



UNDERSTANDING  
THE DEPTH OF THE  
PLASTICS PROBLEM





# THE FACTS ON PLASTIC ARE SINKING IN.

According to the International Union for Conservation of Nature, there are 9.5 million metric tons of plastic released into the oceans every year. By 2050, scientists project there will be more plastic than fish in the world's oceans.<sup>1</sup> From single use plastics to microplastics, the plastic pollution problem isn't going away. With petroleum-based microfibers accounting for 35% of primary microplastic pollution,<sup>2</sup> it's clear that the textile industry needs to take action. That's why Cotton Incorporated is dedicated to learning more about this global problem and finding solutions.

## CONCERN IS RISING.

There is growing public awareness of how textiles are contributing to the accumulation of microplastics in the world's water bodies. Since 2016, there have been more than 6 million mentions of polyester, microfibers and pollution in the media. Governments are banning certain single use plastics. Consumers are demanding more sustainable alternatives. The time for the textile industry to understand the issue and prepare for change is now.

### WHAT ARE MICROPLASTICS?

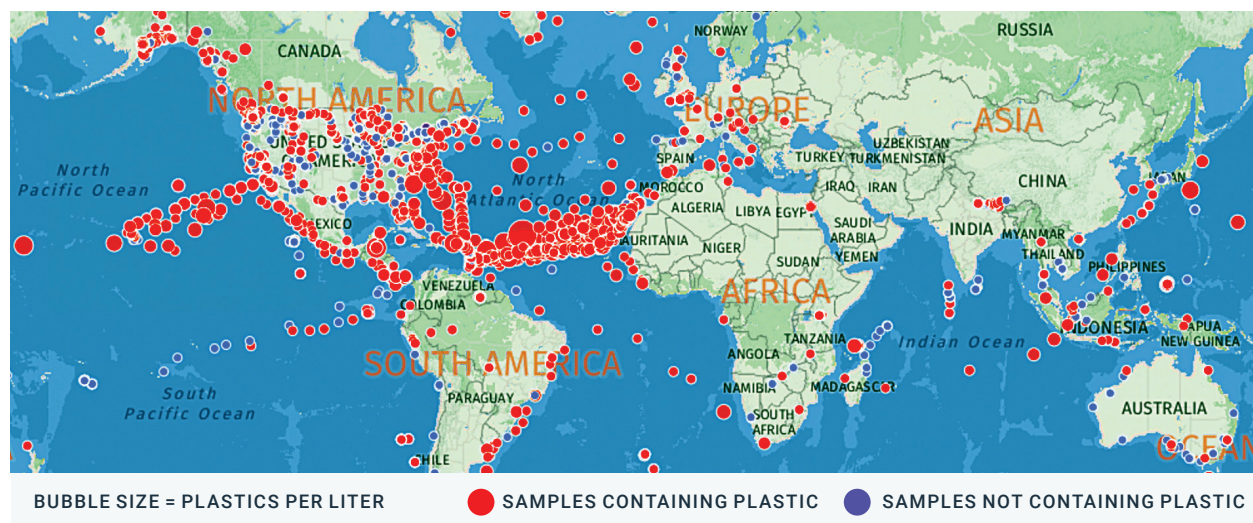
TINY MAN-MADE FRAGMENTS, FIBERS, PELLETS OR GRANULES THAT ARE 5 MM OR LESS IN SIZE.<sup>3</sup>

## TINY FIBER, BIG PROBLEM.

What goes into aquatic environments often ends up in the food we eat and the water we drink. In fact, there is now evidence of microplastics in every part of the food chain,<sup>4</sup> including fish and water supplies around the world.

