

BAGS, BUTTS, AND FOAM

Leveraging Marine Debris Data to Support Marine Debris Mitigation Efforts on Maui

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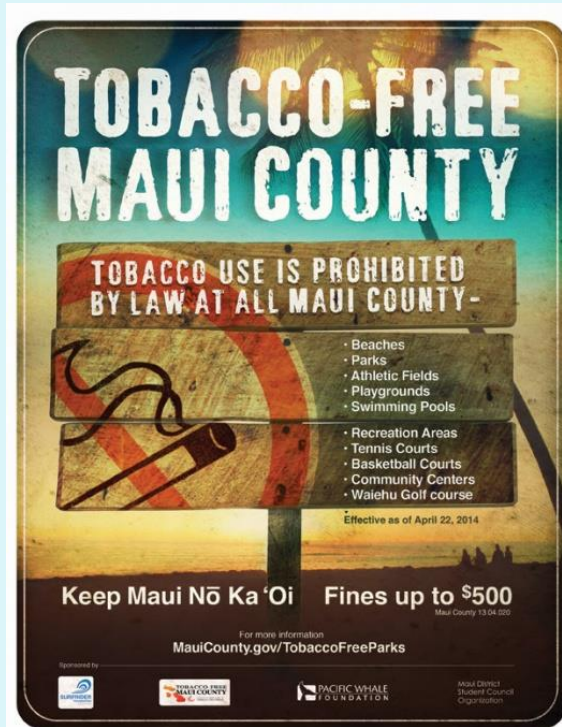




MAUI COUNTY HAS LED HAWAI'I IN PLASTIC POLLUTION LEGISLATION



Maui - 2010
All 4 Counties - 2015



Maui - 2014



Maui - 2017

VOLUNTARY PROGRAMS



GRASSROOTS EFFORTS REMOVE DEBRIS AND RAISE AWARENESS



But are only one part of the equation

LOCAL STUDENTS SORTING 25,055 CIGARETTE BUTTS ON COUNTY LAWN



SHOW US THE DATA!!



BUT WE STILL NEEDED DATA!

LOCAL ACCUMULATION SURVEYS

- **Straight forward marine debris data collection method**
- **Low cost and time commitment**
- **Easy to train volunteers (citizen science!)**

NOAA Marine Debris Shoreline Survey Field Guide

Sarah Opfer, Courtney Arthur, and
Sherry Lippiatt

LOCAL ACCUMULATION SURVEYS CAN HELP US UNDERSTAND MARINE DEBRIS...

- 1. Loads – How much debris is on the coastline?**
- 2. Sources – Where is the debris coming from? (land vs. ocean)**
- 3. Types – What specific types of debris are we finding? (e.g. bottle caps, plastic pieces, fishing gear)**
- 4. Drivers – What factors are driving debris accumulation? (e.g. wind, waves, location to population centers)**

LOCAL ACCUMULATION SURVEYS

Establishing baseline marine debris data can....

- 1. Provide evidence of the extent to which local sources vs. ocean-based sources contribute to Maui's debris loads.**
- 2. Allow us to evaluate the effectiveness of local policies and programs aimed at reducing marine debris (particularly single-use plastics).**

LOCAL ACCUMULATION SURVEYS

- 3 sites
- 100 meter transects
- Sampled on 28 day intervals at low tide
 - Site 3 sampled daily during January 2015
- Size > Bottle Cap (~2.5 cm)
- On-going data collection since 2014



