

# SHORE STEWARDS NEWS

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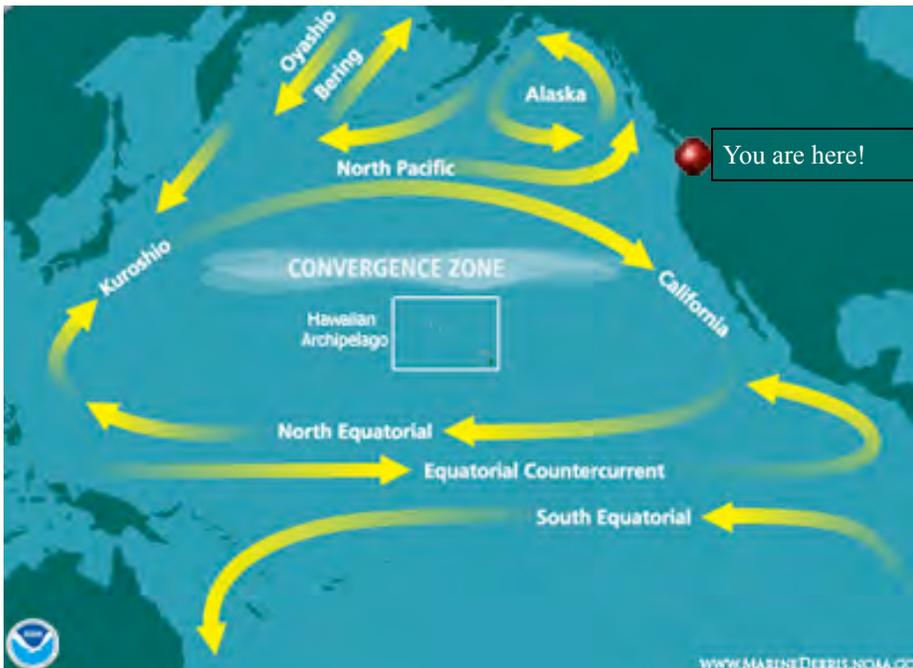
Island County, Washington

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## Plastics and Puget Sound

Humans are the source of all plastic debris in Puget Sound and the majority of it originates from land-based sources. Plastic products and pieces are generated in many shapes and forms and are utilized in everyday human life. Think about the plastic items you may have used today - water bottles, computers, telephones, packaging, bottle caps and movie and



music cases – and you’ll know how pervasive plastic has become in our lives. With 4+ million people living in this region, our daily choices and consumption patterns impact the health and legacy of Puget Sound in many ways.

Products that eventually enter Puget Sound include objects like fishing line and rope, wrappers, bags, netting, six-pack beverage rings, hollow fish floats, bottles, coolers, and small particles like *nurdle pellets* (plastic pellets that are the starting material for many plastic products)

In the North Pacific Central Gyre (where the currents circle around and a stillness forms), plastic pieces gather on an average of 334,271 pieces per square mile. Worldwide marine debris harms more than 267 species, including 86 percent of all sea turtle species, 44 percent of all sea bird species, and 43 percent of marine mammal species.

## The Life Cycle of Plastic

### Plastic Degradation:

Plastic does not fully degrade; it simply breaks into smaller and smaller pieces. The degradation process is determined by the density and type of the plastic, the temperature of the water and the types of additives embedded in the plastic during the production process.

Most plastics photo-degrade on land due to exposure to solar ultraviolet radiation by breaking down into smaller and smaller pieces. When in water, plastic may not get direct sunlight exposure; therefore breakdown happens much more slowly in the aquatic environment. Compostable plastics do not biodegrade in the ocean.

### Plastics and Toxins:

There have been a number of studies on persistent organic pollutants (POPs) binding to plastic debris in the oceans. Recent studies have focused on the uptake potential of organic contaminants from the marine environment to plastic debris. It is shown that plastic debris can transport organic contaminants in the oceans. They have the potential to adsorb organic contaminants from the marine environment. It is possible, though not proven, that plastics could also release these contaminants to animals that ingest plastics.

Organic toxins that do not dissolve well in water, such as PCBs (polychlorinated biphenyls), may bind to and accumulate onto plastic debris at a rate of up to 100,000-1,000,000 times found in the normal seawater concentrations. Research on benthic-feeding invertebrates suggests that toxins may be transferred from plastics, to sediment, to the organism. Further research is needed, taking into consideration the range of contaminant types, types of plastic, and environmental exposure effects.

## Plastics and Animal Feeding Habits

Degraded plastic can resemble natural food sources for fish and wildlife.

