
PROJECT PLAN: MODELING WATER QUALITY BETWEEN UPSTREAM SOURCES AND MUNICIPAL DRINKING WATER

[REDACTED]

[REDACTED]

ABSTRACT

The goal of this project is to model the relationship between characteristics that appear in upstream water sources and the characteristics that appear in municipal drinking water.

1 INTRODUCTION

This project seeks an economic model to establish the cost municipalities face in cleaning their water. Municipal water sources come from surface water and from groundwater. They must treat the drinking water in order to ensure that water's safety for human consumption.

Given that the sources of water for different municipalities may come with varying levels of characteristics in the water, municipalities face different costs to ensure safety. To better understand these varying costs, it is important to model how levels of characteristics in water sources relate to levels of those same characteristics that appear on the CCRs for municipal drinking water.

2 BASELINE OR INITIAL ANALYSIS

The initial work to be done on this project is data collection and cleaning. The Consumer Confidence Reports (CCRs) needed for the analysis are available on the Kansas Department of Health and Environment's website in word documents. The data from these CCRs needs to be aggregated across all municipalities.

Once the data from the CCRs is scraped and aggregated into a single source, it needs to be linked with the water quality data from the Water Quality Portal. This must be done with an understanding of water flows. To connect the data in the CCRs with the data in the Water Quality Portal, the analyst will need to consider how water from surface-level water sources (lakes, streams, and rivers) arrives in municipal water sources. The analyst will also need to consider the share of municipal water each city obtains from surface water and from groundwater.

3 FINAL ANALYSIS

The final analysis for this project is a set of regression estimates that identify the relationship between water quality characteristics in surface-level water and those same characteristics in municipal water sources.

These regression estimates should be put into tables following the standard format in Economics. Include robustness checks, heterogeneity tests, and visualizations that investigate the validity of these estimates.

4 FINAL GOALS & EVALUATION

The final goal of this project is a technical report detailing the data work completed, statistical analysis undertaken, and results and implications of the findings.

5 RELATED WORK

Read, E. K., L. Carr, L. De Cicco, H. A. Dugan, P. C. Hanson, J. A. Hart, J. Kreft, J. S. Read, and L. A. Winslow (2017), Water quality data for national-scale aquatic research: The Water Quality Portal, *Water Resour. Res.*, 53, 1735–1745, doi:10.1002/2016WR019993.

Josset, L., Allaire, M., Hayek, C., Rising, J., Thomas, C., and Lall, U. (2019). The U.S. water data gap—A survey of state-level water data platforms to inform the development of a national water portal. *Earth’s Future*. 7, 433–449. <https://doi.org/10.1029/2018EF001063>

Zheng, J. G., Wang, P., Patton, E. W., Lebo, T., and McGuinness, J. S. L. D. L. (2011). A Semantically-Enabled Provenance-Aware Water Quality Portal. In *Environmental Information Management Conference*.

Environmental Protection Agency. Drinking Water Treatment Technology Unit Cost Models. Last Updated on May 5, 2023. Accessed on February 8th, 2024.

Kansas Department of Health and Environment. Consumer Confidence Reports. <https://www.kdhe.ks.gov/531/Consumer-Confidence-Reports>. Accessed on February 8th, 2024.

6 DATA & TECHNICAL REQUIREMENTS

The data for this project will come from three sources. The water quality data from upstream sources comes from the Water Quality Portal run by the EPA. The water quality data for municipal drinking water comes from the Consumer Confidence Reports (CCRs) that are available on the Kansas Department of Health and Environment’s website. It will also be necessary to find information about how upstream water flows into city water sources.

NOTE: the CCRs are available online for the most recent year. It will be necessary to request additional years from the KDHE.