



SAN DIEGO
COASTKEEPER®



SURFRIDER
FOUNDATION.
SAN DIEGO COUNTY

SAN DIEGO COUNTY

2023 MARINE DEBRIS REPORT



OVERVIEW

Surfrider Foundation San Diego County and San Diego Coastkeeper partner each year to host volunteer-powered beach and park cleanups across San Diego County to address the issue of trash along our coast and in our inland waterways. In addition to hosting approximately seven public cleanup events a month, both organizations host special cleanup events and encourage individuals to conduct their own.

In 2023, our beach cleanups empowered 11,264 volunteers to remove 19,216 pounds of trash from our parks and coastline. Additionally, they collected data on 300,002 separate pieces of trash.

Based on data collected from 268 separate cleanup events, this report provides a detailed picture of the waste we found on our beaches and parks this year. For the first time since we started collecting data in 2007, cigarette butts were no longer the top item found at cleanup events. In 2023, plastic fragments topped the list, surpassing cigarette butts by a significant amount.

Our shared Beach Cleanup program has removed 147,193 pounds from our beaches and waterways since 2007.

In addition to beach cleanups, Surfrider and Coastkeeper are committed to stopping coastal pollution before it reaches our beaches and ocean; this includes fighting for better stormwater and solid waste management practices, waste reduction efforts, integrated water management, and other local and large-scale systemic changes. At the end of the report, we will touch upon cleanup efforts in the larger context.

Beach cleanups remain the most impactful way of removing trash off San Diego beaches once it's already there, and we are proud to continue to lead this effort. Please read on to discover what we found on beaches in 2023 and how our network of community activists is making a difference.





DATA

In 2023, our beach and park cleanups averaged 1.71 pounds per volunteer, with an overall 19,216 pounds of trash removed.

The vast majority of trash we find is made entirely or mostly from plastic. In 2023, plastics accounted for 248,973 of the total 300,002 items collected across 268 separate beach and inland cleanups. Moreover, 21% of all trash collected was categorized as plastic fragments, either smaller or larger than a dime, which are plastics in close transition to microplastics. Microplastics are fragments of plastic less than 5mm in length and pose major threats to the environment due to their size.

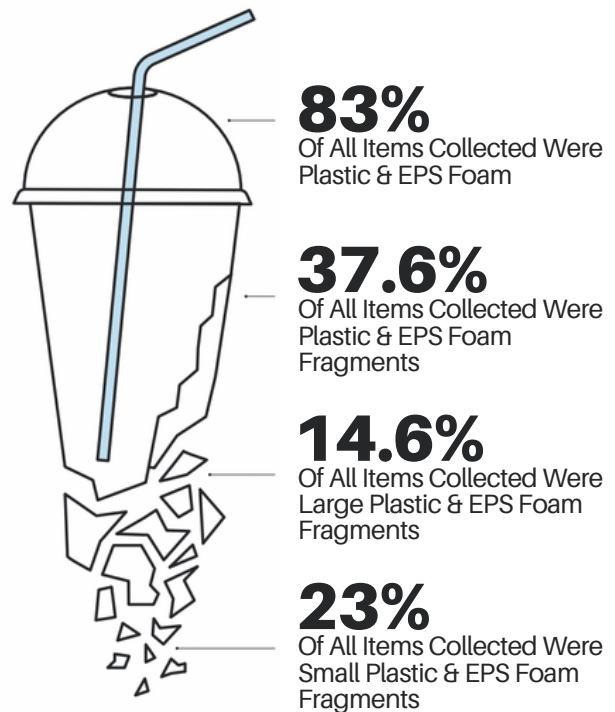
Plastics are particularly damaging to the marine environment, as they do not biodegrade and are easily mistaken as food and ingested by - or pose an entanglement risk to - wildlife.

For every ten pieces of trash collected in 2023, eight were plastic.

While removing close to 10 tons of trash from our beaches is undoubtedly an impressive feat, we prefer to stress the "quantity of items" collected over total weight.

