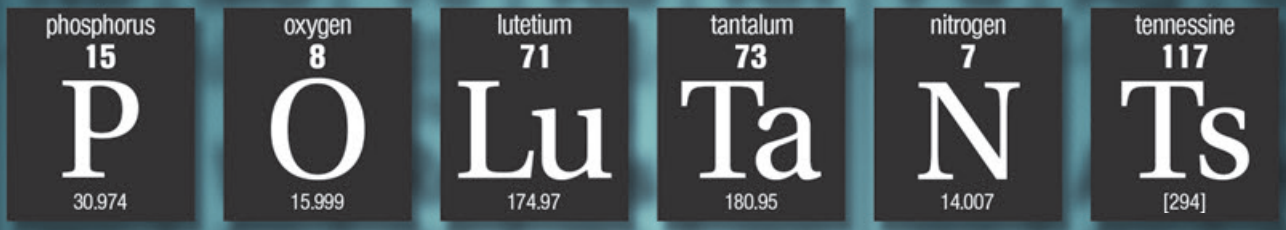
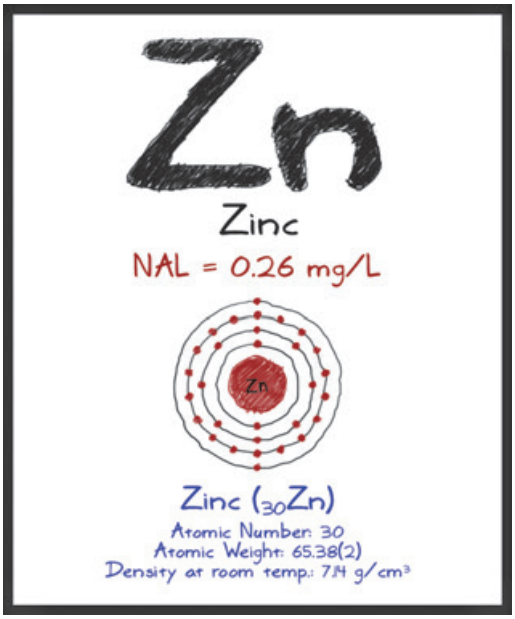
the Rain events

February 2017



*Part 2 of a 12-part **exclusive series** on understanding storm water pollutants*

Pop quiz: What do chain-link fences, sunblock, trombones, Van Gogh paintings, multivitamins, rat poison, and cigarette filters have in common? Well, about the only thing that could tie that odd list together is a bluish-white heavy metal called zinc. Zinc is a very abundant and useful element, and is an essential nutrient for humans, animals, plants, and microorganisms. However, too much zinc can cause toxicity problems (especially in plants and invertebrates), and due to its widespread occurrence, is one of the most prolific pollutants listed on Table 2 in the Industrial General Permit. In this month's edition of ***The Rain Events***, we're continuing our series on understanding storm water pollutants with a close-up look at zinc.



Zinc is most commonly used as either a metal or an oxide. In its pure metallic form, zinc is a bluish-white, lustrous, diamagnetic metal. Over 50% of the metallic zinc produced each year is used as an anti-corrosion agent, the most familiar form of which is galvanization – coating a corrosive metal such as iron or steel with a layer of zinc. Metallic zinc is also used in alloys such as brass (consisting of 33% zinc and 67% copper), nickel silver, and bronze.

The rubber industry is the largest consumer of zinc oxide, which is used as an activator during the vulcanization process, as a catalyst during manufacture, and also in the final product to disperse heat. Zinc oxide is also used in pigments, plastics, pharmaceuticals, and anti-corrosive paints and coatings for metals.

Zinc is the 24th most abundant element in Earth's crust, and is the 4th most commonly used metal. Soil concentrations range between 5 and 770 ppm, with an average concentration of 64 ppm. Most zinc is mined from China, Australia, Peru, and the United States.

OK, so on an average industrial facility, what might be some common sources of zinc? As mentioned above, the most common uses of zinc are galvanized metals and rubber products – and both of these materials can be found at probably every industrial facility in the State of California. Galvanized metal buildings, chain link fences, flashing, gutters, and hot-dipped steel pieces are all strong sources of zinc. Tires and other rubber materials contain zinc, and tire wear can be a significant source of zinc in storm water runoff. Many other common products could also contain zinc – such as brake pads, wheel weights, motor oil and lubricating oils, asphalt, pesticides, fungicides, and wood preservatives.

