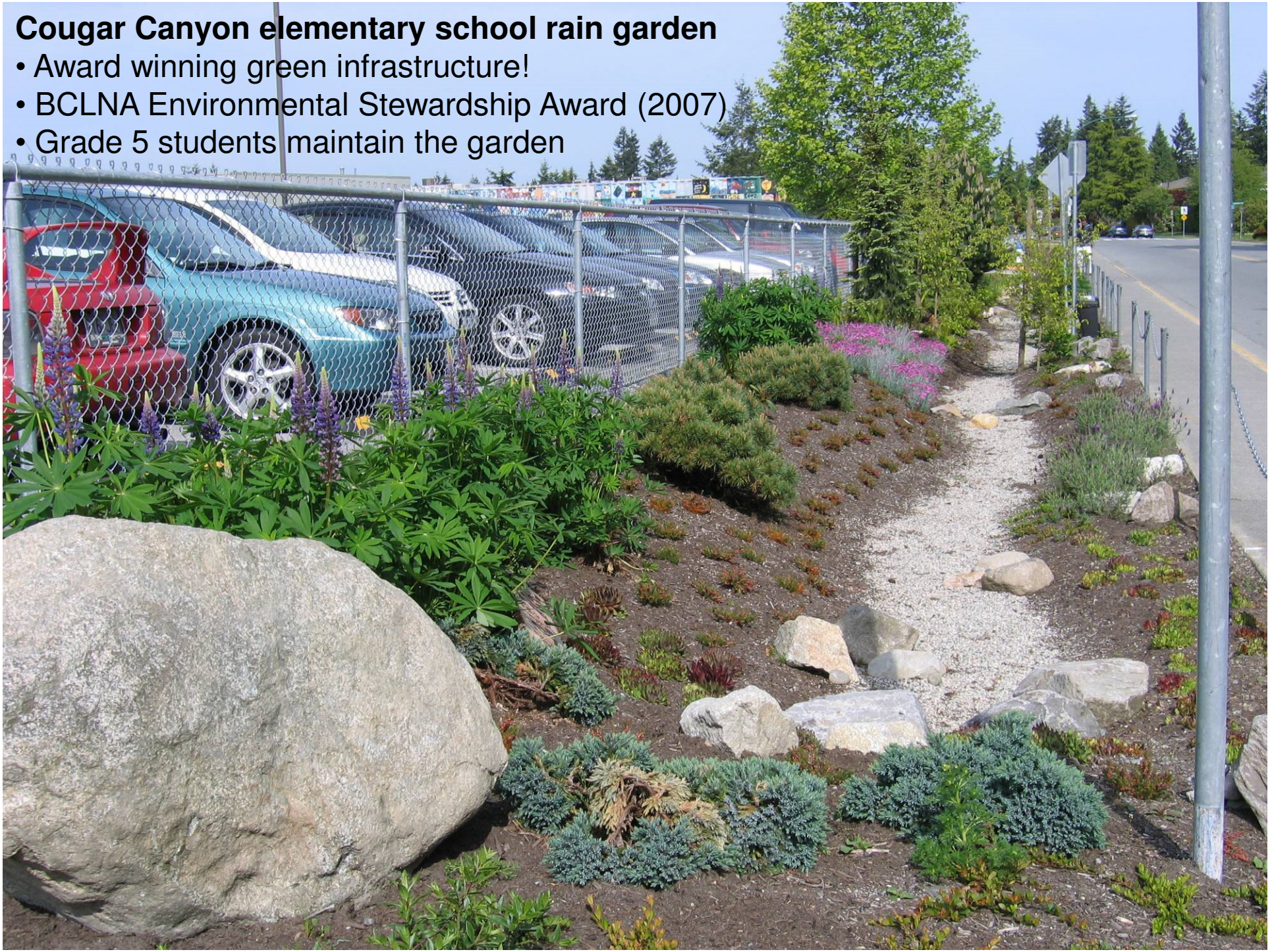
Showcasing Innovation Series

- September 2007 in Delta
- Shared our green infrastructure projects

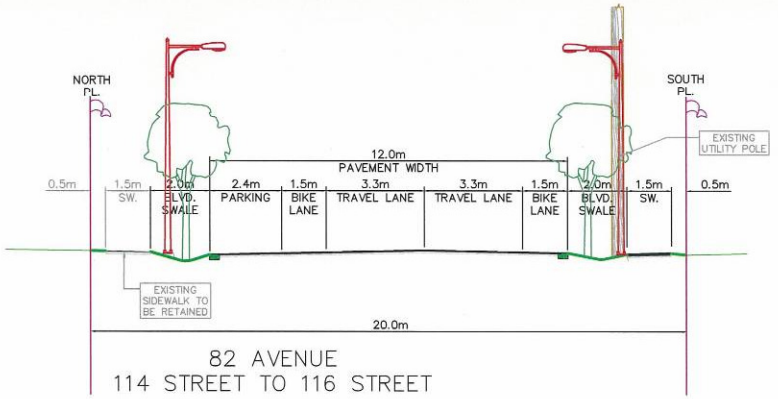
Cougar Canyon elementary school rain garden

- Award winning green infrastructure!
- BCLNA Environmental Stewardship Award (2007)
- Grade 5 students maintain the garden



82 Avenue streetscape revitalization

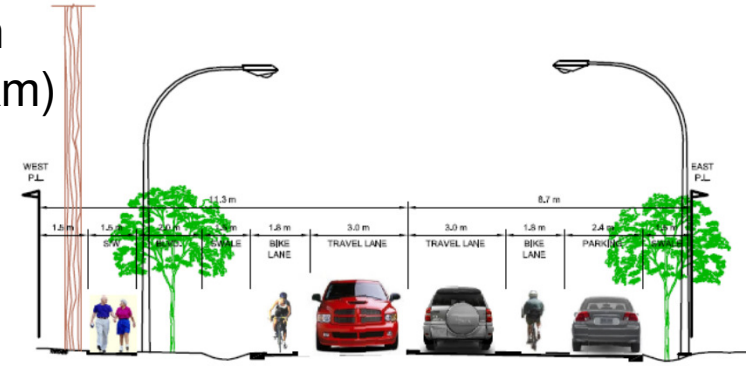
- Roadside swales throughout the travel corridor (2.4 km)
- Rain gardens at intersections
- Bike lanes to encourage alternative modes of transportation

