# Plastic Waste Inputs from Land into the Ocean


United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea
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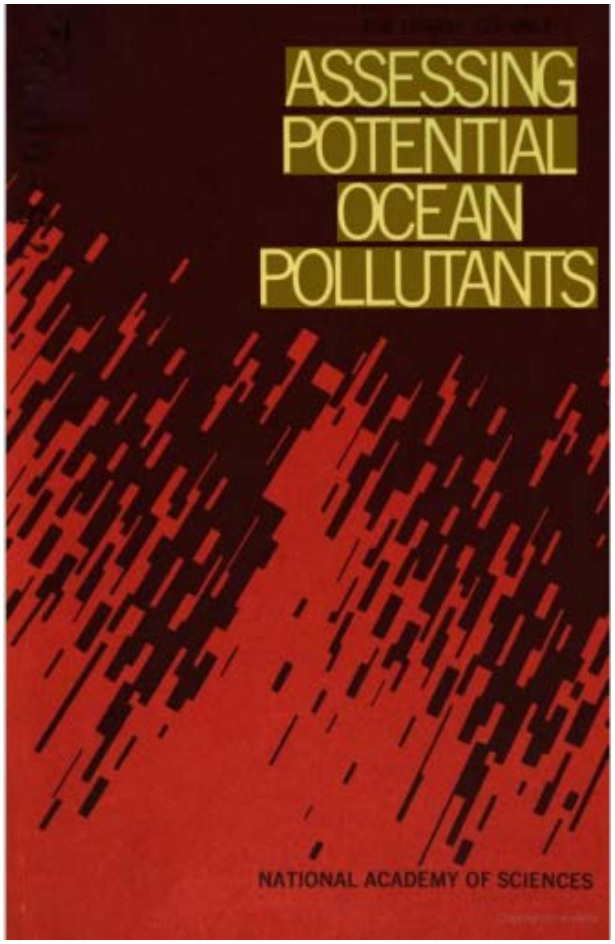
# How "big" is the plastic input issue? (from the land)

- NCEAS working group
  - Kara Lavender Law, Ocean Conservancy
- The last time waste quantification into the ocean was completed was 1975
  - Before MARPOL
  - All ocean-based waste
- The first time land-based mismanaged waste global input has been estimated
- Focused on plastic



# Methods

Coastal countries coastal buffer

*

Population, GNI


*

Per capita waste generation


*

Percent plastic in the waste stream


*

Percent inadequately managed

( 

\+

Percent littered

)

