

3.0 Key Recommendations for Using Rain as a Resource

The following recommendations are based on presentations, the panel discussion, and audience questions and comments at the From Rain to Resource workshop.

“To achieve watershed benefits, human development designs need to move from drainage to retain-age and run-off to run-on.”

– Brock Dolman,
California WATER Institute

3.1 Recommendations for Local Government

3.1.1 Use Low Impact Development techniques in your community

Low Impact Development (LID) is an approach that includes ways of designing, engineering, building and landscaping for green management of stormwater—with a focus on retention and infiltration. LID is often cheaper than conventional pipes and concrete and offers additional benefits. It adds urban green space and recreational areas, cleans water and air, and makes the community more attractive.

There are many LID stormwater and rainwater management features available for local governments to use. The table below provides several examples that are appropriate to typical land uses in a community.

	Institutional	Urban	Residential	Park	Mall	Boulevard	Road
Downspout disconnect	✓	✓	✓				
Harvesting/using roof runoff	✓	✓	✓				
Rain gardens	✓	✓	✓	✓	✓	✓	✓
Infiltration basins/tree wells	✓	✓			✓	✓	
Detention ponds	✓	✓		✓		✓	
Pervious pavement	✓	✓	✓	✓	✓	✓	✓
Constructed wetlands	✓	✓		✓	✓	✓	
Floodwater storage areas	✓	✓		✓	✓	✓	
Green roofs	✓	✓	✓		✓		
Wide riparian buffer zones for filtration/flood storage	✓	✓	✓	✓	✓	✓	✓
Maintenance and restoration of natural channels w/ floodplains	✓	✓	✓	✓	✓	✓	✓
Plant and maintain trees	✓	✓	✓	✓	✓	✓	
Prevent soil compaction	✓	✓	✓	✓	✓	✓	
Uncompacted topsoil (+30 cm) for lawns	✓	✓	✓	✓	✓	✓	
Swales instead of curbs and gutters						✓	
Street sweeping							✓
Minimize road width							✓

Low impact development techniques appropriate to six typical land uses.

Adapted from Bowker Creek Blueprint

“The Public Infrastructure Engineering Vulnerability Committee assessment protocol presents a robust and rigorous methodology to integrate climate change risks into infrastructure planning.”

– **Don Dobson**
Urban Systems

“The Water Balance Model allows users to create watershed objectives and quickly test alternative Low Impact Development techniques prior to implementation.”

– **Jim Dumont**
AECOM

“Communities need to refocus plans on watershed targets and outcomes so that there are clear linkages with the land use planning and development approval process.”

– **Kim Stephens**
Chair, Metro Vancouver LWMP
Reference Panel

3.1.2 Assess stormwater risks and watershed vulnerability in your community

These days, a spotlight rests squarely on the emerging risks to community infrastructure resulting from climate change.

Engineers Canada developed a task force called The Public Infrastructure Engineering Vulnerability Committee (PIEVC) to oversee a national engineering assessment of the vulnerability of Canadian public infrastructure to changing climate conditions. This led to a guiding protocol for vulnerability assessments. The protocol is a procedure to gather and examine available data to understand how climate events will affect infrastructure. It is applicable to all types of public infrastructure. See www.pievc.ca/e/index_.cfm for more information.

To test the protocol prior to widespread use, a series of case studies were selected by the PIEVC, including a project in Castlegar (see Section 4.1.4). The results of the case studies indicate that the PIEVC protocol presents a robust and rigorous methodology to integrate climate change risks with watershed planning. Local governments should consider using the PIEVC protocol to assess risks and watershed vulnerability in their communities.

3.1.3 Incorporate the Water Balance Model into planning

In September 2003, the web-based Water Balance Model (WBM) was launched as an extension of Stormwater Planning: A Guidebook for British Columbia. It allows users to quickly establish the existing, or the predevelopment, base line that will become the standard used to measure the performance of future development scenarios during the planning and design of a project. For more information on the WBM, see Sections 4.4.1 and 4.4.2.

Several communities in the Lower Mainland and Vancouver Island are successfully using the WBM. For example, the District of North Vancouver used the WBM to help develop a watershed restoration vision based on the simple objective of leveraging redevelopment and neighbourhood retrofit into opportunities for landscape based watershed restoration. Other communities using the WBM include Metro Vancouver, Surrey and Courtenay.

Communities in the Okanagan Basin should consider using the WBM for rainwater management planning.

