



# Metro Vancouver's Stormwater Management Program

Adaptation to climate variability and change can be successfully integrated into existing plans and programs



Metro Vancouver, a regional district comprising 22 municipalities, one electoral area and one treaty First Nation, is home to more than 2 million people. It has experienced very rapid growth over the past decade that is expected to continue. The district's mandate relates primarily to regional planning and delivery of essential utility services. Some Metro Vancouver member municipalities have been addressing climate change adaptation for more than five years.

## STORMWATER INTERAGENCY LIAISON GROUP

Under the federal *Fisheries Act*, Metro Vancouver and its member municipalities are not allowed to discharge stormwater and rain runoff that would negatively impact fish and their habitat. The concern is about how changes in stormwater runoff quantity and quality impact the region's many urban and rural salmon and trout streams. Metro Vancouver, its member municipalities, and provincial and federal environmental agencies formed the Stormwater Interagency Liaison Group (SILG) in 2002 under its provincially approved Liquid Waste Management Plan to facilitate the co-ordination and sharing of common research related to stormwater management.

This co-ordinated approach created a template for developing watershed-specific, flexible and adaptive strategies, known as Integrated Stormwater Management Plans (ISMPs). These plans integrate a wide range of water management issues, including watershed health, land use planning, engineering, community values, and climate variability and change. Although the primary drivers in the development of these plans have been expanding urbanization and management of intensive agriculture, climate change has been integrated into the ISMP process and other approaches for managing the health of streams in the region.

## A CHANGING CLIMATE

Metro Vancouver has a coastal climate characterized by mild, wet winters and warm, dry summers. Temperature records indicate a clear warming trend of between 0.5°C and 0.8°C over the past century. Also, annual precipitation in the region has increased over the past 50 years. Much of the short-term variability in climate (years to decades) relates to natural climate cycles such as the El Niño-Southern Oscillation.

## SEVEN STEPS TO DESIGN AND IMPLEMENT AN ISMP

1. Secure political interest and support.
2. Identify watershed problems and opportunities.
3. Develop objectives and alternative scenarios.
4. Collect meaningful data and refine scenarios.
5. Evaluate alternatives and develop component plans.
6. Develop an implementation program.
7. Refine the plan through adaptive management.

## INTEGRATED STORMWATER MANAGEMENT PLANS

The goal of an ISMP is to develop effective stormwater plans that will result in no net loss to environmental quality and protect communities from localized flooding. The process actively seeks input from various stakeholder groups within each watershed and brings together the fields of planning, engineering, ecology and natural hazard protection within an adaptive management methodology. Member municipalities have committed to develop ISMPs for all Vancouver urban and suburban watersheds by 2014.

Within each ISMP process, an advisory group that includes representatives from the development, agricultural and environmental sectors contributes historical knowledge of the watershed and helps to assess the benefits of the ISMP over time. The general public is involved in evaluating alternative management scenarios and reviewing the plan's success. This roundtable approach relies on a combination of knowledge of land use, water resources and engineering from governments, local residents and experts. A widely supported set of final adaptive management rules allows landowners and developers to make long-term investment decisions with confidence, provide government agencies with regulatory certainty and ensure that the investments of municipal governments lead to continuous improvements in stormwater management.

Approximately 25 ISMPs have been completed or are underway in Metro Vancouver – representing about half of the watersheds in the region. Municipalities have adopted such measures as on-site rainfall retention (through infiltration and detention infrastructure) the re-exposure and naturalisation of culverted or buried streams, reduction targets for total impervious area and improved public access to waterways. Some of these measures are driven, in part, by the projected impacts of climate change on the region's watersheds. After the measures are implemented, many municipalities will monitor stream flows and stream health (e.g. benthic and fish studies).

## WATERSHED IMPROVEMENT FEATURES

Many Metro Vancouver municipalities have translated the ISMPs into actions. For example, the Corporation of Delta has a landscape architect on staff to assist the engineering design team to construct landscaped watershed improvement features that reduce stormwater runoff and protect stream health. The engineering team has constructed more than 18 watershed improvement projects that include permeable paving and the planting of street trees over renovated portions of roadsides, infiltration tanks, grassy swales and rain gardens.

## CLIMATE CHANGE VULNERABILITY ASSESSMENT

In 2006, Metro Vancouver partnered with Engineers Canada to conduct an initial assessment of various components of the region's wastewater system – combined sewers, pump stations and the Iona Island wastewater treatment plant. The final report noted that low-lying wastewater infrastructure (such as the Iona Island wastewater treatment plant, which provides primary treatment services for approximately 600 000 people) was vulnerable to both rising sea levels and possible increases in the frequency and magnitude of storm surges. In addition, the increasing intensity of extreme rain events potentially has significant implications for the capacity of existing sewers and the design of upgraded infrastructure.

Metro Vancouver has been proactive in integrating climate change adaptation into the region's wastewater planning processes since 2002. In 2006, Metro Vancouver and Engineers Canada jointly funded an initial assessment of the vulnerability of the region's wastewater infrastructure to climate change. Subsequently, Metro Vancouver undertook actions supporting improving infrastructure resilience, many of which were incorporated directly into the Integrated Liquid Waste and Resource Management Plan, adopted in May 2010. This plan specifically addresses the impacts of climate change and climatic cycles on local water resources.

Although it is not driven directly by concerns about the impacts of climate change, the ISMP process provides Metro Vancouver and its members with an inclusive and comprehensive tool for managing complex risk-management issues that improve the region's capacity to deal with environmental risks, including those related to climate variability and change.

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