

The Contamination of Life's Vital Resource

© 20 August 2014

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Reprinted 2014

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I. Introduction

- A. Water is vital to human survival, and life could not exist without water.
- B. Water is an essential resource used in industry to produce, process, and maintain various products.
- C. Thesis: Water pollution occurs from natural disasters and the discharge of toxic waste into water through industries and households. Water pollution affects the economy negatively, destroys nature, and spreads harmful diseases, sickness, and some cases death. Recycling is a way to prevent further contamination of water.

II. Body

- A. Causes of water pollution
 - 1. Hazardous products used daily by humans
 - 2. Water pollution produced by factories from disposing chemicals into water and the air.
- B. Water pollution on a national scale
 - 1. Amoco Cadiz Oil Spill
 - 2. The Exxon Valdez Oil Spill
 - 3. BP- Deep Water Horizon Oil Spill
 - 4. Toledo, Ohio cyanobacteria problem

- C. Water pollution control
 - 1. Controlled by active and passive methods
 - 2. Federal government response to water pollution
- III. Conclusion
 - A. Water quality decreases as supply and demand increases from the growing population and industries.
 - 1. The effects of water pollution go beyond humans—the environment and animals are also affected.
 - 2. Water pollution follows from natural disasters and the discharge of toxic waste into water through industries and households. Water pollution affects the economy, nature, and spreads harmful diseases, sickness, and some cases death.

Water, often taken for granted, is a substance that plays an intricate part in civilization. How can a colorless and tasteless substance be so imperative to life's existence? Water has connections to all facets of life. In the resource article "Water," Robert Hordon explains, "water could exist on Earth without life, but life cannot exist without water" (2014, p.1307). Water makes up sixty percent of the human anatomy ("Causes and Effects of Water Pollution," 2014). Seventy percent of Earth surface is covered by water (Hordon, 2014, p. 1307). Water exists in three natural states on the planet: gaseous, solid, and liquid. Water pollution is a serious concern in the United States as well globally. Water pollution occurs from natural disasters and the discharge of toxic waste into water through industries and households. It affects the economy negatively, destroys nature, and spreads harmful diseases, sickness, and some cases death. The best option to prevent water pollution would be to practice recycling.

Water is the most plentiful fluid on the planet Earth, but human activities cause severe threats to the planet's water resources. These activities include climate change, landscape changes, and pollution. Contamination of groundwater from pesticides or fertilizers can cause reproductive defects with wildlife in the ecosystem ("Causes and Effects of Water Pollution," 2014). Disputes over water use have been feuded over thousands of years because it is essential for life. Water inadequately controlled could lead to an excess of suspended particles and soil in the water systems (lakes and rivers). The water may harm animals and plants by transporting toxic chemicals. Bacteria and viruses carried by animal waste can enter drinking water supplies and cause cholera and hepatitis (Hordon, 2014, p.1310-1311).

Activities such as building roads, deforestation, farming, and mining may damage aquatic ecosystems and harm water quality. In the article, "Water Pollution and Water

Pollution Control,” Robert Cullers explains that mining can expose pollutants such as mercury that become concentrated in the food chain, which could lead to serious problems in humans. Cullers provided an illustration in which a number of people in 1950, near Minamata, Japan, were poisoned by mercury. Industrial factory waste enriched in mercury from mining was discarded into the bay, where it was concentrated by shellfish that people consumed (Cullers, 2010, p. 1313). In January 2014, chemicals used to process coal leaked from a holding tank into the Elk River, contaminating the supply of water for approximately 300,000 people around Charleston, West Virginia, the largest city in the state (Beckman, 2014). The major causes of water pollution are industrial waste products, sewage, erosion, and oil spills. Industries produce numerous compounds yearly on a list of potential carcinogenic substances not desired to have in any water resources. Exposure to these toxic substances can cause serious health effects such as skin ulcers, energy loss, and fatigue (Cullers, 2010, p.1313). The rivers, lakes, seas, and ocean are continuously becoming deteriorated from water contamination.

Throughout history, major oil spills have impacted the marine ecosystem. In April of 1978, the supertanker *Amoco Cadiz* wrecked near the coast of northern Brittany. The tanker released 219,797 tons of crude oil and 4,000 tons of fuel. The crude oil polluted the sandy and rocky shores of the island. The marine life was severely damaged. Scientists estimated three to six generations would be needed for marine life populations to retrieve stable age distribution. The effects on growth, recruitment, and mortality were observed for three years after the oil spill. Studies concluded reduced growth, productiveness, and recruitment. Scientists are undecided how long it will take before ecosystems and populations return to their former or new balance (Conan, Crisp, & Dunnet, 1982).

On March 24, 1989, in Prince William Sound, Alaska, the oil tanker *Exxon Valdez* ran into a reef. The oil tanker spilled approximately 31.5 million gallons of crude oil into Alaska's Prince William Sound (Ambrose, Ford-Martin, & Renaud, 2011). The oil spill covered nearly 1,500 miles of Alaska's untouched shoreline. Oil eventually reached shores southwest of Prince Williams Sound nearly 600 miles away. The oil spill was recorded in history as one of the most devastating human-caused environmental disasters. (See photo below).



A clean-up worker uses high temperature, high pressure water to cleanse crude oil off the rocky shore of Block Island, Alaska, after the 1989 *Exxon Valdez* oil spill. (Ambrose, Ford-Martin, & Renaud, 2011).

