

The Ocean Conservancy's National Marine Debris Monitoring Program

The National Marine Debris Monitoring Program (NMDMP), coordinated by The Ocean Conservancy and funded by the U.S. Environmental Protection Agency (EPA), is a scientifically valid marine debris study examining the occurrence of thirty specific marine debris items occurring on the U.S. coastline. The program is designed to answer two specific questions: Is the amount of debris on our coastlines decreasing? What are the major sources of the debris? Trained NMDMP volunteers monitor selected beaches for marine debris and conduct beach cleanups every 28 days over a five-year period. The NMDMP takes the idea of beach cleanups a step further by standardizing marine debris collection using a scientifically valid protocol to determine the status and trends of marine debris pollution.

Background:

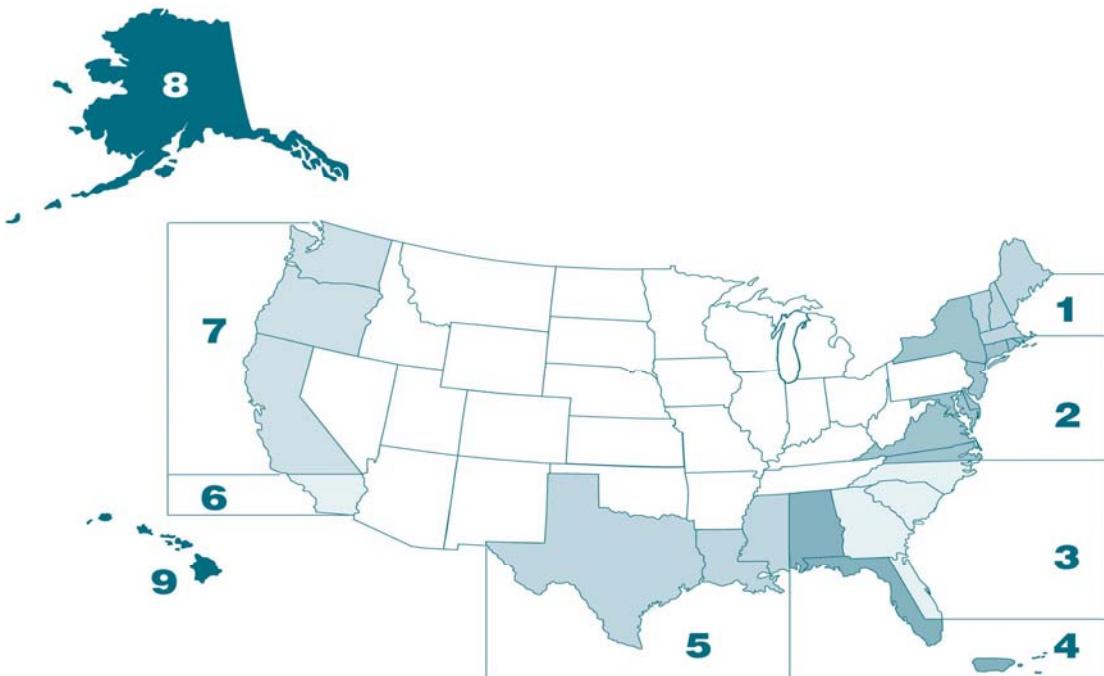
The establishment of the NMDMP monitoring sites was started in the spring of 1996 after a 5-year pilot program designed by a working group composed of representatives from The Ocean Conservancy, EPA, NOAA, the NPS, and selected researchers. The workgroup concluded, based on the results obtained during the pilot program, that the goal of the NMDMP is to be able to measure a 30% change in 30 selected marine debris items on the U.S. coastal shorelines, with a Type I error rate of 0.10 and power of 0.84 which will require the monthly sampling of 20 beach sites per 9 coastal regions, for a five-year period (Ribic 1991, Ribic et al. 1992).

The NMDMP began with the establishment of 40 randomly selected marine debris-monitoring sites along the Gulf of Mexico in 1996. Over the past four years, the NMDMP has expanded its coverage to over 130 sites located along the East, West and Gulf Coasts including Alaska, Hawaii, Puerto Rico and the U.S. Virgin Islands. The protocol for the NMDMP calls for 180 marine debris monitoring sites to be set up along the coastal US being monitored by hundreds of trained volunteers coordinated by The Ocean Conservancy.

