MARINE DEBRIS AND PUBLIC OUTREACH: A DASHBOARD IS WORTH A THOUSAND WORDS

Speaker
Jess Lucas
Speaker Background

---

B.S. from Texas A & M University in Wildlife Biology  
Worked on many species of animals  
Began my GIS journey with ArcMap 8.1

---

M.S. from Clemson University in Wildlife Biology  
Worked with a rare bat species, environmental surveys  
Habitat analysis using GIS

---

GIS Certificate from Austin Community College  
Honed my GIS skills

---

Currently working as a GIS analyst on primarily non-profit projects
Table Of Contents

01 What is SPLASH
   The nonprofit in need

02 What is STOP
   Insight to data collection and data format

03 What is the TXLD
   The purpose of the Texas Litter Database

04 Preparing the Data
   Working with the pre-existing database

05 Building the dashboard
   The flesh and bones

06 Dashboard Maintenance
   KISS, documentation, training
Who is SPLASh

- Comprised of individuals from various non-profits and organizations
  - American Bird Conservancy
  - Gulf Coast Bird Observatory
  - Black Cat GIS
- Conduct outreach and education activities
- Work to develop best management practices for litter control/cleanup
- Host regular coastal cleanups where community volunteers collect, sort, and categorize trash
- Use data from these cleanups to inform better waste management practices.
Project Goals

**PRODUCT**
Create online data visual for SPLASH

**GOALS**
User friendly
Easily updated
No new techniques

**METHOD**
Create dashboards housed on StoryMap
Dashboards as Outreach

When data is online, make it visual

Visual representation can be easier to communicate with the general public

COVID-19 Map
Coronavirus COVID-19 Global Cases by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU)

Johns Hopkins Coronavirus Resource Center
Purpose-built Dashboard

Criteria for this EPA funded non-profit project

1. **Innovative online platform** to collect data and engage the public

2. **Ability to query** trash data entered by site or across sites by year or multiple years

3. **Access and use by local stakeholders** to improve trash management and to target prevention of the most discarded items.

4. **Identify trash peaks** that may coincide with nesting seasons, migration, and other natural, biological and environmental phenomena.

5. Provide a detailed starting point to **track trash removal efforts**
Project Process
Litter Cleanup - STOP

• Driving force behind Texas Litter Database
• Method:
  ◦ track a line and note the distance (say 100 ft) and pick up every single piece of trash you see, the size of a cigarette butt or larger.
  ◦ Once collected, record the number of individual items into the trash report page.
**STOP Field Data**

From field to database

- Field data is reported into the datasheet
- Diverse categories cover most items
- Specific breakdowns of ‘type’ of item within each category
- Totals – overall weight
- Transects – itemized count

<table>
<thead>
<tr>
<th>Item</th>
<th>Tally</th>
<th>Total #</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Estimated Styrofoam Fragments</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Circle best estimate category</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0–100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>101-1000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over 1000</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Styrofoam Cups/Plates</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fishing Floats</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Food Wrappers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Other Jugs/Containers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Personal Care Products</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Examples:** styrofoam cups, to-go boxes, egg cartons, insulation pieces

<table>
<thead>
<tr>
<th>Item</th>
<th>Tally</th>
<th>Total #</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Plastic Cups/Plates</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Plastic Rope/Net Pieces</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Plastic Toys</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Plastic Utensils</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Shotgun Shell Casings</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Straws</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Examples:** chip bags, clear wrappers, candy wrappers

<table>
<thead>
<tr>
<th>Item</th>
<th>Tally</th>
<th>Total #</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Circle best estimate category</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0–100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>101-1000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over 1000</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Paper/Lumber</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cloth/Fabric</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Plastic</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Examples:** clothing and shoe tops, fabric pieces, gloves (non rubber)

<table>
<thead>
<tr>
<th>Item</th>
<th>Tally</th>
<th>Total #</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Circle best estimate category</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0–100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>101-1000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over 1000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>Tally</th>
<th>Total #</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Glass</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Rubber</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PPE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cardboard Cartons</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lumber Products</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Paper/Cardboard Scraps</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Paper Bags</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Examples:** any wearable or personal care products

<table>
<thead>
<tr>
<th>Item</th>
<th>Tally</th>
<th>Total #</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Circle best estimate category</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0–100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>101-1000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over 1000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>Tally</th>
<th>Total #</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Beverage Bottles</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Jars</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Glass Fragments</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Flip Flops/Shoe Soles</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Work (Thick) Gloves</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Rubber Fragments</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tires</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PPE Disposable Gloves</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PPE Face Masks</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PPE Hand Gloves</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PPE Head Protection</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Examples:** any MAN MADE material
Welcome to Texas Litter Database

STOP EVERY PIECE COUNTS!

