

# 75 YEARS OF SEWER

The region's wastewater management strategies have developed over the past century in recognition of the need to protect the Spokane Valley - Rathdrum Prairie (SVRP) aquifer and Spokane River.



Outhouses were originally used, sometimes even constructed on the nearest creek, to quickly carry the waste away! This practice was common in cities, which later installed underground pipes to carry wastewater and stormwater from residences directly to the river. Areas without access to city sewers began to use septic systems, which allowed some treatment of household wastewater in a septic system it percolated through the soil.

Rural areas still use septic systems for wastewater disposal; these systems are safe and efficient when properly built and maintained.

Septic systems in high density population areas led to increases in nutrients in the SVRP aquifer. Over time, local municipalities have built sewers and modern treatment facilities to clean and dispose of wastewater.

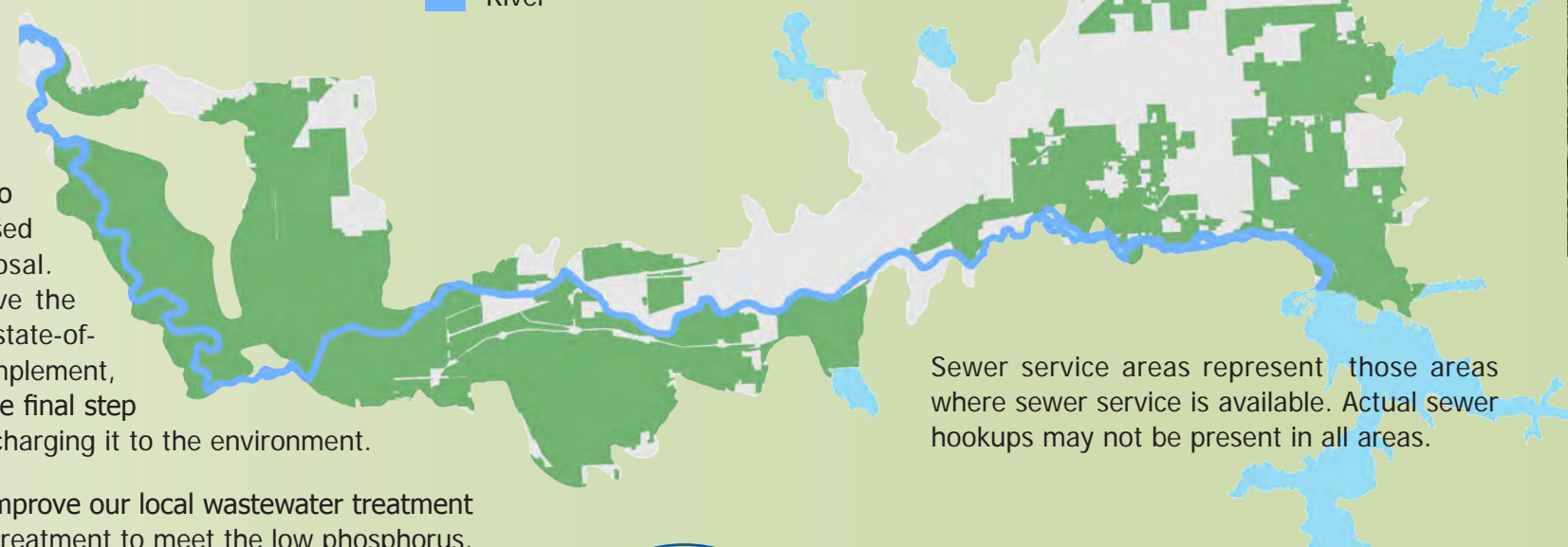
The purpose and goal of modern wastewater treatment is to separate waste solids from water, treat the water with biological and chemical processes, and discharge the water as clean as possible to protect the environment. **Primary treatment** allows the largest materials to settle out of the wastestream and oils and grease to float to the top, similar to what happens in a septic tank. The removed solids are processed in a digester and further dewatered before reuse or disposal. **Secondary treatment** uses biological processes to remove the organic contaminants from the water. **Tertiary treatment** is a state-of-the-art technology that facilities in the region are beginning to implement, and uses microscopic filtration to remove smaller particles. The final step disinfects the water to remove viruses and bacteria before discharging it to the environment.

