

Water Pollution and the Environment



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William Edwards is an Environmental Compliance Inspector for the City of Vacaville Utilities Department. Key responsibilities for this role includes enforcement of sewer discharge and stormwater regulations, investigations and evidence collection, protection of the wastewater treatment plant, and public outreach and education.

Learning Objectives/Attendee Takeaways

- 1) Identifying sources of water pollution
- 2) Effects of pollution on the environment
- 3) Easterly Wastewater Treatment Plant – What is it?



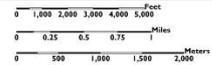


Where's our water?



City of Vacaville
 Utilities Department
 Map Published: 4/29/2024

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Coordinate System: NAD 1983 StatePlane California II FIPS 4002 Feet
 Projection: Lambert Conformal Conic
 Datum: North American 1983
 False Easting: 5,641,464.27
 False Northing: 1,649,414,664.67
 Central Meridian: -122.0000
 Standard Parallel 1: 38.3333
 Standard Parallel 2: 39.8333
 Latitude Of Origin: 37.6667
 Units: Feet US



What is water pollution?

- Water pollution occurs when there are discharges to a storm drain or waterway that are not entirely composed of stormwater.
 - "Only rain down the drain" is a phrase that conveys the following – only stormwater is allowed down the storm drain. Any discharges other than stormwater are prohibited, and could negatively affect our creeks, surface waters, and even our wells.
- Too often these incidents are not corrected, because the proper department doesn't know about them.
- To help address these incidents, we need more eyes on what is happening.



How can we find pollution and stop it from harming the environment?

It takes time and a little training to understand what a potential stormwater pollution event may look like. Let's start off with some basic examples of what a storm drain might look like:



Another example of a storm drain:



If stormwater pollution is any substance entering a drain that isn't pure water, then what does stormwater pollution look like?

- Engine oil
- Paint
- Chlorine (pools)
- Cleaning chemicals
- Sediment
- Sewer overflows
- Fuel
- Hazardous materials transportation
- Detritaceous earth
- More! (pH pollution, thermal pollution, biological pollution)