However, it's important to differentiate between industrial and non-industrial sources of zinc. Under the Industrial General Permit, facilities are not required to sample for non-industrial pollutants – so if your facility does not use any zinc-containing products as a part your industrial activities, then you do not need to sample for zinc (assuming zinc is not a required sampling parameter for your SIC code in Table 1 of the IGP). Check out the SWPPP Radio podcast *(link in the sidebar below)* with Laurel Warddrip of the State Water Board. Laurel gives some

very insightful information about when zinc should be classified as an industrial or non-industrial pollutant. Regardless of whether your facility should have been sampling for zinc or not, if you reach Level 1 status for zinc, you have the responsibility to bring your zinc numbers back under control – and until then, you're stuck sampling for zinc.

So, if you are required by Table 1 or your industrial activities to sample for zinc, what are some practical steps you can take to reduce the amount of zinc present in your storm water runoff? As we mentioned last month, the most effective BMP strategy involves a combination of source control, pollution prevention, and treatment. Unless you are a galvanizing plant or a rubber plant, try implementing some source control and see if there is a different product you could use that doesn't contain zinc. For pollution prevention, good housekeeping can go a long way toward minimizing zinc. Studies have shown that vacuum-assisted dry sweepers can remove a substantial amount of zinc by removing zinc-containing materials such as tire dust and other fines. When it comes to treatment, there are many different options on the market for reducing zinc concentrations – but ultimately, the effectiveness of any treatment solution depends on the effectiveness of your source control and pollution prevention strategy.

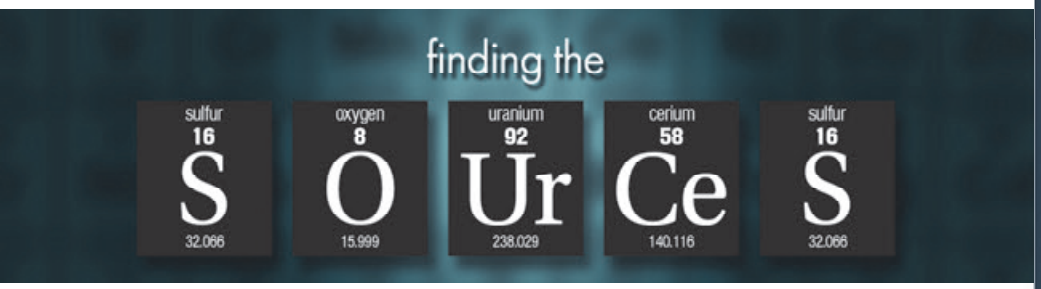
Sources:

California Stormwater Quality Association (CASQA) (2015). *Zinc Sources in California Urban Runoff.*

Emsley, John (2003). *Nature's Building Blocks: An A-Z Guide To The Elements.* Oxford University Press.

Golding, Steven (2008). *Suggested Practices to Reduce Zinc Concentrations in Industrial Stormwater Discharges.* Washington State Department of Ecology. Water Quality Program.

Wikipedia contributors. *Zinc.* Wikipedia, The Free Encyclopedia. https://en.wikipedia.org/w/index.php?title=Zinc&oldid=766393743 [accessed 21 February 2017].



We've talked about the more well-known sources of zinc, but here are a few other potential sources of zinc that you could have on your industrial facility.

- Ceramic glaze and frit compounds (using zinc oxide)
- Pharmaceutical ointments and creams (using zinc oxide)
- Vitamin-enriched foods (using zinc oxide or zinc sulfate)
- Paints, paper, and photocopiers using zinc white (zinc oxide)
- Methane reforming (using zinc oxide and creating zinc sulfide)
- Manufacturing laser diodes or LEDs (using zinc oxide)
- Metal working (zinc, zinc oxide, zinc chloride)
- Disinfectants (using zinc chloride)
- Manufacturing electroluminescent panels (using zinc sulfide)
- Manufacturing semiconductors (zinc, zinc oxide, zinc sulfide)
- Wood preservatives (using zinc naphthenate)
- Fungicides (using zinc dithiocarbamate)

Have questions about the Industrial General Permit?
Give us a call at (209) 334-5363, ext. 114

"To Do List" for February:

- Perform the February monthly inspection
- Collect the last two storm water samples for the 2016-2017 year
- Upload all analytical results to SMARTS (Ad Hoc reports). Ad Hoc reports must be submitted **within 30 days** of receiving analytical results.

THE SCIENCE OF ZINC

To help with our understanding of zinc, we went to McCampbell Analytical Laboratory to ask some questions about the zinc analytical test.

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http://swpppradio.org/listen.php?ID=19

ZINC: INDUSTRIAL OR NOT?

There's been some debate about when zinc should be considered an industrial pollutant. So, we drove up to Sacramento to talk with the State Water Board and hear their perspective.

