



According to a report by the [Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services](#)³ in 2019, 1 million wildlife species are currently threatened with extinction.⁴ The report summarizes that 33 percent of marine mammals are at risk, as well as 33 percent of coral species, and one of the main reasons for this extinction crisis is pollution, including plastic pollution in our oceans.

Photo: Donald Bruschera

INTRODUCTION

Since 1936, the National Wildlife Federation (NWF) has worked to educate and inform Americans about the importance of their natural environment and to build a conservation ethic in successive generations. Our mission is to *unite all Americans to ensure wildlife thrive in a rapidly changing world*, and we are the nation's leading grassroots conservation organization, with six million members and supporters and 51 state affiliates. For 30 years, NWF has been a leader in environmental education, youth development, and career development. With our K-12 programming, we are active in 14,000 public schools and support conservation and career programs in over 1,000 colleges and universities nationwide.

College campuses are like small cities, with their residence halls, dining facilities, transportation fleets, and bookstores, and close to 20 million students and staff are educated and/or employed there annually⁵. With the average college student producing about [640 pounds of trash each year](#)⁶, campuses need comprehensive waste management programs that provide tracking, reporting, education, awareness, fun, and creativity. This guide is for students, clubs, resident advisors, staff and faculty to use as a resource to get started and tackle plastics on campus. This guide features smaller, individual

actions, and campus-wide engagement campaigns. This guide includes information about the plastics pollution problem, its impacts on humans and wildlife, action ideas, and educational strategies.

1. What is the Plastic Pollution Problem

In the past 30 years, the entire world has shifted to single-use plastics for eating, drinking, and packaging merchandise that go straight into the waste stream, on to landfills, and ultimately into the natural environment – with the accumulated waste lasting for decades and posing a hazard to living creatures, including humans.

Roland Geyer, an associate professor at the University of California, Santa Barbara, [led the first ever global analysis of plastic production](#)⁷, and this analysis concluded that “between 2002 and 2015 we made the exact same amount of plastic that we made between 1950 and 2002.” And much of this plastic ends up in the environment, including our rivers and oceans, by people littering, illegal dumping, and accidental loss of trash during strong winds or during transport.



Impacts on Humans

Plastics in the ocean absorb and release heavy metals including lead and cadmium. These toxins enter marine food webs when animals consume plastics and could get passed up to humans. (Munier and Bendell 2018)⁸

Adults and children ingest plastics every week through the food they eat and the water they drink with unknown long-term consequences, according to a recent analysis by the [World Wildlife Fund](#)⁹. According to the UN Environment Programme¹⁰, scientists fear that chemicals in plastics and also chemicals that attach themselves to plastic in the natural environment could cause poisoning, infertility, and genetic disruption in marine life and potentially in humans if ingested in high quantities. Collectively, these harmful chemicals are known to cause the following severe health problems: Cancer, endometriosis, neurological damage, endocrine disruption, birth defects and child developmental disorders, reproductive damage, immune system damage, asthma, and multiple organ damage.¹¹ Here are a few ways that humans are unknowingly ingesting plastics and associated chemicals.

Toxic chemical release during manufacturing is a significant source of the negative environmental impact of plastics. A whole host of carcinogenic, neurotoxic, and hormone-disrupting chemicals are standard ingredients and waste products of plastic production, and they inevitably find their way into our natural environment through water, land, and air pollution. Some of the more familiar compounds include vinyl chloride (PVC is hard plastic made from vinyl chloride), benzene (found in polystyrene, also known as Styrofoam), and bisphenol-A or BPA (BPA is found in polycarbonate plastics that are often used in containers that store food and beverages, such as water bottles).

- ▶ Freshwater areas are being inundated with plastics and waste, and drinking supplies are being dangerously degraded with poor filtering options. Landfills are designed to contain their materials and keep them from the surrounding environment; however, [landfills still end up leaking a variety of pollutants](#)¹². [Leachate](#)¹³, a liquid that forms as materials break down in a landfill, often leaks through the liners of the landfill and can pollute groundwater, and local surface water.
- ▶ Plastics absorb dangerous pollutants such as PCBs (polychlorinated biphenyls), DDE (the breakdown product of DDT, dichlorodiphenyltrichloroethane), and PAHs (polycyclic aromatic hydrocarbons) from surrounding seawater, allowing these substances to accumulate at high concentrations.¹⁴ These chemicals are highly toxic and have a wide range of chronic effects, including endocrine disruption and cancer-causing mutations. When animals ingest these plastic pieces, the toxins are absorbed into their bodies, passed up the food chain and into our food resources. As plastics break apart in the ocean, they also release potentially toxic chemicals such as BPA, which can then enter the food web.

