REDUCING MARINE DEBRIS FROM THE BAYOU CITY TO THE BAYS:

THE GREATER HOUSTON-GALVESTON TRASH-BASED AQUATIC ACTION PLAN

Amanda Hackney

3/15/18

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MARINE DEBRIS

Defined by the NOAA Marine Debris Act of 2006 as:

- "any persistent solid material that is manufactured or processed and directly or indirectly, intentionally or unintentionally, disposed of or abandoned into the marine environment or the Great Lakes"

HOUSTON…WE'RE A LITTLE TRASHY

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In 2015, there were 6,656,947 people in the Houston Metro area

Each day Houston could produce

5,365,299 lbs

of plastic, or

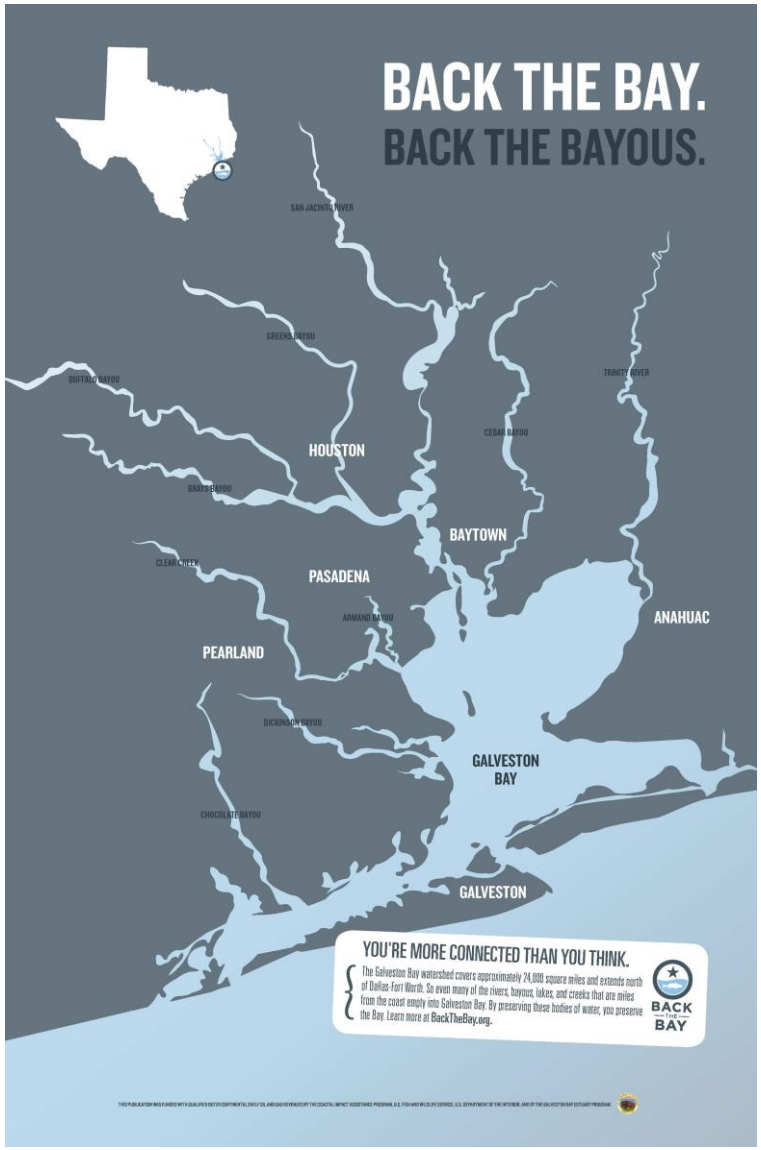
1,958,407,200 lbs

per year

(~ 979,200 tons)

TRASH SOURCES

- Trash is ocean or land based
  - 80% of plastic in the ocean is from shorelines
  - 10% from fishing gear
  - 10% from boats and ships
- Land based debris:
  - Urban and industrial waste sites
  - Sewage and storm water outfalls
  - Terrestrial litter transported by rivers or left by beach users
  - Rivers have been estimated to contribute 1.15–2.41 million tons annually



(McLendon 2010, Le Pen 2018)

WHY IS PLASTIC MARINE DEBRIS AN ISSUE?

