

POLLUTION PROBLEMS

There are many forms of pollution to be considered:

Plastic

PCBs

Micro beads

Heavy metals

Radiation

Oil

These are just some.

Things “break down” or “degrade” as a result of many things. Biodegradable means that living organisms like bacteria. Some things are photodegradable – break down by light. In all cases though, the degrading progress requires the degrading force be there. For example in some areas where biodegradable materials have been placed, the bacteria are not present and so things like lettuce leaves which should break down rapidly do not.

Oil which can be broken down by some bacteria last because the bacteria exist in sufficiently small quantities that they cannot possibly consume all the oil

One has to remember that the “degradability” of anything is contingent on the appearance in sufficient quantities to degrade it. (see the pamphlet on the “notes” page or go directly to

<http://userhome.brooklyn.cuny.edu/anthro/jbeatty/CORESE/A/images/trash.pdf>

Much of the material moved into the ocean by people or natural forces, winds up in the gyres in the middle of the oceans. It has been thought that it will take decades to clean it, and it will have an astronomical cost. However a young man in Europe has come up with a possible solution.

<https://www.youtube.com/watch?v=8K5isWrsDjY>

Plastic

Plastic presents problems in terms of degradation, which doesn't happen, since although it is a biological product it has been so altered that it no longer breaks down like that. Whereas oil is even biodegradable thanks to some bacteria, plastic is not. It leads to concerns since plastic bags and can containers are trapping animals and are sometimes eaten by them which they mistake for food, Sea turtles are fond of jellyfish which the plastic bags often resemble. The plastic may be eaten and cause blockages in the digestive tract and cause the animal to die. Plastic is common place and bags, plastic plates, utensils and such often find their way onto the beach where people picnic. This also happens with bottles, both plastic and glass.

Microbeads

Microbeads are solid bits of plastic less than 1 millimeter in size (0.0393701 of an inch) They occur in personal exfoliating cleaning products such as shampoo, toothpaste and the like.

The Microbead-Free Waters Act of 2015 phased out microbeads in rinse off cosmetics as of July 2017. Because of the small size they can pass through sewerage treatment plants and move on into various bodies of water.

Their impact is largely on fish that develop behavioral problems like the inability to smell predators (or perhaps ignoring the smell of predators)

Birds have been known to eat them and this produces problems for them and other animals up the food chain that eat them.

PCBs (Polychlorinated Biphenyls)

These are chemicals made by humans and do not occur naturally. For 50 years (1929 - 1979) they were made in the US, then their production was outlawed. Because they exhibit non-flammability, chemical stability, high boiling point and electrical insulating properties, PCBs were used in hundreds of industrial and commercial applications including Electrical, heat transfer and hydraulic equipment, plasticizers in paints, plastics and rubber products, pigments, dyes and carbonless copy paper and other industrial applications. They can accumulate in different organisms some of which are used for food by people, hence bio-magnification is a possibility. They may be cancer producing. There is evidence to suggest they impact the immune system as well as the reproductive systems among other things.

Heavy Metals (Not the music groups)

Heavy metals include cadmium, mercury, lead and arsenic, all of which appear in the World Health Organization's list of 10 chemicals of major public concern. Other examples include manganese, chromium, cobalt, nickel, copper, zinc, selenium, silver, antimony and thallium

Thallium had been claimed a “Wonder Drug” for pregnant women who were suffering from insomnia and morning sickness. However a large number of children (over 10,000) whose mothers had used the drug were born with birth defects which included being born with shortened arms and/or legs, or no arms or legs at all. Many died young and only fewer than 3,000 were still alive in 2011.

Minamata

The other major event had to do with mercury poisoning (methylmercury) in Minamata in Kumamoto Prefecture, Japan.

(SEE Prefecture map of Japan below)

There the Chisso had been releasing this chemical into the water from 1932 to 1968. It took several years to identify the cause of the illness and many more get legal compensation for the damage. The symptoms of the illness include ataxia, numbness in the hands and feet, general muscle weakness, loss of peripheral vision, and damage to hearing and speech. In extreme cases, insanity, paralysis, coma, and death follow within weeks of the onset of symptoms. A congenital form of the disease can also affect fetuses in the womb.