3.1.4 Focus on watershed targets and outcomes

Integrated Stormwater Management Plans completed to date by many BC communities tend to be engineering-centric and do not integrate land use and drainage planning. These plans are often resulting in unaffordable infrastructure budget items without providing offsetting stream health benefits.

Local governments should develop outcome-oriented Integrated Stormwater Management Plans that emphasize the relationship between controlling the volume of stormwater runoff, and the resulting flow rates in streams. The plans should look at the impacts to a stream; the causes in the urban landscape; and the mitigation methods needed to restore the natural water balance in that stream.

See Section 4.2.4 for more information.

3.1.5 Consider the site

Site planning brings together information collected from the site including vegetation, slope, circulation, sun exposure, water management and wildlife habitat in order to identify buildable and nonbuildable areas. Design options are then developed that respond to site opportunities and constraints. See Section 4.3.1 for more information on site adaptive planning.

Local governments should ensure that their policies and standards do not inhibit developers, engineers, and planners from considering the site when they are determining the most appropriate rainwater and stormwater infrastructure for a development.

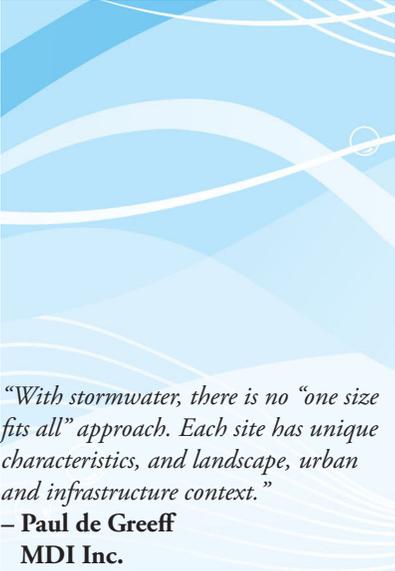
3.1.6 Share responsibility and collaborate

Given the range of stakeholders and decision makers involved in the management of urban watersheds, communication that informs and reinforces policy and legal choices is a key factor in the success of any project. Within local government it is important to communicate objectives and establish joint expectations and understanding across all relevant departments. Externally it can be helpful to work with regional governments to develop a regionally coordinated approach. It is also critical to educate and collaborate with consulting, development and building professionals, and to educate the public about outcomes in order to boost compliance through understanding of the rationale for the requirements.

West Coast Environmental Law, in collaboration with the Green Infrastructure Partnership, created a policy and legal tool called the “Shared Responsibility Matrix” (see Section 4.4.3 for more information). Local governments can use this matrix to guide and focus collaboration with the various parties that need to be involved in rainwater management.

3.1.7 Be innovative and learn from the experiences of others

There are many pilot programs, case studies, municipal experiences, and resources available that local governments can learn from and adapt to their own communities.



“With stormwater, there is no “one size fits all” approach. Each site has unique characteristics, and landscape, urban and infrastructure context.”

– **Paul de Greeff**
MDI Inc.

“A key challenge common to green infrastructure projects is that there are many different departments and areas of responsibility engaged around the management of urban watersheds.”

– **Deborah Law**
West Coast Environmental Law

“We have learned through our own experiences and the trials of others that the best way to manage rainwater is not through the application of one size fits all standards but through a combination of innovative techniques and practices.”

– **Rob Dickinson**
City of Vernon



Beyond the Guidebook 2010 tells the stories of rainwater management happening in over 40 local government settings in three regions. These communities are champions in rainwater management and there is much that can be learned from their experiences. See Section 4.2.5 for more information about the guidebook.

Information sharing is critical to improving the management of rainwater and stormwater. The Rain to Resource workshop provided a venue to showcase innovative case studies happening right now throughout British Columbia. The case studies are described in Section 4.

3.2 Recommendations for Provincial Government

3.2.1 Revise grey water re-use regulations

Stormwater harvesting measures that direct rainwater runoff to indoor uses reduces negative downstream impacts.

Current water reuse regulations are quite prohibitive and unclear. It is very difficult to harvest stormwater for indoor water use. Projects that have accomplished this task have spent considerable time and resources to convince regulators that adequate health protection measures have been put in place.

The proposed changes to the B.C. Building Code go a step in the right direction by allowing indoor water use for toilet fixtures providing that the changes are in fact adopted. However, treatment criteria and consistency across other regulations and local bylaws will still cause confusion. More effort is required in this area.

3.2.2 Expand and maintain hydrometric and weather monitoring networks

Accurate, long-term, real-time hydrometric and weather data is essential for climate change assessment, including calibration and verification of climate and hydrology models. Hydrometric data is also critical for regional flood and drought frequency analysis.

