COLUMBIA BASIN TRUST
*a legacy for the people*

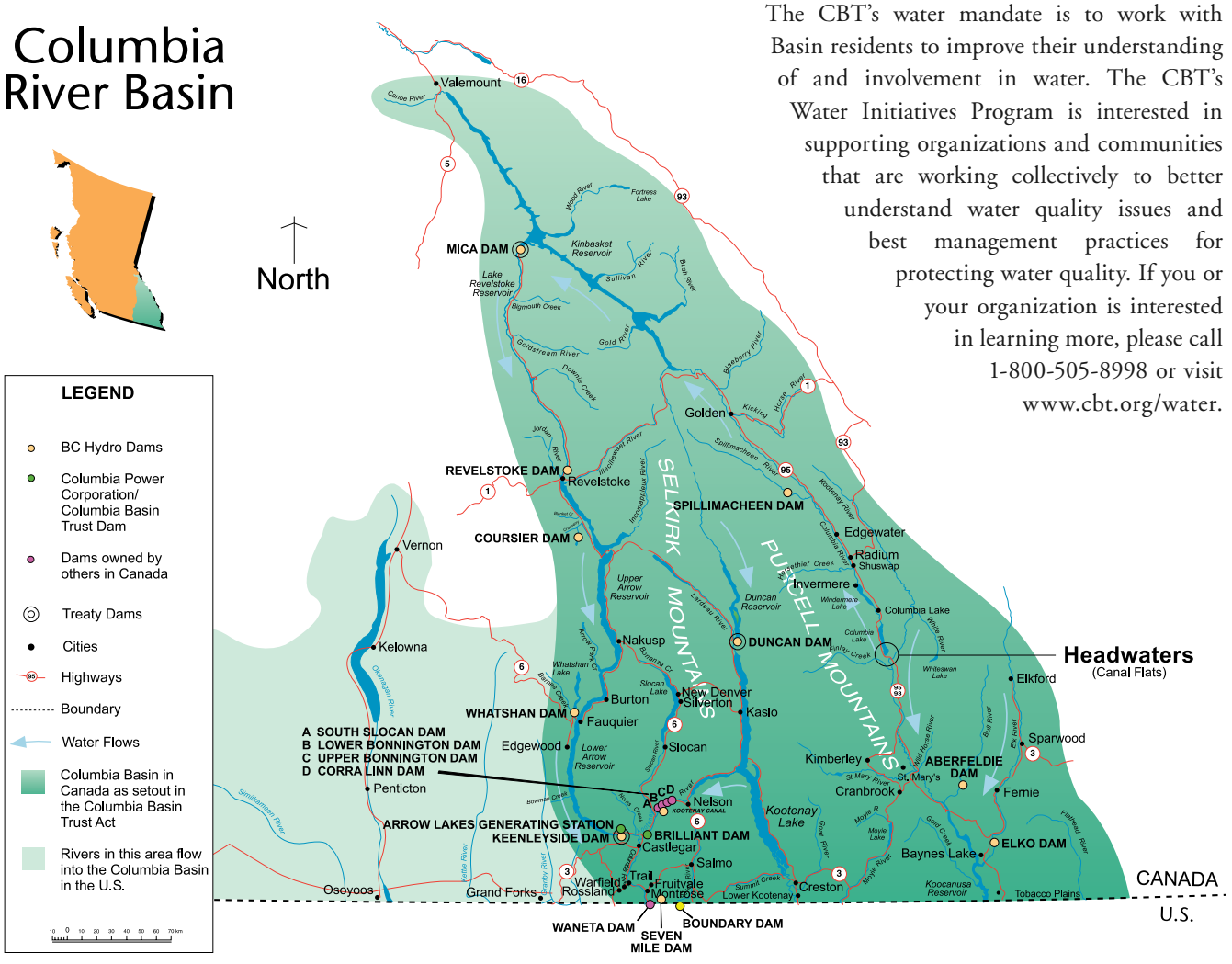
# WATER QUALITY REPORT

# FOREWORD

This project was initiated by the Water Initiatives Program of the Columbia Basin Trust (CBT) in partnership with a variety of provincial and federal agencies and local groups. The document provides information on water quality that is relative to the citizens of the Canadian Columbia Basin. The region's boundaries are generally defined by those watersheds which flow into the Columbia River in Canada and the areas within BC most affected by the Columbia River Treaty.

