



SAN DIEGO COUNTY

2024 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 2024, our beach cleanups empowered 11,558 volunteers to remove 22,168 pounds of trash from our parks and coastline. Additionally, they collected data on 404,405 separate pieces of trash.

Drawing from data collected across 243 cleanup events, this report paints a comprehensive picture of the waste discovered on our beaches and parks this year. Notably, for the second consecutive year since data collection began in 2007, cigarette butts were not the most common item found. In 2024, plastic fragments took the lead, significantly outnumbering cigarette butts.

Our shared Beach Cleanup program has removed 169,361 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 2024 and how our network of community activists is making a difference.





TOP ITEMS OF CONCERN



104,720 Plastic Fragments



69,609 Cigarette Butts



55,875 EPS Foam Fragments

In 2024, our beach and park cleanups averaged 1.92 pounds per volunteer, with an overall 22,168 pounds of trash removed.

Cigarette butts had 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, and this trend continued through 2024.

The vast majority of trash we find is made entirely or mostly from plastic. In 2024, plastics accounted for 335,966 of the total 404,405 items collected across 243 separate beach and inland cleanups. Moreover, 25.9% 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.

Eight out of ten pieces of trash collected in 2024 were plastic.

The consistent and appalling fact that over 80% of all waste collected is plastic, reinforces not only the importance of policy initiatives but the enforcement of those already in place that are aimed at reducing plastic waste at their source.

You can help ensure the success of our state and local plastic laws.

To better understand existing laws and support those advocating for compliance, the Surfrider Foundation San Diego County has compiled a detailed list of state plastic laws and city-specific policies across San Diego County. The list also includes the appropriate contacts for reporting non-compliance in each city.

sandiego.surfrider.org/-plastic-laws-tracker



DATA

2024 BEACH CLEANUP ITEM COUNT

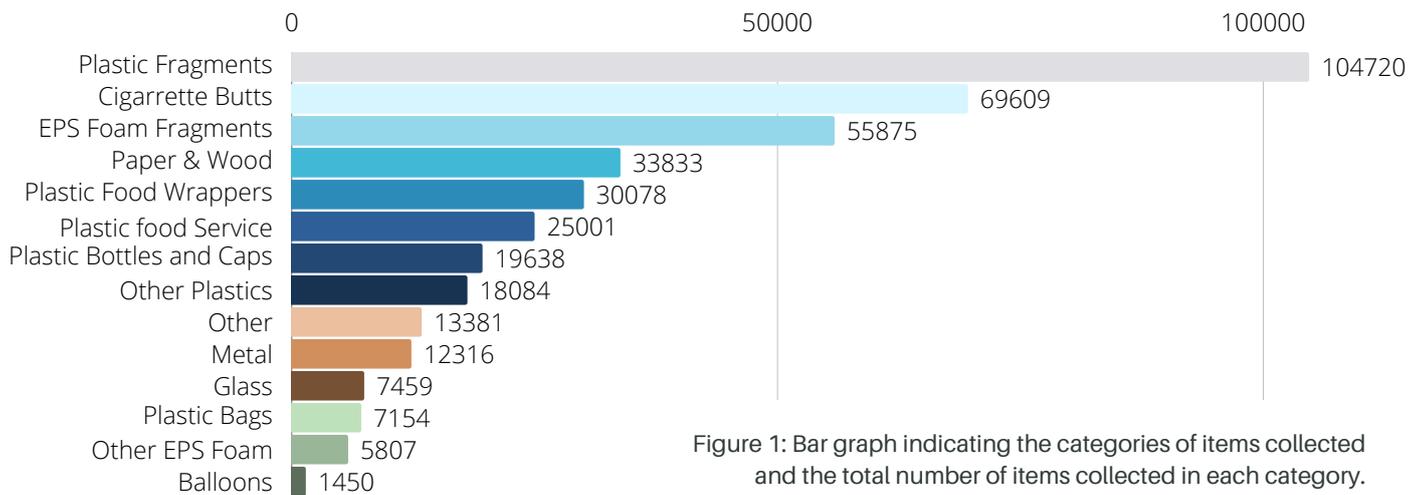


Figure 1: Bar graph indicating the categories of items collected and the total number of items collected in each category.