Percent that enters the ocean

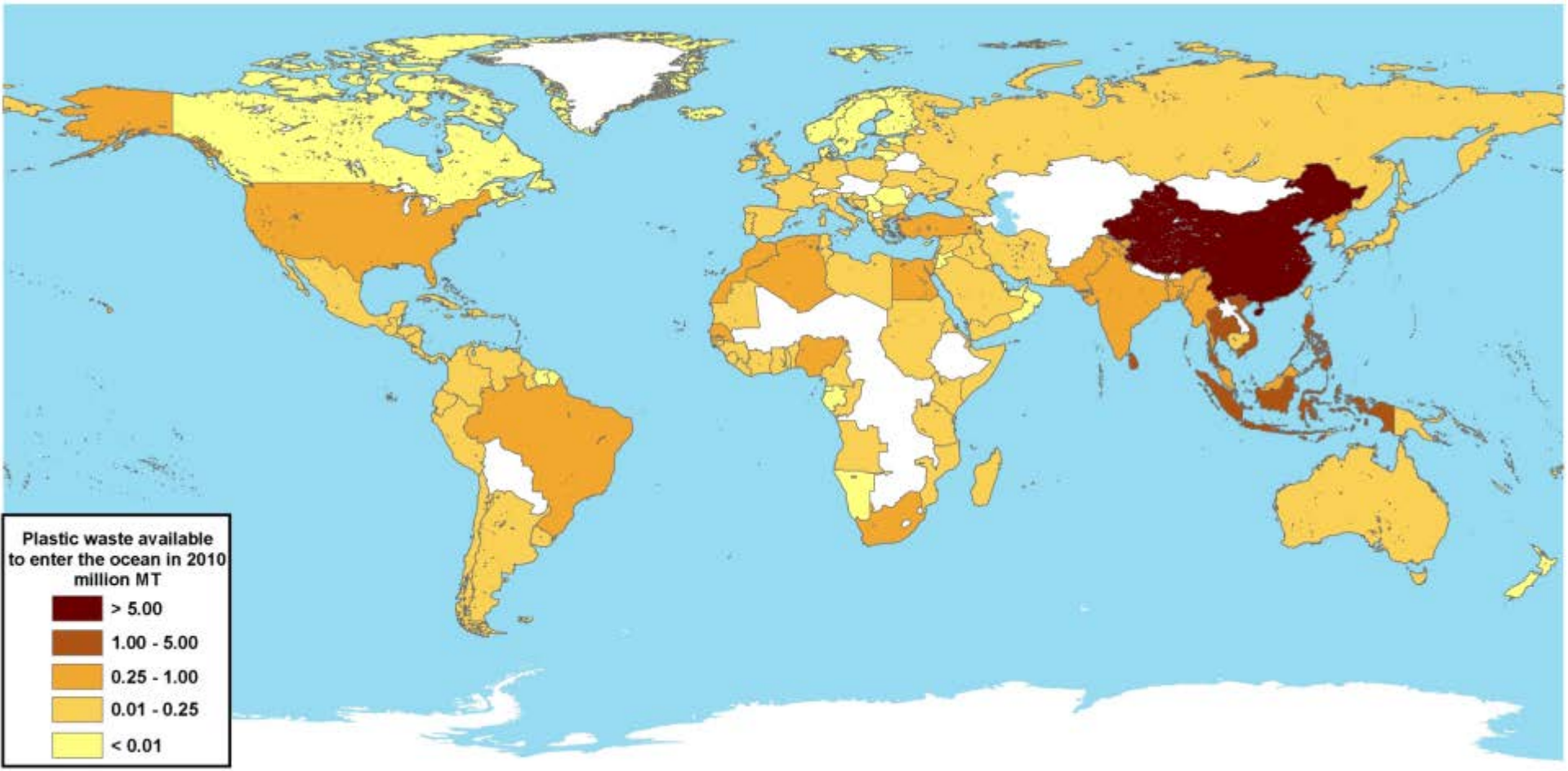
=

# Percent that Enters the Ocean

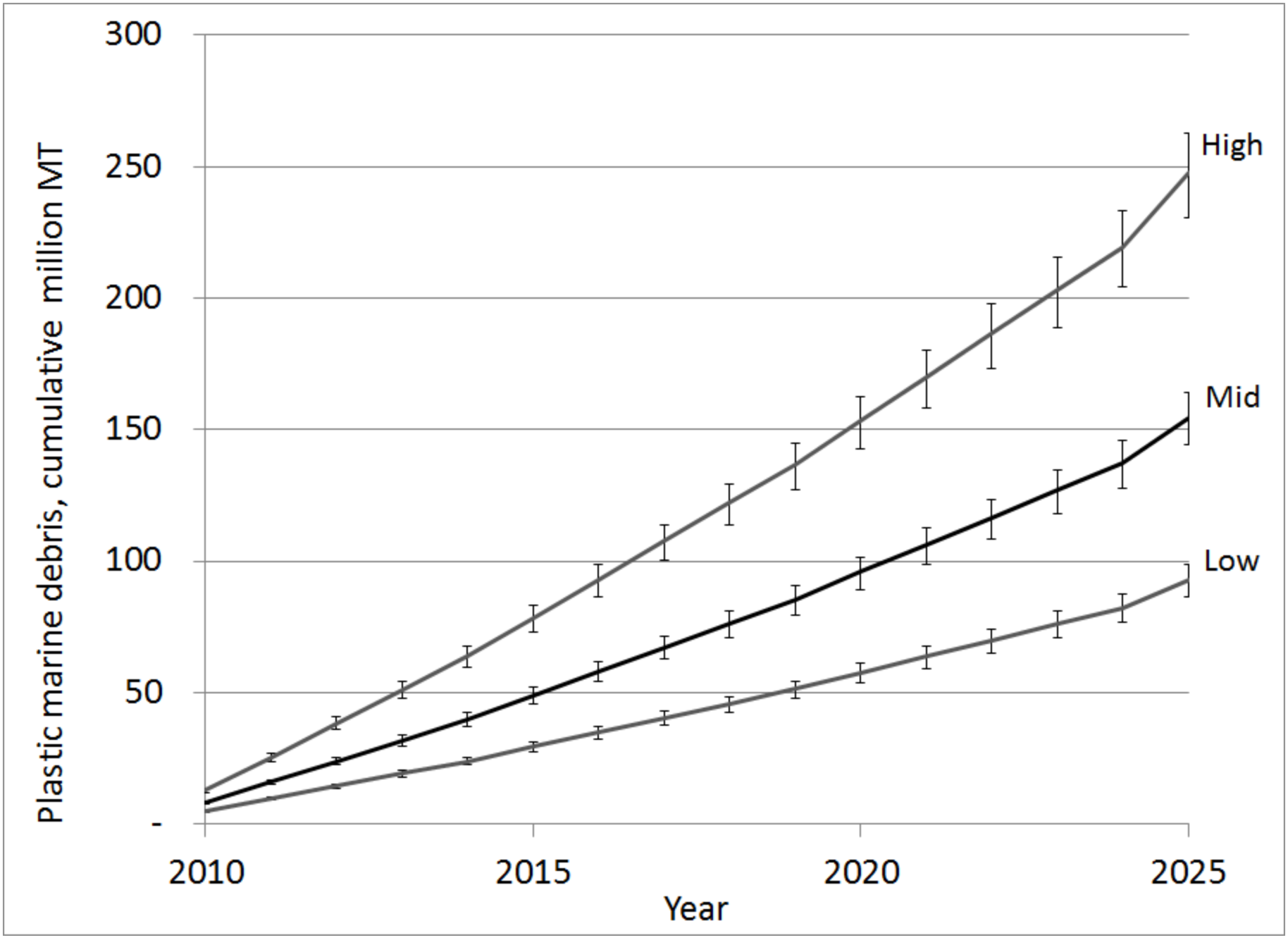
- Not collected by street sweeping
- Not collected by stormwater catchments
- Not picked up in litter removal or cleanup
- = Available as input to the ocean
  - Blown
  - Washed in by storms
  - Washed in by tides



Jambeck et al., Science 2015
270
million metric tons
Global plastic production*
275
million metric tons
Total plastic waste
99.5
million metric tons
Coastal plastic waste
31.9
million metric tons
Coastal mismanaged plastic waste
Plastic waste inputs from land into the ocean in 2010
The 192 countries with a coast bordering Atlantic, Pacific, and Indian oceans, Mediterranean and Black seas produced a total of 2.5 billion metric tons of solid waste. Of that, 275 million metric tons was plastic, and an estimated 8 million metric tons of mismanaged plastic waste entered the ocean in 2010.
12.7
4.8
8
Million metric tons of plastic waste goes into the ocean
6,350-245,000 metric tons**
Estimated mass of plastic waste floating at the ocean surface
Generated by 2 billion people within 50 km (30 miles) of the coast
Mitigation options:
Reduce plastic in waste stream
Improve solid waste managment infrastructure
Increase capture
*Plastics Europe, "Plastics—the Facts 2013" (2010 data)
**Cózar et al., 2014; Eriksen et al., 2014




Jambeck, J.R., Andrady, A., Geyer, R., Narayan, R., Perryman, M., Siegler, T., Wilcox, C., Lavender Law, K. , (2015). Plastic waste inputs from land into the ocean, *Science,* 347, p. 768-771.


