

## 2<sup>nd</sup> Annual Southeast Florida Reef Cleanup

### July 2012

### Summary

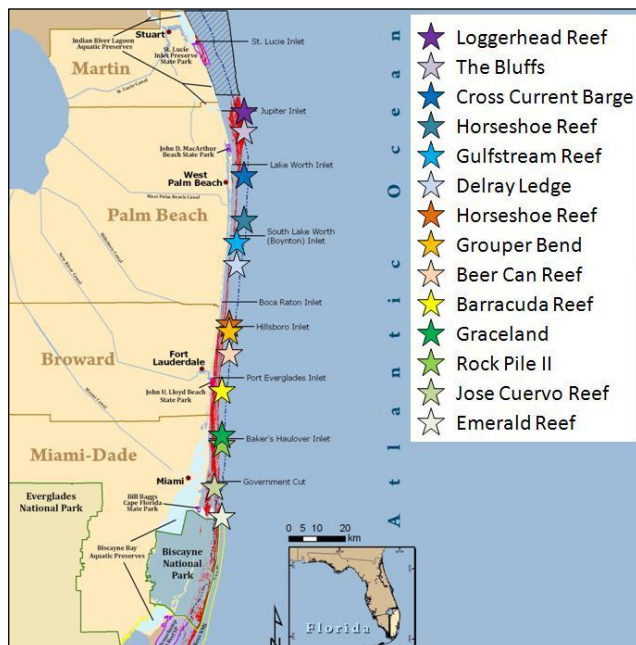
In July 2012, the Florida Department of Environmental Protection Coral Reef Conservation Program (FDEP CRCP) and the Southeast Florida Coral Reef Initiative (SEFCRI) hosted the 2<sup>nd</sup> Annual Southeast Florida Reef Cleanup. In partnership with seven local dive charters, reef cleanups were held in Miami-Dade, Broward, and Palm Beach counties on July 7<sup>th</sup>, 14<sup>th</sup>, and 28<sup>th</sup>, respectively, where a total of 76 volunteer divers helped to remove marine debris from the local coral reefs (Figure 1). Partners for the Southeast Florida Reef Cleanup include the Florida Department of Environmental Protection, the Florida Fish and Wildlife Conservation Commission, Palm Beach County Reef Rescue, Miami Dade County Department of Regulatory and Environmental Resources, Palm Beach County Department of Environmental Resources Management. R.J. Diving Ventures, Adventure Scuba Diving, American Dream Dive Charters, South Florida Diving Headquarters, Jupiter Dive Center, Narcosis Dive Charters, and Splashdown Divers. In Martin County, FDEP CRCP partnered with the Marine Industries Association of the Treasure Coast to sponsor the Pecks Lake Reef Dive Cleanup, held in conjunction with the 5<sup>th</sup> Annual Treasure Coast Waterway Cleanup on July 21<sup>st</sup>. For more information about the 5<sup>th</sup> Annual Treasure Coast Waterway Cleanup, please visit [www.tcwaterwaycleanup.com](http://www.tcwaterwaycleanup.com).



**Figure 1.** Volunteer diver Heather Flint removes marine debris during the 2<sup>nd</sup> Annual Southeast Florida Reef Cleanup. Photo credit: Heather Flint.

Cleanup sites for the 2<sup>nd</sup> Annual Florida Reef Cleanup were recommended by local dive operators in each county, and a total of 14 sites were targeted throughout the region (Figure 2). In Miami-Dade County, participants aboard charter boats from R.J. Diving Ventures and

Adventure Scuba Diving removed debris from four separate locations, including Jose Cuervo Reef, Emerald Reef, Rock Pile II, and Graceland. Broward County cleanup sites targeted by American Dream Dive Charters and South Florida Diving Headquarters included Barracuda Reef, Beer Can Reef, Horseshoe Reef, and Grouper Bend. Finally, in Palm Beach County, charter boats from Jupiter Dive Center, Narcosis Dive Charters, and Splashdown Divers, cleaned up six separate dive sites, including Horseshoe Reef, Cross Current Barge Reef, The Bluffs, Loggerhead Reef, Delray Ledge, and Gulfstream Reef.



**Figure 2.** Sites in Miami-Dade, Broward, and Palm Beach counties cleaned during the 2<sup>nd</sup> Annual Southeast Florida Reef Cleanup.

