Identifying Drinking Water Sources at Risk of Poly- and Perfluoroalkyl Substances (PFAS) Contamination in Washington State

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What are PFAS?

- Manufactured chemicals, widely used in industry and consumer products since the 1950’s
- Persist in the environment
- Leach from surface soil to groundwater
- Some bio-accumulate in exposed humans and animals
- Primary exposure pathways for people: diet, drinking water, dust, air

Potential Sources of PFAS (in drinking water)

- Aqueous film-forming foams (AFFF): fire training centers, military sites, petroleum fire sites, AFFF spill sites, airports
- Industrial sites, waste water treatment plants, oil refineries, land fills, railroad depots
How can PFAS affect my health?

- PFAS exposure has been linked to increased cholesterol, obesity, immune suppression, endocrine disruption and cancer.
- PFAS may affect the developing fetus and child including possible changes in growth, learning, and behavior.
- The EPA lifetime health advisory for PFOA and PFOS is 70 parts per trillion in drinking water.
PFAS in WA (UCMR3)

- 131 Group A Public Water Systems in WA were tested
- 4 public water systems exceeded laboratory reporting limits
- Issaquah water system exceeded the EPA health advisory
Additional Investigations...

Whidbey Island drinking-water wells polluted with firefighting chemicals near Navy airstrips

Whidbey drinking water
Eight Whidbey Island wells serving private homes tested above the EPA lifetime health advisory levels for perfluoroalkyl and/or polyfluroalkyl chemicals. These man-made compounds were present in firefighting foams used by Navy airfield crews.
OBJECTIVE: Use the location of potential PFAS point sources to identify drinking water sources in WA that are at an increased risk of PFAS contamination in an effort to prioritize water testing and treatment.
Which public drinking water sources should be prioritized for testing?

- We calculated the number of group A sources within a 1 mile buffer of a primary point source.
- We calculated the percentage of group A sources within the 1 mile buffer that were tested for PFAS as part of UCMR3.

Water sources surrounding potential point sources that have not been tested need to be prioritized.
Challenges and Limitations

• AFFF use was previously widespread, but not thoroughly documented.

• There is not a comprehensive list of fire training facilities for Washington State.

• There has been limited water testing in Washington, which makes it difficult to evaluate significant relationships between point sources and PFAS contamination.

• We do not have specific locations of water testing results outside of the UCMR3 dataset.
Findings

• Potential PFAS point sources were distributed across Washington

• Spatial analysis identified many small and medium-sized public water systems, that have not been tested, in close proximity to potential point sources

• Spatial analysis can be a useful tool for prioritizing testing of drinking water systems

• Additional water testing results would provide an opportunity for more sophisticated statistical analyses of risk factors for PFAS in drinking water
Questions or Comments?

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# PFOA, PFOS Results

<table>
<thead>
<tr>
<th>Water System</th>
<th>PFOA or PFOS Range (µg/L)*</th>
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<tbody>
<tr>
<td>Issaquah Water System</td>
<td>ND-0.600</td>
</tr>
<tr>
<td>City of Dupont Water System</td>
<td>ND-0.030</td>
</tr>
<tr>
<td>Fort Lewis Water- Main Base</td>
<td>ND-0.087</td>
</tr>
<tr>
<td>McCord Field</td>
<td>ND-0.022</td>
</tr>
<tr>
<td>Private wells, near AULT Field &amp; OLF, Whidbey Island</td>
<td>ND-2.516</td>
</tr>
<tr>
<td>Coupeville Water System</td>
<td>ND-0.060</td>
</tr>
</tbody>
</table>

*Results of either PFOA or PFOS in individual wells in the water system. Ranges do not necessarily reflect concentration in delivered water.