

**Our Ocean Backyard — *Santa Cruz Sentinel* columns by Gary Griggs, Distinguished Professor of Earth and Planetary Sciences, UC Santa Cruz.**

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**Swimming in Plastic**

Our lives revolve around plastic today, so much so that it seems like it might actually be an element in the periodic table. But the word plastic, which is derived from the ancient Greek *plastikos*, meaning capable of being molded or shaped, didn't come into common use until 1907, when the world's first synthetic plastic was developed in New York City.

The many unique and useful properties of plastics – lightweight, flexible, strong, durable, moisture resistant, and relatively inexpensive – led to the rapid proliferation in the development and use of new plastic products throughout the 20<sup>th</sup> century. And it may be obvious that all plastic isn't created equal. Dozens of different kinds of plastic have been created from polyester fabrics, polyethylene bottles and bags, polyvinyl chloride (PVC) plumbing pipes, polystyrene packing foam, disposable cups and plates, and many, many more.

In California we have nearly eliminated plastic shopping bags, and there is a campaign now underway and making progress in getting rid of plastic drinking straws. Yet there are still millions of single use plastic water bottles being bought and drained every day, and a long list of other common plastic products that we use regularly, many more than most of us probably realize. Other than a few plastic products that we hope last for many years (hearts and heart valves and joint replacements, for example), most of this stuff is used just once (things like soft drink and water bottles, plastic food containers, plastic cups and tableware, milk jugs and detergent containers, to name a few) and then is tossed or hopefully recycled.

Industry produces more plastic each year - which we continue to consume - estimated now at about 440 million tons globally. We have built machines around the world that can now produce 20,000 plastic water or soft drink bottles a second. Stacked up end-to-end, this is a line of bottles 3 miles long, made every second! Any of us can do some simple multiplication and realize that this bottle production expands to a line 180 miles long each minute, and 10,800 miles long every hour –

enough to stretch from Santa Cruz to London and back. In a day, the line becomes 259,000 miles long, which would circle the Earth at the equator 10 times! Hard to imagine, but it's happening, every day.

It shouldn't come as a surprise then that landfills, highway roadsides, trash cans, beaches, and even the oceans contain millions of single use plastic bottles. Whenever I begin to feel that we are making some progress locally in reducing our consumption of single use plastic bottles of water I look at the stocked shelves of bottled water in Safeway, or the people coming out of Costco with those industrial-size shopping carts stacked high with cases upon cases of water bottles, and realize we still have long ways to go.

While healthier than soft drinks, there are some major environmental problems that we have created with billions of these plastic bottles. All of those properties that make plastic such a useful material for so many uses are exactly the same properties that make it such a growing concern for the oceans. And the most recent studies indicate that about 15 tons of additional plastic enters the ocean every minute.

A casual walk on a beach, virtually anywhere on the planet, will bear this out. Coastlines from Alaska to Antarctica, from Morocco to Mexico, and from Tahiti to Taiwan will have their own assemblage of plastic debris, which may have traveled a few feet or thousands of miles from its original disposal site.

While Captain Charles Moore brought attention to what became known as the Great Pacific Garbage Patch 20 years ago after sailing through it, each of us has seen the same plastic debris on our own favorite beach. What started out as a patch of plastic the size of Texas in the North Pacific, soon jumped to twice that size in the media. A recent announcement for a plan to clean up the plastic described the Great Pacific Garbage Patch as three times the size of France.

Concentrations of plastic have been observed in all of the world's oceans. The increasing size of these patches, the estimated tonnage involved and the comparisons between the amount of plastic vs. marine life in the oceans have alarmed many individuals, organizations and groups to do something. Are there solutions? To be continued.