

Reduce, Reuse, Reinvent

Replacing Plastic in North Carolina

Sydney Siegel

The climate crisis is fueled by plastic. With 40% of all plastic production going to one-time packaging, consumers' daily habits could hold the key to where the plastic ends up. And where it ends up matters. Plastics are detrimental to our environment and what lives in it, humans included. Plastics contain chemicals that can leak into our groundwater in landfills, poison marine life, and damage our bodies. They can injure and kill wildlife that get trapped in it or ingest it; plastics have been found in 86% of sea turtle species, 44% of seabird species, and 43% of marine mammal species, according to Environment North Carolina. Plastic, which can survive thousands of years in water, can also transport invasive species across oceans and damage the balance of ecosystems. It is essential to our future to use less of it.

But plastic use doesn't just affect the oceans, people, and ecosystems. They are a leading cause of climate change as well. Plastic starts as oil, gas, and coal extracted from fracking, fossil fuels that emit greenhouse gasses. According to "Plastic and Climate: the Hidden Cost of a Plastic Planet" from the Center for International Environmental Law, in just the United States, 12.5 to 13.5 million tons of carbon dioxide are emitted annually to extract and transport natural gas to make plastic. This extraction process takes miles of pipeline that must be surrounded by cleared land. When land is forested and trees are cut down, all the carbon dioxide from the soil and plants is reintroduced into the atmosphere. Millions of acres release over a billion metric tons of carbon dioxide into the atmosphere annually, according to the report. Plastic production must be slowed for the future of the planet.

Recycling is a start, but according to Roland Geyer of University of Santa Barbara, California, only one fifth of disposed plastics actually get recycled. There has to be a better way. These possibilities aren't mysterious; while the United States averages one wasted plastic bag per person per day, shoppers in Denmark use about four plastic bags a year. What's the United States not catching on to? Our attitude towards the climate crisis differs greatly from Denmark and many other countries that have enforced laws and fees related to plastic use. All over the world, and in the US too, artists, scientists and engineers have created smart and possible ways to replace plastic.

Denmark was the first country to enact a plastic bag ban in 1993. In Denmark, single use plastic bags are very rare, and grocery stores sell reusable bags made to last. This response helps make Denmark one of the most environmentally conscious countries in the world.

North Carolina doesn't have a great track record in regard to plastic use. While HB 1465 was passed in 2005, banning the disposal of plastic bottles with few exceptions, that progress was turned around in 2017 with the passing of HB 201756. This bill ended the eight year ban on plastic bag usage in retail in the Outer Banks.

Banning plastic bags protects wildlife, improves the environment, and relieves pressure on landfills. This ban in the Outer Banks was important to protecting its natural environment. According to Jenna Jambeck of University of Georgia, 18 billion pounds of plastic waste goes to oceans every year from coastal regions, and an island like the Outer Banks can be especially susceptible to this. But plastic bag bans are beneficial everywhere. In 2014, California was first to declare a statewide ban on plastic bags, and since then, Connecticut, Delaware, Hawaii, Maine, New York, Oregon, and Vermont have banned single use plastic bags at major retailers, some at all retailers.

To deter plastic bag usage, other states and cities have issued small charges on plastic bags, or in states with plastic bag bans, charges for reusable or paper bags. Since 2009, Washington DC has required all businesses that sell food or alcohol to have a 5 cent charge on plastic or paper bags, and New York charges five cents for paper bags. Cities in North Carolina have explored enforcing these fees too, as many independent retailers already do. In 2019, Durham's City-County Environmental Affairs Board voted unanimously to support a 10 cent fee on plastic or paper bags at retail stores, though this charge has not been enacted into law.

Banning plastic bags and enforcing fees has modeled all over the country manageable ways to keep plastic out of landfills and the environment. By enforcing these changes, especially in fragile environments like the Outer Banks, North Carolina can protect its wildlife, save its environment and relieve pressures on crowded landfills without the added energy of recycling that is often ignored to begin with.

Working towards the idea of a plasticless lifestyle, artists, engineers and scientists have developed new ingenuitive materials to replace traditional packaging.

There are so many alternatives to plastic. Many are renewable, environmentally conscious, and promising. I have compiled a list of ideas and innovations that I feel are

most interesting, environmentally conscious and possible. I omitted examples that would still leave a considerable carbon footprint. For example, upon deeper research, I excluded bagasse, the leftover material after juice is taken out of sugar cane. Bagasse can be used as electricity when burned, and though it is renewable, it still emits carbon into the atmosphere when burning. Therefore, it wasn't at the top of my list.

Lactips is a French firm that produces thermoplastics made from casein, a milk protein. Not only is this plastic packaging alternative biodegradable, but it is also water soluble and even edible. As of now, this technology has been implemented into the detergent market in Europe. Because it so easily decomposes without a trace, milk plastics like Lactips could be a powerful plastic packaging alternative.

Companies like Mushroom Packaging are growing--literally. Food and product packaging is being grown from plant waste and mycelium, the roots of mushrooms--a powerful combination. Mushroom Packaging's products are water resistant, thermally insulating, and can be turned back into compost in forty five days. This mushroom root material can replace styrofoam, plastic, and paper. And mushroom root materials can replace more than just packaging. Recently, Katy Ayers, a student at Central Community College in Columbus, Nebraska, grew a canoe from mycelium, proving how waterproof it is. "Mushrooms are here to help us--they're a gift...They're our biggest ally for helping the environment," she says.