On each dive boat, a reef cleanup dive briefing was given to all participants, who were then provided gloves, cutting shears, and catch bags to remove debris, as well as buoys to mark any debris that was too large to carry back to the boat. The volunteer divers collected debris from the reef at each cleanup site, and then returned to the boat to sort and record their findings. Across the three counties, the cleanup participants collectively spent 93.6 hours underwater cleaning up approximately 36.4 linear miles of southeast Florida's reefs. They succeeded in removing an estimated 485 pieces of debris, which weighed over 350 pounds, and totaled 165.5 gallons. This effort represents a 5-fold increase in participation from the 1<sup>st</sup> Annual Southeast Florida Reef Cleanup, a pilot event held on April 16, 2011 in Miami-Dade County (Figure 3).

County	# of Participants	Dive Time (hours)	Distance Covered (linear miles)	Pieces of Debris Removed	Weight of Debris (pounds)	Volume of Debris (Gallons)
Miami-Dade	23	33.1	4.5	167	136	59.5
Broward	16	25.6	4.4	157	129	55
Palm Beach	37	34.9	27.5	161	91.5	51
<b>2012 TOTAL</b>	<b>76</b>	<b>93.6</b>	<b>36.4</b>	<b>485</b>	<b>356.5</b>	<b>165.5</b>
<b>2011 TOTAL</b>	<b>17</b>	<b>18</b>	<b>3.24</b>	<b>60</b>	<b>110</b>	<b>30</b>

**Figure 3.** Volunteer participation and debris removed from each county during the 2<sup>nd</sup> Annual Southeast Florida Reef Cleanup, as compared to the 1<sup>st</sup> Annual pilot event, held in 2011.

While all marine debris has the potential to damage or entangle reef organisms, the only direct impacts to marine resources observed were a stony coral and a sponge found entangled in monofilament line. Perhaps the most unusual piece of debris recovered was a pair of dentures, which were found on Barracuda Reef in Broward County. The largest single piece of debris removed was a lawn chair, found on Cross Current Barge Reef in Palm Beach County. Some items were discovered and left in place because they were too large to remove safely, include a boat railing, a large pile of thick rope, and an aluminum boat T-top. Each of these items was marked with a surface buoy and GPS coordinates recorded so that they may be

removed from the reef in the future. A tire with a vase sponge and sea fan growing on it was also left in place because it had already become part of the reef and removing it would cause more harm than good (Figure 4).

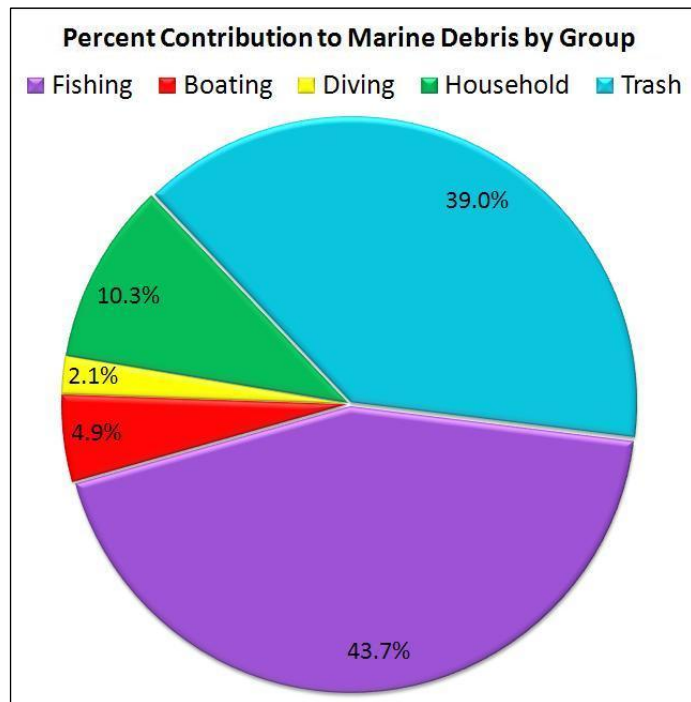


**Figure 4.** a. A chair removed from Cross Current Barge Reef in Palm Beach County; b. A tire discovered at Horseshoe reef in Broward County, but left in place because it had become part of the reef; c. A boat T-top discovered at Beer Can Reef in Broward County was too large to remove. Photo Credit: Jessica Levy (a); Mike Moreno (b, c).

