

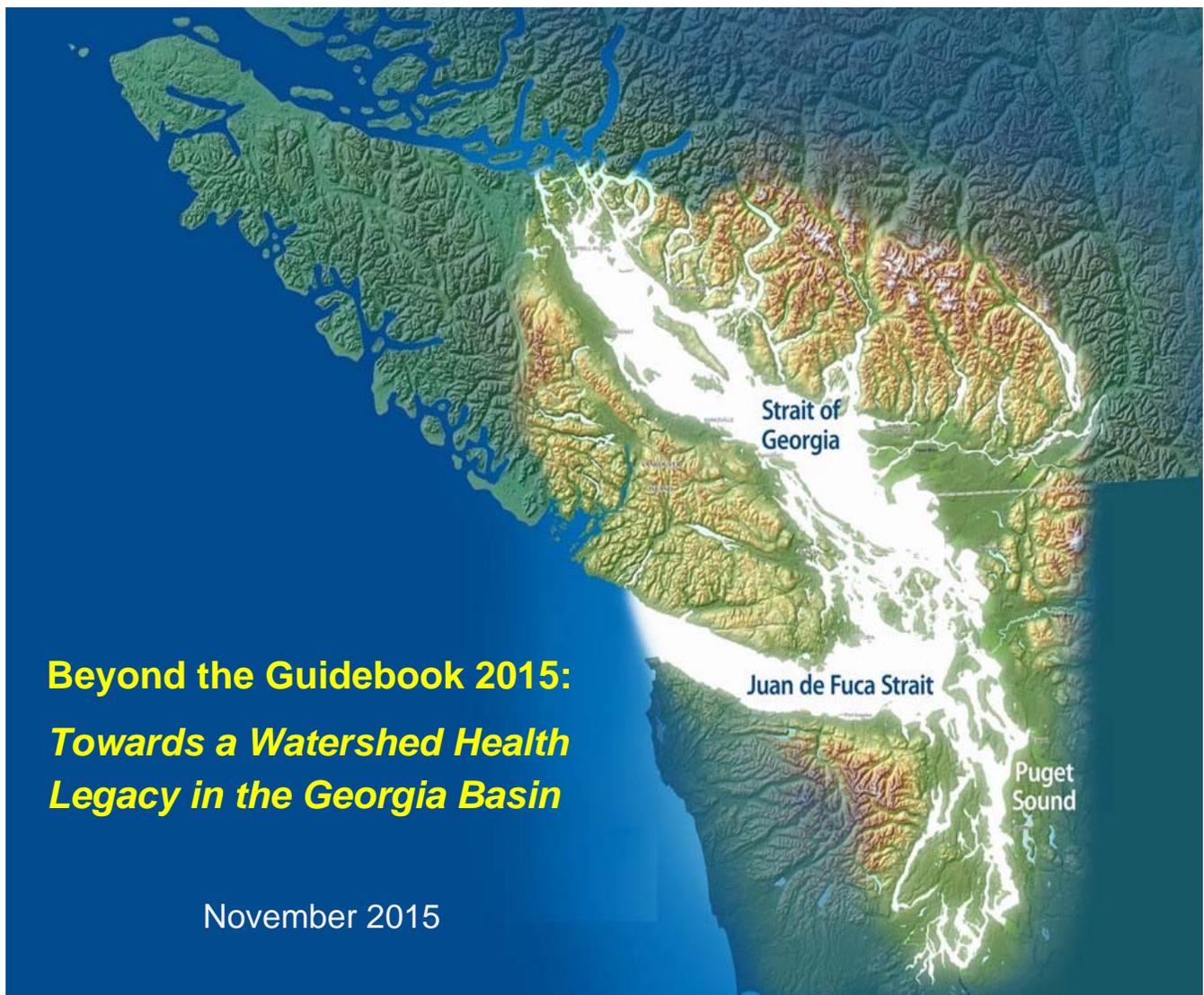


the partnership
for water sustainability in bc

IREI - Inter-Regional Education Initiative



Moving Towards “Sustainable Watershed Systems, through Asset Management”



**Beyond the Guidebook 2015:
Towards a Watershed Health
Legacy in the Georgia Basin**

November 2015

Image Credit: Georgia Basin Action Plan (2003-2009)

Part B

Align with Provincial Policy & Regulatory Framework:

***Enable Action by Decision Makers at
Local Level***

Build Greener Communities

Deal with Uncertainty
 Manage the Water Balance
 Adapt to a Changing Climate



Part B – Align with Provincial Policy & Regulatory Framework	
Chapter No. & Title	Key Messages
2 What Happens on the Land Matters	<p>Milestone years are:</p> <ul style="list-style-type: none"> › 2003: Climate change is real - a ‘teachable year’ › 2008: Living Water Smart & Green Communities launched › 2014: Three provincial game-changers enable action <p>Communities are in the best position to develop solutions which meet their unique needs and local conditions.</p>
a. Water Sustainability Act (Bill 18, 2014)	<p>Better connecting land and water means providing natural resource decision makers with a strategic water lens and, through planning, tools to better integrate land and water which include opportunities for formal collaboration. Water Sustainability Plans can be combined with other local, regional or provincial planning processes to resolve issues.</p>
b. Develop with Care 2014	<p>Local governments have the authority to take action to:</p> <ul style="list-style-type: none"> › Preserve intact functioning ecosystems as an integral part of the strategy for building green communities. › Implement ‘Design with Nature’ standards of practice that would restore an ecologically functioning and resilient baseline condition.
c. Asset Management for Sustainable Service Delivery	<p>The BC Framework recognizes the life-cycle implications of managing the built and natural environments as integrated components of a healthy watershed. The ultimate vision for Sustainable Service Delivery is that communities would value and manage natural assets in the same way that they manage engineered assets.</p>

2. What Happens on the Land Matters

During the late 1960s, BC began its multi-faceted and ongoing journey towards sustainability. By the 1980s, local governments were given enabling legislation to protect the environment.

By the mid-1990s, local governments were given new legislation for *Regional Growth Strategies* and *Official Community Plans* as well as improved tools for environmental protection, particularly in relation to salmonid ecosystems.

During this period, and in the early 2000s, inter-governmental partnerships were formed to address environmental challenges; and were supported by protocol agreements between the Province and the Union of BC Municipalities.

In the post-2000 era, milestone years (from a water / watershed sustainability perspective) are 2003, 2008 and 2014. A unifying theme for the three is 'build greener communities'.

