trashblitz
BELIZE 2024

Tracking and solving for waste and litter trends across Belize.

ANNUAL REPORT

SEA OF LIFE
STRENGTHENING COMMUNITIES TO PROTECT THE OCEAN

5 GYRES
SCIENCE TO SOLUTIONS

BACKGROUND

Sea of Life is a community-centered conservation organization whose mission is to empower and strengthen communities to protect the ocean. We co-create locally relevant solutions for issues that threaten the health of our waterways and communities across Belize. Our More Pride Less Plastic program incorporates three pillars: the Plastic Solutions Academy (PSA) provides comprehensive education and technical training on plastics, the PSA Accelerator offers assistance to fellows of the academy to turn their ideas into real-world solutions, and the TrashBlitz audits are our community science approach to document important details about plastic usage and pollution across Belize.

In 2024, Sea of Life joined with numerous partners nationwide to begin a systemized and consistent waste audit campaign called TrashBlitz. Together with faculty, students, nonprofit organizations, and local ocean and community enthusiasts, we collected waste and litter data and then safely diverted trash to designated waste locations. This report is the summary of our annual community science campaign. This project was created to increase community awareness of the issue of plastic pollution and foster stewardship through litter prevention, refillable and reusable choices, and cleanups. The data from this report is open sourced for all Belizeans and is also made available to all global databases. Most importantly, we work together to remove and prevent plastic pollution from impacting our local waterways and communities in Belize.

BELIZE & PLASTIC POLLUTION

As a nation that is approximately 22,970 square kilometers with a series of islands off the coast and an overall population of over 420k people, Belize is renowned for its diverse ecosystems, the Belize Barrier Reef (the second-largest barrier reef in the world), The Great Blue Hole, Maya culture and artifacts.[1,2,3] Additionally, Belize's coastal plains are characterized by low-lying land, mangrove swamps, and numerous lagoons and estuaries that provide substantive ecosystem services and habitats for wildlife. This all makes Belize one of the most remarkable destinations in Central America, however, it is not an exception to the global struggles of plastic pollution since Belize's economy is heavily reliant on tourism and fisheries, thus contributing significantly to plastic dependency. Moreover, due to Belize being located on the eastern coast of Central America, its coastline is increasingly affected by plastic pollution carried by ocean currents or discarded locally posing a threat to marine life.[4]

According to the Department of the Environment (DOE) website, the government announced a ban on single-use plastics and styrofoam products in 2018, aiming to reduce the most problematic forms of plastic waste.[5] However, implementation has faced challenges. While these measures demonstrate important progress, implementation and enforcement of the policy remain a challenge due to limited resources and monitoring mechanisms. Belize's growing plastic demand outpaces its waste management capacity, posing a significant environmental challenge. This, coupled with population growth, underscores the urgent need for conservation and sustainable practices to protect its natural beauty.

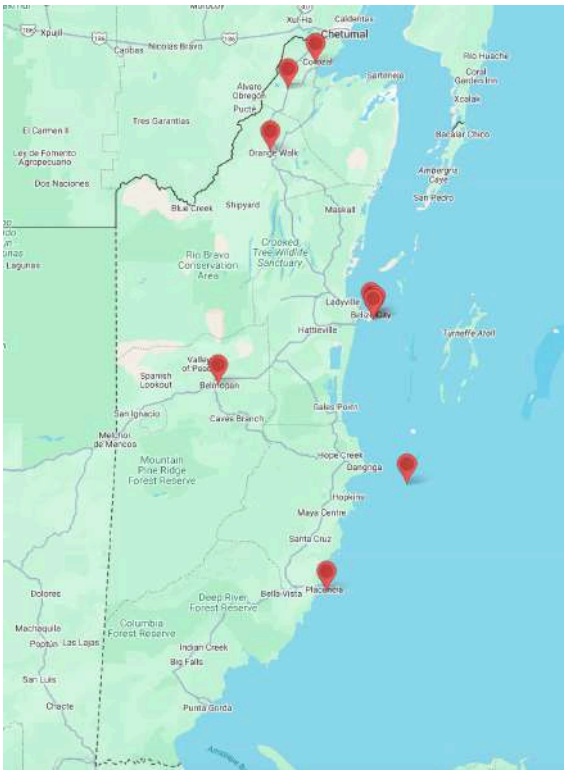
PLASTIC DEPENDENCY AND MANAGEMENT IN BELIZE