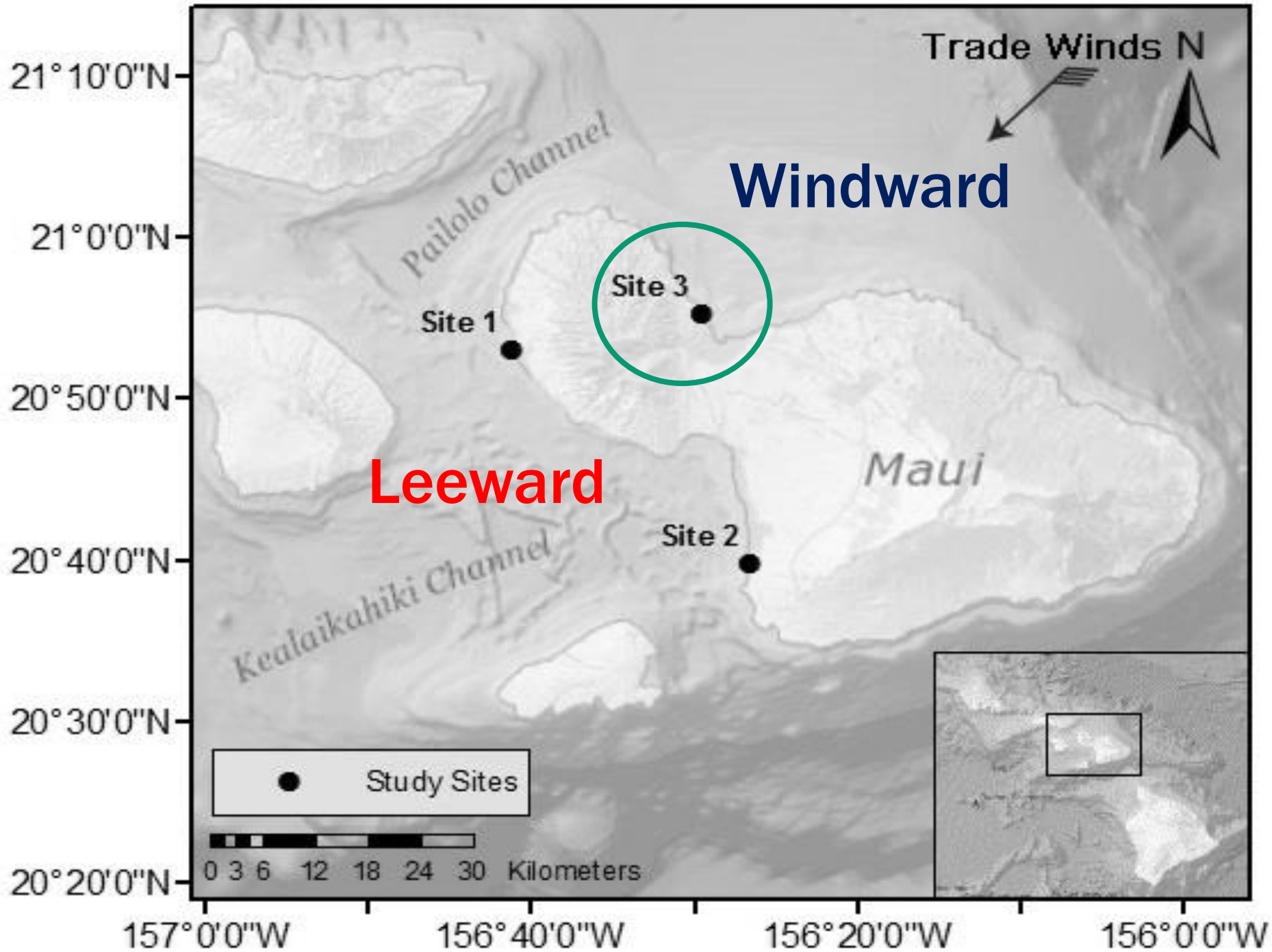
Site 1 (West/Leeward)



Site 2 (South/Leeward)



Site 3 (North/Windward)

