

EFFECTS OF FIRE RETARDANTS USED TO FIGHT WILDFIRES ON FISH

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Background

- Fire retardants used on wildfires runoff into waterways where fish live. These retardants contain a wide variety of chemicals that help suppress fires. The manufacturer of the chemicals have not disclosed what impacts the chemicals have on wildlife. In 2017 Perimeter Solutions produced 50 million gallons of the retardant (L.A. Times, 2020). The Forest Service is a repeat customer of Perimeter Solutions. Over the last decade the Forest Service used 28 million gallons of the retardant on wildfires (L.A. Times, 2020). The regulations and guidelines for the usage of fire retardants were put in place forty years ago which means they are pretty outdated (TuftsNow, 2020).

Motivation

- Due to rising temperatures and shorter winters wildfires are getting bigger and happening more frequently (WRI, 2020). This means that the amount of fire retardant used per year is increasing. This study will provide data about how fire retardant affects fish health in post fire areas. The data that would be gained from this study would fill important gaps that are not provided by the manufacturer. The fire retardant is a federally approved substance which makes people believe it is safe to wildlife but there are not any studies that back this up (Durango Herald, 2018).

Hypothesis

- I hypothesize that there is a relationship between the amount of fire retardant in water and the health of the fish.

Prediction

- I predict that water with higher amounts of fire retardant will have negative impacts to the health of the fish that live in the water.



Figure 1: This image shows an airplane spreading the fire retardant in a wildfire zone. This photo was taken by David Mcnew.

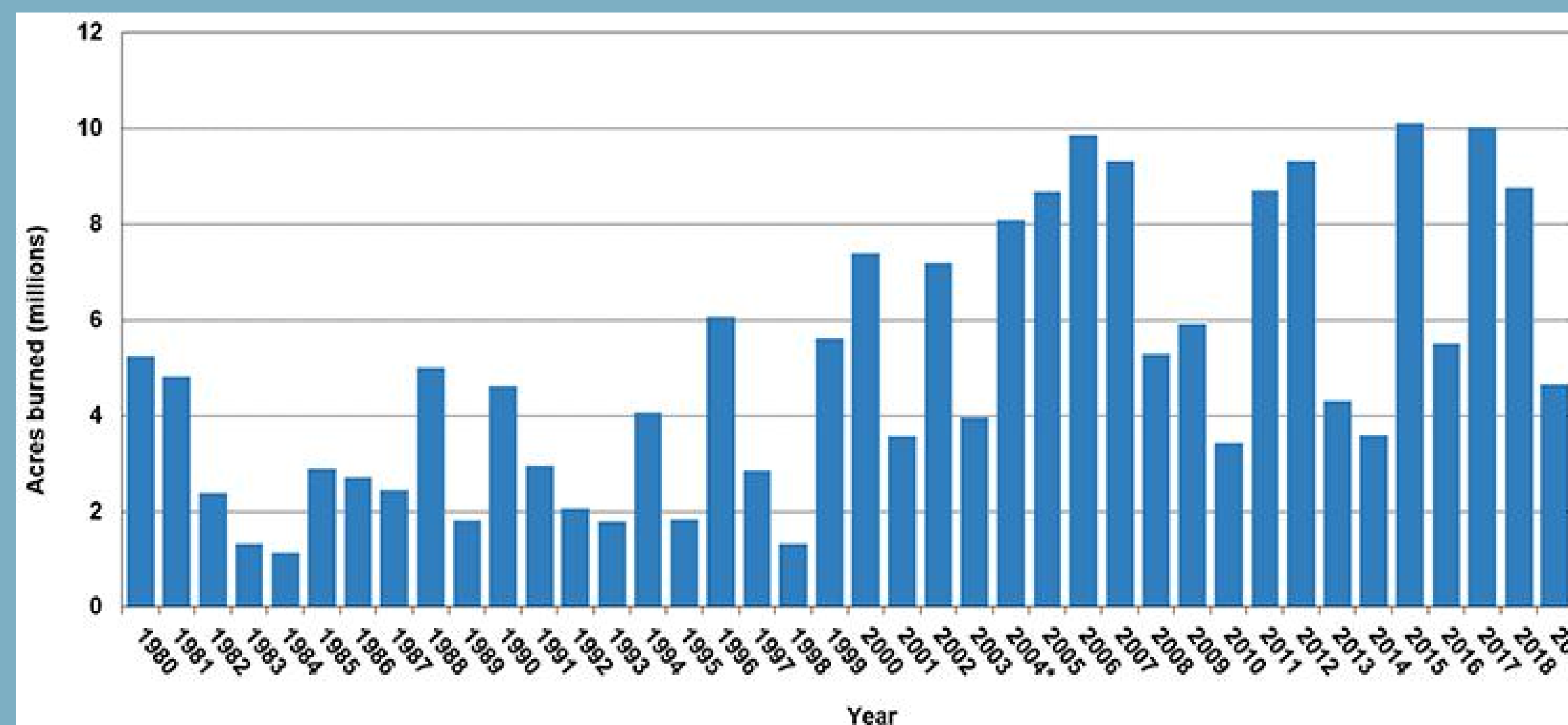


Figure 2: This graph shows the acres burned by wildfires in the U.S. from 1990 to 2019. Due to the increased amount of acres burned more fire retardant is used to try to prevent the spread of the fire. Graph courtesy of iii.org.

