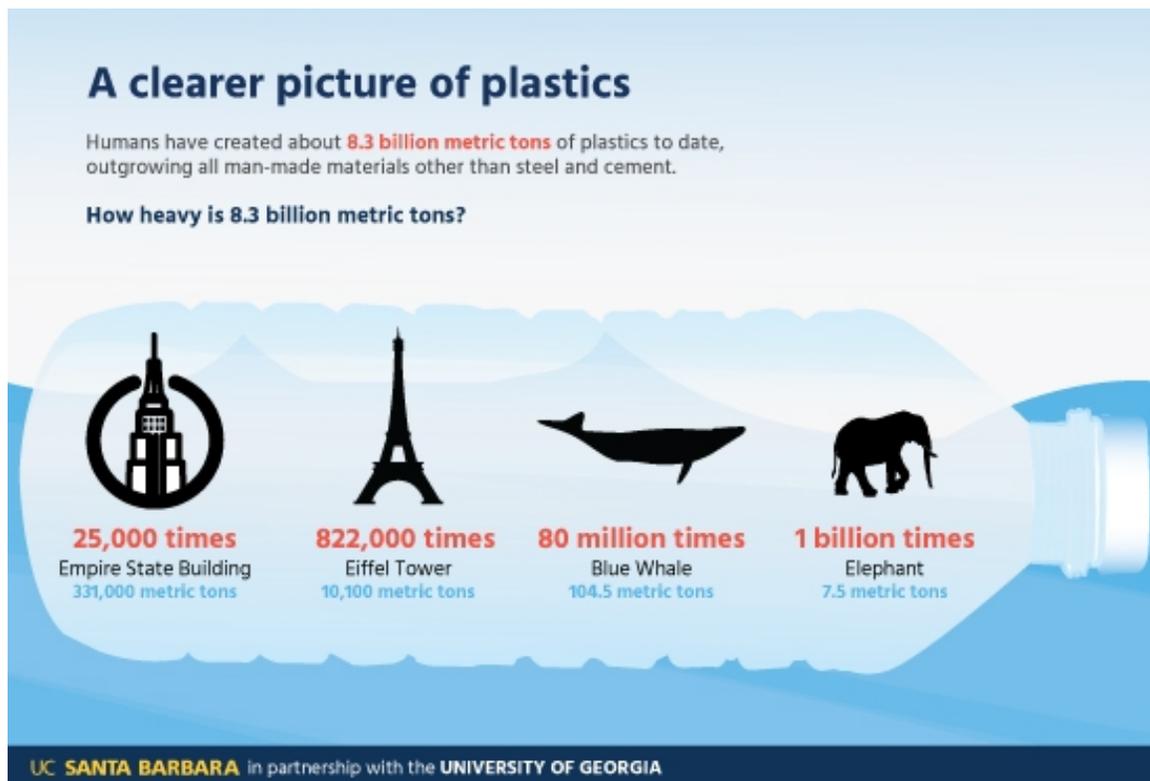


General Plastics Facts

- Geyer 2017, (*Science Advances*, [Production, use, and fate of all plastics ever made](#)) produced the first global analysis of all mass-produced plastics ever manufactured. They estimate that **more than 8 billion metric tons of virgin plastics have been produced to date**.
 - This is roughly 80 million times the weight of a blue whale individual
 - Of this, **6,400 million metric tons has outlived its usefulness and become waste**
 - **79 percent of that waste is sitting in landfills or the natural environment**, 12 percent has been incinerated, and just 9 percent has been recycled.
 - If current production and waste management trends continue, **roughly 12,000 Mt of plastic waste will be in landfills or in the natural environment by 2050**.



- Jambeck 2015 (*Science*, [Plastic waste inputs from land into the ocean](#)) calculated that **275 million metric tons (MT) of plastic waste** was generated in 192 coastal countries in 2010, with **4.8 to 12.7 million entering the ocean**. The US wastes about 2.58 kilos per person per day for our coastal populations of 112.8 million people
 - That's roughly **132,123 lbs of plastic per day** along the coastal US.

