

# Tools to Rapidly and Efficiently Prioritize Individual Contaminants for Contaminant Candidate List and Criteria Development

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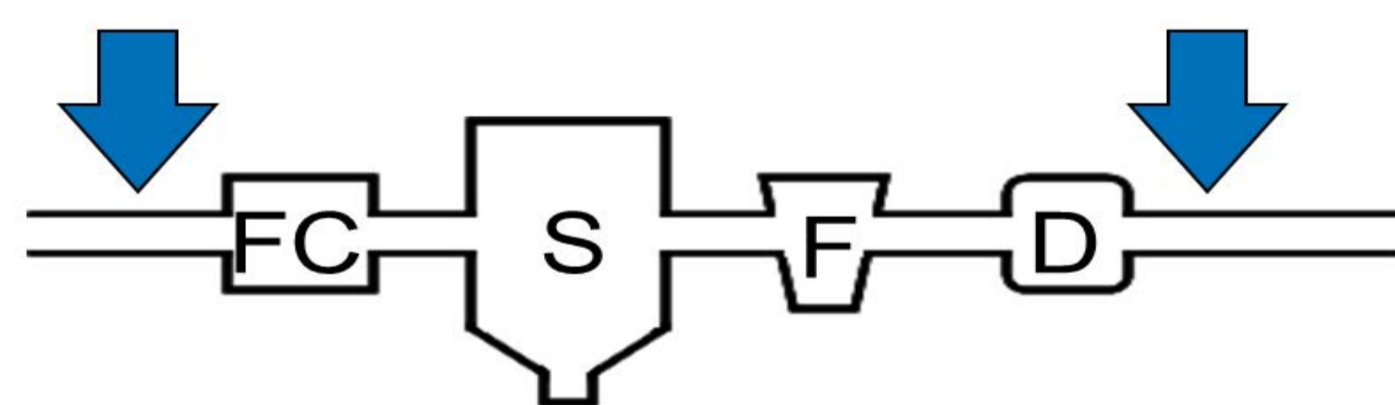
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## Introduction

Most occurrence studies available in the literature have limited analyte lists, and do not discuss ramifications of the detections. This study gathered occurrence data, both in source water and in treated drinking water, on 247 chemical and microbial contaminants of emerging concern. In addition to the chemical occurrence data, a bioassay was used to determine the total estrogenicity of the samples, and the implications to human and aquatic life was evaluated.

## Approach

- Paired source and treated drinking water samples collected from 25 drinking water treatment plants (DWTP) across the United States.



- Samples analyzed by 15 methods for chemicals, microorganisms, and estrogen bioactivity.
- Analyte selection was focused on pharmaceuticals, but the project was opened to other collaborators to provide information on analytes, including perfluoroalkyl substances (PFASs), hormones, fungi, bacteria, protozoa, and viruses.

## Results

- In general, analytes were infrequently detected.
- When analytes were detected, they were found at low concentrations.
- Many analyte detections were close to, or below the method reporting levels, therefore a large number of detections were reported as qualitative (i.e. positive or negative) rather than quantitative.
- Figure 1 depicts the qualitative frequency of detection of all of the analytes in both source and treated drinking water.
- Six analytes—copper, aluminum, strontium, lead, uranium, and nitrate—occurred at concentrations in the source water, which may cause health impacts to aquatic life.
- Two analytes—silicon and strontium—occurred in treated drinking water at concentrations that will require additional investigation to determine the potential for human health impacts.
- Two analytes—lithium and manganese—occurred at concentrations that will require additional investigation because of new health studies that were not considered in the existing health assessment.