Plastic usage in Belize is widespread, with single-use plastics being among the most commonly consumed. Our per capita dependence on single-use plastics far eclipses many nations including the United States. We consume over 235 million single-use plastic bags and over 57 million polystyrene and plastic food and beverage containers every year.[6] Documentation of single-use plastic items is also echoed across multiple studies focused on plastic pollution and waste mismanagement in Belize.[7,8,9]

Waste management infrastructure in Belize varies across the country, and recycling facilities are limited in capacity and availability. While some dumpsites (informal open areas of land where people dump trash) have been replaced with transfer stations and regional landfills (highly engineered excavated pieces of land operated to provide a human health service), this initiative is limited, leaving many dumpsites still in use. Even though the urban areas generally have some level of waste collection services, their effectiveness and coverage are often limited. On the other hand, rural areas often lack consistent collection services, leading to open dumping and uncontrolled waste disposal. This all contributes to a significant amount of plastic ending up in open areas, waterways, and natural habitats. This inconsistent structure for waste management leads to mismanagement impacting our nation and sea. In fact, one 2023 model shows Belize is responsible for the 9th highest rate of plastic waste mismanagement per capita globally.[10]

SITES

Between January to December 2024, Sea of Life worked with a diverse network of institutions. The national TrashBlitz campaign was initially created to focus on school campuses across Belize. However, after consistent requests from other community service organizations, the campaign has grown to include school campuses and other popular social and recreational locations. Places like Memorial Park and the adjacent seawall, and Birds Isle and Yarborough Cemetery in Belize City are iconic locations for recreation or hold historical significance within the city. Placencia Pier is also a popular location for recreation and is also the location of a large-scale annual cleanup hosted by local divers. We also did recurring audits on Wesley College and at the Memorial Park- Seawall. The 2024 campaign includes locations in five of Belize's six districts, listed here from North to South. We also did 4 recurring audits on Wesley College as part of an evaluation of a new partnership program.



- *Corozal Community College*
- *Centro Escolar Mexico Junior College*
- *New Hope High School*
- *Nazarene High School*
- *Memorial Park - Seawall Area*
- *Yarborough - Cemetery and Birds Isle Area*
- *Wesley College*
- *Mount Pleasant Creek - University of Belize Area*
- *Placencia Pier - Beach Area*

COMMUNITY SCIENCE

Community science is at the heart of the Belize national TrashBlitz campaign. As the burden of plastic pollution and waste grows across the world, Belize is faced with surmounting challenges for local ecosystems and waste managers. Through the TrashBlitz audits, local stakeholders clean up, protect, and restore their local environments, while also exercising scientific protocols. Additionally, the process of audits is an educational and eye-opening experience because the systematic accumulation and categorization of trash viscerally illustrates to participants the impact of ongoing plastic pollution on the environmental health and aesthetic desirability of their communities. In 2024, approximately 320 stakeholders, including secondary and tertiary students, faculty, nonprofit partners, and local stakeholders were trained in the collection and documentation of waste.

This initiative not only fosters environmental stewardship but also contributes to the global TrashBlitz and Break Free From Plastic databases on waste composition and plastic pollution. By analyzing the types and sources of waste, participants identify patterns and provide data-driven insights. TrashBlitz has become a platform for uniting communities across Belize in a shared mission to protect its environment. The campaign empowers individuals to see the direct impact of their efforts and cultivates a culture of accountability and sustainability. “ *I have conducted 3 trash audits all in one year. The data collected is necessary as it is the foundation for policies to be made regarding plastics and waste management in our country. Conducting clean-ups is okay but let’s be realistic; this is not the solution. Now is the time to make the policies for a better tomorrow before we consume plastic in larger amounts.”* - Ms. Naomi Sylvania, Teacher, New Hope High School

METHODOLOGY

Process

TrashBlitz uses a standardized approach to data collection based on internationally recognized methods for assessing plastic pollution. The TrashBlitz data methodology is developed from guidelines established by the United Nations Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (UN GESAMP), which provides a structured framework for measuring plastic waste in natural environments. TrashBlitz waste audits align with the data collection goals of global NGOs, offering reliable data to government agencies, municipalities, business leaders, and the public. Sea of Life standardized waste collection intervals at 30 minutes per person allowing more time to sort, analyze, and log data.