Local municipalities have invested significantly to continually improve our local wastewater treatment facilities. Local municipalities are now required to use tertiary treatment to meet the low phosphorus, ammonia, and oxygen demand standards intended to increase dissolved oxygen levels and support aquatic life in Lake Spokane.

## SEWER SERVICE AREAS OVER THE SPOKANE VALLEY - RATHDRUM PRAIRIE AQUIFER

### Legend

- Sewer service areas over the SVRP aquifer
- Lake
- SVRP aquifer
- River



Sewer service areas represent those areas where sewer service is available. Actual sewer hookups may not be present in all areas.

## Recycled Water

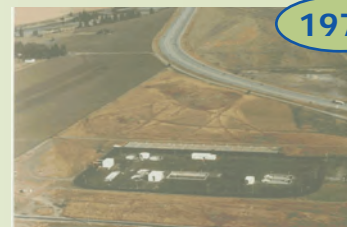
**Water recycling** is a permitted activity that is currently used in Idaho on the Rathdrum Prairie. Wastewater from the cities of Hayden, Hayden Lake, and Spirit Lake along with Farragut State Park and Silverwood Theme Park is treated and used seasonally to irrigate various crops. The most common crops are native forest, alfalfa, and poplar trees. These plants can consume large amounts of water for irrigation and also use the nutrients in the recycled water in place of fertilizer.



The amount of water applied to these crops is restricted to only what the plants need, to limit the amount of recycled water and nutrients that can seep past the roots. How do farmers know how much water to use? Farmers

use weather stations in the area along with crop and soil data to predict how much irrigation can be applied. They also monitor the amount of water in the soil and the nutrients in the plants to ensure that the right amount of recycled water is being applied. Special monitoring wells have been completed in the Rathdrum Prairie Aquifer next to the irrigated fields and are regularly tested to ensure there are no water quality impacts.

**1940s** Spokane residents were informed of the need for a treatment facility and expanded sewer system. Those in opposition called it "a terrific barrage of propaganda."



**1971** Liberty Lake Sewer and Water District was formed by a vote of the residents. The treatment plant was completed in 1982.

**1975** Spokane County began sewer construction in Spokane Valley to eliminate septic tanks. In 1980, Spokane City and County agreed to allow up to 10 mgd to flow from this area to the RPWRF.

**1985** The Post Falls treatment facility came online, allowing 7,000 people to be removed from septic systems.



**2012** Construction is completed on the Spokane County Water Reclamation Facility, which uses state-of-the-art tertiary treatment to remove pollutants.

**1939** Coeur d'Alene completed its secondary-level wastewater treatment plant, one of the first of its kind in the world.

**1958** Spokane opens its treatment plant, now called the Riverside Park Water Reclamation Facility (RPWRF).



The Clean Water Act was enacted in 1972, mandating secondary wastewater treatment.

**1977** Panhandle Health District adopted the "5-acre rule" to limit septic system density over the SVRP aquifer.

**1986** Hayden Area Regional Sewer Board (HARSB) formed. HARSB completed its secondary treatment facility by 1992.

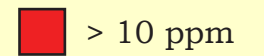


**2021** All facilities discharging to the Spokane River must operate tertiary treatment technology to meet current standards.



