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Welcome to 2018 Salt Summit!

Impacts of Road Salt to WSSC Water Quality, Operations, and Infrastructure

Jin Shin
Water Quality Division Manager, WSSC

2018 WSSC Salt Summit

Outline

- Purpose of the Summit
- WSSC introduction
  - WSSC Water Sources
- Impacts on Source Water Quality
- Impacts on treatment and corrosion
- Impacts on drinking water quality
  - Health Impacts
  - 2015 Discolored Water Event

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Whatever whenever wherever has happened is written on the water of Babel.

"Water" by Wislawa Szymborska

Purpose of the Summit

- Sharing observations and perspectives
  - WSSC's observations
  - SHA Salt Management Plan overview and updates
  - County DOTs salt management and perspectives
  - MDE regulatory activities on related issues
- Identify gaps, and find ways to fill them
- Discuss next steps for continued future collaboration
- Potomac and Patuxent: Two waters, two strategies, and one goal

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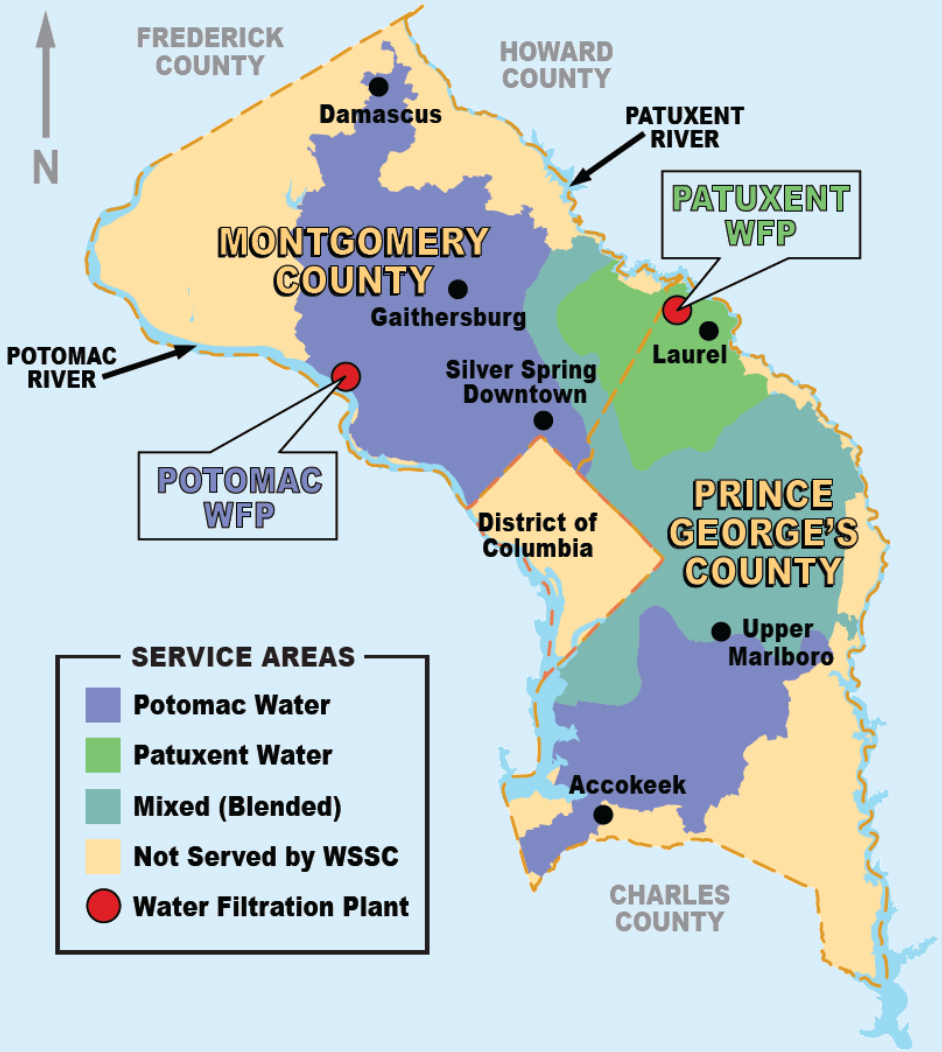
WSSC Drinking Water Sources

- WSSC is a water and water resources recovery utility serving 1.8 million customers in Montgomery and Prince George's Counties
- Operates 5,600 miles of water mains and 5,800 miles of sewer mains
- Potomac serves ~ 70% of the demand
- Patuxent serves ~30% of the demand



