

Delaware River Basin Commission

Uniform Aquatic Life Stream Quality Objectives for Toxic Pollutants in Zones 1

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Delaware River Basin Commission

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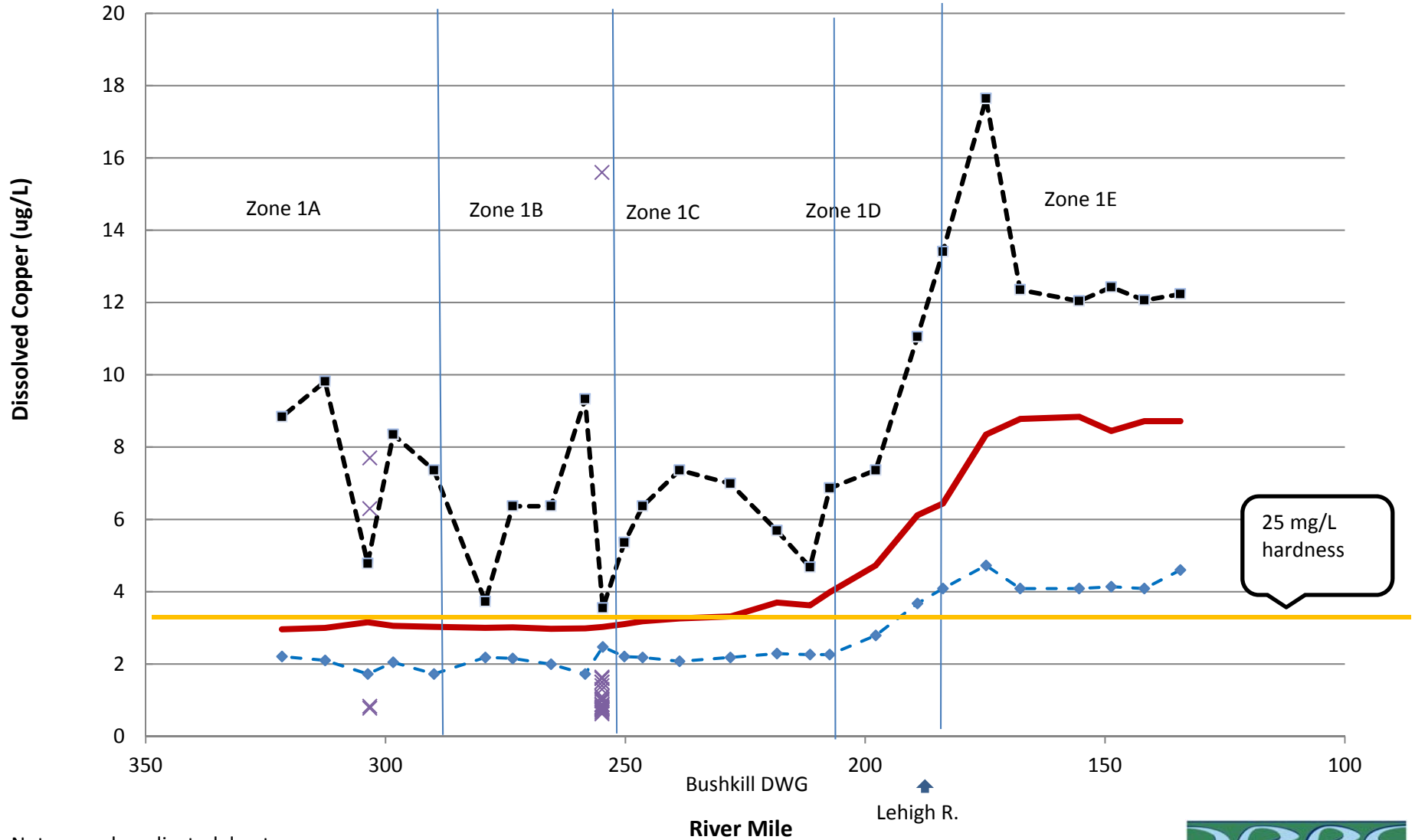
Intro

- * Aquatic life (AL) criteria among basin states are similar.
- * Zone 1 AL criteria would be similar to Zone 2-5 AL criteria.
 - * Differences in hardness dependent metal criteria in low hardness Zone 1 waters.
 - * Differences in pH dependent criterion.
- * Is an update of procedures for converting total recoverable WQC for metals to dissolved criteria warranted?
- * *Review criteria revised or updated since 2010 for all Zones*

