



# Effects of acid rains in aquatic ecosystem

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## DESCRIPTION

The ecological effects of acid rain are most apparent in water bodies or in water environments such as streams, lakes and swamps. Acid rain falls on forests, fields, buildings and roads before flowing into streams, lakes and swamps. Acid rain also falls directly on aquatic habitats. Most lakes and streams have a pH of 6-8, but some lakes are naturally acidic without the effects of acid rain. Acid rain primarily affects sensitive waters in catchment areas where the soil has a limited ability to neutralize acidic compounds (buffering capacity).

Lakes and streams become acidic (that is, their pH drops) if the water itself and the surrounding soil cannot be sufficiently buffered to neutralize acid rain. In areas with low buffer capacity, acid rain releases aluminium from the soil into lakes and streams. Aluminium is highly toxic to many types of aquatic organisms. Many lakes and streams surveyed by the National Surface Water Survey (NSWS) suffer from chronic acidification. This is a condition where the water has a consistently low pH. This study investigated the effects of acid rain on more than 10 acres of more than 1,000 lakes and thousands of miles of rivers, which are considered sensitive to acidification. Of the lakes and streams surveyed, acid rain caused acidification in 75% of acidic lakes and about 50% of acidic streams.

It was found that some parts of the United States contain a lot of surface water that is sensitive to acidification. These include the Adirondack and Catskill Mountains in northern New York, the highlands of the central Appalachian Mountains along the east coast, the upper Midwest, and the mountainous regions of the western United States. In areas with low soil buffering capacity, such as

the north-eastern United States, some lakes have a pH of less than 5.

For example, less than 10 acres of lakes are not included in NSWS, but the number of these small lakes is one to four times that of large lakes. In Adirondack, the proportion of acidic lakes is significantly higher when small lakes are included. Streams that flow over soil with little buffering capacity are as vulnerable to acid rain as lakes. Approximately 580 streams in the coastal plains of the central Atlantic Ocean are acidic, primarily due to acidic sediments. For example, in the New Jersey Pine Barrens, more than 90% of streams are acidic, representing the highest percentage of acidic streams in the country. Over 1,350 streams in the Mid-Atlantic Highlands are acidic, primarily due to acidic sediments.

## EFFECTS ON AQUATIC ECOSYSTEM

- Acid rain causes a series of effects that can damage or kill individual fish, reduce fish populations, completely remove fish species from water bodies, and reduce the biodiversity.
- When acid rain flows through the soil in the basin, aluminium is released from the soil into the lakes and it flows into the basin. Therefore, as the pH of lakes and streams decreases, the level of aluminium increases. Both low pH and increased aluminium content are directly toxic to fishes.
- In addition, low pH and elevated aluminium levels cause chronic stress and cannot kill individual fish, but reduce weight and size and prevent fish from competing for food and habitat.

- Some species of plants and animals can tolerate acidic water. However, others are sensitive to acids and are lost when the pH drops.
- In general, most species of adolescents are more sensitive to environmental conditions than adults. At pH 5, most roes cannot hatch.
- At lower pH levels, some adult fish die. There are no fish in some acidic lakes.

When fish are exposed to acid rain, the disturbed levels of minerals in fish will affect their reproductive system and the females will not release eggs. When certain fish are in water with a very acidic pH level, the mucus on their gills will become very sticky and will eventually stick together, causing them to be unable to receive oxygen from the water.