Nathan Gillispie – (Non)perishable Chemicals

When disasters occur, things change and people often want to return to a normal state. When this happens, information about the disaster or things it affected get lost. Information like this that is valuable to researchers is known as perishable data. This data might include first hand accounts of disasters, whos details people forget about or distort after many retellings. It might also include images and qualitative accounts of the integrity of buildings and structures. Perishable data can also be qantitative, like wind speeds during a hurricane, or seismic activity after an earthquake. As a chemistry major, my interests and skills would involve more quantitative analysis; and can directly apply to local disaster research.

When doing chemistry, it is important to know what substances we are working with and how much. An entire field of chemistry – quantitative analysis – aims to solve this problem of determination and it has everything to do with measuring. My interests in this field begin with the class I took on this subject, research in this field and my ideal of working with the EPA, whos work is concerned with the detection of environmentally harmful chemicals. This work requires setting safe levels and determining concentrations on the environment. This is a common question for analysists: how much of this evil (or morally benevolent) chemical is in the water, in my food, or in my septic tank. First, a method must be prepared for obtaining a homogenous and representative sample, then primary standards of known quantity and concentration of the analyte we are searching for must be obtained. The matrix of a sample is everthing except for the analyte. Its complexity ranges from ideal, like tap water; to a painful poop soup like in the septic tank. Usually, a chromatographic method must be developed to separate the analytes from a simulated matrix then a calibration curve made to finally measure the concentration of the analyte. Due to its complexity, the entire process can take months when starting from scratch, which exacerbates problems of disasters where the end is defined only by safe levels of a chemical.

One important technological disaster of my recallable lifetime is the Flint water crisis. The main concern of the water itself was the corrosivity and lead levels. Ultimately the crisis pertained to the government response, leading people to lose trust in future statements made by the authorities. If proper testing had taken place at the time the water switch happened, proper quantitative analysis by unbiased scientists could have revealed what other chemicals to what amount existed in the water, which would have hopefully eased concerns in the affected areas.[1]

Another water crisis worth mentioning involves the breakage of a coal impoundment in Martin County Kentucky. Here a similar faith was lost in the local government after the water became undrinkable and “residents received monthly advisories that some people exposed to the chemicals in their water ‘may experience problems with their liver, kidneys, or central nervous system, and may have an increased risk of getting cancer.’”[2]

An element of technological disasters like these involves perishable data. Proper sampling of tap, river, etc. might only be possible immediately after a disaster takes place, rendering this data perishable. As a person interested in both chemistry and the ability to take the security of our environment and water supply for granted, the ability to capture perishable data is important to my career when I become involved in environmental disasters.

[1] Mohai, Paul. 2018. *Environmental Justice and the Flint Water Crisis.* Michigan Sociological Association, *Michigan Sociological Review, Vol. 32.*

[2] Boles, Sydney. 2019. *First These Ketuckians Couldn’t Drink The Water. Now They Can’t Afford It.* NPR. [www.npr.org/2019/10/31/772677717/](https://www.npr.org/2019/10/31/772677717/first-these-kentuckians-couldnt-drink-the-water-now-they-can-t-afford-it)