

Thesis Portfolio

**Energy Supply Readiness Across Climate Change and Energy Demand Scenarios in the
Columbia River Basin**
(Technical Report)

**Socio-Technical Relationships between Water Access and Quality in Flint, Michigan and
Newark, New Jersey**
(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science
University of Virginia • Charlottesville, Virginia

In Fulfillment of the Requirements for the Degree
Bachelor of Science, School of Engineering

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Table of Contents

Sociotechnical Synthesis

Technical Report Title

STS Research Paper Title

Thesis Prospect

Sociotechnical Synthesis

This thesis portfolio will discuss the STS research topic of socio-technical relationships among water quality and access within the United States and the technical report will touch on the topic of the optimization of ten reservoirs in the Columbia River Basin. The research topic will dive into two case studies within the United States that will investigate the issues within water access that can lead to poor water quality. Once poor water quality becomes involved the concern with health and overall wellbeing is raised and considering all citizens have the right to clean water, serious cases of negligence and poor communication between residents and government officials. These actions can end up with criminal charges against the people involved and improvements made to laws, regulations, and infrastructure for the affected communities. The two case studies I will be looking at closely are Flint, Michigan and Newark, New Jersey; these studies emphasize how critical the role of government and regulations are when issues with drinking water arises. The technical report will be using computer software to run multiple scenarios amongst the reservoirs by changing the values for climate conditions and energy demands. The group will decide on the most robust policy to fulfill the reservoirs' needs of controlling flooding, contributing electricity to the Northwest's power supply, protecting aquatic life especially the valuable salmon population, and making sure the system runs smoothly so the basin can receive funding. The two topics although are not directly correlated but still relate because they both are concerned with water problems within the United States. Also, the Columbia River Basin provides drinking water to many residents since the reservoirs' stored water is sent to water treatment plants to be distributed to the communities. The two case studies both handle issues within drinking water quality for the resident due to poor decisions made by

the government. These aspects show how the two topics relate to each other and both deal with drinking water concerns.