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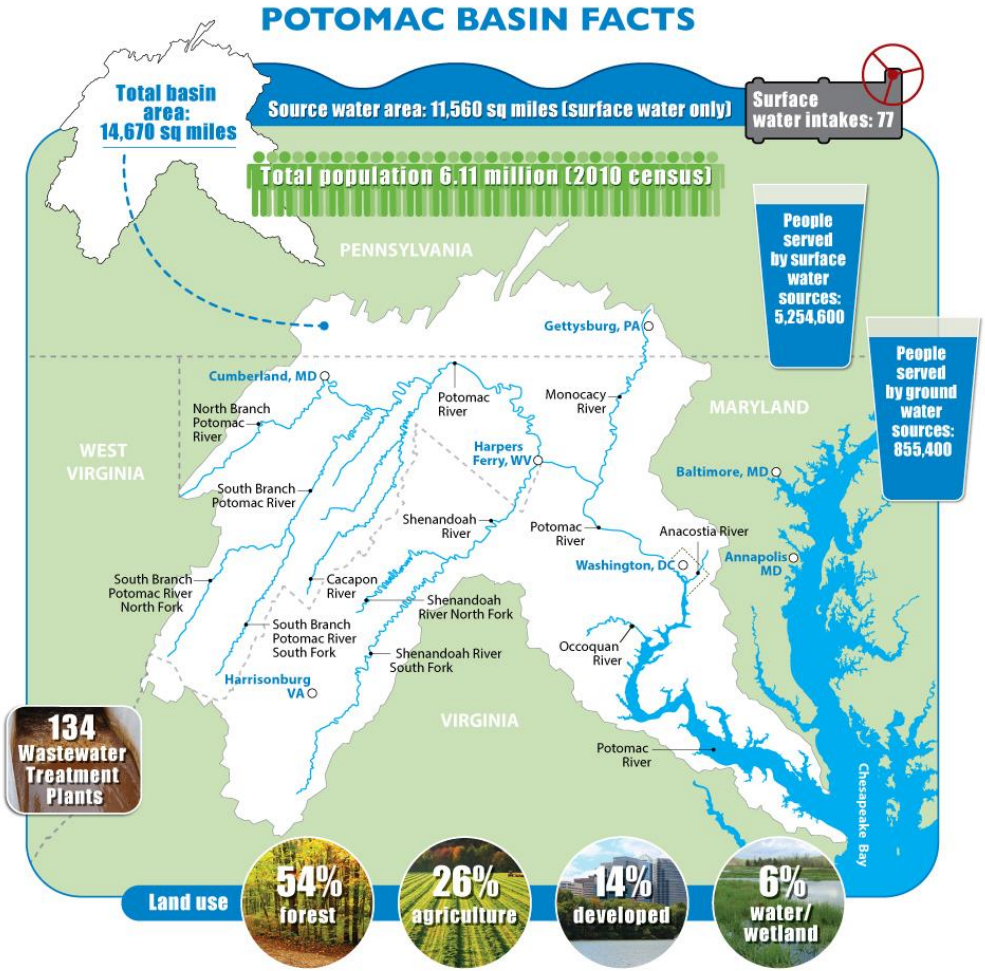
Potomac Watershed

- 14,670 square miles drainage area in 4 states
- 486 MGD withdrawn for water supply serving ~6.1M people
- 14% of watershed developed
- Many challenges – increasing demand, emerging contaminants, spill threats

Source: ICPRB



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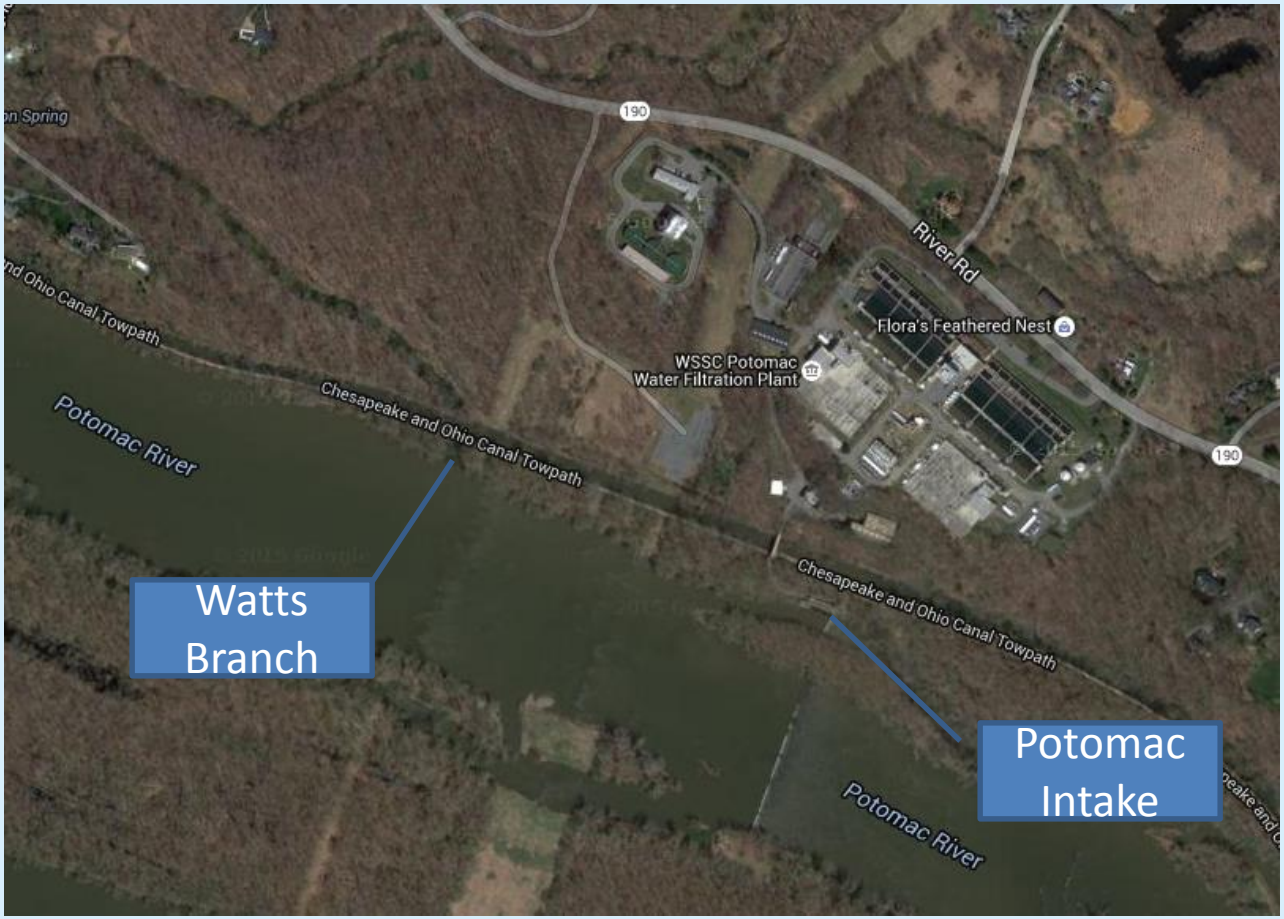
Proximity to Watts Branch