Following the cleanup dives, volunteers turned in their completed data sheets and supplies. The collected debris was recycled to the extent possible or disposed of in trash cans and dumpsters at each location. The data sheets were later analyzed and the collected debris categorized into five main groups:

- Fishing debris – Monofilament, leader line, hooks, sinkers, lures, fishing nets, etc.
- Boating debris – Lines, anchor chain, boat railings, boat cushions, running lights, etc.
- Diving debris – Dive masks, snorkels, dive weights, weight belts, etc.
- Trash – Bottles, cans, food wrappers, plastic bags, miscellaneous plastic, etc.
- Household debris – Chairs, sunglasses, golf balls, bungee cord, water hose, scissors, etc.

Debris in the fishing, boating, and diving categories were determined to have originated from water-based sources. Meanwhile, debris classified as ‘trash’ and ‘household’ have been associated with upland sources, although some of these items may have been the result of boating activities (e.g., sunglasses, food wrappers, beverage bottles). Within this framework, 50.7% or 246 pieces of the total debris collected originated from water-based sources, while 49.3% (239 pieces) came from upland sources. Among the total debris collected across the three counties, fishing debris was the most prevalent (43.7%), followed closely by trash (39%). The remainder of the items recovered consisted of household debris (10.3%), boating debris (4.9%), and diving debris (2.1%) (Figure 5).



**Figure 5.** Percent of marine debris removed from southeast Florida’s reefs, categorized into five main groups.

While fishing-related items comprised the largest contribution to the total amount of debris removed throughout the entire region, it is likely that this number is still an underestimation. Within the fishing user group, monofilament line was the most common type of debris found, which is inherently difficult to quantify; it was often recovered in tangled masses, such that the length of the line was impossible to measure and each mass was only counted a single piece of debris. In an attempt to remedy this discrepancy, hooks found on the line were counted separately. Similarly, in each county divers found and removed wood slats from the reefs. Despite the fact that some of these may have come from fishing traps, they were categorized as trash because the origin could not be confirmed.

It is also likely that boating debris was underestimated as all of the items discovered that were too large to remove safely (boat railing, T-top, and line) fell into this category. Each of these items were left in place and, thus, not included in the cleanup results. Even if they had



been removed, each item would have only represented 1 piece of debris, despite the fact that their volume and weight would likely have surpassed the combined volume and weight of the other debris found at those locations.

This regional information about the general sources of marine debris provides a first indication as to which proactive measures may prove the most useful in reducing the amount of debris that enters the marine environment in the first place. Because fishing debris and trash comprise 82.7% of all the debris that was collected during the reef cleanup dives, it is possible that outreach activities focused on teaching fishing user groups about marine debris and strategies for reducing its impact, combined with efforts to improve land-based waste management, may significantly reduce the amount of debris found on southeast Florida’s reefs.

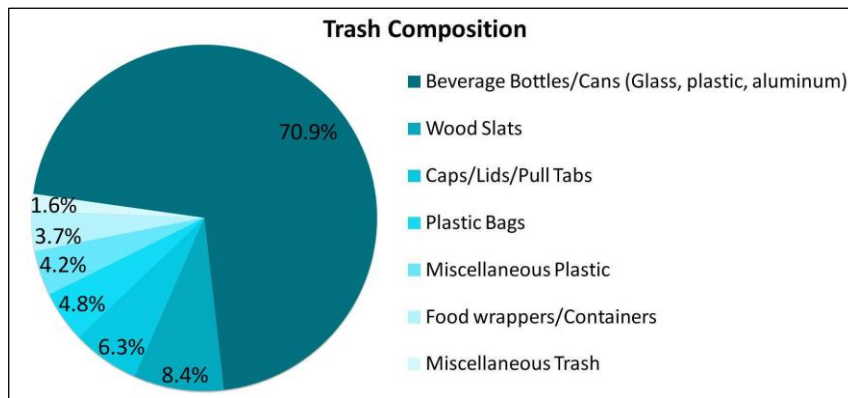


Figure 6. Composition of the marine debris categorized as trash.