There are three zones where marine life eats; surface, pelagic and benthic zones. Different food types live in the different ocean levels, and some food is found on the beach. Many birds are surface feeders and skim bugs or small bits of fish. Gulls, for example, eat fish, intertidal organisms, and beach debris on the surface level and on shore.

Fish are usually pelagic feeders, finding food in the open water column. Given the rich variety of food at this level, many whales, turtles, seals, and diving birds feed here on krill, anchovies, herring or other foods. Dolphins are also pelagic feeders, eating surfperch with their teeth. Orcas eat here too.



Photo courtesy of the Ocean Conservancy

Benthic, or bottom, feeders include sea otters, some whales, turtles, and schools of fish. Sea Otters, for example, eat benthic urchins and shellfish, by diving down deep into the waters and bringing them to the surface to eat.

Animals that feed in different areas of the ocean encounter different forms of plastic. Gulls, for example, accidentally eat up bits of floating plastic pellets thinking it is a food source, but wouldn't scoop up a large, floating, angular object such as a Styrofoam ice chest, or a hollow plastic bottle.

Plastics harm aquatic animals in a variety of ways, based on the buoyancy of the object. Some plastics float, while other plastics sink. Animals can be harmed through entanglement, laceration, suffocation, and ingestion because marine organisms do not recognize it as non-food or know how to respond to it. Many encounters result in injury or death.

Watch this YouTube video for more information on marine debris and its impact to albatross on the Midway Atoll: <http://www.midwayjourney.com/>. The albatross has become the poster child for the ingestion impacts of plastics. Locally, the Port Townsend Marine Science Center is studying the stomach contents of gulls on Protection Island to determine how much plastic ingestion is occurring with birds residing on this preserve just off Port Townsend.

## Preventing Plastic Pollution from Land

People are connected to the ocean, and the health of the ocean depends on people. Land-based sources of plastic pollution are from littering, dumping and improper waste management practices, storms cleaning our landscape of litter and extreme natural events.

The best thing that each of us can do is to use fewer plastic products. Each year, Americans throw away approximately 100 billion plastic bags. Simply by reducing our use of plastic bags, each of us will help to reduce the amount of plastic that winds up in Puget Sound and eventually the Pacific Ocean. Many stores now will sell you their own reusable cloth bags. Why buy new plastic bottles of water when you can refill a glass jar or aluminum canister?

Secondly, don't litter. Elementary school children today know that littering is not good for Puget Sound. Most adults do as well. If you drive vehicles with open air compartments, like trucks, keep the debris from leaving your vehicle. A car litter bag is always helpful to have in your vehicle.

Pick up litter when you see it. Whether you are walking on a city street or a pristine beach in Puget Sound, try to pick up at least one thing that you find. If you have a favorite spot to enjoy the Puget Sound landscape, bring a bag and clean it up! You'll be amazed at how much you'll find if you start looking. If you want to pick up beach litter on a regular basis, there is a program for that in Island County. Contact WSU Waste Wise coordinator Janet Hall for details. On Whidbey, call (360) 678-7974. On Camano, call (360) 629-4522, extension 258.



Reuse and Recycle items as much as possible. When given the choice,

purchase reusable items over single use items. Consider shopping for food items in 'bulk food' sections where you can get larger quantities with less packaging – and often more cheaply. Recycling options are vastly expanded from two years ago. Today, you can recycle items as diverse as printer cartridges, bottles, some plastic food containers...it varies by community so check your local guidelines.

Lastly, consider letting your neighbors, friends and any groups you participate in know about plastics and their impact. Organize a school poster contest on the problems with plastics, set up a recycling program at your community club – let your creativity guide you. Many organizations hold public land clean ups so consider inviting others to join you in these events. If you'd like to learn more, contact your Shore Stewards Coordinator.

## Resources

- California Coastal Commission : <http://www.coastal.ca.gov/publiced/marinedebris.html>
- Coast Savers: <http://www.coastsavers.org/resources.html>
- National Oceanic and Atmospheric Administration (NOAA) Marine Debris Program: <http://marinedebris.noaa.gov/info/plastic.html>
- Ocean Channel: <http://www.ocean.com/>
- Plastics Pollution Coalition: <http://plasticpollutioncoalition.org/learn/basic-concepts/>
- Port Townsend Marine Science Center: <http://www.ptmsc.org/>

For additional information on plastics in the ocean, as well as additional links and references, see the November 2008 Shore Stewards News at <http://www.shorestewards.wsu.edu/island/newsletter/Nov2008Newsletter.pdf>



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*The website for the Northwest Straits Commission can be seen at <http://www.nwstraits.org/>*

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