Microplastics And Citizen Science

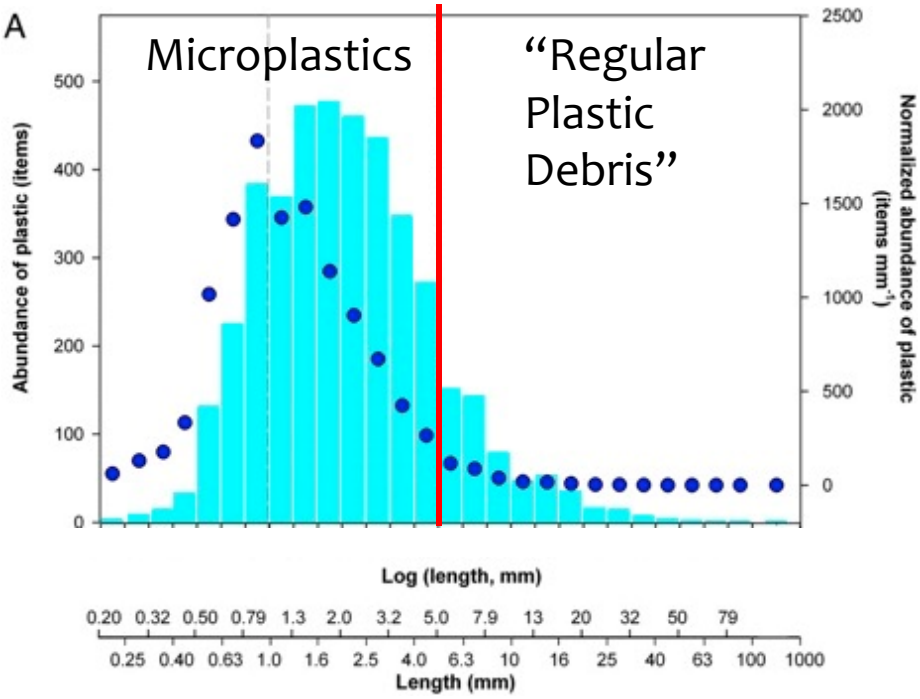
Dr. Jay Brandes

Skidaway Institute of Oceanography
UNIVERSITY OF GEORGIA

Marine Extension and Georgia Sea Grant
UNIVERSITY OF GEORGIA
Sea Grant

What are Microplastics?

* Defined by size- smaller than 5 mm
* Lower size range generally operationally defined, but evidence suggests that they exist down in the bacterial size range
* Variety of sources- manufactured (fibers, beads) or generated from breakdown of larger plastics (mechanical, photochemical or biologically-mediated)
* Of a size range that interacts intimately with the lower levels of the marine food chain



Graph modified from Cozar et al 2013, PNAS doi/10.1073/pnas.1314705111

The Problem from a scientific perspective

* Unlike larger beach debris, microplastics are not easily measured in environmental samples
* Easily contaminated
* Need to separate them from their environment and concentrate for analysis
* Need complex, expensive instrumentation to establish exact composition