Although there were no human deaths or injuries, the oil spill devastated the rich marine life. Efforts were made to contain the oil spill with booms and use of specially designed equipment to skim the oil from the surface (Shabecoff, 1989). The *Exxon Valdez* Oil Trustee Spill Council estimated that 22 killer whales, 250 American bald eagles, 300 harbor seals, 2,800 sea otters, and 250,000 varieties of birds were killed. Billions of salmon eggs were destroyed by the spill (Ambrose, et al., 2011). Despite all the cleanup efforts, the effects of the oil spill still exist today.

The *Exxon Valdez* oil spill was surpassed by the *Deepwater Horizon* (also referred as the BP oil spill), which discharged 185 million gallons of oil into the Gulf of Mexico (Ambrose, et al., 2011). The oil spill occurred on April 20, 2010, from a direct explosion on an oil rig. The oil spill resulted in eleven fatalities. Scientists are still evaluating the damage attributed to *Deepwater Horizon*. Nearly 8,000 marine mammals, birds, and sea turtles were discovered dead or injured in the six months following the oil spill (“How does BP Oil Spill impact wildlife and habitat?,” 2014). “The long-term damages caused from the oil spill and the chemical dispersants used to clean the spill will not be known for some years. Oil is not visible to the eye today on the surface. Scientists have discovered significant amounts on the Gulf floor” (“How does BP Oil Spill impact wildlife and habitat?,” 2014). The impact of *Deepwater Horizon* will spread out for years and will take longer to understand.

Cyanobacteria is a word many people do not know or care to understand. Three weeks ago, cyanobacteria completely shut down a major United States city water supply. The once-unthinkable crisis in the world’s biggest freshwater region sent approximately 500,000 citizens scrambling for drinkable water (Henry, 2014). The cause of the cyanobacteria bloom was primarily phosphorus from farm fertilizer runoff into the Great Lakes. Researchers admit the algae blooms have been developing for at least a decade (Seewer, 2014). In the article “Cyanobacteria Are Far from Just Toledo’s Problem,” writer Carl Zimmer says, “Fertilizers and other pollutants, the consequences of modern agriculture and fossil fuel production, are flowing into the rivers and lakes, promoting growth of these waterborne bacteria” (2014). Cyanobacteria are toxic substances that frequently occur in freshwater rivers and lakes and can have a direct effect on the health of humans (Kramer, Saker, Vale, & Vasconcelos, 2007).

Cyanobacteria is often called “blue-green algae” (“Introduction to the Cyanobacteria,” 2014). Cyanotoxins in some cases have been linked to human sickness and death. They have been known to cause various incidents of animal mortality as well.



Algae-contaminated water from Lake Erie that washed up onshore at Maumee Bay State Park in Oregon, Ohio, near Toledo. Credit Joshua Lott for *The New York Times*.

<http://www.nytimes.com/2014/08/05/us/lifting-ban-toledo-says-its-water-is-safe-to-drink-again.html? r=0>

Water pollution can be controlled through active and passive measures. Active measures should be used to control pollution where soil or groundwater has already been contaminated. Determining where the funds generate from for remediation and expensive cleanup is one problem. If an industry polluter is identified and proved, the defendant should pay for the cleanup or be sued. The Environmental Protection Agency (EPA) superfund should be used for exceedingly hazardous or widespread cases of pollution if no other government agency or industry can be held liable for the pollution. Passive measures include storing hazardous waste under conditions that decrease the movement of toxic constituents into the groundwater system. Landfills should accommodate industrial and household garbage unless it contains hazardous materials. The waste should be physically isolated from the groundwater. High-level waste like radioactive material takes hundreds to thousands of years to decay. Alternative solutions for long-term storage have to be developed to store all hazardous, non recyclable waste (Cullers, 2010, p. 1313).

The EPA estimates that fourteen billion pounds of waste, which consists of primarily plastics, is dumped into the oceans yearly ("Causes and Effects of Water Pollution," 2014). The federal Clean Water Act was intended to decrease pollution from fixed points similar to sewer pipes and industrial outfalls. Most states have chosen not to address the issue or act. In recent years, the Supreme Court has questioned the scope of the Clean Water Act. The EPA proposal to reinstate part of the Clean Water Act's authority has come under fire due to privacy issues and threats to farmers (Wines, 2014). Water contamination causes health problems in humans and marine animal ecosystems. The Supreme Court needs to make a decision about whether all the nation's waters are protected by the Clean Water Act (Beckman, 2014).

Living things and earth link to water. In order to preserve this vital resource, people and industries need to become proactive to preserve its existence. People should become conscious and educated about the harmful effect of polluting water and taught the correct way of waste disposal. Water pollution is a huge issue nationally and around the world. People are affected by water pollution, and in some cases they succumb to death. Marine ecosystems consisting of streams, rivers, lakes, wetlands, oceans, and coral reefs perform vital services for the planet's environment. Recycling is a way to prevent further contamination of water. Recycling processes used waste and material into reusable products, reducing litter, which helps reduce water pollution. One of the challenges for controlling these blooms in most locations around the United States is to cut the current supply of nutrients sources (Spotts, 2014). . Water pollution impacts people's lives enormously; if people do their part by not dumping chemicals or trash into the drains and water supplies, it will improve aquatic life and provide healthy living. On the other hand, continuing to contaminate the water will lead to a catastrophic outcome for future generations.

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