Methodology

The U.S. coastline has been divided into 9 regions (Figure 3) based on available information on the types of marine debris found there and the prevailing currents. Twenty marine debris-monitoring sites per region are randomly selected from a comprehensive list of beaches, which fit the NMDMP criteria. Each beach must be of low to moderate slope, composed of sand to small gravel, have a length of at least 500 meters (1/3 mile), have clear direct access to the sea (not blocked by breakwaters or jetties) and must be accessible to volunteers year round. Care is also taken to select beach sites that will not impact any endangered or protected species such as sea turtles, sea birds, marine mammals, and sensitive beach vegetation. At each designated study sites, trained volunteers conduct beach cleanups and marine debris surveys every 28 days.

Figure 3
NMDMP Survey Regions



- Region 1: U.S.-Canada border to Provincetown, MA
- Region 2: South of Cape Cod, MA to Beaufort, NC
- Region 3: Morehead City, NC to Port Everglades, FL
- Region 4: Port Everglades, FL, Puerto Rico, U.S. Virgin Islands to Gulf Shores, AL
- Region 5: Dauphin Island, AL to U.S.-Mexico border
- Region 6: U.S.-Mexico border to Point Conception, CA
- Region 7: North of Point Conception, CA to U.S.-Canada border
- Region 8: Alaska (southern coast and Aleutian Islands)
- Region 9: Hawaiian Islands

NMDMP Data Collection:

Data are recorded on the NMDMP data card by the volunteer survey teams. Information is recorded on thirty specific debris indicator items grouped into three general categories of debris - *ocean-based, land-based, and general sources*.

Ocean-Based Source Indicator Items: gloves, plastic sheets (≥ 1 meter), light bulbs/tubes, oil/gas containers (> 1 quart), pipe-thread protectors, nets (≥ 5 meshes), traps/pots, fishing line, light sticks, rope (≥ 1 meter), salt bags, fish baskets, cruiseline logo items, floats/buoys.

Land-Based Source Indicator Items: syringes, condoms, metal beverage cans, motor oil containers (1 quart), balloons, six-pack rings, straws, tampon applicators, cotton swabs.

General Source Indicator Items: plastic bags (<1 meter), plastic bags (≥ 1 meter), strapping bands (open), strapping bands (closed), plastic beverage bottles, plastic food bottles, plastic bleach/cleaner bottles, other plastic bottles.

The thirty specific items listed on the data card will provide the information needed to measure the changes and trends in the amount of debris appearing on the U.S. coastline. Additional items may also be tracked that are specific and meaningful to local regions (i.e. plastic mesh bait bags in New England, fluorescent light tubes in the Gulf of Mexico). The data, which are collected by each volunteer survey team, is sent back to The Ocean Conservancy's Office of Pollution Prevention and Monitoring in Virginia Beach, Virginia where the data is added to our national database.

As with any scientific study, quality assurance (QA) is practice to ensure that all data collected is reproducible and comparable. It is the responsibility of each monitoring site Survey Director to follow QA procedures during the survey set-up, volunteer training, and data collection.

Throughout the course of each year of the study, Survey Directors are instructed to randomly select four dates on which to conduct a QA procedure. The QA procedure requires the Survey Director to follow behind volunteers taking note of any debris items that were overlooked.

Collected debris is re-inspected and a new data card is completed with "QA" labeled on top. The original data card and the QA data card are returned to The Ocean Conservancy for a calculation of percent error.

The data from this study will be analyzed at the end of the five-year study and will yield a more in-depth understanding into the nature and trends of marine debris in the U.S. Data will be examined both on a national basis as well as regionally. The program is currently in the final stages of the establishment of marine debris monitoring sites and the training of volunteers. To date, over 130 marine debris monitoring sites have been established along the coastal U.S. The initial analysis will begin on a regional basis upon completion of the first five years of data collection. Final analysis on a national level will occur once all nine regions have been established and operating together for a five-year period. Once five years of data collection on a national level is complete, analysis will begin to examine trends in marine debris as well as an examination of the major sources of the debris.

Contact Information:

National Marine Debris Monitoring Program
The Ocean Conservancy
Office of Pollution Prevention and Monitoring
1432 N. Great Neck Road, Suite 103
Virginia Beach, Virginia 23454

Phone: 757-496-0920
FAX: 757-496-3207
Email: nmdmp@oceanconservancyva.org