Microfibers and microplastics

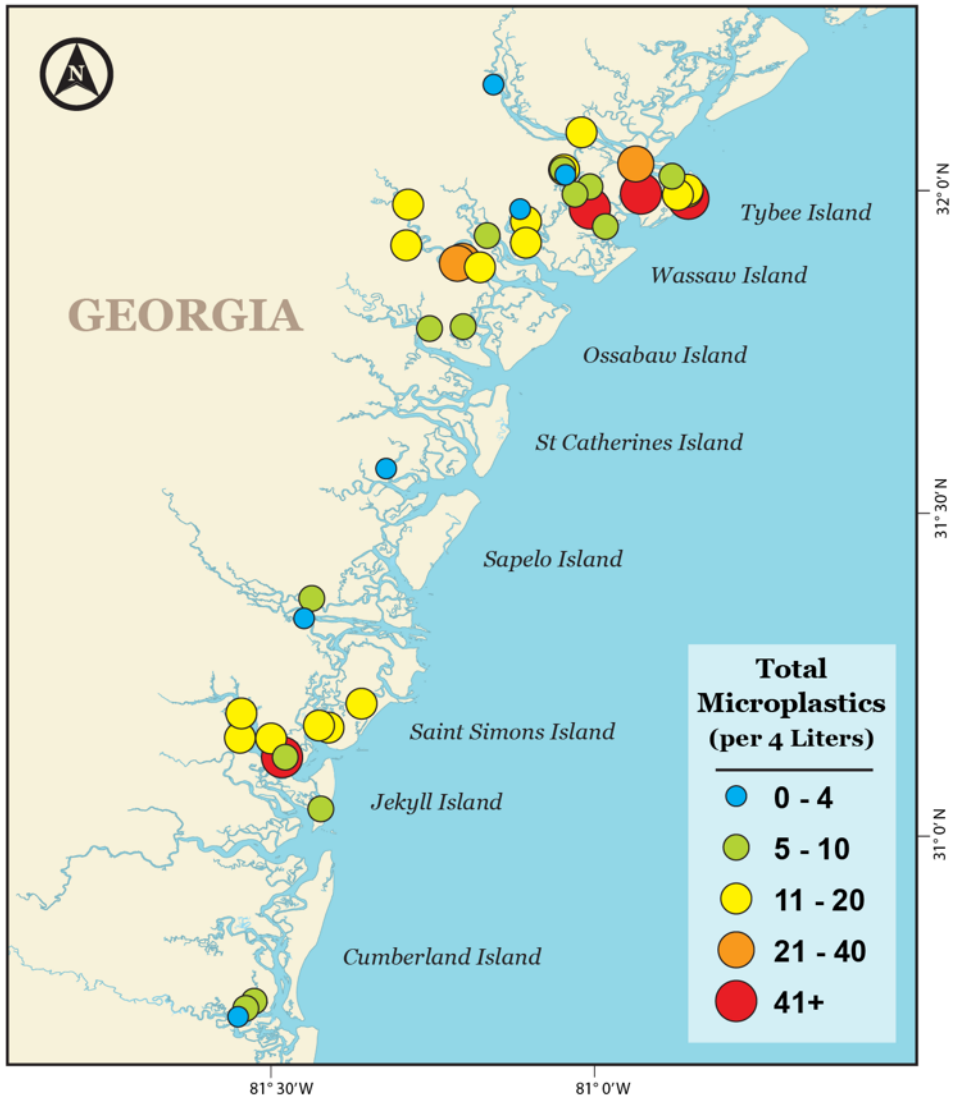





Microplastics Results

Main Points to consider

* Concentrations very patchy- vary by over 1 order of magnitude within a few miles!
* Results of 1 Person x 2 months effort
* Rough estimate, conservatively over 1 trillion plastic microfibers/particles in upper 1 foot of Georgia's Intercoastal waterways and estuaries
* Additional work indicates roughly 20-25% of coastal fish and shrimp in Savannah area have ingested microplastics in their guts



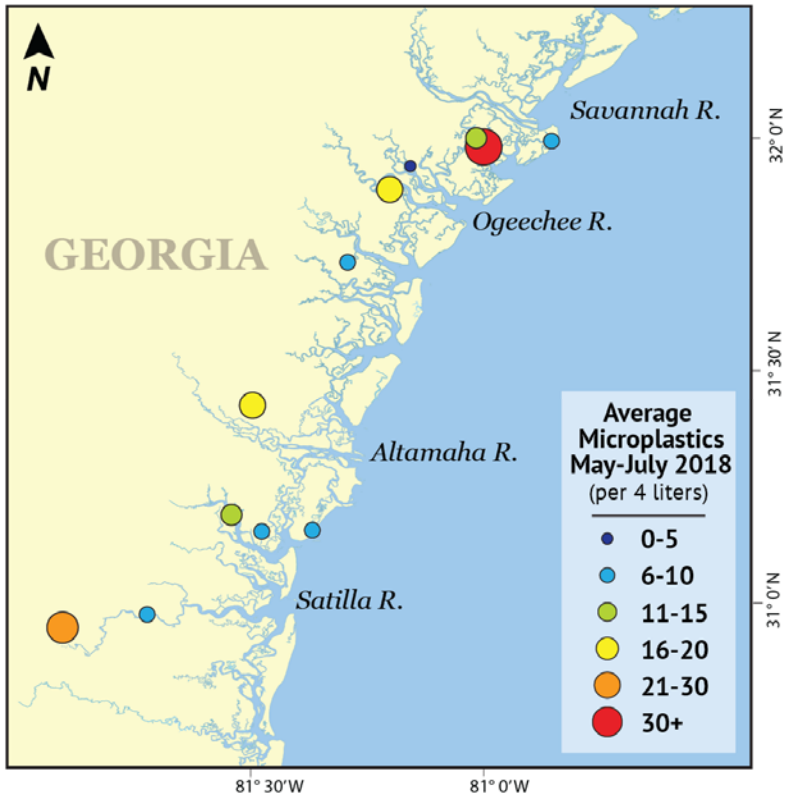
How to tackle a difficult problem?

