

## ACIDIFICATION

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Acidification is caused by emissions of sulphur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), and ammonia (NH<sub>3</sub>), of which sulphur emissions are the primary source.

Acid mine drainage, industrial effluent, and atmospheric emissions of sulphur and nitrogen oxides are largely responsible for the acidification of surface waters. Most surface waters have a pH between 6 and 8.5, and values below six can be hazardous to aquatic life. Fish, shellfish and aquatic insects have different tolerances to acidic waters and species diversity will decrease along with increased acidification.

Young organisms tend to be more sensitive to acidic waters: for example, at a pH of 5, most fish eggs cannot hatch, while only some adult fish will be affected. Trophic level effects may cause indirect survivorship challenges in instances where prey species are eliminated. Acidic waters also mobilize metals that can be toxic to aquatic species (e.g., aluminium). Metal toxicity can cause reduced survivorship in fish through chronic stress, which impairs health and decreases the affected individuals' ability to secure food, shelter, or reproductive partners.

Industrial effluent has the potential to alter the chemistry of receiving waters and make them more susceptible to acidification.. Water quality at that monitoring station also tended to have much higher hardness, conductivity, chloride, sulphate and nitrate concentrations than a baseline, upstream monitoring station.

While acid mine drainage tends to affect individual systems and be fairly localized in its impact, industrial emissions of sulphur and nitrogen oxides to the atmosphere have affected large areas and many ecosystems. Attempts to curb acidification of terrestrial and aquatic landscapes have resulted in reduced sulphur emissions to the atmosphere in many parts of the world.

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