Build Greener Communities

Drought, forest fires and floods in 2003 created a 'teachable year' for change (Figure 10). The year began with destructive wind storms and deadly avalanches, followed by a summer of fire, an autumn of floods and an early winter with more record rains. The province's year of weather misery and misfortune earned it a place at the top of Canada's weather stories for 2003.

Heightened awareness of a changing climate led to the **Water Sustainability Action Plan for BC**, released in February 2004. The main goal was to encourage province-wide implementation of fully integrated water sustainability policies, plans and programs. The Action Plan created a partnership umbrella for aligning actions at three scales – provincial, regional and local. Action Plan success helped to lay the groundwork for the *Living Water Smart* and *Green Communities* initiatives in 2008.

2008 - Call to Action: The 45 actions and targets in **Living Water Smart, BC's Water Plan** establish expectations vis-à-vis how land will be developed (or redeveloped) and how water will be used. The **Green Communities Initiative** complements Living Water Smart and comprises plans, strategies and enabling tools to achieve the land and water stewardship vision. The two initiatives constituted a call to action:

- prepare communities for a changing climate;
- choose to live water smart; and
- strive to build greener communities.



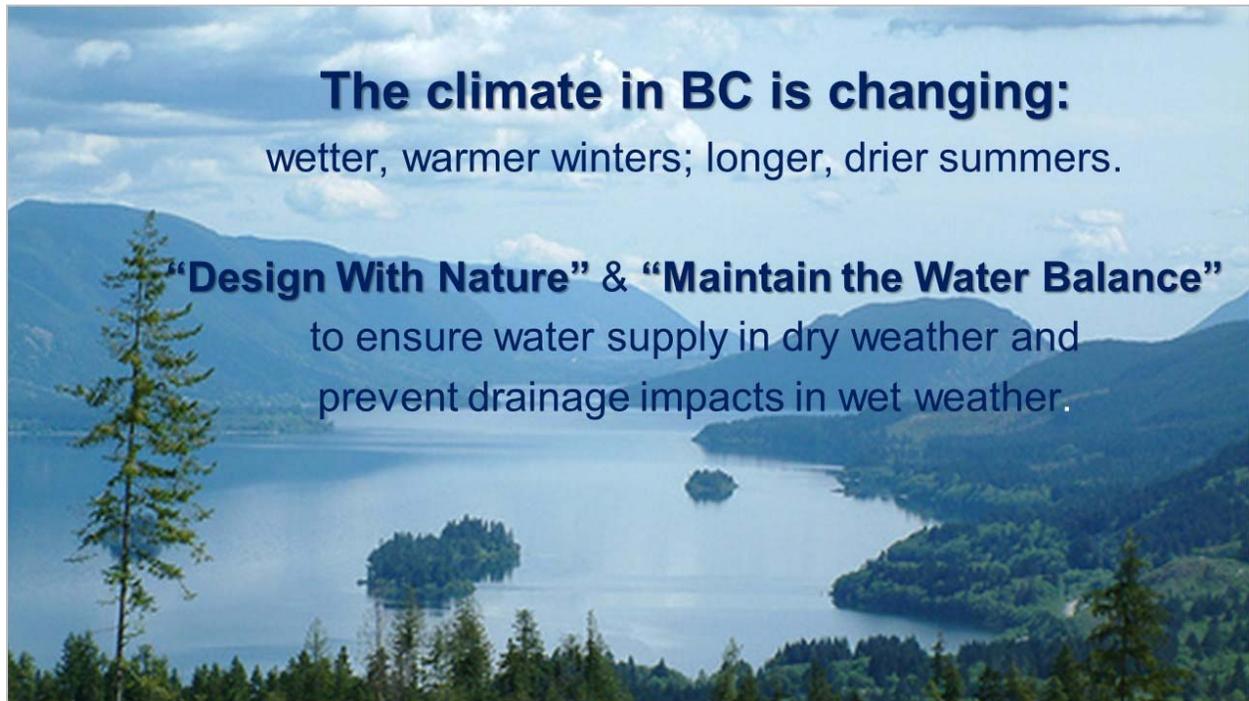
2014 – Game-Changers Enable Action: The 2008 'call to action' resulted in three landmark initiatives. These came to fruition in 2014. Together, they provide a platform for integrated actions that achieve the Watershed Health Goal.

Develop with Care 2014: Environmental Guidelines for Urban and Rural Land Development in British Columbia, released in March, makes the link between environmental function and resilience as communities grow.

The **Water Sustainability Act**, passed in May 2014, makes the link between land use actions and desired water balance outcomes.

Asset Management for Sustainable Service Delivery: A BC Framework, released in December 2014, makes the link between local government services, the infrastructure that supports the delivery of those services, and watershed health.

In 2003, it was the Kelowna Fire that sparked the discussion.....



Drought, forest fires and floods in 2003 created a ‘teachable year’ for change



Satellite imagery of forest fires in the Okanagan Basin

“The year's top weather story wasn't one single event. Instead, it was a year-long parade of weather disasters that befouled British Columbia.”

“Given what happened in 2003, more people than ever became convinced that climate change is real.”

Environment Canada website
2003 Top Ten Weather Stories



Moving Towards Sustainable Watershed Systems, through Asset Management

Beyond the Guidebook 2015: *Towards a Watershed Health Legacy in the Georgia Basin*

Call to Action (2008)

In 2008, work over a 5-year period by a host of champions (inside and outside government) culminated in the Province's *Living Water Smart* and *Green Communities* initiatives. This work built on the foundation that had been laid over previous decades. The resulting policy, program and regulatory framework enables implementation of **collaborative solutions** that would achieve the Watershed Health Goal.

Figure 11 conceptualizes the essence of the two complementary initiatives.

Green Communities Initiative: BC is perhaps the least prescriptive province, and BC local government is among the most autonomous in Canada. The Province enables local government by providing policy and legal tools in response to local government requests.

The enabling approach means the onus is on local government to take the initiative and implement. The Province recognizes that communities are in the best position to develop solutions which meet their own unique needs and local conditions. This is why the *Green Communities Initiative* has four types of building blocks, in particular partnerships.

Being Enabled Means: *"It is exciting to see local governments acting creatively to address the pressing environmental challenges of our time. Good work in planning, service delivery and infrastructure development - that fits the unique context of individual communities - is contributing to making our communities not only more sustainable but also better places to live,"* states Dale Wall, former Deputy Minister, Community and Rural Development.



