

Understanding Environmental Impacts of Synthetic Microfibers

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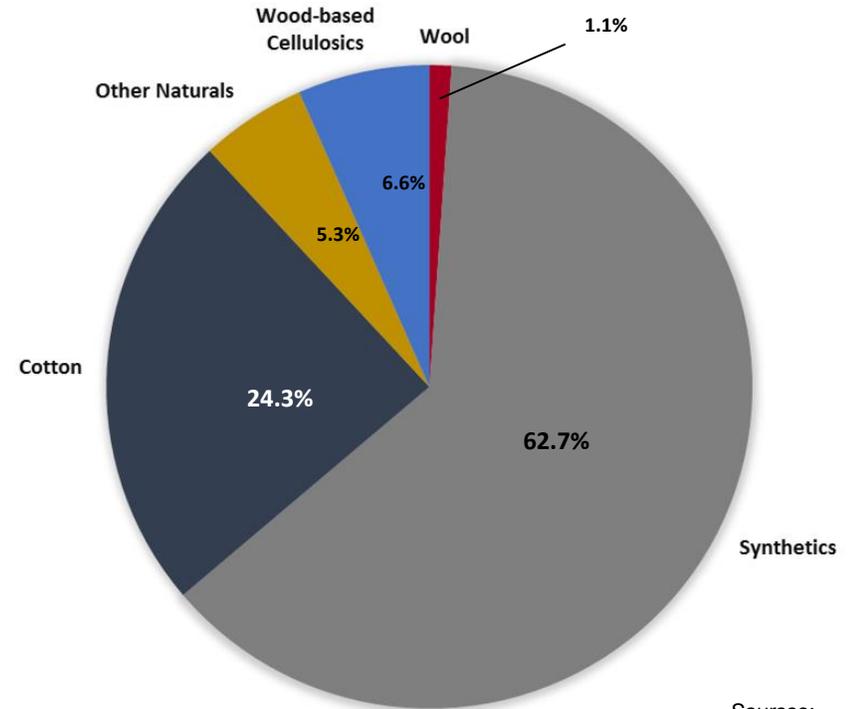
Holden Lab

Synthetic Microfiber Working Group, CT DEEP



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Clothes: We All (well, Most) Wear Them



Sources:
Lenzing/ICAC/CIRFS/TFY/FEB

2016 Global Fiber Consumption

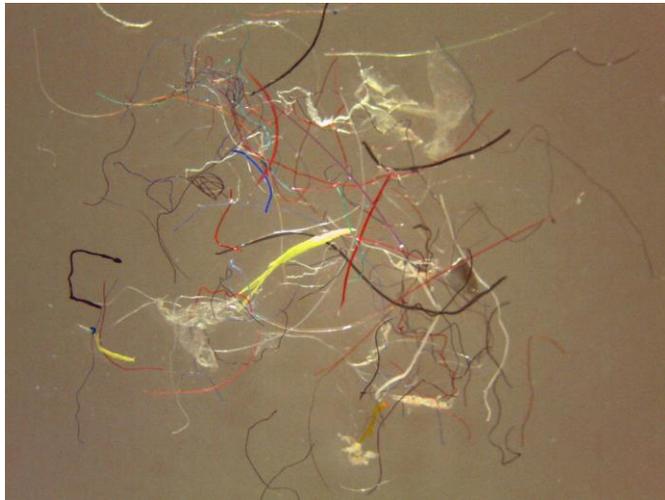
- Polyester makes up ~80% of synthetics consumed
- 80% of polyester consumed is used in apparel
- Synthetics do not easily degrade in the natural environment

What are Synthetic Microfibers?



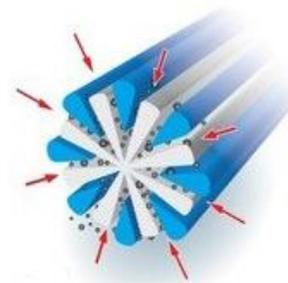
The Florida Microplastic Awareness Project

- Less than 5 mm in length.
- Estimated 0.19-1.7 million metric tons of synthetic microfibers enter our natural environments annually.

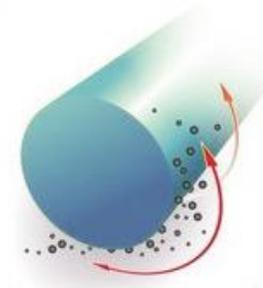


Sherri Mason @ SUNY Fredonia

Microfiber



Cotton Fiber



Where have they been found?



