NORTH SHORE WATER COMMISSION

Lead and Copper Results

Monitoring Event: January 1 through June 30, 2025

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6/6/2025

Introduction

In accordance with DNR requirements, member utilities conducted corrosion optimization, which the Commission facilitated and implemented from 2023 to 2024. To verify the effectiveness of this optimized treatment, DNR mandated semiannual lead and copper monitoring for each member utility in 2025. All necessary samples for the initial monitoring period (January 1 to June 30) have been collected. I am happy to share that these results show a decrease in lead levels for all member communities since the 2020 monitoring period.

Action Limits and 90th Percentiles

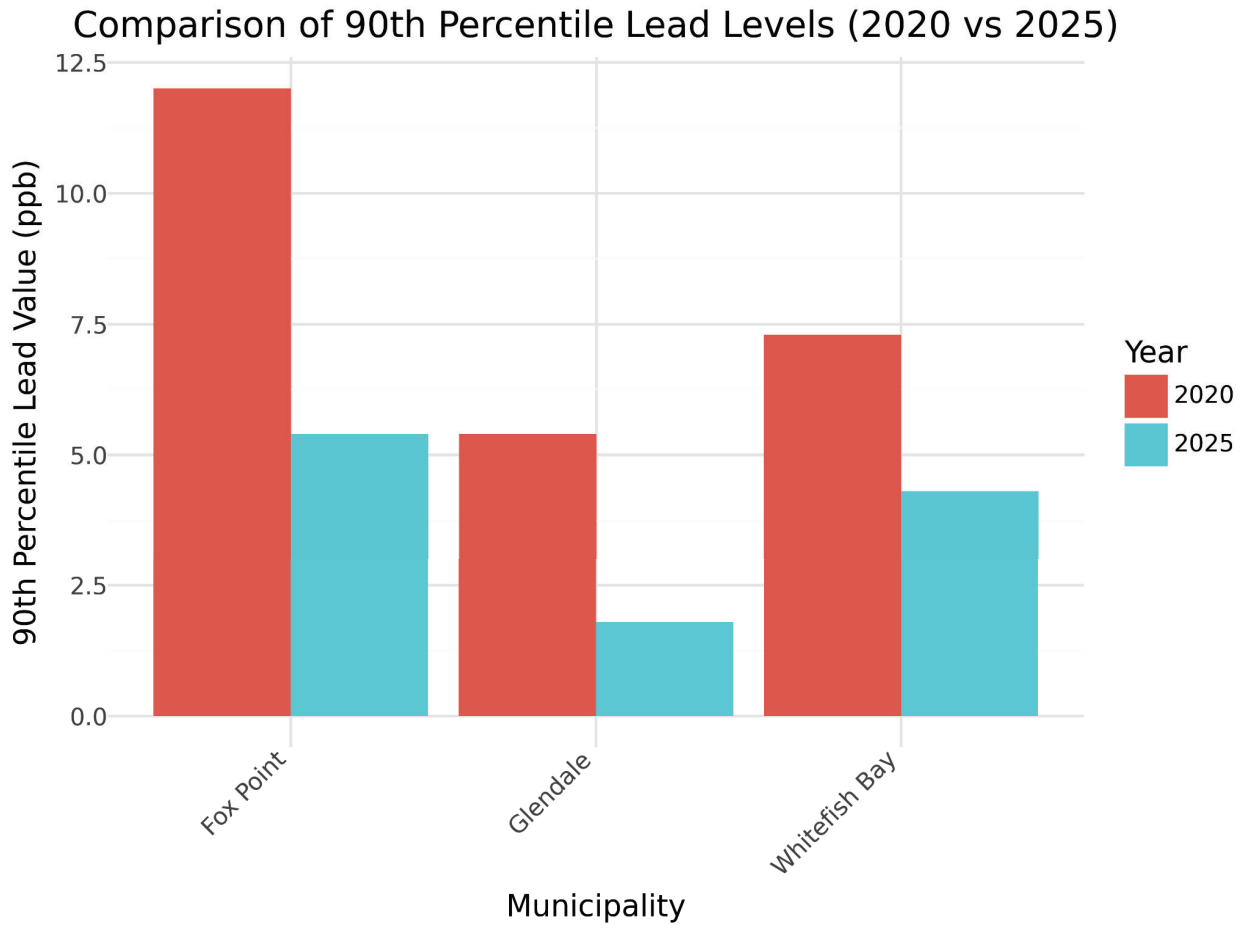
Please note that lead and copper do not have a Maximum Contaminant Level (MCL). Instead, they have an Action Level (AL). To determine compliance with state regulations, all results collected from a monitoring event are arranged lowest to highest and the ***90th percentile value*** is evaluated. If the 90th percentile value is at or below the AL, no additional action is required. This process is applied for each water system.

The AL for copper is 1300 parts per billion (ppb) and the AL for lead is 15 ppb.