Living Water Smart – BC's Water Plan: Living Water Smart solutions and commitments go beyond what government does, and are ongoing. Actions and targets are grouped into five themes:

Living Water Smart - Implementation Themes

1. Governance, legislation, regulatory change
2. Efficiency, outreach, public awareness
3. Science, information & learning
4. Watershed planning & restoration
5. Community planning and development

Partnerships: The umbrella provided by the *Water Sustainability Action Plan* has allowed the Province to leverage partnerships to greatly enhance the profile and resulting impact of Living Water Smart. The Partnership for Water Sustainability, a non-profit society, is playing a key delivery role in several theme areas, in particular developing tools for local government and providing training to support an environmentally adaptive approach to community design.

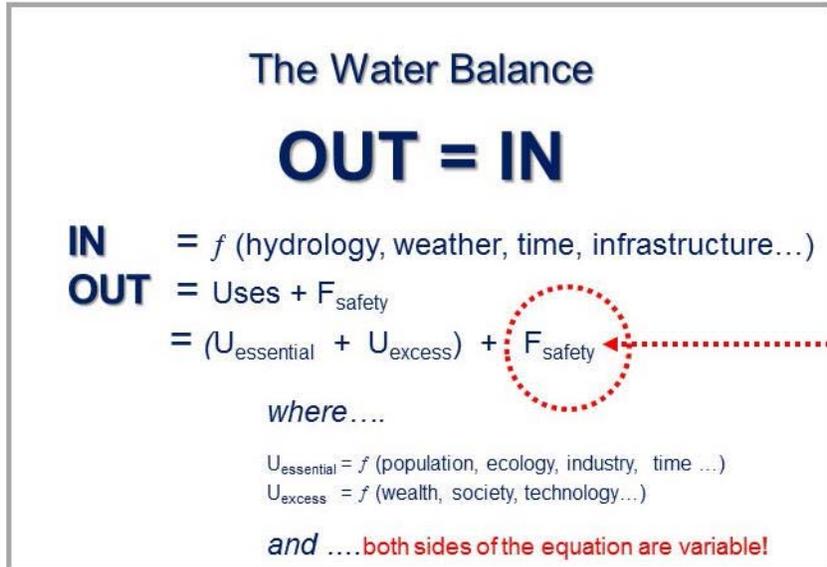
The outreach and education provided by the Partnership for Water Sustainability has been important in helping to realize the goals of Living Water Smart.

Collaboration: *"Living Water Smart acknowledges that what government does is only part of the solution. Living Water Smart challenges all British Columbians – individuals, families, communities, business and industry to step up and be water stewards. Embrace shared responsibility. Create a legacy for those who follow in our footsteps,"* states Lynn Kriwoken, Executive Director in the Ministry of Environment. Her responsibilities encompass Living Water Smart development and implementation.



Living Water Smart, BC's Water Plan

is founded on an understanding of:



HOLISTIC APPROACH:

This deceptively simple equation embodies principles and concepts for dealing with uncertainty and managing risk.

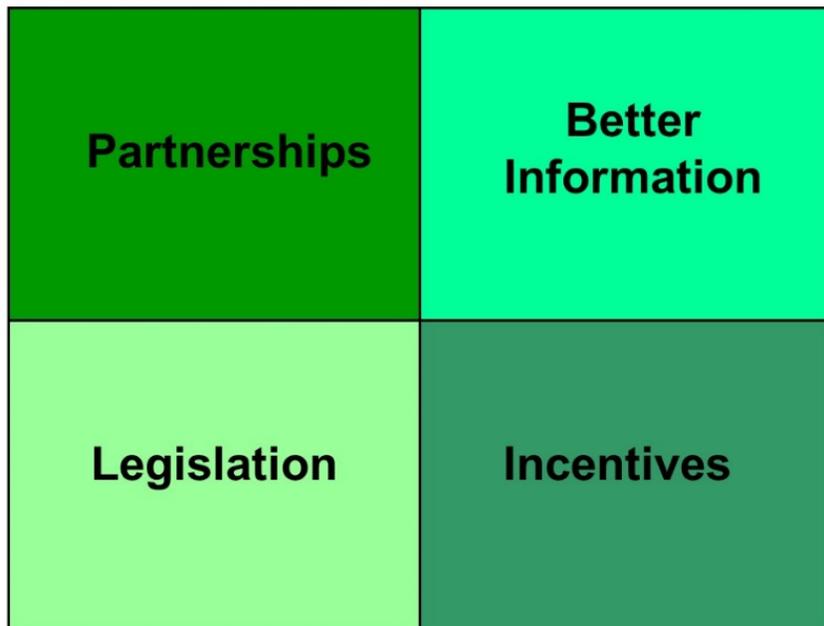
Over time, the safety factor has been decreasing in BC

LIVING WATER SMART ACTION:

"Adapting to climate change and reducing our impact on the environment will be a condition for receiving provincial infrastructure funding." – p. 63

Green Communities Initiative

is comprised of four types of building blocks:



AUTHORITY TO ACT:

The Local Government (Green Communities) Statutes Amendment Act (Bill 27, 2008) removed legislative barriers for local governments. The legislation ensures local governments have the necessary authority to take action to reduce GHG emissions, conserve energy and water and make their communities more socially and environmentally sustainable.

Figure 11

Game-Changers Enable Action (2014)

Doing business differently and making a difference is a building blocks process. Understanding expands and becomes clearer over time. The foundation for integrated action that connects land and water has been constructed over the past half-century. The three recent milestone years are:

- 2003 – The Teachable Year
- 2008 – Call to Action
- 2014 – Game-Changers Enable Action

Accepted ‘standards of practice’- especially those for engineering, planning and finance – influence the form and function of the Built Environment. The goal of shifting to an ecologically functioning and resilient baseline and creating a watershed health legacy will ultimately depend on implementing ‘Design with Nature’ standards of practice.



Springboard to Implementation: It has taken a decade to move from the ‘teachable year’ to a point where the policy, regulatory and program framework is in place and enables implementation of watershed-based solutions.

*As of 2014, three game-changers (Figure 12) provide the springboard for collaborative action to achieve the **Watershed Health Goal**. Integration and coordination of the three will maximize their joint effectiveness and the part each can play over time in building Green Communities that are resilient.*

Environmentally Adaptive Approach: A guiding principle for collaboration is to leverage ‘science-based understanding’ of the relationship between land use changes and resulting stream health (and also financial liability) consequences – and thereby influence community planning by means of an environmentally adaptive approach.