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http://swpppradio.org/listen.php?ID=18

FUN FACT

Did you know that certain metals, including zinc, create a "screaming" or "crying" noise when bent? This is due to the crystal twinning within the metal. Here is what tin cry sounds like:

https://www.youtube.com/watch?v=Xbk5t061x4c

Please contact us if you have any questions …

The Rain Events

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- Units can be daisy-chained for larger flows
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- Size: L 46 in., W 26 in., H 42 in.; 950 lbs.

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- Optimized flow distribution; top or side inlet
- Internal high flow bypass, security lid, totalizing flow meter
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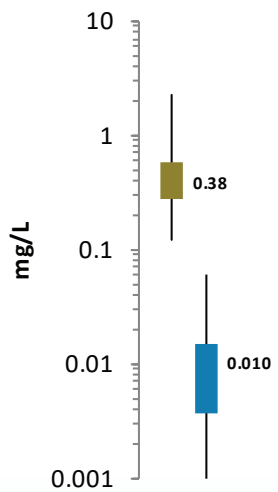
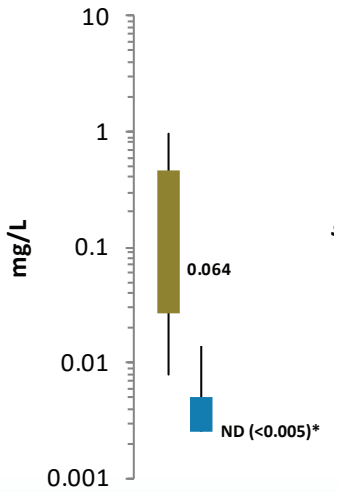
Total Zinc



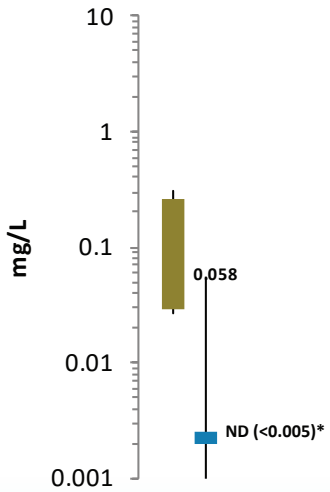
Median Removal Efficiency:
98% (26 pairs)

Total Copper



Median Removal Efficiency:
96% (11 pairs)

Total Lead



Median Removal Efficiency:
94% (8 pairs)

How to read the plots:

Before treatment

After treatment

Reported values are median of respective sample sets.

Box Range = 25th - 75th percentile

Whisker Range = 5th - 95th percentile

*The median value was non-detected. The median effluent value was plotted as 1/2 the detection limit.

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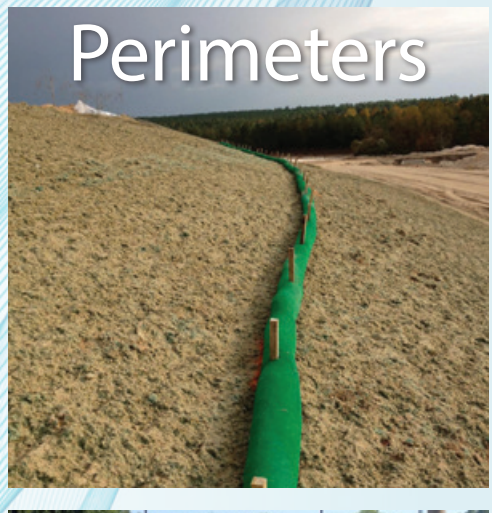
POLLUTANT REMOVAL

Treatment Train Pollutant Removal

EnviroSoxx® use natural materials to remove targeted pollutants from stormwater runoff



System Advantages

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- Best performance—Mimic Nature® for the most effective pollutant removal
- Use in any Filtrexx application to increase pollutant removal
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Removal Rates

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Storm Water Contest...

Each month, we invite our readers to participate in a contest to test their knowledge of the Industrial General Permit and their storm water compliance program. We enter all submittals to our monthly newsletter question into a drawing, and one person is selected at random to receive a $25 gift card. Last month's question was:

A good BMP strategy uses a combination of what three things?

Great job, **Pearce Swerfeger**, you're correct! A good BMP strategy uses a combination of **source reduction**, **pollution prevention**, and **treatment techniques.** Pearce wins a $25 gift card to Chipotle Mexican Grill!

This Month's Contest Question:

Zinc is the 4th most commonly used metal. Which three metals are used more commonly than zinc? (You may need to do a little research)

By March 24, 2017, submit your response to the above question by sending an email to jteravskis@wqr-sw.com. All persons submitting the correct answer will be placed in a drawing. The winner will receive a $25 gift card to Starbucks Coffee.

THIS JUST IN

The State Water Board recently came out with a clarification statement on qualifying storm events and when samples should be collected. We went up to the State Water Board to talk with Laurel Warddrip and Rebecca Greenwood about the issue.

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