The objective of this pamphlet is to help improve Basin residents' understanding about water quality by answering the following questions: What is water quality? Why is water quality important to us? What factors affect water quality? How do we impact water quality? How can Basin residents help to preserve water quality? What are some on-line resources and best management practices for protecting water quality?

The CBT's water mandate is to work with Basin residents to improve their understanding of and involvement in water. The CBT's Water Initiatives Program is interested in supporting organizations and communities that are working collectively to better understand water quality issues and best management practices for protecting water quality. If you or your organization is interested in learning more, please call 1-800-505-8998 or visit www.cbt.org/water.



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# WHAT IS WATER QUALITY?

Fill a glass of water and hold it up to the light. Is it clear and sparkling, or are there little bits floating around? Even if it's clear, how do you know if it's safe to drink?

Water quality is the term used to describe the condition of water—its physical, chemical and biological characteristics. Measuring those characteristics tells us if water is suitable for a specific use—like drinking.

Water quality is valued in many ways. Drinking water is the most obvious. Water also supports life both in water (aquatic ecosystems) and on land (terrestrial ecosystems). It provides opportunities for recreation and for the simple sense of well-being that people feel around water. Agriculture depends on water quality for irrigating crops and raising livestock. The food processing industry relies on clean fresh water to prepare food for the market.

Water is the foundation of our social, economic and environmental well being, thus it is important that we understand what factors affect water quality, where contaminants come from, and what each of us can do to improve water quality.

# WHAT FACTORS AFFECT WATER QUALITY?

## PHYSICAL FACTORS

### Water Quantity

The more water there is in a water body, the greater its ability to dilute any contaminants and reduce their impact on water quality.

### Natural Water Content

As rain permeates the earth's surface, it flows over and through soil and rock, dissolving and transporting various substances. That's why water is called the "universal solvent"—it dissolves more substances than any other liquid. Natural water contains a mix of organic matter, nutrients, ions, trace metals, bacteria and other microorganisms.

### Water Temperature

An increase in water temperature caused by human activity is called "thermal pollution." It can result from removal of streamside vegetation, or from the release of heated waters from industrial processes or urban runoff into a water body.

During the process of stream erosion (either natural or human-induced), channels become wider and shallower, resulting in greater solar heating and a rise in water temperatures that alter the aquatic environment.

Excessive water temperature increases can be lethal to aquatic organisms by inhibiting migration, raising the respiration rate, affecting the timing of hatching, and increasing susceptibility to disease.

Increases in water temperature can also cause decreases in dissolved oxygen, which can lead to dramatic changes in aquatic environments. Cold water species are replaced by those that prefer warm water environments. Warmer water can also produce favourable conditions for certain pathogens or the organisms that carry them (such as mosquitoes).

The type of rock that water contacts affects water quality. For example, limestone underlies fairly extensive areas of the Columbia Basin—on the western side of the Rocky Mountains and in part of the Lardeau area north of Kootenay Lake. Groundwater in these areas can be very "hard"—it carries a lot of calcium and magnesium.

## CHEMICAL AND BIOLOGICAL FACTORS

Many synthetic substances persist in the environment and build up in the fatty tissues of living organisms, a process known as **bio-accumulation**. Organisms lower in the food chain will accumulate small amounts, but as they are eaten by others above them, **bio-magnification** occurs. Predators at the top of the food chain will accumulate much greater concentrations that may be toxic.

Both natural and synthetic substances can impact water quality. Natural water usually has low levels of contaminants except in those areas where water flows through highly mineralized rock formations or saline deposits. Human activities can elevate or depress levels of contamination. For example, natural nutrients like nitrogen and phosphorus occur at desirable levels in the aquatic environment, contributing to good water quality. However, their levels in the lower portions of the main stem Columbia River have been reduced by the trapping of nutrient-bearing sediments behind upstream dams.