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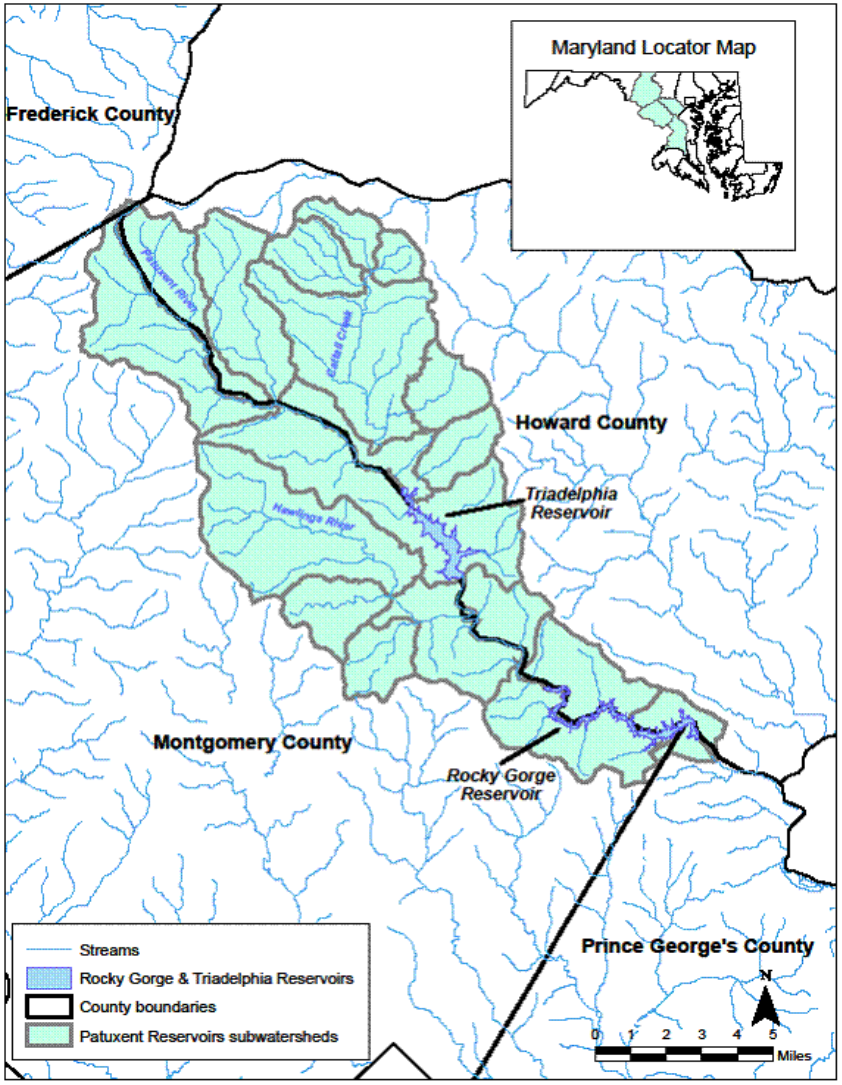
Patuxent Watershed

- 132 sq. miles watershed in MD Piedmont to Rocky Gorge
  - About 77 sq. mile (59%) drains to Triadelphia Res.
  - Major Subwatersheds
    - Cattail (HC to Triadelphia)
    - Hawlings (MC to Rocky)
    - Mainstem (both to Triadelphia)
- 99% watershed in Howard & Montgomery Counties



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Water Quality Changes

- Elevated chloride and sodium levels in source and tap water
  - Salt cannot be removed by conventional water treatment
- Elevated salt in groundwater promotes erosion of organic and inorganic material from soil, enter water system via snowmelt
  - Discolored water due to manganese
  - High chlorine demand due to organics
- Corrosion of water supply infrastructure
  - Iron rust from pipes, causes water discoloration
  - Potential lead corrosion (e.g., Flint)
- Can stimulate algal growth, thereby stimulate algal toxin release and taste/odor complaints