- The composition of marine debris is shifting; over the past 50 years, **organic materials yielded to synthetic polymers** as the most abundant material found in solid wastes (Sheavly, 2010)
- Among the **8 billion tons of plastic produced since 1950, 60%** have been discarded in landfills or in the natural environment (Le Pen, 2018)
- In some compartments of the marine environment, plastic represents up to **95% of marine litter** (Le Pen, 2018)

BAYOU CITY AND OUR DIRECT LINE TO THE GULF

- Between 4.8 and 12.7 million metric tons of plastic entered the ocean in 2010 from people living within 50 kilometers of the coastline worldwide
- The oceans take in roughly 8 million metric tons of plastic in a typical year
- This is the equivalent of finding five grocery bags full of plastic on every foot of coastline in the 192 countries examined in the study

(Jambeck et al., 2015) (Schupska, 2015)

BAYOU CITY AND OUR DIRECT LINE TO THE GULF

- "Sources and Distribution of Debris in the Galveston Bay Estuary", **1993**
- **Plastic accounted for over 50% of debris items** in shoreline and submerged areas
- Plastic accounted **for 25% of items in nearshore**, with another 25% classified as industrial/ construction (brick, carpet, cans, shingles, tar, other)
- **"Stopping debris from entering Galveston Bay is the key to solving the debris problem."**

(Morgan & Lee, 1993)

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FROM OUR HOME TO THE WATER

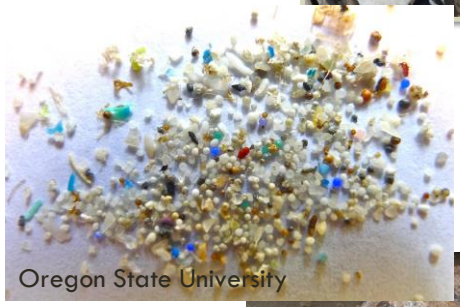
HOW DOES TRASH AFFECT HABITAT?

- Plastic debris can alter light and oxygen availability
- Micro-plastics can change the permeability and temperature of sandy beaches- causing issues for temp dependent reptiles
- Simply takes up space
- Can alter the availability of refuge areas- providing hard surfaces for the transfer of non-native taxa

U.S. National Park Service; Mote Marine Lab, Sarasota, FL

HOW DOES TRASH AFFECT WILDLIFE?

- Two major complications:
  - Ingestion
  - Entanglement
- Due to ingestion or entanglement in plastic debris, **over 270 species** (turtles, fish, seabirds, and mammals) have experienced impaired movement, starvation or death (Sigler, 2014)



Oregon State University

National Park Service

HOW DOES TRASH AFFECT THE ECONOMY?

- Main economic sectors affected by marine litter are:
  - Agriculture
  - Aquaculture
  - Fisheries
  - Commercial shipping and recreational boating
  - Coastal municipalities
  - Coastal tourism sector
  - Emergency rescue services

HOW DOES TRASH AFFECT THE ECONOMY?

- Texans for Clean Water estimates that **$21.1 million is spent annually in the Houston region** on trash prevention, outreach, abatement and enforcement
- Evaluations of marine ecosystem services, which are estimated at **$20.4 trillion** (U.S.) in one study (Costanza et al.1997), suggest that even fractional deterioration in provision would represent a significant cost

SO HOW DO WE BEGIN ASSESSING THE PROBLEM?

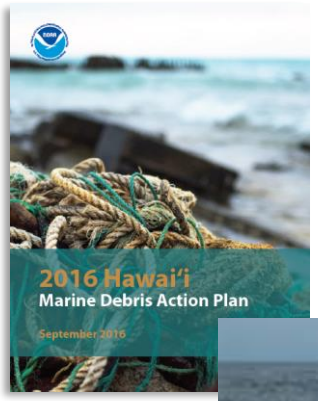
- Who (demographically) is doing the littering?
  - Who is having litter "escape" issues?
  - Concern with too much finger pointing- It's THEIR FAULT not mine….
- What is escaping into the system from waste management systems?
- When is trash escaping?
- Where in the Houston Galveston area is trash escaping?
- Why is the trash escaping into the system?

