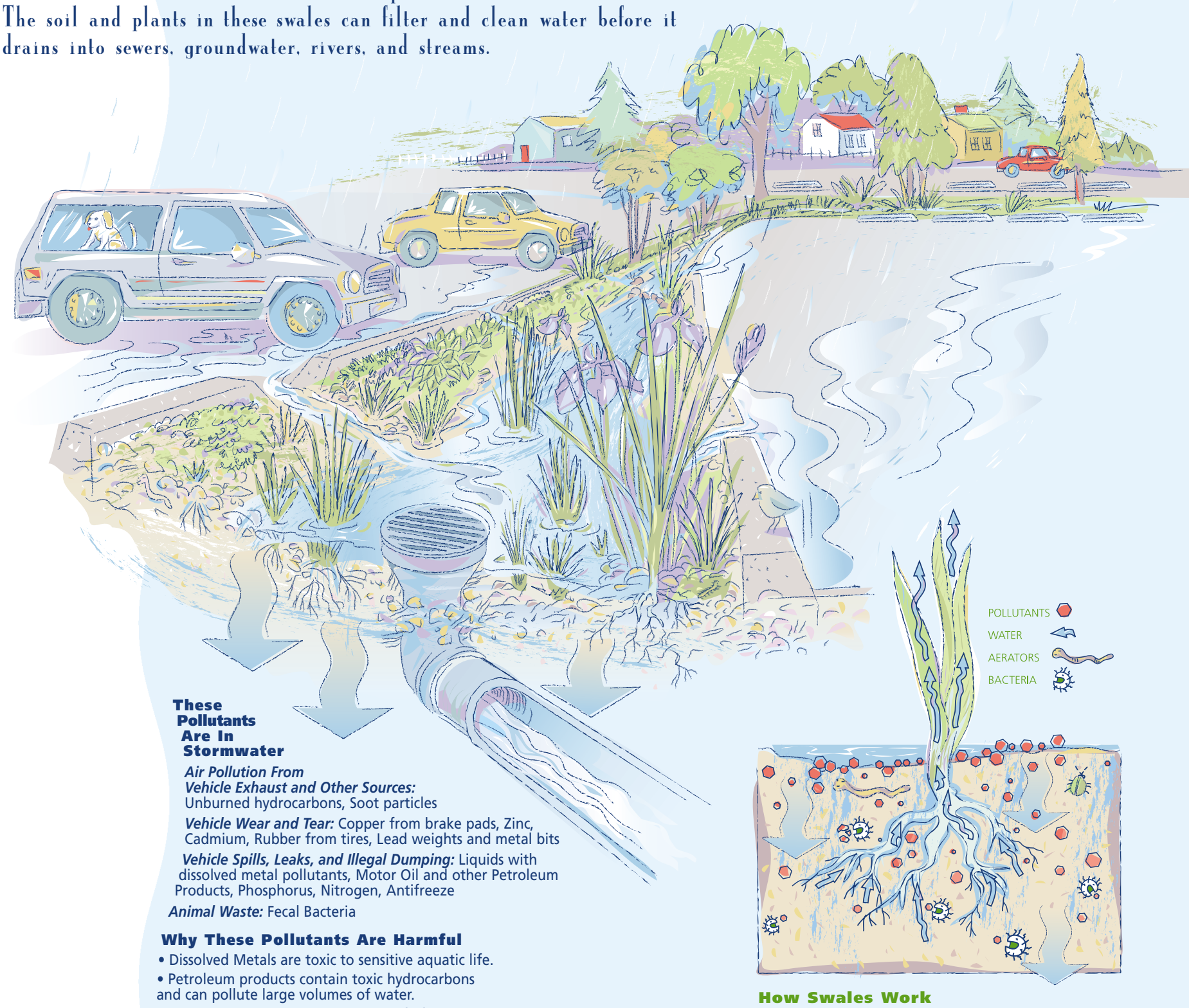
Stormwater Landscape Swales

a natural way to reduce and clean water from parking lots and roads

A landscape swale is a long, gently sloping, landscaped depression that collects and cleans stormwater. When it rains, water runs over pavement and other hard surfaces, picking up pollutants along the way. Much of this polluted stormwater runoff goes to stormdrains and into our rivers and streams. Landscape swales collect and slow down stormwater. The soil and plants in these swales can filter and clean water before it drains into sewers, groundwater, rivers, and streams.



These Pollutants Are In Stormwater

Air Pollution From Vehicle Exhaust and Other Sources: Unburned hydrocarbons, Soot particles

Vehicle Wear and Tear: Copper from brake pads, Zinc, Cadmium, Rubber from tires, Lead weights and metal bits

Vehicle Spills, Leaks, and Illegal Dumping: Liquids with dissolved metal pollutants, Motor Oil and other Petroleum Products, Phosphorus, Nitrogen, Antifreeze

Animal Waste: Fecal Bacteria

Why These Pollutants Are Harmful

- Dissolved Metals are toxic to sensitive aquatic life.
- Petroleum products contain toxic hydrocarbons and can pollute large volumes of water.
- Fecal bacteria can make water unsafe for recreation by conveying diseases to humans, pets, and wildlife.
- Phosphorus and nitrogen supply nutrients for aquatic vegetation that can cause abnormally huge blooms within water bodies. During the night, aquatic plants absorb oxygen through respiration and can leave little oxygen for aquatic animals.
- Sediment can fill in our rivers and streams, changing aquatic habitat. It can also bring in pollutants such as fertilizer and pesticides attached to sediment particles.

