Engaging Students on Marine Debris

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UNIVERSITY OF HARTFORD

Presentation Overview

* Marine litter
* Past results
* Future plans

The problem of marine litter

Plastics

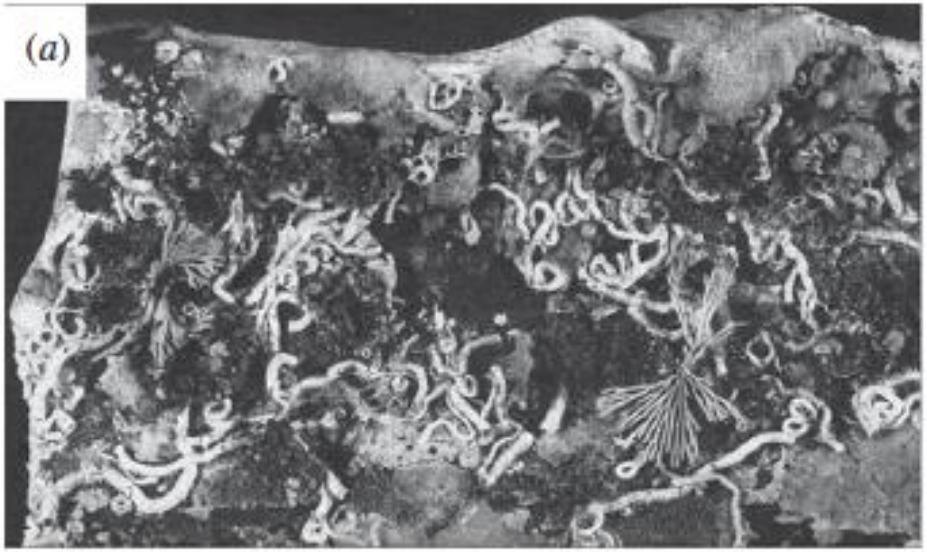
* Disposable and single-use plastic
* About 20 million tons of plastic reach the ocean annually
* The five oceanic gyres contain approximately 100 million tons of marine debris
* 1950s: 5 million tons annual global production
* 2015: 322 million tons were produced globally

