

# CALIFORNIA LEGISLATURE

STATE CAPITOL  
SACRAMENTO, CALIFORNIA  
95814

SENATE COMMITTEE ON ENVIRONMENTAL QUALITY  
AND  
SENATE COMMITTEE ON NATURAL RESOURCES AND WATER

JOINT INFORMATIONAL HEARING:

CLOGGING CALIFORNIA'S OCEAN WITH PLASTICS

Wednesday, March 20, 2019 9:30am  
State Capitol, Room 3191

BACKGROUND INFORMATION

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Over the last fifty years, plastic has become the packaging material of choice. It's durable, lightweight, easily molded into different shapes and applications, and readily seals out oxygen and other contaminants. It is also artificially cheap. It dominates single-serve food and beverage packaging, carry-out shopping bags, and to-go containers and cutlery from restaurants and other eateries. About 40 percent of plastic produced is packaging that is used once and then discarded.

According to the Ocean Protection Council (OPC), ocean litter, also commonly referred to as "marine debris," is a persistent and growing problem worldwide that significantly impacts the health and beauty of our oceans and beaches. It poses serious threats to marine wildlife, including sea birds, sea turtles, and mammals such as dolphins and whales, as well as human health and welfare. Researchers estimate that 80% of marine debris comes from land-based sources, particularly trash and plastic litter in urban runoff, and the generation of trash and waste is increasing. Globally, an estimated 10.6 - 28 billion pounds of plastic waste flows into oceans every year from coastal regions.

The Great Pacific Garbage Patch is a collection formed by ocean currents of marine debris on or near the surface in the North Pacific Ocean. For many, the idea of a "garbage patch" conjures up images of an island of trash floating on the ocean. In reality, these patches are almost entirely made up of microplastics, (plastic particles less than 5 mm in size), which make the water look like cloudy soup. That soup is intermixed with larger items, such as fishing gear, shoes, and plastic bottles. The mass of the plastic in the Great Pacific Garbage Patch is estimated to be approximately 80,000 tons. A total of 1.8 trillion plastic pieces are estimated to be floating in the patch - a plastic count that is equivalent to 250 pieces of debris for every human in the world.

Most of this debris comes from plastic bags, bottle caps, plastic water bottles, and Styrofoam cups. According to the National Geographic website, about 80% of debris in the Great Pacific Garbage Patch comes from land-based activities in North America and Asia. The remaining 20% comes from boaters, offshore oil rigs, and large cargo ships that dump or whose shipping containers lose debris directly into the water. While many different types of trash enter the ocean, plastics make up the majority of buoyant marine debris for two reasons: (1) plastic's durability, low cost, and malleability mean that it is being used more and more in consumer and industrial products, and (2) generally, plastic goods persist in the marine environment even if many do break down into smaller pieces.

While some marine plastic debris is of small size to begin with, sunlight, ocean currents, and a variety of attendant physical, biological and chemical processes can result in larger plastic debris becoming microplastics or smaller. The size of the plastic matters as the risks posed to marine species vary as a function of size, as does the transformation and ultimate fate of the debris. For example, microplastics or smaller particles may preferentially absorb certain persistent organic pollutants or heavy metals from the water column which may, when ingested by a marine animal, result in a significant dose to that animal. The small size also makes it very difficult to remove the plastic from the marine environment, as well as to determine its source.

Less than a fifth of all plastic is recycled globally. Plastic recycling rates are highest in Europe at 30 percent. China's rate is 25 percent. The United States is at 9 percent. According Better Alternatives Now, or BAN 2.0, an analysis done by several pollution research groups, the top 10 types of plastic products found in the environment include food wrappers made from plastic, plastic bottle caps, plastic beverage bottles, plastic bags, plastic straws/stirrers, plastic lids, utensils,

cigarette butts, and take-out containers. The cumulative amount of plastic waste available to enter the ocean from the land is expected to increase by a factor of 10 by 2025. Scientists estimate that by 2050, there will be more volume of plastic than fish in the oceans.

### **Global responses**

Plastic pollution is a global issue and countries all over the world are responding. Dozens of nations are acting to cut plastic, including a ban on plastic bags in Kenya and on Styrofoam in Sri Lanka. Last summer, India vowed to eliminate all single-use plastic in the country by 2022. In October 2018, the European Union approved the issuance of directives, to be carried out by its member states, that included the ban of many single-use plastic items, minimum content standards for drink bottles, and the call for extended producer responsibility programs. In Fall 2019, Vancouver is set to ban plastic straws. The ban, which is part of the city's plan to go waste free by 2040, will also cover single-use Styrofoam takeout containers and cups.