How Swales Work

- ***Adsorption:*** Pollutants in water attach to the surface of soil particles, where roots and bacteria can use them or where they are retained.
- ***Storage:*** Roots, insects, and worms increase the space between soil particles making more room for stormwater runoff storage.
- ***Plant Uptake:*** Water, nitrogen, phosphorus, and trace elements are used for plant functions.

Check Out These Existing Swales

Example of Grassy Swales:

Reed College: 3202 SE Woodstock, part retrofit, part new development around the tennis courts on the west side of the campus

Parkrose Middle School: 11800 NE Shaver, retrofit on the east side of the main entry driveway

Examples with tire stops:

PCC Annex: 1626 SE Water Ave., New development in parking lot

Ecotrust- Jean Vollum Natural Capital Center: 721 NW 9th, new development within parking lot

Water Pollution Control Lab: 6543 N. Burlington, new development within the parking lot

Multnomah Arts Center: 7688 SW Capitol Hwy, new development in the south parking lot

Leach Gardens: 6704 SE 122nd Retrofit on the north side of the south parking lot across the street and over the bridge

Johnson Creek Commons: 7940 SE 72nd, new development

Examples with curb cuts:

Buckman Heights: 430 NE 16th, new development in parking lot

Grant High School: 2245 NE 36th, retrofit on the west side of the north parking lot

Gabriel Park SW Community Center: 6820 SW 45th, new development in parking lot

Oregon Museum of Science & Industry: 1945 SE Water Avenue, new development in parking lot

Willamette Park: SW Macadam and Nebraska, retrofit on the north side of the parking lot

Sample of check dams:

Housing Authority of Portland 4400 NE Broadway

Heron Point Wetlands: SW Boundary and SW Macadam, retrofit along the parking lot and the Willamette river.

Sample of swale hedge:

Walnut Park on NE 6th between Roselawn and Emerson Streets.

ENVIRONMENTAL SERVICES
CITY OF PORTLAND
CLEAN RIVER WORKS

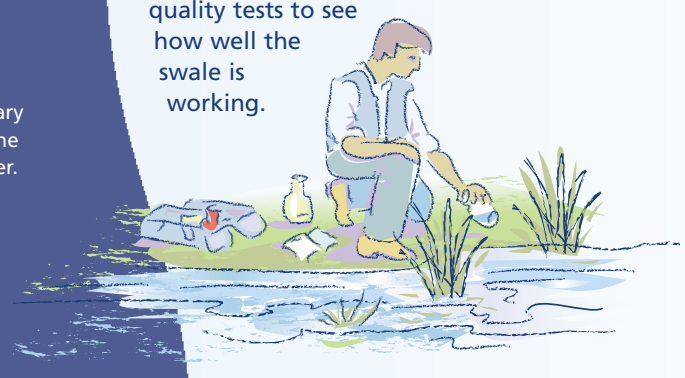
Dan Saltzman, Commissioner
Dean Marriott, Director

You Can Help Minimize Automotive Pollution

- The average car produces one pound of pollutants every 25 miles driven.
- Use your car less. Combine trips, bus, carpool, bike, or walk.
- One quart of motor oil can contaminate more than 250,000 gallons of water.
- Take care of your car and watch for leaks.
- Properly dispose of motor oil. In the City of Portland, you can put motor oil in a clear plastic milk jug and recycle it at the curb.
- Particles from brake pads, car exhaust, and tires pollute our rivers and streams.
- Make sure tires are properly inflated and aligned to reduce wear.
- Slow down. Driving over 55 mph reduces your gas mileage and wears tires out faster.
- Soak up spills or dripped auto fluids with kitty litter, then sweep up the litter and dispose of it in the trash can.
- Wash vehicles using non-phosphate soap or a car wash that recycles water.

Helping With Swale Maintenance

- Remove trash from swales. It looks better and helps keep drains from getting clogged.
- Sediment collecting near curb cuts may need to be scooped up occasionally. Toss sediment in the garbage.
- Walk around swales, or use stepping stones to walk across instead of compacting soil and decreasing water infiltration.
- Join or form a group that adopts a swale to plant native plants and remove non-native, invasive plants.
- Get your local school to do water quality tests to see how well the swale is working.



Terms to Know

Adsorption Attachment of pollutants in water to soil particles, resulting in retention of pollutants.

Biofiltration The physical ability of plants to remove pollutants from water.

Heavy Metals Common elements like zinc, lead, copper, chromium, and cadmium that can be toxic to aquatic life when dissolved in water.

Hydrocarbons Toxic chemicals made of carbon and hydrogen, like motor oil and gasoline.

Impervious Surface A hard surface that does not allow fluids, like water, to pass through it.

Infiltrate The flow of a fluid through pores or spaces in a substance. An example of infiltration is water moving through the spaces in soil.

Nitrogen A prevalent element that is an essential nutrient for plants, but can have harmful effects in large quantities.

Petroleum A flammable liquid hydrocarbon such as gasoline, motor oil, or hydraulic fluid.

Phosphorus An element that is an essential nutrient for plant growth.

Phytoextraction The removal of essential elements and pollutants from soil and water by plant roots.

Respiration At night, plants absorb oxygen and release carbon dioxide.

Trace Elements Elements essential to plant or animal life but required in only small amounts, such as trace amounts of manganese, zinc, iron, molybdenum, cobalt and copper.

Resources

Making or retrofitting your own swale in the City of Portland?
Contact the Sustainable Stormwater Design Team at 503-823-7267.

Teaching Portland students about stormwater solutions?
Our environmental education programs like *Soak it Up* or the *Green Solutions Tour* will help. Call the Clean Rivers Education Program at 503-823-5281.

Visit Environmental Services online at www.cleanrivers-pdx.org.