

Quantifying Global Marine Waste with a focus on Africa



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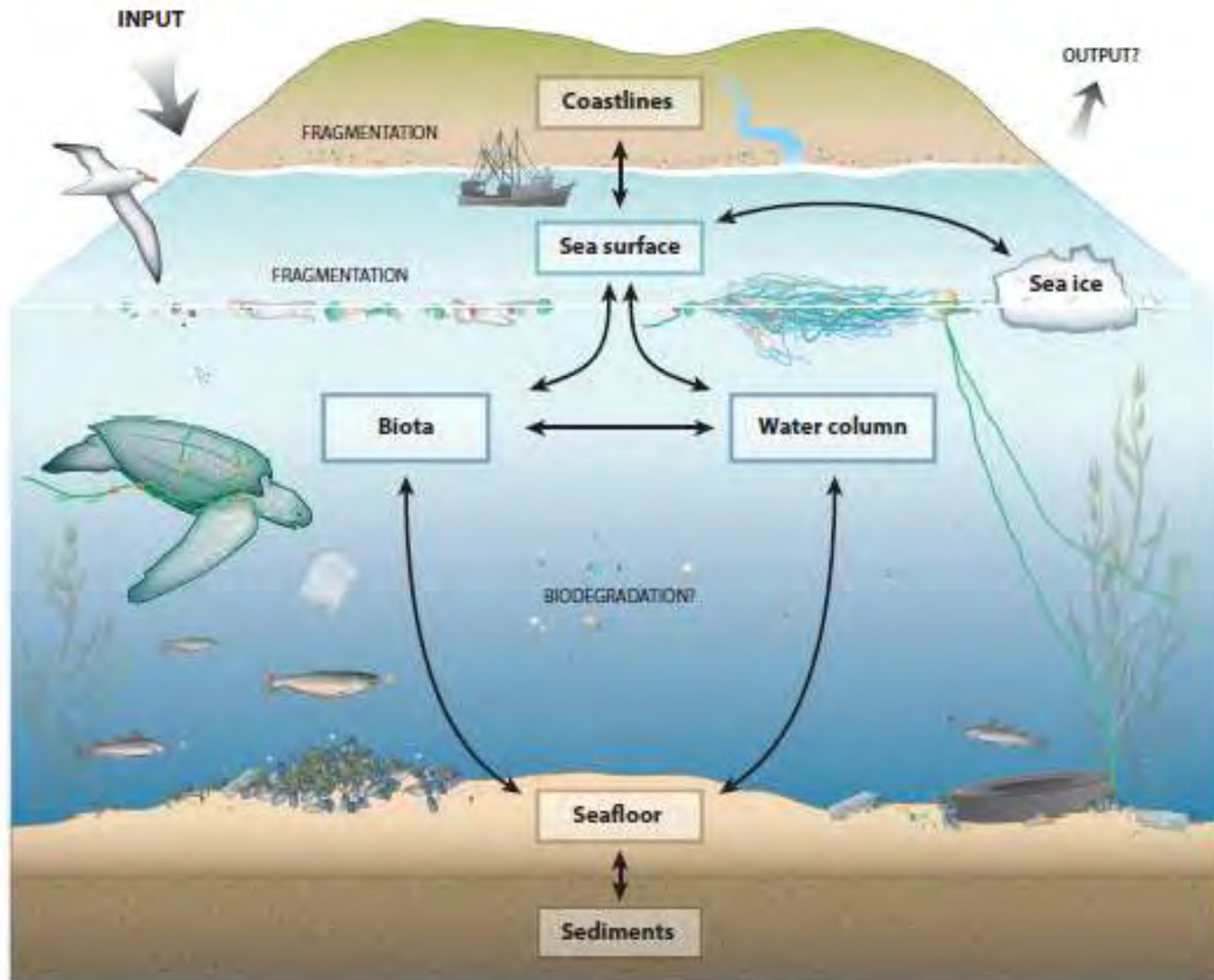




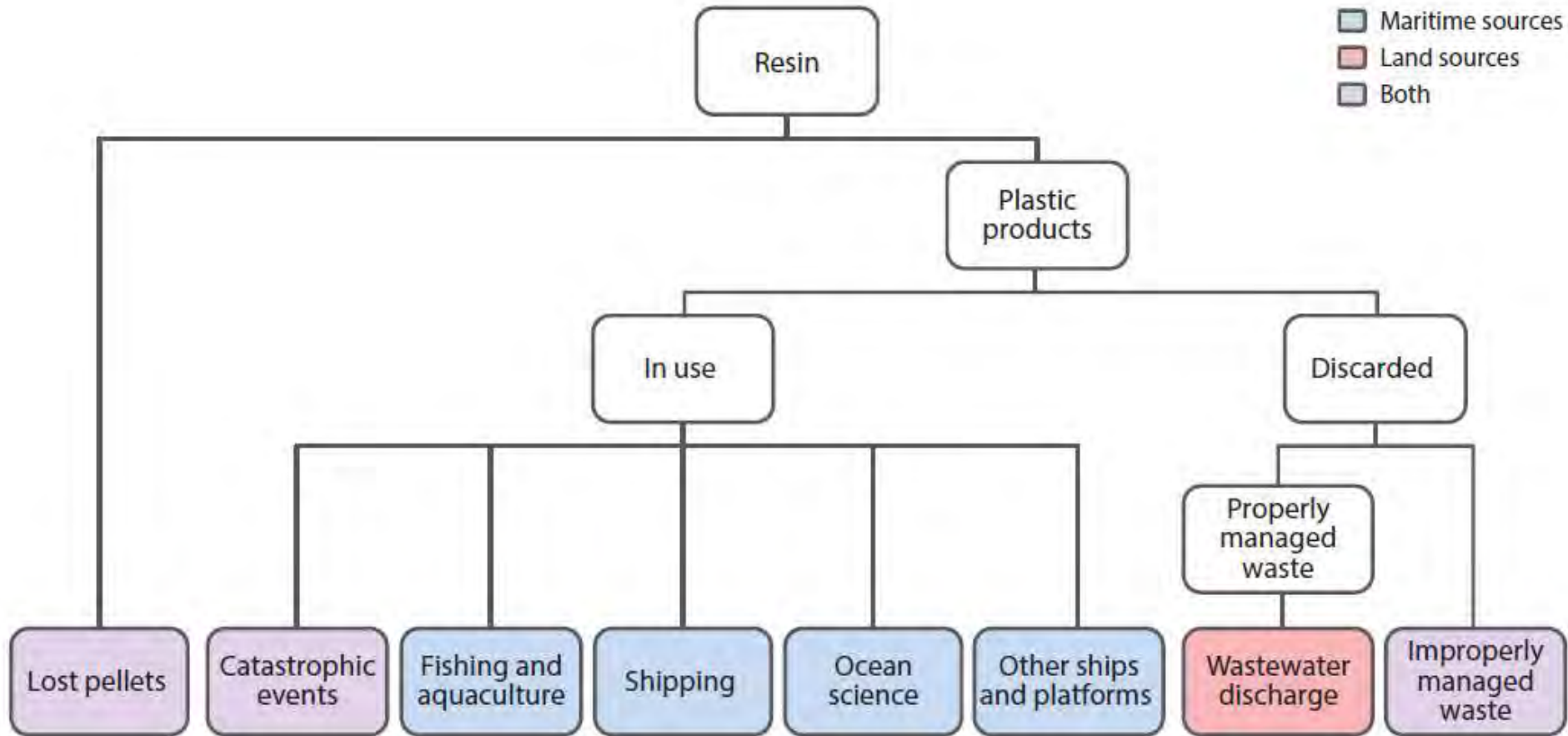
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Fate of Plastic in the Marine Environment