In contrast, there are no desirable levels of **synthetic substances** in water, only levels considered acceptable or unacceptable to human health and the health of other living organisms. Synthetic substances, which do not occur naturally, can present a very serious challenge because there are no natural mechanisms for breaking them down. They can persist and may become biomagnified in living organisms.

Some substances occur both naturally and as a result of human influences. For example, mercury is a naturally occurring element, but is also a byproduct of carbon fuel emissions and the burning of municipal waste. Exposure to mercury (and many of the contaminants in the following sections) at high enough concentrations can have detrimental effects on the health of humans and ecosystems. At natural levels, risk is generally considered low.

# NATURAL SUBSTANCES

## Degradable Organic Matter

Degradable organic matter is the tissues and cells of dead plants and animals. Natural sources include leaves, woody debris, the erosion of stream banks, and dead plants and animals. Human sources include runoff, failing septic systems, industrial discharges, and effluents from wastewater treatment plants.

Other organisms consume organic matter as food and during that process, oxygen is consumed—this is called the biochemical oxygen demand. The greater the demand, the more rapidly oxygen is consumed by microorganisms. This means less oxygen is available to higher forms of aquatic life, which may become stressed or die.

## Sediments

Sediments (soil particles) enter water bodies through runoff and by natural or human-induced erosion of shorelines and streambanks. In particular, the removal of riparian vegetation decreases bank stability and contributes to erosion. Sediments can also be stirred up and suspended in watercourses at times of increased flow or following a disturbance.

Other human activities also act as sources of sediment, including urban development, agriculture, construction, roads and some forestry practices.

Suspended soil particles make water turbid (muddied or dirty), which can reduce plant photosynthesis, degrade spawning habitat, smother invertebrates and eggs, and impede fish respiration and feeding. Dissolved oxygen may also be reduced if high levels of organic material are associated with the sediments. Sediments and increased turbidity can transport attached microorganisms and reduce the effectiveness of disinfection and water treatment.

## Nutrients

Nitrogen and phosphorus are two important nutrients because they are essential to the growth of phytoplankton—the primary producers in the aquatic food chain.

Nutrients enter water naturally through erosion and the movement of sediments, or via the decomposition of organic matter. They can also enter the water from human sources such as fertilizer runoff, leaking sewage systems, and industrial and wastewater treatment effluent.

Kootenay Lake and the main stem of the Columbia River experience a nutrient deficiency because sediments that carry important nutrients such as phosphorus are trapped behind upstream dams. To compensate, the Arrow Lakes and Kootenay Lake fertilization programs add nutrients to the system during the spring and summer.

A high concentration of nutrients can promote excessive growth of algae and other aquatic plants—a condition known as eutrophication. This can result in reduced oxygen levels, altered habitat conditions, and negative impacts to fish species.

## Trace Metals

Trace metals are elements that exist naturally in the environment at low concentrations. They may also be pollutants resulting from human activities—urban runoff, sewage system discharge, seepage from waste disposal sites, burning fossil fuels or mining and smelting.

Some trace metals, like copper and zinc, are essential micronutrients for aquatic ecosystems to function well. However at higher concentrations, they can become toxic. Other trace metals such as mercury, lead and cadmium have no known essential function.

Metals do not degrade and some (cadmium and mercury, for example) tend to bioaccumulate in the food chain, especially in predatory fish. Consumption of these fish may be hazardous to human health.

Many factors affect the toxicity of trace metals, and the impacts on humans are wide-ranging and can be very serious.

## Pathogenic Microorganisms

In the Columbia Basin, wildlife has historically been the predominant source of waterborne pathogens.

Waterborne pathogens (meaning they cause disease) include bacteria like *Salmonella sp., E.coli sp.,* viruses like Norwalk or Hepatitis A and protozoa like *Giardia sp.* and *Cryptosporidium sp.* They can enter aquatic environments from municipal wastewater effluents, septic systems, urban runoff and agricultural waste and wildlife.