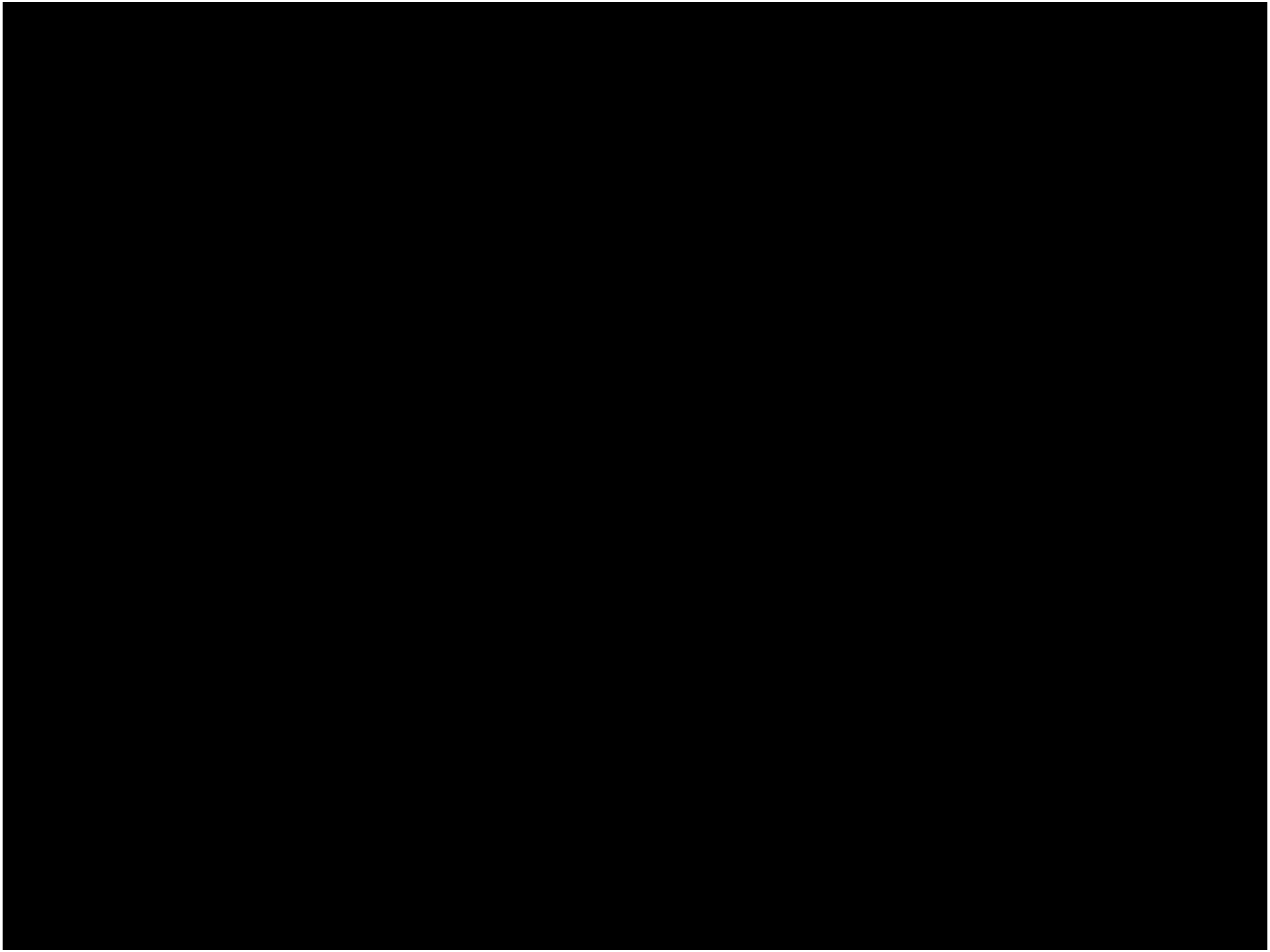


82nd AVENUE:
108 STREET TO 120 STREET

115 Street utilities upgrade and street revitalization

- Roadside swales throughout the travel corridor (0.7 km)
- Rain gardens at intersections
- Community gardens in the hydro ROW





CAVI – Convening for Action on Vancouver Island
Leadership in Water Sustainability
BCWWA
THE REAL ESTATE FOUNDATION
CAVI
Leadership Team
Ministry of Environment
Ministry of Community Services
BRITISH COLUMBIA
Creating Our Future:
The New Business As Usual

The New Business As Usual:
Visualize What We Want Vancouver Island to Look Like in 50 years
CAVI brings together those
who plan and regulate (local government),
those who build (developers) and those
who provide the legislative framework (the Province)

The keys to the success of CAVI are…

- We seek a common vision
- We create learning and networking opportunities
- We focus on the relationship between land and water
- We promote sharing of ideas and experience

2007 Vancouver Island Series Green Infrastructure Innovation

- **Comox Valley**
  Connecting to Sustainability
- **Nanaimo Region**
  Designing with Nature
- **Cowichan Valley**
  Partnerships & Collaboration – moving from Concept to Reality

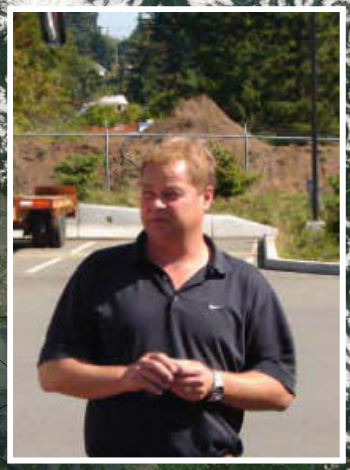
Inland Kenworth Case Study in Nanaimo:

Where *Designing with Nature* meets *Green Value*

Nanaimo staff challenged the owner's design team to "dare to be different"
Inland Kenworth symbolizes the 'turning of the tide' in the City

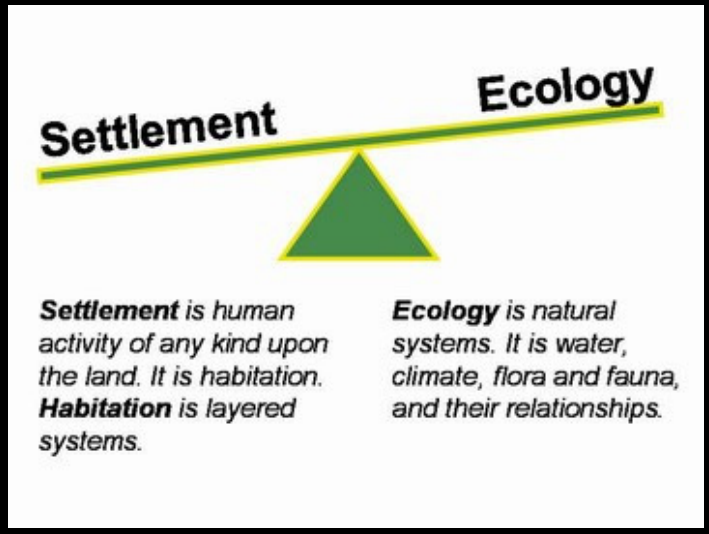
"We're very proud of our new facility in Nanaimo.
By incorporating green measures ….
Inland Kenworth also leads the way in helping to
reduce the industry's impact
on the environment."
Jim Beiderwieden,
Inland Group president
Today's Trucking Online

Greg Constable is the common link between Inland Kenworth in Nanaimo and Mazda-Toyota in Courtenay



2007 Green Infrastructure Leadership Forum

Co-hosted by CAVI and the Vancouver Island Association of Coastal Communities…..