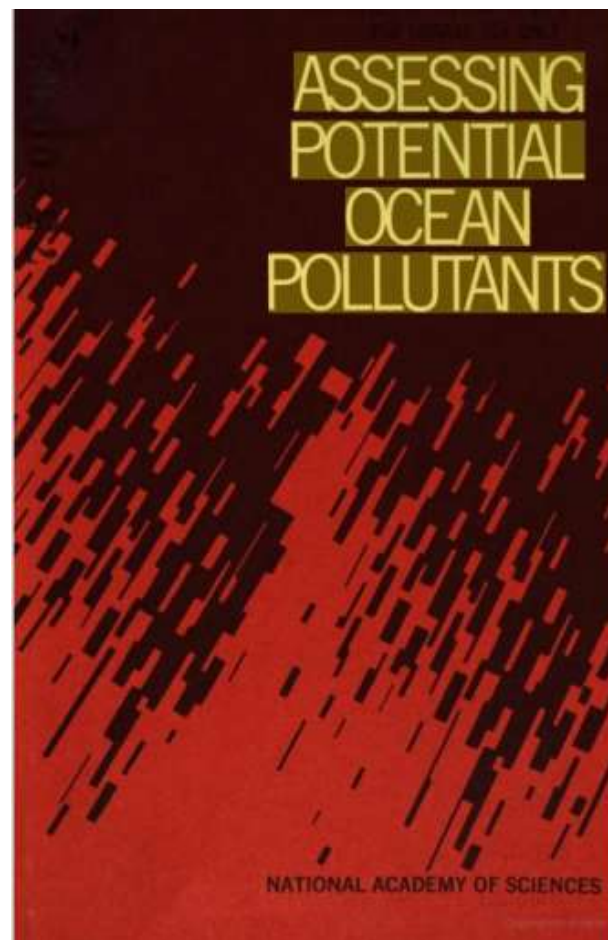


Some Sources of Plastic to the Ocean



How "big" is the issue? (from the land)

- NCEAS working group funded by the 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 global input has been estimated
- Primarily focusing on plastic



Methods

Coastal countries
coastal buffer



*



*

Per capita waste
generation



*

Percent plastic in
the waste stream



*

Percent inadequately managed



+

Percent littered



)