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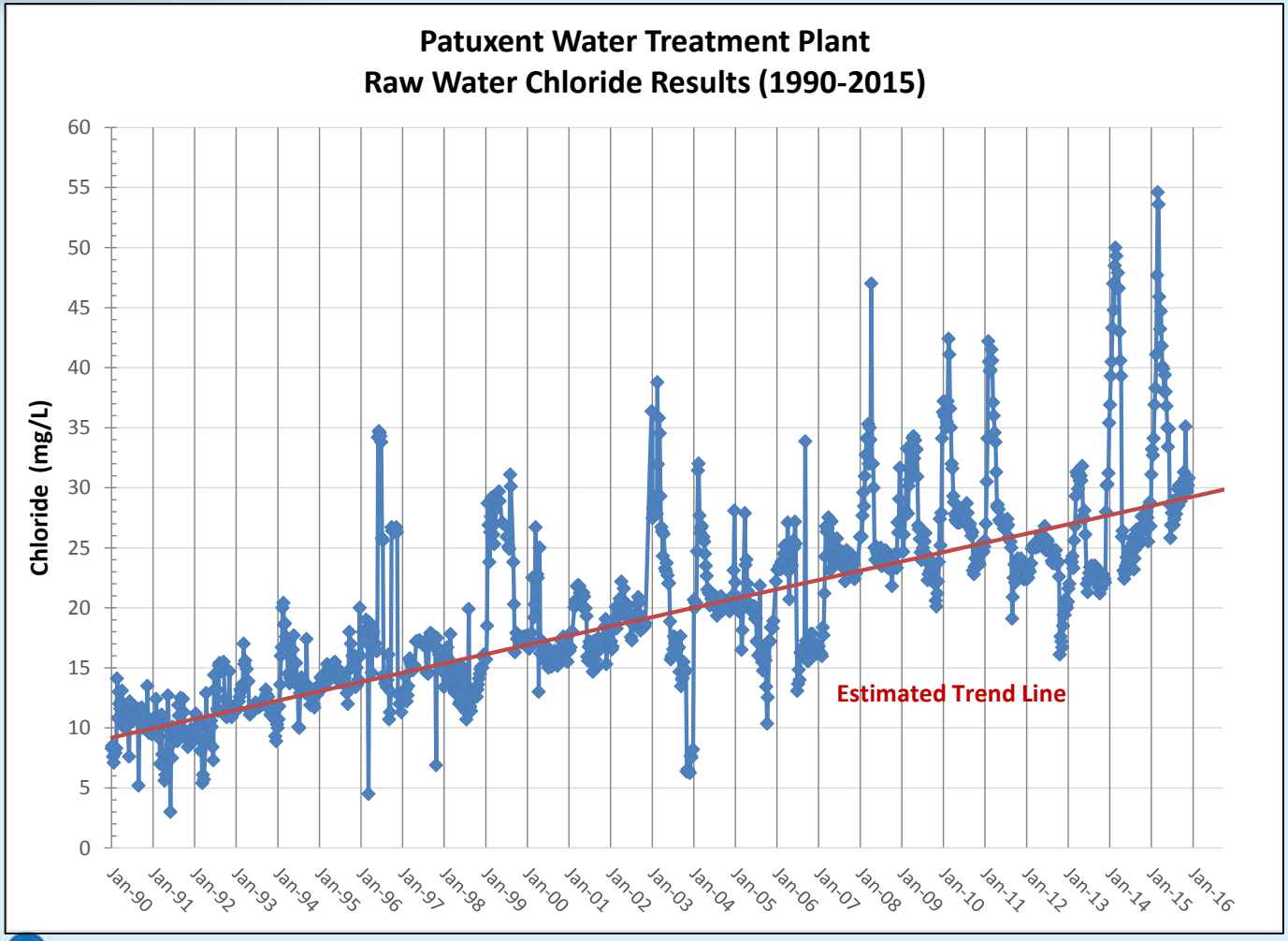
Chloride Trend – Patuxent Plant



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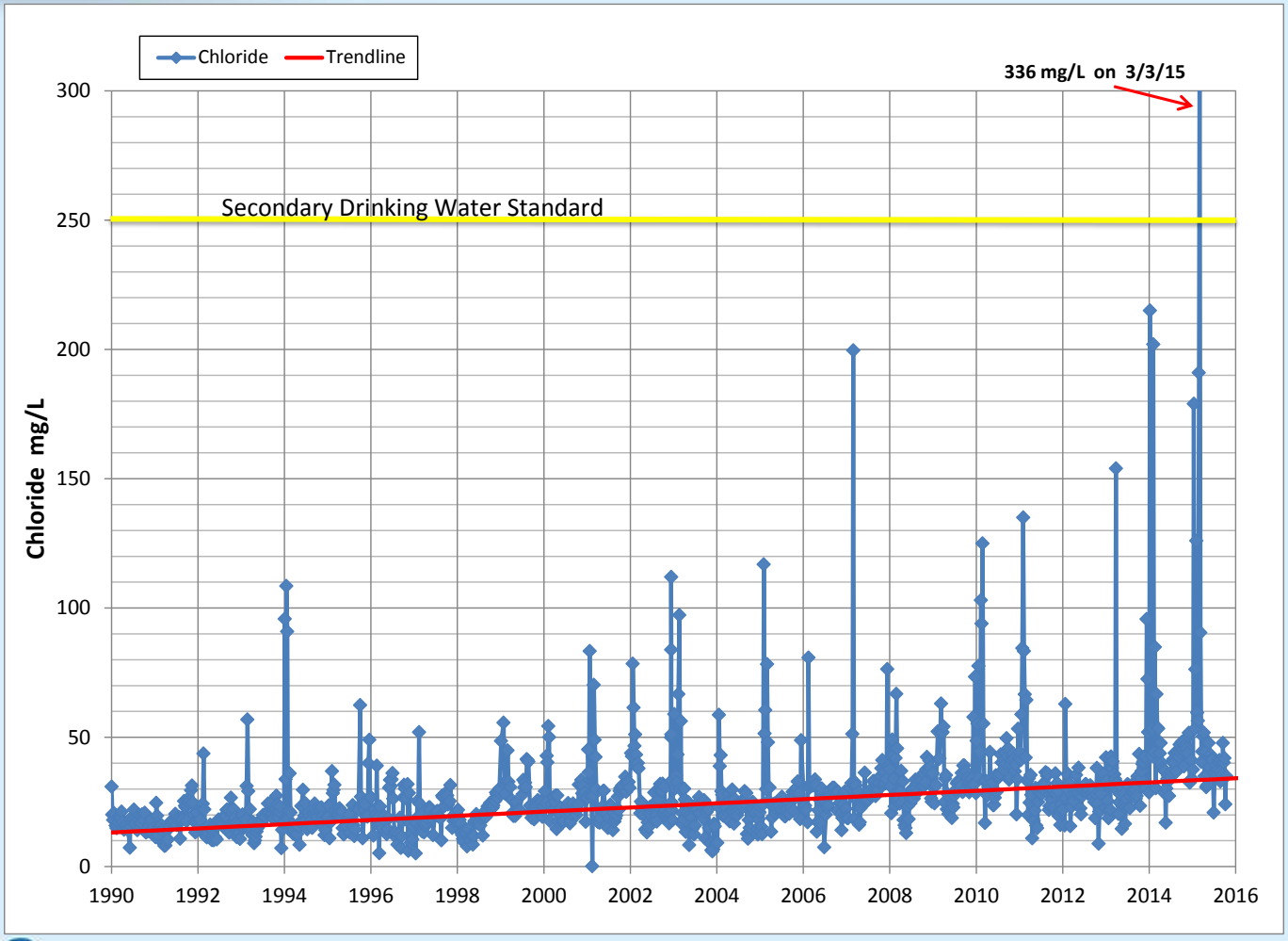
Chloride Trend – Potomac Plant