### **Statewide efforts**

California has taken a number of steps to reduce the amount of plastic that is consumed by our residents. In 2016, Californians voted to prohibit grocery stores from providing single-use plastic carry-out bags to their customers. Since the bag ban went into effect, the number of plastic bags collected from state beaches during the annual Coastal Cleanup Days has dropped significantly from about 65,000 bags in 2010 to about 26,000 bags in 2017. SB 1335 (Allen, Chapter 610, Statutes of 2018) prohibits a state food service facility from dispensing prepared food using type of food service packaging unless the packaging is on a specified list maintained by the Department of Resources Recycling and Recovery and has been determined to be reusable, recyclable, or compostable. AB 1884 (Calderon, Chapter 576, Statutes of 2018) prohibits sit-down full service restaurants from providing a single-use plastic straw to its customers unless requested.

### **Local efforts**

Local jurisdictions have also taken it upon themselves to reduce waste. In California, the cities of Alameda, Carmel, San Luis Obispo, Davis, Malibu, Manhattan Beach, Oakland, Richmond, and Berkeley have enacted plastic straw bans. In April 2018, the City of Manhattan Beach City Council voted to prohibit food providers from using or distributing plastic beverage straws, plastic stirrers or plastic utensils, whether for use on-site, to-go, or delivery.

In January of this year, Santa Monica also banned the use of single-use plastics. Under the ordinance, all straws, lids, utensils, plates, trays, containers, cups, bowls, stirrers, and lid plugs are banned in the City for prepared food products. Additionally, marine degradable straws and utensils may only be provided upon request.

### **Observations of marine life interaction with plastics**

Interactions between nearly 700 marine species and anthropogenic debris – of which 92% was plastic and 10% was ingested plastic – are reported in the scientific literature, and the number of species continues to rise as more research is completed. Affected species range in size from small invertebrates to large whales, and include species that feed by various mechanisms throughout the water column from the deep sea floor to the surface. These species span the entire food web and include zooplankton, jellyfish, corals, fish, marine mammals, sea turtles, and seabirds. For example, on the order of half of the world's seabird species have been reported to be affected by marine debris ingestion, and estimates suggest that over 50% of all sea turtles have ingested plastic debris. Some species may seek out plastic particles as they are mistaken for food, and some (e.g. filter feeders) may be unable to exclude them.

While in some instances the ingested plastic may pass quickly through the animal, the effects of chronic ingestion appear in some instances to impair the animal, and much remains unknown regarding how environmental processing of the particles may impact particle bioavailability and toxicity to the animal when ingested. Negative effects on marine life from plastic ingestion include intestinal blockage, diminished feeding, lowered hormone levels, reproductive inhibition and failure, and increased toxic exposure. Relatively higher concentrations of ingested plastics have been associated with animal death, for example in sea turtles, and whales, among other species. The full ecological implications of plastic ingestion by marine life remain uncertain, and there is documented evidence that this ingested plastic enters the human food chain.

The entanglement of marine life in plastic materials is of serious concern and can result in the injury or death of the affected animal. Although every entangled animal is likely not observed, the past few years have witnessed the highest reported total observations of whale entanglements in fishing gear off the US West Coast (e.g. 71 in 2016) since data started being kept in 1982. As recently as 2002, fewer than 5 whale entanglements were reported per year. Sea turtles, seabirds, and other marine mammals and animals also suffer from plastic

entanglement. This aspect of marine plastic pollution and its impact on marine flora and fauna, however, is beyond the scope of this hearing.

Federal and state agencies, as well as non-governmental organizations, are working to reduce the risk of entanglement through, for example, the ban on the use of drift gillnets off significant portions of the California coast by NOAA Fisheries to protect endangered leatherback and loggerhead sea turtles in certain periods and conditions, the implementation of pilot lost fishing gear retrieval projects at different ports state-wide, the institution of a voluntary surrender program for commercial drift gill net swordfish and shark permits in state waters (SB 1017 (Allen, Chapter 844, Statutes of 2018)), the development and dissemination of information of best gear setting practices in fixed-gear fisheries, and the development and implementation of a lost Dungeness crab fishing gear retrieval program at the California Department of Fish and Wildlife (CDFW) and of a protocol that could limit or close the Dungeness crab fishery when whales are present (SB 1309 (McGuire, Chapter 985, Statutes of 2018) and SB 1287 (McGuire, Chapter 542, Statutes of 2016)), among other programs. Additionally, the Legislature has recently provided specific funds to help pay for the cost of whale rescue and disentanglements.<sup>i</sup>

### **Businesses reactions.**

Many businesses have taken the initiative to take responsibility for their contribution to plastic pollution. In Europe, Starbucks has agreed to phase out all plastic straws and cutlery. United Kingdom McDonalds has begun experimenting using paper straws in its restaurants or making plastic straws available only upon request. In June 2018, SeaWorld Entertainment announced that it will be removing all drinking straws at its 12 parks, along with plastic shopping bags. Also in June 2018, Royal Caribbean Cruises announced that by 2019, its fleet of 50 ships will not have plastic straws. Alaska Airlines has also announced that it is getting rid of plastic straws on its flights. Last month, Walmart announced plans to have packaging for its in-house brands be 100% recyclable, reusable, or compostable by 2025 and be made of at least 20% recycled content by that same year.

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<sup>i</sup> Citations available upon request for data from the scientific literature included herein.