2024 BEACH CLEANUP BREAKDOWN

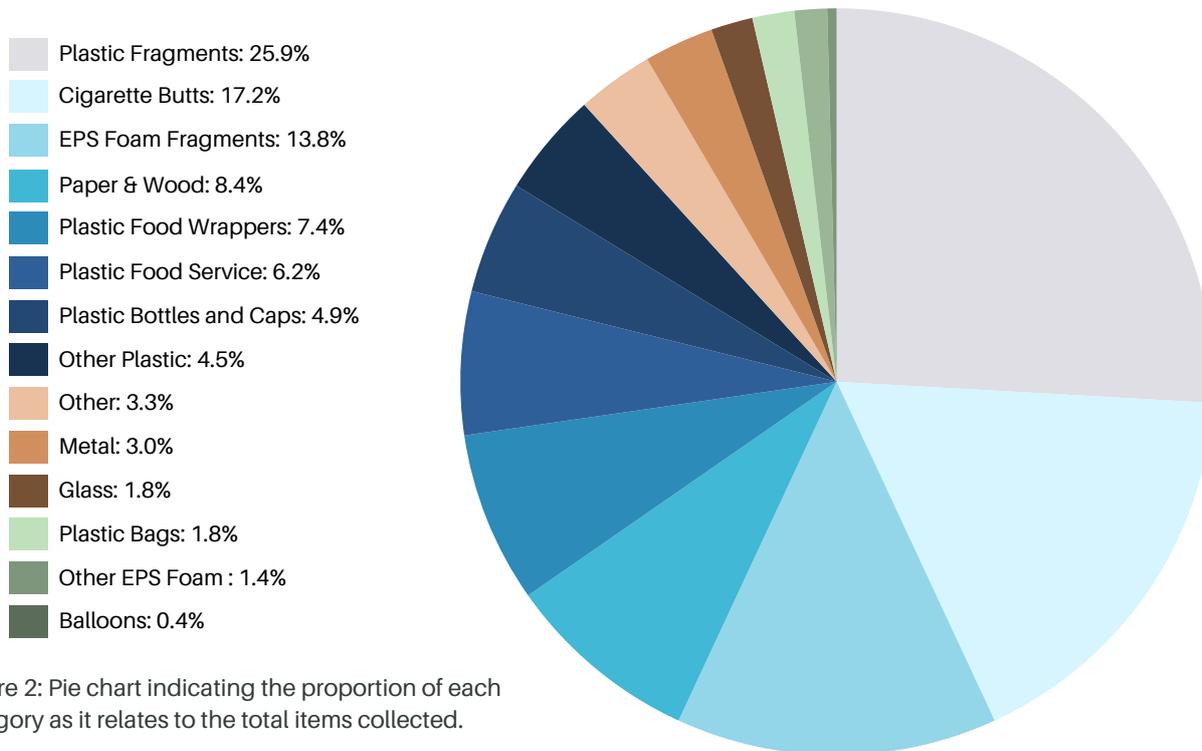


Figure 2: Pie chart indicating the proportion of each category as it relates to the total items collected.

Plastic Fragments



Plastic fragments dominated the cleanup landscape in 2024, with 104,720 individual pieces recorded by volunteers.

The majority of this litter falls into the category of mesoplastics (5 mm–20 mm in size) (Jabeen et al., 2017). As these fragments degrade, they break into even smaller particles, increasing their bioavailability and impacting a broader range of species. Over time, mesoplastics become microplastics, tiny particles that now permeate not just our coastlines but virtually every ecosystem on the planet.

