MARINE DEBRIS SURVEY: *More than just cleaning the shoreline...seeking the source.*

OBJECTIVES:

- Become aware of debris problem; seriousness
- Learn sources of debris; ways to minimize
- Understand dangers to wildlife
- Learn ways for individuals to control problem
- Promote awareness of problem

GRADE/SKILL LEVEL:

Adaptable to grade 5 and beyond.

MATERIALS:

FOR DISCUSSION:

- Field Guide to Plastic Marine Debris on Outer Cape Shores
- NOAA pamphlets on plastic debris
- Graph packet; beach debris found on Outer Cape Cod
- Video; Turning the Tide (31 min.)

ON SITE:

- Checklist of the Marine Debris of Outer Cape Cod
- Plastic Bags
- Gloves

ACTIVITIES:

Pre-visit:

- Review and discuss the article on Plastic Marine Debris.
- Discuss sources of debris and who is responsible for making and disposing of it.
- View video Turning of the Tide.
- Develop your own checklist of items you expect to find; possibly different lists for ocean vs. bay beaches.

On Site:

- Assemble group, issue bags and assign sub-groups different parts of the beach. Warn group not to pick up any hazardous materials or sharp-objects without gloves.
- Rendezvous; catalogue findings of group using checklists.

BE ALERT TO STAY AWAY FROM PLOVER OR TERN NESTING AREAS DURING SPRING OR SUMMER.

Post Visit:

- Discuss hazards, particularly to animals, of specific items found. Dem onstrate using NOAA pamphlet.
- Design posters on “Pick it up/Pack it out” theme.
- Discuss ways for individuals to reduce the amount of disposable materials they use, based on items found.
- Design, complete posters from graphs (i.e. larger, more colorful graphs, high interest graphs such as pictographs).
- Estimate build-up of debris over time if unchecked; discuss or write essays on long term outlook.

For more information contact:

National Office/ East Coast Marine Debris Information Office
Center for Marine Conservation
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MARINE DEBRIS . . . *More Than Just an Eyesore*

Student Information Sheet

Have you ever seen a seal with its neck entangled in a plastic six-pack yoke, or a sea turtle after it has swallowed a plastic bag? What happens when a seabird mistakes a plastic pellet for a fish egg and eats it? These deadly events are a constant threat to our marine life.

Unfortunately, the characteristic durability of plastic has made it both the most common type of ocean debris and the most destructive to marine animals. A small, seemingly harmless six-pack yoke has an estimated life span of hundreds of years. Marine animals often confuse plastic items for real food — a mistake that can be fatal. Sea turtles can mistake plastic bags for jellyfish. One whale was discovered with over four dozen plastic bags in its stomach.

Entanglements with floating debris pose another problem. An estimated 50,000 fur seals die each year after becoming ensnared in plastic trash. Birds sometimes collect plastic debris for their nests, thus creating death traps for their young. And the list goes on . . .

The large-scale oil spills, such as the one in Alaska, have reawakened Americans to the problems facing the ocean environment. What many people don't realize, however, is that these recent catastrophe are not the real problem. They are only a strong warning about the greater problem: the way we think about our environment. The ocean's vastness has lulled us into believing that it cannot be greatly affected by our discarded rubbish.. A whale entangled in a fishing line might disagree — if only it could!

Cape Cod is far from Alaska, but similar pollution problems still exist. Small scale oil spills have occurred on Cape Cod, usually in the form of oil deposited on the beach during high tides. Oil endangers such already-threatened birds as the piping plover, which uses the beach for nesting on during the spring. Oil spills compound the problems that marine animals face in living within the ocean waters just off our National Seashores.

National Park Service rangers are presently conducting marine debris surveys throughout the Park System to determine the nature and extent of the problem. Several one-kilometer long stretches at several beach locations are surveyed every three months, and the debris counted and categorized.
In the first survey on Cape Cod, 5,829 items of debris were collected, with plastics accounting for 80% of all items found. Fishing gear fragments, packaging materials, balloons, bottle caps and straws were among the most common items gathered. While this overall amount of debris collected may seem like a lot, Cape Cod beaches are clean compared to many others!

Ocean debris comes from a variety of sources. According to one estimate, marine vessels dump some 12 billion pounds of cargo waste into the ocean each year. Additional debris comes from poor disposal practices by people living or visiting along shorelines. Recently-enacted laws have made the dumping of trash illegal in waters near the United States coastline, and lawmakers are considering a complete ban on dumping into ocean waters. Unfortunately, many port cities and harbors are not adequately set up to provide waste disposal sites and dumping at port can be costly. Sometimes marine debris also comes from careless disposal of trash on land, which finds its way off shore and into ocean currents.