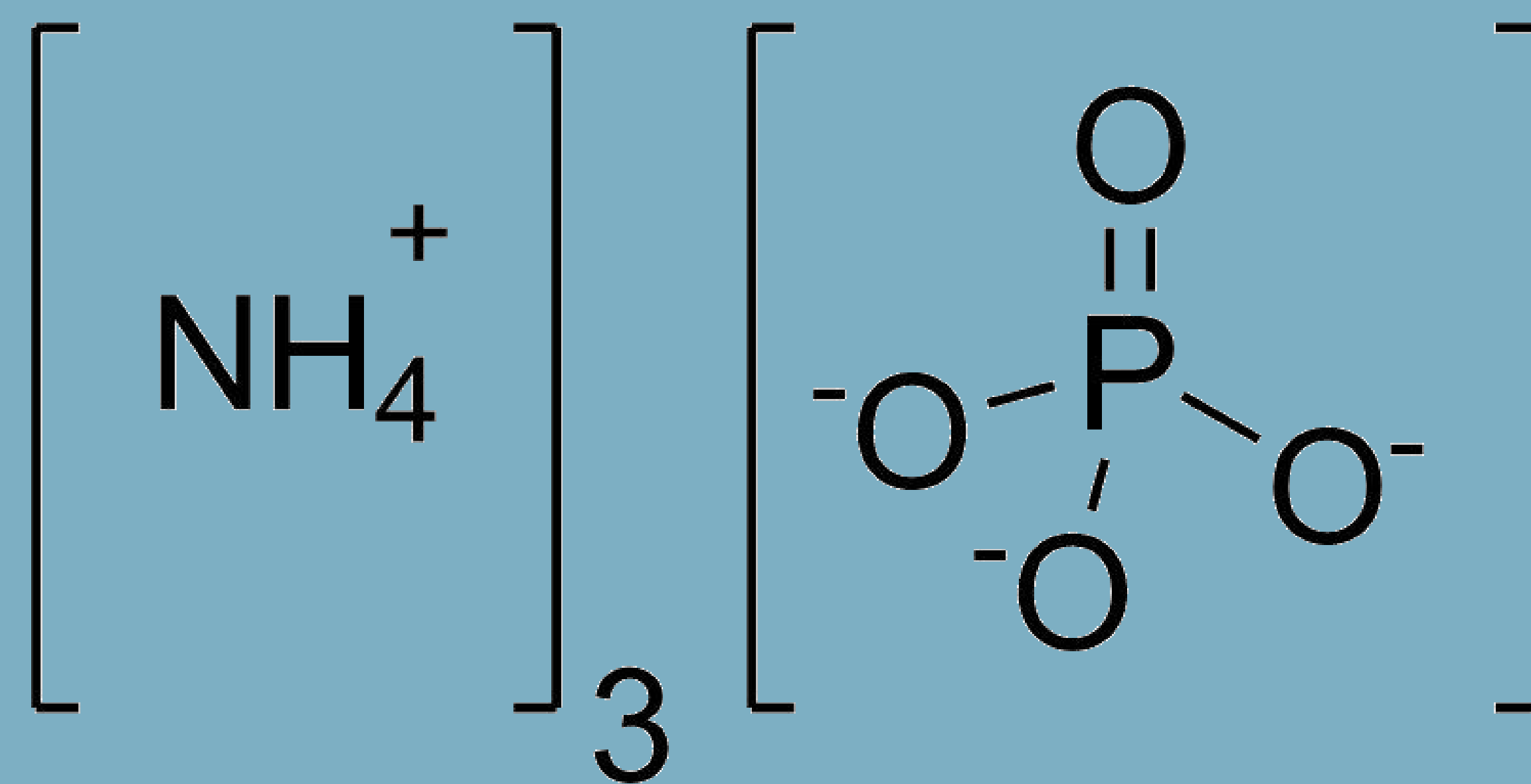


Figure 3: This is the chemical formula for ammonium phosphate which is the active ingredient in the fire retardant. Formula courtesy of byjus.com.

Study Design

Observational study in high risk wildfire areas, where fish will be evaluated before and after the fire retardant enters the water. 20 fish will be tested at 10 different sample sites. Water quality will be tested before and after the fire retardant enters. The acute toxicity test will be used to see whether or not the retardant has negative health effects on the fish. This test shows what materials are toxic to fish by exposing them to the chemical for a short period of time (Ilar Journal, 2000).

Timeline: This is a 5 year study due to the fact that it is difficult to predict where wildfires will occur. 5 years will give us enough time to be able to produce accurate results.

Intended Analysis

The analysis will compare the health of fish that have been exposed to the fire retardant and fish that have not been exposed to the fire retardant. The independent variable is the water type and the dependent variable is the health of the fish.

Expected Benefits

This research will give us crucial knowledge about how the chemicals in fire retardant effect the health of fish. This research is urgent because millions of gallons of this substance are being dumped in the wilderness and each year the amount used is increasing. Conducting research on this substance would show whether or not it is harmful to fish and if it is, then an alternative chemical could be used that doesn't harm fish.

Literature cited:

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