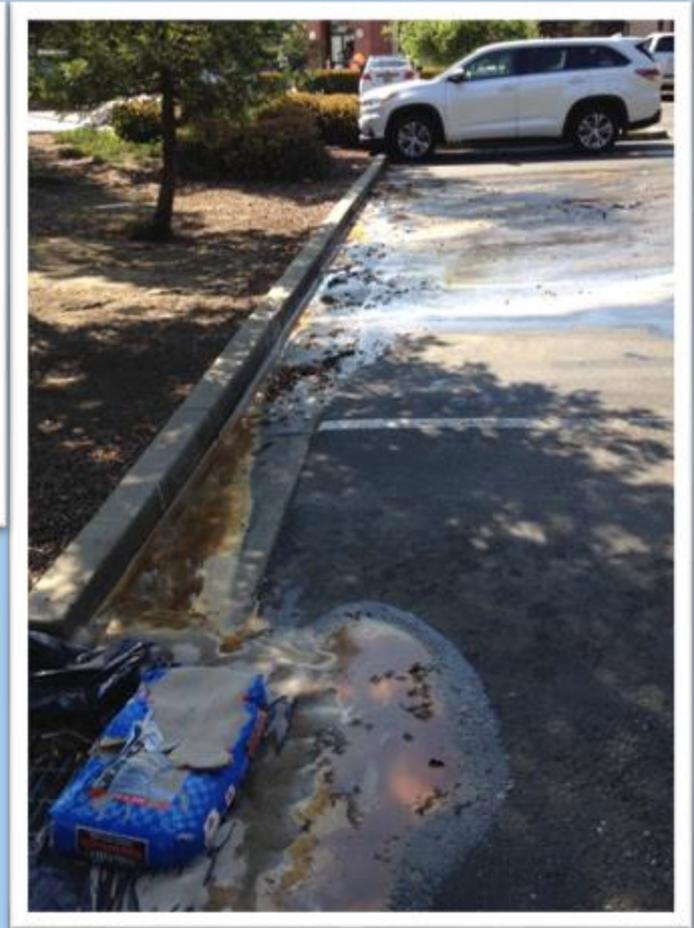
Engine oil



Trash outside of a dumpster



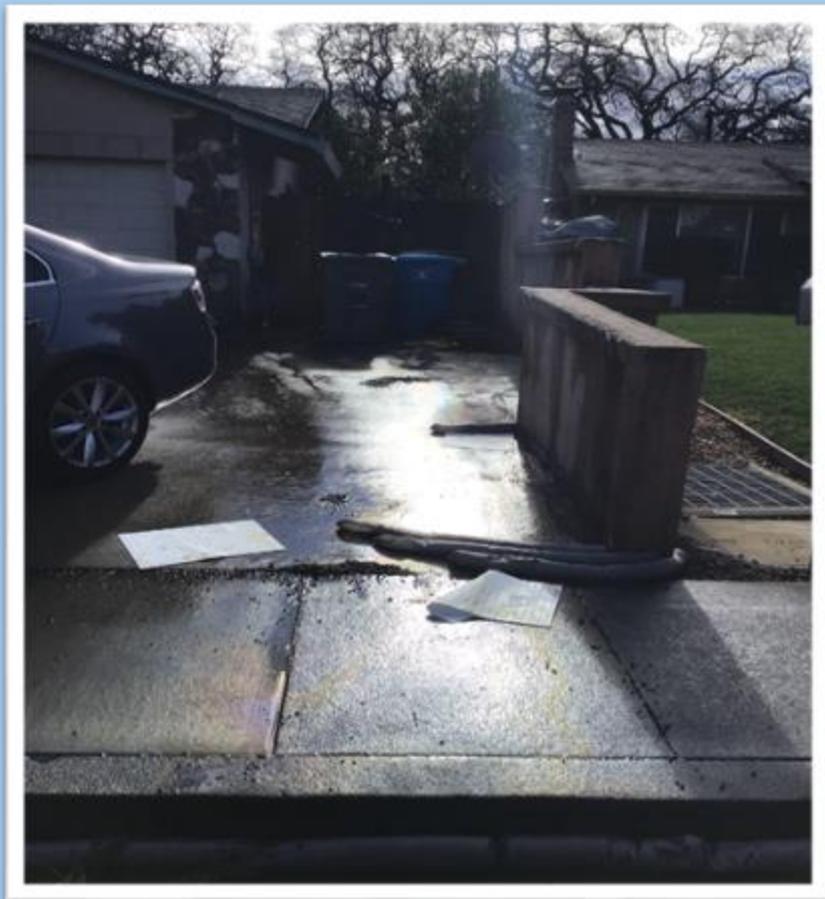
Waste oil bin leak and bad best management practices



Grease Interceptor Overflow



Leaking vehicle/oil



Washing machine discharge



Engine oil drips (long term accumulation)