- Eriksen 2014 (*PLoSOne*, [Plastic pollution in the world's oceans](#)) estimate a **minimum of 5.25 trillion particles weighing 268,940 tons are present in the world's global marine environment.**
- Cozar 2014 (*Proceedings from the National Academy of Sciences*, [Plastic debris in the open ocean](#)) estimate the amount of plastic in the *open-ocean surface* between **7,000 and 35,000 tons**
 - plastic concentrations per surface area were comparable across each of the five accumulation zones, **although the North Pacific Ocean contributed importantly to the global plastic load (between 33 and 35%)**

Expanded polystyrene (EPS) foam information

Science, polystyrene vs. animals

Bad for marine animals

There are two primary pathways by which polystyrene foam can be harmful – mechanical and chemical.

Mechanical – causes intestinal occlusion or blockage that can outright kill marine animals (e.g. turtles and seabirds).

e.g. loggerhead sea turtles are an endangered species. 35% of loggerhead sea turtles in one study were determined to have eaten some kind of marine debris, 15% of these contaminated turtles had eaten styrofoam ([Lazar and Gračan 2011](#)).

Chemical – poisoning from contaminants native to the polystyrene or much more commonly via pollutants that end up collecting on the polystyrene foam; e.g. mercury and PCBs. Polystyrene foams also essentially act like little pollution sponges, picking up and concentrating some of the nastiest contaminants in the ocean – then something like a sea turtle comes along and eats this thinking it is a jellyfish. We have a lot yet to learn about the potential lethal and sub-lethal chemical poisoning effects of polystyrene foams.

e.g. Styrofoam debris may accumulate mercury compounds present in the marine environment ([Graca 2013](#)).

Places with EPS ordinances

For extensive list see: <http://www.surfrider.org/pages/polystyrene-ordinances>

- Berkeley. 1988.
- Maine, statewide. 1993.
- San Francisco & Oakland. 2007.
- Portland. 2008.
- Seattle 2009.

- Miami Beach. 2014.
- Washington, DC. 2016.
- New York City. 2017. (reinstated after the Department of Sanitation NY [reported that](#) attempting to recycling EPS styrofoam is completely infeasible economically and logistically).
- Belfast, Maine. 2018.

International:

- Haiti. 2012 & 2013. Ban import and use of styrofoam cups and plates.
- Makati, Philippines. 2013. Ban on styrofoam materials for food products.
- Guyana. 1 Jan 2016. Ban import and use of styrofoam products.
- Kuala Lumpur and 2 other Malaysian federal territories. 2017.
- Sarawak (Malaysian state on the island of Borneo). 2017.

EPS production and waste output in Hawaii

- EPS foam products in Hawaii are either sourced from the mainland US, China, or from a few local producers (Pacific Allied Products, Hawaii Foam Products, K. Yamada Distributors).
 - Pacific Allied Products: “We’re very, very small,” CEO Bernie Coleman said. He estimated that his company makes about 200,000 containers each year. “Some places make 200,000 in a week” ([Castele 2011a](#)).
 - “The American Chemistry Council – which represents chemical manufacturers – estimates that the United States produces about 850,000 tons of polystyrene each year” ([Castele 2011b](#)).
- In 2006, the City and County of Honolulu commissioned a study on island waste streams – estimated $7,056 \pm 1,371$ tons of polystyrene waste produced every year. That’s about **38,663lbs of polystyrene waste per day**. And Oahu is only ~70% of the total population of HI (“Final Report: 2006 Waste Characterization Study” 2006).

Alternatives to EPS foam containers

- Best non-reusable alternatives are biodegradable, compostable paper or plant-based materials: sugarcane, plant starch, PLA (polydactyl acid) from cornstarch, wheat straw, etc.
 - Some of these products handle much like petroleum-based EPS, are soak proof, and can handle temperatures up to 220F (>boiling temp of H₂O), microwave safe.

Can EPS be recycled?

- Yes, it’s technically possible to recycle EPS, but in it’s current stage it’s an [economically unfeasible option](#). It’s simply cheaper to produce new EPS. Recycling EPS requires collection and shipping, which is very expensive due to its low density. It just burns more carbon to transport it to the handful of facilities that can recycle it – usually it can only be remade into non-food related items due to food safety concerns.
- The nearest place to Hawaii that recycles EPS is California – and even most places in CA are aimed at packing “filler” EPS or clean (non-food contaminated) EPS.