MANGANESE LANDSCAPE IN WASHINGTON

OCCURRENCE, CHALLENGES, AND REGULATORY PERSPECTIVE

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Manganese Landscape in Washington
Occurrence, Challenges, and Regulatory Perspective

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Topics to be covered

- Standards and regulation of manganese
- Manganese in Washington
- Treatment plants
- Challenges and caveats
- What's next?

Standards for Manganese in Washington

- Secondary MCL, based on aesthetic concerns – 0.05 mg/L
- Health Advisory Levels
  - 0.3 mg/L lifetime and 10-day exposure for infants under 6 months
  - 1.0 mg/L acute 1-day exposure

Regulatory Requirements

- Washington
  - WAC 246-290-130, WAC 246-290-300, and WAC 246-290-310
  - Tied to source approval for new wells or if majority of customers are willing to pay for treatment
- Oregon
  - No specific requirements for treatment
  - OAR 333-061-0030(6) - Table 6 (incorporates secondary standard)
- Idaho
  - No specific requirements for treatment
  - Design Standards – IDAPA 58.01.08.535

Washington Administrative Code (WAC)

- WAC 246-290-300 (table 4)
  - Group A public water systems are required to monitor for Mn after treatment, prior to the distribution system
  - However, there are data issues (more on this later)

Washington Administrative Code (WAC)

- WAC 246-290-310 (3) Source Approval
  - For a new source, if it does not meet the water quality standards it may be approved if treatment is provided
  - However, the water quality follow-up section requires treatment for new community and new non-transient noncommunity (NTNC) water systems only if the system is without active consumers
  - All other existing systems may take follow-up action based on the “degree of consumer acceptance of the water quality and their willingness to bear the costs of meeting the secondary standard”

Washington Administrative Code (WAC)

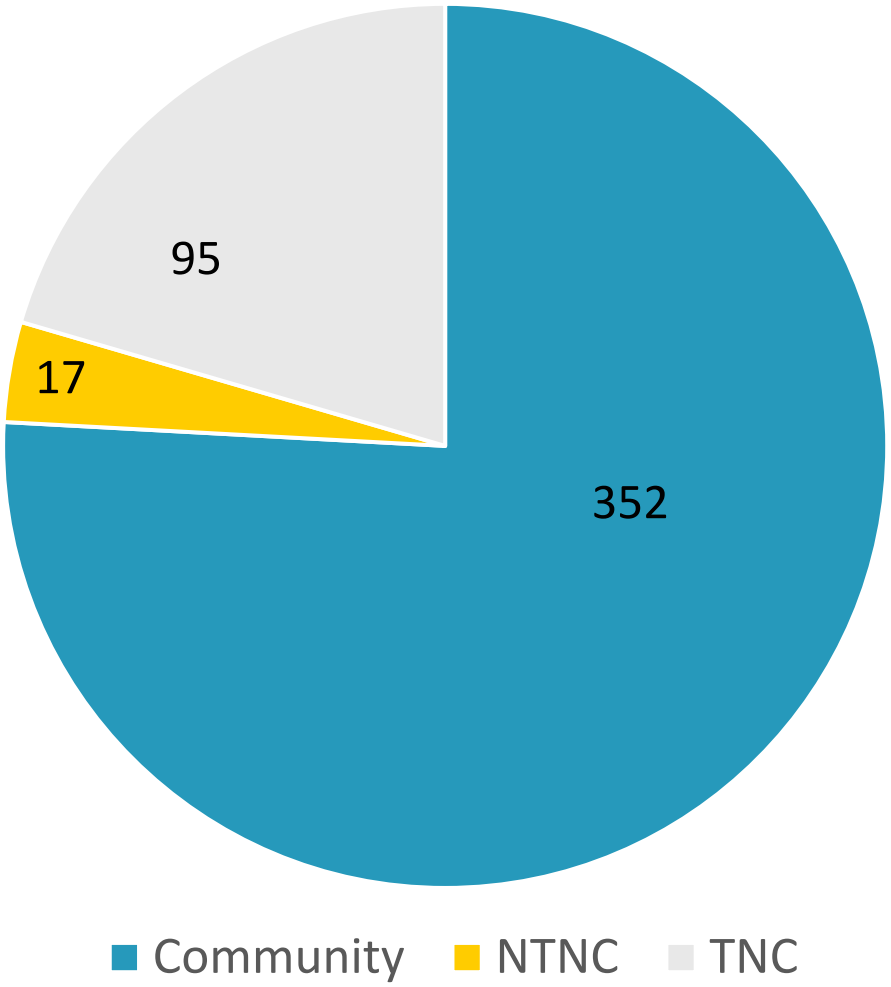
- All other systems may take follow-up action based on the "degree of consumer acceptance of the water quality and their willingness to bear the costs of meeting the secondary standard"
  - Based on customer complaints that we receive
  - The utility is then directed to survey customers to determine if customers want treatment installed **AND** are willing to pay to have it installed
  - Treatment installation would be based on the customer response

Manganese by the Numbers in Washington

- Between 2002-2017
  - 15,290 samples for manganese
  - 2,385 water systems (community, non-transient noncommunity, and transient noncommunity)
  - Range: non-detect to 0.98 mg/L
  - Average of all results 0.032 mg/L

- Between 2019-2021
  - 46 community systems exceeded 0.30 mg/L Health Advisory Level
  - 3 of those over 1.0 mg/L