The problem of marine litter

* wildlife
* potentially human health
* water quality
* the economy

Ingestion

Entanglement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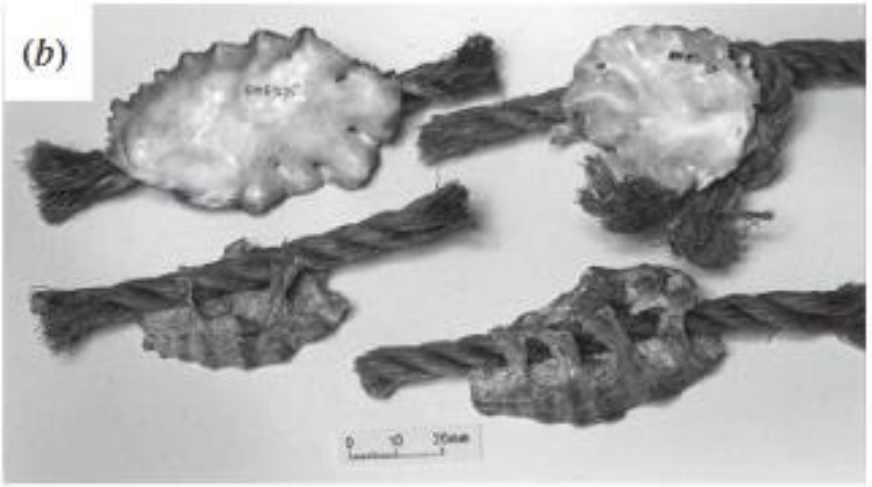
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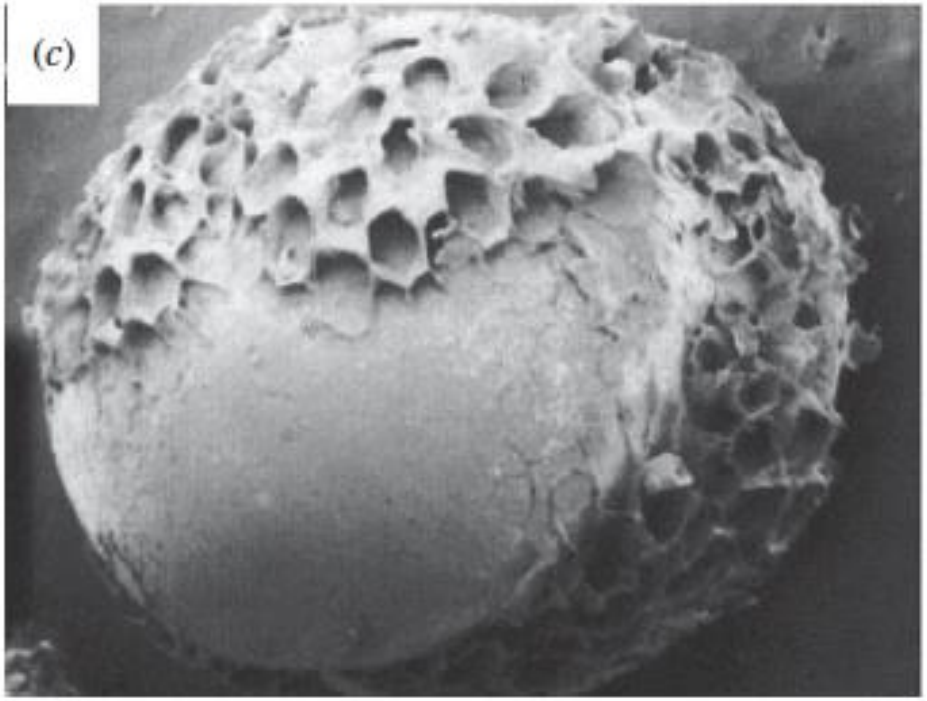
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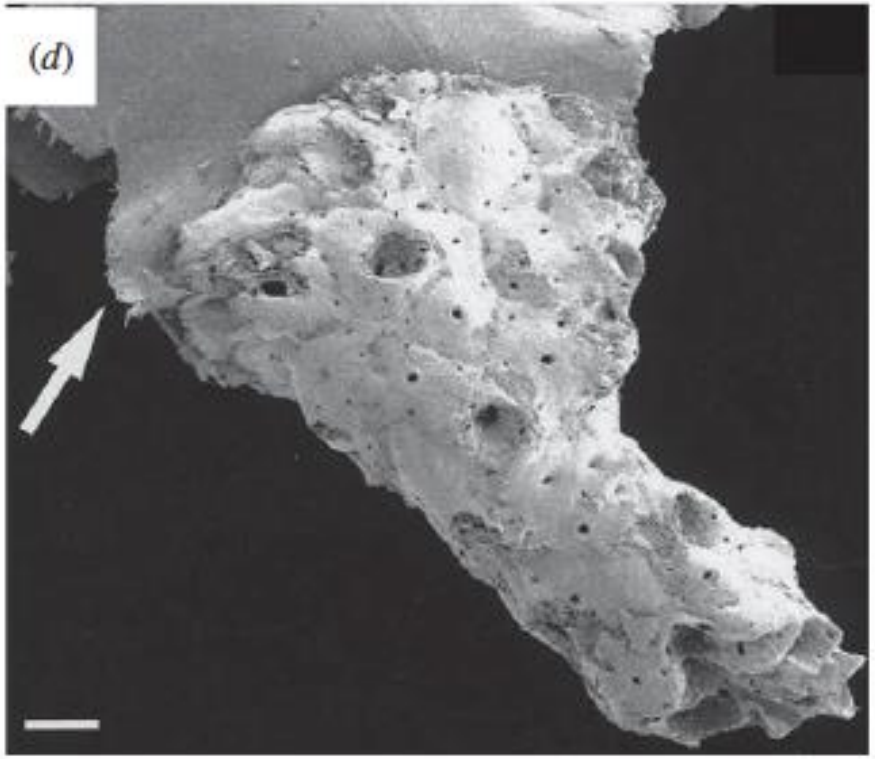
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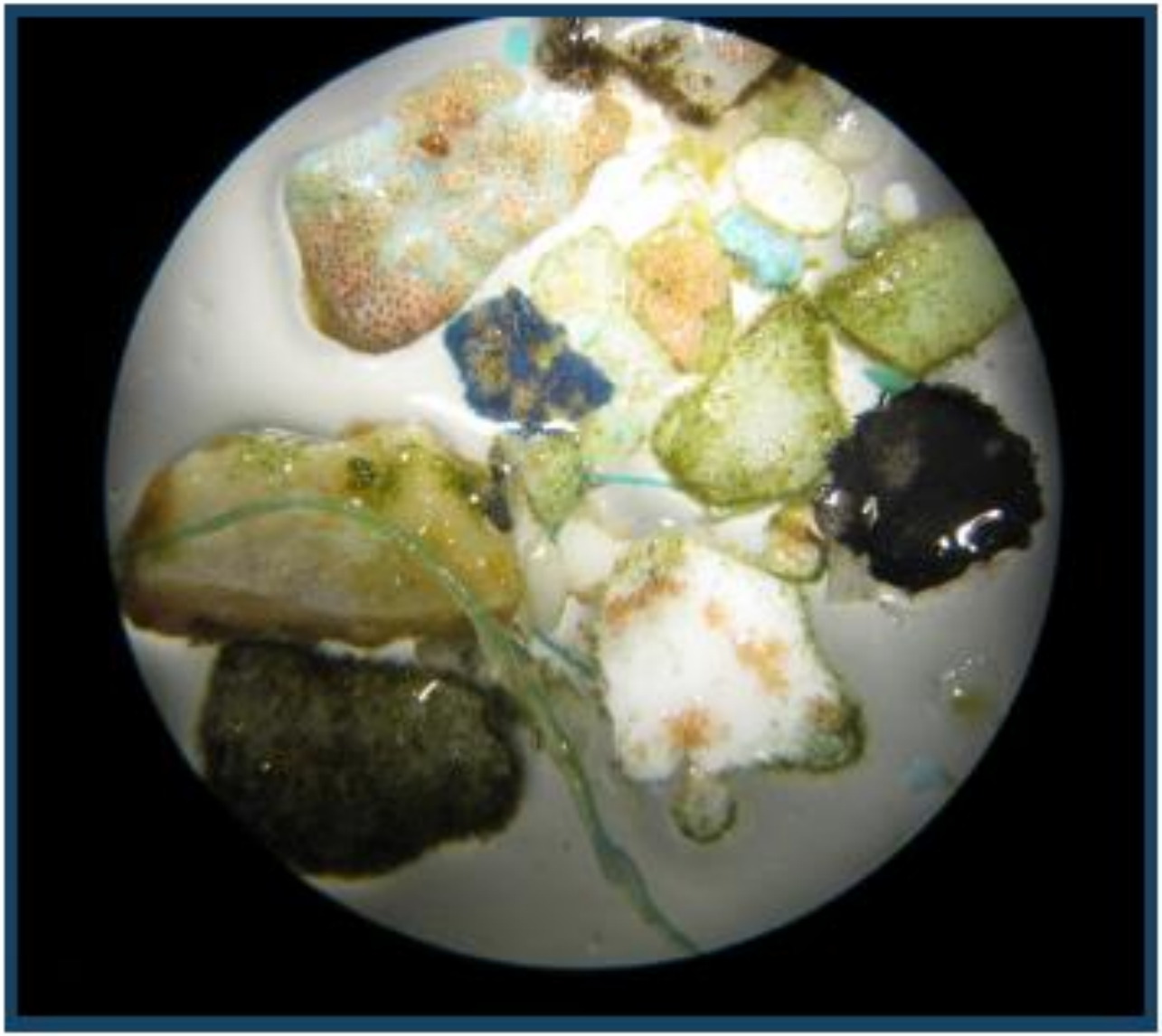