As the pie chart on the next page illustrates, our top items of concern are virtually weightless, have a wide-ranging detrimental impact on marine ecosystems, and make up the majority of debris collected at each cleanup. In contrast, one heavy item - i.e., a mattress, a water-logged surfboard, or a discarded appliance - will effectively skew the total weight of any single cleanup effort.

PLASTIC BREAKDOWN





DATA

2023 BEACH CLEANUP ITEM COUNT

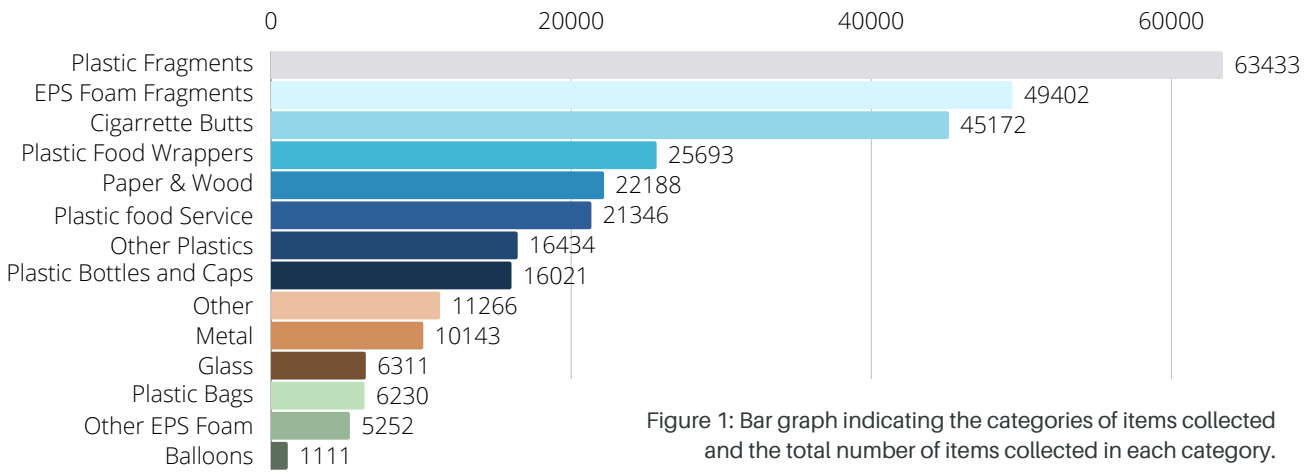


Figure 1: Bar graph indicating the categories of items collected and the total number of items collected in each category.