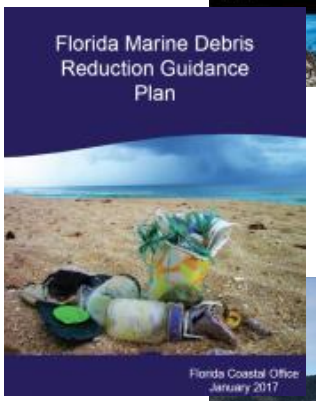
PROJECT BEGINNINGS: THE ACTION PLAN

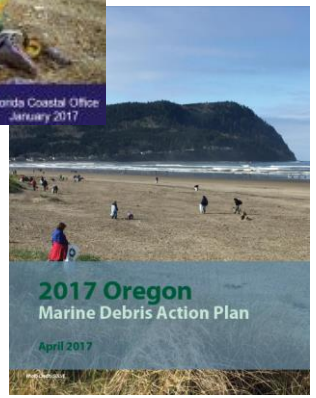
- The goals of this project are to discuss the need for:
  - Research & Assessment
  - Coordination
  - Prevention
  - Removal Emergency Response & Preparedness

EXAMPLE ACTION PLANS

- Completed literature reviews of Houston/ Galveston area research
- Reviewed existing marine debris plans
  - Hawai'i
  - Great Lakes
  - Florida
  - Oregon
- Contacted previous plan writers/ follow up on progress







DON'T TRASH A GOOD THING

Greater Houston-Galveston Trash-Based Aquatic Action Plan

TRASH SUMMIT WORKSHOP ONE: MAY 2017

- Stakeholders representing 18+ local nonprofit organizations and 12 local government entities
- Discussed methods to prevent/reduce marine debris and better coordinate regional efforts
- Began brainstorming development of a regional Trash-Based Aquatic Plan
- Drafts of goals for the Plan were developed

Meeting Sponsors:

WHY AN ACTION PLAN?

A non-regulatory guidance document

- The document is not intended to be regulatory or specifically binding on actions or timeframes.

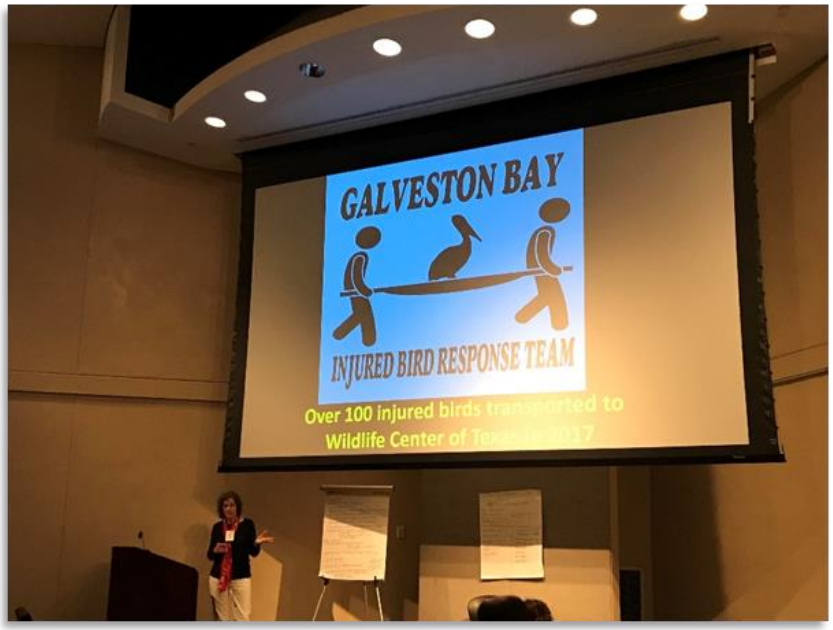
- Not just a communications plan for a marketing or awareness campaign.
- Plan addresses many aspects of marine debris and aquatic trash.

Components of an action plan framework

Modified from Integration and Application Network at University of Maryland Center for Environmental Science.

BUILD PARTNERSHIPS

- Identify key stakeholders
- Identify issues of concern
- Set primary goals



Still seeking industry, commercial, government and nonprofit partners

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CHARACTERIZE AND CONCEPTUALIZE

- Define the geographic area of focus
  - Lower Galveston Bay Watershed
- Characterize existing conditions
  - Great need for research and data analysis
- Gather existing data
- Identify gaps
- Identify causes and sources of trash pollution
  - Research needed
- Identify public awareness and perception

WHY DO WE LITTER?