Microplastics skimmed from the North Pacific Ocean.
Photo courtesy of J. Foley, C-MORE.

Water quality and human health

* As plastics decompose they leach chemicals into water resources

Economic implications

Outreach and education

My work

* NOAA funding
* Create an open source class
* Pilot it here
* Share results with lawmakers
* Measure impact on students

The Proposal

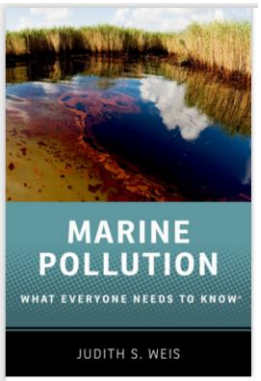
* From Shore to State House
* NOAA marine debris prevention through education and outreach program

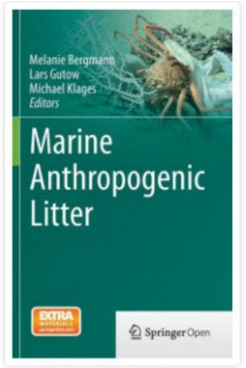
The class

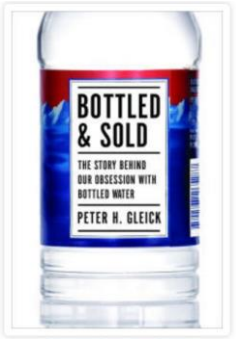
* Introduce students to the issue of marine debris
* Guide them in the process of collecting and tracing the life cycle of debris
* Challenge them to use these data to contextualize policy alternatives, and
* Present results to state legislators

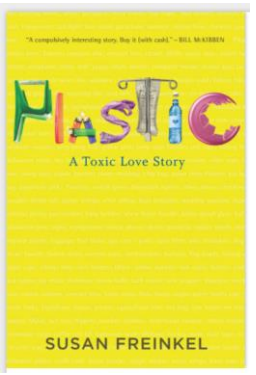
This class

* Semester-long
* In person
* Undergraduate class
* Course readings, in class activities, presentations, lectures
* Experiential and service learning via multiple cleanups and reflection