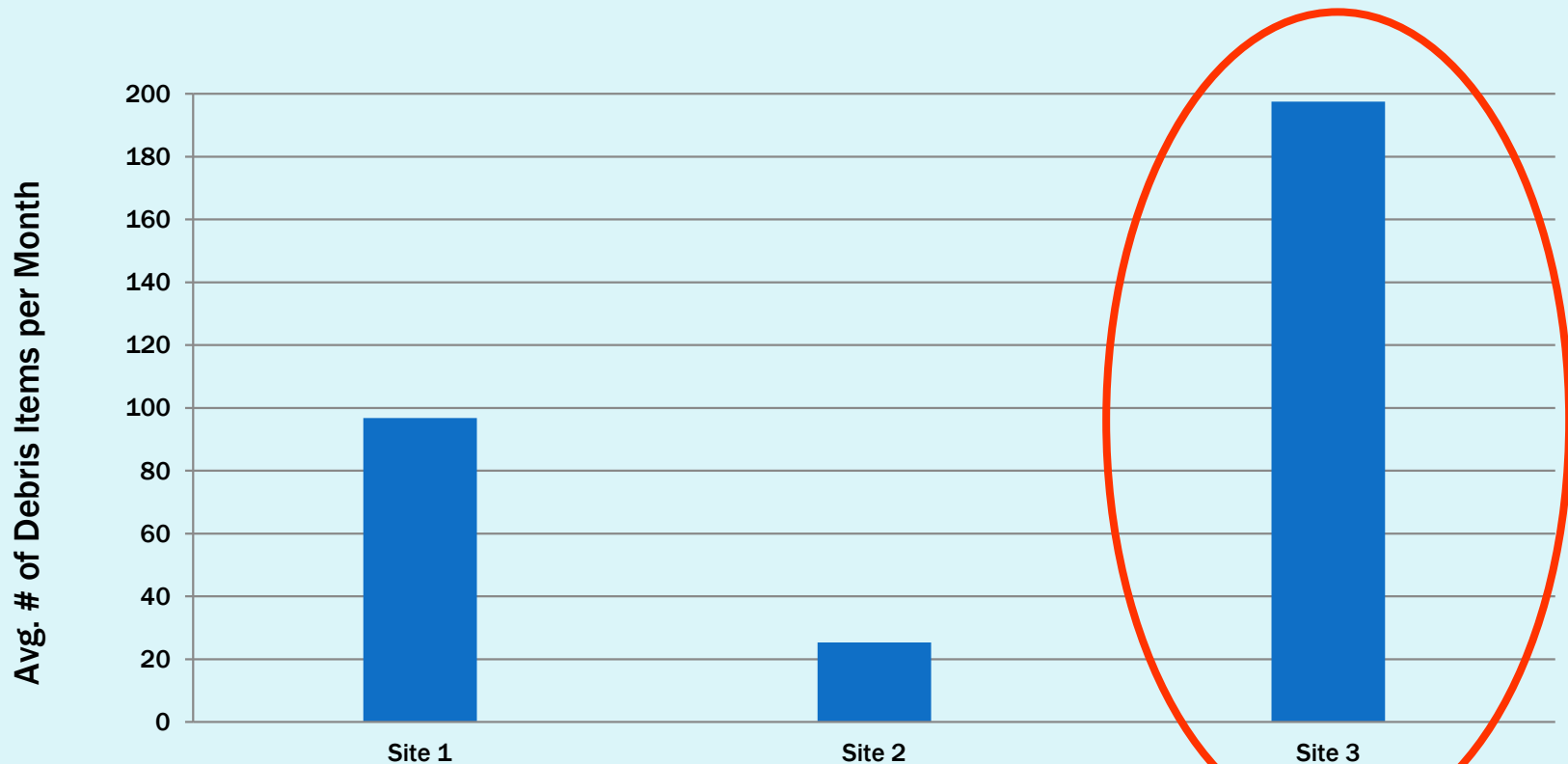


MONTHLY ACCUMULATION SURVEY RESULTS

- **Plastics were the most common debris type at all sites**
 - **Site 1 = Cigarette butts (land-based)**
 - **Site 2 = Cigarette butts (land-based)**
 - **Site 3 = Hard plastic fragments**

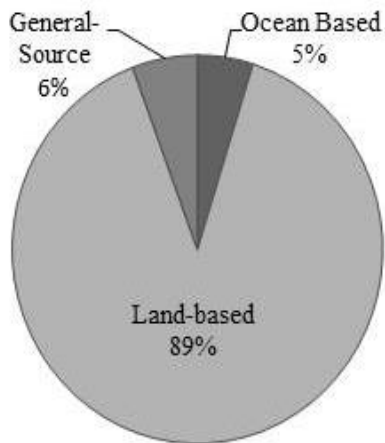
MONTHLY ACCUMULATION SURVEY RESULTS

- Accumulation rates and loads were higher at windward beaches (Site 3)

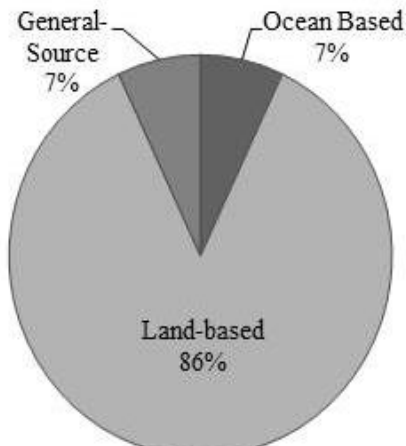


MONTHLY ACCUMULATION SURVEY RESULTS

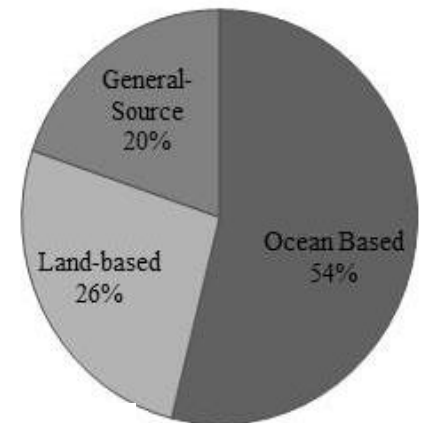
- Ocean-based debris is more prevalent at windward beaches (Site 3)