Microplastics persist in the environment for centuries. Their small size allows them to travel easily through inland waterways, storm drains, and even the atmosphere before settling in oceans, rivers, and soil. Once in the marine environment, their widespread presence poses a serious threat to wildlife. From plankton to whales, organisms mistakenly consume these plastic particles, leading to reduced reproductive success, disrupted feeding behavior, and increased mortality rates (Botterell et al., 2019). These impacts ripple through the food chain, affecting entire ecosystems.

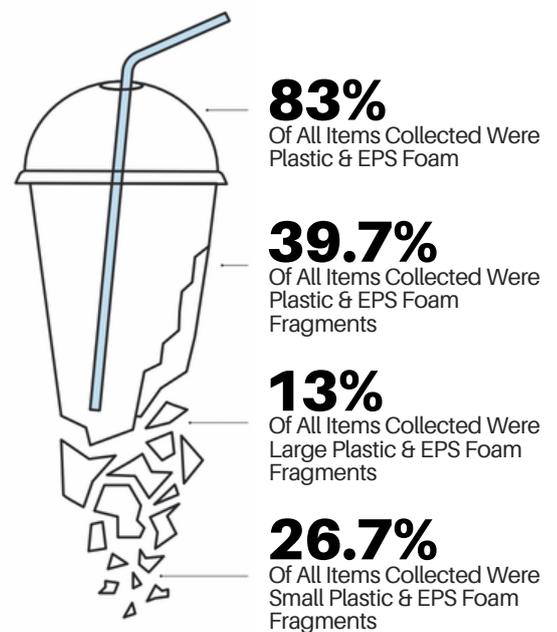
The pervasiveness of microplastics isn't just a concern for marine life—it's a growing threat to human health. From the air we breathe to the food we eat, an average person is estimated to ingest between 78,000 and 211,000 microplastic particles per year—a number that skyrockets for those who

primarily drink bottled water (Cox et al., 2019). This translates to roughly 5 grams of plastic per week—the equivalent of ingesting a credit card. While the long-term health effects remain unclear, early research suggests potential links to inflammation, endocrine disruption, and other serious health concerns.

Plastic pollution is not just a coastal issue—it's a global crisis. Addressing it requires urgent action at every level, from reducing plastic production to improving waste management and investing in sustainable alternatives. The time to act is now.

Check out Surfrider's website for ways you can [reduce your plastic footprint](#).

Plastics Breakdown





CIGARETTE BUTTS

EPS FOAM

69,609 Cigarette Butts we recorded in 2024.

Cigarette butts have been among our top items collected since we began collecting data in 2007. 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.

This year, cigarette butts accounted for over 17% of all items collected.

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), not only leach chemicals, but also act as sponges, absorbing chemicals from the water, and making them toxic to animals that consume them (Rochman et al., 2013).

These filters can take more than 10 years to decompose in the water column, posing a major threat to marine life.

55,875 Expanded Polystyrene (EPS) Foam Fragments we recorded in 2024.

EPS foam—a plastic commonly referred to as Styrofoam®—is notorious for its fragile nature, easily breaking into tens, hundreds, or even thousands of tiny fragments. Once dispersed, these pieces become nearly impossible to distinguish from natural debris like shell fragments and sand, making cleanup efforts extremely challenging, and making them ingestible for marine life.

Adding to the problem, EPS foam can take over 500 years to degrade in sunlight—and even longer once it sinks into the water column, where the absence of sunlight slows the breakdown process even further.

In 2024, EPS foam accounted for 13.8% of all items collected during our cleanups.

Surfrider and San Diego Coastkeeper have been strong advocates for local ordinances restricting the use of Styrofoam®. By reducing reliance on these materials, we can help prevent further pollution and protect our coastlines for future generations.



Nurdles

How Are Plastic Items Made?

Plastic nurdles are tiny plastic pellets, typically 1–5mm in diameter, that serve as the raw material for manufacturing plastic products. These small but essential building blocks are used to create bottles, caps, utensils, and many other everyday items—many of which are commonly found during beach cleanups.