The Ohio State University



Impacts on Wildlife

It is estimated that ingestion of plastic kills 1 million marine birds and 100,000 other marine animals each year.¹⁵

In spring 2019, [One Green Planet](#)¹⁶ released a list of five marine animals that are dying because of plastic trash.

1 Sea Turtles

Sea turtles, like many other sea creatures, accidentally ingest plastic because they think it's food. This can result in blockages in their digestive systems, causing distress and sometimes death.

“Studies from 2013¹⁷ suggest as many as 50 percent of sea turtles are ingesting plastic at an unprecedented rate, and dying because of it. Another study of the loggerhead species found that 15 percent of young turtles examined had ingested such enormous quantities of plastic that their digestive system was obstructed.” Almost all species of sea turtles are listed as endangered by the [U.S. Fish and Wildlife Service](#)¹⁸. Sea turtles that currently have an “endangered” status include the loggerhead, green, leatherback, hawksbill, Kemp’s ridley, and olive ridley.



Photo: Santana Navarrett



Photo: Caroline E. Brown

2 Seals and Sea Lions

Seals and sea lions are sometimes entangled in plastic trash including plastic bags or plastic packing bands. This can decrease their ability to swim freely, eat, and come up for air, and can cause sickness and death. “Plastic packing bands and rubber bands continue to deeply impact the Steller Sea Lion population.¹⁹ An eight-year study in Southeast Alaska and British Columbia documented 388 sea lions entangled in plastic debris.”²⁰ The Steller sea lion is listed as endangered; the Hawaiian monk, Mediterranean monk, Ladoga ringed, and Saimaa ringed seals are also listed as endangered.



Photo: Marian Herz

3 Seabirds

A 2015 study published by [PNAS](#)²¹ found that 90 percent of seabirds are eating plastic, and by 2050 virtually all sea birds will have ingested some sort of plastic material. This is resulting in the deaths of an estimated 1 million marine birds each year. For example, the Laysan albatross has been deeply impacted by plastic pollution because of the way it hunts. The albatross dives into the ocean or skims the surface for food and inadvertently swallows plastic debris or gets it caught on its beak.

4 Fish

According to the [Center for Biological Diversity](#)²², fish in the North Pacific ingest 12,000 to 24,000 tons of plastic, including microplastics, annually, which can result in intestinal injury and ultimately death. The plastic that fish ingest also moves its way up the food chain to larger fish, marine mammals, and humans. Fish are vulnerable to microplastics since they bring in water through their gills. A study done by the University of Exeter in the United Kingdom suggest that microscopic debris in the ocean could take up to six times as long for the animal to rid themselves of through their gills in comparison to ingesting the plastic through its mouth.²³



Photo: William Goodwin



Photo: Hal and Kristen Snyder

5 Whales and Dolphins

According to [Marine Pollution Bulletin](#)²⁴, whales, dolphins, and porpoises are ingesting plastic debris at a rate as high as 31 percent, resulting in an increased risk of death; plastic often punctures and tears the stomach lining, which can lead to sickness and starvation. These animals are mistaking plastic pollution for food and are also unknowingly swallowing plastic trash as they swim and feed with their mouths wide open. This is especially true for baleen whales, which filter feed – opening their mouths wide and scooping water along with fish, krill, and other small sea creatures. A very sick Cuvier's beaked whale was found in Davao Gulf in the Philippines in early 2019.²⁵ Unfortunately, the whale died, and a necropsy found 88 pounds of plastic (plastic bags, snack bags, nylon rope, and other plastic debris) in the whale's stomach. The whale likely died from starvation and dehydration since the plastic was obstructing the animal's ability to absorb nutrients and water.