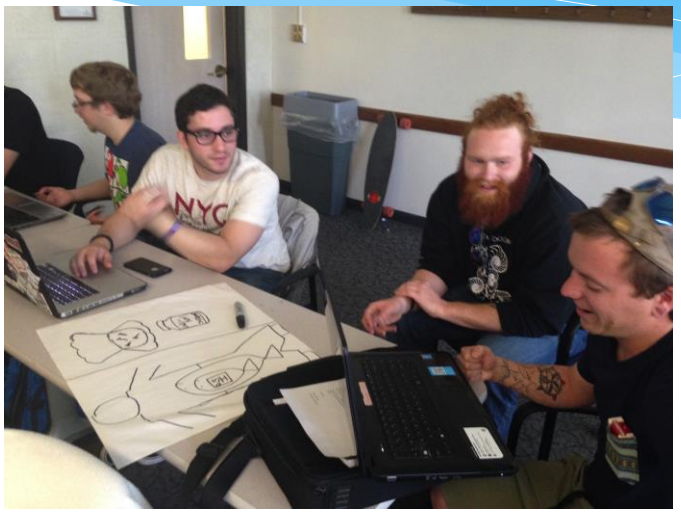






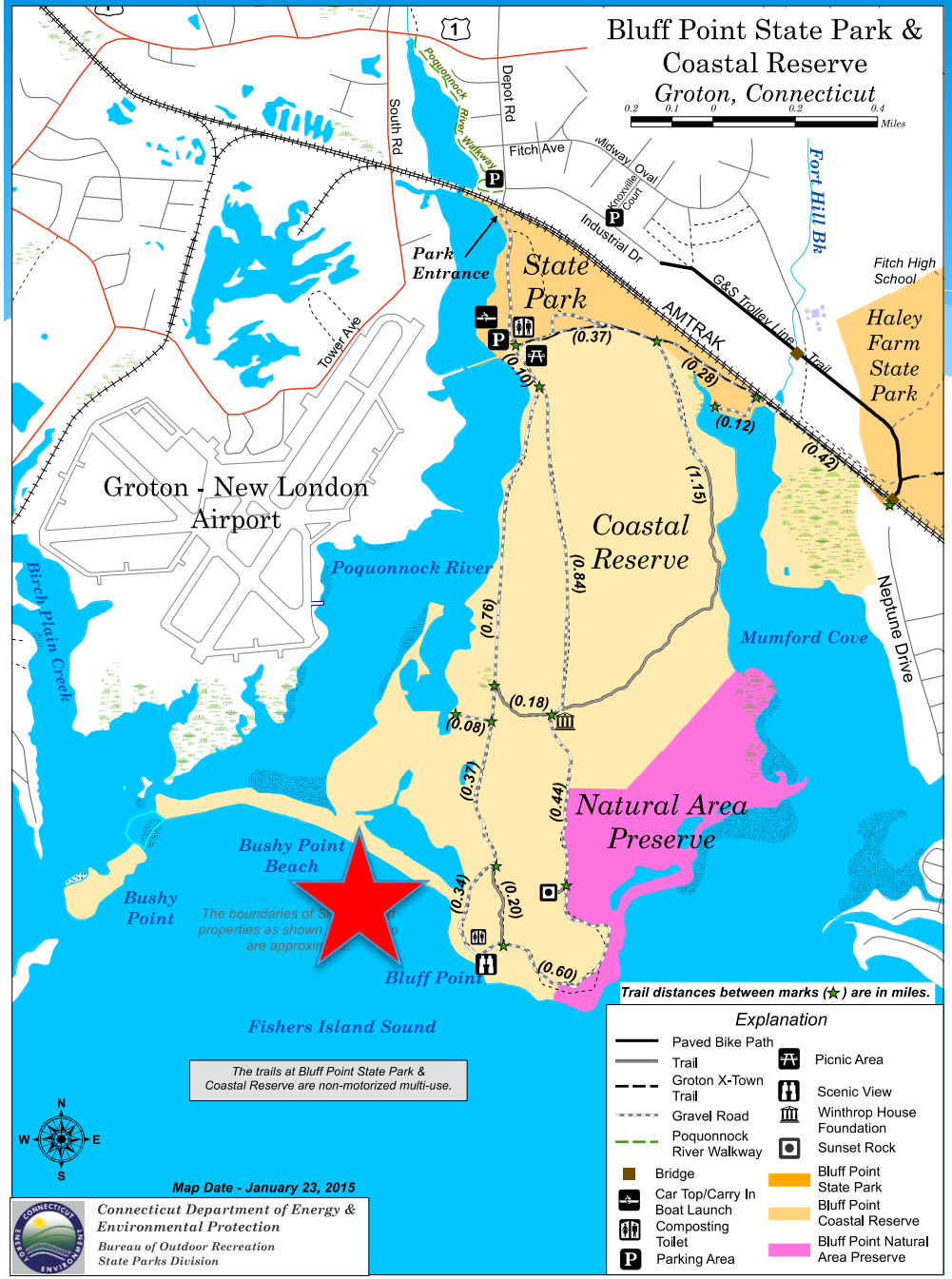


The class



* Conduct 4 beach cleanups in Connecticut (February-April 2016)
* Weigh, measure, catalog debris found
* Create a Tumblr
* Present results to state legislature