Nurdles are transported globally in cargo containers on ships and trains. Due to their small size, spills frequently occur during loading, unloading, train derailments, and other transport mishaps. **Each year, over 230,000 tons of nurdles leak into the marine environment, posing a major threat to ecosystems** (Eunomia, 2016).

Once spilled, nurdles are incredibly difficult to clean up. Their tiny size allows them to spread widely and embed in natural elements like sand, sediments, and plant matter, making removal both costly and labor-intensive. Like most plastics, nurdles do not biodegrade. Instead, they break down over decades or even centuries, contributing to the world's second-largest source of ocean microplastics.

Beyond the well-documented dangers of microplastics—such as toxicity and pollutant absorption—nurdles also serve as carriers for invasive species. As they drift through waterways, they can introduce harmful biofouling organisms to new environments, threatening native biodiversity.

Nurdle Pollution in San Diego

San Diego's coastal train tracks run directly over lagoons and estuaries that drain into the Pacific Ocean. For years, large quantities of nurdles have been found near tracks at Buena Vista, Agua Hedionda, Batiquitos, San Elijo, San Dieguito, and Los Peñasquitos Lagoons.

In April 2024, San Diego Coastkeeper and the Coastal Environmental Rights Foundation (CERF) filed a Clean Water Act Notice of Intent to Sue against BNSF Railway Company for discharging nurdles into local waterways. Both organizations continue to fight to mitigate this growing environmental problem.

Interested in learning more or contributing to collecting nurdle-specific data? Check out Nurdle Patrol - <https://nurdlepatrol.org/app/>





A TRUE COMMUNITY IMPACT



Surfrider and Coastkeeper are incredibly grateful to the 11,500+ volunteers who came together to clean our coastline. Thanks to your dedication, we removed over 11 tons of debris from our beaches and parks—an extraordinary achievement. The vast majority of the 404,405 items collected posed a real threat to our ocean, and your efforts have made a meaningful impact on protecting marine life. We hope each participant takes pride in contributing to this vital cause.

Your impact goes beyond the trash removed. The data collected during these cleanups is invaluable, helping to raise awareness, inform education efforts, and guide advocacy for stronger plastic pollution policies. By identifying the most common types of waste, we can work toward reducing pollution at its source.

Our mission extends beyond cleanup—we strive to create lasting change by preventing debris from entering our ocean in the first place. None of this would be possible without the dedication of volunteers like you. Your efforts are paving the way for a cleaner, healthier future for our beaches and marine ecosystems.

CONCLUSION

Beach cleanups offer a fun, accessible, and educational way for thousands of San Diegans to give back to their community each year. More than just a volunteer opportunity, these efforts play a critical role in protecting our marine ecosystem by keeping plastics off our shores—preventing them from breaking down into harmful microplastics (Bødtker et al., 2023). But while cleanups make a difference, they highlight a deeper issue: our coastal communities shouldn't have to spend their time picking up trash just to enjoy a pristine shoreline. Even one piece of litter is one too many.

Our beach cleanup programs shine a local spotlight on a global crisis—one far more complex than the common belief that we simply have a “litter problem.” While careless individuals do contribute to dirty beaches, the real question we should be asking is: where does all this trash come from in the first place?

The short answer? We are producing more waste than at any other point in history, and unless we change course, this trend will only accelerate (Kaza et al., 2018). A growing share of this waste consists of single-use, disposable plastics—designed to be used once and discarded—including plastic fragments, cigarette butts, and EPS foam, our top three items of concern. The sheer volume of trash we generate overwhelms our ability to manage it, and much of it inevitably escapes into the environment. More often than not, the ocean becomes the final dumping ground.



