Environmental Disasters and Issues of Modern Times
Environmental Science Research Topics

Species Interactions and Biodiversity

1. **Amazon Deforestation**
The Amazon is 5.7 million square kilometers and the largest continuous rainforest in the entire world. Since 1970, 1/6 of the Amazon has been cleared, mainly for beef, and increasingly for ethanol production.

2. **Invasive Species – Ship Rats**
The Rattus Rattus is native to India, but it has spread to almost everywhere in the world. This rat has directly caused, or contributed to, the extinction of multiple wildlife species including a variety of birds, plants and other small mammals. They’re blamed for the incredible decline in seabirds on several islands, including many Hawaiian species.

3. **Invasive Species – Zebra Mussels**
The zebra mussel, native to western Asia, spread to most of Europe starting in the 1700s. It was most likely introduced in North America in the mid-80s by a European cargo ship that released ballast water into the Great Lakes. They have caused loads of damage, especially to water intake pipes that they colonize and then clog. They also compete with native species for food, dramatically reducing the native populations.

4. **Invasive Species – The European Rabbit in Australia**
The European rabbit has had an impact on many places, but especially in Australia. Rabbits are partially blamed for the extinction of almost an eighth of mammal species in Australia. They cause millions of dollars in agricultural damage a year, and cause serious soil problems. They also contribute to the flourishing of other non-native species, specifically foxes and feral cats, which cause further damage to the Australian ecosystem.

5. **Coral Reef Bleaching**
Ten percent of the world's reefs have been completely destroyed. In the Philippines, over 70% have been destroyed and only 5% can be said to be in good condition. The Great Barrier Reef may be functionally extinct by 2050. While much of this destruction is due to tourism and poaching, there are also links to global warming and its effects on the ocean – from temperature increases to change in water pH levels.

Food and Agriculture

6. **The Dust Bowl**
The 1930s brought severe drought, a grasshopper infestation and high winds. Poor farming practices left no natural anchors to keep the soil in place. As a result, it dried, turned to dust, and blew away eastward and southward in large dark clouds.
7. **Food Poisoning**
   Over the last several years, there have been multiple recalls of contaminated food. Everything from meat to peanut butter and even spinach has been affected. Food poisoning is caused by contamination of the meat by bacteria found in feces, so how does it get into the meat and vegetables? Can these outbreaks be prevented, or are they a consequence of our industrialized food system?

**Global Warming and Climate Change**

8. **Hurricane Katrina and New Orleans**
   The Atlantic storm that began as a category 1 hurricane as it blew across southern Florida wound up being the country's costliest tragedy. Katrina strengthened quickly over the warm waters of the Gulf of Mexico, then roared into the Louisiana coast with 125 mph sustained winds, causing a storm surge that broke levees that shielded New Orleans from surrounding, higher coastal waters, and leaving 80 percent of the city under water. Multiple factors led to this disaster, including wetland removal, the low altitude of New Orleans, and a potential link to global warming.

9. **Polar Bears**
   Many biologists are concerned over the fate of many polar bear populations in relation to global warming. The biggest danger to the animals is habitat loss. Rising polar temperatures cause sea ice to melt earlier in the year. This shortens their time to hunt seals and fatten up for the coming summer. Multiple other aspects of polar bear life have also been affected.

10. **Australia**
    The arid continent of Australia may be a harbinger of events to come if the worst predictions of global climate change become reality. During the 2000s, southern and western Australia faced a severe prolonged drought, deadly wildfires, and heat waves that warped metal structures. Meanwhile, the north has experienced more frequent and intense severe storms and typhoons. This has lead to a boom in the population of mosquitoes that spread malaria and dengue fever.

**Environmental Hazards and Human Health**

11. **Bhopal: The Union Carbide Gas Leak**
    Shortly after midnight, a poisonous gas cloud escaped from the Union Carbide India Limited (UCIL) pesticide factory. The cloud contained 15 metric tons of methyl isocyanate (MIC), covering an area of more than 30 square miles. The gas leak killed at least 4,000 local residents instantly and caused health problems such as oedema for at least 50,000 to perhaps 500,000 people.
12. Seveso: Italian dioxin crisis

On midday of July 10, 1976 an explosion occurred in a reactor in the ICMESA chemical company in Meda, Italy. A toxic cloud escaped into the atmosphere containing high concentrations of TCDD, a highly toxic form of dioxin. Downwind from the factory the dioxin cloud polluted a densely populated area of six kilometres long and one kilometre wide, immediately killing many animals. A neighbouring municipality that was highly affected is called Seveso.

13. The European BSE crisis “Mad Cow Disease”

Bovine Spongiform Encephalopathy (BSE), is a fatal cow disease. The disease is sometimes called ‘mad cow disease’ because it causes cows to act strangely and collapse on the spot. The disease is spread by an infected protein called a prion, which there is no treatment for.

14. Malaria

This is a vector-borne infectious disease caused by protozoan parasites. It is widespread in tropical and subtropical regions, including parts of the Americas, Asia, and Africa. Each year, there are approximately 515 million cases of malaria, killing between one and three million people, the majority of whom are young children in Sub-Saharan Africa.

Air Pollution

15. The 1952 London smog disaster

December 1952 brought an episode of heavy smog to London, which lasted until March 1953. An unusual cold in London in the winter of 1952-1953 caused additional coal combustion and many people travelled only by car, which caused the occurrence of a combination of black soot, sticky particles of tar and gaseous sulphur dioxide. At the same time, a temperature inversion had settled over the city. This resulted in the heaviest winter smog episode known to man.