Waterborne pathogens can have very serious impacts on human health, as was experienced in Walkerton, Ontario. As well as contaminating drinking water supplies, they can also degrade recreational waters and source waters for agriculture and aquaculture, and impact aquatic ecosystems and biodiversity. For example, outbreaks of botulism have caused substantial waterfowl mortality in Canada.

The full impact of these microorganisms on drinking water and aquatic ecosystems remains uncertain. Concern is growing about their role in chronic disease.

# SYNTHETIC SUBSTANCES

(includes substances categorized as both naturally occurring and synthetic compounds)

## Persistent Organic Pollutants

Persistent organic pollutants (POPs) comprise a group of synthetic chemicals that degrade slowly in the environment, may bioaccumulate and can have toxic properties. Many POPs move freely among air, water, soil and vegetation. Once contaminants become airborne, they can travel over great distances and eventually fall on to land or into water. This is called atmospheric deposition and can be a source of aquatic contamination.

Historic use of POPs, such as DDT and PCBs, has created accumulations in the environment. For example, they may still persist in agricultural soils that were treated with pesticides or in sediments in lakes that were sprayed for insect control. These sources may continue to supply POPs to the atmosphere even though these compounds are now banned or heavily regulated in Canada. In fact, POPs can still be found in the air and precipitation throughout Canada.

Unsafe levels of POPs can cause an array of adverse health effects among humans and animals.

## Pesticides

Pesticides are toxic chemicals used to kill or control pests. The term includes insecticides, herbicides, fungicides, microbicides, rodenticides and other substances. Many pesticides are household products, such as weed killers, pet flea collars and kitchen disinfectants.

Pesticides are applied to our surroundings and can get into water sources via overspray, air currents, runoff and accidental spills.

Excessive levels of pesticides can inhibit photosynthesis; kill fish and other aquatic life; affect reproduction, respiration and growth; cause disease, mutations and deformities; and be biomagnified through the food chain.

Across Canada over 140 municipalities (14 in BC, including Nelson) have passed bylaws to ban cosmetic pesticides.

## Non-chlorinated Organic Compounds

These compounds comprise a wide range of natural and synthetic chemicals, including plasticizers, solvents, flame retardants, combustion byproducts, certain detergents, and oil, grease and fuels and their residuals (e.g., benzene, toluene).

The sources of these compounds are as diverse as the compounds themselves. They can enter water bodies from runoff, atmospheric deposition, landfills, municipal wastewater effluent, industrial releases and motor vehicle emissions.

Many of these compounds are toxic to living organisms at high enough concentrations, and some do not degrade but biomagnify in food chains. Other impacts on aquatic environments are diverse—disease, reproduction effects, and many others.

## Acids

Acids enter the aquatic environment from two main sources—acid rain and acid mine drainage.

**Acid rain** results when gases emitted from human activities (such as heavy industrial emissions and vehicle exhaust) undergo complex chemical processes in the atmosphere and on the ground. The end result is sulphuric acid and nitric acid.

**Acid mine drainage** results from abandoned mine sites with waste rock and sulphide tailings. Sulphide minerals (e.g., pyrite or iron sulphide) are oxidized when exposed to air and water, again generating sulphuric acid. This can result in dissolved metals that can be toxic.

Some water is more able to neutralize acidic pollution. In general, however, as water acidifies, its ability to sustain a diversity of life decreases. Both chemical and physical changes affect the aquatic environment and the plants and organisms living there.

## Endocrine Disrupting Compounds (EDCs)

This category includes a wide variety of synthetic and naturally occurring compounds that alter the normal functioning of the endocrine system. That system's function is to secrete hormones that affect growth, development, reproduction and sexual characteristics in living organisms.

EDC sources include municipal wastewater effluents (they contain EDCs in the form of pharmaceuticals, for example), pesticide and hormone use in agriculture, and industrial effluent from pulp and paper mills, mines and other industries.