Clean Up Sites

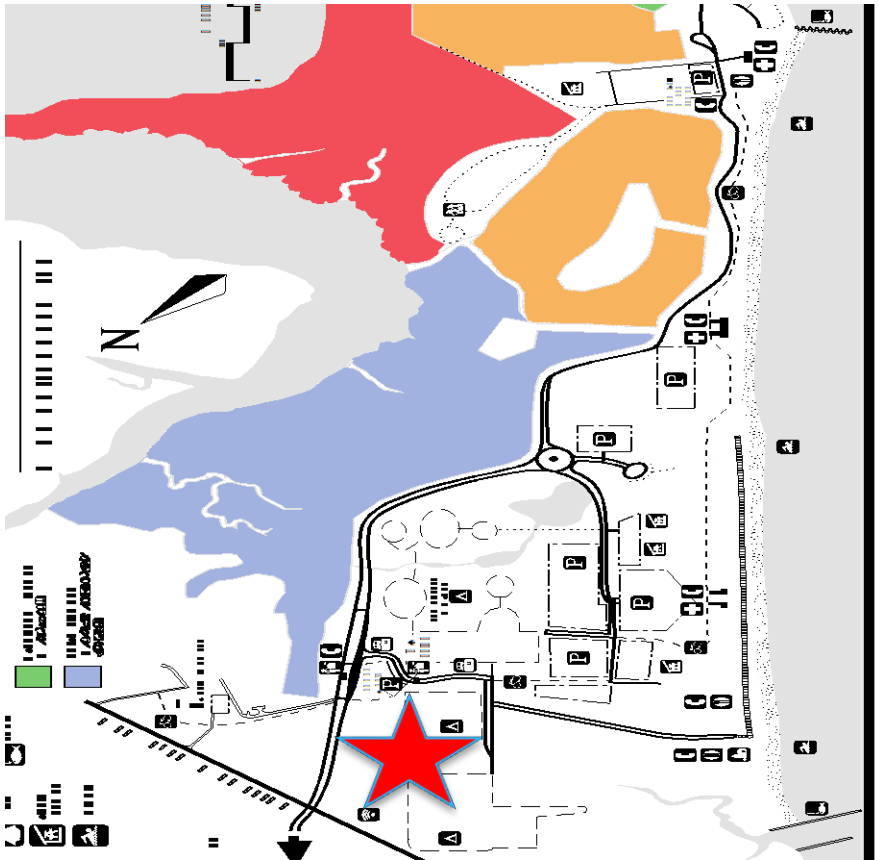


* Bluff Point State Park and Coastal Reserve
* February 6, 2016

Bluff Point

Clean Up Sites

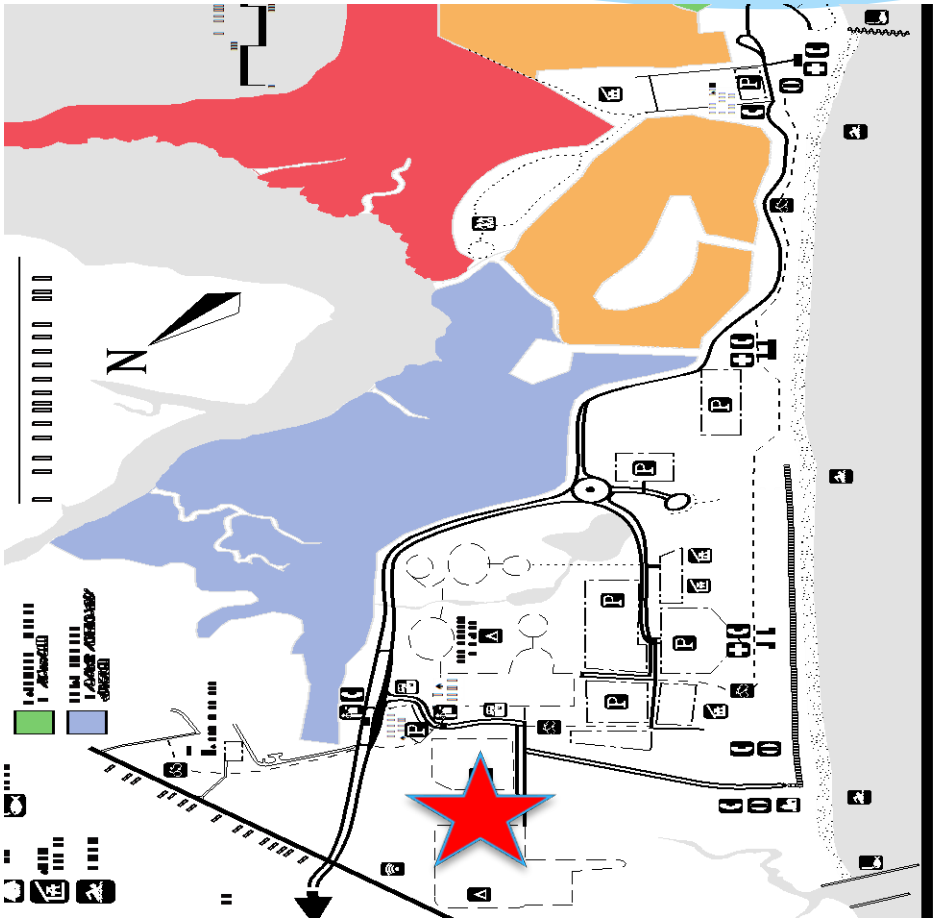
* Hammonasset Beach
  * February 7, 2016