Salt

Yang et al. (2015)
Karami et al. (2017)



Ocean/River/Lake

Sediment

Browne et al. (2011); Miller et al. (2017); Baldwin et al. (2016)



a

b



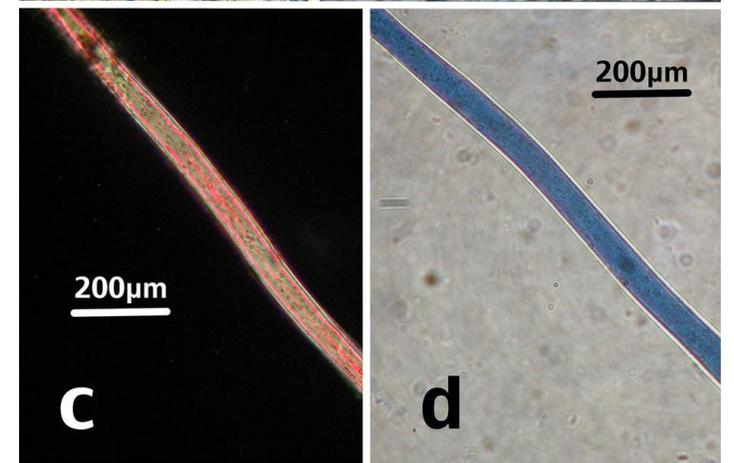
Sewage Sludge

Mahon et al. (2017)



Arctic Ice

Obbard et al. (2014)



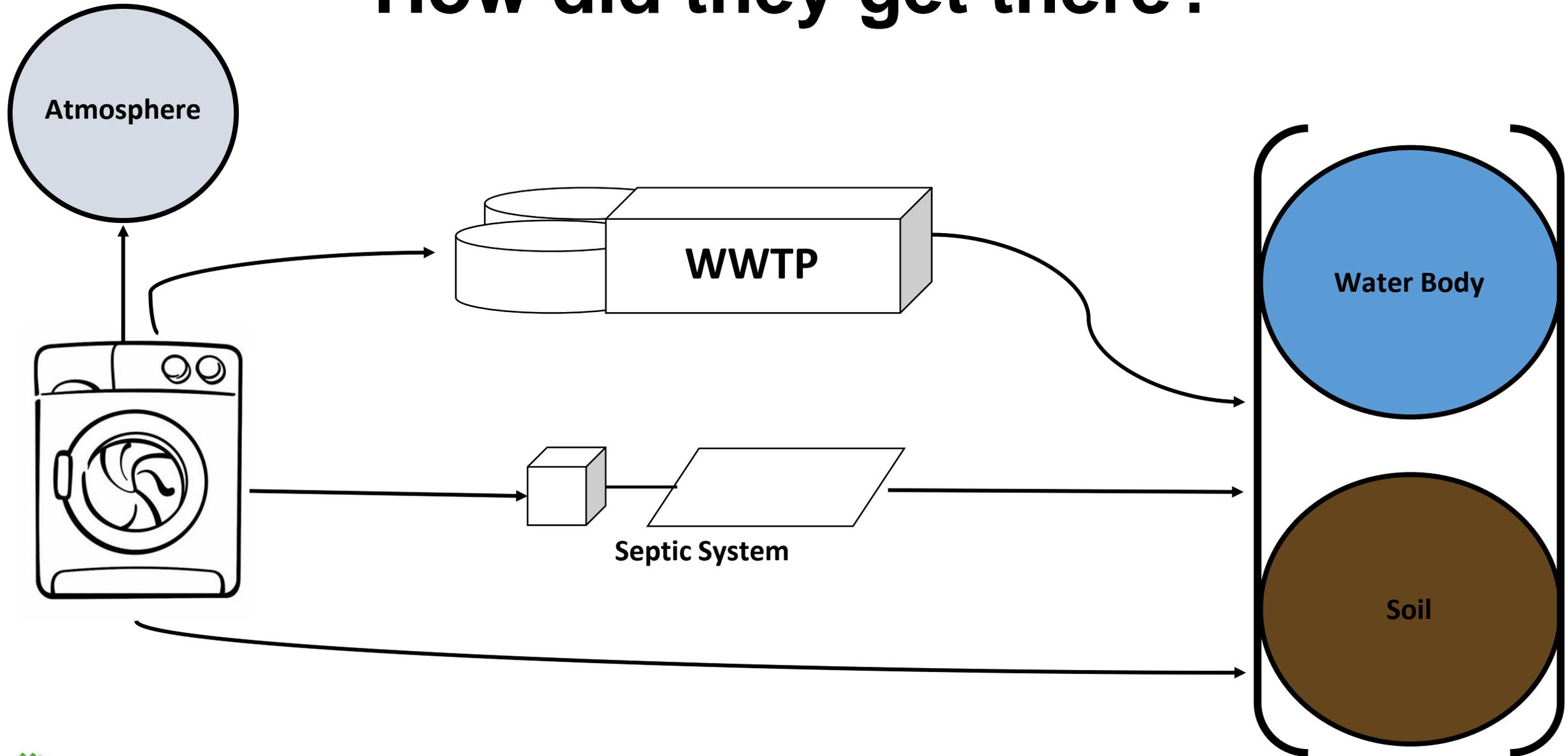
c

d

Inside Organisms

Taylor et al. (2015)