## Legend

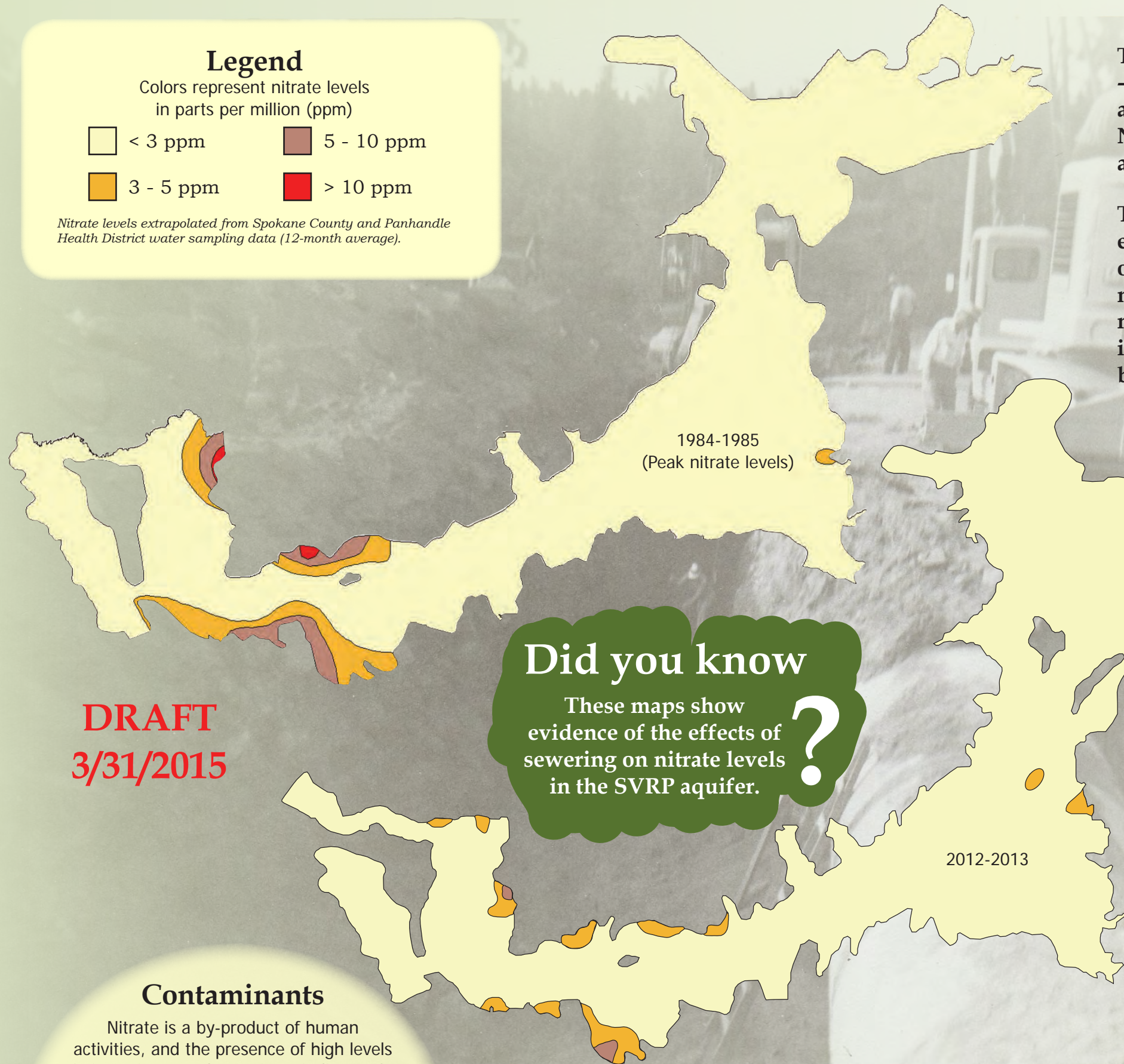
Colors represent nitrate levels in parts per million (ppm)

 < 3 ppm	 5 - 10 ppm
 3 - 5 ppm	 > 10 ppm

*Nitrate levels extrapolated from Spokane County and Panhandle Health District water sampling data (12-month average).*

The illustrations on this page show concentrations of nitrate in the Spokane Valley - Rathdrum Prairie (SVRP) aquifer through time. Under natural conditions in our aquifer, nitrate occurs in low concentrations, typically 1 to 2 parts per million (ppm). Nitrate in drinking water above 10 ppm may cause illness. Septic systems, fertilizer, and stormwater are potential sources of elevated nitrate levels in the SVRP aquifer.