Limitations

This dataset represents a sample of plastic waste collected across Belize rather than a comprehensive inventory. Because participation varies between sites, the quantity of a haul may vary too. To address this we now limit the clean-up time per person to 30 minutes to reduce randomness in our sampling protocols.

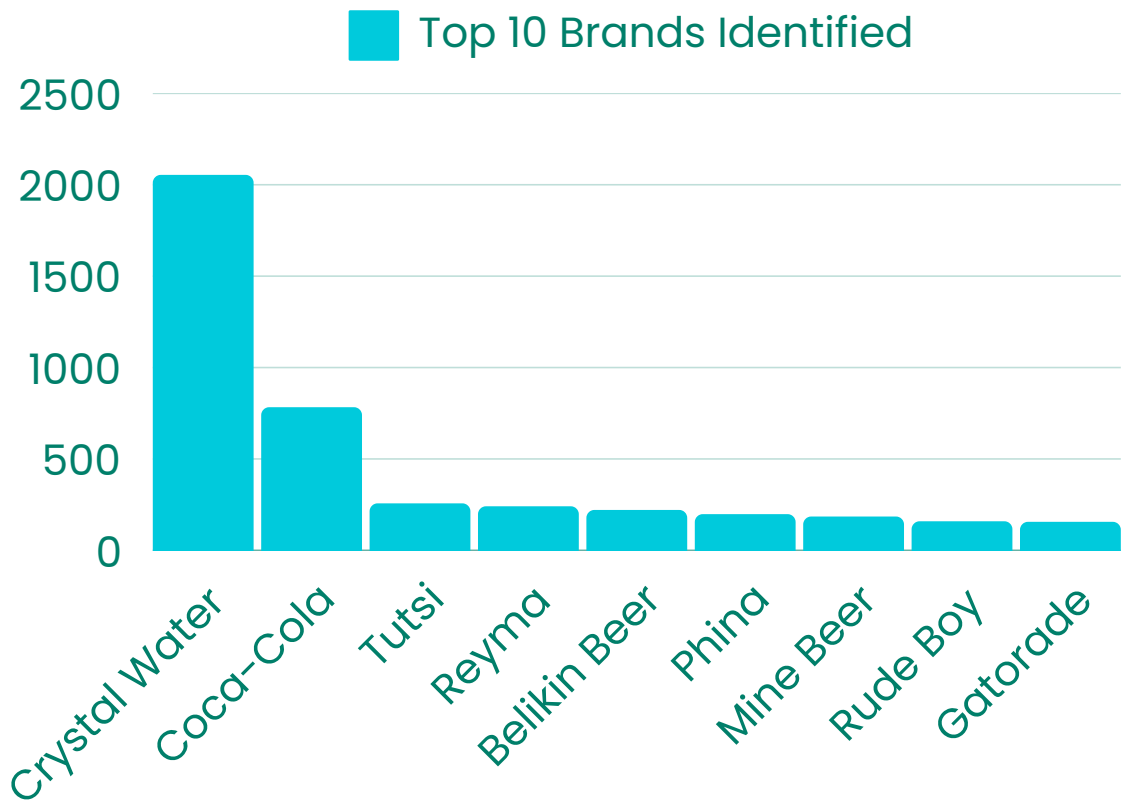
Additionally, the data collection process relies on participants' accurate identification and categorization of plastic waste, which can introduce some variability. To address this issue, Sea of Life is training more auditors and also assigning more time to the sorting and logging of data to ensure more accurate reporting. While the TrashBlitz audits provide valuable insights into trends in plastic pollution, it cannot claim to be fully representative of all plastic waste in these environments.