…..the Forum initiated a conversation about A Positive Settlement Strategy

Vancouver Island Coordinating Team

- Mission: To facilitate a consistent, science-based approach to rainwater management on Vancouver Island.
- Objective: Align efforts to advance the state-of-the-practice in rainwater management
- Implementation is keyed to use of the **Water Balance Model**
- Team includes representatives from:
    - Ministry of Environment,
    - Ministry of Agriculture & Lands
    - Ministry of Community Services
    - Department of Fisheries and Oceans
    - First Nations
    - Local Government

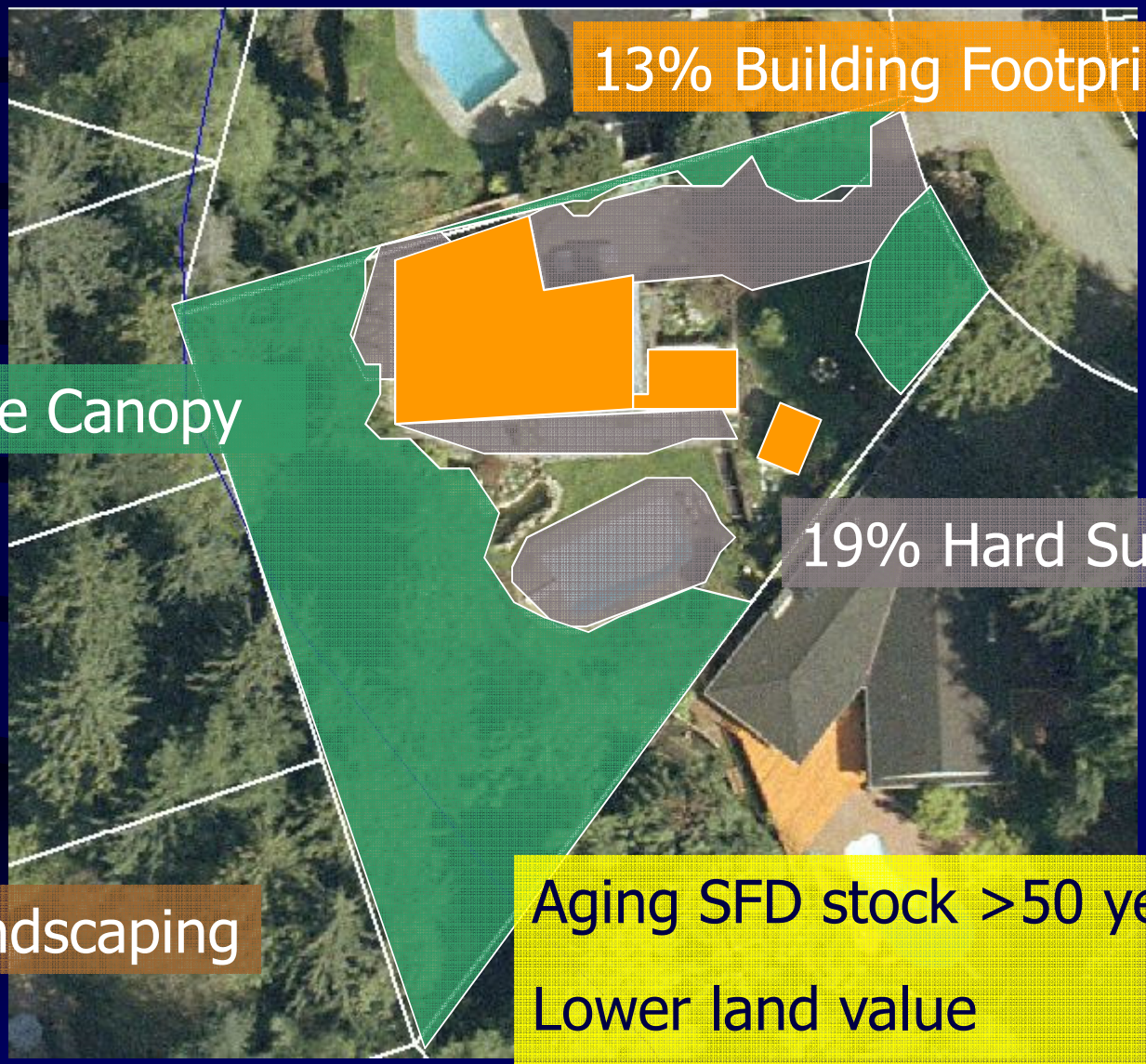
In 2008, program elements for *The New Business As Usual* include…

- Beyond the Guidebook:
  Create Liveable Communities & Protect Stream Health
- Catalogue of Green Value Practices: Taking actions on the ground that add up to A Positive Settlement Strategy
- Green Value Workshops for Land Owners & Developers
- Showcasing Green Infrastructure Innovation
  in the Capital Region
- Climate Change Workshop:
  Risk Management & Sustainable Infrastructure

Single Family Rainwater Mgt.

Science tells us that watershed health begins to deteriorate as a watershed moves beyond 10% total impervious surface area.

Total lot area = 1901 sq. m.