Coordinated & Integrated

Opportunities abound to couple the three game-changers with other elements of the existing policy, regulatory and program framework - such as *Liquid Waste Management Plans* (LWMPs) and the *Climate Leadership Plan* – to achieve the Watershed Health Goal.

Liquid Waste Management Plans: The rainwater component of an LWMP is a potentially powerful regulatory and planning tool. It can influence other local government processes for the better. When fully integrated with land use and (re)development processes, the rainwater component of an LWMP can generate the blueprint for coordinated action at a watershed scale, one property at a time.

Climate Leadership Plan: The process for developing BC’s Climate Leadership Plan was announced in April 2015. The anticipated release of the plan is March 2016. The plan will include recommendations on how to further the Province’s collaboration with local governments within the context of mutually-beneficial climate actions.

Climate Action: “Adaptation is local in application. The Province has developed information and tools to support practitioners and decision makers to take action at a local level. Sharing of knowledge and experience through ‘organic collaboration’ is also vital because peer-to-peer learning is what practitioners respect most,” states Thomas White, Manager, Climate Risk Management, Climate Action Secretariat (Ministry of Environment).



Resilient Communities - What Happens on the Land Matters:

As of 2014, three provincial **Game-Changers** enable **Collaborative and Integrated Action** to achieve the **Watershed Health Goal**:

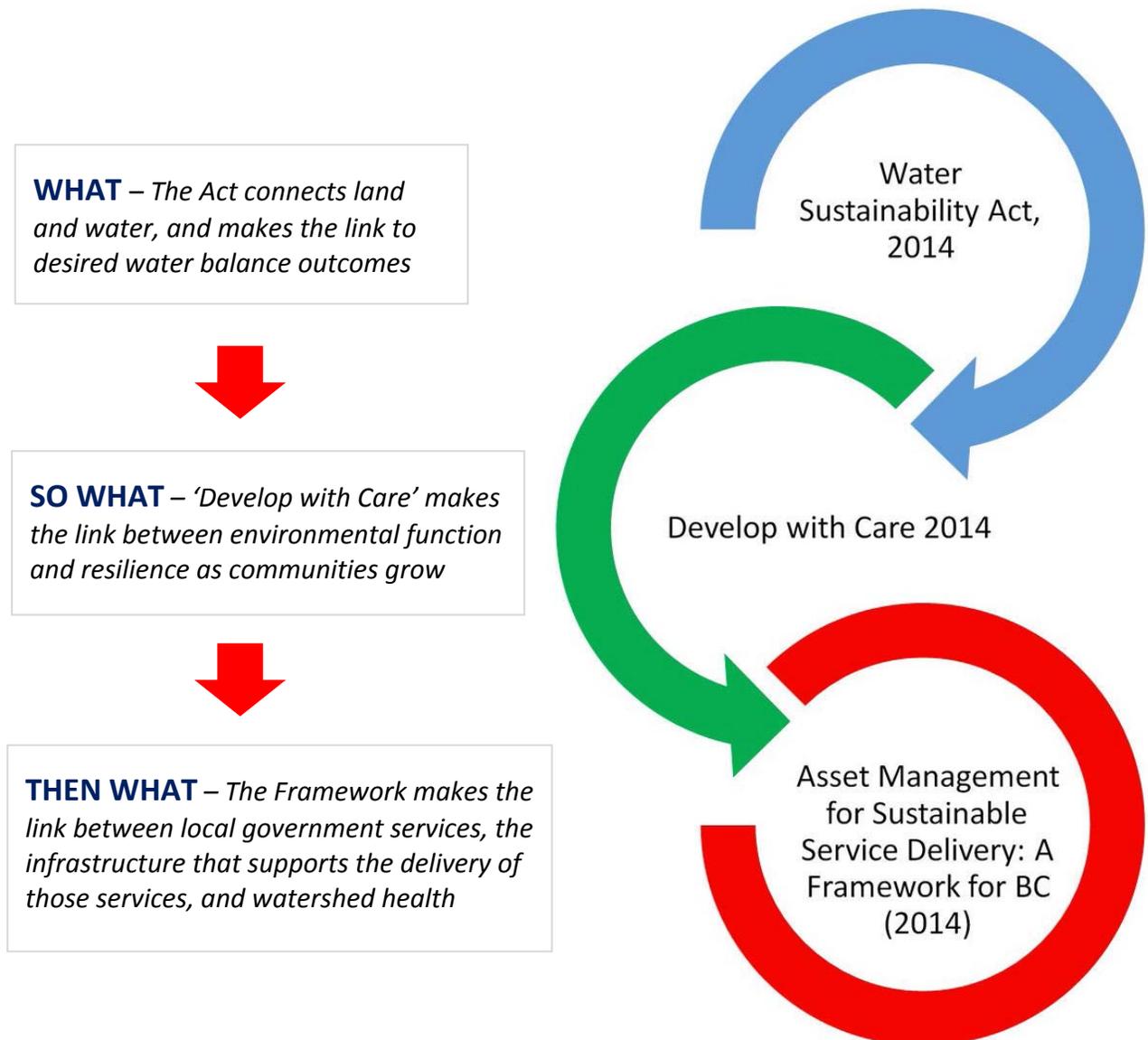


Figure 12

a. Water Sustainability Act (Bill 18, 2014)

A decade in the making, the new Water Sustainability Act is an historic achievement. The Act is the signature piece in a policy and legislative framework that establishes expectations and direction for adapting to a changing climate. The Act recognizes the connection between land use actions and the implications for the both the water cycle and watershed sustainability.

The Act will have widespread impacts on how water and land practitioners conduct their work.

Seven Policy Areas

The Act addresses seven policy areas (Figure 13). These policy areas bring together 19 of the 45 Living Water Smart commitments that are ultimately implemented through the Act, build on the current merits of the Water Act and bring in new policy tools which will help manage BC's water more sustainably into the future.

One policy area - **consider water in land use decisions** - helps to address the potential impacts of land use actions on water. To do this, the Water Sustainability Act enables a number of tools which will help decision makers better manage the impacts of land use on water.

The development of Water Objectives and Water Sustainability Plans are two tools for managing the impacts of land use on water.

Connecting Land and Water

Under the *Water Sustainability Act*, Water Objectives promoting protection of water quality, water quantity and aquatic ecosystem health will be established in regulation and further defined in policy.

