

Water Pollution

BC Urban Streams & Watersheds

ENVIRONMENTAL SCIENCE 12



This resource is part of the BC Urban Streams & Watersheds lesson plans, assembled in 2025. Learn more and download additional resources at www.engagewithnbs.ca/for-schools

This material is available to resuse and adapt in your classroom.



Learning Objectives

- **To be able to identify human actions that affect the water quality of urban streams.**
- **To be able to describe how stormwater runoff affects water quality.**

Which human actions affect the quality of water in urban streams?





Watch the 5-minute video *Watershed Stewardship: Contaminants in Stormwater*: <https://youtu.be/r0KEBORn4E4>

Water Pollution

- **Pollution** — undesirable state of the natural environment being contaminated with harmful substances as a consequence of human activities
- **Point source pollution** — water pollution sources that may be traced to a specific source, such as a sewer line or a discharge pipe of an industrial facility
- **Non-point source pollution** — pollution that cannot be tied to a single, identifiable source (for example, nitrate pollution from agriculture is nonpoint source pollution, since a single source can't be identified)
- **Runoff** — overflow of fluid from a farm, urban area, or industrial factory
- **Stormwater drain** — a system of pipes (separate from sanitary sewers) that carry only water runoff from building and land surfaces
- **Impervious surfaces** — surfaces that resist the absorption of water into the ground like concrete, roads, asphalt, bricks, stone, and rooftops — and these surfaces then contribute to the increased amount of runoff and stormwater surges

Litter & Floating Debris

- **Litter on our streets** can be carried into streams.
- Floating debris on water ways consists of **mostly plastics, single-use foil wrappers, cigarette butts, fishing equipment**, etc.
- **Microplastics** (up to 5 millimetres in diameter) enter water systems when marine plastic litter breaks down and transported by run-off, leakage from production facilities, etc.

Organic Pollution

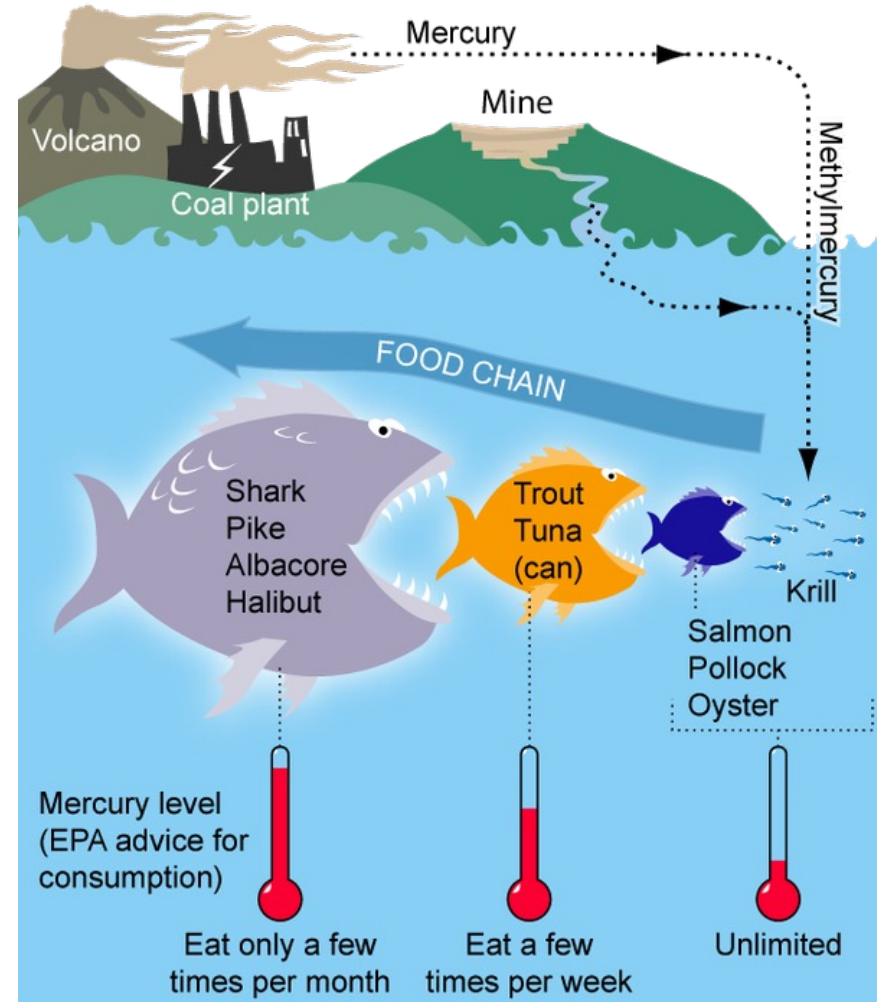
- Sewage, animal or plant-produced waste can contribute to organic pollution and affect the water quality.
- An organic pollutant contains mainly carbon, hydrogen, and oxygen.
- You can use **biological indicators** to determine the distance from the source of the pollution.