Percent that enters
the ocean



=

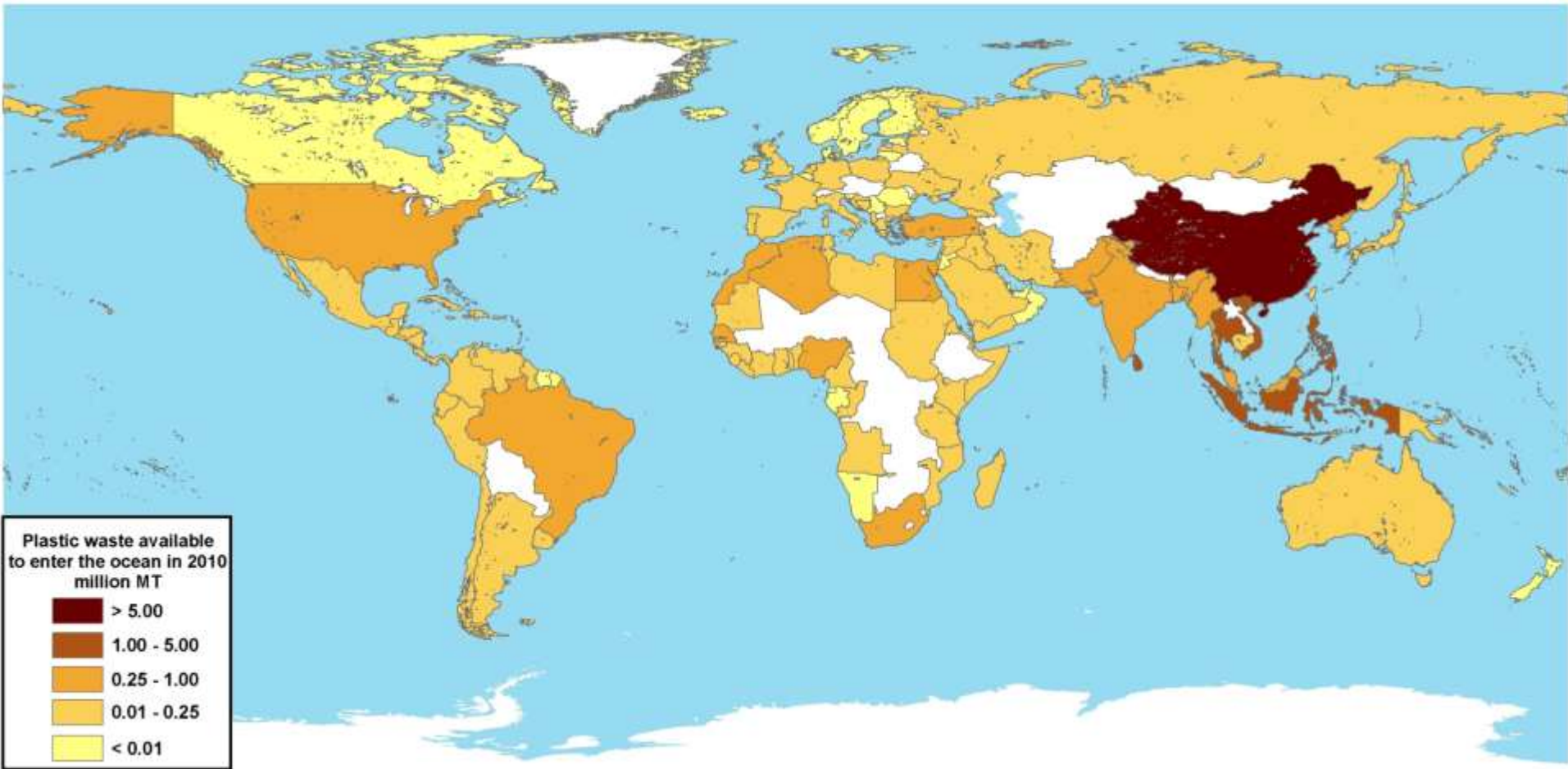
Percent that Enters the Ocean

- 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



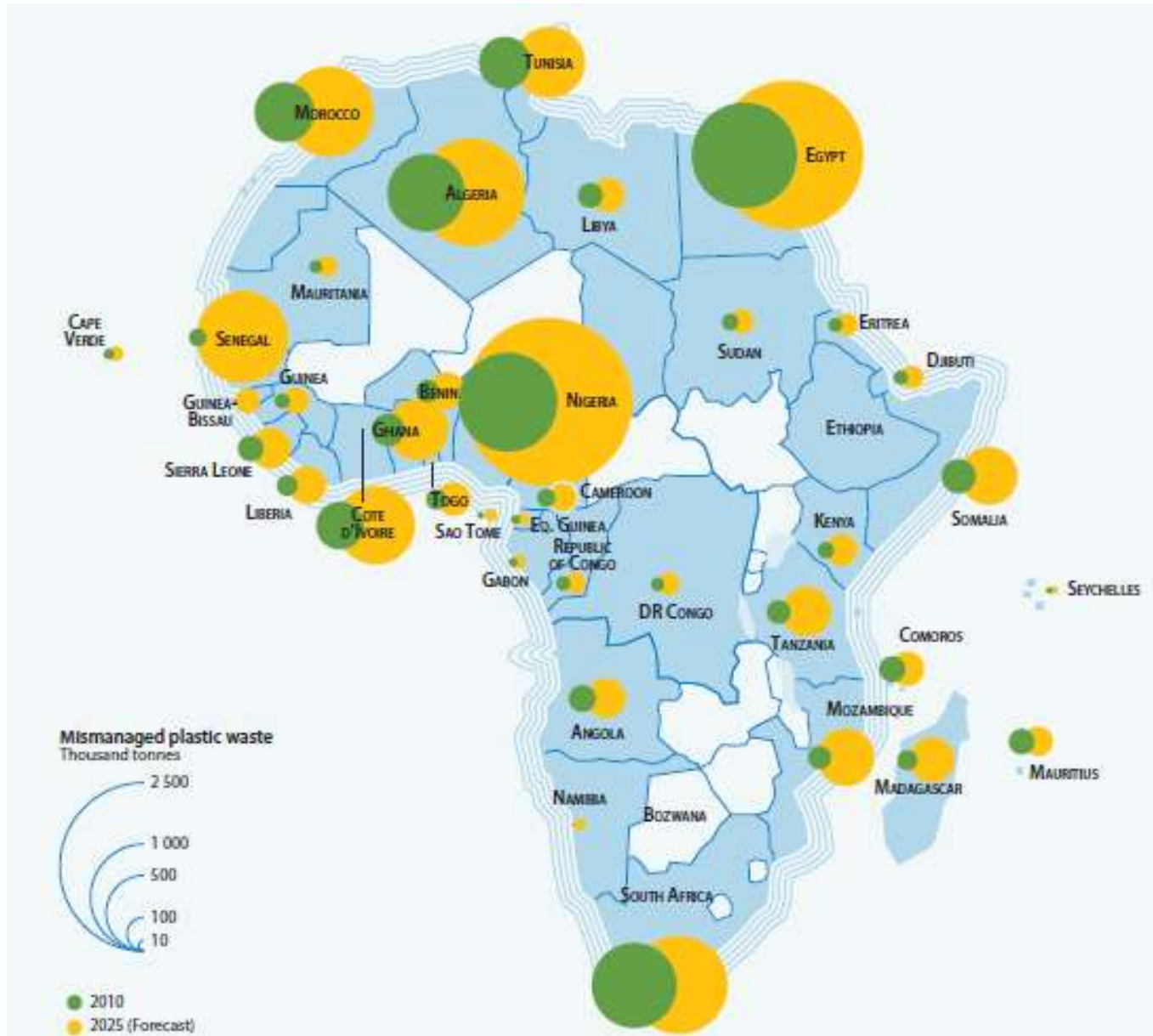


*Plastic Europe, "Plastics—the Facts 2013" (2010 data)
**Cobler et al., 2014; Erikson et al., 2014



[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.

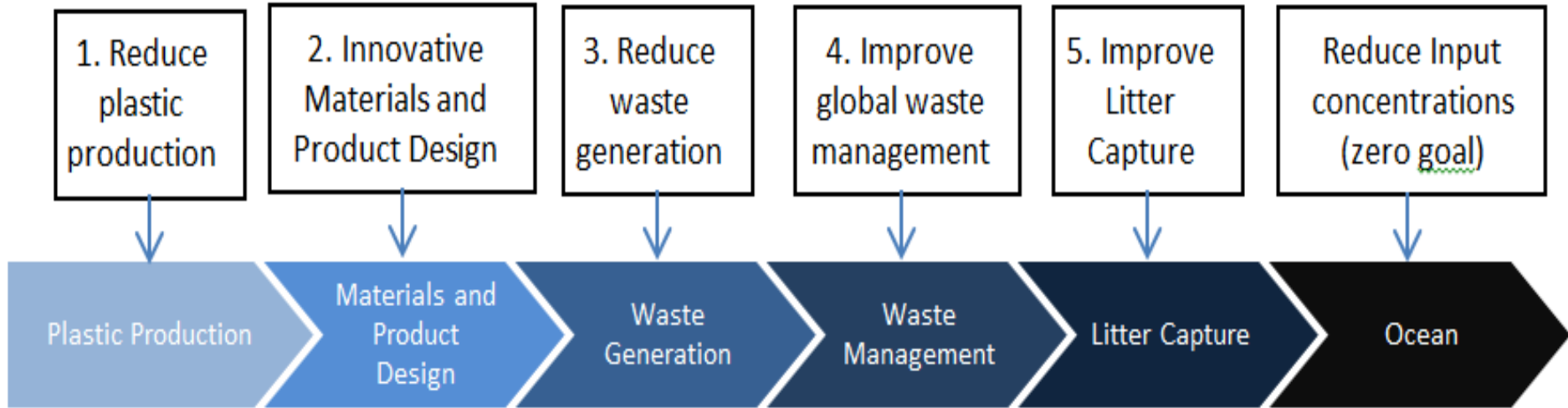
Mismanaged waste in Africa 2010 and 2025



Source: Jambeck, J.R., R. Geyer, C. Wilcox, T.R. Siegler, M. Perryman, and A. Andrady, "Plastic Waste Inputs from Land into the Ocean" Science 347, 2013.



Photos and © Jenna Jambeck



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

1. Consumer Choice (luxury) - Reduce Demand

- Advocate for the change you want to see
- Use less disposable (e.g., plastic) items
 - Reusable water bottles
 - Reusable bags
 - Reusable straws (stainless steel or glass)
 - Reusable picnic materials
 - Choose products with less plastic packaging
 - Choose products without microbeads



1 & 3. Collaborative, Sharing Economies



Ride

Bike share is great for quick trips around town or leisurely rides through the park. Use it to commute to work or school, run errands and explore the city.