Strategic Water Lens for Making Decisions:

Establishing the Water Objectives will also build on the provincial government's current initiatives related to cumulative effects management and environmental mitigation. Having Water Objectives will help support decision-making across a number of natural resource statutes, and in particular support a more consistent approach for the consideration of the impacts that land-based activities can have on water.

By establishing broad province-wide objectives and an evaluation framework that can be customized by region, decision makers will have a strategic water lens that can be used in decision making so the decisions they make will better *integrate objectives for water quantity, water quality, and aquatic ecosystem health.*

Integration with Local Government Planning:

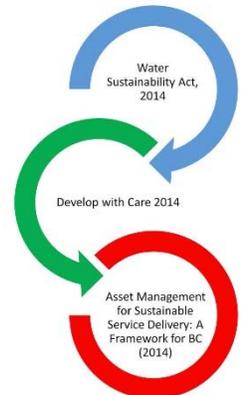
The *Water Sustainability Act* also allows for the development of Water Sustainability Plans. These collaboratively developed plans can integrate water and land use planning and can be combined with other local, regional or provincial planning processes to address water-related issues focused on addressing or preventing conflict, mitigating risk to water quality, water quantity and aquatic ecosystem health or restoring watershed function.

Process for Water Sustainability Action Plans:

"The scale and scope of each plan – and the process used to develop it – would be unique, and would reflect the needs and interests of the watersheds affected. Planning will be an effective tool where the need is great, and where other area-based management tools are not able to address the links between land use and watershed impacts," explains Jennifer Vigano, Water Policy, BC Ministry of Environment. Jennifer helped to write the new Act.



The new **Water Sustainability Act** addresses seven policy areas



Water Sustainability Act

Seven Policy Areas

- Protect stream health and aquatic environments
- Regulate and protect groundwater use

Consider water in land use decisions

- Regulate during scarcity
- Improve security, water use efficiency, and conservation
- Measure and report
- Enable a range of governance approaches

Water Objectives

Protection of water quality, water quantity and aquatic ecosystem health through provincial and area-based objectives

Water Sustainability Plans

Protection of water quality, water quantity and aquatic ecosystem health through watershed level planning

The **Seven Policy Areas** bring together **19 of the 45 Living Water Smart** commitments

Figure 13

b. Develop with Care 2014

Develop with Care 2014: Environmental Guidelines for Urban and Rural Land Development in British Columbia (Figure 14) replaces the 2012 version of this internationally acclaimed document. It provides information and guidance so that local governments, land developers and others involved in land use can use creative approaches to meet the Province's environmental standards.

Develop with Care 2014 is part of the Province's results-based approach to land use decisions. It provides supporting details to achieve the objectives of the Living Water Smart and Green Communities initiatives.

Towards Resilient Communities

Develop with Care 2014 has evolved in the course of five releases, starting in 2001.

- *Environmental Objectives, Best Management Practices and Requirements for Land Developments (2001)*
- *Environmental Best Management Practices for Urban and Rural Land Development in British Columbia (2004)*
- *Develop with Care: Environmental Guidelines for Urban and Rural Land Development in British Columbia (2006)*
- *Develop with Care 2012*
- *Develop with Care 2014*

The Province has many different programs that provide local governments with guidance to achieve their community goals. Develop with Care 2014 brings together information and guidance from several provincial ministries. The document takes an integrative and collaborative approach so that the information and guidance (to the extent possible) is all in one place.

Alignment of Provincial and Local Government Mandates

The expanded scope of the 2014 edition includes new information on the Province's programs and direction, with emphasis on the environmental protection mandate of the Ministry of Environment.

Develop with Care 2014 is a tool to engage with local governments, planners, developers and others involved in land use about the provincial mandate and issues.

Land Use and Environment: "Develop with Care 2014 incorporates the integration piece that now makes the direct connection to the Built Environment and the local government mandate.

A focus on the Built Environment provides an opportunity to look at environmental protection from perspective of land use, and get out in front of issues. Partnering of provincial policies and mandate with the local government decision process for zoning and development leads to local government being in sync with provincial policies and working together," states Helene Roberge, former Unit Head, Clean Communities Section of the Ministry of Environment. She was co-lead for Develop with Care 2014.

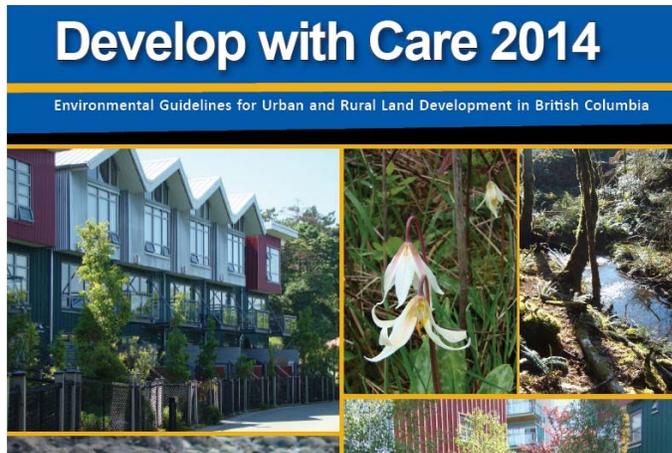


A Compilation of Best Practices: "Develop with Care has evolved and grown from its beginnings in 2006, as a reference to preserve species and ecosystems on Vancouver Island, to becoming the reference of choice to protect ecological values in urban and rural communities across British Columbia, elsewhere in Canada and even overseas. We are delighted to offer this compilation



of best practices to landowners, local governments and the development industry," summarizes Maggie Henigman, co-lead for creation and evolution of the Develop with Care series. Maggie Henigman is an Ecosystems Biologist with the Ministry of Forests, Land and Natural Resource Operations.

Develop with Care 2014 promotes ways to retain and create environmental function and resilience as communities grow...



Guidance, Not Legislation:

Based on science and experience, and building on leadership that is being shown by many local governments and developers to create resilient communities and developments, *Develop with Care 2014* is intended to support and encourage good decision making and to influence sustainable planning. In addition to what is prescribed in mandatory provincial and federal legislation, or to objectives that are set, *Develop with Care 2014* provides guidance on how to meet those standards without being prescriptive.

Support for Decision-Making:

Features information on 'green' alternatives to standard urban development practices, riparian protection, climate change, waste management, the protection of *Environmentally Valuable Resources*, a *Terms of Reference* for conducting biological inventories, *Checklists* for streamlining review processes, *species and land use based Fact Sheets*, and much more.