300
250
200
150
100
50
-
Plastic marine debris, cumulative million MT
2010
2015
2020
2025
Year
High
Mid
Low


Jambeck et al., Science 2015
270
million metric tons
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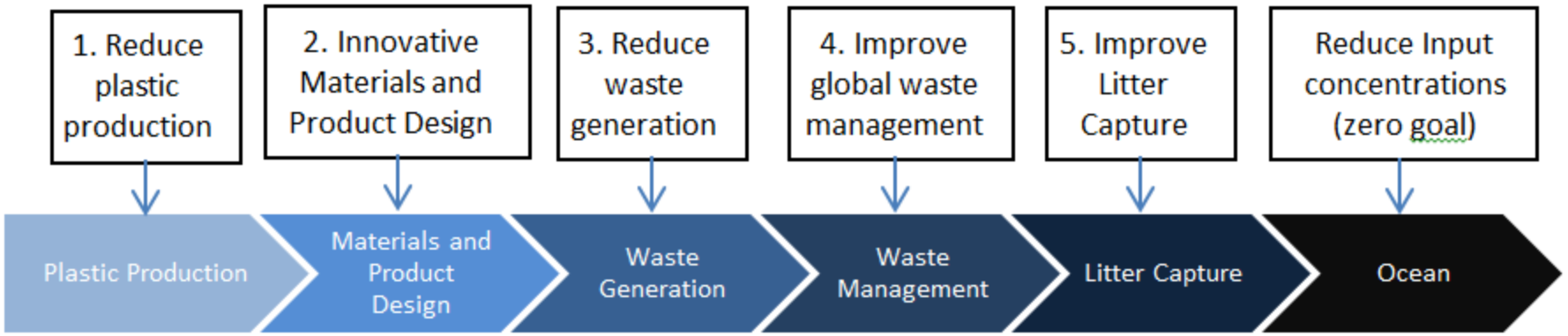
# Mitigation Strategies




1. Industry-led or reduce demand
2. Green Engineering, Circular Economy
3. Reusable items, Sharing/Collaborative Economy
4. Context-sensitive Solid Waste management Infrastructure
5. Litter Capture and Clean-up

# Green Engineering Principles

1. Designers need to strive to ensure that all materials and energy inputs and outputs are as inherently nonhazardous as possible.
2. It is better to prevent waste than to treat or clean up waste after it is formed.
3. Meet Need, Minimize Excess
4. Minimize Material Diversity: promote disassembly and value retention.
5. Design of products, processes, and systems must include integration and interconnectivity with available energy and materials flows.

Anastas, P.T., and Zimmerman, J.B., "Design through the Twelve Principles of Green Engineering", Env. Sci. and Tech., 37, 5, 94A-101A, 2003

# Think Circular, Collaborative Economies

I do not need a drill.