RESULTS: Brands

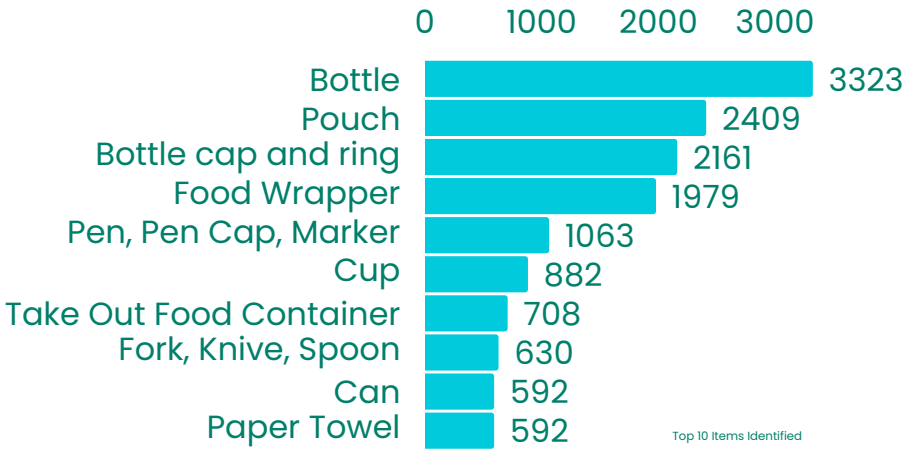
18,735 pieces of trash were tagged in the 2024 National TrashBlitz campaign.

Crystal Water was the leading brand identified across Belize, with more than double any other labels in waste streams and litter for 2024. Crystal water pouches and bottles are a common issue on school campuses and in social and recreational areas, with Coca-Cola coming in as the second most recorded brand. Another concerning trend in brand data is the percentage of high sugar high fat foods and beverages. Crystal Water and Coca-Cola made up 36% of the identifiable brands study wide. It's also important to note the high number of nonbranded bottles and food wrappers which we discuss further on page 9 of this report.

One unique finding is the case of Nazarene High School. This school actually banned Coca-Cola products in 2018. As a result we only logged four Coca-Cola bottles in TrashBlitz on their campus; whereas Coca-Cola bottles averaged 139 across the other four school campuses audited in 2024.

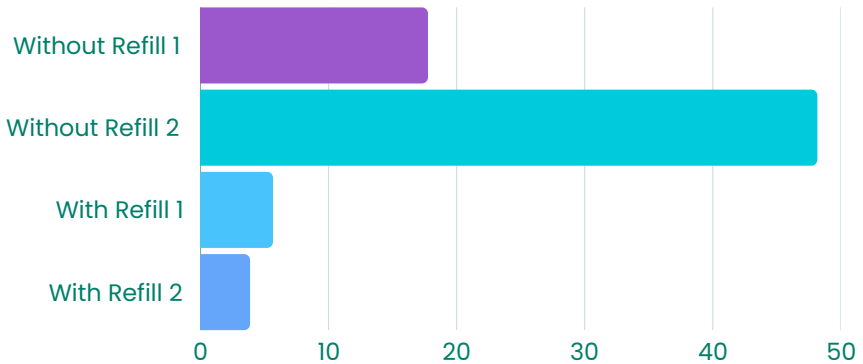


RESULTS: Items



Single-use plastic packaging still dominates the identifiable items in Belizean audits. In 2024, beverage containers and food wrappers made up approximately 54% of all identifiable items. Nine of the top ten items identified in this study are single-use. **It's important to note 963 unknown items and 910 fragments were also tagged over the year.** To harmonize our findings with other major data sets like the International Coastal Cleanup, we only list identifiable objects in the top 10 item list.[11,12,13]