Figure 14

Adaptive Communities are Resilient Communities

BC communities have already experienced the impacts of a changing climate such as flooding, drought, wildfire and more frequent and intense storms. The extent and costs of these events have been significant.

“Successful adaptation does not mean that impacts will not occur, only that they will be less severe than would have been experienced had no adaptation occurred,” say D. S. Lemmen, F. J. Warren and J. Lacroix.

Planning for a Changing Climate: Some communities are already anticipating and adapting to this “new normal”, and they are using existing planning legislation and tools. Being able to start with good information about projected future conditions is key to assessing the risks and vulnerabilities of a particular location.

Figure 15 identifies seven strategic resources to help achieve the goals for resilient communities, and these are described opposite.

Each Community is Different: “We worked in partnership with Pacific Climate Impacts Consortium to make the regional climate science maps and data projections available to communities through the **Plan2Adapt** interactive web tool,” says Cathy LeBlanc,

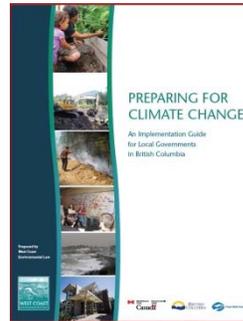


Intergovernmental Relations and Planning Branch, Ministry of Community, Sport and Cultural Development.

“Communities can use the science projections to figure out what is happening (i.e. climate variables), so what (i.e. impacts) and then what (i.e. affected sectors). Each community is different and by developing its own strategies for mainstreaming adaptation into its decisions and operations, it will become more resilient.”

“Collaborating with other communities and partners, using key adaptation resources, and mainstreaming activities, will help to increase community resilience,” concludes Cathy LeBlanc.

Preparing for Climate Change: An Implementation Guide for Local Governments in BC (2012) provides over 90 links to examples of planning tools being used for adaptation and it provides three land use scenarios and two checklists.



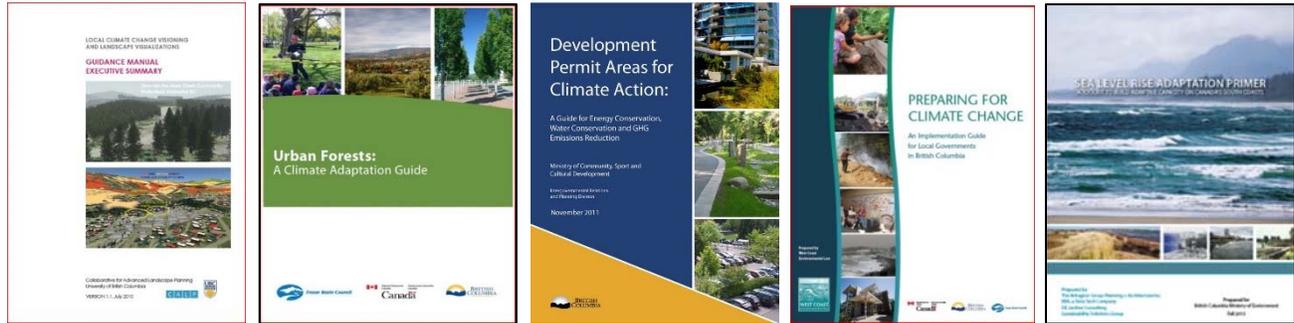
It reinforces the linkages between low impact development, emergency management, asset management, and financial and strategic planning. And it encourages communities to collaborate with their neighbours to assess regional impacts.

A number of other recent partnerships developed key adaptation resources including:

- ▶ **Local Climate Change Visioning and Landscape Visualizations Guidance Manual** (2010) - to help communities visualize localized scenarios for flood adaptation, snow pack melt, wildfire, and sea level rise.
- ▶ New resources for coastal communities facing flooding, storm surge and sea level rise, such as the **Sea Level Rise Adaptation Primer** (2013).
- ▶ **Urban Forests: A Climate Adaptation Guide** (2010) - to help plant the right tree, for the right place and the right time.
- ▶ **The Development Permit Areas for Climate Action: A Guide for Energy Conservation, Water Conservation and GHG Emissions Reduction** (2011) – that promotes the use of DPAs individually or in combination to achieve broader rainwater management goals.

Previous partnerships helped to produce the **Water Balance Model** (capturing rainwater on-site and recharging aquifers) and the **Stormwater Planning: A Guidebook for BC** (performance targets).

Implement ‘Design with Nature’ practices to build Resilient Communities....



2010 Visioning Guide

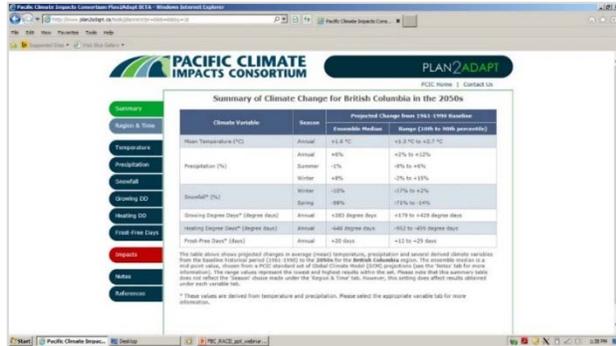
2010 Urban Forests Guide

2011 DPA Guide

2012 Implementation Guide

2013 Sea Level Rise Primer

FIVE RESOURCES that provide local government elected officials and practitioners with high-level guidance on how to make informed decisions



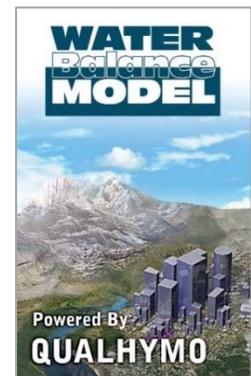
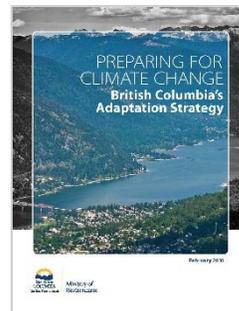
Plan2Adapt:

This online tool allows users to generate information (maps, graphs and data tables) to better understand how climate will change in their area, how the region will be impacted and what they can do to prepare.

ONLINE TOOLS enable scenario comparisons.

Climate change innovation by the Pacific Climate Impacts Consortium is incorporated in the Climate Change Module within the Water Balance Model.

