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Plastic vs. Waterways

Most everyone reading this knows that plastics are bad for freshwater and saltwater critters and their habitats. So, how did we get into this predicament? How bad is it? And, what can we do to mitigate the problem?

The rise of plastics and how they helped us become a throwaway society

On August 1, 1955, *Life Magazine* published an article called “Throwaway Living—Disposable Items Cut Down Household Chores” (p. 43). An interesting photo appeared on the lead page depicting a family tossing several ordinary household items into the air that represented at least 40 hours of work for a housewife (and yes, we were not such an enlightened bunch back then) to clean. The point was to illustrate that if a person did not have to bother cleaning certain things, they would have much more free time. Considering the extensive conscientiousness of saving and reusing items following the Great Depression and World War II, this was a pretty radical departure only a decade after the war’s end.

The article highlighted some of the items that now make life easier: plastic plates, cups, cutlery, table cloths, and flowers; popcorn sold in a toss-away pan [Jiffy Pop], disposable diapers, and even throwaway draperies. Also shown is a pet feeding bowl on a wrought-iron stand with disposable, waterproof bowls that “eliminate washing-up chores.” The stand and six bowls could be

had for only \$1. There’s a “disposa-pan,” which meant no more scouring pots after cooking, that contained a steel frame and eight heavy disposable foil pans for a mere \$2.98. And more ambitious was an entire throw-away barbecue that came with a stand, an *asbestos* shell, a wire grill, and an hour’s worth of charcoal – all for 79¢.

Plastics do provide [benefits](#) to our lives in several ways, and some of them are essential. Conversely, many uses for plastic are detrimental and unnecessary as has been discovered over the past decades. About 15 years after the *Life Magazine* article, the environmental movement began to focus on the problems of excess production and waste and the benefits of recycling. At the time, this was not a bad solution. However, as we know today, recycling is no longer the panacea – especially in light of China’s January 1, 2018, [ban](#) on importing half the world’s recycling waste. Today, [recyclables are piling up in overwhelming numbers](#) throughout North America, Europe, and other locations, and it’s too late to put the genie back in the bottle. So what do we do? And, what does this have to do with water? As we’ll see, a lot!

Plastic and watersheds

Many find it difficult to comprehend that every person on Earth lives in a watershed. The U.S. Geological Survey defines a [watershed](#) as “the area of land where all of the water that falls in it and drains off of it goes to a

common outlet...Watersheds are important because the streamflow and the water quality of a river are affected by things, human-induced or not, happening in the land area ‘above’ the river-outflow point.”

In this context, **what’s on the ground, washes down** – to a stream, a lake, a bay, or an ocean – meaning unwanted items are carried downhill through a watershed until they eventually make their way to one of the great ocean trash [gyres](#). These gyres hold enormous

Washed-up plastic parts, including several BIC “disposable” lighters, litter the ground at Eastern Island at Midway Atoll-Washed. C. Northon photo





A Laysan Albatross feeding its chick on Midway Island. C. Northon photo.



The carcass of a Laysan Albatross found on Midway Island shows that the bird had ingested various forms of plastic. Chris Jordan photo

amounts of garbage – of which most is plastic – and it’s estimated that 80 percent of the contents originate on land as opposed to being dumped from ships at sea.

Bits & Pieces, Nurdles, and Microbeads

Because of the accelerating demand for plastics, increased production over the recent decades, and its hardness (difficulty in breaking down), the problem is ubiquitous. Most plastics are not biodegradable, but, instead, they break into smaller and smaller “bits and pieces” over time, and [they never truly go away](#) – well, at least they haven’t in our lifetime. These objects can resemble colorful confetti, and this, unfortunately, attracts sea birds because they think it’s food. Also, filter feeders, from clams to whales, strain the waters and consume many of the plastic fragments.

These plastic bits affect some of the most remote areas of the world, such as Midway Atoll which lies about 1,300 miles northeast of Honolulu. Laysan albatross and other sea birds, green sea turtles, and Hawaiian monk seals are found on Midway and Eastern Islands. Sadly, Midway is also a place of death for many of the albatross who ingest or are fed plastic by their parents, because it resembles fish eggs, plankton, and other food particles. Ultimately, their stomachs fill up, and they starve to death.

Nurdles are another overwhelming problem for aquatic organisms. These are the building blocks, the raw material, for most of our plastic products. How, then,

do they get in our waters? This happens mostly from spills at factories (about 80 percent) and the rest at sea, when containers full of nurdles go overboard. There have been two rather massive spills from just a few shipping containers over the last five years. One spill in Hong Kong during July 2012 involved six containers releasing 150 tons of nurdles, and the other in Durban Harbour during October 2017 is estimated to have released 49 tons from two containers. This equates to billions of nurdles (average count of nurdles per ton is ~ 50,000,000). And since both of these spills were close to fishing grounds and fish farms, the immediate impact of ingestion was able to be observed. It is known that eating fish and sea food contaminated with nurdles is harmful to humans.