These nitrate concentration maps are from water years 1985 and 2013. In 1985 a major effort on both sides of the state line was initiated to reduce septic system contamination of the SVRP aquifer through installation of piped sewer collection systems. The maps show that on-going SVRP aquifer protection programs have decreased the nitrate contamination despite significant population increases. The main program is installation of sewers. The groundwater in the SVRP aquifer remains some of the best quality water available anywhere.



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3/31/2015

**Did you know?**  
These maps show evidence of the effects of sewerage on nitrate levels in the SVRP aquifer.

## Septic system operation and aquifer impacts

Wastewater flows from the house to the septic tank, where solids settle out and scum floats to the top.

Plants use some of the water and then transpire it into the air.

Microorganisms in the soil below the drainfield provide additional treatment by breaking down septic waste and filtering contaminants as the wastewater migrates downward.

SVRP aquifer

The remaining liquids flow to the drainfield. Nutrients and other contaminants are still present in the liquid.

## Septic System Maintenance

- Be cautious about chemical or biological additives. Research has shown that additives provide little to no benefit.
- Inspect your system annually to measure sludge and scum levels.
- Pump your septic tank every 3 to 5 years based on results of annual inspections.
- Keep a grass cover over the drainfield to help use some of the available nutrients and aid in evapotranspiration.
- Keep trees from growing over the drainfield. Roots from the trees can plug or damage the lines.

For more information, see the Lake\*A\*Syst Manual in Idaho or the Spokane Regional Health District website in Washington.

## Contaminants

Nitrate is a by-product of human activities, and the presence of high levels of nitrate in groundwater is an indicator that other by-products of human activity may also be present. Other possible contaminants include phosphorous, petroleum products, heavy metals, and industrial chemicals. Traces of some of these other contaminants have occasionally been found in local aquifer wells. On-going monitoring and protection programs are essential to protect the high quality of aquifer water.

Note: The latest aquifer boundary is slightly different than previous versions because it reflects minor adjustments resulting from the 2007 Bi-State Aquifer Study.



# AQUIFER PROTECTION - BUSINESS

We are fortunate to have many types of businesses in our area including aerospace; agriculture; vehicle maintenance and fueling; machining; manufacturing; metal fabrication; surface mining/concrete and asphalt; and heavy equipment manufacturing and maintenance. Unfortunately, all these businesses present a potential risk to groundwater when they store and use chemicals.

Sometimes chemicals are intentionally applied to the ground for our benefit. They may present a risk especially if unintentionally released, misapplied, or overused.



Transferring chemicals between containers or to a vehicle presents a risk of a spill and release to the ground.



## RISKS

**DID you know ?**

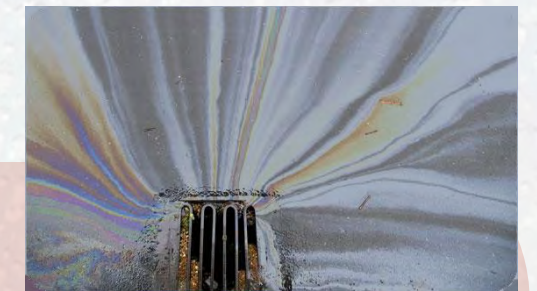
There are tens of millions of gallons of chemicals stored over our SVRP aquifer.



Underground storage tanks can leak and their contents can end up in the SVRP aquifer.



Storage containers may leak or their contents can be displaced by stormwater if left unprotected outside.



Precipitation can carry contaminants into storm drains that discharge into the SVRP aquifer or into our lakes and rivers.



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Wastewater from washing vehicles, commercial carpet cleaning, metal plating, and numerous other manufacturing and industrial processes can pollute our water if it is not disposed of properly.



Stormwater can enter open dumpsters, contact garbage, and leak the polluted water to storm drains.



## CHEMICAL STORAGE & HANDLING



Store chemicals and hazardous waste in secondary containment to keep spills from spreading and moving. Chemicals stored outside should be covered to keep out stormwater.