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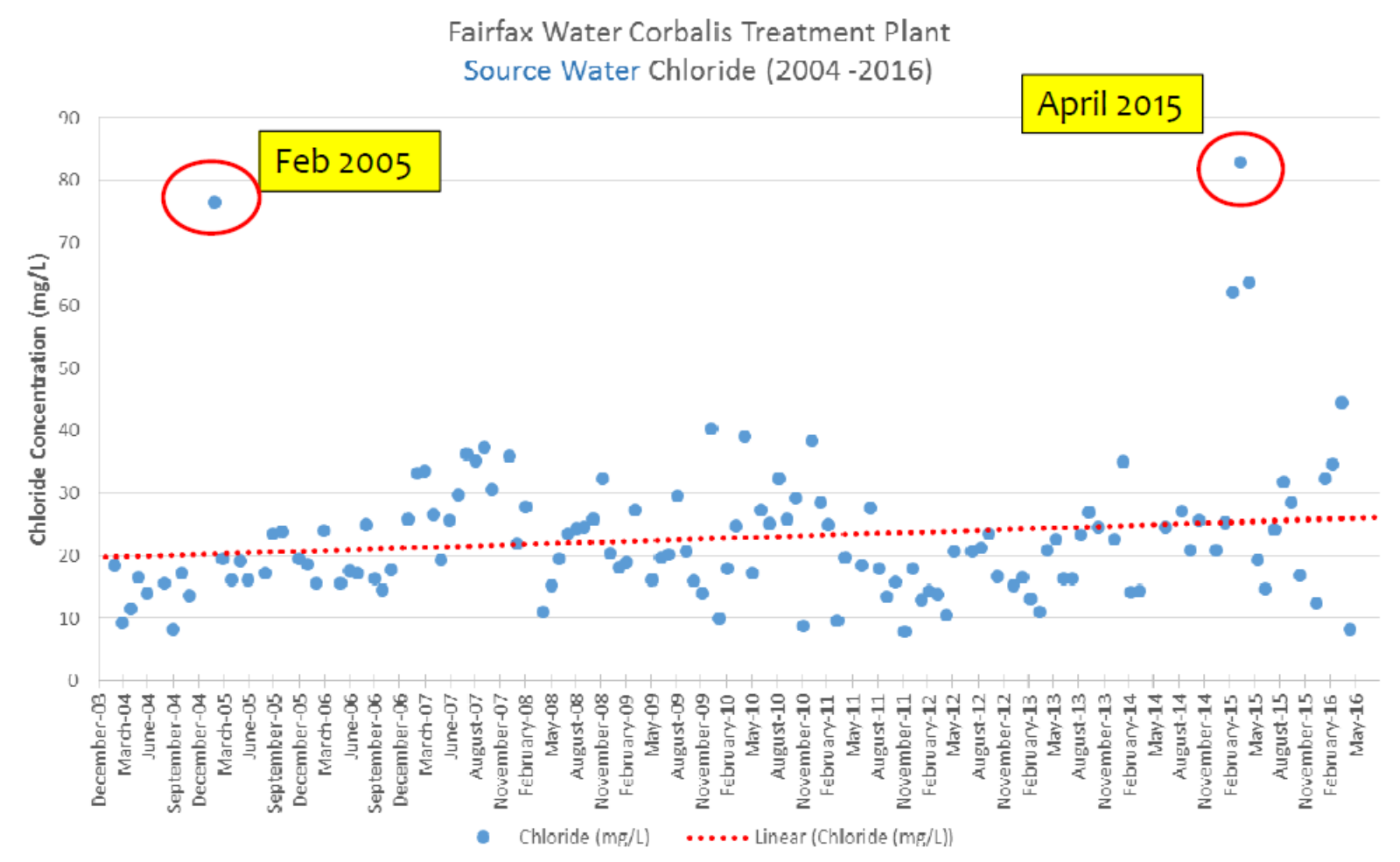
Chloride – Fairfax Corbalis Plant