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Nurdles or pre-production plastic pellets found on a beach in Hawaii. NOAA photo



Microbeads seen as specks in toothpaste.



*Microbeads that have been filtered out of toothpaste.
NOAA photos*

And, let's not forget microbeads.

Introduced in 1972 as an additive to personal care products, such as facial scrubs and toothpaste, they are, despite their minute size, something that can kill marine life. Our waters are laden with high concentrations of them which are also attractive as food to aquatic critters. Unfortunately, they are so small that even our most sophisticated waste water treatment plants cannot filter them all out, and eventually the toxic sludge they create needs to be cleaned up. Where will the sludge go? Undoubtedly, to landfills.

Alarmingly, some of the fish and seafood we eat are now carrying pollutants that have adhered to the microbeads before being ingested. Microbeads are not only harming aquatic organisms, but they are working their way up the food chain to us! And, recent [studies](#) have found that they are entering our drinking water sources. In December 2015, Congress amended the Federal Food, Drug, and Cosmetic Act by passing the [Microbead Free Waters Act of 2015](#), which will phase out their manufacture and use over the next few years, but they remain out there in the environment. You can't call them back.

A Common Loon floats on Jewel Lake near Anchorage with monofilament wrapped around its beak. C. Northon photo.

But wait, there's more!

Plastic bits are not the only problem to contend with. Discarded fishing line, commonly known as monofilament, is a tremendous hazard to fish and wildlife. Birds, especially, are injured or killed from this essentially invisible trap. Often the line will have hooks and weights on it that are also ingested. In 2015, Anchorage Waterways Council established the first monofilament collection and recycling program in Anchorage. Since then hundreds of miles of line have been sent back to [Berkley Industries](#) for recycling and repurposing. AWC recently submitted a grant to expand the program and to work on reducing Alaska's "plastic" footprint. An excellent video by University of Alaska Anchorage Conservation Biology students was created in 2017 on this problem titled, [The Dangers of Monofilament](#), and it was filmed right here on Anchorage's urban creeks. Check it out!



And let's not forget cigarette butts!

[Dr. Thomas Novotny](#), a renowned opponent of tobacco and cigarette butt waste recently wrote, “[u]sed cigarette butts are not just pieces of non-biodegradable plastic. They also contain the carcinogens, nicotine and toxins found in all tobacco products. We have found that one cigarette butt soaked in a litre of water for 96 hours leaches out enough toxins to kill half of the fresh or salt water fish exposed to them.”



The ground around this bench at University Lake, Anchorage, is littered cigarette butts. C. Northon photo

Cigarette butts and their 95 percent [plastic-based filters](#) are the most common litter item during cleanups by the Ocean Conservancy as noted in their [2017 report](#) when nearly 2 million were picked up. Birds and fish swallow them, they add carcinogens to water, and they are unsightly on the ground.

It's difficult to not notice how many butts are tossed away before entering a building or a vehicle or when sitting on a bench. And from there, it's just a short trip for that butt to the storm drain and into our waterways.



Cigarette butts wash down a storm drain on Tudor Road in Anchorage. C. Northon photo

What are *you* doing in your life to effect change regarding plastic?

In an effort to reduce the impacts of plastic on our waters, Anchorage Waterways Council is implementing dialogue in order for people to become more aware of and examine their personal lifestyle choices and how each and every one of us, while contributors to the problem, can also be part of the solution.

Think about your daily routine. Do you need that straw with your ice tea or soda? Can you remember to carry cloth bags to stores and reduce plastic bag consumption? Maybe suggest to that store clerk who is automatically bagging the one or two items that you purchased that a bag is not necessary. How about buying a reusable water bottle instead of purchasing bottled water? Pay attention to the types of takeout containers that restaurants use – plastic foam or compostable paper? What other things in your life can you change? Try a bamboo toothbrush or reusable food storage wraps. There are so many ways that each of us can make a dent in this overbearing problem.

About the Author

Cherie Northon has a master's and a doctorate in Geography from the University of California Berkeley, where she taught for 19 years. She is also a cartographer – working in GIS, remote sensing, and GPS-acquired data. Her areas of interest are habitat protection and improvement of the natural environment (flora and fauna), student outreach (K-12), and generating public participation in environmental issues. She has been the executive director of Anchorage Waterways Council since 2010.