CONCLUSION

Beach Cleanups in the Larger Context

The most effective way to keep beaches clean is to generate less trash in the first place. This strategy, known as source reduction, is especially crucial for plastics, which do not biodegrade. Many single-use plastic items can be replaced with durable, reusable alternatives, while biodegradable materials offer a lower-impact option for those that cannot.

Surfrider and Coastkeeper advocate for reducing unnecessary single-use plastics that often end up on our beaches and in the ocean. Cities across San Diego County—including Solana Beach, Encinitas, Del Mar, San Diego, Imperial Beach, Coronado, Vista, San Marcos, Carlsbad, and Oceanside—have passed ordinances restricting plastic bags, EPS foam containers, plastic straws, or all three. We continue to push for broader single-use plastic reduction policies countywide. Policy, advocacy, consumer demand, or a combination of these can drive systemic changes that reduce waste at the source—far more effective than reactive cleanups.

Keeping our oceans clean requires action from individuals, businesses, and governments alike. We invite all San Diegans to join our 2025 Beach Cleanup Program and support organizations like The Surfrider Foundation and San Diego Coastkeeper in the fight for clean water and healthy beaches—now and for future generations.



References

Bødtker, G., Haave, M., Velle, G., Andersen, G. L., Gomiero, A., Gaasø, R., et al. (2023). How plastic and the clearing of plastic affect the ecosystem

Botterell, Z. L., 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*, 245, 98-110.

Cox, K. Garth A. Covernton, Hailey L. Davies, John F. Dower, Francis Juanes, and Sarah E. Dudas Eunomia Research & Consulting Ltd. (2016). "Plastics in the Marine Environment. <https://www.eunomia.co.uk/reports-tools/plastics-in-the-marine-environment/>]

Cox, K. D., Covernton, G. A., Davies, H. L., Dower, J. F., Juanes, F., & Dudas, S. E. (2019). Human consumption of microplastics. *Environmental science & technology*, 53(12), 7068-7074.

Dhanesha, N. (2022, May 6). *The massive, unregulated source of plastic pollution you've probably never heard of*. Vox. <https://www.vox.com/recode/23056251/nurdles-plastic-pollution-ocean-microplastics>

Jabeen, K., Su, L., Li, J., Yang, D., Tong, C., Mu, J., & Shi, H. (2017). Microplastics and mesoplastics in fish from coastal and fresh waters of China. *Environmental pollution*, 221, 141-149.

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>

Law, K. L. (2017). Plastics in the marine environment. *Annual review of marine science*, 9(1), 205-229.

Lyngøy, L. (Main report). NORCE Norwegian Research Centre. ISBN: 978-82-8408-289-9

Botterell, Z. L. R., Beaumont, N., Dorrington, T., Steinke, M., Thompson, R. C., & Lindeque, P. K. (2019).

Pew Charitable Trusts and SystemIQ, 'Breaking the Plastic Wave: A Comprehensive Assessment of Pathways Towards Stopping Ocean Plastic Pollution,' 2020

Preproduction Plastic Debris Program. The California State Water Board.

https://www.waterboards.ca.gov/water_issues/programs/stormwater/plasticdebris.shtml

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>

Rochman, C. M., Hoh, E., Hentschel, B. T., & Kaye, S. (2013). Long-term field measurement of sorption of organic contaminants to five types of plastic pellets: implications for plastic marine debris. *Environmental science & technology*, 47(3), 1646-1654.

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.

Surfrider San Diego & San Diego Coastkeeper 2025 Community Cleanup Calendar

Unless otherwise noted, all cleanups will be held from 9 am to 11 am. Events may be canceled due to inclement weather or unexpected circumstances. For full details, up-to-date information, FAQ's, and how to register for cleanups, check our websites at www.sdcoastkeeper.org and www.surfridersd.org/beachcleanups.