Citizen Science benefits

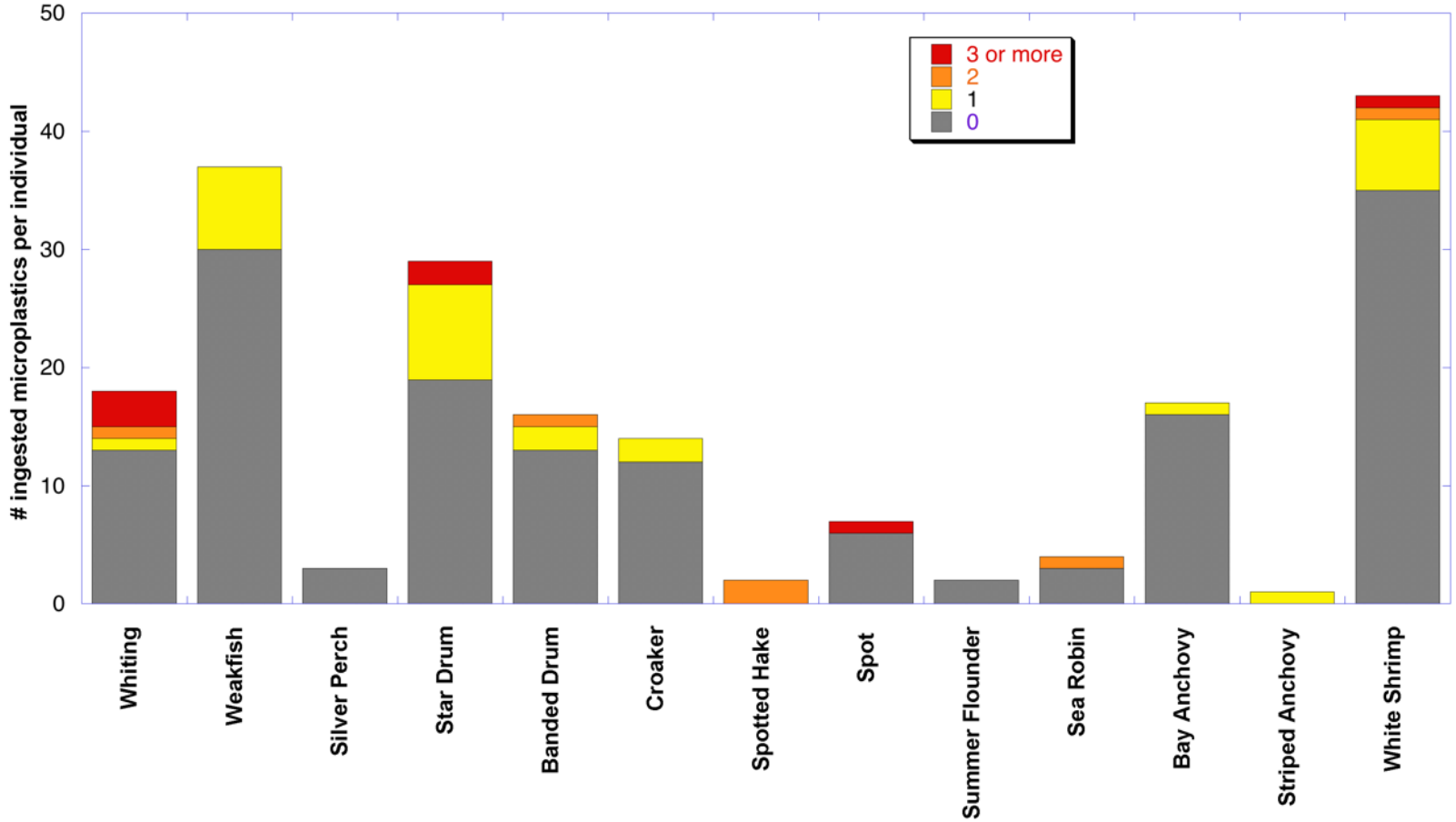
* Microplastics research is a scientific subject that the public is keenly interested in
* This leads to many environmentally-focused groups- riverkeepers, boating and fishing enthusiasts, nature lovers- who volunteer to help in any way they can
* Microplastics research requires large scale sampling, processing and analysis
* However, the basics of clean sampling techniques and the sampling equipment needed are relatively inexpensive
* Engaging the Citizen Scientist provides 'force multipliers' who can greatly increase the spatial and temporal detail possible in studying microplastics

Riverkeeper Results

- Monthly sampling along coast
- Started Summer 2018
- Variability but follows larger trends
- Some trend towards lower concentrations closer to ocean



Ingested microplastics



Oysters and environment

- No significant difference between sites
- Highly variable system
- No evidence for long-term accumulation in Oysters