Create New Event  Download Field Sheet  Enter Data

Total Trash Count 139,656
Total Volunteers 95,984
Total Events 672
Total Reports 2,372
100+ Plastic Film Fragment Report
36
100+ Hard Plastic Fragment Report
56
Highest Weight (lbs) in One Cleanup 710,000

Data Download
The Advanced Research Center (HARC) has launched a Data Download.

Data Format
CSV format

Definitions

FAQ:

Currently managed by Houston Advanced Research Center (HARC)
Data Download/Cleaning

Manage Data quality

Similar quality to citizen science

Entry by numerous volunteers, untrained staff, etc.

Creates misspellings, duplications, inconsistency, etc.

Corrections by program staff

Best use of pre-existing fields

Little/no flexibility in field name or availability

Not always ideal for Dashboards

Some post-download modifications

Filter relevant data

Sort only SPLASH events

Separate totals/transects at data entry
Import Data

Create a map with site points
Add layer for cleanup data
Amend any field aliases
Create pop-ups to be used in ‘data at a glance’
Bring the data to ArcGIS Online
Building the Dashboard

- Work with SPLASH to determine dashboard wish-list
  - Must-have categories
  - Metrics and desirable layout
  - Style sheet
    - colors, type, logos
Dashboard - Maps and Metrics

Create a dashboard with overall metrics and site specific metrics.

Components
- Maps
  - Site Map
  - Overall sites
- Data at a Glance
- Indicators
- Category selector
- Text box
Category Selector

Volunteers removed **25.81** pounds of trash from 1 events

At this site **34** volunteers attended 1 event

Volunteers removed **7.63k** pounds of trash from 12 events

At this site **608** volunteers attended 12 events
Category Selector

- Actions

Select actions for different layers and maps in the dashboard

---

Filter

- Filters the data in the "data at a glance" to reflect only site data
- Filters the data in the indicators to reflect only site data

Flash

- Can flash a point on the map

Pan

- Can pan to a point on the map

Zoom

- Zoom to the selected site in the main map
Category Selector

**Data**
- Choose Grouped Values
- Filter by site name (exclude null/empty)
- Select category field
  - Site Name

**Selector**
- Label for selector - ‘Select a category’, ‘sites’, ‘hospitals’ etc.
- Choose icon
- Choose presentation mode
  - Dropdown with single selection
- None option
  - No selection shows ALL data (labelled overall data)
Indicators

Data:

- Apply relevant filters
  - external ID ‘TOTAL’ (not itemized)
  - event organization (SPLASH)
- Create statistic
  - sum of total pounds of trash
- Create reference point
  - statistic
  - event organization
  - count - distinct event name

Indicator:

- Customize colors and text
- Insert the value/reference
- Choose/Import an appropriate icon
Indicators

Data:

- Choose the relevant data layer
  - Cleanup Site Data
- Apply necessary filters
  - Event/organization
- Determine the preferred statistic
  - Sum of Total volunteers
- Identify the reference points
  - Statistic
  - Event organization
  - Count - distinct event name

Indicator:

- Customize colors and text
- Insert the value/reference
- Choose/Import an appropriate icon.
Data at a Glance

Created using pop-ups in ArcPro

- Select categories
- Correct aliases
- Transect/Totals
- Create chart of site items
  - composite groups
Create a dynamic live dashboard that presents website and item data in easily digestible sections.

Components
- Maps (stacked)
  - Community Partners
  - Site Map
- Data at a Glance (stacked)
- Indicators
- Serial Charts
Serial Chart

Simple to create

- add categories
- label axis
- set orientation

Select the most common items

- Too many items to include Styrofoam pieces
- Chart ordered with most > least
Total trash/site graph
## Maintenance

**Manual - for non-GIS users**
- Include login process and information
- Data download information
- Modifications to CSV file
- Updating the file in ArcGIS Online
- Documenting updates in Credits (Attribution) because of multiple users

**Staff Training**
- Available for any questions
- Walk-through with new staff

<table>
<thead>
<tr>
<th>Open in Map Viewer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open in Scene Viewer</td>
</tr>
<tr>
<td>Open in ArcGIS Desktop</td>
</tr>
<tr>
<td>Publish</td>
</tr>
<tr>
<td>Create View Layer</td>
</tr>
<tr>
<td>Export Data</td>
</tr>
<tr>
<td>Update Data</td>
</tr>
<tr>
<td>Share</td>
</tr>
</tbody>
</table>
Ongoing updates

Texas Litter Database is switching to an ESRI based system in the future, which will dramatically change the way data can be used and displayed - check back in 2024!
Thank you

Special thanks to those who make this work possible