Hammonasset Beach

Clean Up Sites

* Meig's Point, Hammonasset
  * February 7, 2016
  * April 2, 2016



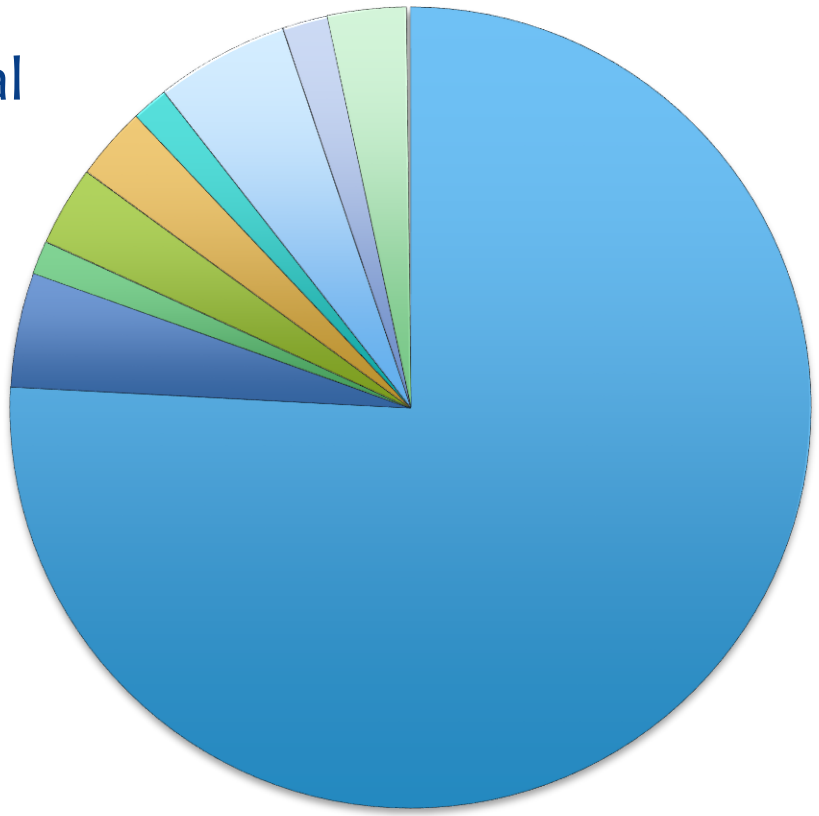
Meig's Point Hammonasset

Meig's Point Hammonasset

Meig's Point Hammonasset

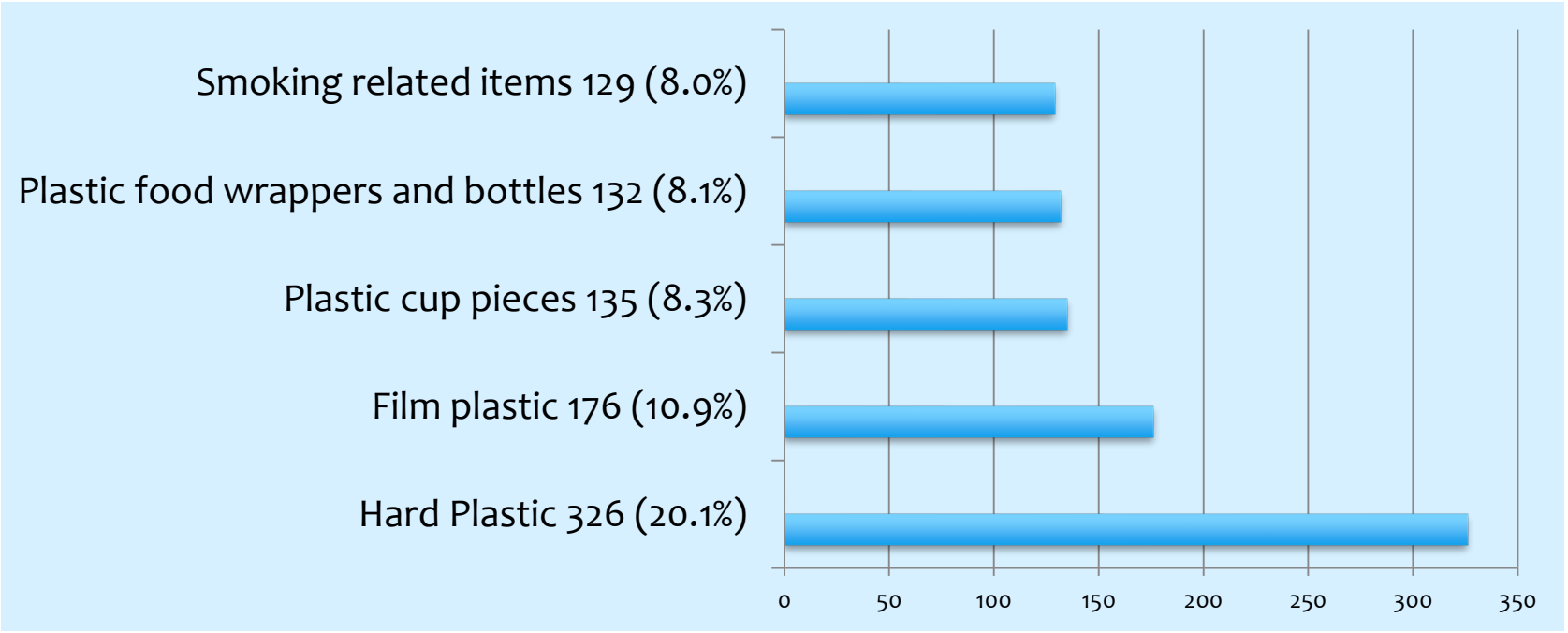
What we found

* 1,622 individual pieces



What we found

* The five most frequently found items



Informing policy

* We found remnants of municipal waste
* Not fishing gear (recreational or commercial)
* Not manufacturing
* Not from the shipping industry

Presenting results

Lessons Learned

* Benefits of active learning
* Time consuming
* Management
* Winter collections versus nesting seasons
* Connecting with policy makers
* Not advocating for one policy