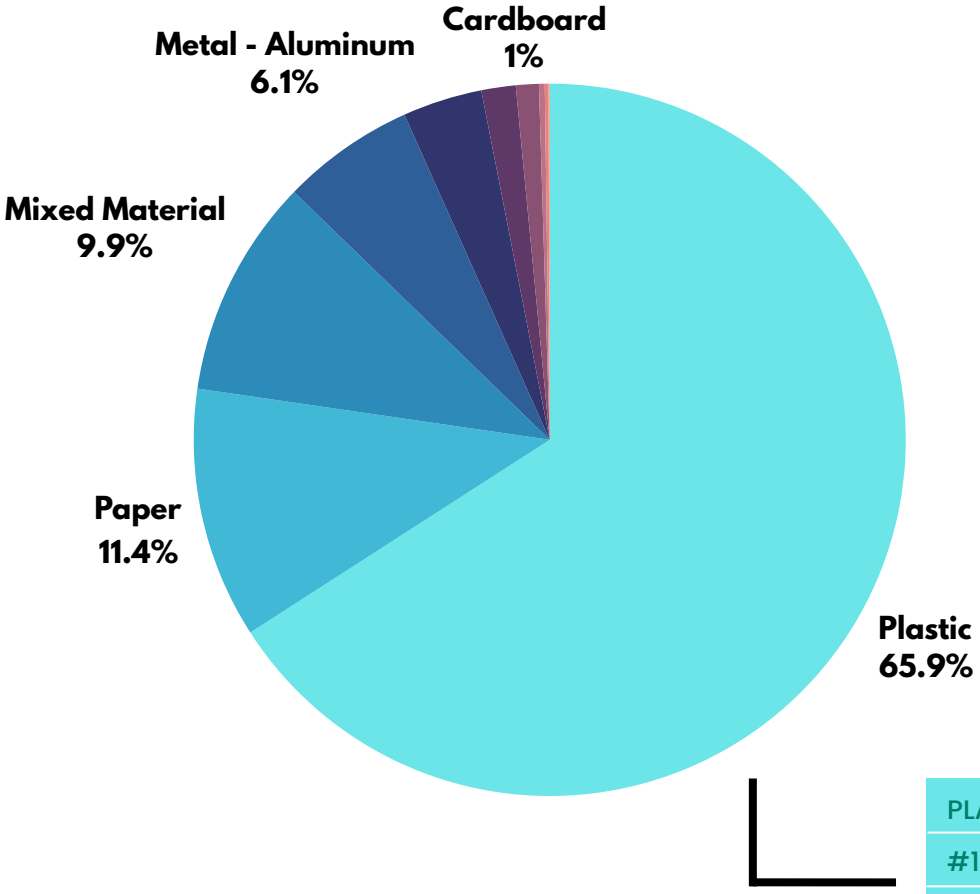
Tracking change ➡ In August of 2024, Wesley College implemented refillable water on campus paired with a ban on *shilling wata* aka water pouches. To monitor the impact, Sea of Life and Wesley College scheduled pre and post-refill audits. Water pouch waste dropped significantly in post-refill TrashBlitz audits as shown in the chart below which shows the **% percent of pouches per audit**. The January and May dates are pre-refill and the November dates are after refill is implemented, showing an 85% decrease of pouches logged per audit.



18,735 pieces of trash were tagged in the 2024 National TrashBlitz campaign.

RESULTS: Materials

This 2024 national audit data reveals plastic is by far the most common material in our waste streams and also the most persistent material littering our communities, sea, and waterways. Multiple types of plastic polymers total almost 66% of all the material identified in our audit. And there is also another 9.9% denoted as mixed materials. In this report, those mixed materials are pairings of plastic with metal or plastic with paper. This means that over 75% of our national audit encompasses whole or partial plastic objects.



PLASTIC TYPE KNOWN	
#1 PET	2209
#2 HDPE	419
#3 PVC	70
#4 LDPE	1392
#5 PP	2146
#6 PS	1314
#7 MIXED POLYMERS	424
UNKNOWN	3247

18,735 pieces of trash were tagged in the 2024 National TrashBlitz campaign.

RESULTS: Other Trends

18,735 pieces of trash were tagged in the 2024 National TrashBlitz campaign.

As we acquire access to more waste data, we can identify unique themes about plastic pollution and its intersection with other issues. One important trend identified is the large percentage of high-sugar and fat snacks and beverages. When grouped together, chip, biscuit, ice cream, candy, punch, and soda brands made up 42% of all identifiable brands, highlighting the correlation between high amounts of single-use plastics, and high consumption patterns of unhealthy food and beverage.

