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Composition and distribution of beach debris in Orange County, California

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ABSTRACT

Many studies have quantified the amount of debris collected along beach shoreline areas in various locations around the world. Only a few of those studies have been conducted in the United States, and they are largely limited to semi-quantitative efforts performed as part of volunteer clean-up activities. In this study, we quantified the distribution and types of beach debris by sampling 43 stratified random sites from Seal Beach to San Clemente on the Orange County, California, coast from August to September, 1998. An area of shoreline was delineated for each site that was 25 yards in length and extended from the water's edge to the first pavement or rocky cliff. All trash was collected by at least three people walking systematically along transects. In addition, a five-gallon bucket was used to sieve one bucket of sand at each site to collect and quantify the small items that were undetectable by visual examination. Based upon the survey data results, it was estimated that more than 106 million items, weighing approximately 13 tons, occur on Orange County shorelines. The most abundant items were pre-production plastic pellets, followed by foamed plastics and hard plastics. Debris density on the remote rocky shoreline was greater than that on high-use sandy beaches for most debris items. This finding partially reflects the periodic cleanup of high-use beaches by local municipalities, and also indicates that a high percentage of the observed debris was transported to the site from waterborne sources. The amount of Orange County beach debris estimated by this study is 50 times that (excluding pre-production plastic pellets) collected in the California Coastal Cleanup Day. The difference appears to be attributable to Cleanup Day's focus on large, visible debris at a subset of high-use beaches that are periodically cleaned by mechanical combers.

Full Text

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