Measuring the impact

* Measure student knowledge, environmental attitudes, and behaviors
* Compare with a traditional laboratory-based environmental studies course

Results

Pre-post scores and analysis for test and control subjects

Variable	**AUCT120, a traditional lab-based environmental course (the control) (*n*=26)**			**POL/HON, a marine debris experiential and service-learning course (the test) (*n*=24)**		
	Pre-test *Mean* *SD*	Post-test *Mean* *SD*	Point change p-value	Pre-test *Mean* *SD*	Post-test *Mean* *SD*	Point change p-value
Knowledge of marine debris	7.4 1.1	7.6 1.3	+0.2 p=0.211	7.6 1.4	8.5 0.8	**+0.9** **p=0.0023***
Environmental attitudes	56.1 6.77	59.7 9.35	**+3.6** **p=0.0078***	57.3 7.86 (*n*=23)	58.9 8.91 (*n*=23)	+1.6 p=0.08
Environmental behaviors	58.7 11.5	65.6 13.9	**+6.9** **p=0.0021***	63.2 19.0	77.2 18.1	**+14.0** **p=0.00001***

*Statistically significant

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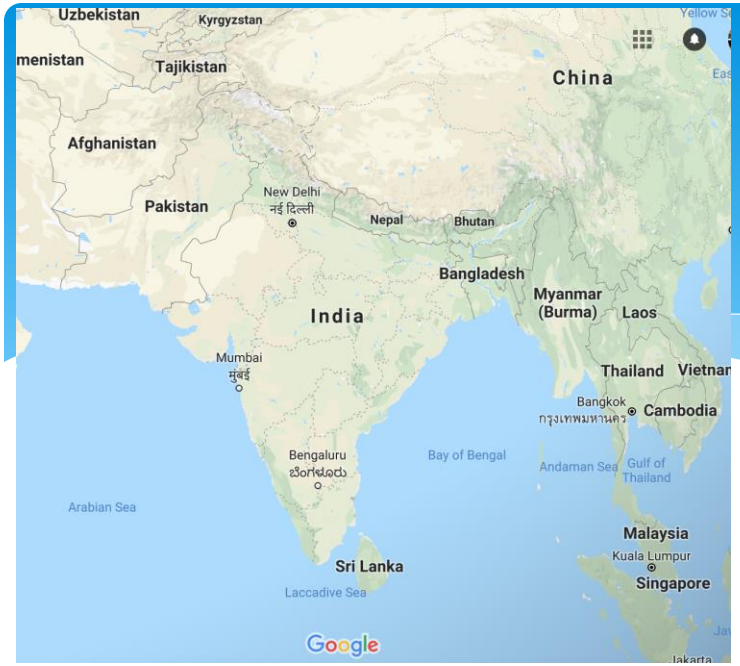
Weaknesses

* Relatively small sample sizes
* A short term observation
* Bias toward the perceived "preferred" answer?
* Courses are not all taught by the same professor

Conclusions

- Meeting the gold standard of laboratory class
- Interesting questions about the way experiential work may influence (depress?) attitudes
- Open source, replicable model expansion