It will take both the "land-lubbers" living on shore and water enthusiasts at sea, to solve the problem of ocean dumping and improper shoreline disposal. Solutions include sorting and storing cargo wastes on board ships for recycling and disposal at the harbor, retrieving debris others have left behind and improving shoreline waste disposal methods.

Collecting and keeping records about the types of debris found on our beaches is a step in the right direction. This activity helps to clean our beaches, and gives us information on what types of materials are causing the problem. Working together, we can all help to make our beaches clean and beautiful once again.

MARINE DEBRIS STUDY SHEET

Oil spills and animals killed by plastic debris are part of a much larger problem. That problem is _____

Marine animals often confuse plastic bags for _____

Because of its durability, _____ is one of the most common type of ocean debris.

In order to understand the problem of trash on our beaches, the National Park Service regularly conducts _____

_____ percent of all the items found during the first Marine Debris Survey on Cape Cod were made of plastic.

List three solutions to help solve the marine debris problem on our seashore.

_____

_____

_____

A Field Guide To Plastic Marine Debris On Outer Cape Shores

From *Cape Cod Driftlines* **by David Manski**

Although they reside on our beaches, many people aren't aware of them. They tend to be small and somewhat obscured, partially buried in the sand or hidden behind the vegetation. But they are actually easy to observe if you inspect the beach closely, and there is a vast assortment of them: human-generated debris that has washed ashore from unknown origins.

Cape Cod beaches are nationally renowned for their unspoiled beauty. Yet, even veteran beachcombers might be surprised to learn just how abundant and diverse this litter is. For example, one year over 75 different items totaling 27,253 pieces were found on quarterly surveys conducted on just five one-half mile sections of different outer Cape beach. While some of this debris has no doubt been generated by recent beachgoers, the vast majority washes ashore from ocean and bay waters; while adrift much of this litter poses significant hazards to marine mammals, birds, fish and turtles. Debris that washes ashore is actually just a small sample of what still remains at sea to further injure wildlife and foul our beaches.

This guide describes some of the more common marine debris likely to be encountered on outer Cape Cod beaches. While the discussion is general in nature, information presented here is based on actual quantitative data collected during systematic surveys of five beaches within Cape Cod National Seashore.

General Patterns

Approximately 85 percent of the debris on outer Cape beaches is plastic. Other litter (in rank order of abundance) includes wood, glass, metal, paper and other products. Medical objects constitute less than 0.09 percent of all debris. Over half of the plastic litter is represented by fishing related gear (e.g. nets, rope) and packaging materials (e.g. bags, bottles). Plastic personal items, such as smoking accessories, toys and tampon applicators, comprise less than one-fifth of the debris. Plastic objects that can be ingested by marine wildlife are greater than five times more abundant than plastic items posing entanglement hazards. On the Outer Cape, bay beaches generally have over three times as much debris as ocean beaches.

A Throw-Away Guild of Plastics:

The following nine objects account for approximately 80 percent of all plastics likely to be found on outer Cape beaches:

Rope: Very abundant. Our most common plastic on outer Cape Cod. Can be observed in greatest numbers on bay beaches. Found in all colors and diameters either twisted or braided. Over 90 percent will be less than three feet long. Larger pieces are a serious entanglement hazard to marine animals. Source--the commercial fishing industry.

Foam fragments: Seasonally common, most notably after intense storms. Usually observed tumbling along the beach surface. Found in all sizes ranging from very tiny (penny) to large (volleyball). Remnants of styrofoam cups, plates, food containers, styrofoam packaging, foam insulation or fishing buoys. Often observed pock-marked by gulls or other birds; possibly lethal if ingested.

Bags and Sheeting: The most abundant packaging material found on beaches. Although can be discovered whole, usually observed tattered, shredded and in small pieces. Colors vary from clear, white, brown or black. Bags have creases or seams. One of the more hazardous ingestible debris to marine wildlife.

Balloons: Abundant. The fourth most numerous plastic debris on beaches. Originally helium filled, they are best identified by an attached and brightly colored ribbon (check the ribbon end for the confirming "knot"). Not unusual to find logos indicating where the balloon migrated from (some have originated as far away as New York City).Usually solitary, but occasionally found in large twisted and tangled aggregations. Observed in most colors. Poses a significant threat to marine wildlife if ingested.

Straws: Common. All types likely to be found, from jumbo drinking to short hollow coffee stirrers. Typical colors include clear, white, white and red and blue. When partially buried in the sand, easily confused with shafts of gull feathers

Caps & Lids: Locally abundant. The vast majority tend to be tops and broken seals of gallon milk or water jugs (blue and red dominate). Screw type caps from other bottles and lids of food containers are not uncommon.