81% OF TESTED WATER SAMPLES FROM MAJOR METROPOLITAN AREAS AROUND THE WORLD WERE CONTAMINATED WITH PLASTIC FIBERS.<sup>5</sup>

In the last four years, Adventure Scientists have collected over 2,677 samples in marine and freshwater systems around the world, spanning every continent and ocean. The results, shown below, indicate that microplastics are accumulating at a higher rate in marine systems (89% of samples) than in freshwater systems (51% of samples).<sup>3</sup> This research provides one of the largest datasets that clearly shows the scale of the microplastic pollution problem.

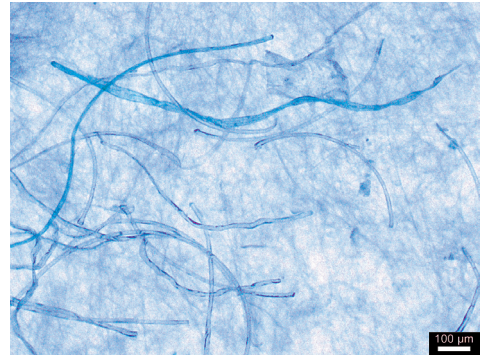


## DIGGING DEEPER.

Cotton Incorporated and the Cotton Research and Development Corporation partnered with North Carolina State University to conduct a two-year study that tested the degradation rates of four fiber types: cotton, rayon, polyester and a cotton/polyester blend. The microfibers were tested using established methodologies in different aquatic environments.

Research was conducted according to ISO14851:1999 2005 and ASTM D6691 test methods in three aquatic environments:

- wastewater
- fresh water
- salt water



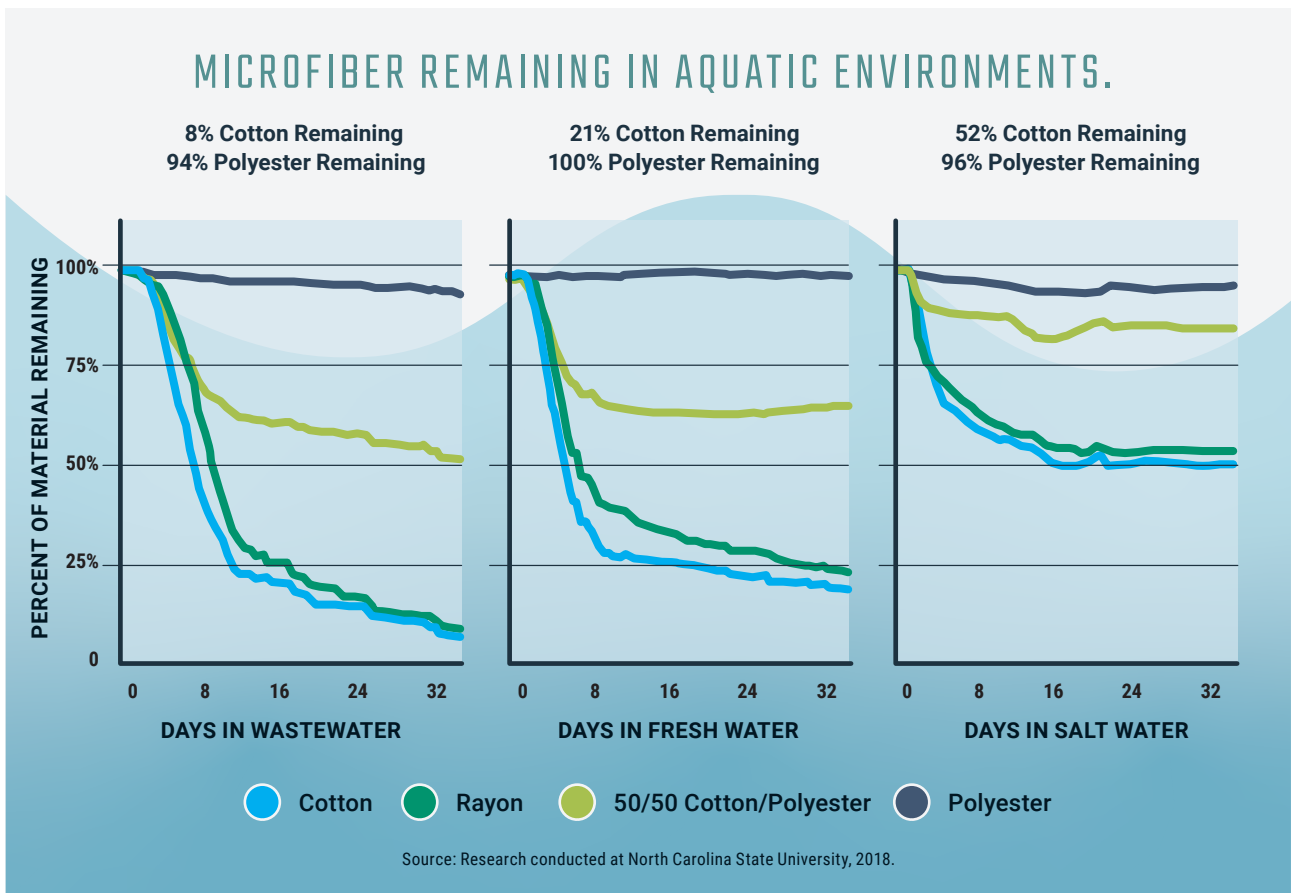
**HOW TINY IS TINY?** THESE POLYESTER MICROFIBERS AVERAGE 0.58 MM IN LENGTH, ACCORDING TO RESEARCH CONDUCTED, AND ARE OFTEN UNDETECTABLE TO THE EYE.