2023 BEACH CLEANUP BREAKDOWN

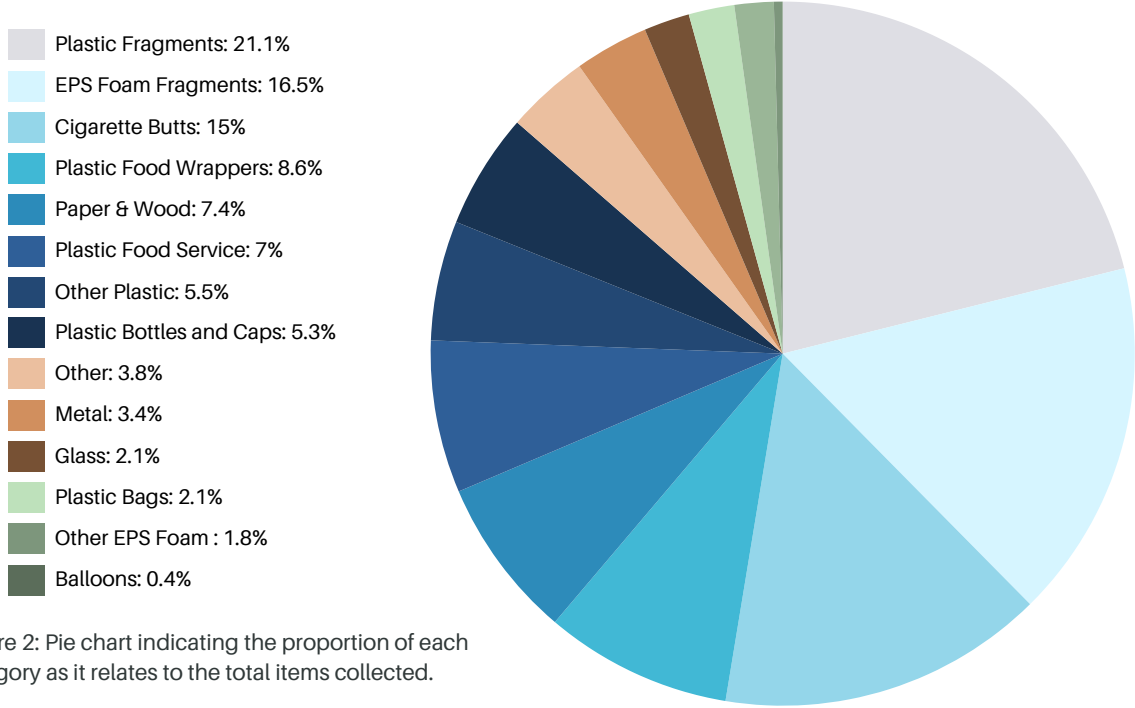


Figure 2: Pie chart indicating the proportion of each category as it relates to the total items collected.



TOP ITEMS OF CONCERN



63,433 Plastic Fragments



49,402 EPS Foam Fragments



45,172 Cigarette Butts

PLASTIC FRAGMENTS

Plastic fragments dominated the cleanup landscape in 2023.

Cigarette butts have long been the top item found along San Diego's coastlines, accounting for 20-25% of all items found in previous years. In 2023, plastic fragments of various sizes - both larger and smaller than a dime - surpassed butts as the top item of concern.

The vast majority of this category of litter is defined as mesoplastics (between 5 mm - 20 mm in size). As these fragments break up into smaller pieces, their bioavailability increases, thereby potentially affecting a broader array of species compared to larger plastics. Mesoplastics break down into smaller fragments, which are defined as microplastics, and are of particular concern and permeate not just our coasts but virtually every biome on the planet.

Microplastics persist in the environment for centuries. Their diminutive size makes it easy for them to travel to the coast via inland waterways and storm drains. Additionally, it makes them easily ingestible by marine life, leading to a cascade of harmful effects throughout the food chain. From plankton to whales, organisms consume these particles, leading to reduced reproductive success, altered feeding behavior, and increased mortality rates (Botterell et al., 2019).

The ubiquity of microplastics in the environment also poses a threat to human health.

From the air we breathe to the food we eat, an average person is estimated to ingest between 78,000 and 211,000 microplastic particles yearly, and significantly more for those who drink mostly bottled water (Cox et al., 2019). This translates to roughly 5 grams - or a credit card's worth of plastic - each week.



Expanded Polystyrene Foam

49,402 Expanded Polystyrene (EPS) Foam Fragments we recorded in 2023

Due to its delicate nature, EPS foam - a plastic commonly referred to as Styrofoam[®] - easily breaks down into tens, hundreds, or even thousands of smaller pieces. Once that occurs, it becomes exceedingly difficult - and often impossible - to identify, separate, and remove EPS foam debris from shell fragments and sand. EPS foam accounted for 18.3% of the total items found at our cleanups.

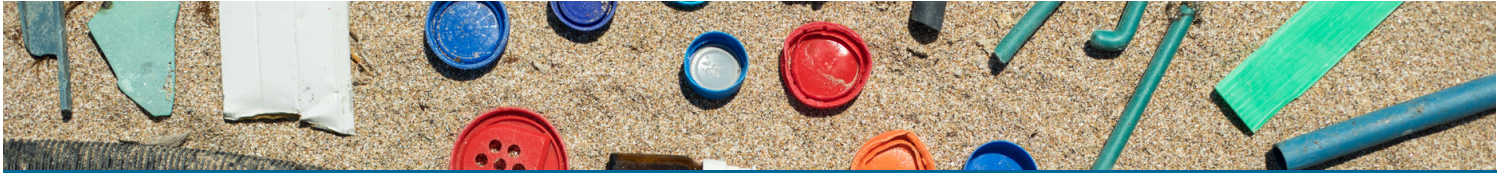
Surfrider and San Diego Coastkeeper have been strong advocates for local ordinances restricting the use of styrofoam and other harmful single-use plastics.