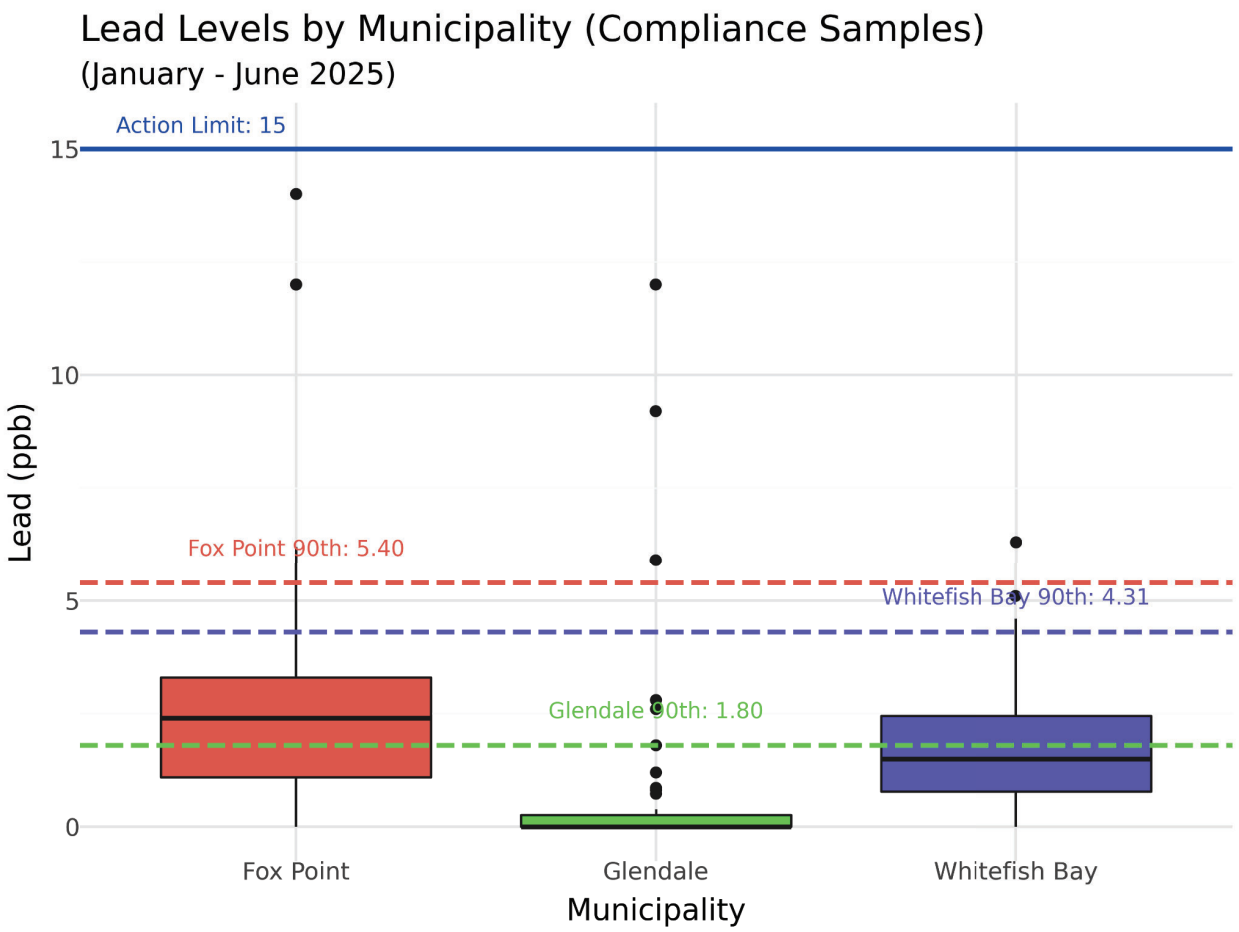
Lead Results

Below is a table which characterizes the levels found during the last monitoring event. Please note that all 90th percentile values for lead are significantly below the 15 ppb AL.

Municipality	Quantity	Min Lead (ppb)	Average Lead (ppb)	Max Lead (ppb)	90th Percentile Lead (ppb)
Fox Point	41	0	3.06	14.0	5.40
Glendale	61	0	0.75	12.0	1.80
Whitefish Bay	64	0	1.87	6.3	4.31

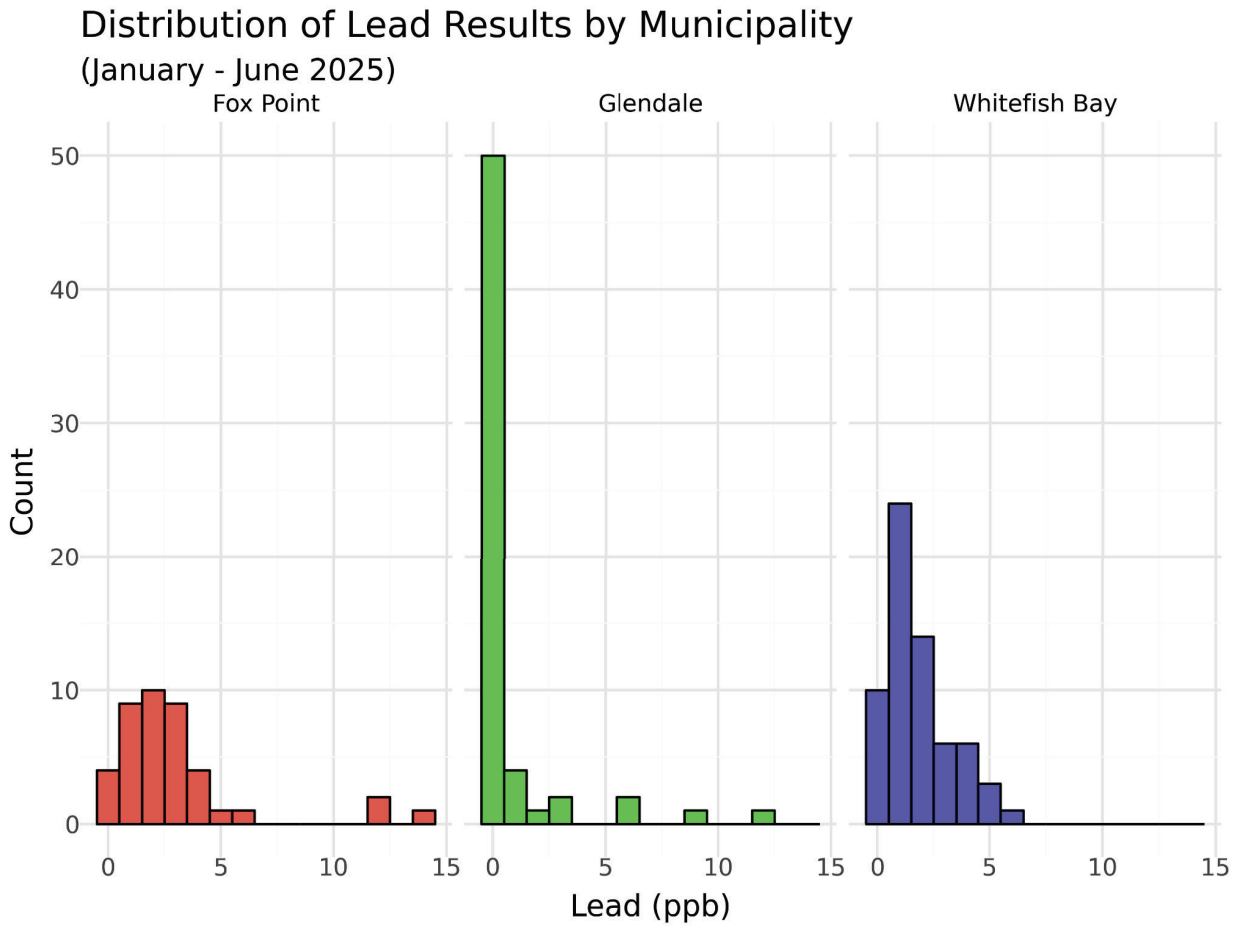


The graph above illustrates the effectiveness of our corrosion optimization. In rough terms, the 90th percentile lead levels were reduced by a factor of 2. Staff is optimistic that the next monitoring event that starts in July and ends in December will find similar results.