Plastic containment for drums



Concrete containment

Poly-geotextile containment

## SOLUTIONS - Best Management Practices at Businesses

To minimize risk, businesses are asked (or required) to implement best management practices (BMPs). BMPs are methods using current knowledge and technology to provide the best acceptable control and/or treatment of the three main sources of contamination: chemical storage and handling; process wastewater; and contaminated stormwater.

## UNDERGROUND STORAGE TANKS



Underground storage tanks (USTs) are used to store petroleum or other hazardous liquids. There are nearly 300 active UST sites, often with multiple tanks at each site, operating over the Spokane Valley - Rathdrum Prairie aquifer that are regulated by state UST programs.



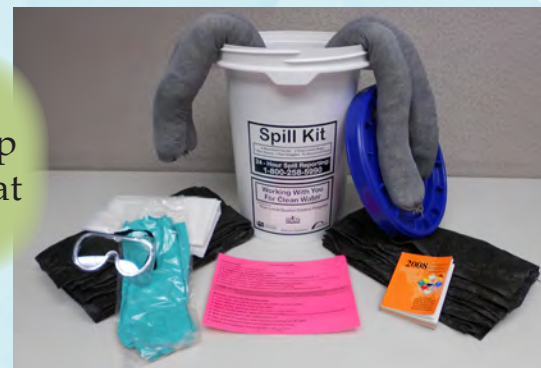
Every UST facility must be inspected at least once every 3 years.

All owners and operators of USTs are required to complete training in how to properly identify, operate, and maintain UST components.

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Have a spill plan and spill clean-up materials ready at all times.

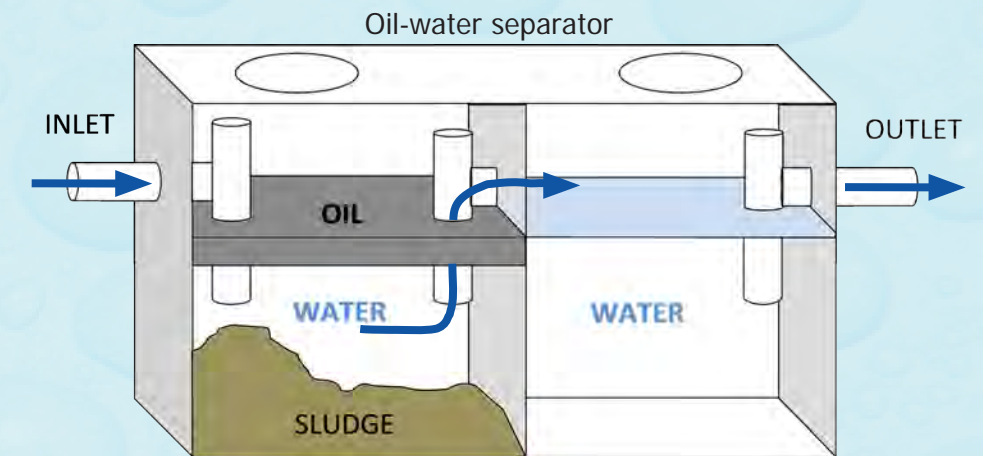


## STORMWATER

Rain and snow can mix with contaminants at industrial sites. The contaminants can come from historical practices or from current storage and handling. The most common way stormwater becomes contaminated is at fueling sites where drips, overfills, and drive-offs are common.



All contaminated stormwater at fueling businesses must be collected on a concrete pad and passed to a drain then through an oil-water separator.



Oil-water separators work because fluids, such as oils and fuels, which are less dense than water, float and remain in the first chamber, the heavy sludge sinks to the bottom where it can be removed and disposed of properly. Oil-water separators must be cleaned regularly to remain effective.

Regularly inspect, maintain, and clean drywells in parking lots and swales.



Sweep parking lots, work areas and streets instead of washing them to a storm drain.

## PROCESS WASTEWATER

Commercial wastewater must be discharged to a public sewer when permitted and possible. When that is not possible, the wastewater must be contained on site and evaporated (if permitted) or hauled to an acceptable waste disposal site.



Wastewater retention pit with mechanical evaporator

Passive wastewater evaporation pond