I do not need a drill.
I need a hole in the wall



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



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Dresses (3557)

SORT BY RECOMMENDED ▾



ABOUT » MEMBERSHIP » INVENTORY » 3D PRINTS & LASER CUTTING » YOUTH » WORKSHOPS » MEDIA » DONATE »



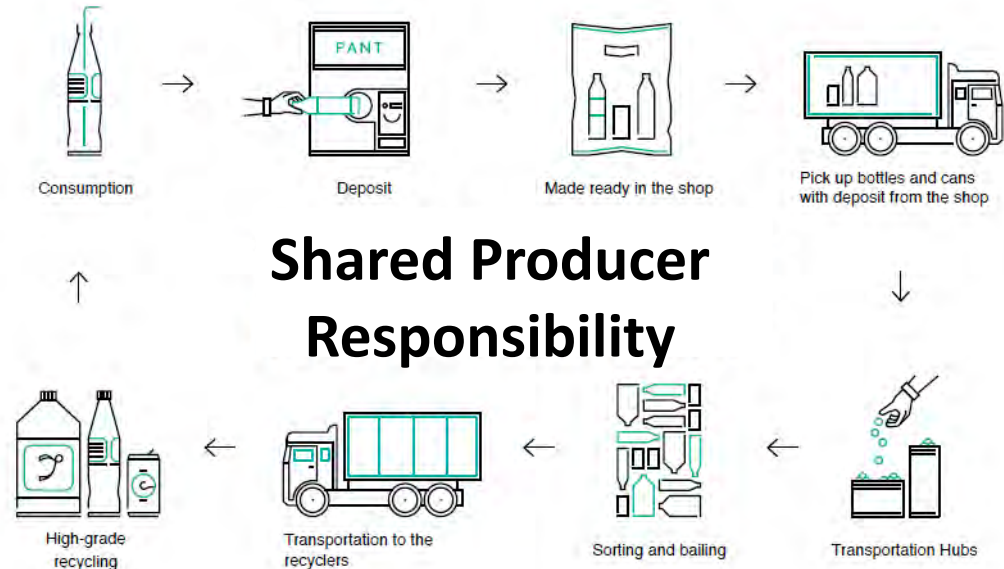
EASY UPCYCLING PROJECTS FOR KIDS

TTL Kids! happily situates itself in The Maker Movement, which can be broadly defined as a collective of people around the world who are employing do-it-yourself or do-it-with-others techniques to develop unique products and devices. Tinkering, coding, building, creating and innovating - together. This movement rests on makers making their designs open-source and available for anyone to reproduce off Internet sites such as Instructables or Thingiverse. We believe that getting kids involved in areas that teach the skills and thought processes...

2. Consider End-of-Life at Design Stage



PET BOTTLE



Shared Producer Responsibility

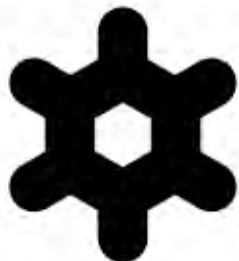
Extended Stakeholder Responsibility

2.



THE UNIVERSITY OF GEORGIA

New Materials Institute



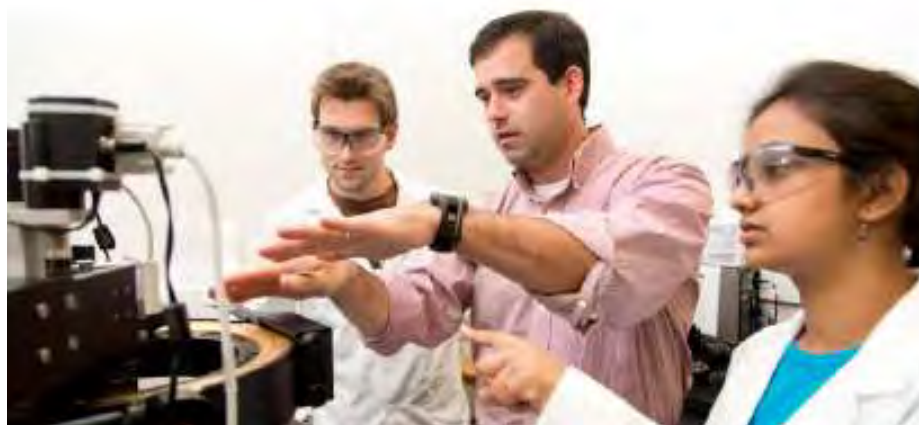
**Advanced
Fiber + Coating
Technologies**



**Circular
Materials
Management**



**Novel
Biodegradable
Polymers +
Additives**





2 & 3. 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

4. Improve Waste Management Infrastructure Globally

- Collect



- Capture



- Contain





Photos and © Jenna Jambeck

SALLY
JUNK SHOP
 2297 F.B. Harrison Street, Pasay City
 CONTACT NO. 569-9842/0929-727-8657

1994
 WAL NO PAG-INOM NG ALAK SA
 UGAR, GUSALI AT SEMENTERYO
 NO ANUMANG ORAS MADING
 HANA NG KADIMLANG PARUSA
 2002
 NO PAGGANA O PAGLIKHA
 MENTED !!!



Lance Gabriel
 by One Stop Junkshop
 Tell# 8348939 / 09055324400

PRICE LIST

Copper A	Battery
B	MCB 15M
C	15M
Drum	25M
Aluminum	35M
Zinc	65M
Bakal	20
Tarp/rodo	40
Iron	50
Lata	
Alambre	Lata
Cantos	Coligo
Papel Puti	Moro
Gloryo	30M
Magazine	
Libro	
Pei	
Shank	

The shop is do well closed up

Photos and © Jenna Jambeck





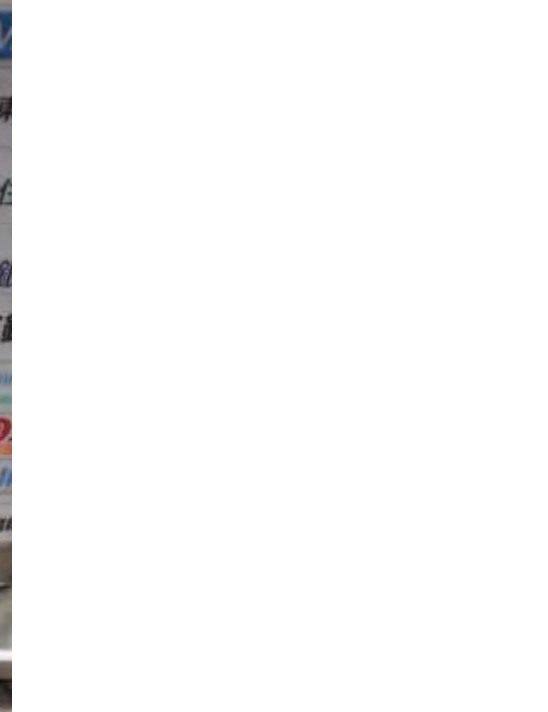
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4. Private Sector Involvement

NMI Industry Partner: Norton Point



Dell and others...