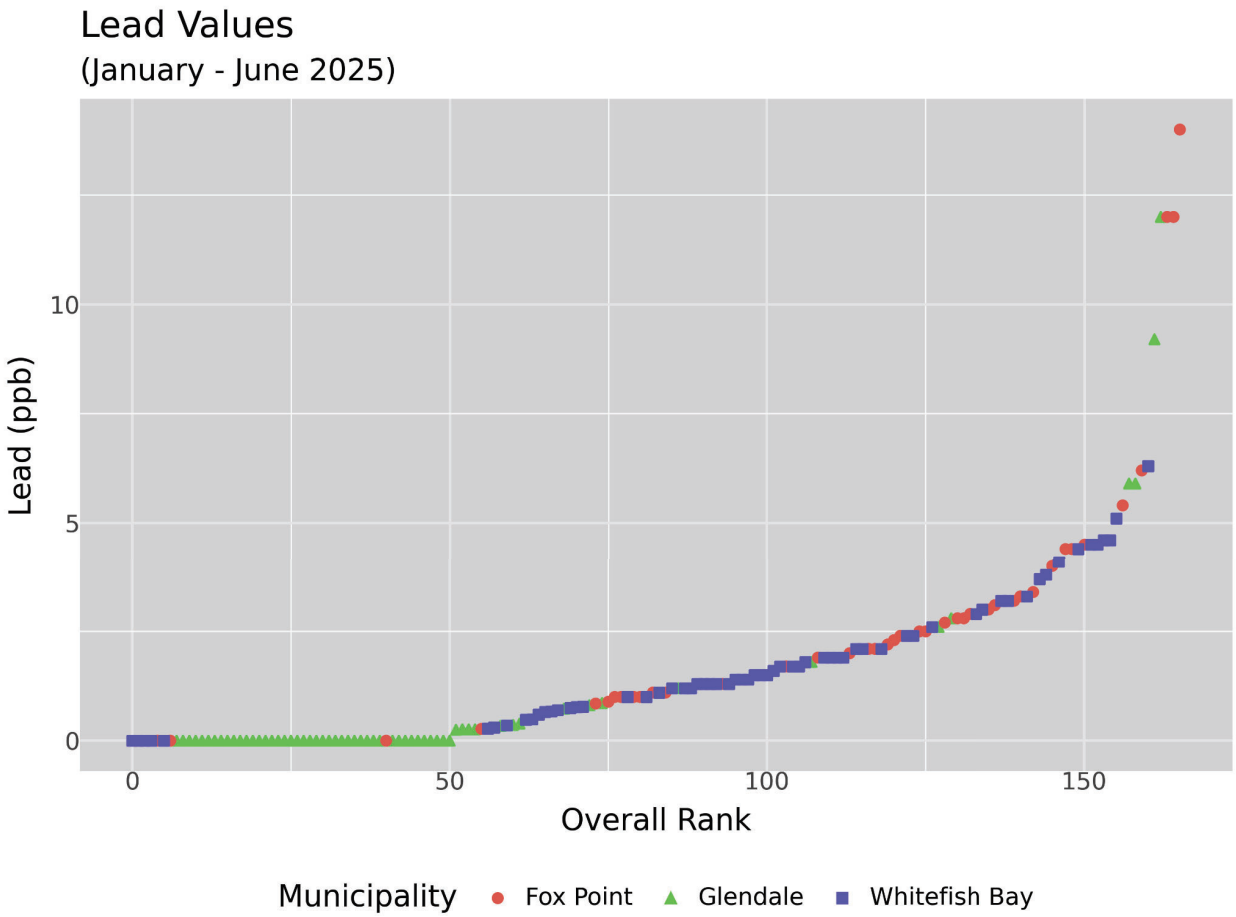


The chart above is a box and whisker plot of the 2025 lead data for each municipality; it helps to show the distribution of lead values. Most of the values are inside the box; the median value is the horizontal line within the box. Outliers are represented by points.