I need a hole in the wall

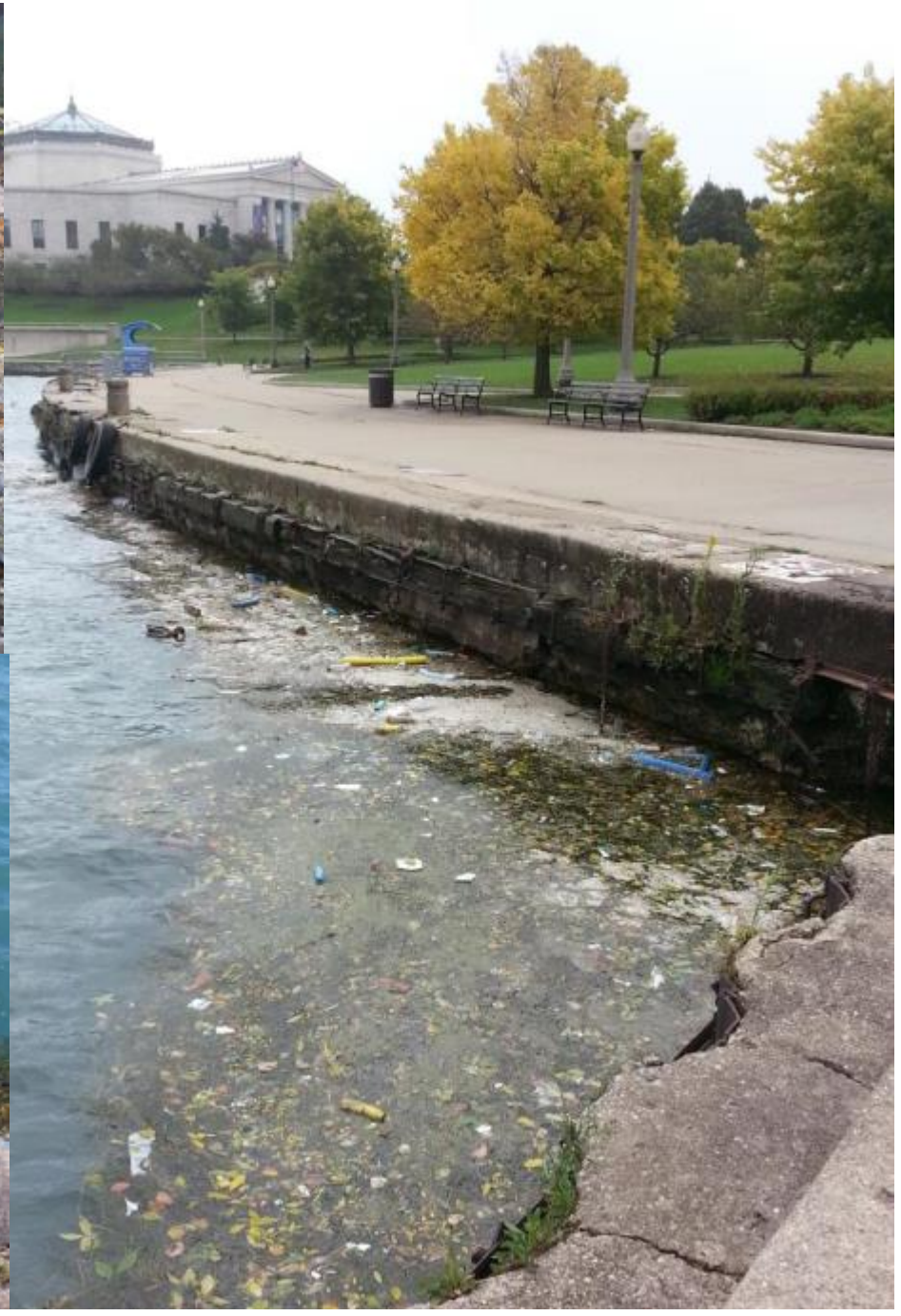
http://www.cruxcatalyst.com/wp-content/uploads/drill-hole.jpg

# Improve Waste Management Infrastructure Globally

- Collect
- Capture
- Contain





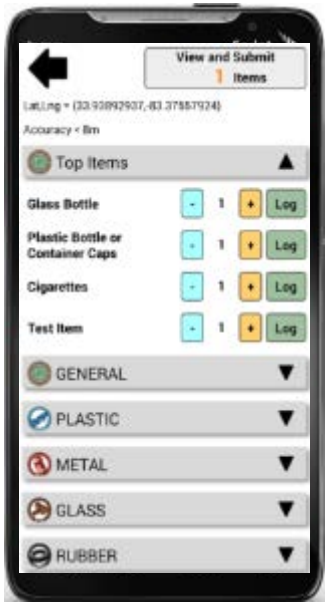



# Harbor Floating Debris Collection

# Marine Debris Tracker

Tool for Data Collection

- Less error without paper & pen
- GPS coordinate for every debris item
- Near real time data gathering/upload
- Easy download (Excel) and mapping
- Used by researchers, citizens or citizen scientists





Website: http://www.marinedebris.engr.uga.edu/


Delegates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CHILE


DUMPING!
RAINS TO RIVER

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Marine Debris Tracker
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