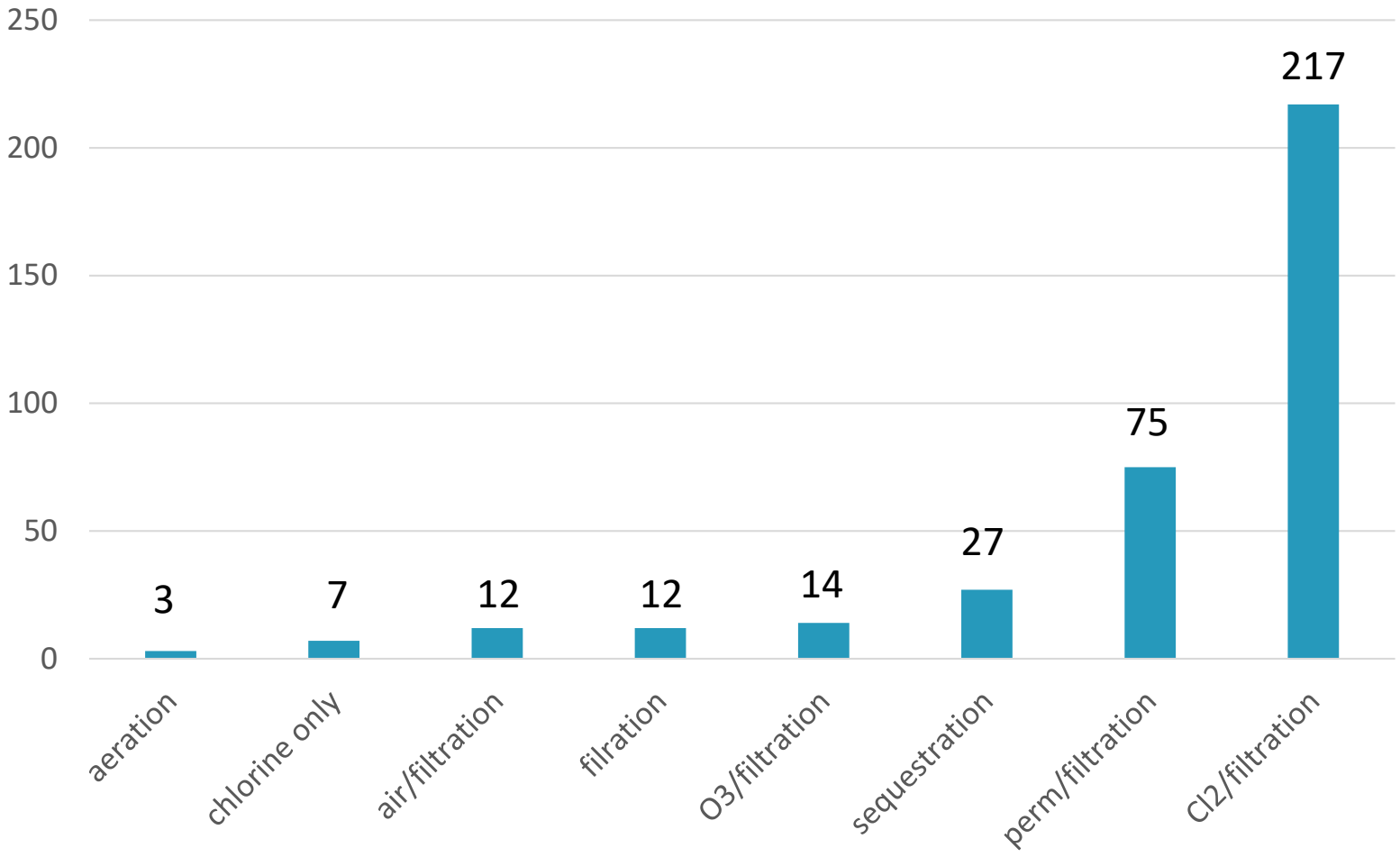
Water Systems with Treatment



Treatment Plants

- Oxidation filtration
  - Oxidants include chlorine, ozone, and potassium permanganate
  - Filtration includes greensand, manganese dioxide, sand media
  - Some plants paired with arsenic removal
- Ion exchange
- Oxidation/in-tank settling
- Sequestration
  - Recommend limit for combined Fe/Mn level not to exceed 0.5 mg/L
  - Combined Fe/Mn level >1.0 mg/L (with Mn >0.1 mg/l) we will not approve

Types of Treatment



Pilot testing and Design

- Pilot testing is recommended
  - Some smaller utilities may decide to run a full-scale pilot test
  - At their own risk
  - Rationale and justification should be discussed with DOH before moving forward
- Raw water parameters should be well understood
  - Hardness, alkalinity, pH, temperature, TOC

Process Control and Monitoring/Reporting

- Process Control
  - Important to ensure that treatment always functions safely and reliably, even when unattended
  - Project report must address process control measures
- Monitoring/Reporting
  - Water system should monitor all treatment processes
  - The means, methods, and frequency for monitoring water quality and physical parameters must be clearly identified for each treatment process in the project report
  - While there is no specific reporting requirement for manganese treatment, this can be integrated with monitoring/reporting for other processes (such as chlorination)

Data Caveats

- Treatment plants are not separated out for iron and manganese and many times both are present
- Samples may not be collected where we think they are
- TNC systems do not have ongoing monitoring requirements for inorganics (including manganese)

Looking Ahead

- Internal look at manganese from a health perspective
- Need to ‘clean up’ data
- Distribution releases
- Potential for inequitable outcomes
- What’s next?

Thank you!

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