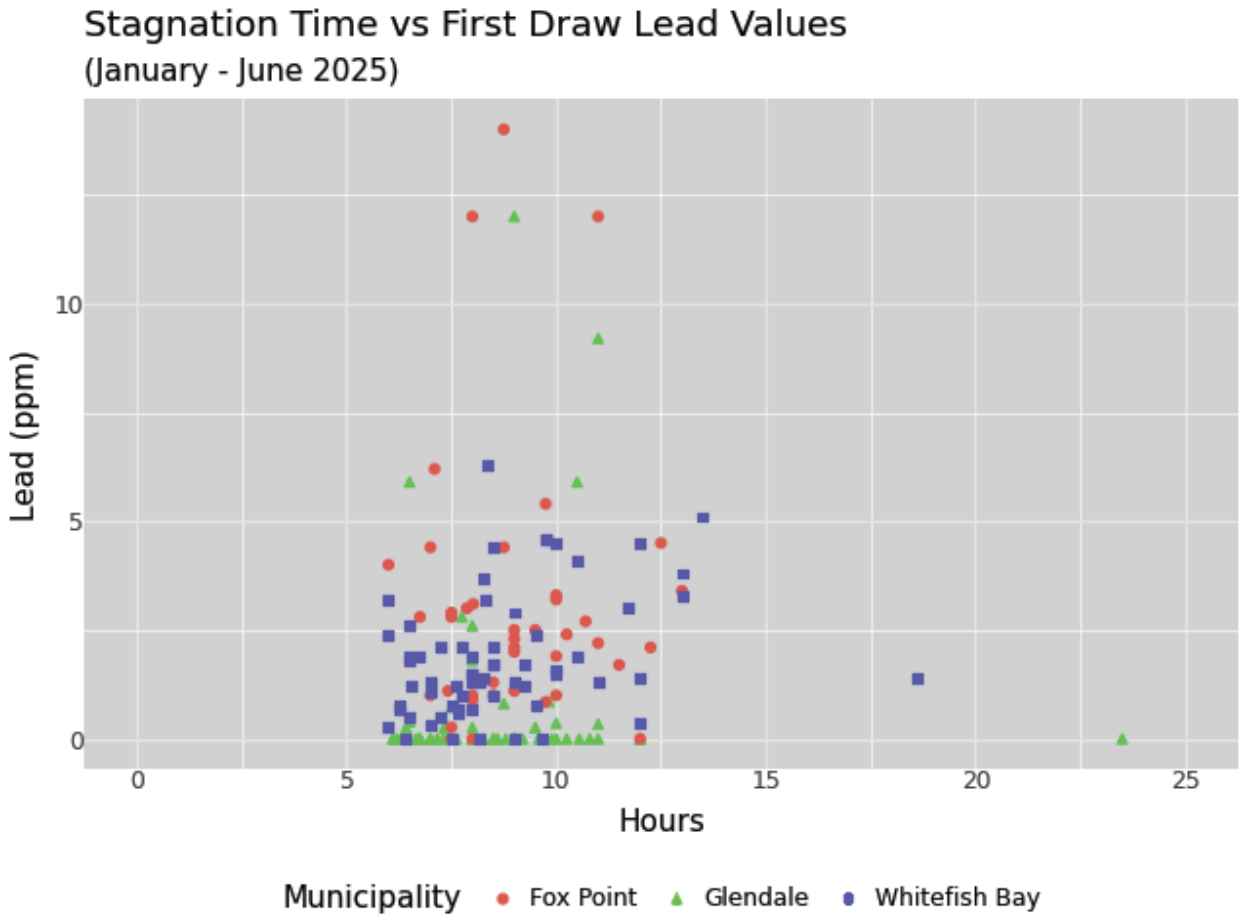
Most lead results are significantly below 10 ppb, which will be the lead action level in the future.



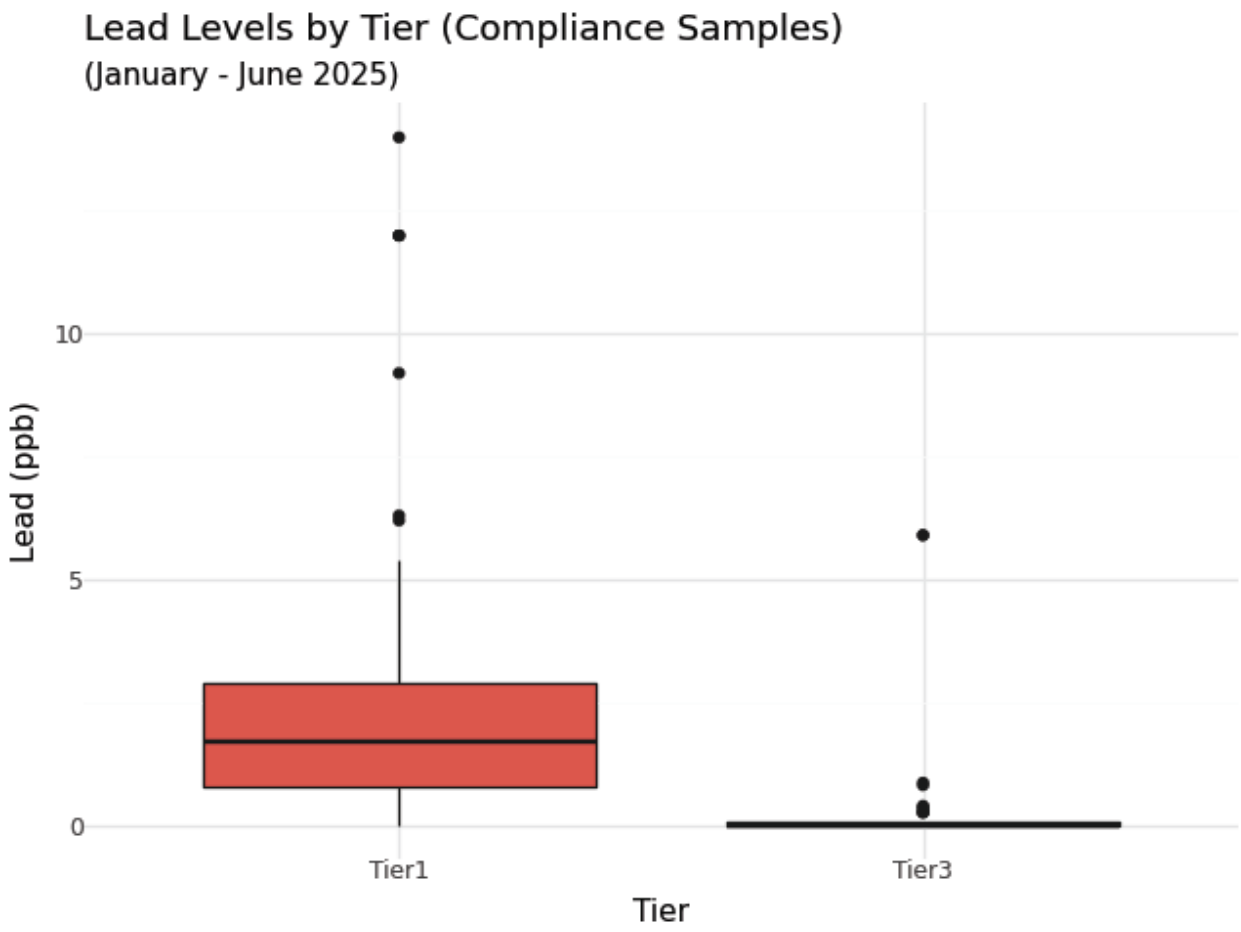
Histograms provide another useful way to analyze the data, displaying the number of samples within specified ranges or bins. The chart above uses 1 ppb wide bins. Notably, Glendale exhibits a distinct result distribution compared to other municipalities. A significant majority of Glendale's samples showed lead levels below 0.25 ppb, which appears as 0 (no detection) on the graph. This is likely due to Glendale's limited number of lead service lines; most samples were collected at Tier 3 sites.