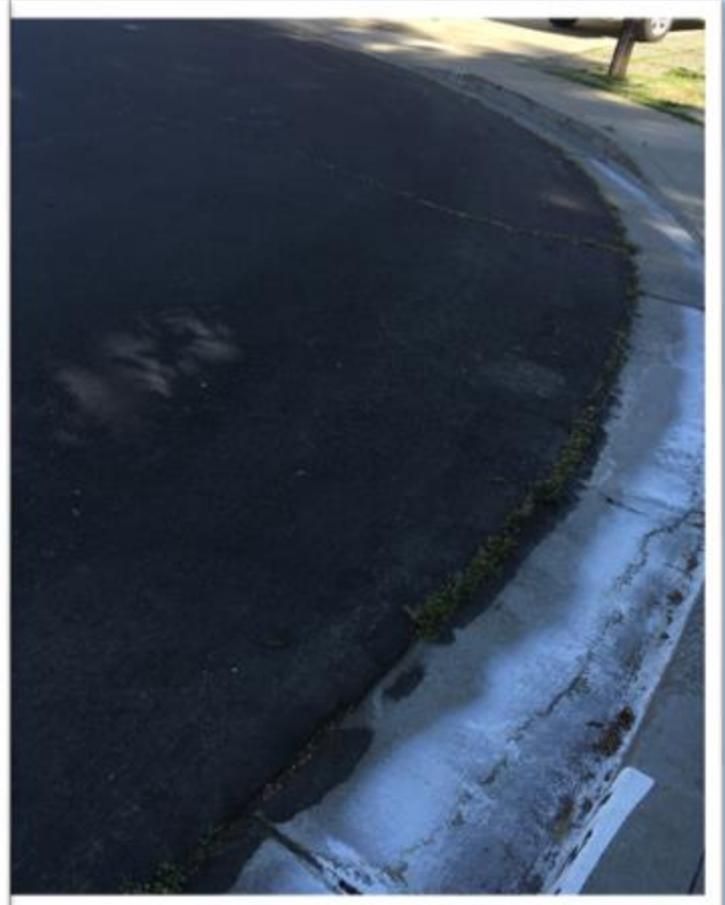
RV septage leak



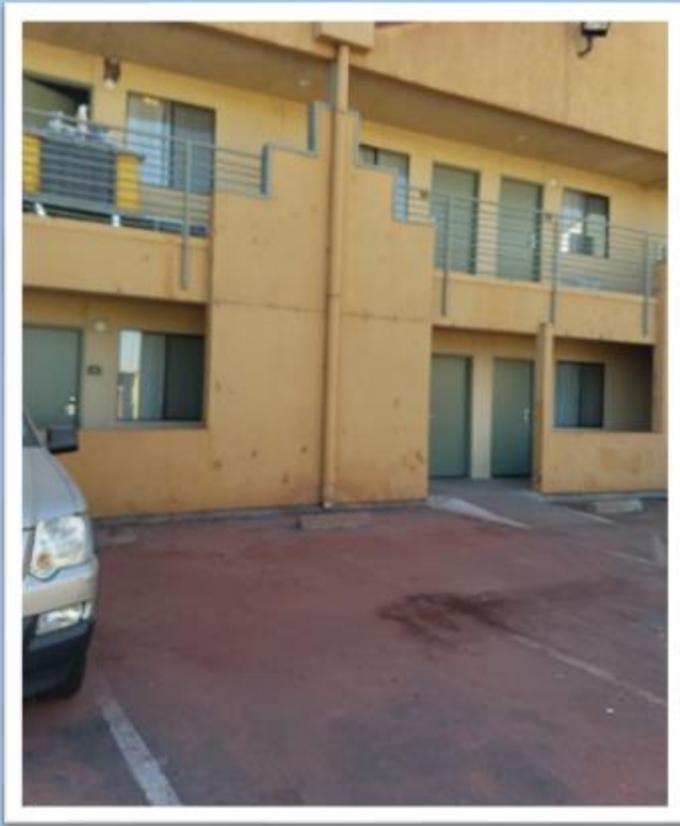
Landscaping debris (in public right of way)



Paint



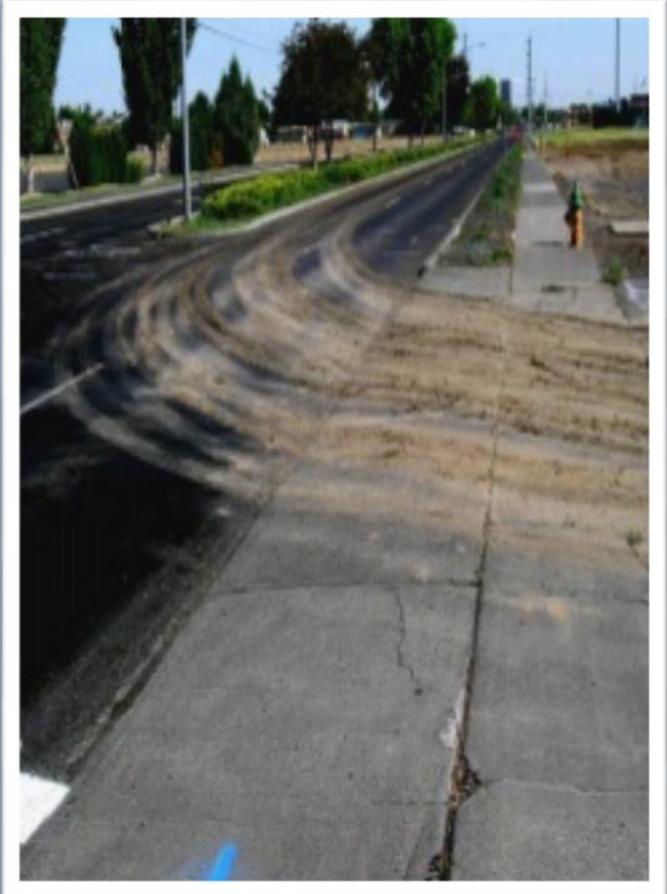
Roof paint (cleanup and capture)