5. Last Chance Capture...

(but need infrastructure to manage & should capture data for upstream solutions)



<http://www.postlandfill.org/baltimore-water-wheel-floaty-trash-meets-match/>

Jakarta, Indonesia



Jakarta Sanitation Agency

Photo: Wawan Hadi Prabowo

saunie @saunieindiego Feb 11
@Care4Ocean @DebrisTracker Thousands of miles away, same kinds of plastic litter.



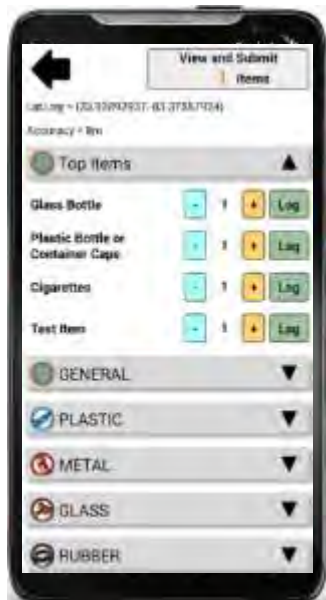
MUVE @muvemiami 12
#Volunteers are collecting and logging #marinedebris today at #VirginiaKey with @DebrisTracker. #getmoving pic.twitter.com/evk2zLSyFX



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/>



View and Get Data

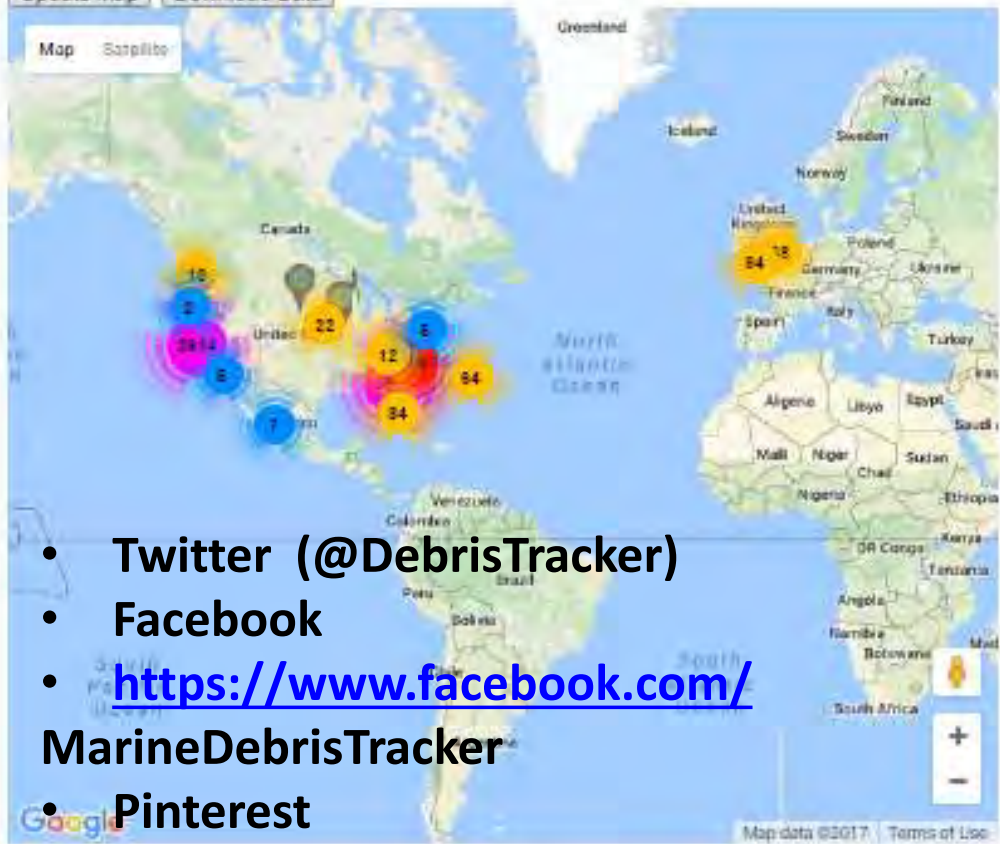
Marine Debris Items

- Ocean Conservancy ICC List
- Internacional Coastal Cleanup Lista en español
- AAAS Water Diplomacy Symposium List



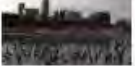







From: To:

Enter your Marine Debris Tracker login information if you want to download only your data

User: Password:



- Twitter (@DebrisTracker)
- Facebook
- <https://www.facebook.com/MarineDebrisTracker>
- Pinterest

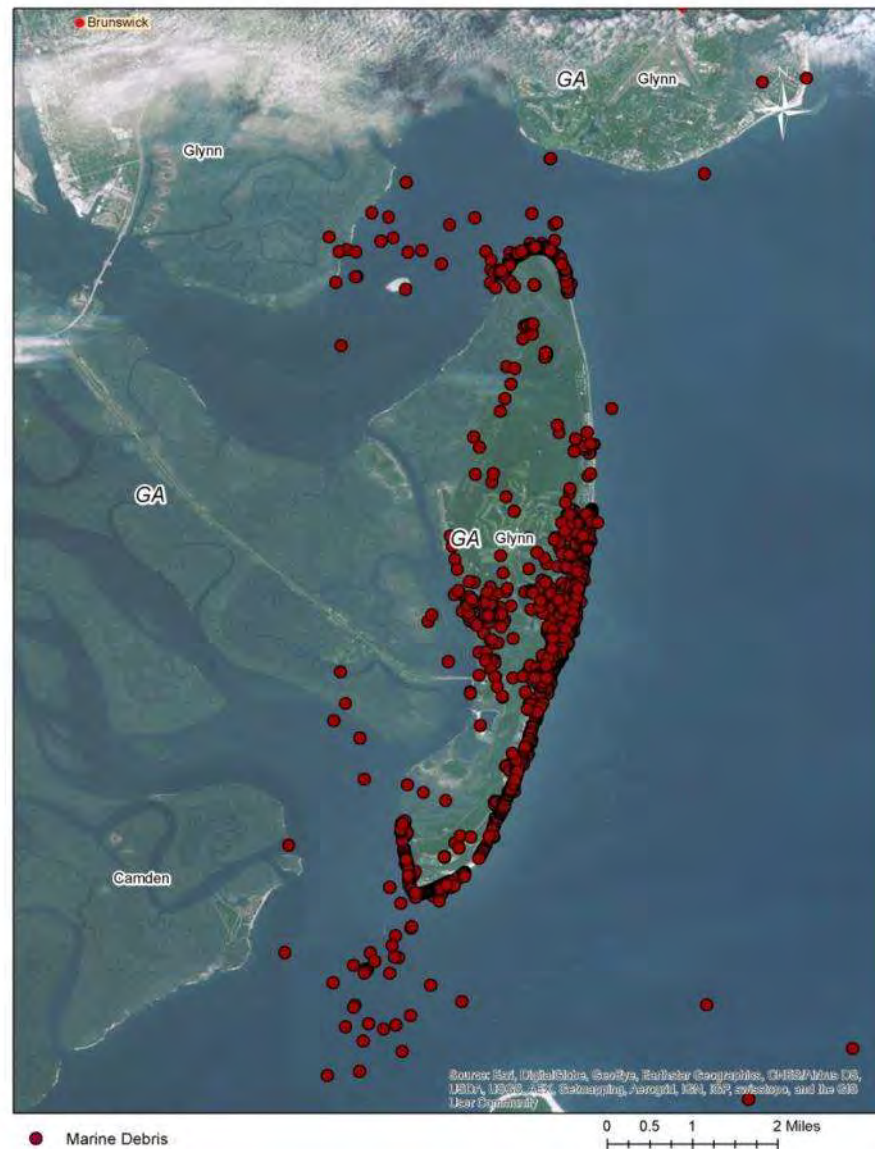
User	Description	Items Logged	Entries	Badge
 GSTC Citizen Science	The Georgia Sea Turtle Center is a marine turtle rehabilitation, research, and education facility on Jekyll Island. The Center's Marine Debris Citizen Science participants keep Jekyll Island's beaches free of marine debris.	229136	35736	
 OldMarketPhoto	Old Market Photo has a passion for photographic light and to take 18,000 steps a day. The path behind him is cleaner than what faces him because he picks up litter and documents it all with MDT! Find him on Twitter @oldmarketphoto.	85087	10591	
 muvemiami	Museum Volunteers for the Environment (MUVE) is Patricia and Phillip Frost Museum of Science volunteer based restoration project. Conserving coastal habitats in South Florida.	39460	6903	
 IslandLife @CaviOcean Feb 15 @IslandLifeTracker This went end up in our ocean!				
 @user This was my Valentine's Day. After pick up from the beach, I was at...				