Repurposing disposable packaging is often overlooked in the search for greener alternatives, but artists are taking advantage of it with Nestle's help. In Japan, the chocolate candy KitKat is packaged in paper with instructions of how to repurpose it into an origami crane. According to Nestle, this reusable packaging saves 380 tons of plastic annually. Other artists are getting to work on green packaging as well. As a master's degree student in Material Futures at Central St. Martins College in London, Mi Zhou developed aesthetically minded liquid soap packaging--made of more soap. These beautiful vegetable soap bottles are lined in beeswax and are fully functional to contain liquid toiletries, and then melt away when no longer needed.

Almost as counterintuitive as soap bottles made of more soap is paper made from stone--but it works. Stone paper is a recyclable, bio-plastic paper made from the naturally abundant calcium carbonate, or limestone. Many different types of companies are taking advantage of this waterproof paper. Karst, a sustainable notebook company, makes all of their paper products from recycled stone, leaving a carbon footprint sixty percent less damaging than traditional paper.

North Carolina small businesses are taking action against plastic packaging. The Fillaree, a Durham based soap company, has a creative way of refilling their products without creating excess waste. Through a subscription, you can send a refill bottle that comes with your soap bottle back to the company when you need more. There are also twenty-five refill stations throughout the United States where you can refill your soap bottles. This system minimizes plastic waste through a community commitment to reusing resources.

Plastics are bad for the environment, but humans have the ingenuity to be bad for plastics. North Carolina has the opportunity to lead the country in a movement to take advantage of modern plastic alternatives. Through enforcing bans and fees on plastic bags, we can break the cycle of excessive plastic waste that harms the climate, our environment and our wildlife. Our community of innovators has presented us with so many alternatives to plastics, and if we only commit to integrating these solutions so much is attainable. It is more than possible to redirect North Carolina's impact on the plastic crisis we are currently facing.

Bibliography:

Bauman, Brooke. "Why Plastics Can Be Garbage for the Climate." *Yale Climate Connections*, 4 Apr. 2020, www.yaleclimateconnections.org/2019/08/how-plastics-contribute-to-climate-change/.

Bonner, Lynn. "Durham Environment Board Endorses Proposed 10-Cent Fee on Plastic Shopping Bags." *Newsobserver*, Raleigh News & Observer, 12 Aug. 2019, www.newsobserver.com/news/business/article233780707.html.

"Fillaree Refillable, Sustainable Soap." *Fillaree*, fillaree.com/.

Greenway, Shelly. "13 Plastic Packaging Alternatives." *Disruptor League*, 29 Apr. 2020, disruptorleague.com/2018/07/02/13-plastic-packaging-alternatives/.

Karst Stone Paper, karststonepaper.com/?gclid=CjwKCAjw7-P1BRA2EiwAXoPWAzS9RpSMdtl4yQu2QFXlqxuqUc9faN91U8d1yKSrlMsVg6VecK5ApBoCCKYQAvD_BwE.

Knoblauch, Jessica A. "Plastic Manufactured in the First 10 Years of This Century Eclipses the Total Produced in the Entire Last Century." *EHN*, EHN, 20 Apr. 2020, www.ehn.org/plastic-environmental-impact-2501923191.html?rebellitem=1#rebellitem1.

Kuta, Sarah. "Is Fungus the Answer to Climate Change? Student Who Grew a Mushroom Canoe Says Yes." *NBCNews.com*, NBCUniversal News Group, 19 Apr. 2020, www.nbcnews.com/news/us-news/fungus-answer-climate-change-student-who-grew-mushroom-canoe-says-n1185401.

Parker, Laura, and Jason Treat. "Fast Facts about Plastic Pollution." *National Geographic*, 20 Dec. 2018, www.nationalgeographic.com/news/2018/05/plastics-facts-infographics-ocean-pollution/.

"Plastic Bottles." *North Carolina Environmental Quality*, deq.nc.gov/conservation/recycling/plastic-bottles.

Rooney, Katharine. "Plastic Packaging Problem: Five Innovative Ideas." *World Economic Forum*, 17 Oct. 2019, www.weforum.org/agenda/2019/10/plastic-packaging-environment-design-loop/.

Schultz, Jennifer. "State Plastic and Paper Bag Legislation." *State Plastic and Paper Bag Legislation*, 24 Jan. 2020, www.ncsl.org/research/environment-and-natural-resources/plastic-bag-legislation.aspx.

tofino, Photograph by. "Danes Use Far Fewer Plastic Bags Than Americans-Here's How." *Denmark Uses Far Fewer Plastic Bags Than the U.S.-Here's How*, 21 May 2018, www.nationalgeographic.com/news/2018/05/denmark-uses-less-plastic-bags-usa-culture/.

"Welcome." *Mushroom® Packaging*, mushroompackaging.com/welcome.

"Wildlife Over Waste." *Environment North Carolina*, environmentnorthcarolina.org/feature/nce/wildlife-over-waste.

“BASF Signs Partnership Deal with Lactips to Market Films Based on Milk Protein.”
Packaging Europe, 13 May 2019,
packagingeurope.com/basf-signs-partnership-deal-with-lactips-to-market-films/.