Above is a chart of all the lead values aggregated on a single plot. Please note, the vast majority of samples contained low lead values, with relatively few sites in Glendale and Fox Point skewing the averages up.



Despite our original hypothesis, the data shows very little connection between lead levels and how long water remained stagnant. This was unexpected. We thought samples where water sat for a longer time would have higher lead, but the scatter plot shows that isn't the case.

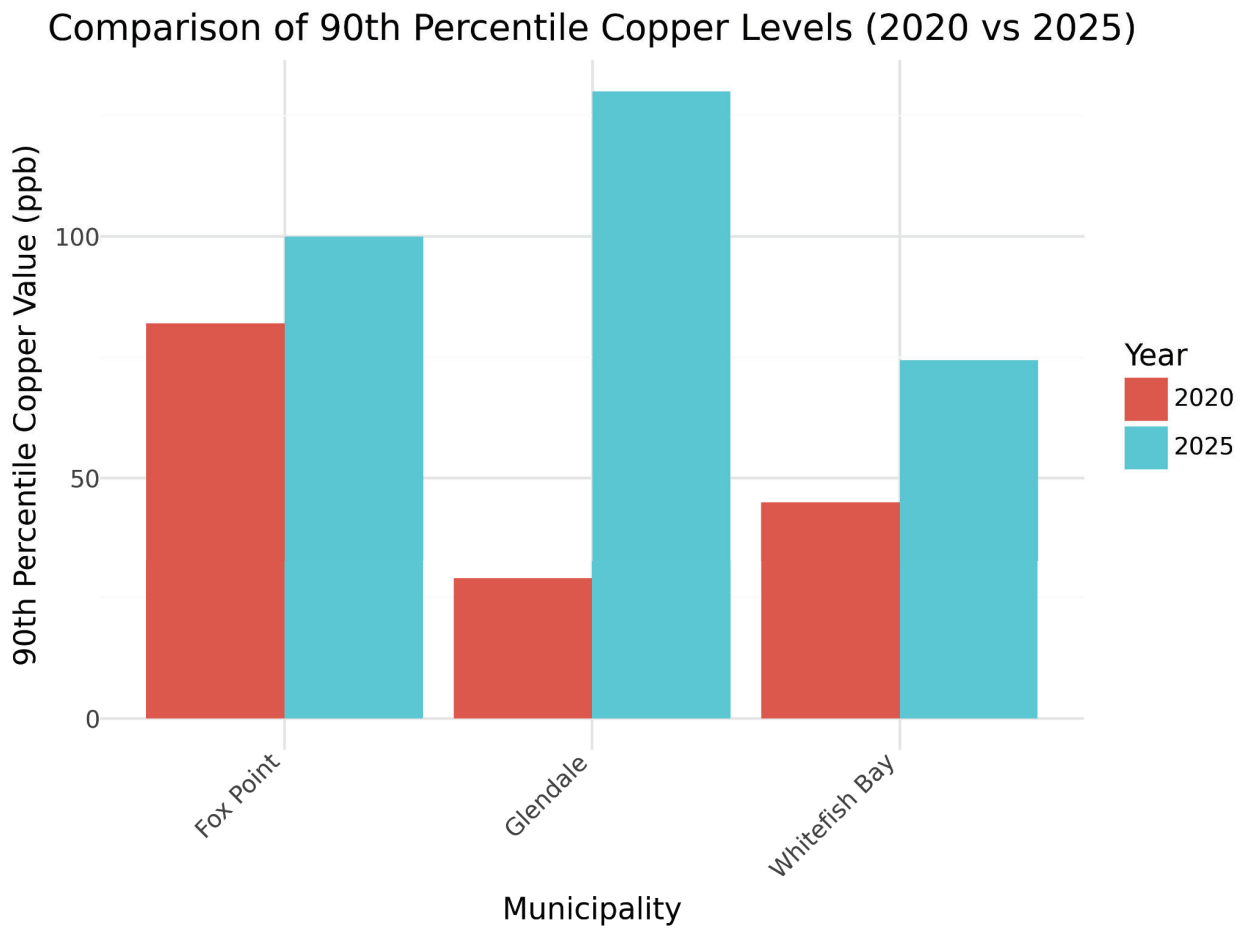


Sites for water quality monitoring are classified into 3 tiers. Tier 1 consists of homes with lead service lines. Tier 3 includes homes with copper plumbing and soldered joints, which may contain lead. As expected, Tier 3 sites demonstrated lower lead levels than Tier 1 sites. This difference arises because increased contact with lead elevates the risk of it dissolving or becoming suspended in the water.