Contextual variables

- aspects of the physical surroundings
  - availability of trash receptacles
  - existing litter
  - weather
  - time of day

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Personal variables

- were aspects of the individual
  - age and gender
  - motivational variables like awareness, attitudes, and feelings of personal responsibility.

LITTERING IN AMERICA: KEY FINDINGS

- Older individuals littering less than younger
- Individuals are much more likely to litter into littered environments
- When interviewing observed litterers, 35% denied littering in the past month, despite the fact that they were caught in the act
- Individuals who were observed littering were much less likely to report a personal obligation to not litter
- Posting litter prevention messages or signs in already-littered environments is likely to exacerbate the littering problem, rather than fix it

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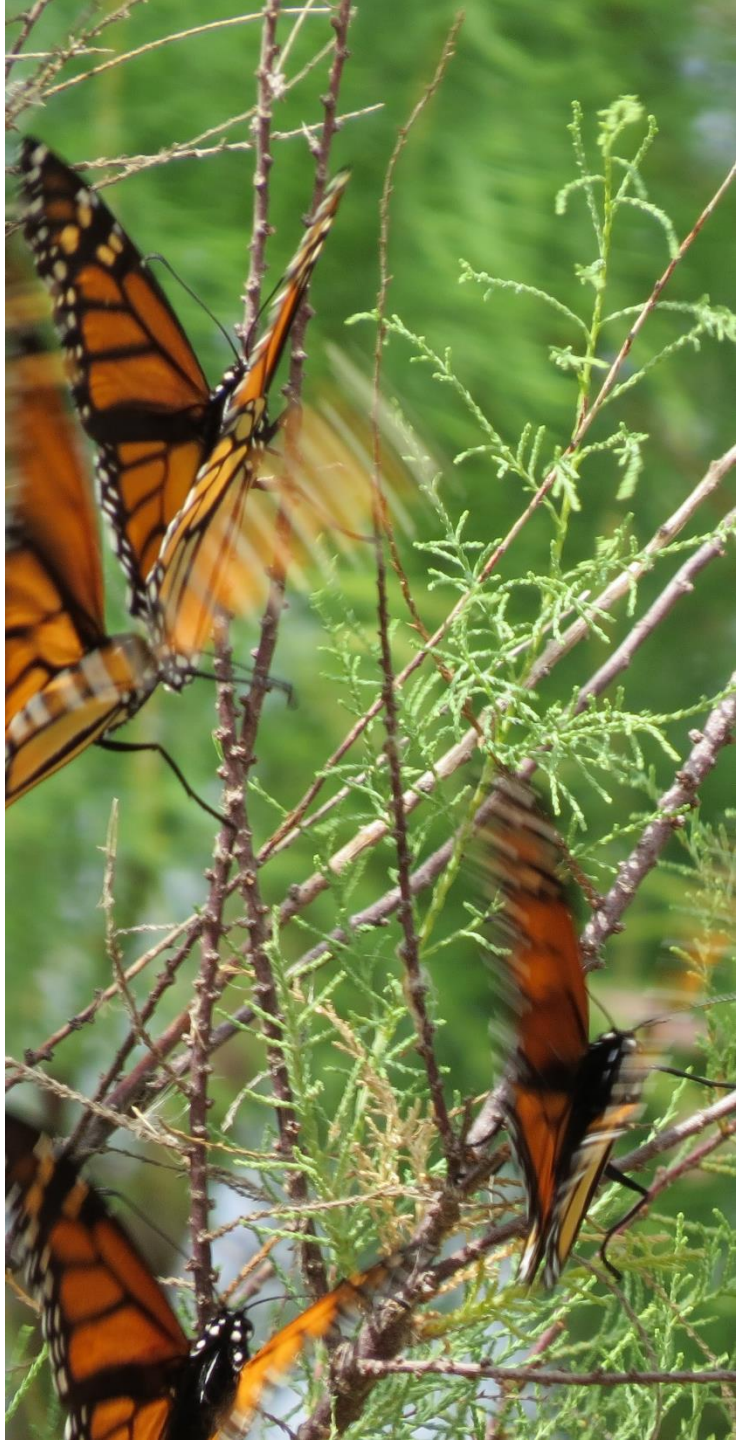
FINALIZE GOALS, IDENTIFY SOLUTIONS & PREPARE ACTION PLAN