Launched in 2003, this online scenario modelling and decision support tool is designed to help local government implement green infrastructure that is effective in maintaining the natural Water Balance.



The model supports two provincial initiatives: **Living Water Smart**; and **Preparing for Climate Change: British Columbia's Adaptation Strategy**.

Figure 15

c. Asset Management for Sustainable Service Delivery

Introduced in Part A, *Asset Management for Sustainable Service Delivery: A Framework for BC* (Figure 16) is a landmark initiative. Several years in the making, the BC Framework is aligned with the asset management requirements for the Province's capital grants programs, and is therefore a game-changer.

Sustainable Service Delivery encompasses water resources and drainage, and hence, will determine the achievability of the Watershed Health Goal.

The Province's grants program provides a financial incentive for local governments to demonstrate how they can fulfil 'Design with Nature' objectives and expectations that are both explicit and implicit in the BC Framework.

Land Servicing and the 'Unfunded Infrastructure Liability'

The unwanted legacy of historical 'stormwater management' is the unfunded liability that is created when land development and infrastructure servicing practices combine to harden the landscape and short-circuit the natural Water Balance (bottom part of Figure 16).

When altering of the land surface short-circuits the Water Balance, consequences include expensive drainage and stream stabilization fixes (in an era when communities are challenged to fund and replace essential infrastructure services).

Implementing 'Design with Nature' development practices at the site scale – so that benefits accumulate and mimic the natural Water Balance at a watershed scale – ultimately means that communities will be more **resilient** during periods when there is either too much or too little rain.

Focus on Desired Outcomes

Over the past 15 years in BC, local government leaders have been applying science-based understanding to develop tools, establish precedents and gain the experience necessary to implement practices that would ultimately achieve the Watershed Health Goal.

The "missing link" in the sharing and learning process has been an opportunity or driver to package the tools, precedents and experience into a comprehensive and integrated application.

The renewed Gas Tax Agreement complete with requirements to implement the BC Framework (in order to meet asset management commitments) now provides a timely driver for such integration.

Outcome-oriented, the BC Framework is the catalyst for local governments to integrate natural systems and climate change thinking into Asset Management, and forestall an 'unfunded infrastructure liability'.

Asset Management Continuum: "The BC Framework provides a high level overview of what is needed to develop, implement and maintain strong asset management practices for local governments.



The BC Framework also points the way to integration of natural systems and climate change thinking into asset management. Resilient cities will be the ones that can absorb water and manage the water cycle as a closed loop. We can view asset management as a continuum. Communities will progress along it incrementally as their understanding grows. By accounting for and integrating the services that nature provides, they can achieve the goal of Sustainable Service Delivery for watershed systems," explains Liam Edwards, Executive Director (for Infrastructure and Finance, Local Government Division) in the Ministry of Community, Sport and Cultural Development.

Branding graphic for
Asset Management for Sustainable Service Delivery: A Framework for BC

Asset Management Defined:

Asset Management is an integrated process, bringing together skills, expertise, and activities of **People**; with **Information** about a community's physical **Assets**; and **Finances**; so that informed decisions can be made, supporting Sustainable Service Delivery

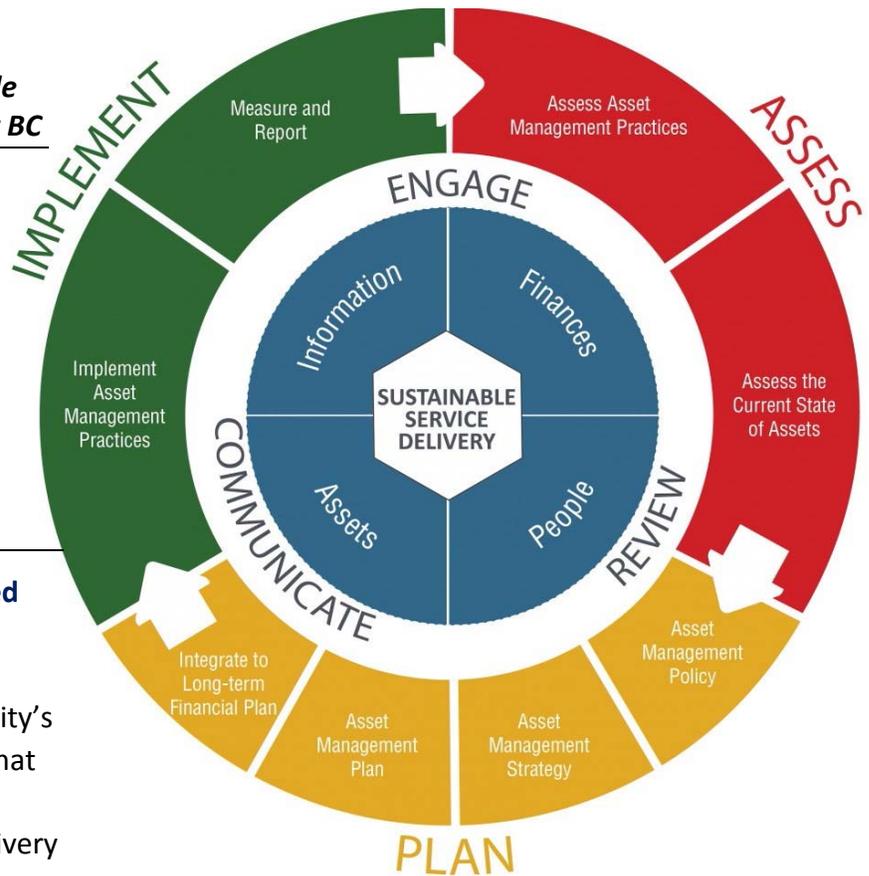


Figure 16

When the land surface is hardened, below-ground flow paths to streams are eliminated

With potential financial liability and sustainability consequences



TOO MUCH WATER:

Erosion, instability and movement of gravel and contaminants

TOO LITTLE WATER:

Creeks go dry ... (and fish will not survive)

Sustainable Service Delivery for Watershed Systems

The Union of BC Municipalities (UBCM), in partnership with the Province and Asset Management BC, developed the BC Framework. It sets strategic direction for asset management and its implementation in BC.

The BC Framework makes the link between local government services, the infrastructure that supports the delivery of those services, and the health of watershed systems. The focus on outcomes allows local governments to tailor an approach to individual needs and capacities.