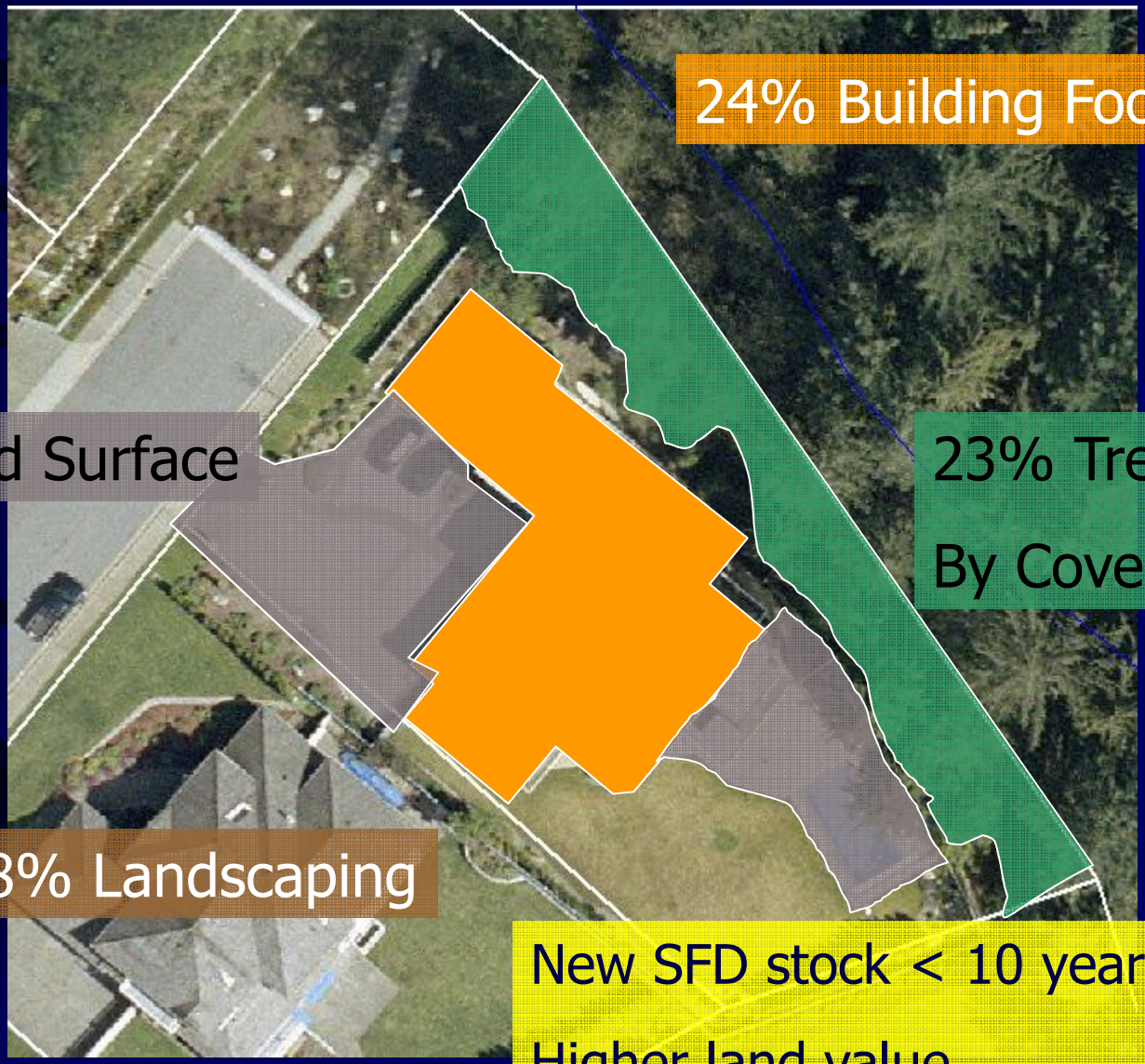


Aging SFD stock >50 years

Lower land value

Different appreciation for space

Total lot area = 1972 sq. m.



24% Building Footprint

25% Hard Surface

23% Tree Canopy

By Covenant

28% Landscaping

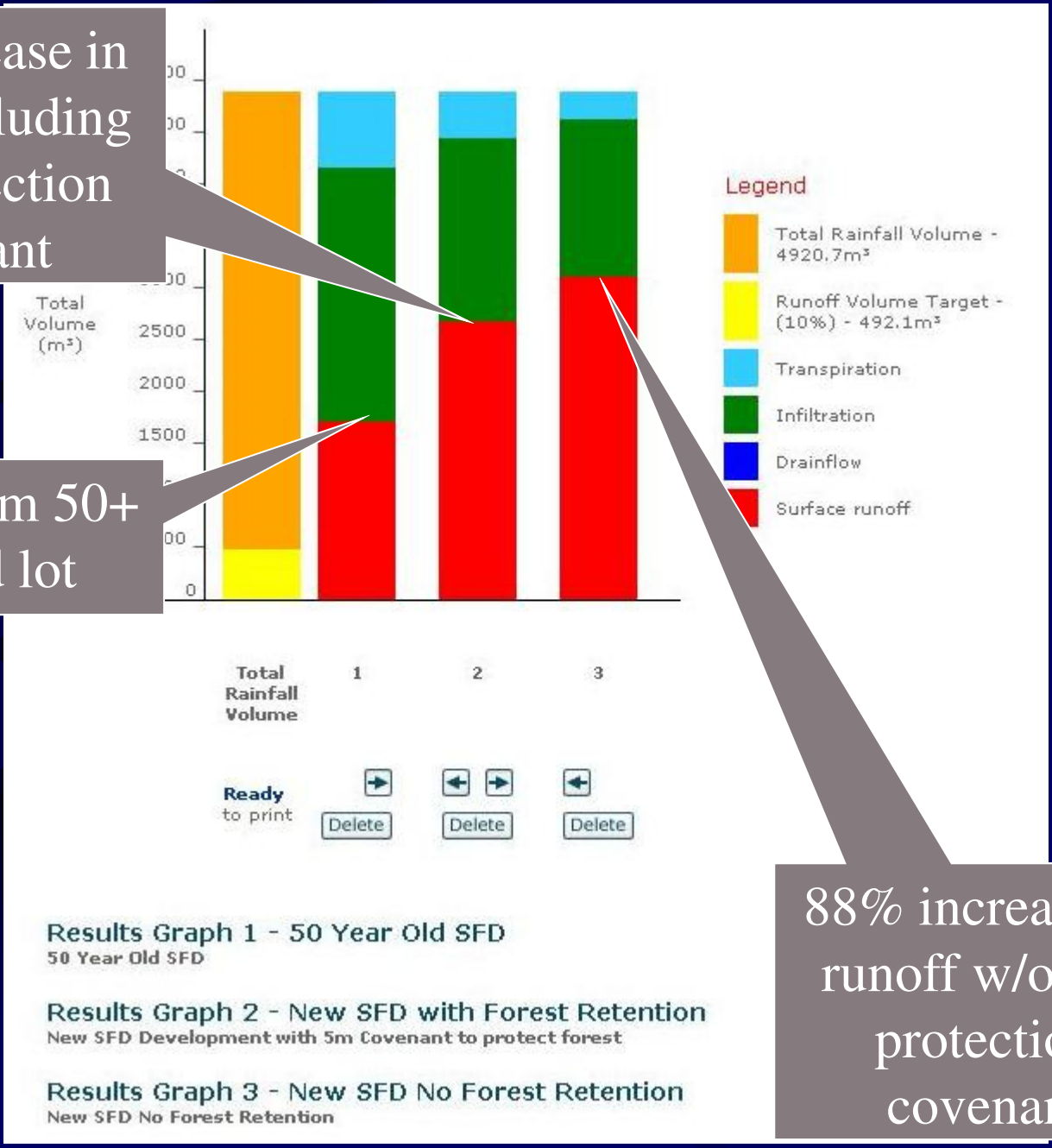
New SFD stock < 10 years

Higher land value

Different appreciation for space

59% increase in runoff including tree protection covenant

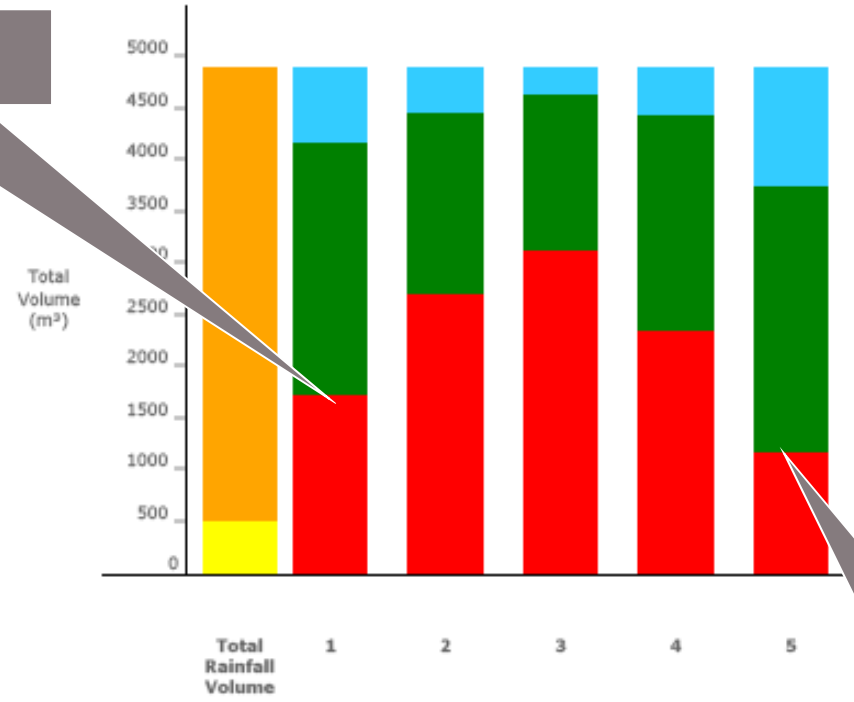
Runoff from 50+ year old lot



88% increase in runoff w/o tree protection covenant

Benefits of Source Control

1950's



Results Graph 1 - 50 Year Old SFD
50 Year Old SFD

Results Graph 2 - New SFD with Forest Retention
New SFD Development with 5m Covenant to protect forest