<https://www.youtube.com/watch?v=ihFkyPv1jtU>

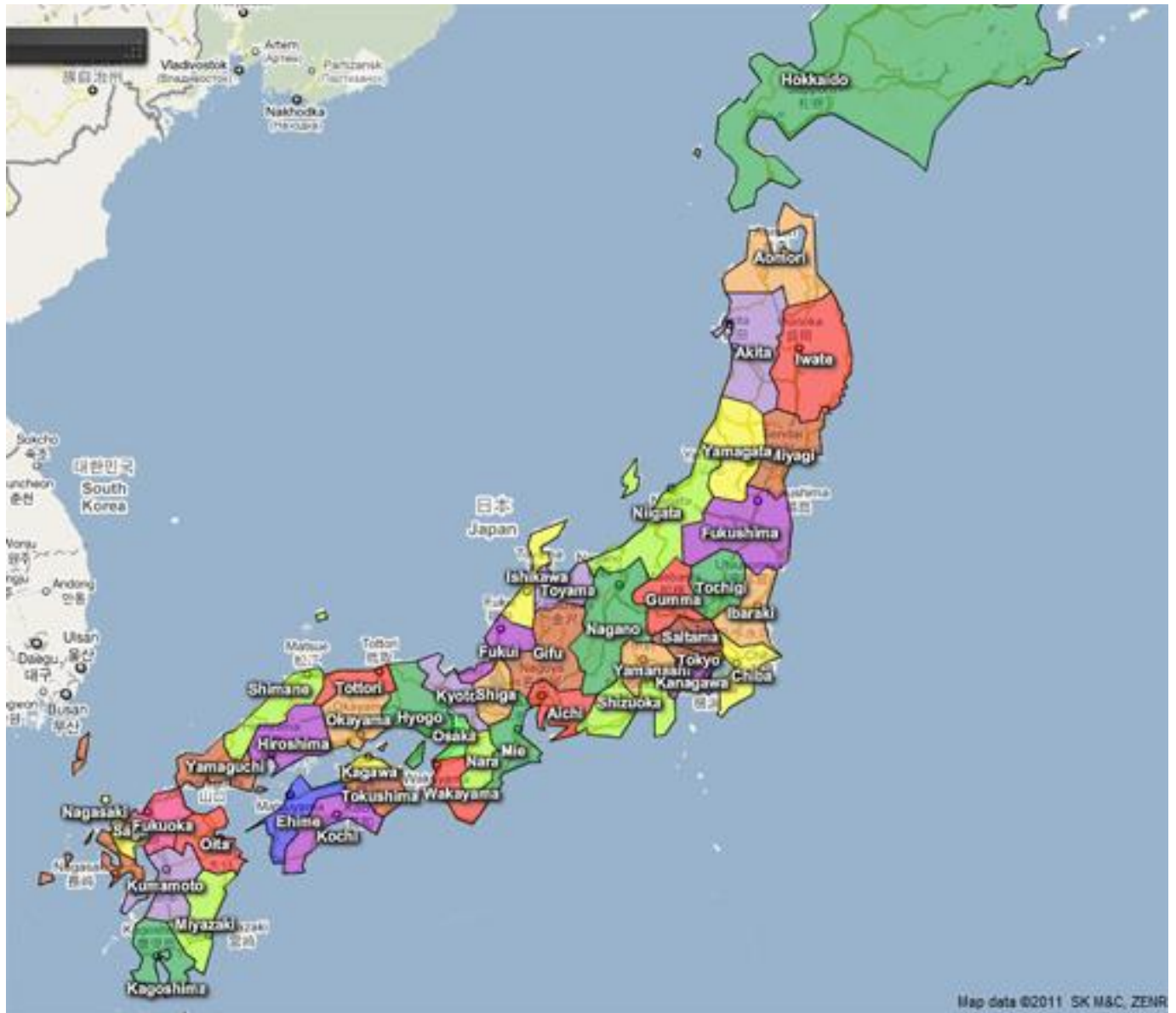


Kumamoto is the light purple on the island furthest south. Niigata is on the west coast of Japan, on the main island (Honshu) and is marked light green – the fourth prefecture down from the top of the main island. The single green island on the top is Hokkaido. Toyama prefecture (see below) is just below Niigata and is shown in purple on the

map Mie Prefecture (see below) is located on the main island on the large peninsula next to the island of Shikoku which lies just south of the main island and east of Kyushu (the island on which Kumamoto is found). Mie is indicated by a green color.

Toyama prefecture (see below) is just below Niigata and is shown in purple on the map

Mie Prefecture (see below) is located on the main island on the large peninsula next to the island of Shikoku which lies just south of the main island and east of Kyushu (the island on which Kumamoto is found). Mie is indicated by a green color.



Of the 2265 people affected by the disease, 1784 have died. In 1965 a second outbreak occurred in Niigata prefecture. Of the four major pollution disasters (all caused by improper handling of industrial waste), three involved water. Itai - Itai ("itai" is Japanese for "it hurts") disease was caused by cadmium poisoning in rivers, the

Minamata and Niigata Minamata disease were involved with the sea. Only the Yokkaichi Asthma disease in Mie Prefecture was air pollution

Name of disease	Japanese prefecture affected	Cause	Source	Year
Itai-itai disease	Toyama Prefecture	Cadmium poisoning	Mitsui Mining & Smelting Company	1912
Minamata disease	Kumamoto Prefecture	Methylmercury	Chisso Corporation	1956
Niigata Minamata Disease	Niigata Prefecture	Methylmercury	Showa Denko	1965
Yokkaichi Asthma	Mie Prefecture	Sulfur dioxide	Air pollution within Yokkaichi	1961

Problems of Minamata disease and relation to A-bombs and ETA. People from these pariah groups have problems in marrying because of fear of genetic mutations.

Radiation

There are questions about the impact of radiation on life in the ocean. From the A-bomb tests on Bimini through the problem of radiation from the Dai ichi Nuclear plant in Fukushima that was heavy damaged by the recent tsunami

there have been questions about how much radiation has occurred and what impact it has had on life in the ocean.

The idea of radiation impacting life in the ocean has been common in popular culture in post WWII films. Godzilla is a prime example. The original Japanese film (not the altered American version with Raymond Burr) raises questions about the social responsibility of scientists (dutifully removed from the American release)

Radiation is not only possible from nuclear plants, but also from atomic powered vessels like atomic powered submarines. One Russian submarine had gotten into trouble and there was some question as to whether there would be a nuclear melt down in the ocean.