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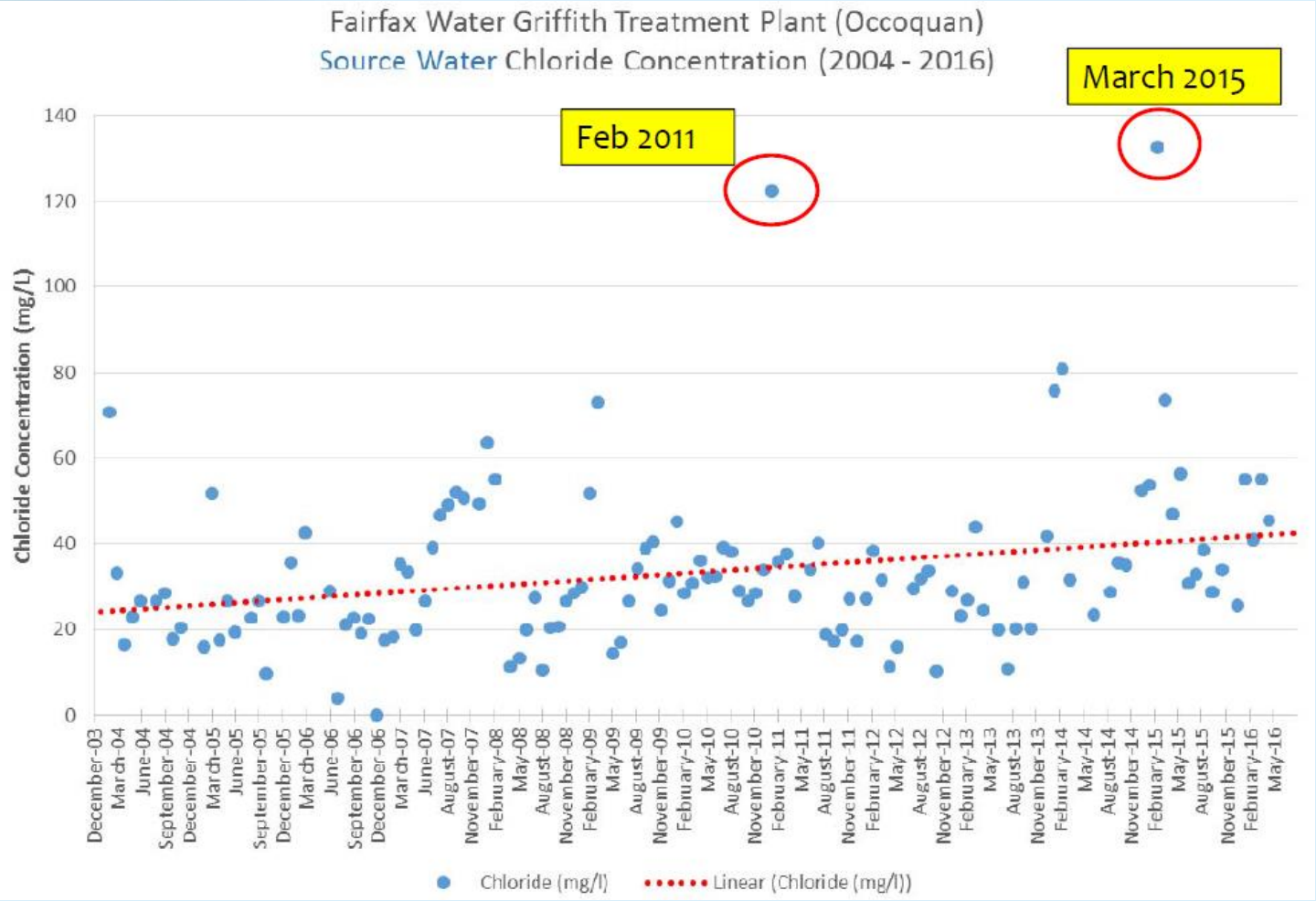
Source: Fairfax Water

Chloride – Fairfax Griffith Plant



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Source: Fairfax Water

Impacts on Corrosion

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Health Impacts

- Chloride adds salty taste to the water
  - EPA Secondary MCL at 250 mg/L for aesthetic recommendation
- Sodium can cause high blood pressure, kidney and liver diseases
  - EPA Health Advisory at 20 mg/L for individuals with salt restricted diet
- Iron: EPA Secondary MCL at 0.3 mg/L
- Manganese
  - EPA Secondary MCL at 0.05 mg/L
  - EPA lifetime health advisory at 0.3 mg/L; 10-day HA at 1 mg/L
- Lead
  - Elevated chloride level in treated water can potentially aggravate lead corrosion. E.g., Flint lead crisis

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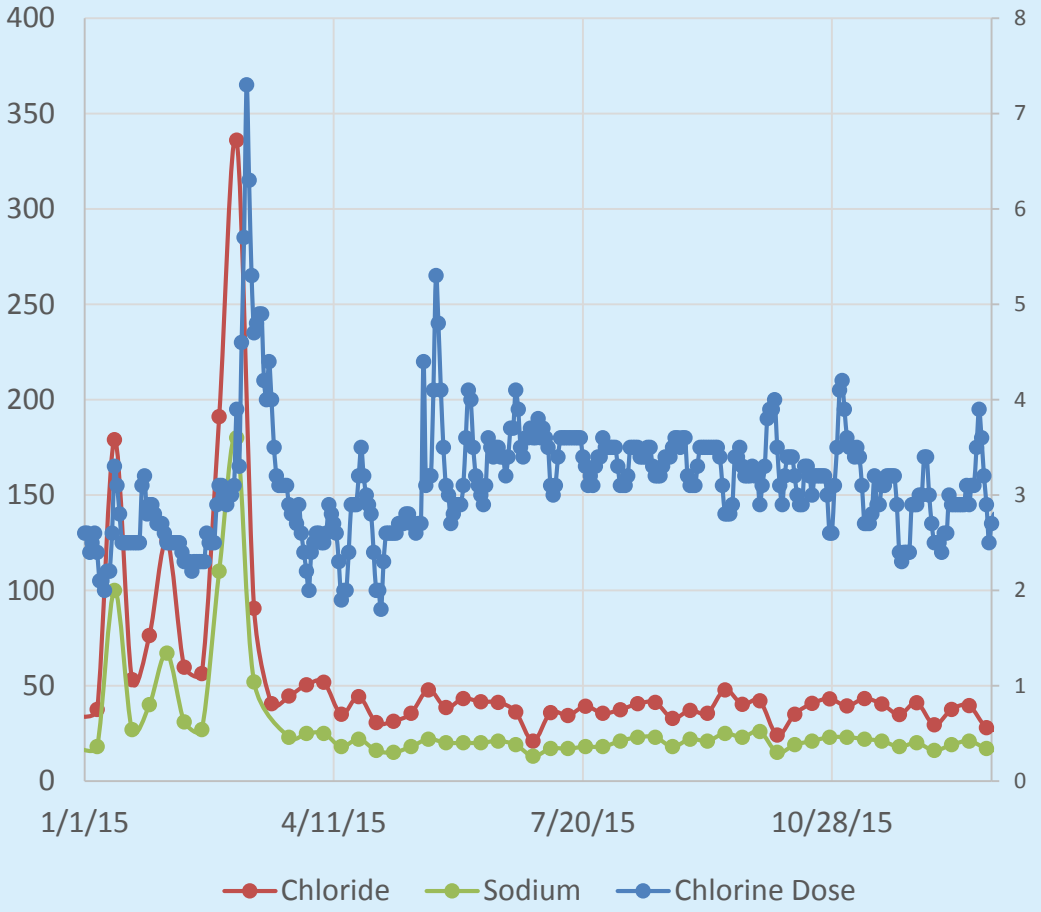
Impacts on Water Treatment