Results Graph 3 - New SFD No Forest Retention
New SFD No Forest Retention

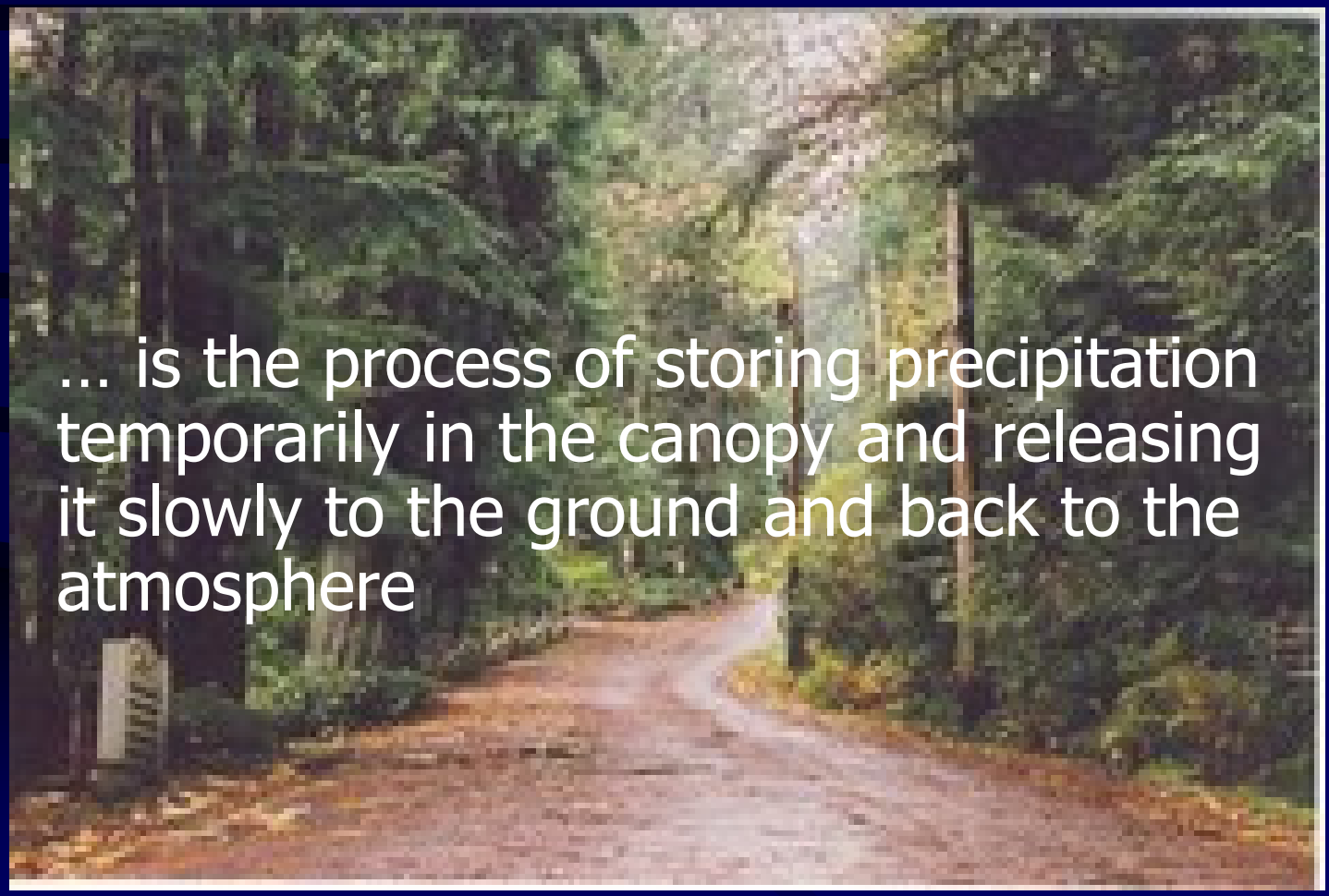
Results Graph 4 - New SFD with Basic Source Control
Basic SFD with Absorptive Landscape & Pervious Surface

Results Graph 5 - New SFD with Basic Source Control
New SFD with Basic Source Control & Raingarden

1990's with Source Controls

UBC Tree Canopy Interception Research Project:
Bringing Rainwater Management Science into the Community

Tree canopy interception …



The project is precedent-setting because…

…it will quantify the proportion of rainfall intercepted by the tree canopy in an urban forest

A network of 60 *Tree Canopy Climate Stations* has been established across the North Shore ....

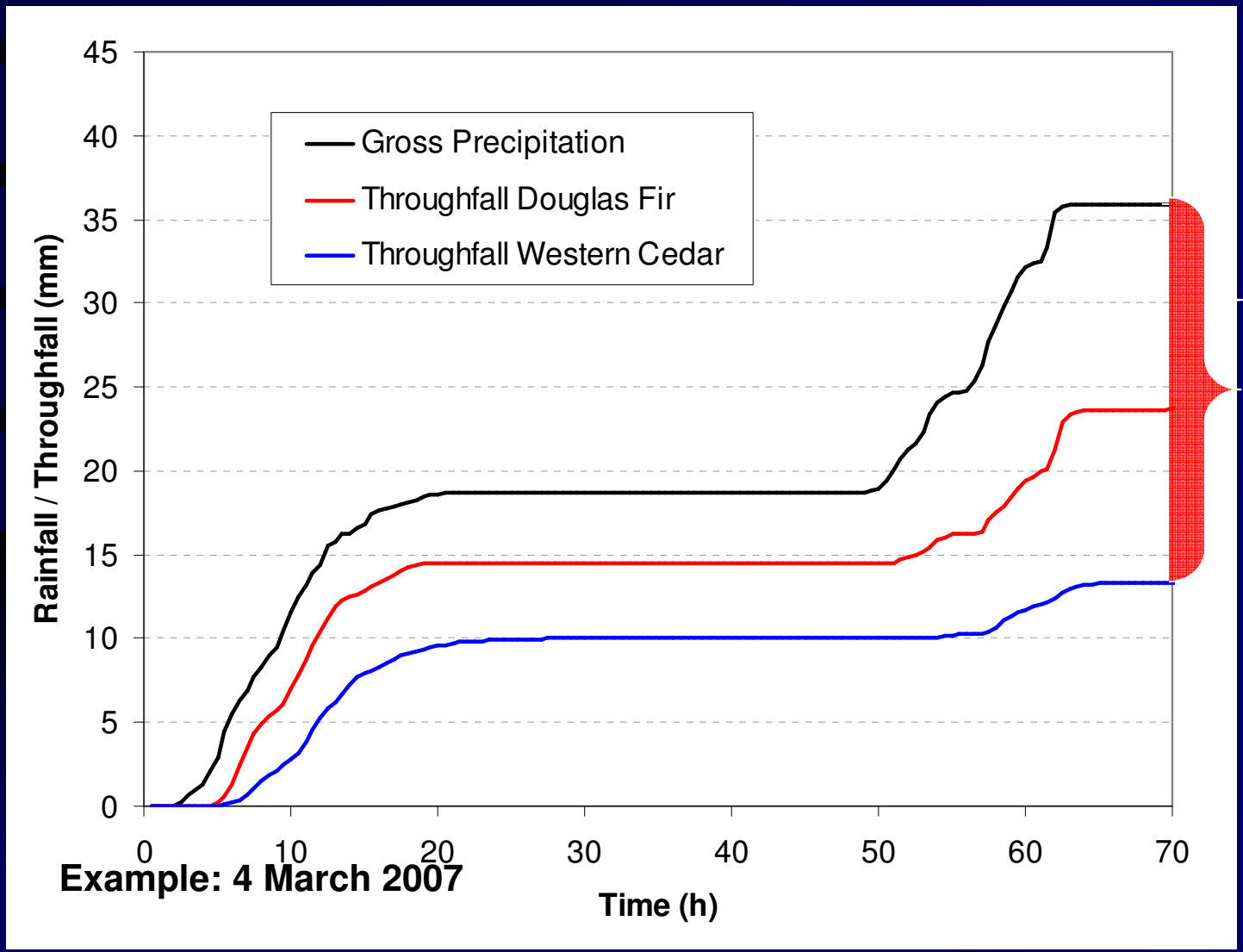
... to investigate the effects of tree density, tree structure and tree species on rainfall interception