April – Creek to Bay

- 5: **Ocean Beach Pier** | Meet at Ocean Beach Veterans' Plaza south of the lifeguard station (Surfrider monthly cleanup)
- 19: **Moonlight Beach** | Meet near restrooms (Surfrider monthly cleanup)
- 19: **Imperial Beach (10 AM - 12 PM)** | Meet where Palm Ave. meets the beach (Surfrider monthly cleanup)
- 26: **Creek to Bay Cleanup Day** | 9 a.m. to noon | Various locations | Visit www.creektobay.org to register
- 26: **Creek to Bay Cleanup Day – Otay Valley Regional Park** | Meet at 2587 Pal Ave. - Parking at Terra Bella Nursery (Coastkeeper hosts)
- 26: **Ruocco Park (Downtown)** | Meet on the lawn at Ruocco Park, near the restrooms (Surfrider cleanup)

May

- 3: **Oceanside Pier** | Meet at Lifeguard Tower 8, near the corner of Breakwater and The Strand (Surfrider monthly cleanup)
- 3: **Ocean Beach Pier** | Meet at Ocean Beach Veterans' Plaza south of lifeguard tower (Surfrider monthly cleanup)
- 10: **River Day Cleanup – Ocean Beach Dog Beach (9 AM - 12 PM)** | Meet at Ocean Beach Dog Beach, east of Tower 5 (Surfrider and Coastkeeper hosts)
- 17: **Moonlight Beach** | Meet near restrooms (Surfrider monthly cleanup)
- 17: **Imperial Beach (10 AM - 12 PM)** | Meet where Palm Ave. meets the beach (Surfrider monthly cleanup)
- 24: **Pacific Beach (10 AM - 12 PM)** | Meet on the sand south of Crystal Pier (Surfrider cleanup)

June

- 7: **Oceanside Pier** | Meet at Lifeguard Tower 8, near the corner of Breakwater and The Strand (Surfrider monthly cleanup)
- 7: **Ocean Beach Pier** | Meet at Ocean Beach Veterans' Plaza south of the lifeguard station (Surfrider monthly cleanup)
- 7: **World Ocean Day - South Mission Beach** | Meet near restrooms by lifeguard tower (Coastkeeper hosts)
- 21: **Imperial Beach (10 AM - 12 PM)** | Meet where Palm Ave. meets the beach (Surfrider monthly cleanup)
- 28: **South Ponto State Beach** | Meet on the sand, near Lifeguard Tower 20 ((Surfrider monthly cleanup)
- 28: **Ruocco Park (Downtown)** | Meet on the lawn at Ruocco Park, near the restrooms (Surfrider cleanup)

July – Morning After Mess

- 5: **Morning After Mess** | 9:00 a.m. to noon | Various locations | Visit <https://sandiego.surfrider.org/mam> to register
- 19: **Moonlight Beach** | Meet near restrooms (Surfrider monthly cleanup)
- 19: **Imperial Beach (10 AM - 12 PM)** | Meet where Palm Ave. meets the beach (Surfrider monthly cleanup)
- 26: **Pacific Beach (10 AM - 12 PM)** | Meet on the sand south of Crystal Pier (Surfrider cleanup)
- 26: **South Ponto State Beach** | Meet on the sand, near Lifeguard Tower 20 ((Surfrider monthly cleanup)

August

- 2: **Oceanside Pier** | Meet at Lifeguard Tower 8, near the corner of Breakwater and The Strand (Surfrider monthly cleanup)
- 2: **Ocean Beach Pier** | Meet at Ocean Beach Veterans' Plaza south of the lifeguard station (Surfrider monthly cleanup)
- 16: **Moonlight Beach** | Meet near restrooms (Surfrider monthly cleanup)
- 16: **Imperial Beach (10 AM - 12 PM)** | Meet where Palm Ave. meets the beach (Surfrider monthly cleanup)
- 21: **Thursday Night Cleanup – Mission Bay - Crown Point Park (3-5 pm)** | Meet next to the Mission Bay Park Basketball Courts at Crown Point Park (Coastkeeper hosts)
- 23: **Ruocco Park (Downtown)** | Meet on the lawn at Ruocco Park, near the restrooms (Surfrider cleanup)
- 23: **South Ponto State Beach** | Meet on the sand, near Lifeguard Tower 20 ((Surfrider monthly cleanup)

