Red Tides Essay, Research Paper

Red tides also known as harmful algal blooms, HAB for short, are a toxic, single celled algae called photoplankton. This organism produces a toxin that affects the central nervous system of fish so that they are paralyzed and can’t breathe. As a result, red tide blooms often result in dead fish washing up on beaches. From biblical times to present day this killer of marine animals and health risk to humans is affecting rivers and coast lines all over the world. Despite how long we have known about red tides there is not much we can do to stop them or determine where it will strike next.

Certain blooms of algae are termed red tides when the tiny pigmented plants grow to a great abundance. The term red tide is misleading in the name. “Red tides are only occasionally red, also appearing as orange, brown, and even green. And they never occur literally as tides, which are the rises and falls of the sea.” (New York Times: Aug. 27,1997) Some cases of red tides do not show any change in the color of the water at all. This makes a red tide very hard to predict or find.

Red tides often occur when fresh water runoff creates a stratified surface layer above colder nutrient-rich waters. “heavy rains might have helped the red tides develop by pouring fresh water and nutrients into surrounding sea waters,” (New York Times: Sept. 19, 1996) Fast growing algae quickly strip away nutrients in the upper layer, leaving nitrogen and phosphorus only below the interface of the layers, called the pycnocline. Many swim at speeds of 10 meters a day, and some go through vertical migration rising to the top of the water to get sun and then swimming down to the pycnocline to take up nutrients at night. Another cause of red tides is from human pollution. “nutrient runoff from human development, the heavy use of fertilizer and livestock farms is feeding the growth of marauding swarms.” (New York Times: Aug. 27, 1996) Dr. Jane Lubchenco, a prominent ecologist at Oregon State University said, “There is a correlation between increased nutrients in coastal waters and increased frequency of photoplankton blooms.” One bloom of the red tide can kill millions of fish at a time.

Humans are affected by red tides when the fleshy tissue in clams, mussels, and oysters absorbs toxins from the microorganisms. “Typically, the shellfish themselves are affected only slightly, but a single clam can sometimes pack enough poison to kill a human.” (New York Times: Aug 27, 1996) Although death to humans from this poison is rare, serious symptoms like nausea, dizziness, fever, tingling in the extremities, and dilated pupils are much more common.

JoAnn M. Burkholder, a scientist at North Carolina State University at Raleigh, came upon a very dangerous and deadly form of a diverse class of aquatic organisms that cause red tides. “The baffling case began in the late 1980’s when scientists puzzled over large fish kills in which the victims were covered with open bleeding sores.” (New York Times: Aug 27, 1996) Burkholder discovered a breed of microorganisms she called Pfiesteria piscida. Pfiesteria is nourished by runoff from urban development and industries like hog farming. Severe effects of this organism not only affect marine life dramatically but human life as well. Burkholder learned first hand in 1993 when she breathed the toxic fumes of dying fish in one of her labs. “The resulting nausea, burning eyes and cramps were bad enough, but then she began having trouble remembering phone numbers, writing or even holding a conversation. The fumes had crippled her memory and mental powers.” (New York Times: March 25, 1997) This extremely potent toxin which is released to stun fish also affect humans who breathe it. Many of her other co workers got stomach cramps, became dizzy, and got skin lesions on their hands and forearms. Soon after the lab was closed for a year and became a biohazard Level 3, which is on a par with AIDS.

Not much can be done to prevent or stop the destruction of red tides but scientists are starting to learn and understand these phenomena a great deal more in the last few years. Expanding research of red tides is being initiated by federal agencies. They are seeking ways to prevent, control, and mitigate red tides. Controlling pollution and industrial runoff of fertilizers and other chemicals can reduce the onset of some red tide outbreaks. An assessment conducted for The National Fish and Wildlife Foundation and The National Oceanic and Atmospheric Administration Coastal Ocean Program said, “evaluation of the effectiveness and side-effects of chemical, physical and biological control agents; development of better detection an measurement of toxins and HAB species for application in monitoring; ballast water temperatures; and determination and treatment of the effects of chronic exposure on human health.” With further research and extensive studies on red tides hopefully one day a definite way of prevention will be known.

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