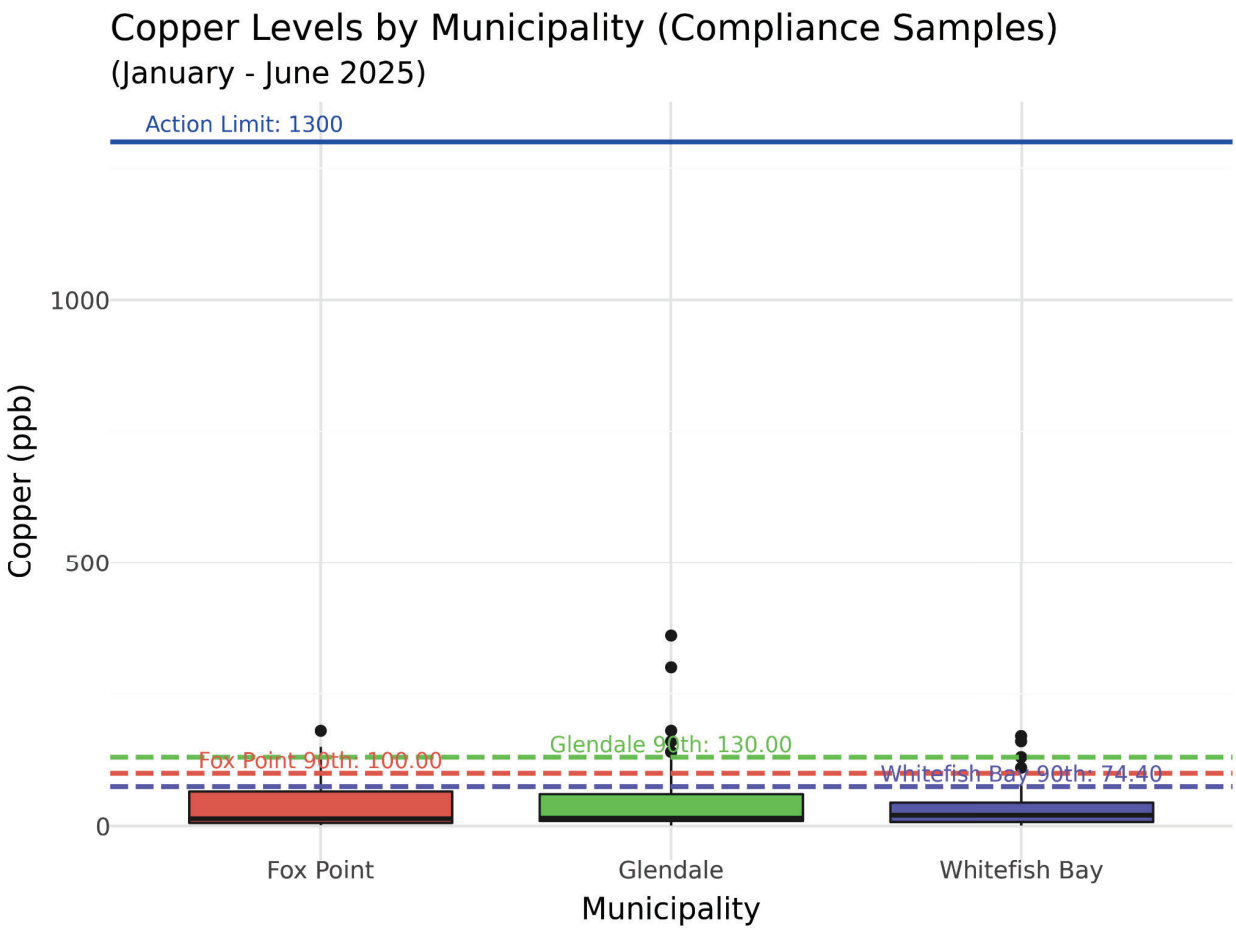
Copper Results

Below is a table which characterizes the levels found during the last monitoring event. Please note that all 90th percentile values for copper are significantly below the 1300 ppb AL.

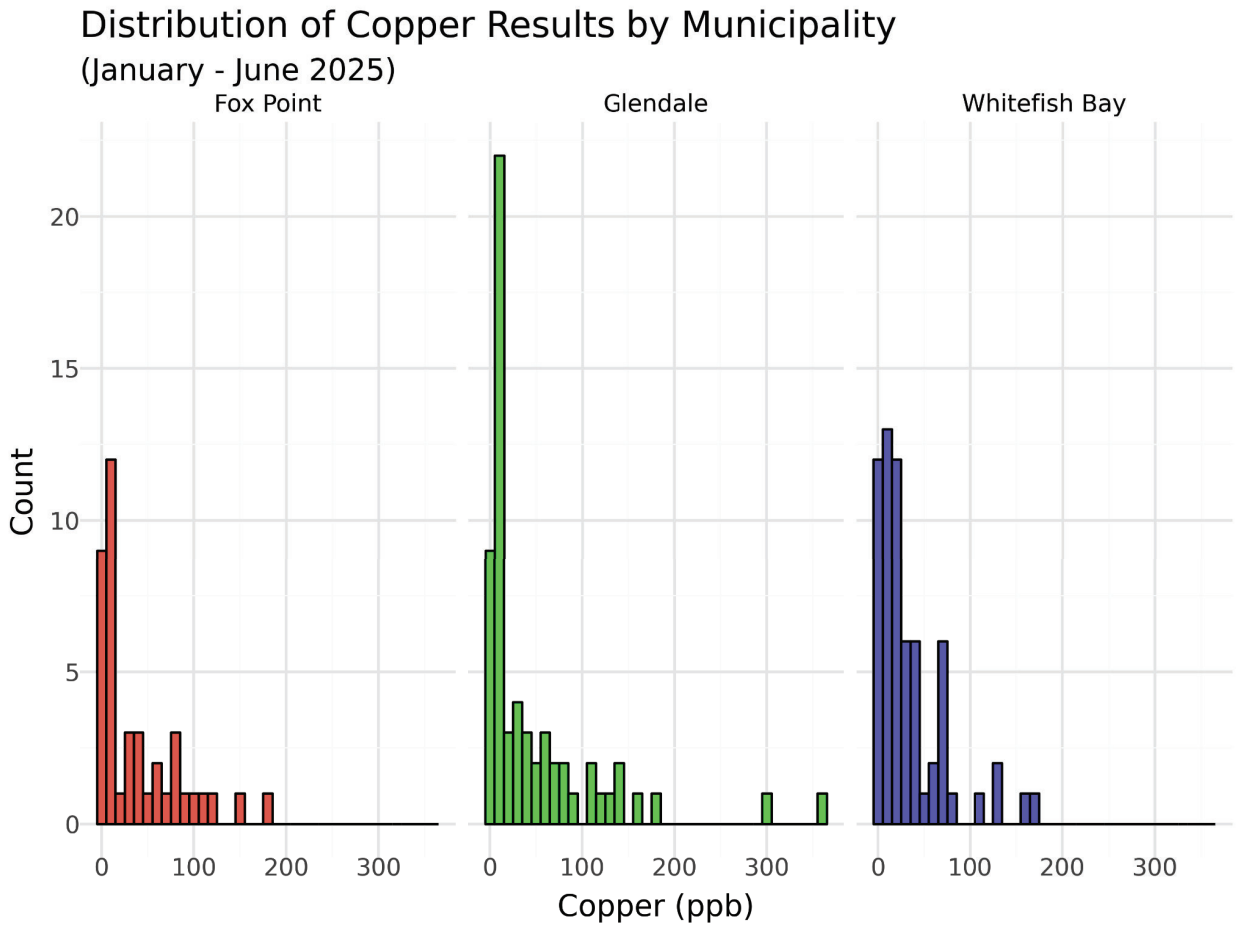
Municipality	Quantity	Min Copper (ppb)	Ave Copper (ppb)	Max Copper (ppb)	90th Percentile Copper (ppb)
Fox Point	41	1.30	39.37	180	100
Glendale	61	1.20	49.07	360	130
Whitefish Bay	64	0.75	34.07	170	74.4