## WHAT THE RESEARCH SAYS.

The aquatic biodegradation research indicates cellulosic fibers degrade significantly more than petroleum-based microfibers, leaving fewer microfibers behind. Polyester microfibers show very little degradation in all three aquatic environments and are expected to persist in the environment for long periods of time<sup>6</sup> based on the data trend shown below. In the cotton/polyester blend, it can be expected that the cotton degrades, leaving only the polyester after 20+ days. Cotton also degrades faster than artificial cellulosic fibers such as rayon.

## TURNING THE TIDES WITH COTTON.

The results are clear: cotton degrades faster than rayon and the cotton/polyester blend, while polyester hardly degrades at all.







## CAN COTTON HELP SAVE OUR SEAS?

The research conducted continues to enhance our understanding of the plastic microfiber pollution problem. Test results point toward natural fibers like cotton playing a role in the global solution.

How can you help? Incorporating cotton into your apparel, home fabrics and everyday products, from household cleaning to beauty to baby care, are some ways you can contribute to cleaner waters everywhere.

Find out more about this study and cotton's biodegradability at [cottonworks.com/sustainability](https://cottonworks.com/sustainability).



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Sources: <sup>1</sup> World Economic Forum (2016). The New Plastics Economy - Rethinking the future of plastics.; <sup>2</sup> Boucher, J. and Friot D. (2017). Primary Microplastics in the Oceans: A Global Evaluation of Sources. Gland, Switzerland: IUCN. 43pp.; <sup>3</sup> Global & Gallatin Microplastics Initiatives (2018). Adventure Scientists. [https://www.adventurescientists.org/uploads/7/3/9/8/7398741/2018\\_microplastics-report\\_final.pdf](https://www.adventurescientists.org/uploads/7/3/9/8/7398741/2018_microplastics-report_final.pdf); <sup>4</sup> Rochman, Chelsea M, et al. (2013) "Policy: Classify Plastic Waste as Hazardous." Nature 494 (7436): 169–71. doi:10.1038/494169a; <sup>5</sup> Kosuth, M., Mason, S., & Wattenberg, E. (2018). Anthropogenic contamination of tap water, beer, and sea salt. PLOS One.; <sup>6</sup> Zambrano, M. et al. (2018). Microfibers generated from the laundering of cotton, rayon and polyester based fabrics and their aquatic biodegradation. Marine Pollution Bulletin 142 (2019) 394–407.