Dirt/Sediment



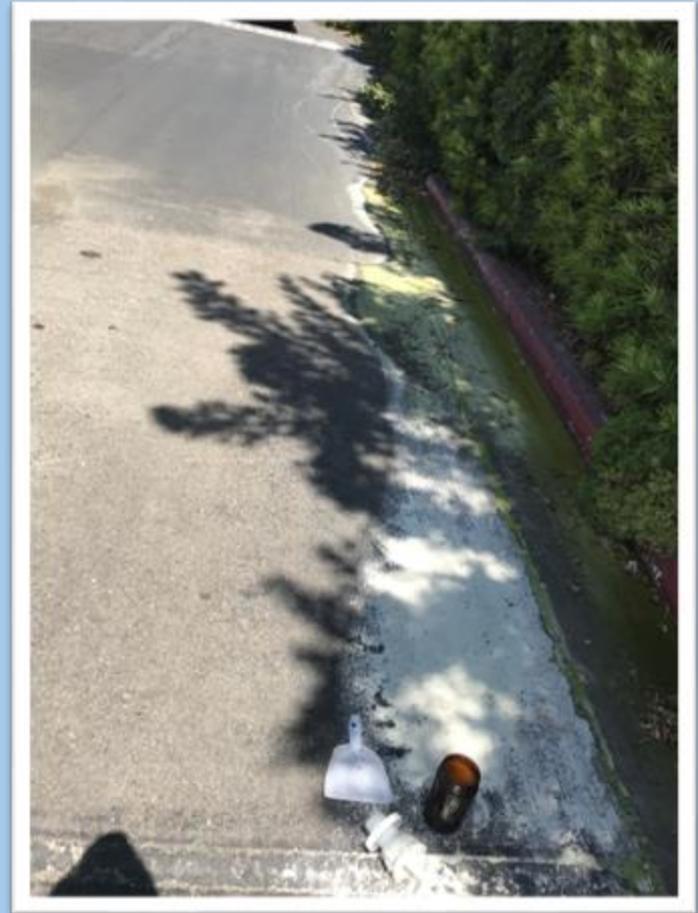
Construction sediment track-out



Dirt from off-roader: sediment pollution



Diatomaceous earth

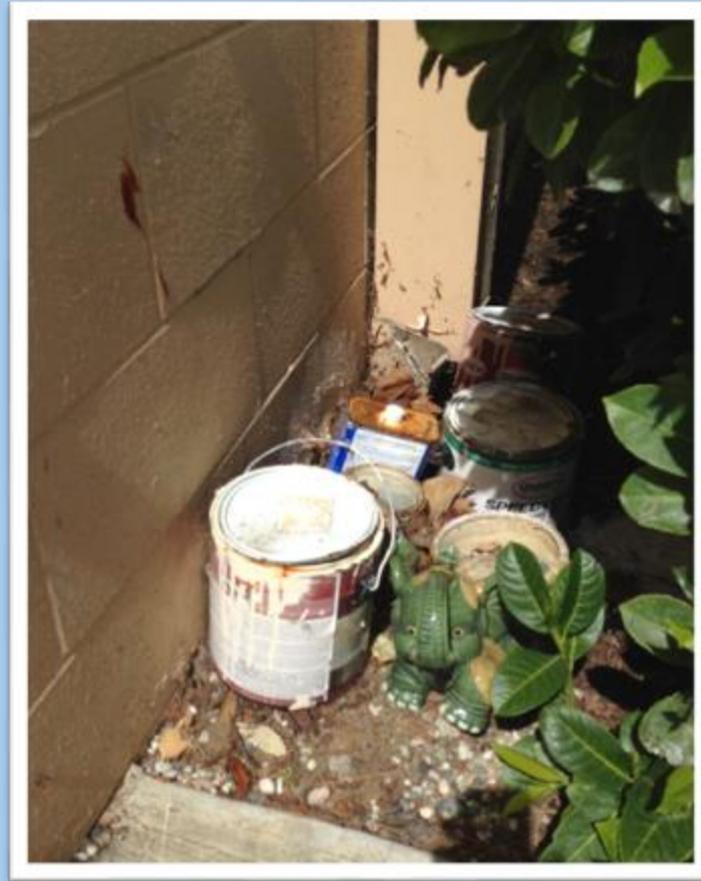


Pool discharge:

(example on the right was a non-chlorinated pool discharge, coordinated with Public Works)



Improperly stored liquids



Sewer Overflow – Grease Interceptor effluent clean out



Evidence of past sewer overflow– Tissue scraps near the clean out



Sewer overflow



Abandoned tote of used engine oil



Do you see any issues here?