Site 1
Leeward



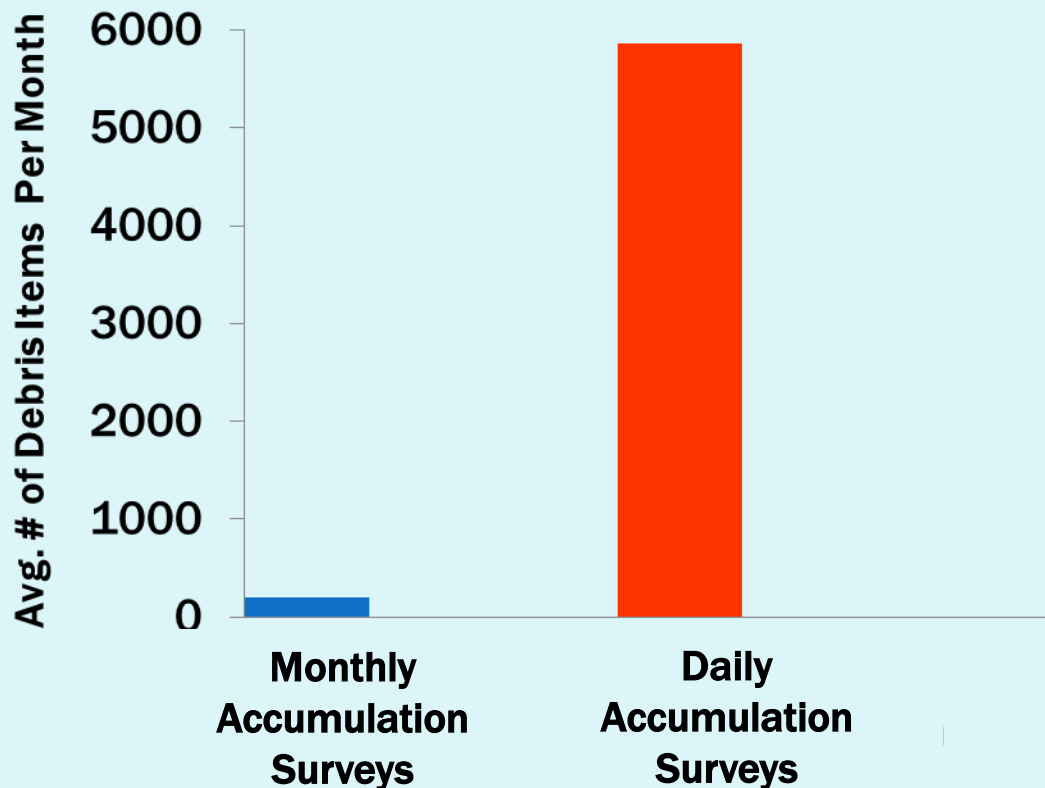
Site 2
Leeward



Site 3
Windward

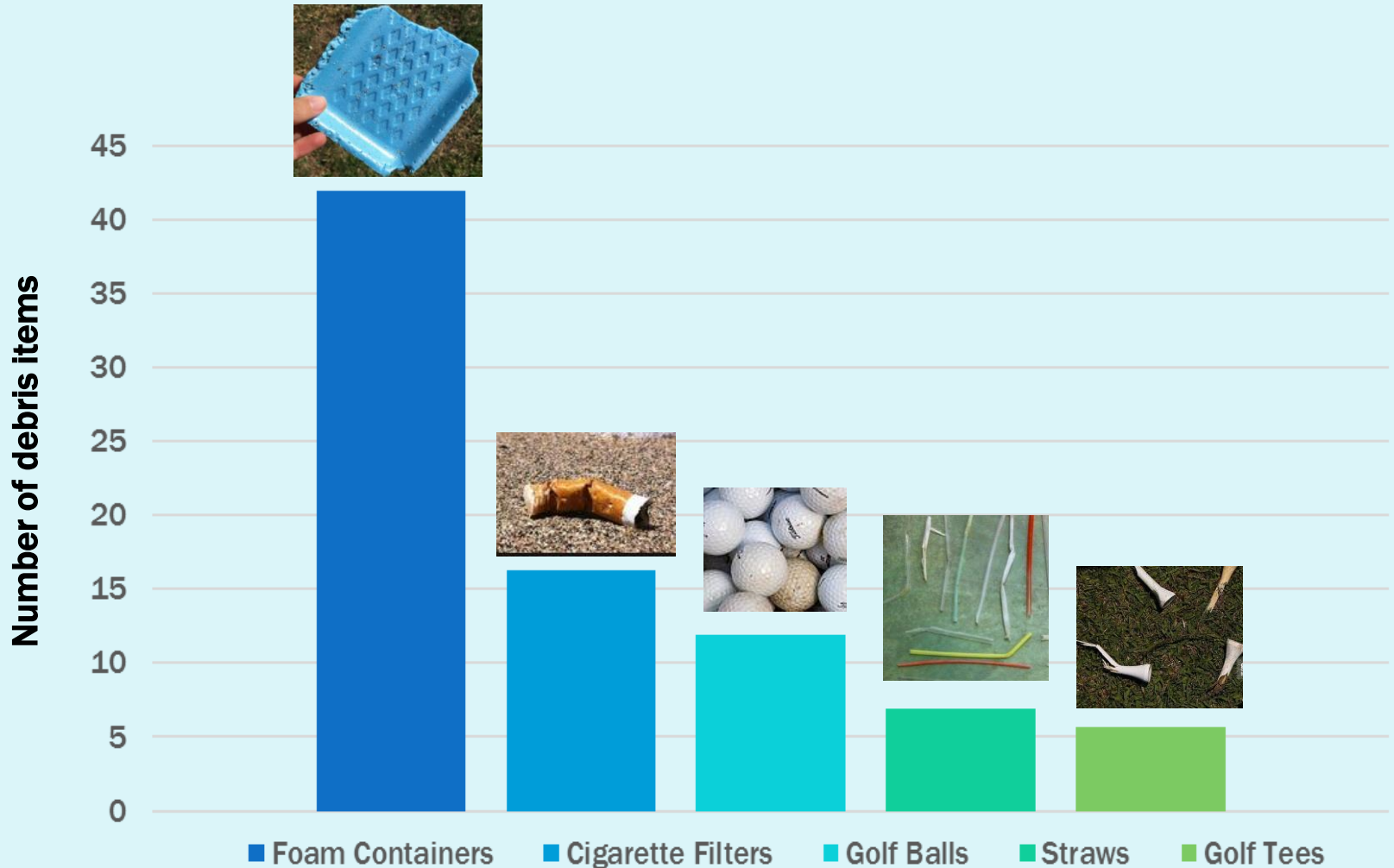
MONTHLY VS. DAILY SURVEYS

Impact of Temporal Variation in Survey Frequency on Average Monthly Accumulation Rates



- Debris undergoes a high rate of turnover!
- Monthly surveys likely underestimate at-sea debris loads

TOP 5 LAND-BASED DEBRIS ITEMS (DAILY SURVEYS)



HOW DOES THIS DATA TRANSLATE TO LOCAL POLICIES?

MAUI'S PLASTIC BAG BAN

- NO plastic or paper grocery bags were collected during an 18 month study period.
 - Retailers charge a fee for paper bags, encouraging the use of reusable bags.
- Policy is relatively straight forward and “easy” to enforce (producer-based).



Maui County, Our County

MAUI'S PLASTIC BAG BAN

Maui Landfill Before Bag Ban (2010)



PHOTOS COURTESY OF THE MAUI NEWS / MATTHEW THAYER

MAUI'S PLASTIC BAG BAN

Maui Landfill After Bag Ban (2011)



PHOTOS COURTESY OF THE MAUI NEWS / MATTHEW THAYER

TOBACCO FREE BEACHES AND PARKS



TOBACCO FREE BEACHES AND PARKS

- Reduction of cigarette butts has not been as significant as plastic bags.
- Policy requires shift in social norms (consumer-based)
- More difficult to enforce
- Focus public education efforts at leeward beaches

POLYSTYRENE FOOD CONTAINERS



BAN POLYSTYRENE
Hawaii

These Hawaiian Islands Just Outlawed Polystyrene Foam Food Containers



Lauren Bickley

Marine

Biologist/Writer/Surfer



**MAUI
NOW**
**Maui Polystyrene Ban
Unanimously Approved**



POLYSTYRENE FOODWARE

- **Plastics lobbyists and industry mounted a strong opposition**
- **Local data was critical to bill's success**
- **Combined multiple data sets to demonstrate that polystyrene foam was a significant source of debris on Maui**
- **Takes effect December 31, 2018**

CONCLUSIONS

- #1. Despite limitations, accumulation surveys are an easy method to understand localized debris loads and establish baseline data.**
- #2. It is important to incorporate regular data collection into clean up activities.**
- #3. Local data can inform policies and mitigation strategies both at home and beyond.**
- #4. Marine debris requires a holistic approach. (ocean-based debris, waste management, etc.)**



Blickley, L.C., Currie, J.J., Kaufman, G.D. 2016. Trends and drivers of marine debris accumulation on Maui shorelines: Implications for mitigation strategies. Marine Pollution Bulletin.