Citizen-Based Litter and Marine Debris Data Collection and Mapping

Jenna R. Jambeck and Kyle Johnsen | University of Georgia, Athens

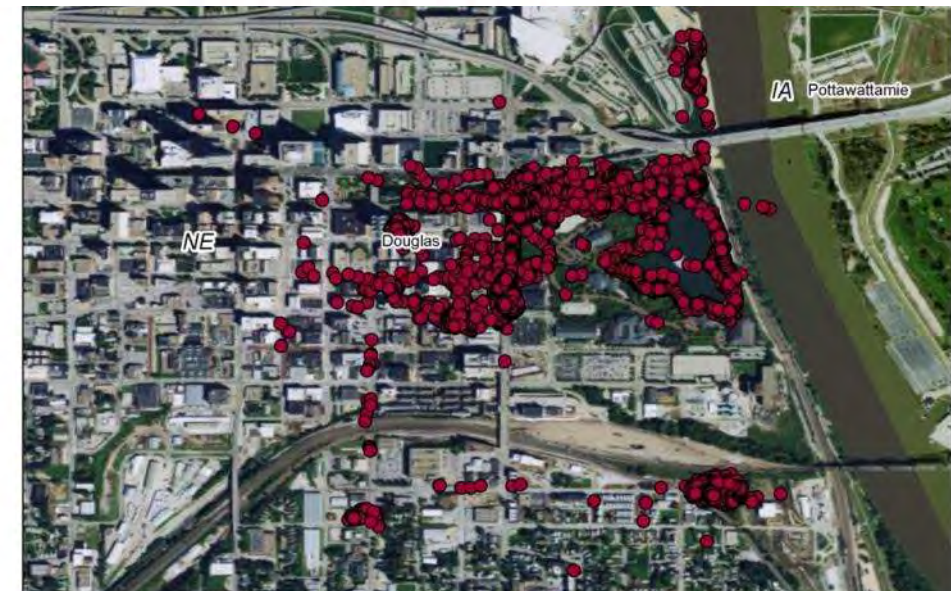
The monitoring of litter and debris is challenging at the global scale because of disconnected local organizations and the use of paper and pen for documentation. The Marine Debris Tracker mobile app and citizen science program allows for the collection of global standardized data at a scale, speed, and efficiency that wasn't previously possible.



