

Title: "Sources and Aftermaths of Pipeline Related Leaks and Spills"

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The escape of oil and other hazardous materials have been shown to pollute and destroy ecosystems. As an aspiring chemist, I am adamant about the secure handling and transportation of oil and other hazardous materials. In the past, researchers have concentrated on oil's high viscosity. Oil's high viscosity physically smothers wildlife, affecting their ability to continue critical functions such as respiration, feeding, and thermoregulation. My research focuses on the source of these oil spills, as well as natural gas leaks, for the purpose of risk assessment. In addition, I compare recovery efforts based on the cause of the leak/spill, the gas/liquid type, and the location of the leak/spill.

The data set contains 2,795 pipeline-related leaks/spills reported to the Pipeline and Hazardous Materials Safety Administration (PHMSA) between 2010 and 2016. These records include: pipeline operator; pipeline name; general cause of incident; specific cause of incident; pipeline type; pipeline location; city, county, and state where the accident took place; type of hazardous gas/liquid; quantity lost; and associated costs of cleanup. Questions I sought to answer are: Is the recovery rate the same for different substances leaked/spilled? Is the recovery of oil onshore better than the offshore recovery? Is the recovery dependent on the cause of the leak/spill? Is the cause of a pipeline leak/spill related to a pipeline's location? Is the cost of cleanup the same for different substances leaked/spilled?

I analyzed the data using nonparametric tests, such as tests on the median using the binomial distribution, the chi-square test of independence, Kruskal-Wallis, and a K-sample permutation F test with post hoc tests as appropriate. With answers to these questions, organizations like the PHMSA and the Occupational Safety and Health Administration (OSHA) may better understand where to implement safety measures and improve clean-up operations.