Recent research in Canada has indicated that exposure to certain levels of EDCs may produce subtle changes to the growth, reproduction and development of humans, wildlife and aquatic organisms.

## Pharmaceuticals and Personal Care Products

This category includes drugs such as antibiotics, blood lipid regulators, analgesics and beta-blockers, and products such as fragrances, lotions and antiseptics. Contamination from these products often originates in our bathrooms when we expel or wash off products or dispose of pharmaceuticals.

Agricultural use of pharmaceuticals for disease prevention and growth promotion is also a source; for example, spreading manure containing these products on fields may contaminate surface or ground waters.

There is limited knowledge about the environmental effects of all these products, yet their use will grow as the population grows, agriculture intensifies, and the pharmaceutical industry develops.

## Disinfection Byproducts

Disinfection of water systems is accomplished by exposure to ultraviolet energy or the addition of chemicals (such as chlorine or ozone) to inactivate or kill pathogenic microorganisms.

Disinfection byproducts are formed when disinfectants react with bromide and/or natural organic matter present in the water. The resulting byproducts, if consumed in water over many years at levels in excess of safe standards, can have human health effects.

# WHAT ARE THE MAJOR SOURCES OF CONTAMINANTS?

Pollutants affecting water quality may come from point or non-point sources, or a combination of both.

- **Point source** pollution is the direct introduction of an impurity into an aquifer or surface water body at an easily identifiable and distinct location.
- **Non-point source** pollution comes from many diffuse sources. It is caused by runoff (from rainfall or snowmelt) moving over and through the ground, picking up contaminants and finally depositing them into lakes, rivers, wetlands and even underground aquifers.

## POINT SOURCES

### Municipal Wastewater Effluent

This is the treated water that is discharged from treatment plants. It may contain:

- Nutrients that can lead to eutrophication.
- Bacteria and pathogens, if not disinfected.
- Contaminants such as heavy metals and treatment residuals such as chlorine and chloramines.
- Natural and synthetic hormones.
- Pharmaceuticals and personal care products.

## Industrial Effluents

The wastewater effluent from industrial processes that require the use of water can affect ecosystem health through habitat alteration and the release of toxins and nutrients.

The **pulp and paper** process produces large volumes of waste effluent containing complex mixtures of hundreds of compounds. If untreated this effluent could have negative impacts to aquatic ecosystems.

Many **mining** facilities are located adjacent to freshwater systems in remote areas, and mining wastewaters can be discharged into small headwater streams where the effluent can be a dominant source of streamflow to the local system. Effects of the effluent can be long-lasting, because metals released do not degrade but remain in the environment. Even when mines are closed, they can continue to contribute contaminants to local surface and ground waters through leachate from tailing ponds and slag heaps. Concerns associated with mining include the long-term effects of chronic exposure to low levels of metals, bioaccumulation of toxins, sediment contamination, and acid mine drainage.

Over the past few decades the pulp and paper industry and the mining industry have been making significant efforts to reduce the impacts of their operations on the health of aquatic ecosystems.

## Spills and Releases

These can occur either intentionally or accidentally. For example, if combined storm water-sewer systems are overwhelmed by heavy rainfall, untreated effluent may bypass the disinfection process and introduce bacteria and pathogens to the aquatic environment.

Increased knowledge and investment in upgrades over the past few decades has resulted in the pulp and paper mills in the Columbia Basin achieving a very good performance record. The Tembec mill near Elko has tertiary treatment that delivers high quality effluent. The Celgar mill in Castlegar has secondary biological treatment, producing one of the best effluent qualities for pulp mills in the province.

# NON-POINT SOURCES

## Impacts from Dams

The spills at various dams produce dissolved gas supersaturation, which persists downstream of the facility. The Brilliant Expansion Project will harness more of the spills at Brilliant Dam, diverting them to the new generating unit. Reduced gas supersaturation levels in both BC and Washington state will result.

Both BC Hydro and the Columbia Power Corporation are involved in projects to better manage reservoir water levels for a variety of values and to restore nutrient levels through fertilization projects.

