Riverkeeper's Report

The Middle Susquehanna Riverkeeper Association offers a deeper look into an emerging threat

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Microplastics becoming a megaproblem

Studies show an increasing prevalence in our waterways

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In 2019, as Susquehanna University professor Jennifer Elick transported her class to a wastewater treatment facility tour and water sampling opportunity in eastern Snyder County, one of her students started feeling sick.

"I dropped her off at the local laundromat with some fleece blankets and had her run them through the wash cycle," Elick said. "Every 10 minutes, she took a sample of the washer's water."

Meanwhile, Elick and the rest of her students proceeded to the treatment facility and took samples of both the influent water and effluent discharge before taking all the samples back to the classroom for testing.

"In the collected laundry water samples, after they filtered out the water, not only was it full of dirt, but also tiny strands and filaments from the blankets," said Elick. "They were very colorful blankets, so the students were better able to see the microplastic filaments."

The water taken both before and after the treatment facility's cleaning process also discovered a high number of microplastic particles.

"When the students went on winter break, I went on to collect samples from eight different wastewater treatment facilities that fed into the main stem of the Susquehanna and up both the North and West branches," she said. "Every one of them was discharging water containing microplastics into the river."

New study shocking, not surprising

Considering what Elick discovered nearly two years ago, the results of a recent statewide study by PennEnvironment's Faran Savitz and Josh Chetwyn may not be as surprising.

Researchers pulled 315 water samples from 53 bodies of water throughout the state, determining that every major waterway in Pennsylvania is polluted with various microplastics.

Savitz's initial reaction to the results, in one word: "Shock."

"I knew we'd find plastic. I knew we'd find a lot of it, especially at places like the Schuylkill River or the Ohio or Allegheny. But we didn't expect to find it in every single waterway we tested and in almost every single sample we collected," he said.

Photo provided

Susquehanna University student Samantha Chillis tests samples for evidence of microplastics, which she found in increasing numbers in Bull Run near Lewisburg, Pa.

Photo provided

Microplastic particles found in samples taken from waterways in Union County, Pa.

"I think all but two or three of the 300-plus samples contained at least one or two elements of microplastics. It didn't matter if it was an urban river or a less-traveled one – or a place with visible litter or without – they all had quite a bit of plastic."

According to Savitz, the study was focused on the presence of microplastics and not the prevalence, looking specifically at microfibers, microfilm/flakes and microbeads. The study wasn't designed to determine which waterway was more polluted than another, but they did discover a few interesting trends in the final data.

"Every single site had microfibers – which is striking because they come from our clothing, from any sort of textile that uses synthetic fibers, and they're washed directly into our waterways from washing machines," he said. "So the fact that we saw these in every single waterway is very telling."

The study also discovered quite a bit of microfilm in waterways across the state.

"That can be an indicator of all the packaging and plastic bags we use," Savitz said.

One positive discovery – a lack of plastic microbeads. Out of all the samples collected, Savitz's team found just one microbead.

"That's certainly heartening because in 2015, congress banned plastic microbeads from many cosmetics, facial scrubs and toothpastes," he said. "The fact that we didn't see that many could be an indictor of the effectiveness of that policy toward these sort of pollutants."

Again, Savitz pointed out that the study's focus was on presence – and illustrates just how widespread the issue has become in our state alone.

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Washing machines spew countless microfibers into our waterways.

Photo provided

Microfibers hang off a decaying leaf wrapped around a branch along the banks of Penns Creek near Selinsgrove, Pa.

John Zaktansky
Reflections from the Riverkeeper

Making changes at the source among realistic next steps

DRAWN TO THE BANKS of the Penns Creek near Selinsgrove by the welcomed seasonal call of the spring peeper, it didn't take long for me to notice some unique debris left behind by high water events a number of weeks prior.

Wrapped around a new growth branch of a creek-side bush – hanging out over the water – was a decayed leaf littered with tiny fibers. After collecting some samples, I tested them using methods learned via recent interviews for the Middle Susquehanna Riverkeeper Association deep-dive article on microplastics.

First, I poked and prodded the tiny fibers with tweezers to see how they'd react. I then used the hot needle test – in the presence of a very hot needle, plastic pieces will melt or curl. Biological and other non-plastic materials typically will not.

The fibers I found tangled on the leaf wrapped around a small branch were definitely synthetic.

The mini-study is just another example of the proliferation of microplastics within and along our waterways. We outlined four other studies conducted both statewide and locally in our recent look at the microplastic problem.

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