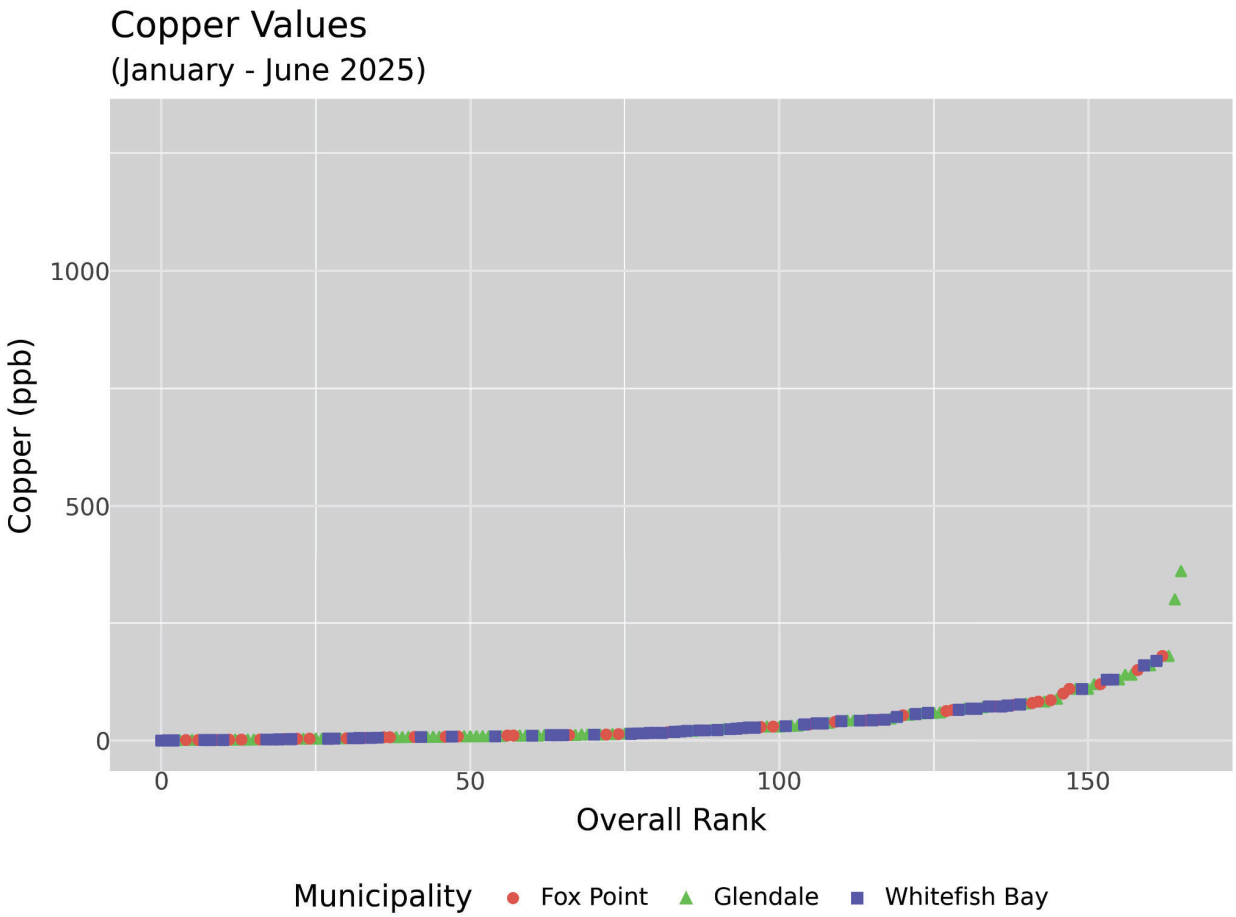
While lead levels decreased with corrosion optimization, copper levels actually increased from 2020. In the case of Glendale, the increase of copper is likely explained by the increase in Tier 3 sites. Staff does not have a theory regarding the increase in copper levels in Fox Point and Whitefish Bay; however, the 90th percentile levels are significantly below the AL.



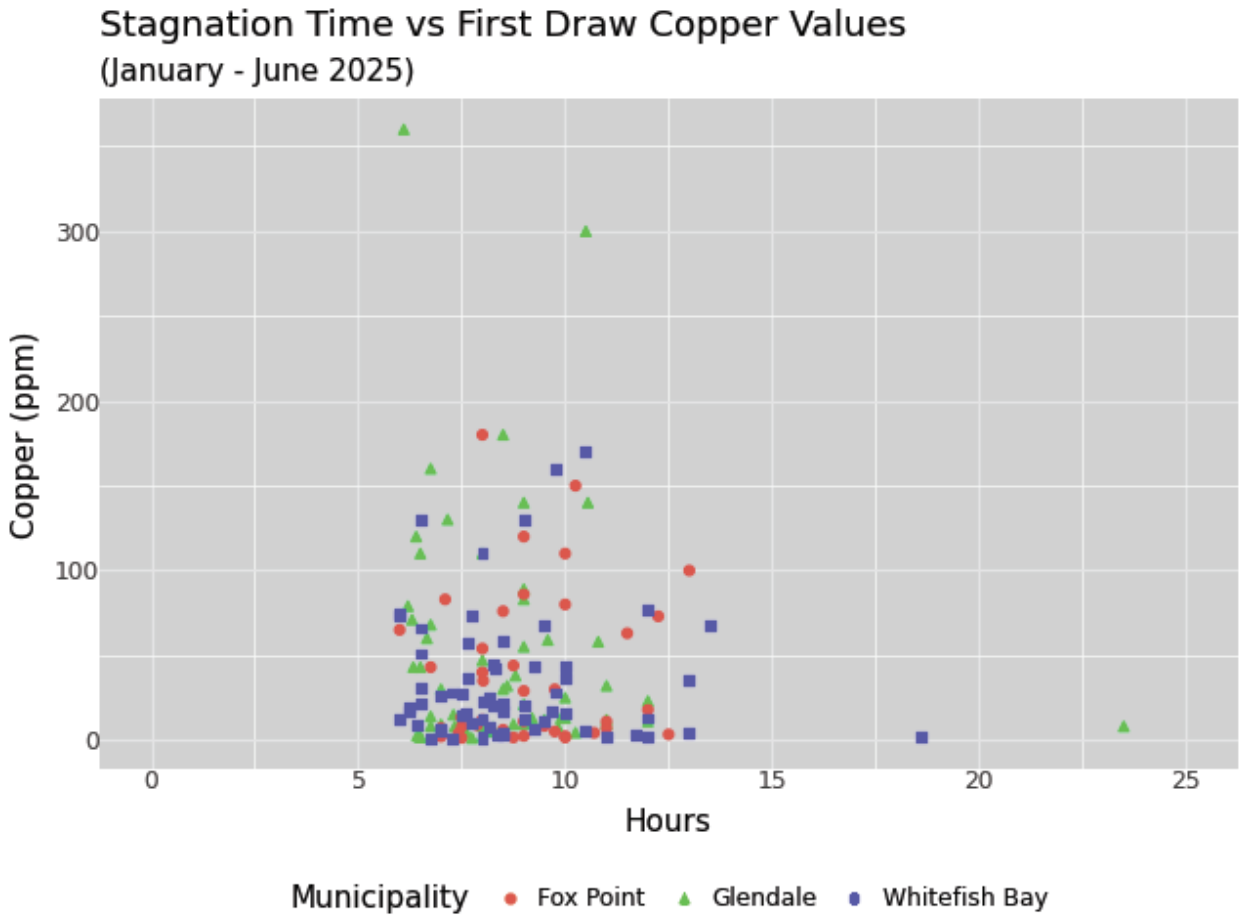
The following chart is a box and whisker plot of the copper data for each municipality. Clearly, copper levels are low for all of our members.