The right trees in the right places

"…very little research has been done in an urban setting anywhere in North America. One of our research interests is to determine the effectiveness of a single tree versus that for a cluster of trees."

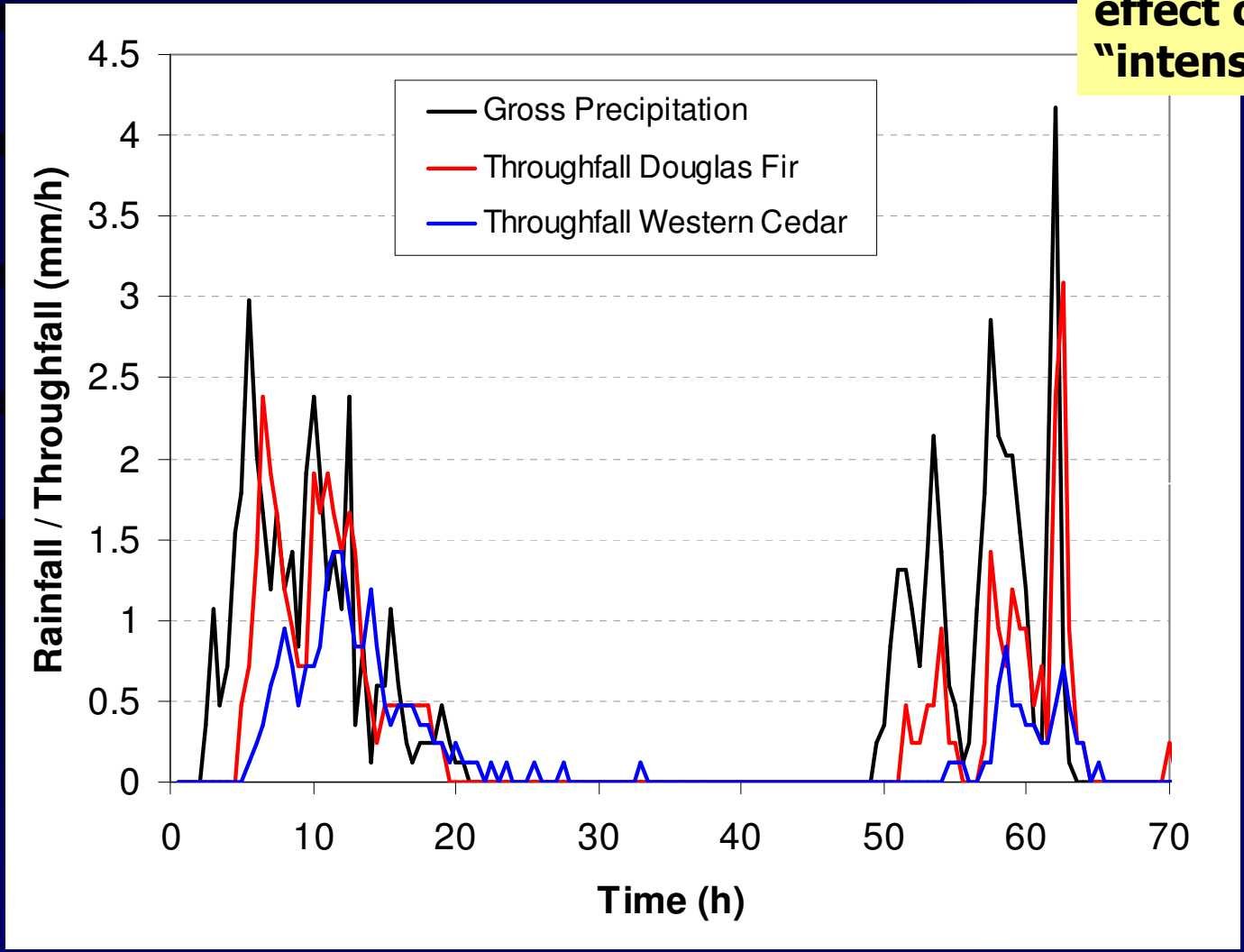
Dr. Markus Weiler
former Chair of Forest Hydrology
University of British Columbia