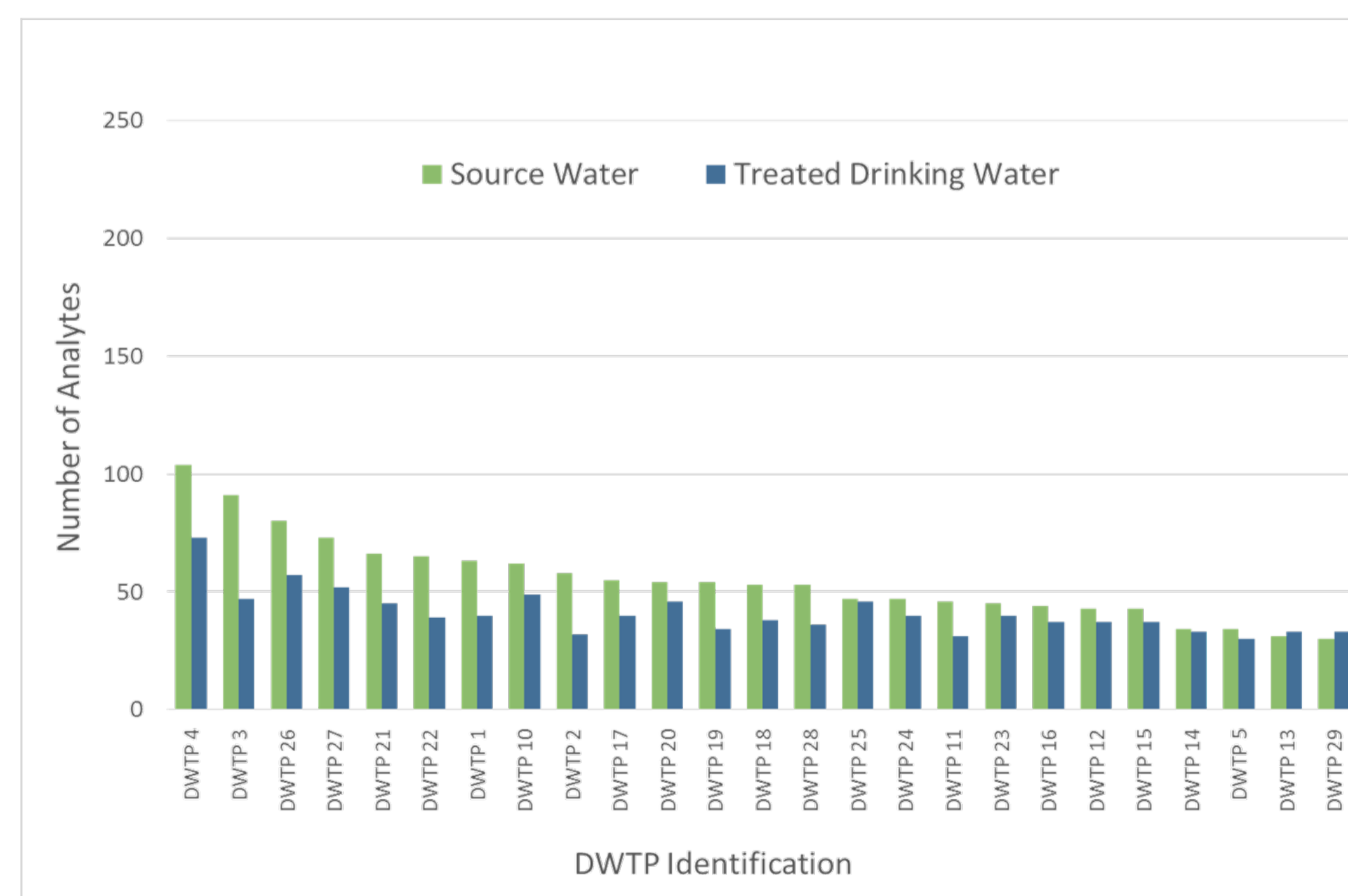


Figure 1. **Qualitative Frequency of Detection.** Graph depicting the qualitative frequency of all analytes from source and treated water samples from each DWTP.

## Expected Use

- Seven manuscripts detailing results will be published in *Science of the Total Environment*.
- Data on eight analytes have been given to EPA's Office of Ground Water and Drinking Water for Contaminant Candidate List (CCL) discussion.
- EPA's Office of Chemical Safety and Pollution Prevention has evaluated the data for estrogenicity.
- The data generated in this project will also be used in the CCL 5 decision making process.

## Future Direction

Ongoing collaborations between EPA and the U.S. Geological Survey (USGS) are examining the sources, fate, and transport of chemical and microbial contaminants of emerging concern. In addition to the analyte measurements, these studies incorporate bioassays with additional endpoints, passive integrative sampling, and non-targeted chemical analyses.

## Collaborators

This research was a collaboration between EPA and USGS. EPA collaborators included the following: Office of Research and Development's National Exposure Research Laboratory, National Risk Management Research Laboratory, and National Health and Environmental Effects Research Laboratory; Office of Water; Office Chemical Safety and Pollution Prevention; and Region 8.

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