Value Natural Services: The BC Framework defines asset management as a continuous process (not a discrete task). The PLAN is only a part of the overall process. The PROCESS deals with all of the components necessary to:

- refocus the business process to properly manage a community's infrastructure within the built environment; and
- understand the life-cycle implications of managing the built and natural environments as integrated components of a healthy watershed.

The BC Framework recognizes that nature, and the ecosystem services that it provides, are a fundamental and integral part of a community's infrastructure system. This recognition reflects an understanding that trees, soil, green spaces, and water contribute a valuable municipal function in maintaining the hydrologic integrity of a healthy watershed.

The ultimate vision for fully integrated Sustainable Service Delivery is that communities would protect, preserve, restore, and manage these natural assets in the same way that they manage their engineered assets.

Get It Right At the Front End: Holistic application of the BC Framework would help local governments reconcile two dilemmas:

- **Engineered assets:** The long-term operating, maintenance and renewal cost of infrastructure assets is usually about 80 percent of the life-cycle cost. Communities bear this cost forever. Often this is not adequately funded through property taxation and utility charges. For this reason, the life-cycle shortfall is characterized as an 'unfunded infrastructure liability.'
- **Natural assets:** Loss of hydrologic integrity is a consequence of historical drainage and 'stormwater management' practices that do not respect the Water Balance. Local governments bear the entire financial burden to stabilize and restore watershed systems impacted by increased runoff volumes after the landscape is transformed by development. This too is an 'unfunded infrastructure liability.'

Sustainable Service Delivery for watershed systems, and 'getting it right at the front-end,' would apply to land uses that local governments regulate and/or can influence within settled areas of watersheds (Figure 17).

Inform and Educate Practitioners: By 2017, an over-arching program goal of the *Georgia Basin Inter-Regional Educational Initiative* (IREI) is that local governments in the partner regions would truly understand **how** natural systems support municipal services and would be able to fully **integrate** this understanding and application of the Water Balance Methodology as the technical foundation for programs, planning and funding.

Professional development provided by the IREI program would result in a common understanding among all departments within an organization about how they could align their efforts to achieve *Sustainable Watershed Systems, through Asset Management*.



Sustainable Watershed Systems, through Asset Management applies to land uses that local government regulates and is founded on an understanding of how the **Water Balance Methodology** integrates the **Site** with the **Watershed, Stream and Groundwater Aquifer**

The Water Balance Methodology is about managing the whole rainfall spectrum and providing benefits to the stream through the wide range of stream needs - from base flow to managing flooding. The Water Balance Methodology bridges all ranges in rainfall and streamflow events. The Water Balance Methodology incorporates robust and proven calculation techniques and engineering applications to define a watershed and stream as a whole system. In this manner the results can be used to provide a quantitative assessment of both impacts and mitigation effectiveness. It also possible to show benefits that have been long thought as not achievable.

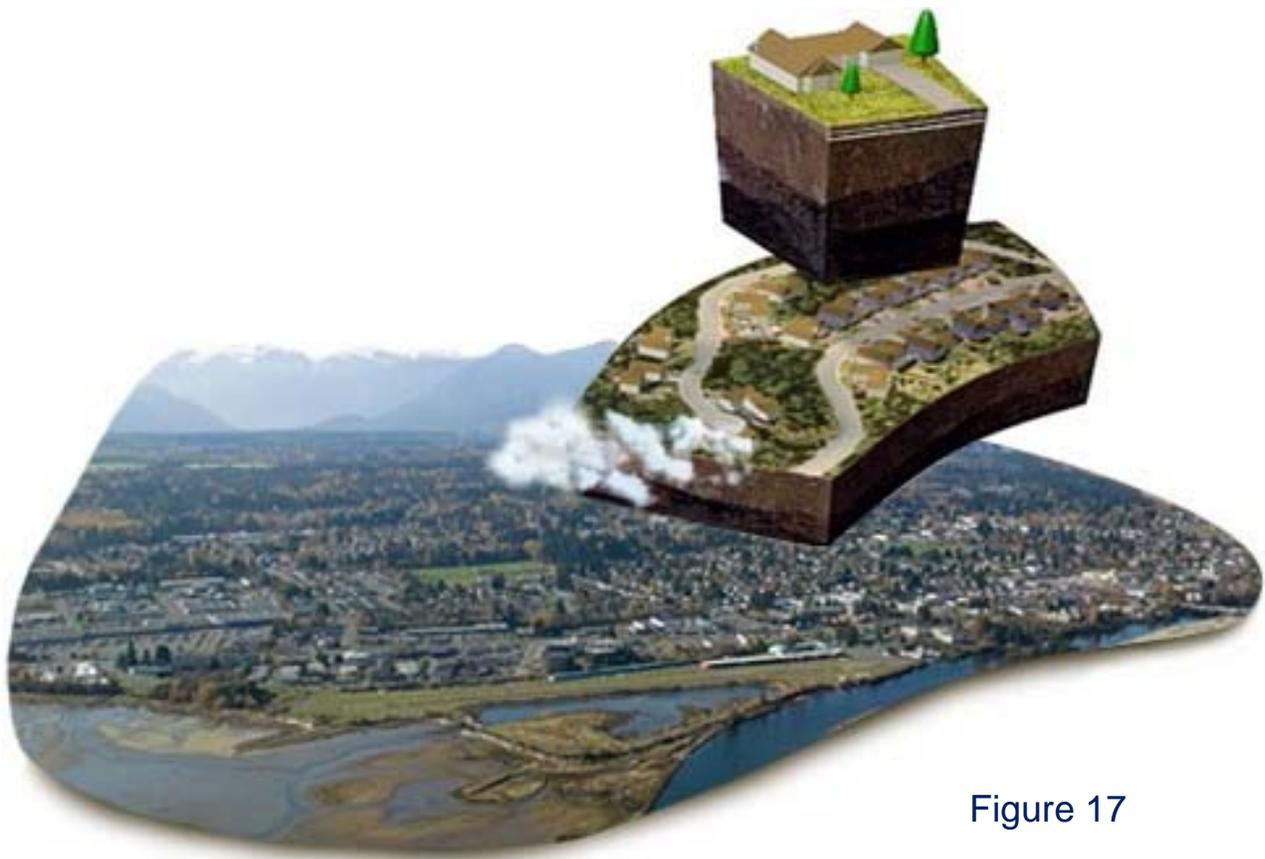


Figure 17

Sustainable Watershed Systems, through Asset Management

Beyond the Guidebook 2015: *Towards a Watershed Healthy Legacy in the Georgia Basin*

This Page Intentionally Left Blank