Results

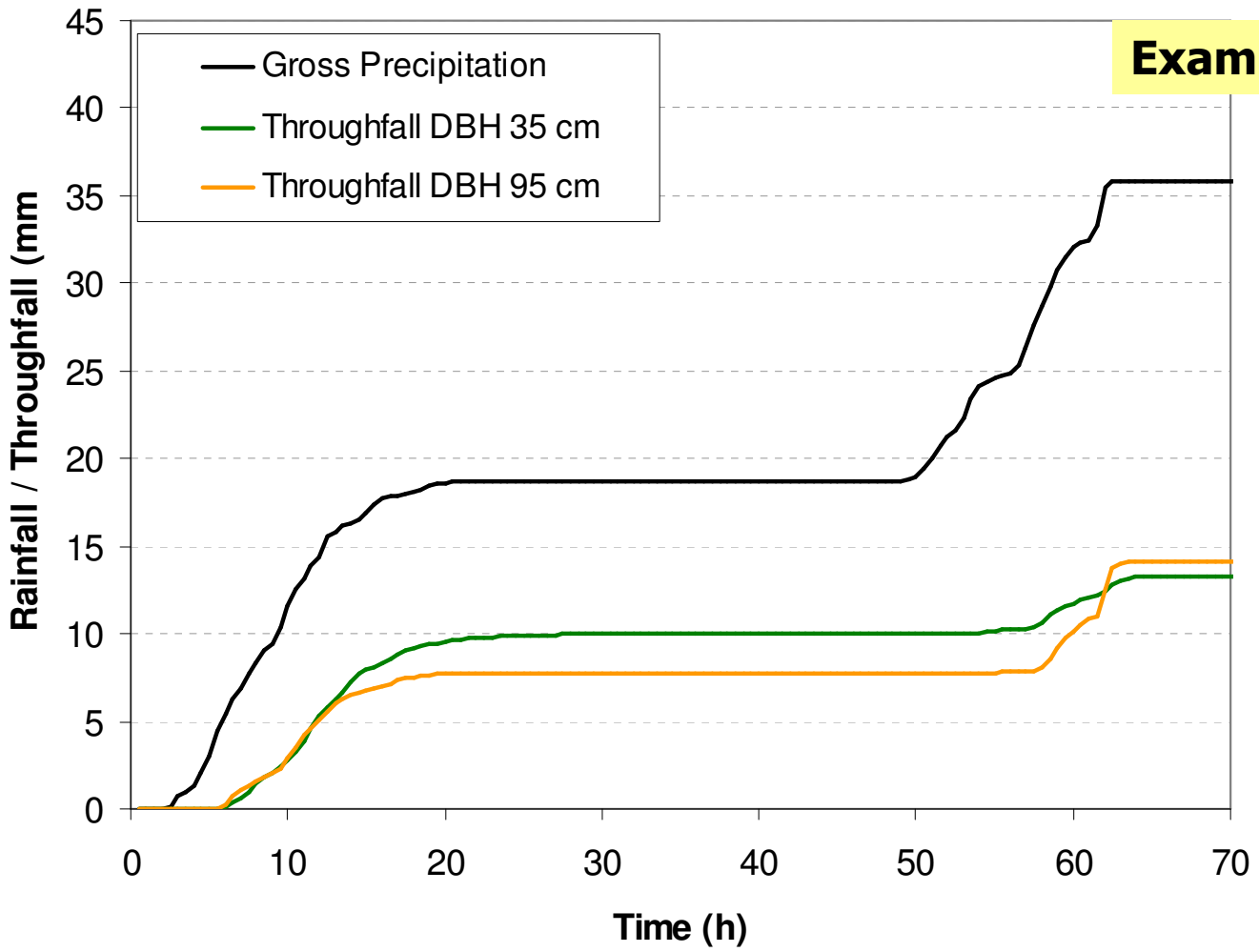

Gross Precipitation
Throughfall Douglas Fir
Throughfall Western Cedar
Rainfall / Throughfall (mm)
Time (h)
0
5
10
15
20
25
30
35
40
45
0
10
20
30
40
50
60
70
Example: 4 March 2007
39% Interception
66% Interception

Results

Quantifying the effect of "intensity dampening"



