

BENTON COUNTY STORMWATER PROGRAM

-6PPD-Q and Emerging Pollutants-

Water pollutants are substances that alter the physical, chemical or biological composition of water. Pollutants can cause harm to humans, plants, and animals. While we are familiar with many of these, enhanced ability to test for compounds in the environment has revealed chemicals that we did not know exist. Many of these, such as 6PPD-Q, are the breakdown products from other chemicals.

When chemicals are exposed to the open environment, and factors like UV radiation, weather, acid rain, or as they degrade naturally, they can form new compounds with unexpected results. This is the case for a newly-identified compound called 6PPD-Q.

What is 6PPD-Q?

6PPD-Q is a toxic product created during the breakdown of a tire product called 6PPD. This stands for N-(1,3-dimethylbutyl-N'-phenyl-p-phenylenediamine). 6PPD-Q means that 6PPD has an added quinone group. 6PPD itself prevents vehicle tires from breaking down. However, when it reacts with air and ozone, it creates 6PPD-Q. Until recently, we didn't know this.

Salmon Mortality

In recent years, researcher and residents in Washington state noted that there were mass mortality events of adult coho salmon, particularly near bridges and drainages. It took testing for over 100 compounds and exposing fish in a lab to find the cause. Researchers eventually discovered 6PPD-Q and its effects on salmon and it was soon realized that this chemical was coming from stormwater and roadways. [These results were published in 2021](#) in the journal *Science*.

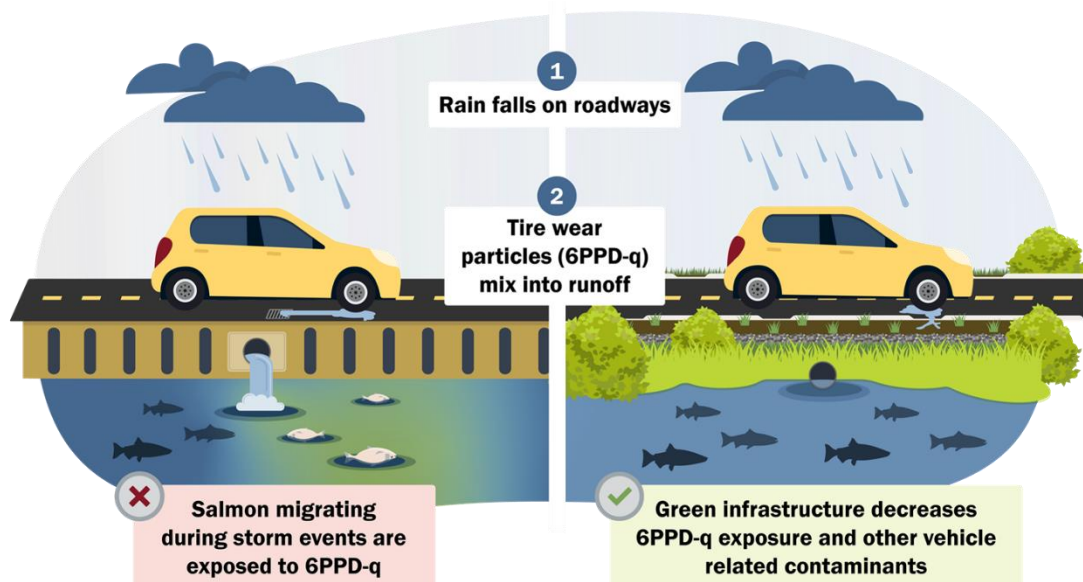


Figure: ecology.wa.gov



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What Does This Mean?

Not only is 6PPD-Q lethal to salmon, it is toxic to other species and incredibly common as there are millions of tires on the road at any given time. Until the tire industry can come up with a solution to prevent this compound from forming, it will continue to be present. It is very prevalent and occurs in water, dust, air, soil, and sediment. It can also bio-accumulate, meaning it can build up in organisms over time.

This finding tells us that there are many industrial chemicals in our world that we still don't even know about but could have serious consequences for animals and people. Utilizing basic best management practices, erosion and sediment control, and good stewardship can reduce these compounds even if we cannot see or measure them.

Green infrastructure like permeable pavement, vegetated ditches, bioswales, or rain gardens can also help filter and break down these pollutants before they enter our waterways. As they say, an ounce of prevention equals a pound of cure.

What Can You Do?

While these chemicals do seem very frightening, the reality is we have been existing with them for a long time. The best thing we can do is be informed about the products we use and how we dispose of them and to stay current on these types of issues.

Using natural products is almost always better than synthetic or non-natural ones. If you garden with mulch, for example, opt for wood mulch rather than rubber mulch sold at big box stores. And as always, hazardous products and pharmaceuticals should be disposed of properly instead of letting them enter the environment. Each act may seem small, but they add up significantly over time for our natural world, ourselves, and our descendants.

Learn More!

Marys River Watershed Council

<https://www.mrwc.org/>

Luckiamute Watershed Council

<https://www.luckiamutelwc.org/>

Mid-coast Watershed Council

<http://www.midcoastwatersheds.org/>

Long Tom Watershed Council

<https://www.longtom.org/>

<https://www.sciencedirect.com/science/article/abs/pii/S0269749123018304>

<https://www.sciencedirect.com/science/article/abs/pii/S0304389423015480>

<https://ecology.wa.gov/Waste-Toxics/Reducing-toxic-chemicals/Addressing-priority-toxic-chemicals/6PPD>

<https://www.washingtonnature.org/fieldnotes/2022/5/18/6ppd-the-secret-killer-of-puget-sound-salmon>

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Or visit to learn more:

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