Abstract

The trash from Tucson is a widespread issue and is overwhelming the Santa Cruz River. The Sonoran Institute Trash Study is designed to characterize trash in the river and has found that food packaging was the most frequently observed contributor of waste followed by plastic bags and clothing. These data are now going to be paired with a randomized assessment of the trash localization in the river to identify trash hot spots to better address trash at the source and through policy.

Methodology

The Sonoran Institute Trash Study is a 3-year campaign with three distinct phases, yet the assessment methodology is consistent throughout.

Phase 1 was a characterization study where Earth Grant researchers scouted for and assessed pockets of trash. Phase 2 aims to assess the location and load of trash in the Santa Cruz, wherein researchers assess trash in randomly selected GPS locations.

For the current Phase 2 study, the GPS location pulled from the River Randomization within the study area. In addition to trash data, site characterization data (e.g., date, flow conditions, vegetation cover) are collected to better understand the impact of site conditions on trash (i.e., are bushes or trees acting as nets? Does the flow rate of the river mobilize the trash?).

For the randomized assessments 3 replicate 10m x 10m grids are laid out to end-to-end spanning the width of the river to build statistical power in the assessment of the location.

Lastly, the researchers walk the 10m x 10m grid and count each piece of trash and mark it in a datsheet that includes 57 categories of trash. Analyses are conducted in a large database to be assessed used Python and Matlab.

Preliminary Data

Phase 1 of the Sonoran Institute Trash Study was performed by scouting out trash hot spots (i.e., not randomly selected). In analyzing these data, it was observed that plastic bags and food packaging are the primary contributors to trash in the river (by frequency of observation), followed by water bottles, cups, clothes, miscellaneous debris.

Current Work

The current scope of this project (Phase 2) is assessing the trash along the river using a randomized distribution. The method removes any location bias and allows for a more robust analysis of trash load and distribution. The Phase 2 assessment is being conducted to: a) confirm that the previous data about the trash contents of the river are not only uniform amongst many locations and hot spots, and b) to better understand how the trash is ending up in the river and the best ways to address elimination and reduction of this waste.

Field work in Phase 2 is targeting at least 50 randomly chosen locations. Sampling events are occurring weekly, and the Earth Grant researchers are building additional capacity within the database to perform analyses automatically upon data entry.

As Phase 2 of the project continues throughout 2023, Earth Grant researchers will continue to showcase the project findings at scientific conferences, including Sonoran Institute’s Santa Cruz River Research Days in April.

Further, the Earth Grant research team is showcasing the AIREs program during Santa Cruz River trash cleanups to demonstrate the impact of the Earth Grant program and the Sonoran Institute Trash Study.

Conclusion

• This randomized assessment is ongoing. There is a total of 50 points that are to be assessed, only of which 8 are completed thus far.
• Some of these assessments have yielded very little trash in the survey areas, while other are very large trash hotspots. This has the possibility of creating a heatmap of the hotspots of trash along the river to better aid with trash diversion.

Acknowledgement


References