September – California Coastal Cleanup Day

- 6: **Oceanside Pier** | Meet at Lifeguard Tower 8, near the corner of Breakwater and The Strand (Surfrider monthly cleanup)
- 6: **Ocean Beach Pier** | Meet at Ocean Beach Veterans' Plaza south of the lifeguard station (Surfrider monthly cleanup)
- 20: **California Coastal Cleanup Day** | 9 a.m. to noon | Tecolote Shores, Ocean Beach, Imperial Beach, and various other locations | Visit www.cleanupday.org to register
- 20: **River Day - Otay Valley Regional Park** | Meet at the [Rios Avenue Staging Area](#) - 1769 Rios Ave (Coastkeeper hosts)
- 20: **Imperial Beach (10 AM - 12 PM)** | Meet where Palm Ave. meets the beach (Surfrider monthly cleanup)
- 27: **Pacific Beach (10 AM - 12 PM)** | Meet on the sand south of Crystal Pier (Surfrider cleanup)
- 27: **Tamarack Beach** | Meet near Lifeguard Tower 34 (Surfrider monthly cleanup)
- Ongoing: Events throughout the month to restore the Tijuana River Valley | Visit <http://trnerr.org/tram/> to learn more

October

- 4: **Oceanside Pier** | Meet at Lifeguard Tower 8, near the corner of Breakwater and The Strand (Surfrider monthly cleanup)
- 4: **Ocean Beach Pier** | Meet at Ocean Beach Veterans' Plaza south of the lifeguard station (Surfrider monthly cleanup)
- 9: **Thursday Night Cleanup – Mission Bay - Fiesta Island (3 -5 pm)** | Turn onto Fiesta Island Rd. Meet at the blue Coastkeeper canopy (Coastkeeper hosts)
- 18: **Moonlight Beach** | Meet near restrooms (Surfrider monthly cleanup)
- 18: **Imperial Beach** | Meet where Palm Ave. meets the beach (Surfrider monthly cleanup)
- 25: **Downtown** | HOLD: Location TBD (Surfrider cleanup)
- 25: **Tamarack Beach** | Meet near Lifeguard Tower 34 (Surfrider monthly cleanup)

November

- 1: **Oceanside Pier** | Meet at Lifeguard Tower 8, near the corner of Breakwater and The Strand (Surfrider monthly cleanup)
- 1: **Ocean Beach Pier** | Meet at Ocean Beach Veterans' Plaza south of the lifeguard station (Surfrider monthly cleanup)
- 15: **Moonlight Beach** | Meet near restrooms (Surfrider monthly cleanup)
- 15: **Imperial Beach** | Meet where Palm Ave. meets the beach (Surfrider monthly cleanup)
- 22: **Tamarack Beach** | Meet near Lifeguard Tower 34 (Surfrider monthly cleanup)
- 22: **Pacific Beach (10 AM - 12 PM)** | Meet on the sand south of Crystal Pier (Surfrider cleanup)
- 29: Thanksgiving weekend

December

- 6: **Oceanside Pier** | Meet at Lifeguard Tower 8, near the corner of Breakwater and The Strand (Surfrider monthly cleanup)
- 6: **Ocean Beach Pier** | Meet at Ocean Beach Veterans' Plaza south of the lifeguard station (Surfrider monthly cleanup)
- 20: **Moonlight Beach** | Meet near restrooms (Surfrider monthly cleanup)
- 20: **Imperial Beach** | Meet where Palm Ave. meets the beach (Surfrider monthly cleanup)
- 27: **Downtown** | HOLD: Location TBD (Surfrider cleanup)
- 27: **Tamarack Beach** | Meet near Lifeguard Tower 34 (Surfrider monthly cleanup)