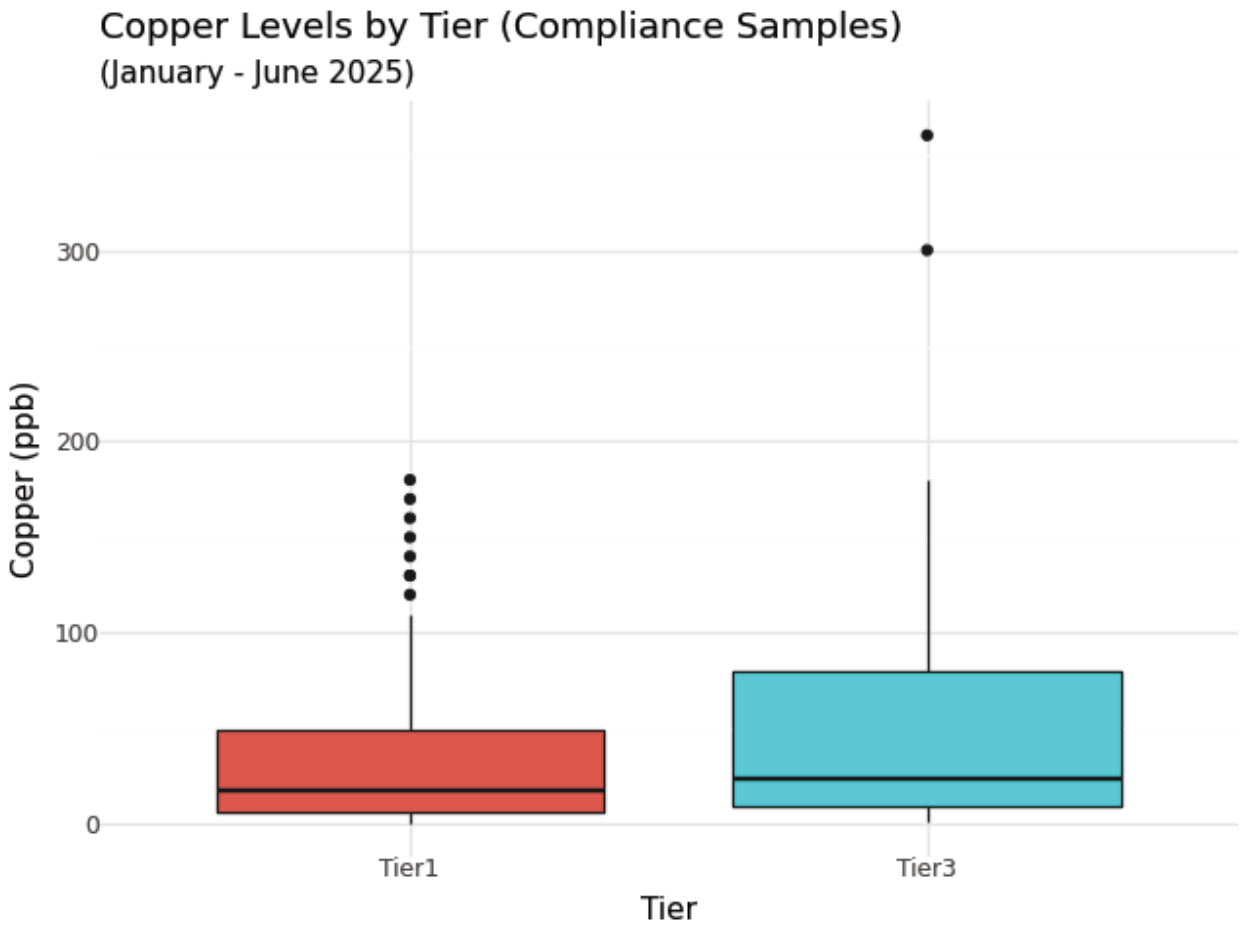
Copper histograms mirrored lead histograms in form. Glendale exhibited numerous samples with low copper levels. However, the concentration of elevated values inflated both the average and 90th percentile figures.



Similar to lead data, the distribution displayed a tight cluster of values at the lower range, with a few outliers reaching higher levels.



Analysis indicates that water stagnation time has minimal impact on copper levels, echoing the findings regarding lead values.



Note the inverse correlation between lead levels and tier placement. This aligns with expectations: Tier 1 sites, which have water lines made of lead, should contain less copper, resulting in a lower copper residual.