Bottles: Common. Any type found in the supermarket can also be observed washed up on the beach; beverage (milk, water, soda, etc.) are typical. Occasionally rope will be attached to handles of bulk liquid containers (5 gallon size). These are used by fishermen and boaters as homemade buoys.

Miscellaneous Hard Fragments: Fairly abundant. Rigid, non-foam, non-porous broken pieces of unknown debris. Observed in all colors, sizes and shapes.

Tampon Applicators: Locally abundant, especially on bay beaches. Almost always pink. Their presence in marine litter is indicative of inadequate sewage treatment facilities, such as combined stormwater and sewer overflow systems. In this design, untreated sewage and accompanying solid waste (like tampon applicators) divert into storm sewers during heavy rainfall and eventually discharge into coastal waters. Since outer Cape towns do not discharge sewage to coastal waters, communities on the Massachusetts eastern shore (and possibly other towns in adjacent coastal states) are likely responsible for some of the sewage associated wastes washing up on our beaches.

Other interesting but less abundant plastic items to be found on the beach include: 1 inch long yellow, red or blue thick rubber bands (used to keep lobster claws closed); colored triangular shaped caps and narrow 1-2 inch long red cylinders (firework rocket tail and cap sections); narrow 4-6 inch long white hard bands with a stamped number and red maple leaf (Canadian salmon tags reportedly from fish carcasses used as lobster bait); 10-12 inch long black, yellow or blue nylon mesh bags (used for holding bait in lobster traps); clear 1 inch long hollow tubes spliced into four or more pieces at one end (packaging to house shotgun shell pellets); and multi-shaped, clear or white 2 inch long hard pieces used in the arrangement and attachment of balloons or flowers into decorative displays.

You can also find many plastic items on outer Cape beaches that pose serious hazards to marine animals. Foam fragments, bags and sheets, and balloons were already mentioned as being potentially ingested. Other entanglement objects besides rope include nets (trawl webbing and gillnets), monofilament fishing line, six-pack yokes (used to hold beverage cans) and closed straps (flat, narrow bands to bind crates, boxes or newspapers).

Debris Watching

As you ramble and roam the beaches this summer, consider keeping track of the litter you observe; record your sightings on the plastic marine debris "check list" below. While you work at developing into a seasoned debris watcher, you will also likely become a more enlightened and educated consumer. All it will take is that one special sighting.

Maybe it will be the thousands of foam fragments washed ashore after an unusually strong storm, or possible the tens of multi-colored balloons tangled among the limbs of a solitary tree. Perhaps it will be the dried, somewhat brittle shreds of plastic sheeting blowing along the sand. Hopefully it won't be the limp body of a herring gull or dogfish entangled in a ball of monofilament fishing line.

Regardless of how your emotions get challenged, the likely result of your debris watching will be a greater awareness of the ultimate fate and impact of some of those discarded items we long ago forgot about. The experience should also help foster a better understanding of why it is so important for us to change from a disposable society to one that recycles or even eliminates the use of certain products. We must learn that releasing helium filled balloons into the environment is as inappropriate as tossing beverage bottles into the ocean.

Education is the key to implementing change. Knowing more about the patterns and sources of human-generated beach debris is a vital component of this process. Through observation and research today, we can evaluate our future performance; information on beach litter obtained in the present will serve as tomorrow's baseline. So when you are out on the beaches this summer, think about what you see and how you can personally help reduce the amount of litter found on the shoreline. Begin recycling. Consider participating in community or state-sponsored beach cleanups. Start a debris "life list." Hopefully beachcombing in years to come will be even more rewarding; not because of what you discover, but because of what you don't!

CHECK LIST TO THE PLASTIC MARINE DEBRIS OF OUTER CAPE COD

Fishing Gear

___trawl webbing
___monofilament gillnet
___monofilament fishing line
___rope
___fish or shellfish floats
___5-gallon lubricant containers
___fish baskets
___mesh bait containers
___lures
___light sticks
___lobster bands
___other _____

Personal Effects

___hats/helmets
___footwear
___gloves
___smoking accessories
___toys
___balloons
___combs/brushes
___tampon applicators
___fireworks
___other_____

Packaging Materials

___bottles
___caps/lids
___bags
___sheeting
___straps
___cups
___styrofoam cups
___styrofoam food containers
___other food containers
___utensils
___straws
___pails/buckets
___six-pack yokes
___styrofoam packaging
___other _____

Miscellaneous Items

___shotgun wads/shellcases
___pipe/tubing
___brushes/brooms
___garbage cans
___tires/innertubes
___gaskets
___hard fragments
___foam fragments
___medical
___other _____

Total plastic items ____ Percentage ____

Total wood items ____ Percentage ____

Total paper items ____ Percentage ____

Total metal items ____ Percentage ____

Total other items ____ Percentage ____