Dams are barriers across flowing water and are used to provide water for irrigation and municipal use, for flood control and power generation, and to contain effluent from industrial sites such as mines.

Dams affect water quality in a variety of ways:

- Nutrient deficiency: Dams trap nutrient-bearing sediments behind them.
- Gas supersaturation: This means an excess of dissolved gases resulting from rapidly forcing water through dams. It may cause damage to fish tissue, known as "gas bubble trauma."
- Temperature changes in downstream waters: This affects whether aquatic species can find suitable habitat.
- Stream flow changes: This can impact water levels, water chemistry, erosion potential and the accumulation of toxins in reservoirs.
- Loss of wetlands: Wetlands play a major role in nature's water filtration system. They assimilate excess nutrients, remove sediments, and filter trace metals and organic contaminants. Wetlands depend on a natural cycle of stream flows to flush them out and deposit new sediments; dams and reservoirs disrupt this cycle.

## Forestry

In addition to their socioeconomic value, forests also purify water, stabilize soil, moderate climate, regulate water flow, and provide habitat for wildlife.

Water quality impacts from timber harvesting may include increases in:

- Water yield, due to reduced interception and transpiration by the forest canopy.
- Sedimentation from roads.
- Water temperatures due to removing streamside vegetation.
- Soil temperatures and humidity, which affect degradation processes and the flux of chemicals.
- Organic matter content in water.

- Logging roads are usually the greatest source of sediment in forestry during construction and as a result of poor road maintenance. Logging can also disturb the hydrological flow path and this often results in terrain instability which is another major source of sediments.

The use of forest pesticides can also contaminate both surface and ground water. Although the ones commonly used today do not persist in the environment or biomagnify in the food chain, high concentrations of them can be toxic to aquatic life.

Forest fires also have impacts. They create a flush of nutrients and sediments into local surface waters, and change the forest canopy which impacts temperatures of local streams. As well, intense fires can create an impermeable soil, increasing surface runoff and sedimentation.

Fire suppression too has impacts. Construction of roads and water extraction from water bodies contribute to sedimentation. Fire retardants are composed primarily of nitrogen and phosphorus and may contribute to eutrophication.

Over the past few decades forestry practices in BC have been changed to better recognize and mitigate forest management impacts on water quality.

## Agriculture

Farming is quite prevalent in some regions of the Columbia Basin, where it has potential to impact water quality.

The impacts of agriculture on water quality may include:

- Diversion of water for farm operations, reducing the amount available to dilute pollutants.
- Erosion of soil, via tillage and livestock entering streams.
- Increased nutrients, mainly from manure, into surface and ground water can lead to eutrophication.
- Introduction of heavy metals, via animal feeds.
- Pesticide contamination.
- Pathogen contamination from poor livestock and manure management.
- Contamination by endocrine disrupting compounds from manure, which contains hormones excreted by livestock.
- Pharmaceutical contamination (antibiotics) from manure.

The effective management of riparian areas adjacent to agricultural operations can help control many of the above impacts. There has been significant work done to improve our understanding of agricultural impacts on water and to change current practices to mitigate these effects.

## Air Pollution

Once contaminants become airborne, they can travel great distances and eventually be deposited on land or into water.

Natural processes (volcanoes, forest fires) and human-caused ones (smelting metals, spraying pesticides, burning coal) can result in atmospheric pollution. Five categories of contaminants have the greatest potential to degrade water quality through atmospheric deposition: nitrogen compounds, mercury, other metals, pesticides and combustion emissions.

## Landfills and Waste Disposal

Many types of waste are disposed of in our society: hazardous and industrial solid waste; mining and agricultural waste; and municipal biosolids and septic systems. The main threat to water quality from the disposal of these wastes occurs in the groundwater environment.

Groundwater contamination can be difficult to observe and trace to its source, as groundwater moves slowly underground. It's also difficult, costly and potentially impossible to remediate. Should serious groundwater contamination occur, it could impact drinking water supplies and aquatic ecosystems for decades or longer.