Inorganic Plant Nutrients

- Soil erosion and land run-off can contribute to high levels of nitrates and phosphates in streams.
- As a result, an increase in nutrients in water can lead to **eutrophication**.

Toxic Metals

- Some metals like mercury can be toxic to organisms.
- Mercury comes from burning coal, and smoke particles fall into water systems. When it is in the form of methylmercury, the metal can **bioaccumulate and biomagnify** in marine organisms.
- As a result, we are often told to reduce consumption of top predators like tuna, marlin, or swordfish.



Suspended Solids

- **Particles or sediment** that float in water and causes increased turbidity in streams and reduces visibility.
- An increase in turbidity, reduces productivity of producers as **less light for photosynthesis**.
- For example, suspended solids can come from nonpoint source from land run-off or point source from sewage pipe or storm drain.

Synthetic Compounds

- **Persistent Organic Pollutants (POPs)** are an example of man-made (synthetic) compounds and can bioaccumulate and biomagnify.
- Due to the Coriolis effect POPs reach higher concentrations in polar regions.

Pathogens

- Bacteria, protozoa, viruses, fungi, and other microbes.
- Pathogens are water-borne disease causing microorganisms.
- Some examples include diarrhea, vomiting, cholera, dysentery, typhoid, intestinal parasites, etc. In some instances, fecal matter of an infected person reaches a water source contaminating groundwater.

Biological Pollutants

- **Invasives species** — competition with native species can lead to extinction and have serious ecological and economic impacts.
- For example: Quagga and zebra mussel species (currently not in BC)



Noise & Light Pollution

Noise pollution ...

- ... can affect aquatic, marine, and terrestrial organisms from navigating and communicating.

Light pollution ...

- ... affects behaviour of organisms disrupting circadian rhythms.
- ... disorientates migrating birds.

For example, light pollution prevents turtles from coming to nest on beaches and prevents hatchlings from orienting towards the sea.

Common Sources of Water Contaminants

- **Vehicles** deposit oil, gas, grease, and other contaminants on roads and paved surfaces.
- Exhaust, brake dust, engine fluids, washing, and vehicle maintenance can also contaminate through stormwater runoff.
- **Outdoor maintenance and washing** lead to the release of contaminants including metals, paints, oils, and wood.

Common Sources of Water Contaminants

- Deteriorating **heating oil tanks** can leak oil into the soil and surrounding area.
- Heavy rains, floods, and disconnected storm drains can lead to **overflowing storm drains networks** into nearby streams and waterways.
- **Agriculture and residential areas** that use pesticides, herbicides, fertilizers, and chemicals can be washed away into streams and waterways.

Take a walk to a nearby stream or pond.

Around your local stream or pond, what are some possible non-point sources of pollution that could affect the water quality?





Residential houses

fertilizers, impervious services

Farm

pesticides, fertilizers, manure

Industrial/Construction

sediment, gas/oil, chemicals

Runoff

*overflow of fluid from a farm,
urban area, or industrial factory*

Soccer field

fertilizer, pet waste

Storm sewer

*a system of pipes (separate from
sanitary sewers) that carry water
runoff from building and land surfaces*





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communities in local stewardship of lands & waters

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