- Fulbright
- South Asia, Southeast Asia
- Indonesia, India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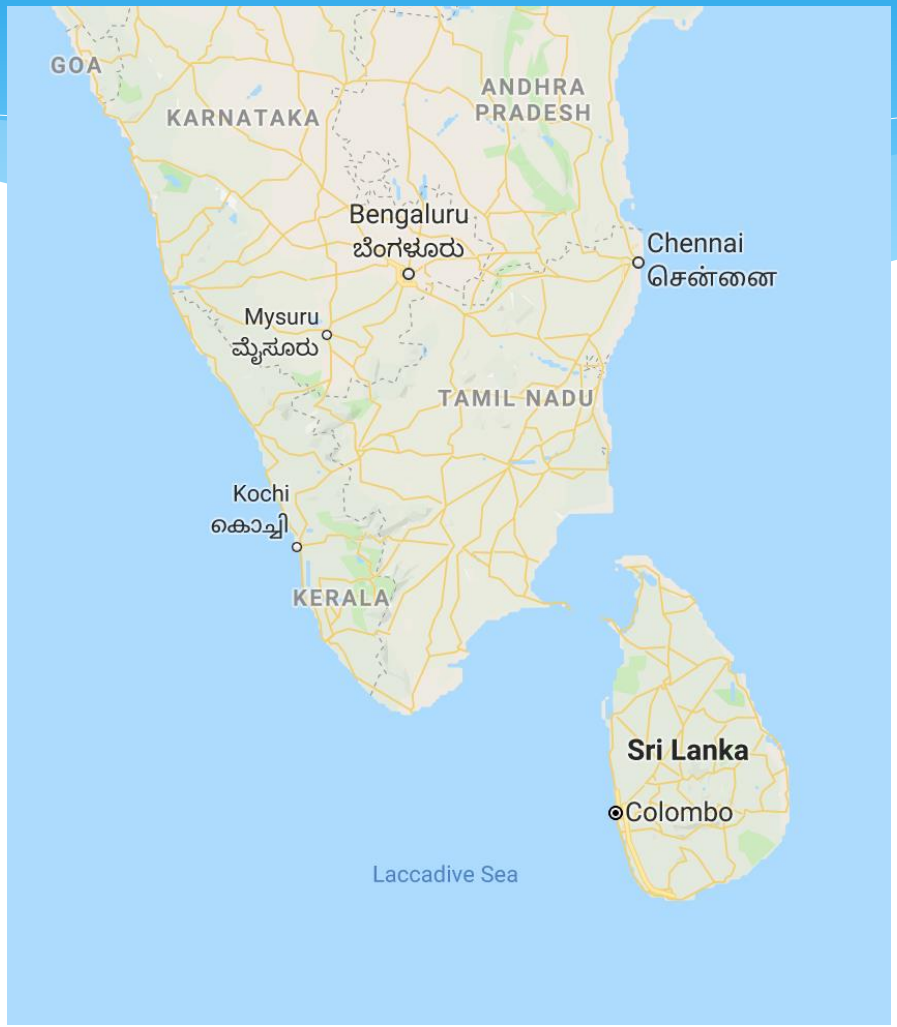
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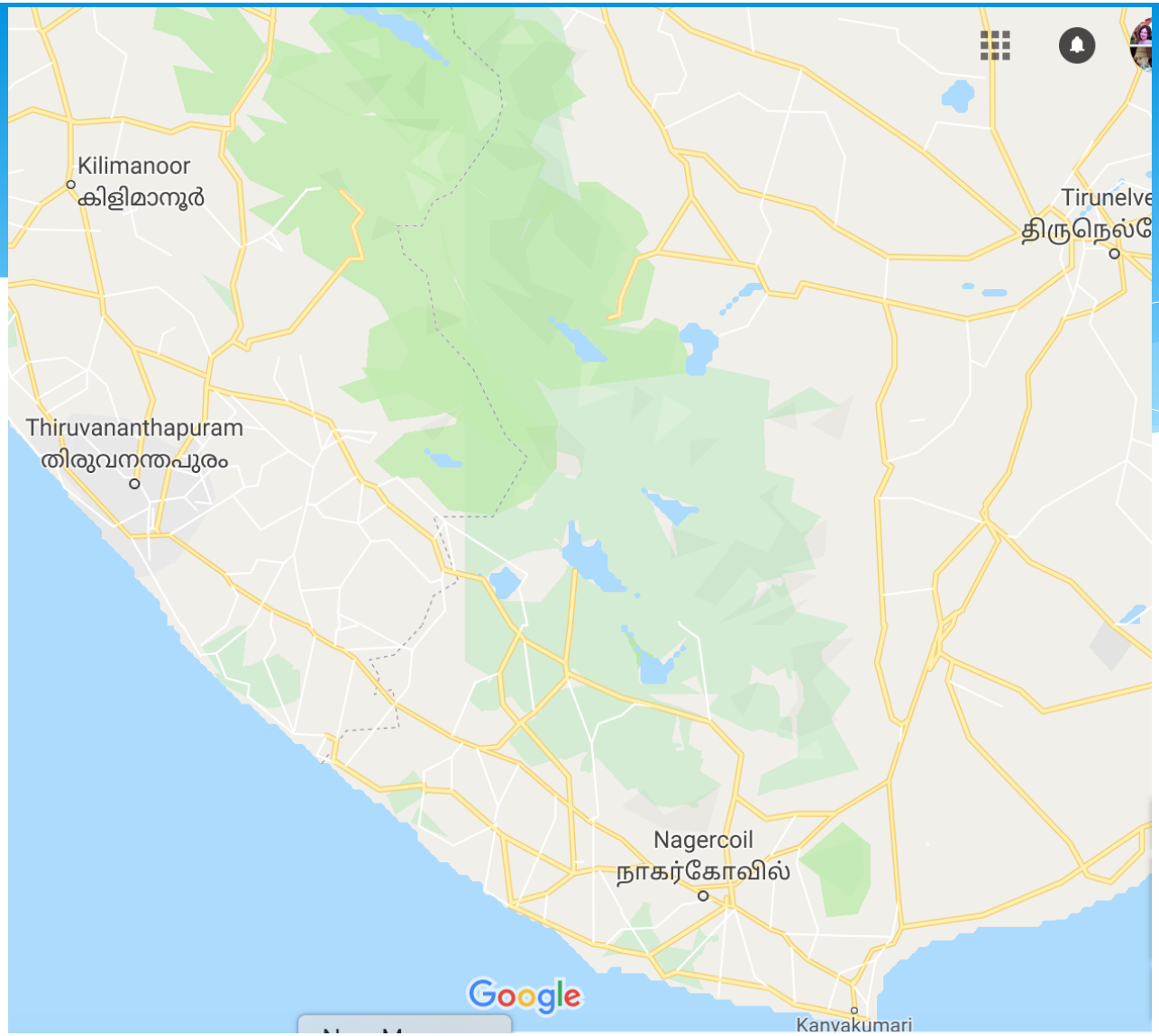

- Thiruvananthapuram, India

Project plan

- 6 months
- University of Kerala, Kariavattom campus
- Teach 2-week modules in two courses
- Replicate Uhart project
- Teacher training workshop

Shankumugam Beach

Kollam Beach


PotOfShots.com

Thank you!

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