- High chloride mobilizes organic matter (DOC and DON) from soil
- Increases chlorine demand
- Taste and odor complaints
- Increases disinfection byproduct (DBP) formation



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2015 Discolored Water

- WSSC experienced 5,300+ discolored water complaints in 2015
- Record high chloride (~330 mg/L) in source water
- Chloride aggravated release of iron rust from corroding iron pipes
- High levels of manganese from Potomac
- Legacy manganese caused sustained discolored water rest of the year

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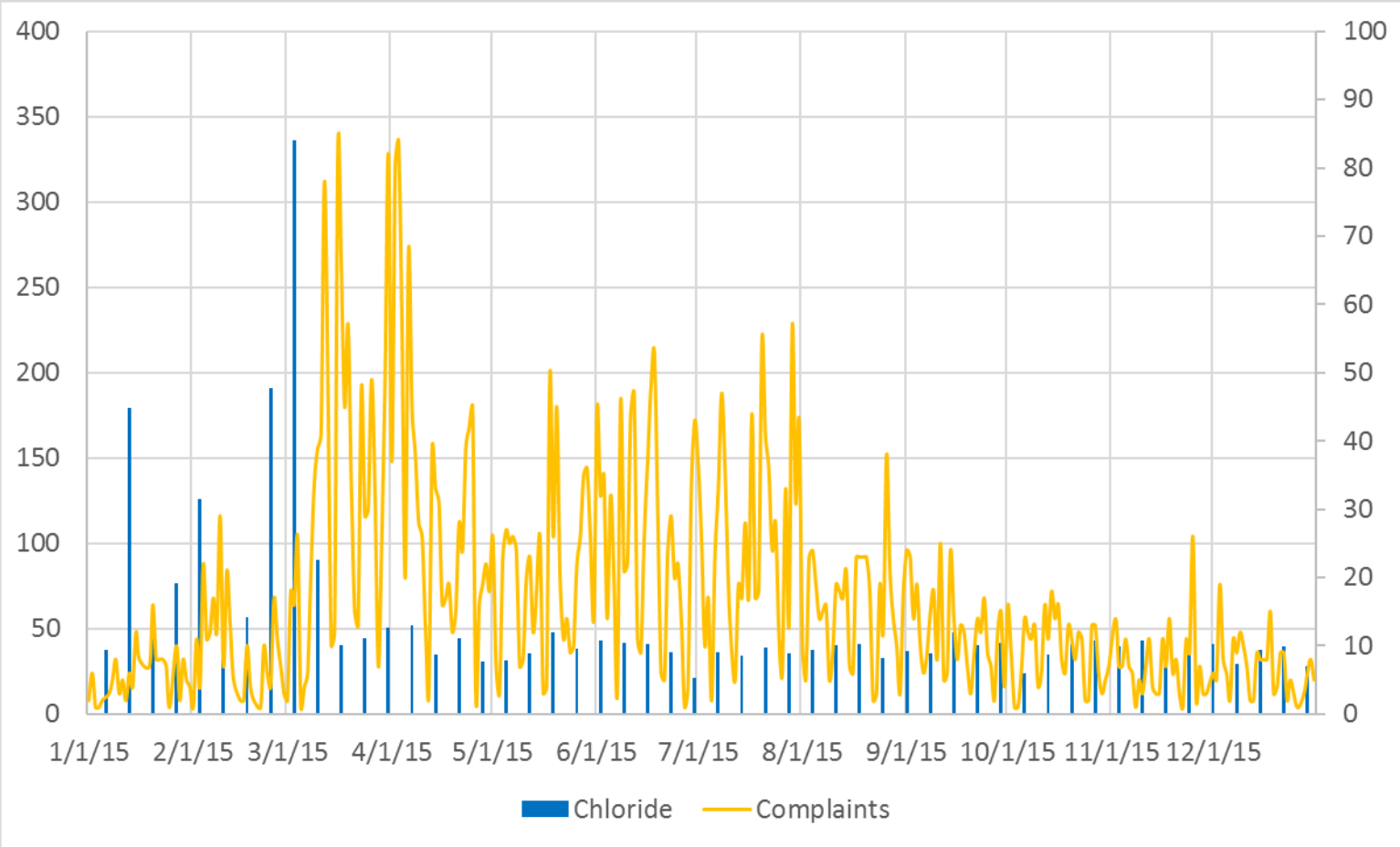
2015 Discolored Water