- Set overall goals, strategies and objectives
- Develop targets
- Develop measures to achieve goals
- Identify lead implementers
- Set a timeline to achieve goals
- Set timeline to assess achievements and overall plan review

FINALIZE GOALS, IDENTIFY SOLUTIONS & PREPARE ACTION PLAN

- Draft a guidance document that is a compilation of recommended strategies and actions toward reducing the amount and impacts of marine debris
- **Not a final or prescriptive document**
- Plan is **voluntary** and designed to be a living document that can be updated based on successes and challenges in tackling existing marine debris issues



GOALS IDENTIFIED AT MAY 2017 TRASH SUMMIT

Goal 1: Conduct High Quality Research and Evaluation

- Strategy 1.1 Identify Resources and Current Efforts
- Strategy 1.2 Monitoring

Goal 2: Reduce Sources of Land-Based Debris through Prevention

- Strategy 2.1 Increase Awareness and Change Behavior through Education and Outreach
- Strategy 2.2 Promote and Encourage Extended Producer Responsibility
- Strategy 2.3 Enhance Efforts to Support Waste Reduction
- Strategy 2.4 Enhance Efforts to Utilize Physical Mechanisms to Prevent Debris

Goal 3: Reduce Sources of Water-Based Debris through Prevention

- Strategy 3.1 Increase Awareness and Change Behavior through Education and Outreach
- Strategy 3.2 Promote and Encourage Extended Producer Responsibility
- Strategy 3.3 Enhance Efforts to Support Waste Reduction
- Strategy 3.4 Enhance Efforts to Utilize Physical Mechanisms to Prevent Debris

Goal 4: Support and Sustain Removal of Traditional Litter and Trash

- Strategy 4.1 Removal
- Strategy 4.2 Disaster Debris

Goal 5: Increase Capacity for Large Debris Removal

- Strategy 5.1 Disaster Debris
- Strategy 5.2 Vessels
- Strategy 5.3 Vehicles

TRASH SUMMIT WORKSHOP TWO: OCTOBER 2017

- 20 partner organizations further discussed and refined goals and strategies for Action Plan
- Partners worked to refine language and determine best fit strategies for each category
- Project website (www.donttrashagoodthing.org) was introduced and the group discussed new features and capabilities they wanted on the site.
- Post-meeting, partners used website's member only forum to comment further on strategies and to begin suggesting actions

GOALS FOR THE GROUP WEBSITE

- Act as a rallying point for partners
  - Partner event calendar
  - Member only pages with login
  - Links/ display partner videos, news releases
- Offer up information to the group
  - Easy to access regional documents, scientific journal articles of interest and example debris plans
- Handle registration and communications to the group
- Currently focused on partners, will transition to more public use