There has been a lot of recent emphasis put on managing landfill and waste disposal systems to improve best management practices and reduce their impact on ground water sources.

## Urban Land Development

Land development, especially in the early stages, provides opportunities for numerous non-point sources of water pollution. The cumulative effects can push surface and ground waters beyond their capacity to assimilate contaminants.

Land development can result in loss of green space, decreased pervious surface area, diversion of streams, destruction of aquatic habitat, and removal of riparian vegetation—all elements of natural systems that protect the aquatic environment and its inhabitants.

Sources of water quality impacts include:

- erosion from clearing
- introduction of pollutants during construction
- hydrocarbon spills
- sewage leaks
- metals, particulates and other compounds deposited by vehicles

New land development strategies are beginning to integrate practices that reduce the impact of the development on the local water resources.

## Urban Runoff

Natural vegetation and soil structure allow the gradual absorption of rain and snowmelt, whereas paved streets and buildings speed delivery of both water and pollutants to waterways. Rain and snowmelt transport pollutants from commercial, industrial and residential activities into storm drains that flush the wastes into rivers, lakes and wetlands.

Urban runoff has been recognized as a significant environmental detriment in recent years. Both storm water and combined storm-sewer overflows cause various effects on receiving waters:

- flooding and habitat washout
- erosion and sedimentation
- thermal pollution (when heat is transferred from pavement)
- addition of nutrients, trace metals, pesticides, hydrocarbons, pathogenic microorganisms, etc.
- organic contaminants from road and parking lot run off

All of the above can adversely affect the aquatic ecosystem, as well affecting human health by contaminating drinking water, recreational waters, and fish and shellfish.

Increasingly, local governments are exploring new and innovative planning strategies to deal with water quality issues associated with urban runoff.

# WHAT IS BEING DONE TO IMPROVE WATER QUALITY?

The protection and improvement of water quality in the Columbia River Basin requires collaberation amongst industry, all levels of government and individual citizens to promote best management practices. Local industry such as forestry, mining, pulp and paper, hydropower and agriculture are showing leadership in implementing measures to protect water quality. Local governments are developing better tools and policies to manage and minimize impacts of land use on water quality. The Provincial Government provides legislation to support oversight and enforcement of activities to protect water quality. Individuals can provide leadership to ensure those activities they are involved with or observe will minimize impacts on water quality.

## Some Industry, Municipality and Individual Best Management Practices On-line Resources for Protecting Water Quality

Agriculture and Agri-Food Canada—Beneficial practices which improve water quality
http://www.agr.gc.ca/pfra/water/practices_e.htm

B.C. Guide to Watershed Law and Planning
http://www.bcwatersheds.org/issues/water/bcgwlp/index.shtml

BC Ministry of Environment: Environmental Protection Division
Water Quality Protection Documents
http://www.env.gov.bc.ca/wat/wq/wq_protection.html

Canadian Water Quality Guidelines:
http://www.ec.gc.ca/CEQG-RCQE/English/Ceqg/Water/default.cfm

Forrex: Sustainable Natural Resource Management Decisions: Watershed Management
http://www.forrex.org/program/web_links.asp?AreaPkey=7

Ministry of Forests and Range: Forest Practices Code: Community Watershed Guidebook
http://www.for.gov.bc.ca/tasb/legsregs/fpc/FPCGUIDE/WATRSHED/Watertoc.htm

Natural Resources Defense Council
Stormwater Strategies: Community Responses to Runoff Pollution
http://www.nrdc.org/water/pollution/storm/stoinx.asp

SmartGrowthBC
http://www.smartgrowth.bc.ca/

Stewardship Centre for British Columbia: The Stewardship Series
http://www.stewardshipcentre.bc.ca/publications/default.asp?sProv=bc&siteLoc=scnBC&lang=en

Stewardship Canada: Resource Directory
http://www.stewardshipcanada.ca/stewardshipcanada/links/links_searchOptions1.asp?s=scn&1=en

Sustainable Approaches to Water Resources
http://www.waterbucket.ca/

The Living by Water Project
http://www.livingbywater.ca/main.html

# WHAT CAN I DO TO IMPROVE WATER QUALITY?

As an individual you can make a difference by taking measures to protect water quality in your day to day life.