● Marine Debris

0 0.5 1 2 Miles

Jekyll Island, Georgia
Marine Debris Tracker Data



6 Years Cumulative Effort

Legend

Marine Debris

Events



CLOTH



FISHING GEAR



GLASS



METAL



OTHER ITEMS



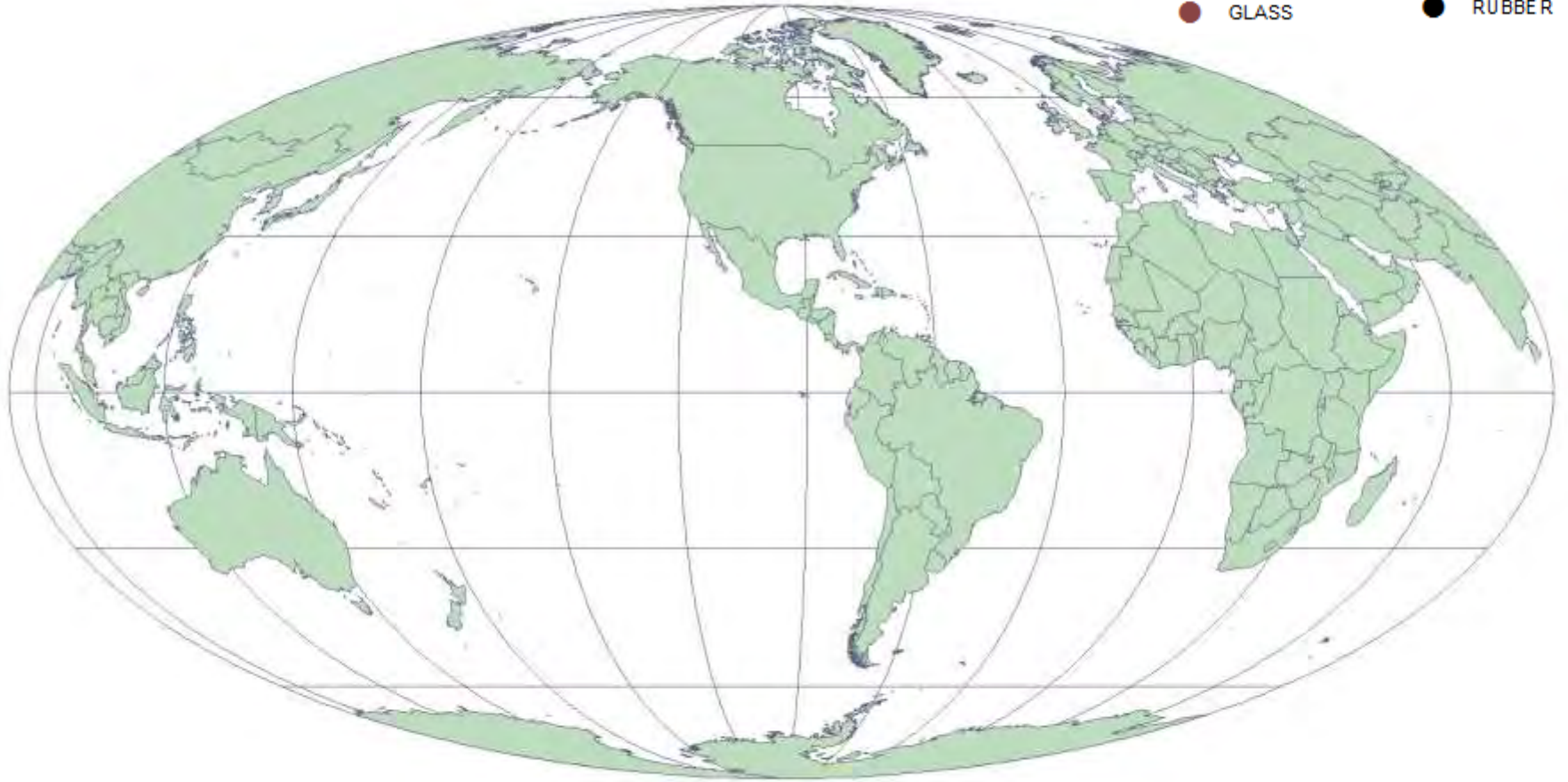
PAPER & LUMBER



PLASTIC

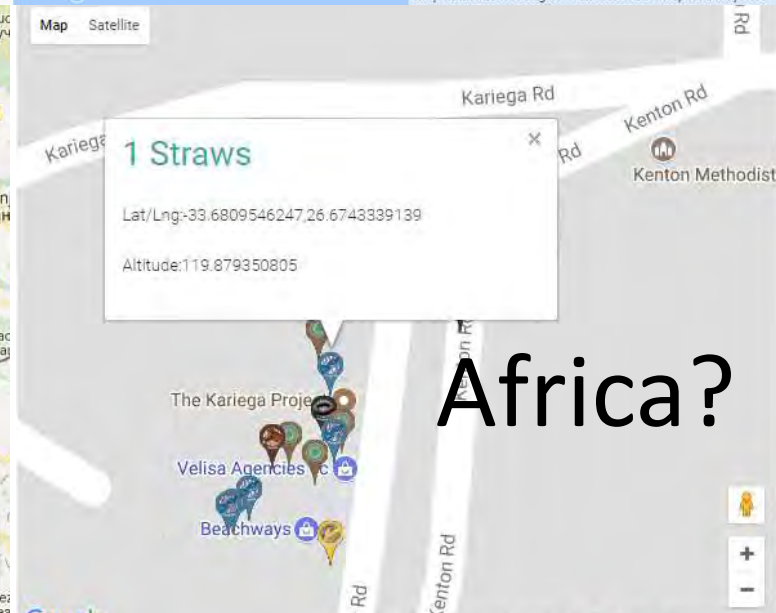
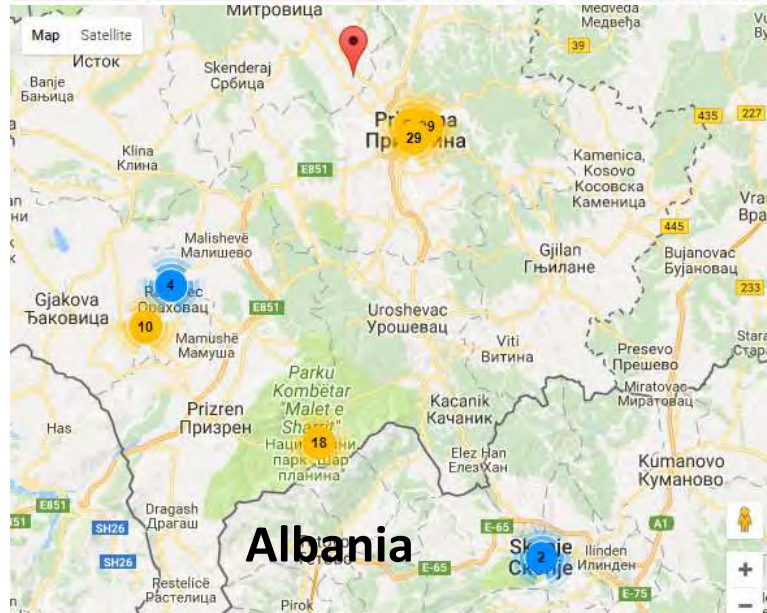
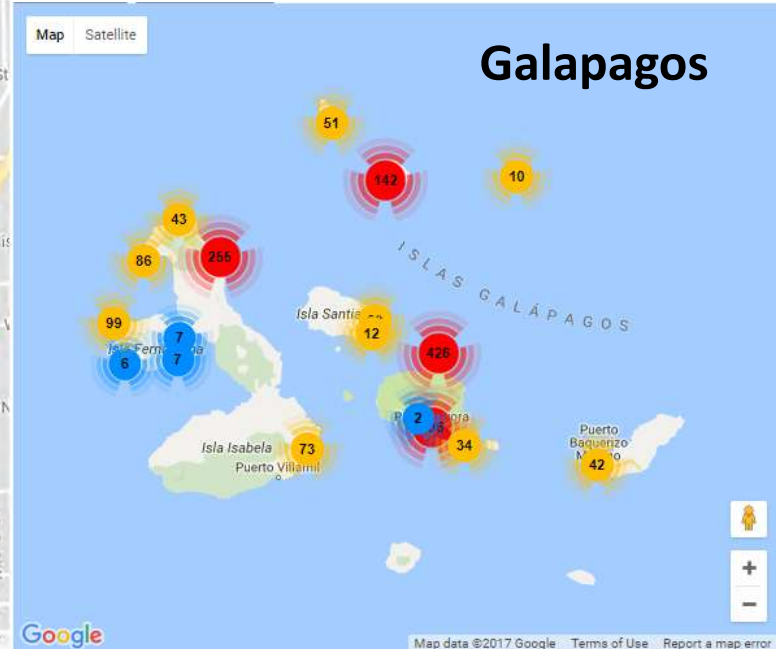
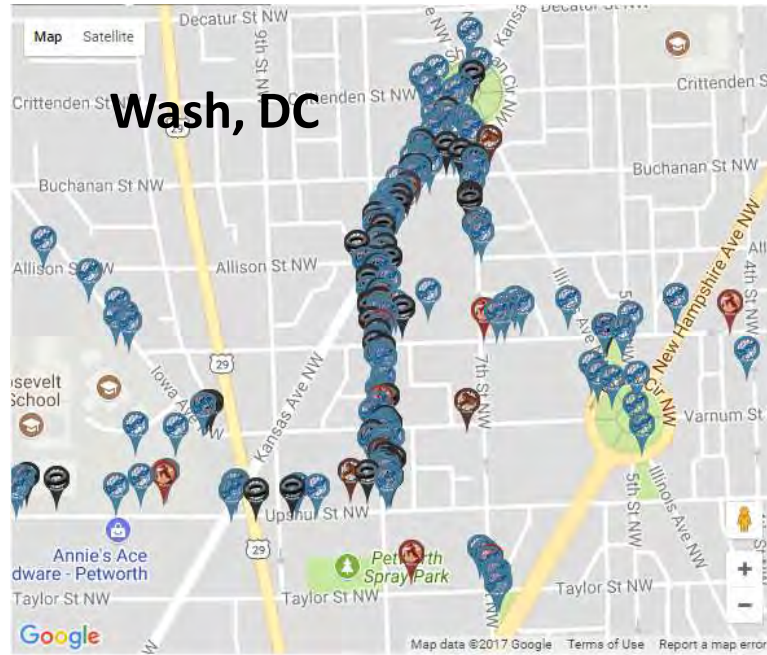