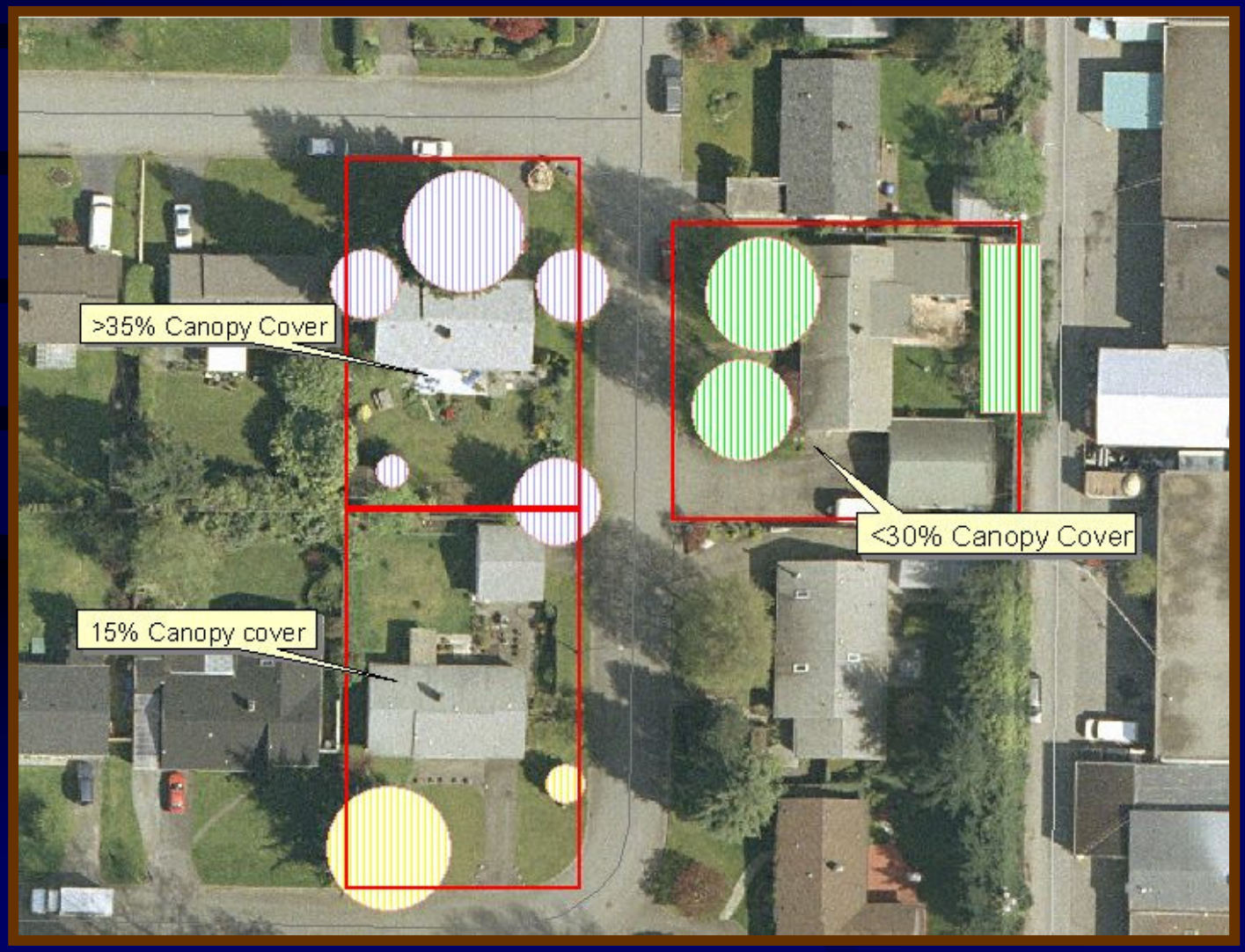
Results

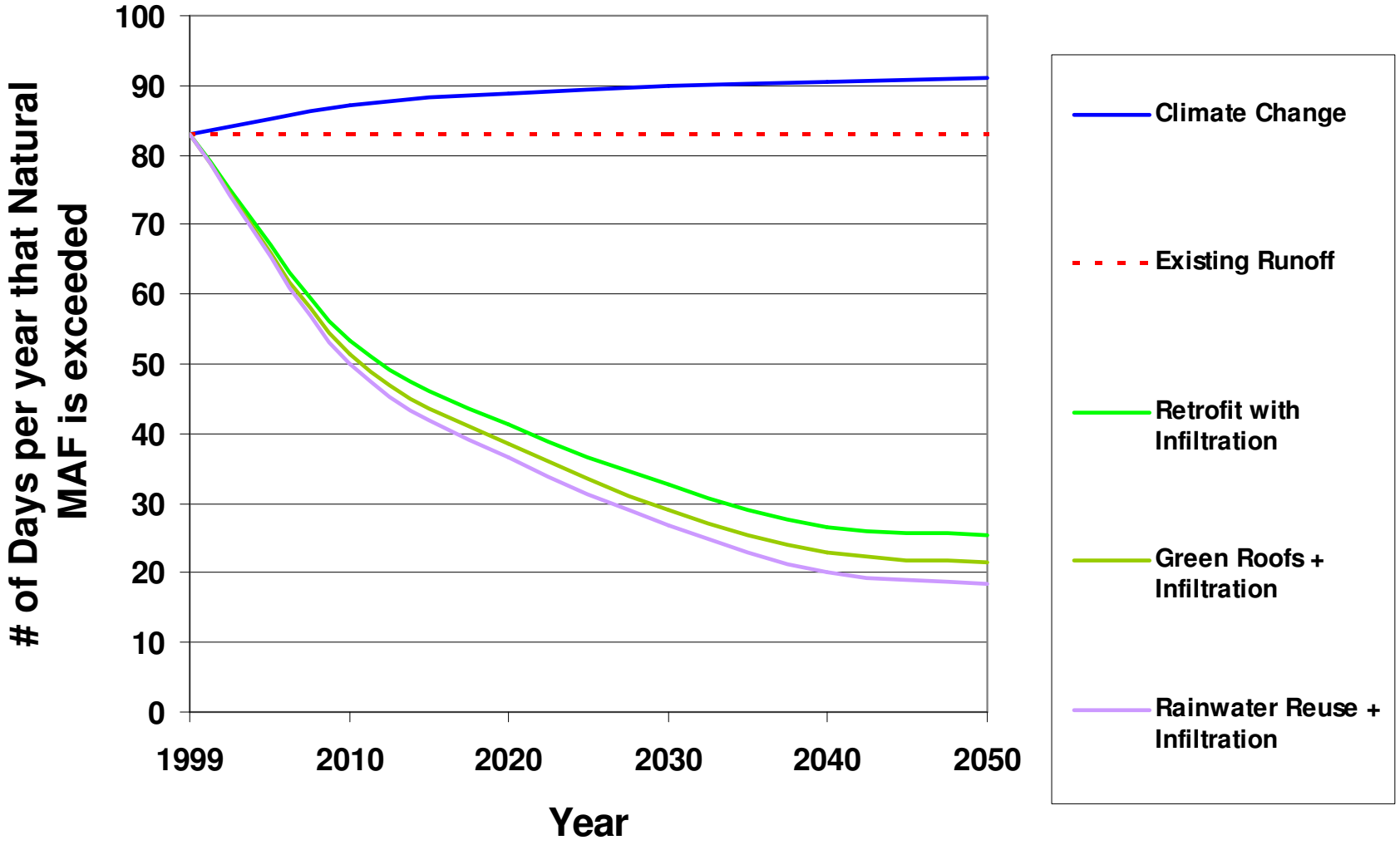
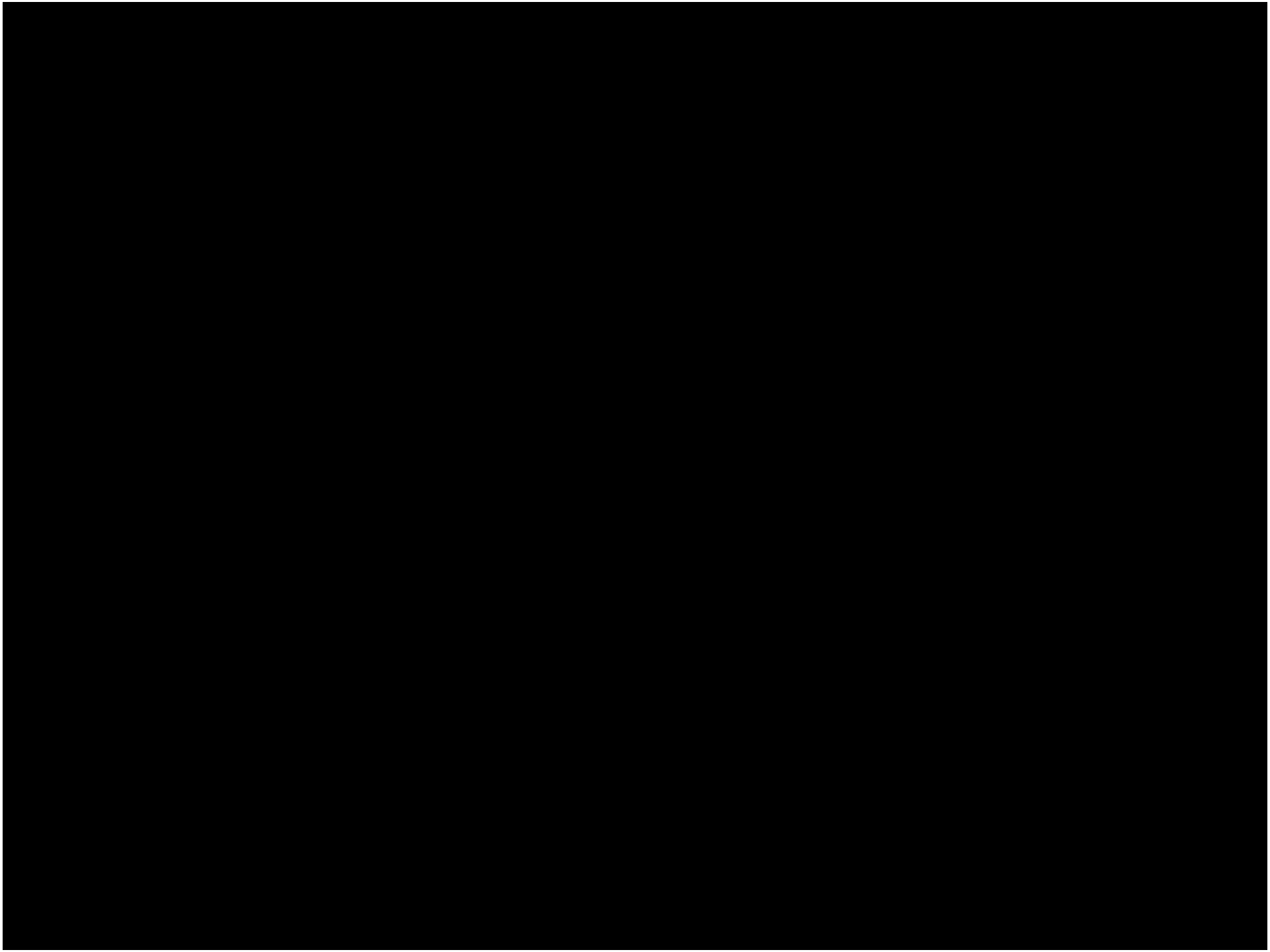


Example: 4 March 2007

66% Interception

Urban Forest *"Planning"*



MacKay Creek Watershed Retrofit Scenarios

Reduction in frequency of erosive streamflow