Additionally, there were 725 nonbranded single-use plastic bottles. These bottles are usually used for packaging “natural juices”. However, the majority of these “natural juices” are actually high-sugar fruit-flavored concentrates. The colloquialism of calling these drinks ‘natural juice’ is a misnomer. A more accurate term could be ‘punch’ or ‘fruit-flavored drink’. Accurate naming of food and beverage is important for promoting transparency about the products they are consuming.

RECOMMENDATIONS

refillable water and bans

Water refill stations on school campuses, offices and in high traffic tourism hot spots, offer a clear pathway to reducing the demand for and litter from single-use plastic bottles and pouches. In less than six months of implementing refillable water on Wesley Campus the decline in *shilling wata* litter is tremendous. Additionally, the water refilling stations will save parents over $300.00 a year per student, while generating substantial revenue for the campus programs by charging a one-time annual water fee. Parents and guardians will no longer pay the daily costs associated with single-use water, a significant outcome for a school where many students' families struggle with making ends meet. This model is easily replicable in government offices and other high-traffic areas. A most important condition is that refillable systems have a point person who maintains these systems monthly. This is easy to establish though the refillable technology providers and can involve students in the monitoring proces

Bans on non-essential single-use plastics in policies. While these bans effectively reduce single-use plastic waste, it's essential to pair them with other approaches to eliminating problematic products. As revealed in the case of Nazarene High School, a ban on Coca-Cola products resulted in the school recording 97.2% fewer Coca-Cola products than other schools across Belize. Similarly, the reduction in pouches on Wesley Campus is made possible, in part, by a ban on *shilling wata*. Bans can be phased in and can initially target non-essential products. These are the types of products that can be easily replaced with alternative options that are better for the environment and for human health. For instance, soda is not a necessary product in classrooms, so a ban is an excellent fit. In the case of water, students need hydration. Therefore a ban can begin with a phase-down of pouches while behavior shifts. Then a school can ban small bottles of water too until schools only offer large waters in a more limited supply. Further, while plastic shopping bags did not make it into the top 10 items in our national audit, it was the 12th most tagged single-use plastic item audit-wide. Single-use plastic bags have an array of alternatives at all price points, making them an easy non-essential plastic to ban. The Belize Department of the Environment is working to mandate a phase-out of single-use plastic bags nationwide and this type of policy is another clear step towards reducing the burden of single-use plastic pollution on Belizeans.

RECOMMENDATIONS
for further exploration

Expanded and consistent studies documenting plastic and pollution issues. The national TrashBlitz campaign should incorporate more consistent reporting and include more sites. At least two sites from each of the six districts should be evaluated annually to learn more about single-use plastic usage, leakage, and impacts.

Additionally, nonprofit organizations should work together with local academic institutions, and the government of Belize, to advance more robust research on the probability of leakage of plastic waste, create a national reporting protocol for reporting impacts to key wildlife, and prepare a national audit of single-use plastic purchasing across schools nationally. These types of studies will help to provide the layers of evidence needed for mandating solutions and inspiring change within our beautiful nation.

Further, researchers should prioritize the harmonization of national data sets. Currently, there are multiple data collection platforms, including Clean Swell, Litterati, Marine Debris Tracker, the TrashBlitz App, multiple foreign studies by academic institutions, and the newly developed national marine debris survey protocols by The Centre for Environment, Fisheries, and Aquaculture Science. Data from Belize has been tracked in all of these platforms yet it is difficult to bring all that data together for synthesis.

Based on field observations, we recommend that audits require a professional staff member or trained audit technician to be present, to provide oversight to ensure reliable data. Given that collecting waste and litter is often dirty and daunting, it's easy for individuals who are sorting, counting, and entering data to face fatigue. This leads to inconsistent and inadequate quality of data. Stakeholders should strive to collect the most thorough, comprehensive, and concise data possible. This will require financial investments in organizations that can be present and oversee audits, database customization, and data reconciliation.

Finally, Belizean organizations and experts should be prioritized in opportunities to prepare study narratives and publications on plastic pollution as it is Belizean stakeholders who face the burden of the issue and must lead activities to lessen the burden of plastic pollution on our sea and communities.

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To access the full database contact Sea of Life by scanning the QR code below.