## Avoid Hazardous Household Products

- Check product labels for hazard warnings. Follow the label's instructions on how to use the product safely.
- Only buy the hazardous products you really need, in an amount that you'll be able to completely use up.
- Use "environmentally friendly" products, but be critical of potentially misleading use of that label.
- Look for the Environmental Choice EcoLogo. That means the product has been tested and certified by the Canadian Standards Association as minimizing the use of environmentally hazardous substances and maximizing energy efficiency and the use of recycled or recyclable materials.

## Don't Misuse the Sewage System

- Toss items such as dental floss, hair, disposable diapers and plastic tampon holders into the wastebasket, not the toilet.
- Completely use up (or pass on to others) cleaning products, polishes, bleaches, solvents, paints, etc.
- Save food scraps and compost them; don't dump them down the drain.
- Choose latex paint instead of oil-based.
- Ensure your septic field is regularly cleaned and maintained so it doesn't leach untreated sewage into surface or ground water.
- Pharmaceuticals; return excess to pharmacy.

## Don't Use Pesticides in Your Garden

Whenever possible, use alternatives to pesticides and other hazardous materials, such as:

- Hand pull weeds.
- Snip and discard infested leaves.
- Dislodge insects with insecticidal soap or a water hose.
- Practise companion planting.
- Set ant and roach traps instead of using chemical sprays.
- Apply a natural insecticide such as diatomaceous earth.
- Fertilize with natural materials such as bone meal or compost.
- Apply the appropriate nutrients in the appropriate amount at the appropriate time.

## Don't Dump Hazardous Products into Storm Drains

Storm drains empty directly into nearby streams in many areas and the contents are generally not processed at sewage treatment facilities.

- **Don't** pour oils, paints, detergents, solvents and other products into storm drains, or on your driveway or street.
- **Do** take them to local recycling or disposal facilities.
- **Do** contact the local fire department which will normally accept unwanted remainders of BBQ starter fluids, lighter fluids, gasoline and furnace oils.

## Remember Water Quality when Recreating

- Powerboats can pollute the water through gasoline leaks and spills; if you use one, choose a 4-stroke engine and keep it in good repair. Consider alternatives like a sailboat, rowboat, canoe or kayak.
- Make sure your cottage has a proper sewage disposal system.
- When camping, bury biodegradable waste at least 60 metres (200 feet) from any water source. Use only biodegradable soaps and pack out your garbage.

### Practise Water Conservation

Water conservation is one of the easiest and cheapest ways to reduce the volume of wastewater, improve water quality and ensure sufficient water for other uses. Water saved is water that does not end up in the wastewater stream requiring treatment, which is never 100 per cent effective anyway. Treatment costs are then reduced, freeing up resources for infrastructure renewal and protection of water supply sources.

Here are some examples for both indoor and outdoor water conservation:

- Don't use the toilet as a wastebasket or flush it unnecessarily.
- Replace your conventional toilet with a low-flush one.
- Take short showers—five minutes or less. If taking a bath, fill the tub only one-quarter full.
- When hand washing dishes, fill one sink or a large pot with rinse water, rather than leaving the water running.
- Turn the water off while you're brushing your teeth.
- Only do full loads of laundry.
- Keep a bottle of drinking water in the refrigerator rather than running the tap to get cold water.
- Find out how much water your lawn really needs. Most require little more than two to three centimetres (one inch) of water per week.
- Water early in the morning.
- When washing a car, use a bucket and sponge. This can save about 300 litres of water.

## TAKE FURTHER ACTION TO PROTECT WATER QUALITY

- Inform yourself and your friends, and educate your children.
- Be willing to change your attitudes, behaviour and expectations.
- Seek out environmentally-friendly products and methods.
- Boycott harmful products and tell retailers why.
- Use the opportunities provided to you as a citizen (public hearings, advisory boards, etc.) to have your voice heard.

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