www.donttrashagoodthing.org

JANUARY 2018 GOAL FINALIZATION

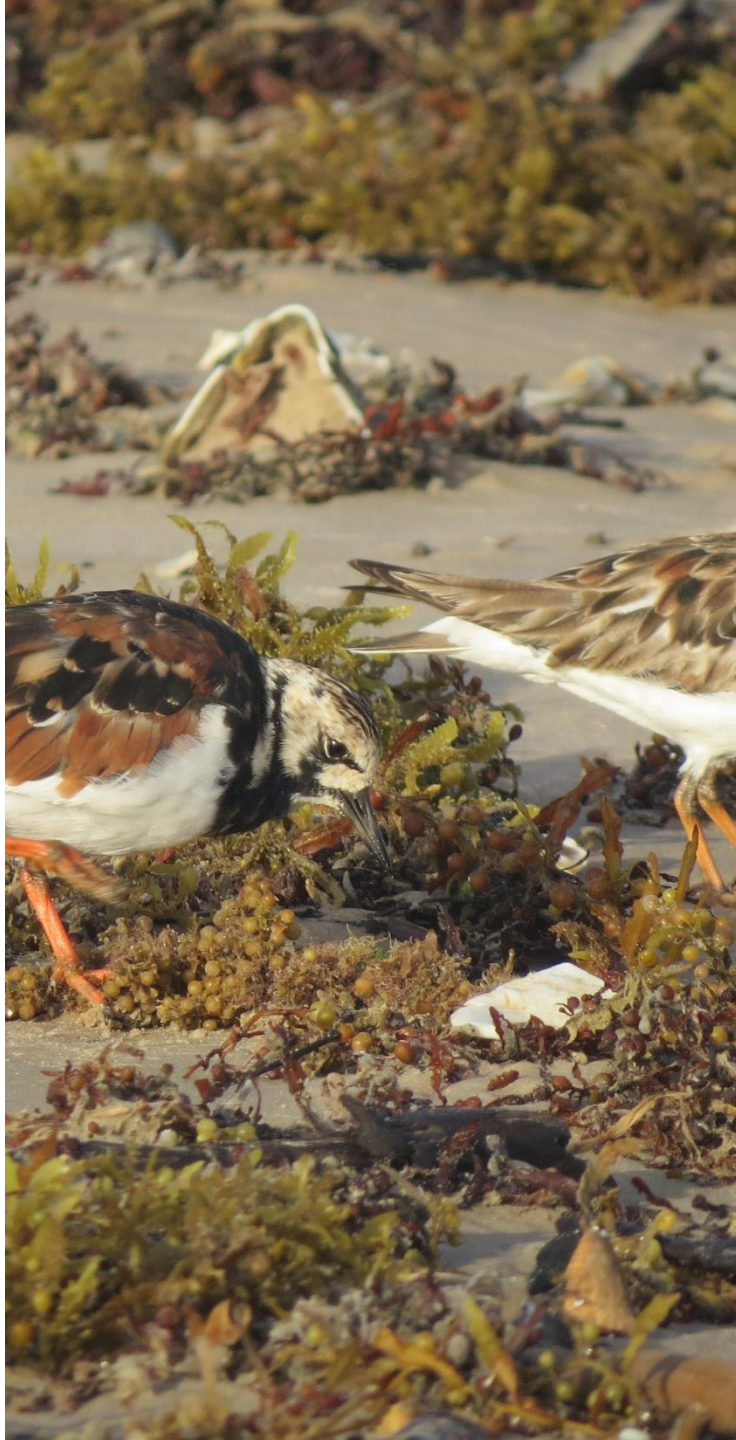
- Series of conference calls conducted in January 2018
- Suggested goal language had been compiled from members
- Members also offered strategies and actions to fit under goals
- Additional strategies/ points of discussion pulled from example plans

JANUARY 2018 GOAL FINALIZATION

- Goal 1: Conduct High Quality Research and Needs Assessment
  - Strategy 1.1 Identify resources and current efforts
  - Strategy 1.2 Data gap assessment to prioritize needs
  - Strategy 1.3 Develop understanding of life cycle, transport, quantity and accumulation rate of marine debris
  - Strategy 1.4 Monitoring and standardization

JANUARY 2018 GOAL FINALIZATION

- Goal 2: Reduce Sources of Land-based and Water-based Debris Through Prevention
  - Strategy 2.1 Increase awareness and change behavior
  - Strategy 2.2 Promote and encourage producer and merchant responsibility
  - Strategy 2.3 Enhance efforts to support waste reduction



JANUARY 2018 GOAL FINALIZATION

- Goal 3: Support and Sustain Removal of Litter, Trash and Debris
  - Strategy 3.1 Removal of traditional litter
  - Strategy 3.2 Removal of disaster debris
  - Strategy 3.3. Increase capacity for large debris removal (including abandoned vessels and vehicles)

Components of an action plan framework

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NEXT STEPS FOR THE GREATER HOUSTON-GALVESTON REGIONAL STAKEHOLDERS….

- Reconvene to work on strategies for the goals that were set in early 2018
  - Meeting will likely be May 2018
- Continue to build partnerships and bring in additional stakeholders who can contribute to preparing the plan and implementing actins.
- Establish timeline for releasing the plan
- Establish timeline for implementing actions
- Locate funding to speed up process

HOUSTON WE HAVE A PROBLEM… AND SOLUTIONS!

- **We need you! Seeking partners in all industries and sectors**
- **www.donttrashagoodthing.org**
- Amanda Hackney: Black Cat GIS & Biological Services
  - a.hackney@blackcatgis.com
- Stephanie Glenn, Erin Kinney: Houston Advanced Research Center
- Cynthia Clevenger, Lisa Marshall: Galveston Bay Estuary Program
- Rebecca Begley: Houston- Galveston Area Council

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HARC

GALVESTON BAY ESTUARY PROGRAM

Houston-Galveston Area Council