16. The Donora Fluoride Fog

Horror visited the US Steel company-town of Donora on Halloween night, 1948, when a temperature inversion descended on the town. Fumes from US Steel's smelting plants blanketed the town for four days, and crept murderously into the citizens' homes.

17. The Southeast Asian Hazes of 1997 and 2006

These were two widespread air pollution events that affected several countries in Southeast Asia. Particulate matter was released into the air in large amounts due to slash-and-burn farming techniques. This amplified the already polluted air quality in many urban areas.
Water Pollution

18. The Bangladesh Arsenic Crisis
Bangladesh has had major drinking water problems for many decades. Most people used to drink surface water, which was often contaminated with diseases like cholera and dysentery. International organizations started promoting the drilling of tube wells for drinking water production. It was not known, however, that groundwater in Bangladesh contained significant amounts of toxic arsenic.

19. The Baia Mare cyanide spill
Workers in gold mines use cyanide (CN) to purify gold from rocks. In January of 2000, cyanide used in a gold mine in Baia Mare overflowed into the major river the Somes and subsequently into the river Tisza. The cause of the spill was a break in the dam that surrounded a settling basin. This resulted in the release of at least 100,000 cubic meters of water with very high cyanide concentrations.

20. Spanish waste water spill
On April 25, 1998 the dam of the mining residual tank of a pyrite mine in Aznalcollar, Spain suffered a rupture, releasing sludge and contaminated wastewater. The wastewater entered the Guadiamar River, polluting the river with heavy metals such as cadmium, lead, zinc and copper. It affected an area of 4.634 hectares, contaminating 2.703 hectares with sludge and 1.931 with acidic water.

21. Deep Water Horizon Oil Spill
Deep Water Horizon is a floating oil platform in the Gulf of Mexico that experienced a sudden surge of methane gas. Due to a series of mechanical faults, the gas was able to exit through the rig, catching fire, and causing an explosion. The resulting ruptured pipe leaked oil for several weeks into the Gulf of Mexico, and is the single worst oil spill by volume in history.

22. Exxon Valdez Oil Spill
The Exxon Valdez oil spill occurred in the Prince William Sound, Alaska, on March 24, 1989. It is considered to be one of the most devastating human-caused environmental disasters ever to occur in history. Prince William Sound's remote location (accessible only by helicopter and boat) made government and industry response efforts difficult and severely taxed existing plans for habitat for salmon, sea otters, seals and seabirds.

23. Minamata Disease
Minamata disease was first discovered in Minamata city in Japan in 1956. It was caused by the release of methyl mercury in the industrial wastewater from the Chisso Corporation's chemical factory, which continued from 1932 to 1968. This highly toxic chemical bioaccumulated in shellfish and fish in Minamata Bay and the Shiranui Sea, which when eaten by the local populace resulted in mercury poisoning. While cat, dog, pig and human deaths continued over more than 30 years, the Japanese government and Chisso Corporation did little to prevent the pollution.
Nonrenewable Energy

24. The Gulf War
In August 1990 Iraqi forces invaded Kuwait, starting the Gulf War. In January 1991 as Iraqi forces were pulling out of Kuwait, they committed two environmental disasters. The first was a major oil spill 16 kilometres off the shore of Kuwait by dumping oil from several tankers and opening the valves of an offshore terminal. The second was the setting fire to 650 oil wells in Kuwait.

25. The Three Mile Island partial meltdown
At approximately 4:00 a.m. on March 28, 1979 the main feed water pumps in the non-nuclear cooling system of reactor 2 of the Three Mile Island nuclear power plant near Harrisburg, Pennsylvania failed. This caused cooling water to drain away from the reactor resulting in partial melting of the reactor core.

26. The Chernobyl meltdown
The single greatest disaster in the history of nuclear power plants occurred in the USSR in 1986. There is a wide radius surrounding the site that is contaminated, even today. The incidence of cancer, mutation, and birth defects in nearby areas is now much higher.

27. Tennessee Coal Ash Spill
This spill occurred on December 22, 2008, when an earthen dike broke at a 40-acre (0.16 km²) waste retention pond at the Tennessee Valley Authority's Kingston Fossil Plant in Roane County, Tennessee. 1.1 billion gallons (4.2 million m³) of coal fly ash slurry was released.

Waste

28. E-Waste
As electronic technology rapidly evolves, obsolete computers, monitors, cell phones, and other devices are piling up. Because of this, e-waste is a growing problem in Lagos, Nigeria, and elsewhere in the developing world. Much of the waste ends up being discarded along rivers and roads. Often it's picked apart by destitute scavengers, who may face dangerous exposure to toxic chemicals in the broken equipment.

29. The Love Canal chemical waste dump
A city near a chemical dumpsite wanted to buy it for urban expansion. Despite the warnings of Hooker the city eventually bought the site for the meagre amount of 1 dollar. Hooker could not sell for more, because they did not want to earn money off a project so clearly unwise. The city began to dig to develop a sewer, damaging the red clay cap that covered the dumpsite below. Blocks of homes and a school were built and the neighbourhood was named Love Canal.

This list is not complete! If there is another disaster you would like to research, please discuss it with me. A good place to start for other ideas is this Wikipedia entry: http://en.wikipedia.org/wiki/List_of_environmental_disasters