The Okanagan network of hydrometric and weather stations has declined significantly since the 1980s and is no longer adequate to support water management planning. 156 Water Survey of Canada (WSC) stations were discontinued in the Okanagan, leaving just 25 active WSC stations in the basin by 2007. A report completed by Dobson Engineering in 2008 suggests that the Okanagan Basin should be supported by a network of 160 stations to meet the long-term requirements for hydrometric data.

Managing the basin water resources in a sustainable manner and properly designing and sizing infrastructure to develop low-impact designs for neighbourhoods will require comprehensive water data. Such data will only be available if the hydrometric network in the basin is improved.

3.2.3 Provide infrastructure funding for rainwater management and LID

Infrastructure renewal and redesign is expensive. While there are significant long-term cost savings, like many green initiatives, the up-front cost of these projects may be prohibitive to most municipalities. While provincial and federal infrastructure funders have made great strides with recognizing the values of new approaches to rain and stormwater management, there is a real need for sustained funding programs to support this work. New construction is, by contrast, easier to build with designed-in solutions. On the other hand, generations of original stormwater infrastructure may take many years to renew.

3.3 Recommendations for Federal Government

3.3.1 Conduct climate impact studies

Regional climate modeling was conducted for Metro Vancouver to predict climate change impacts. The study took the Global Circulation Model results and used relationships based on historical rainfall patterns to build 5 min to 24 hr intensities. From this, a prediction was made on how Intensity-Duration-Frequency curves will be impacted by climate change. Results showed that the observed rainfall trend in Metro Vancouver already exceeds the forecasted climate model trend.

This type of rainfall intensity analysis should be completed by Environment Canada for the Okanagan region. Much of our development is on flood plains and it is crucial that we understand the relationship between the current rainfall trend and what is forecasted for the basin.

3.3.2 Provide infrastructure funding for rainwater management and LID

The recommendation provided in Section 3.2.3 applies equally to the federal government.

3.4 Recommendations for the Okanagan Basin Water Board

3.4.1 Provide infrastructure funding for rainwater management

Since the 1970s, the OBWB has provided sewage facilities grants to Okanagan communities. The result has been dramatic reductions in nutrient loading to lakes and streams. At present, non-point sources, such as stormwater/rainwater runoff are the major inputs of nutrients to waters in the Basin.





The OBWB should investigate the appropriateness of extending the Sewerage Facilities Grants program, which provides infrastructure funding for wastewater treatment, to other infrastructure upgrades, including rainwater and stormwater management systems, to further protect the quality of Okanagan valley lakes. As with the existing grant program, OBWB funds would help leverage senior government infrastructure monies.

3.4.2 Provide small grant funding for pilot rainwater management projects

The OBWB's Water Conservation and Quality Improvement (WCQI) grant program provides funds to local government to support innovative, tangible, on the ground, water quality and conservation improvement initiatives.

The OBWB should encourage local governments to apply for funding under the grant program to support projects in their communities that address rainwater management and can be used as a model for other organizations. These projects could include the installation of rain gardens, absorbents landscaping, green roofs, and rainwater harvesting systems.

3.4.3 Prepare a homeowner's guide to rainwater managements

The publication "Slow it. Spread it. Sink it. A Homeowner's & Landowner's Guide to Beneficial Stormwater Management", compiled and written by the Southern Sonoma County Resource Conservation District and the Resource Conservation District of Santa Cruz County, is an excellent example of what can be done to teach homeowners how to manage stormwater on their properties. The OBWB should contact the conservation districts to request permission to adapt this guide to the Okanagan Basin.

The guide focuses on best management practices that can be done at home. The BMPs are not complicated and are geared toward residential homes or small developments. The underlying concepts follow the mantra: Slow it. Spread it. Sink it.:

- Slow the runoff down,
- Spread it out in planters, gardens, or over other pervious surfaces - do not confine runoff to pipes, and
- Sink it back into the ground.

3.4 Recommendations for the B.C. Water and Waste Association

3.5.1 Develop position statements on stormwater management

In 2009, the BCWWA amended its mission statement to add the words "providing a voice for the water and waste community". One way in which BCWWA will move forward in this new role is by preparing position statements on water and waste related topics that represent the views of their broad membership.

"The BCWWA has embarked on a process to develop position statements on stormwater management that focus on raising awareness of the potential impact of stormwater on receiving waters, risk assessment and mitigation."

– **Michael MacLatchy**
Chair, BCWWA Watershed Management Committee