RUBBER

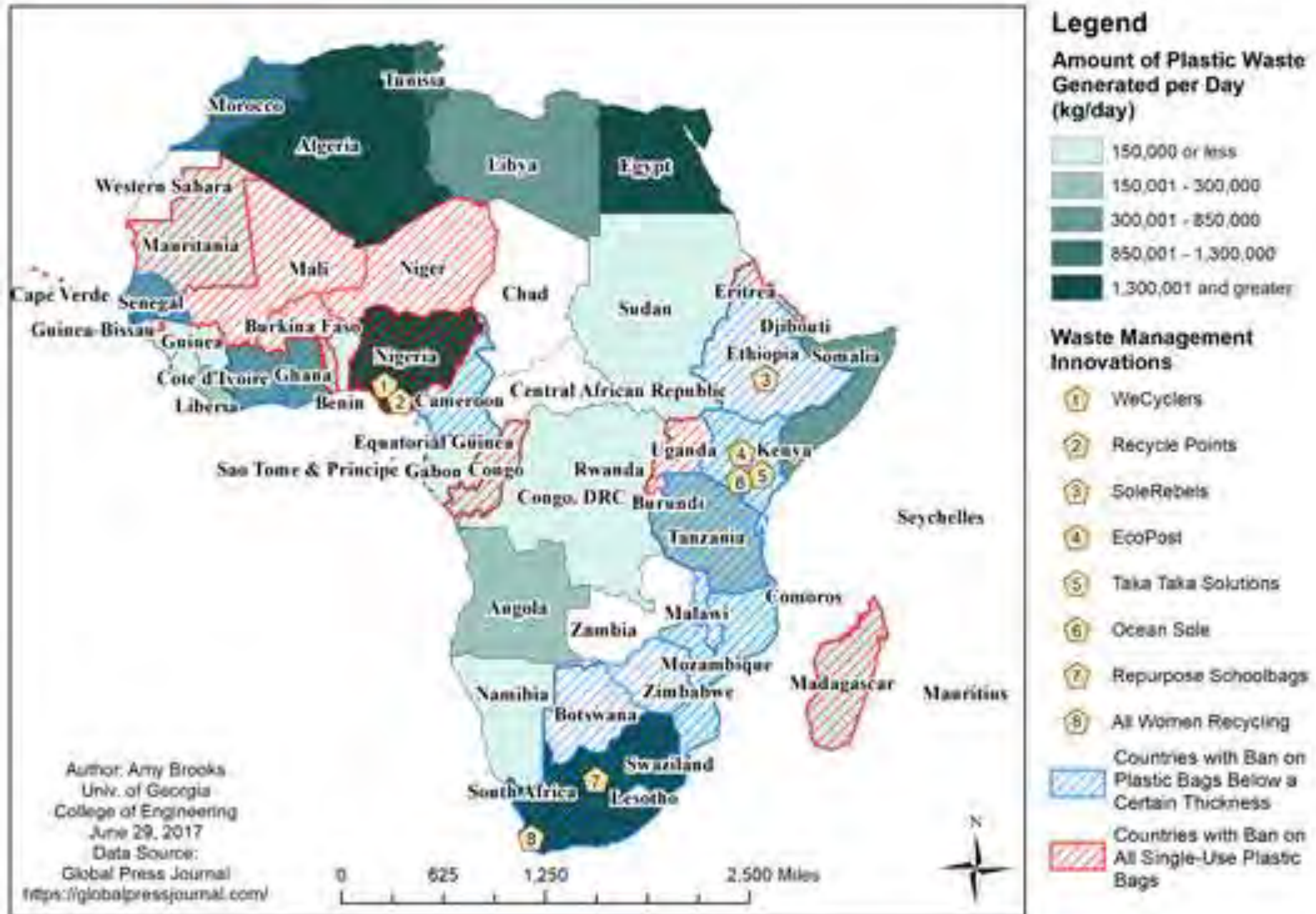




Data to Inform Solutions



Plastic Waste, Policy and Innovations in Africa



Global Outreach, Diplomacy, Policy Initiatives



US State Dept. Chile, Philippines, Indonesia, Japan, South Africa

World Bank, G7, G20, APEC (+OC)

UNEP – UNEA, Clean Seas, Global Convention (?)

Other Countries: Denmark, Norway, UK, Canada, *Netherlands*

USA: Save our Seas Act: Local and Global Goals (NOAA)

ISU – Ellen MacArthur Foundation Design Competition (Judge)

Global Investment Strategies



Moss, E., Eidson, A., and Jambeck J., 2017. Sea of Opportunity: Supply Chain Investment Opportunities to Address Marine Plastic Pollution, Encourage Capital on behalf of Vulcan, Inc., New York, New York.



MARINE LITTER NETWORK

[GLOBAL PROJECTS](#) ⌵

[POLICY AND ACTION](#) ⌵

[RESOURCES](#) ⌵

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[ABOUT](#)



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Hosted by the Global Partnership on Marine Litter, this is the place for the most up-to-date information on marine litter worldwide. Come here for recent news, [global projects](#) and state-of-the art [science](#).

What's Happening? Marine Litter in the News.

- [Plastic debris inundates remote UK coasts endangering wildlife](#)

Join the [#marinelitter](#)
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EVENTS

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- [5 Things You Probably Didn't Know About Singapore's Waters](#)

Source: Marine Debris | Published on 2017-06-15

- [Cleaning Cayman's beaches](#)

Source: Marine Debris | Published on 2017-06-14

- [Community action targets **marine debris**](#)

Source: Marine Debris | Published on 2017-06-14

- [Long Beach Island Grade School's 'Waves of **Debris**' Installation Merges Art and Environmentalism](#)

Source: Marine Debris | Published on 2017-06-14

- [Are bans on plastic the solution to **marine litter**?](#)

Source: Marine Litter | Published on 2017-06-13

- [Pacific voyage reveals depth of plastic pollution crisis](#)

Source: Marine Debris | Published on 2017-06-13

- [Pacific voyage reveals depth of plastic pollution crisis](#)

Join the **#marinelitter**
#marinedebris
conversation.

Tweets



MUSTARD SEED

@MAZHAR_ALI

#Ocean plastics fm #Haiti's beaches recycled for laptop #packing
newscientist.com/article/213433... via @anita_makri #marinelitter #BreakFreeFmPlastic



Ocean plastics from Haiti's...
Laptop packaging is an unlik...
newscientist.com



Aquarius Systems

@AquariusSystems

Fisheries & Marine Institute challenging residents to help tackle threat facing ocean: litter



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