In June of 2022, California Governor Newsom signed SB 54, which requires 100% of packaging in California to be recyclable or compostable, a 25% decrease in plastic packaging, and 65% of all single-use plastic packaging to be recycled by 2032. SB 54 also bans EPS foam foodware outright by 2025 unless producers can demonstrate a 25% recycling rate statewide (and 65% by 2032). Considering its dismal recycling value, frequent contamination, and brittle nature, Surfrider and Coastkeeper are confident that SB 54's foam recycling requirements will result in a de facto foam foodware ban in 2025.

Meanwhile, both organizations were also involved in the passage of EPS foam bans in Solana Beach, Encinitas, Del Mar, Imperial Beach, San Marcos, Vista, Carlsbad, San Diego, and most recently, [Oceanside in September 2023](#). With these foam bans in place and a potential statewide foam foodware ban going into effect next year, we are hopeful the amount of foam pollution along our coasts will decrease in the years to come.

In addition, Governor Newsom also signed AB 1276 in 2021, which only allows restaurants to provide disposable food accessories upon customer request. While implementation of this bill has been slow, AB 1276 is a great example of how businesses can actually save money by only offering single-use plastic accessories when requested by the customer.





CIGARETTE BUTTS

45,172 Cigarette Butts we recorded in 2023.

Even though small plastic and EPS foam fragments took the lead as the most prevalent pollutant during beach cleanups, cigarette butts still accounted for over 15% of all items collected. This persistence of cigarette butt litter underscores the challenge posed by these small and lightweight, yet pervasive pollutants along San Diego's coastlines. They remain one of the top items found, despite public smoking bans at all public beaches in the County and a sharp decrease in the popularity of smoking in California over the last several decades.

Cigarette butts are well-known for their detrimental effects on marine ecosystems, leaching toxins, dangerous chemicals, and carcinogens into the water (Slaughter et al., 2011). These non-biodegradable filters, made of cellulose acetate (a plastic), can take up to 10 years to decompose. However, if not exposed to sunlight (i.e., sinking to the ocean floor), they will stop the decomposition process, posing an even longer-lasting threat to marine life.

BALLOONS

Surfrider and Coastkeeper volunteers have removed over 27,000 balloons from our shores since 2007; in 2023, we picked up 1,111 balloons.

While they may not be a top item found in terms of quantity, the intentional (and unintentional) release of helium balloons disproportionately kills marine life and seabirds due to entanglement and ingestion (Roman et al., 2019).

Because they're so deadly to marine life and birds, Surfrider volunteers have recently begun advocating for "lighter than air" balloon bans at various cities in San Diego County. In 2023, Surfrider San Diego successfully led a campaign to ban balloons in Del Mar, and in 2022, the organization counted similar victories in Encinitas and Solana Beach. The City of Carlsbad fell short of banning helium balloons completely, but they did prohibit *intentional* balloon releases in 2022.

Botterell, Z. L. R., Beaumont, N., Dorrington, T., Steinke, M., Thompson, R. C., & Lindeque, P. K. (2019). Bioavailability and effects of microplastics on marine zooplankton: A review. *Environmental Pollution (Barking, Essex:1987)*, 245, 98–110. <https://doi.org/10.1016/j.envpol.2018.10.065>

Kieran D. Cox, Garth A. Covernton, Hailey L. Davies, John F. Dower, Francis Juanes, and Sarah E. Dudas Human Consumption of Microplastics. *Environmental Science & Technology* 2019 53 (12), 7068-7074 DOI: 10.1021/acs.est.9b01517

Slaughter, E., Gersberg, R., Watanabe, K., Rudolph, J., Stransky, C., & Novotny, T. (2011). Toxicity of cigarette butts, and their chemical components, to marine and freshwater fish. *Tobacco Control*, 20(Suppl 1), i25-i29. DOI: 10.1136/tc.2010.040170.