Furthermore, because the majority of items found within the trash category consisted of beverage bottles and cans (Figure 6), waste management strategies focused on improving recycling efforts may be the most effective at reducing the amount of trash that ends up on the reef.

While these management strategies apply to southeast Florida as a whole, a more specific analysis shows that the distribution of debris varies greatly between Miami-Dade, Broward, and Palm Beach counties, which suggests that the best management strategy for reducing marine debris may vary within the region. More specifically, in Miami-Dade County only 13.8% of the total debris recovered was attributed to fishing activities, whereas 56.9% was identified as trash (Figure 7). In contrast, 72.6% of the debris collected in Palm Beach County was associated with fishing activities, while only 19.3% was categorized as trash. Thus, a greater focus on improving recycling efforts may prove the most beneficial for reducing the total amount of debris in Miami-Dade County, while outreach to fishing communities might be the best strategy in Palm Beach County. A combination of these efforts would likely be

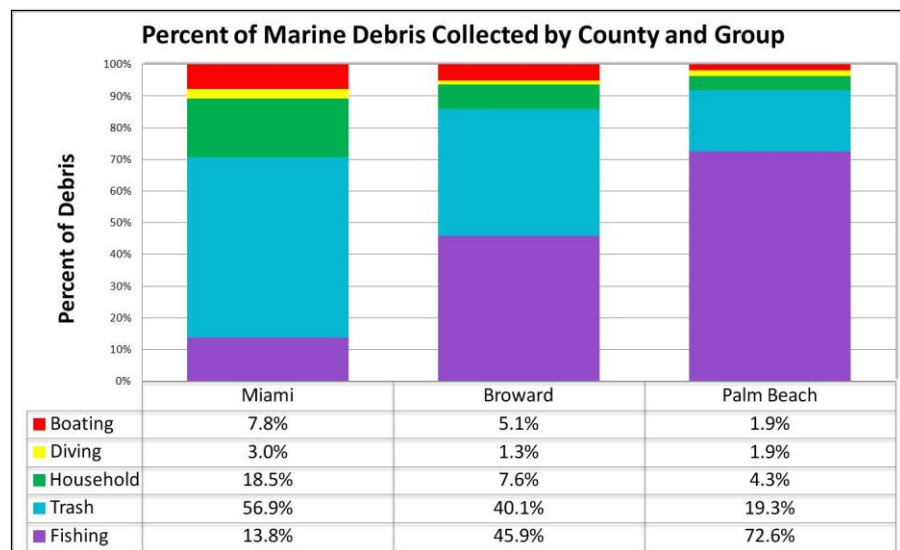


Figure 7. Percent of marine debris removed from each county, categorized into five main groups.

necessary for Broward County, where the proportion of trash and fishing debris were approximately equal. Finally, although the amount of debris collected in Miami-Dade, Broward, and Palm Beach counties was comparable (157, 167, and 161, respectively; Figure 3), when adjusted for effort, divers in Palm Beach County found the least amount of debris (4.4 items per person) followed by Miami-Dade (7.3 items per person) and Broward (9.8 items per person). While this data provides useful information about the composition and volume of marine debris in southeast Florida, in order to provide the most accurate management recommendations, more data is necessary to determine if these county-specific trends persist or fluctuate over time.

The 2<sup>nd</sup> Annual Southeast Florida Reef Cleanup was part of the larger Southeast Florida Action Network (SEAFAN), a reporting and response system designed to improve the protection and management of southeast Florida's coral reefs by enhancing marine debris clean-up efforts, as well as by providing early detection and response to vessel groundings, coral damage, and biological disturbances. As a central component of SEAFAN, the Southeast Florida Marine Debris Program seeks to raise awareness about the causes and consequences of marine debris, while minimizing its impacts and developing strategies to reduce the amount of debris entering the marine environment. In addition to organizing yearly reef cleanup events, this program encourages local divers and dive shops to remove small debris on a regular basis and report all debris by calling the Southeast Florida Action Network (SEAFAN) hotline at (866) 770-SEFL or filling out an online form at [www.SEAFAN.net](http://www.SEAFAN.net).

For more information on the Southeast Florida Marine Debris Program and SEAFAN, or to report marine debris or other marine incidents, visit [www.SEAFAN.net](http://www.SEAFAN.net), or call 866-770-SEFL.