Chlorine! The
source was
pool water



Improperly
stored engine oil



What is allowed? (check your local ordinances)

- Emergency firefighting activities
- Air conditioning condensation
- Water line flushing
- Dechlorinated pool water
- Residential car washing
- Springs
- Uncontaminated pumped groundwater
- Incidental runoff from landscaping areas
- Discharges from potable water sources (not recycled water)

Why is enforcement against illegal pollution important?

- Polluted waterways negatively impact:
 - Human health and safety
 - Wildlife and habitat
 - Land preservation and conservation
- Compliance with State Water Board and Clean Water Act requirements
- To ensure the long term prosperity of an invaluable common resource for future generations: our environment.

Cigarette Butts: Why are they a stormwater pollution concern?

- Although they are small, cigarette butts contain a high volume of toxic chemicals.
- Cigarettes contain thousands of chemicals, some of which include:
- Nicotine (the addictive drug that produces the effects in the brain that people are looking for)
- Hydrogen cyanide
- [Formaldehyde](#)
- Lead
- [Arsenic](#)
- Ammonia
- Radioactive elements, such as polonium-210 (see below)
- [Benzene](#)
- Carbon monoxide
- Tobacco-specific nitrosamines (TSNAs)
- Polycyclic aromatic hydrocarbons (PAHs)

Toxicity of cigarette butts, and their chemical components, to marine and freshwater fish

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Abstract

Background Cigarette butts are the most common form of litter, as an estimated 4.5 trillion cigarette butts are thrown away every year worldwide. Many chemical products are used during the course of growing tobacco and manufacturing cigarettes, the residues of which may be found in cigarettes prepared for consumption. Additionally, over 4000 chemicals may also be introduced to the environment via cigarette particulate matter (tar) and mainstream smoke.

Methods Using US Environmental Protection Agency standard acute fish bioassays, cigarette butt-derived leachate was analysed for aquatic toxicity. Survival was the single endpoint and data were analysed using Comprehensive Environmental Toxicity Information System to identify the LC50 of cigarette butt leachate to fish.

Results The LC50 for leachate from smoked cigarette butts (smoked filter + tobacco) was approximately one cigarette butt/l for both the marine topsmelt (*Atherinops affinis*) and the freshwater fathead minnow (*Pimephales promelas*). Leachate from smoked cigarette filters (no tobacco), was less toxic, with LC50 values of 1.8 and 4.3 cigarette butts/l, respectively for both fish species. Unsmoked cigarette filters (no tobacco) were also found to be toxic, with LC50 values of 5.1 and 13.5 cigarette butts/l, respectively, for both fish species.

Conclusion Toxicity of cigarette butt leachate was found to increase from unsmoked cigarette filters (no tobacco) to smoked cigarette filters (no tobacco) to smoked cigarette butts (smoked filter + tobacco). This study represents the first in the literature to investigate and affirm the toxicity of cigarette butts to fish, and will assist in assessing the potential ecological risks of cigarette butts to the aquatic environment.

Engine oil

- According to the U.S. EPA, more than 40% of the nation's oil pollution comes from the improper disposal of used motor oil. One gallon of motor oil can contaminate up to one million gallons of freshwater, which is enough water for 50 people for one year. Used motor oil is toxic, insoluble, and persistent, and it can contain heavy metals and toxic chemicals. It also sticks to things like beach sand and bird feathers, and it's slow to degrade.
- Major Negative impacts include Harming animals and insects, preventing photosynthesis in plants, disrupting the food chain.

Easterly Wastewater Treatment Plant

- City Website:
- <https://www.cityofvacaville.gov/government/utilities/sewer/waste-water-treatment>