

AS WE DRIVE OUR CARS, OUR TIRES SHED TINY PARTICLES WHERE DO ALL THOSE PARTICLES END UP?

When it rains, stormwater runoff carries tire particles—and the toxic chemicals they contain—from city streets and highways to storm drains and fish habitat in creeks and estuaries like San Francisco Bay. Stormwater washes trillions of tire particles into the Bay each year.

KEY FACTS



Vehicle tire particles threaten water quality

A broad menu of promising measures can tackle this pollution



Additional science can focus actions to maximize benefits and minimize cost



Coho salmon. Courtesy of NOAA, photo by Morgan Bond.

HOW DO TIRES AFFECT WILDLIFE?

A recent [study](#) found a highly toxic chemical (“6PPD-quinone”) derived from vehicle tires in Bay Area stormwater at levels that are lethal to coho salmon. New [data](#) indicate that steelhead, a salmon species still migrating through the Bay to surrounding watersheds, are also sensitive to this chemical.



Tire and storm drain.
Courtesy of *Estuary News*, photo by Lonny Meyer.

WHAT DO WE KNOW?

Tire particles may be the biggest global source of microplastic (plastic particles smaller than 5 mm) pollution. Due to our car culture, scientists estimate that the US has the highest tire particle emissions in the world—7 to 12 pounds per person every year!

While most tire wear material lands on the ground close to roads, some of it flies up into the air and contributes to local and global air pollution.

In California, urban stormwater runoff carries tire particles directly to surface waters, usually through separate storm drain systems designed to prevent flooding and avoid sanitary sewer overflows. Costs and other challenges make the treatment of urban stormwater relatively rare. In contrast, in large European cities where most tire particle research has been done, stormwater is treated alongside wastewater before being discharged to surface waters. While these combined stormwater/sanitary sewer drainage designs can increase the likelihood of sewage overflows, they do remove most tire particles.

WHAT ARE THE SOLUTIONS?

SFEI has identified a broad spectrum of prevention and treatment options to address tire pollution.

- Moving to long-life tires benefits both water quality and consumers' pocketbooks. According to *Consumer Reports*, some highly rated tires last three times longer than others.
- Reformulating tires to eliminate toxic ingredients, a focus for the California Department of Toxic Substances Control Safer Consumer Products Program.
- Driving less—already a climate change priority—by shifting people and goods to rail, public transit, walking, or biking.
- Installing on-vehicle tire wear debris collection systems (in development) that capture tire particle emissions.
- Installing [rain gardens](#) (bioretention stormwater runoff treatment systems) in locations that protect sensitive habitats.

California's [Statewide Microplastics Strategy](#) calls for developing a tires-specific pollution prevention strategy by 2023.



On-vehicle tire debris collection system.
Courtesy of The Tyre Collective.



Microplastics collection in San Francisco Bay.
Photo by Jane Sedlak.

WHAT QUESTIONS REMAIN?

Scientific information can focus actions to maximize their cost-effectiveness and environmental benefits.

- Do tire-related chemicals other than 6PPD-quinone pose risks to aquatic ecosystems?
- What are the concentrations of tire particles and tire-related chemicals in urban runoff and San Francisco Bay?
- What field and laboratory methods best measure environmental tire particles?
- What is the optimal particle size range for tire wear collection systems to capture to protect water quality?
- How can stormwater treatment be designed and where can it be strategically installed to best protect sensitive ecosystems?
- Can tires be designed to shed less and avoid use of potentially harmful chemicals?

ADDITIONAL RESOURCES

SFEI completed a major field study of [microplastics in San Francisco Bay](#) in 2019, funded by the Gordon and Betty Moore Foundation, with support from the San Francisco Bay Regional Monitoring Program (RMP) and others.

In 2021, SFEI published a [report](#) funded by the California Ocean Protection Council and the RMP to identify the sources of microplastics in urban runoff and potential solutions.

FOR ADDITIONAL INFORMATION:

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Visit www.sfei.org/projects/microplastics

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Night traffic on the Bay Bridge.
Courtesy of Unsplash, photo by Joshua Sortiono.