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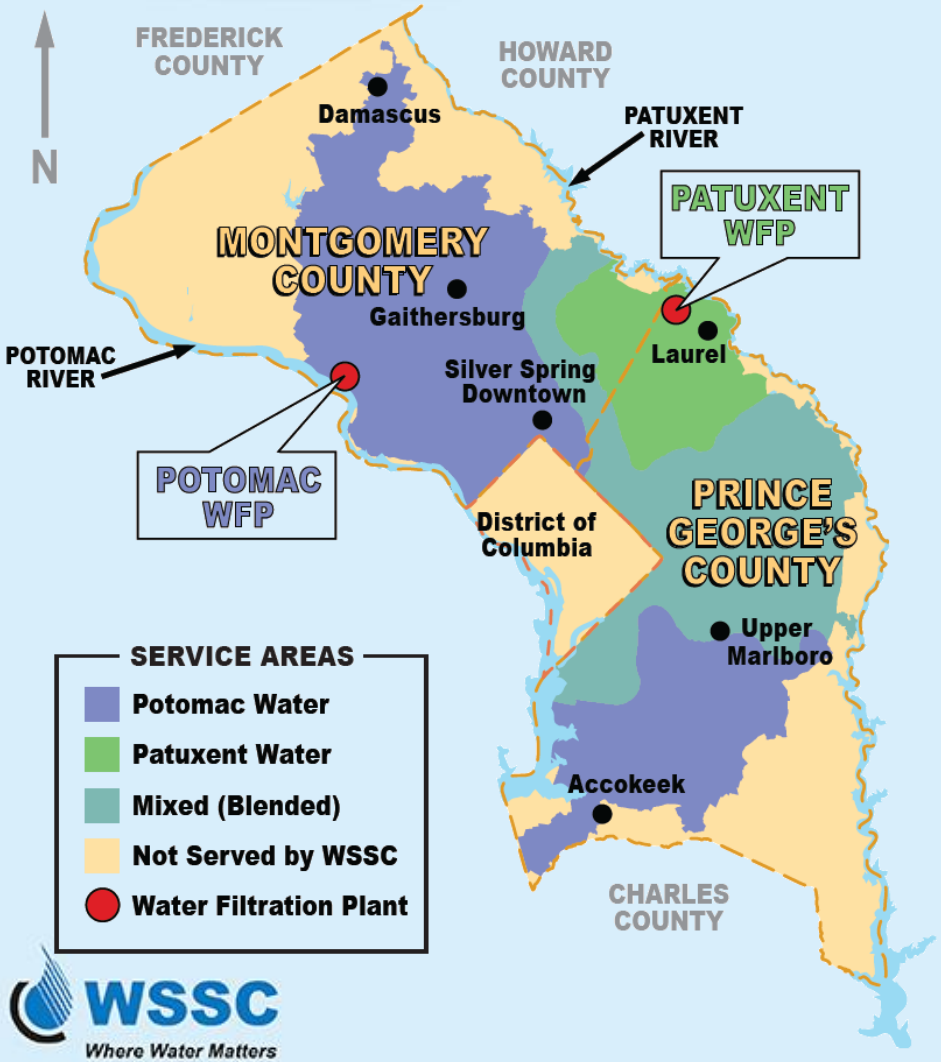
Where It Occurred



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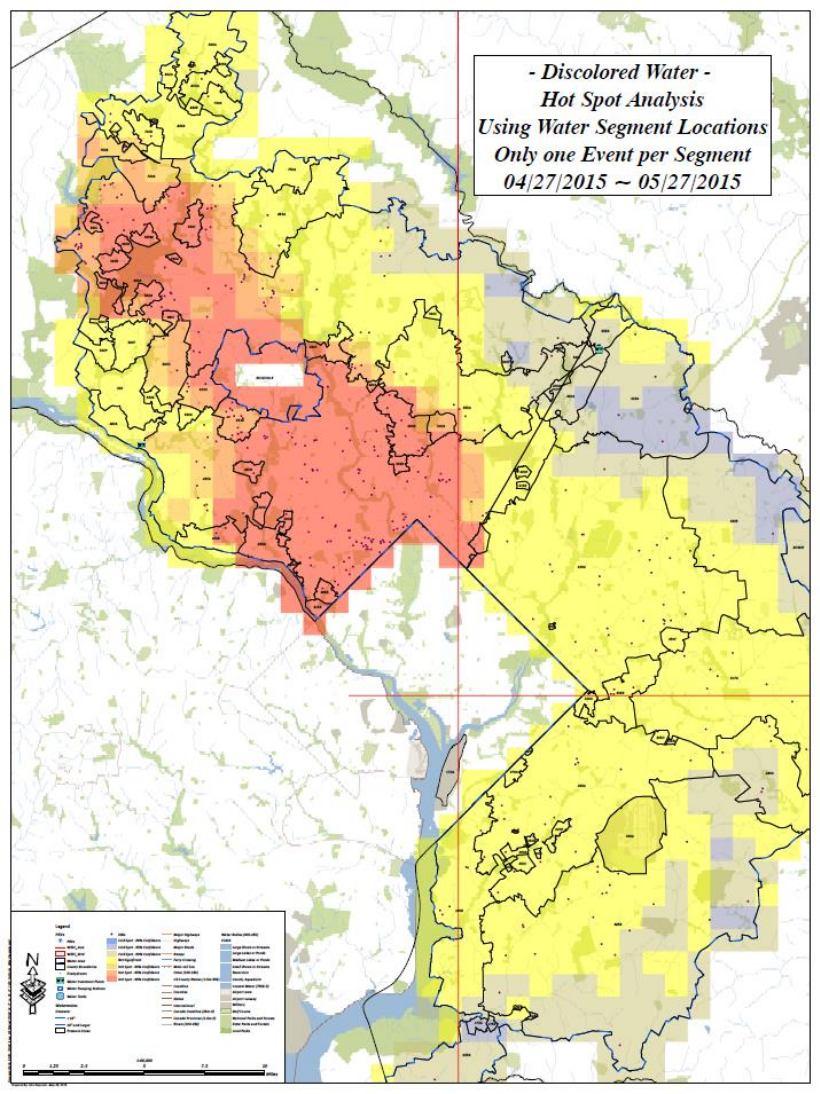

What Happened After?

- Same seasonal chloride peaks, but not 336 mg/L
- Changed the way we treat the water
  - Additional processes and enhanced monitoring for manganese
- Flushing, flushing, and flushing
- Developing BMPs
  - Mitigate impacts of chemical changes to cause discolored water

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Where Do We Go from Here?

- Road salt application has undisputable benefits
  - Saves lives
  - So does drinking water quality
- Making balance
  - Identify gaps – what we do know and what we don't know
  - Best ways to fill the gaps
- Continued collaboration makes difference
- Climate is changing, be proactive.

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I'm Dreaming of a White Christmas…

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Questions?