Kaza, S. et al. (2018). *What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050*. Washington DC: The World Bank. <https://doi.org/10.1596/978-1-4648-1329-0>

Roman, L., Hardesty, B.D., Hindell, M.A. et al. A quantitative analysis linking seabird mortality and marine debris ingestion. *Sci Rep* 9, 3202 (2019). <https://doi.org/10.1038/s41598-018-36585-9>

Bødtker, G., Haave, M., Velle, G., Andersen, G. L., Gomiero, A., Gaasa, R., et al. (2023). How plastic and the clearing of plastic affect the ecosystem at Lisle Lyngoy (Main report). NORCE Norwegian Research Centre. ISBN: 978-82-8408-289-9



A TRUE COMMUNITY IMPACT



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Surfrider and Coastkeeper would like to thank each of the 11,000 plus San Diegans and visitors who contributed to this large-scale collective effort to clean our coastline. Removing close to 10 tons of debris from our beaches and parks is no small feat; for the record, each and every one of the over 300,000 items removed presented a real threat to our ocean ecosystem. We hope every participant feels proud of their contribution to cleaning up our coastline and ocean.

Furthermore, the cumulative impact ripples far beyond the actual trash removed from San Diego beaches. Volunteer-collected data contributes directly to this report, which we hope will serve as an educational resource regarding the larger issue of plastic pollution. Beach cleanup data informs education, outreach, and policy advocacy to target and reduce the most prevalent forms of debris in our environment.

Ultimately, the goal of our shared beach cleanup program is not simply to remove trash from our shores, but to drive change that prevents it from reaching the beach in the first place. Without reliable data, none of that would be possible.

CONCLUSION

Beach cleanups provide a fun, accessible, and educational community service opportunity for thousands of San Diegans every year. Beyond this, **beach cleanups directly reduce plastic in our marine ecosystem by preventing larger plastics from entering the ocean, where they quickly break down into smaller fragments and microplastics** (Bødtker et al., 2023). Despite this, it is essential to remember that our coastal communities would rather enjoy pristine beaches than be constantly called upon to clean them. **Even one piece of trash on the beach is one piece too many.**

Our beach cleanup programs shed a local light on a global problem, the origins of which are far more complex than the common perception that we have a “litter problem.” While litter from careless individuals certainly contributes to dirty beaches, it only scratches the surface of a much more important question - where does all this trash come from?

The short answer is that we produce exponentially more waste than at any other time in history; this amount is only forecasted to grow if current trends persist (Kaza et al. 2018). An increasingly large percentage consists of single-use, disposable, and “throwaway” items made from plastic. Unfortunately, the amount of trash we produce overwhelms any chance we have to dispose of it properly. Much of it ends up in the natural environment, where the ocean is often the final destination.



CONCLUSION

Beach Cleanups in the Larger Context

In the larger context, the most effective approach to clean beaches is to generate less trash. This approach, often referred to as “source reduction,” is especially relevant in the case of plastics that do not biodegrade in the natural environment. Most of the single-use plastic items we have come to rely on can be replaced with long-lasting, reusable alternatives. For those that cannot, biodegradable materials offer an alternative with far less end-of-life impact on the environment.

Surfrider and Coastkeeper advocate for restrictions on unnecessary single-use plastics that commonly end up on our beaches and in the ocean. The cities of Solana Beach, Encinitas, Del Mar, San Diego, Imperial Beach, Vista, San Marcos, Carlsbad, and Oceanside have all passed ordinances that restrict either single-use plastic bags, EPS foam containers, plastic straws, or all three. We will continue to advocate for more comprehensive single-use plastic reduction ordinances in San Diego County.

Whether through policy advocacy, consumer demand, or a mix of both, systemic changes that reduce waste at the source are possible and ultimately more effective than reactive approaches like cleanups. For example, our data suggests that San Diego beaches would be 15% cleaner if tobacco companies stopped attaching a single-use filter to every single cigarette; instead, smokers who prefer filters could employ a reusable one. With one fell swoop, litter from cigarette butts would be eliminated.

Individuals, businesses, and governments all have a role to play in keeping our oceans clean. We invite and encourage all San Diegans to participate in our 2024 Beach Cleanup Program and, of course, to support and get involved with The Surfrider Foundation, San Diego Coastkeeper, and other organizations dedicated to the realization of clean water and healthy beaches for present and future generations.



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