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|  | MARINE POLLUTION  In the 1960�s Lake Erie was pronounced �dead� because extreme levels of pollution drastically affected the ecosystem. From 1980 to 1991 nitrate concentrations in samples of ground water at three locations in Idaho failed to meet Federal and State drinking water standards. In 1991, the deaths of over one million fish in Louisiana were linked to the application of azinphos-methyl (Guthion) used to control pest insects in sugar cane (Alder).The occurrences like these are commonplace and readily available in the scientific record. When are we going to stop polluting our oceans, rivers and our own drinking water? When will it be to late?  Marine pollution is the introduction by man, directly or indirectly, of substances or energy to the marine environment resulting in such deleterious effects as harm to living resources; hazards to human health; hindrance of marine activities including fishing; and impairment of the quality for use of seawater (Clark). Without a doubt, the greatest risk for a marine ecosystem is having high concentrations of humans as neighbors. As civilizations have advanced, so too have the ways by which humankind has purposefully or inadvertently harmed streams, rivers, and oceans.  Marine pollution has occurred for many years. We continue to release large quantities of pollutants into our rivers, lakes, and coastal waters, resulting in ongoing risks to human health and environmental quality. An alarming number of aquatic species are in serious jeopardy. Major aquatic habitats, such as estuaries, continue to be paved over, drained, filled, and otherwise altered by the onslaught of human activities. Much of this pollution is runoff from farms, logging, and urban development also know as agricultural pollution. Agricultural farming involves the use of pesticides, fertilizers and insecticides to increase the production of their crop. These contaminants often reach our oceans and lakes through rivers. Some extremely toxic, non-selective pesticides have caused fish and aquatic animal die-offs.  Overall, pesticide use statistics are startling and indicate the risk of potential pesticide problems in our water. Over four billion pounds of pesticides are used in the United States each year. The Environmental Protection Agency (EPA) registers about 620 active ingredients which are used in approximately 20,000 pesticide products. According to EPA, approximately 430 million pounds of pesticides were applied to agriculture in 1987 (Alder). The occurrence of nutrients from pesticides in rivers and ground water has become a national priority. It is ranked among the highest in importance because of widespread environmental and public health concerns.  One of the environmental concerns is plant growth. Plant growth can be altered by the availability of nutrients. By affecting the species composition and the growth of photosynthesizers, nutrient availability affects the entire ecosystem, reducing the food chain and increasing decomposition by bacteria and fungi. In general, nutrient-rich waters are more productive, have denser algal populations, and have fewer species than nutrient-poor waters. In the sea, the nutrients that most often effect plant growth are nitrogen and phosphorus.  Nutrient pollution, including nitrates and phosphates, is of concern because it can initiate eutrophication. Eutrophication, the biological process initiated by excessive nutrient enrichment, of large rivers, lakes, estuaries, and shallow marine environments is the most immediate environmental consequence of nitrate and phosphate pollution (Clark). The following progression characterizes eutrophicated water:  1) increased primary production  2) changes in plant species composition  3) very dense, often toxic, blooms  4) conditions of hypoxia (low oxygen concentrations) or anoxia (no oxygen)  5) adverse effects on fishes and invertebrates  6) changes in structure of benthic communities  Not all of these are observed in every case, because the process may not always reach the final stages. Some of the final stages consist of depletion of oxygen levels in the water during algal blooms. This happens when increasing numbers of dead cells are decomposed by bacteria. Also during major algal blooms, the phytoplankton community can become dominated by a single species to the near exclusion of others. Lastly the existence of �red, green, or brown tides,� occurs because the algae are abundant enough to discolor the water and leads to the exclusion of many animals from the area.These problems have been documented in the Mississippi River and in the Colombian river.  Nutrient pollution can have adverse effects long before oxygen is depleted. Reef corals, which rely on mutualistic algae within their tissues to supply most of their energy, grow and survive best in clear waters with low nutrients. They become vulnerable when added nutrients stimulate growth of phytoplankton or benthic algae. Because algal blooms cloud the water, they reduce the amount of sunlight that reaches the reef, slowing the growth of corals and making their survival impossible in deeper water. Similarly, higher nutrient levels favor benthic algae that compete with corals for space and light and can actually overgrow and smother them. Pollution, specifically nutrient pollution, can drastically effect and change the ecosystem of the rivers, lakes, an oceans.  [Next Page](http://docs.google.com/intro2.html)  [Intro 3](http://docs.google.com/intro3.html)  [Intro 4](http://docs.google.com/intro4.html) |

*This Web Site is Best viewed with 256 or more colors.*

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