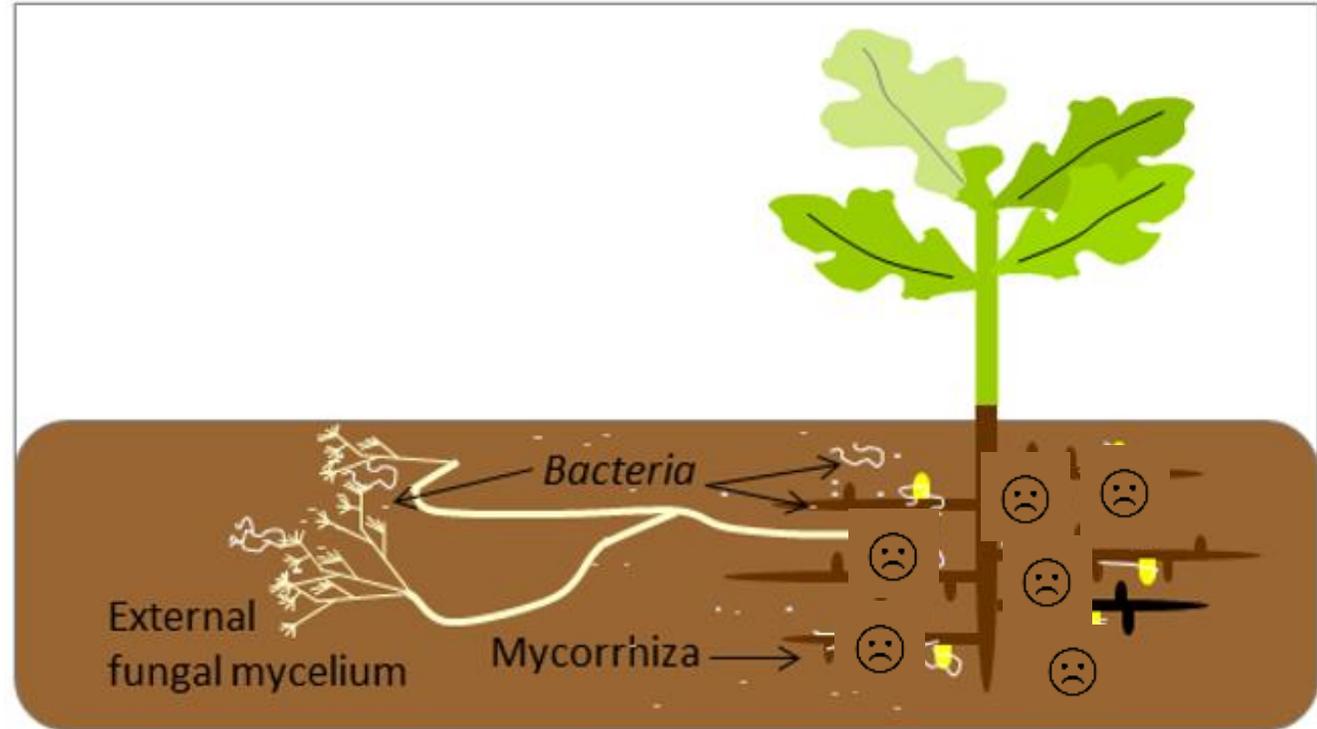
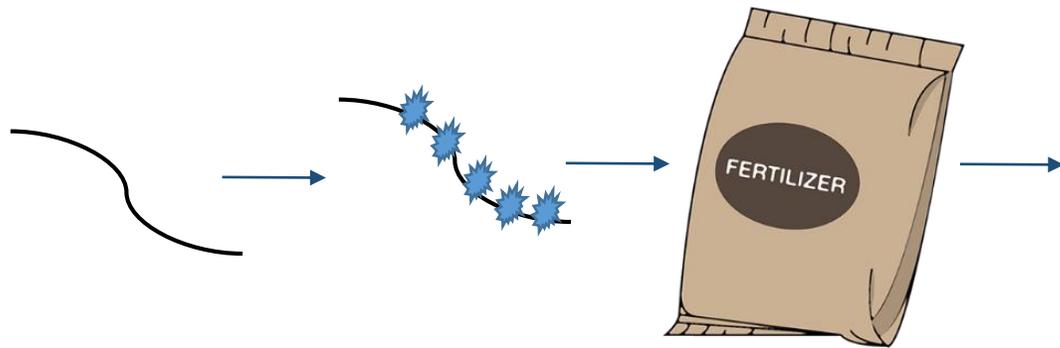
How did they get there?



These are NOT the only sources



Effects in Terrestrial Matrices



 = pollutant

<https://www.ufz.de/index.php?en=38915>

Effects in Terrestrial Matrices



de Souza Machado et al. 2018

Research @ Bren



Dr. Roland Geyer



Dr. Sangwon Suh



Dr. Trish Holden



Timnit Kefela

1. Conduct global material flow analysis and hotspot identification of microfibers
2. Understand how microfibers behave in different wastewater treatment matrices
3. Explore effects of microfibers to plant-microbe interactions in agroecosystems