Assumptions for DRBC stream quality objectives

- * Use EPA published final criteria under section 307(a) of CWA or adopted criteria or standards for toxic substance by basin state
 - ✓ cadmium, chromium, copper, lead, mercury, nickel, silver and zinc dissolved form
 - ✓ median hardness value of 100 mg/L (EPA)
 - ✓ median hardness value of 74 mg/Liter (FW Zones 2 to 5)
 - ✓ median hardness value of 21 mg/Liter (Zones 1) basin states do not have high cap of 400 mg/L or low cap of 25 mg/L hardness

Hardness Dependent Acute Criteria Copper at ICP

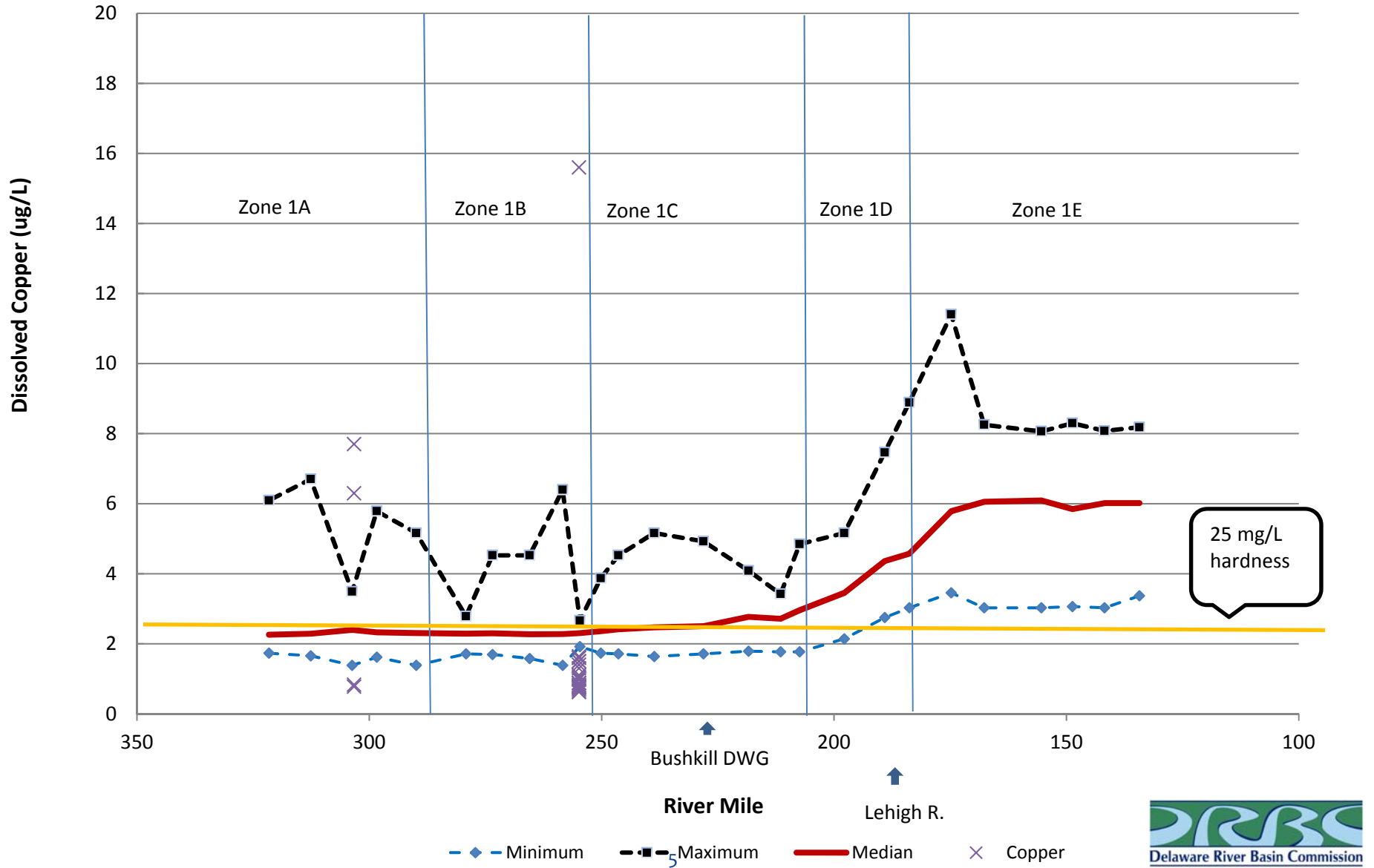


Note: may be adjusted due to effluent hardness in mixing zone

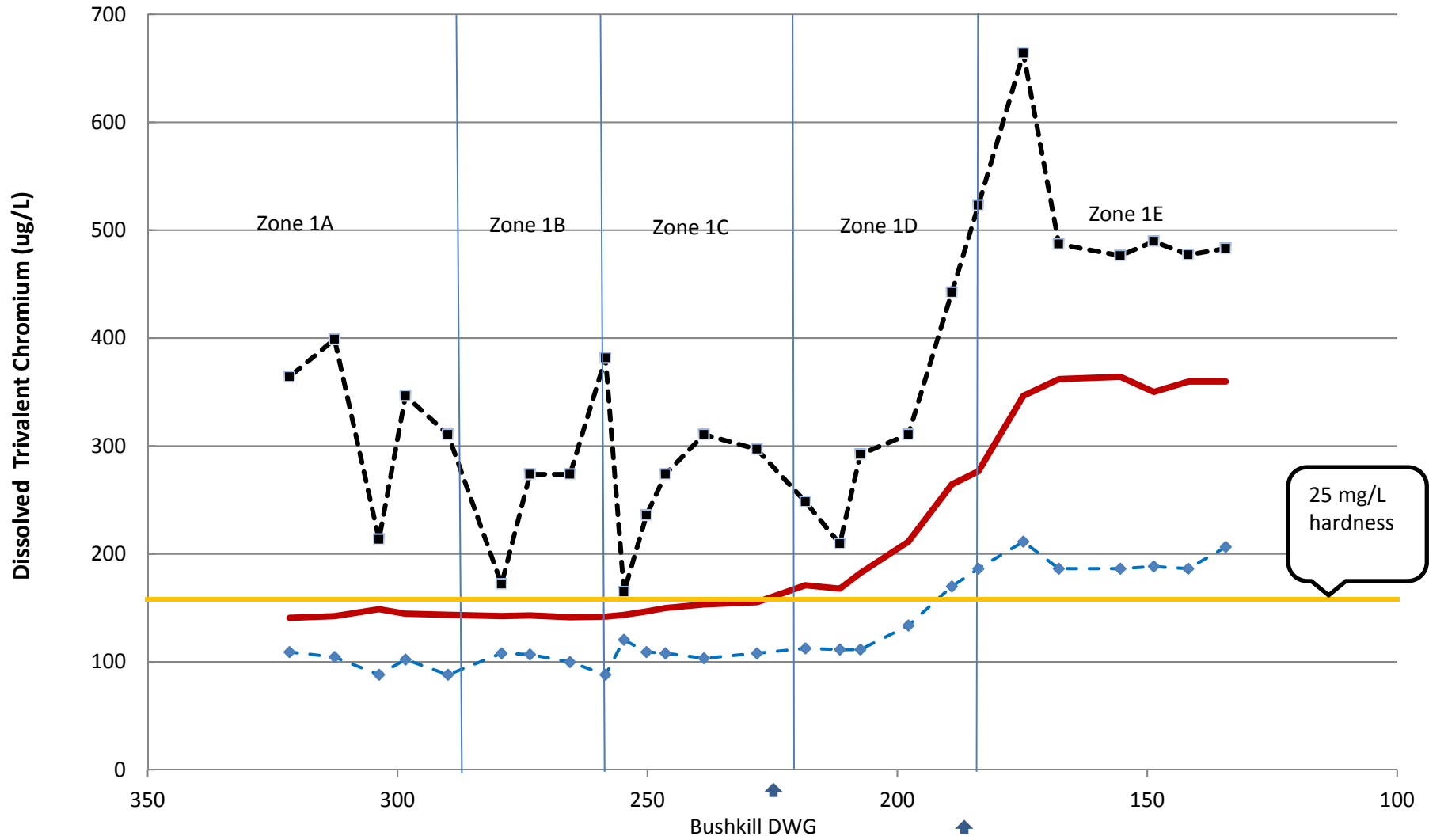
◆ - Minimum
 ■ - Maximum
 — - Median
 × - Copper



Hardness Dependent Chronic Criteria Copper at ICP



Hardness Dependent Acute Criteria Trivalent Chromium at ICP

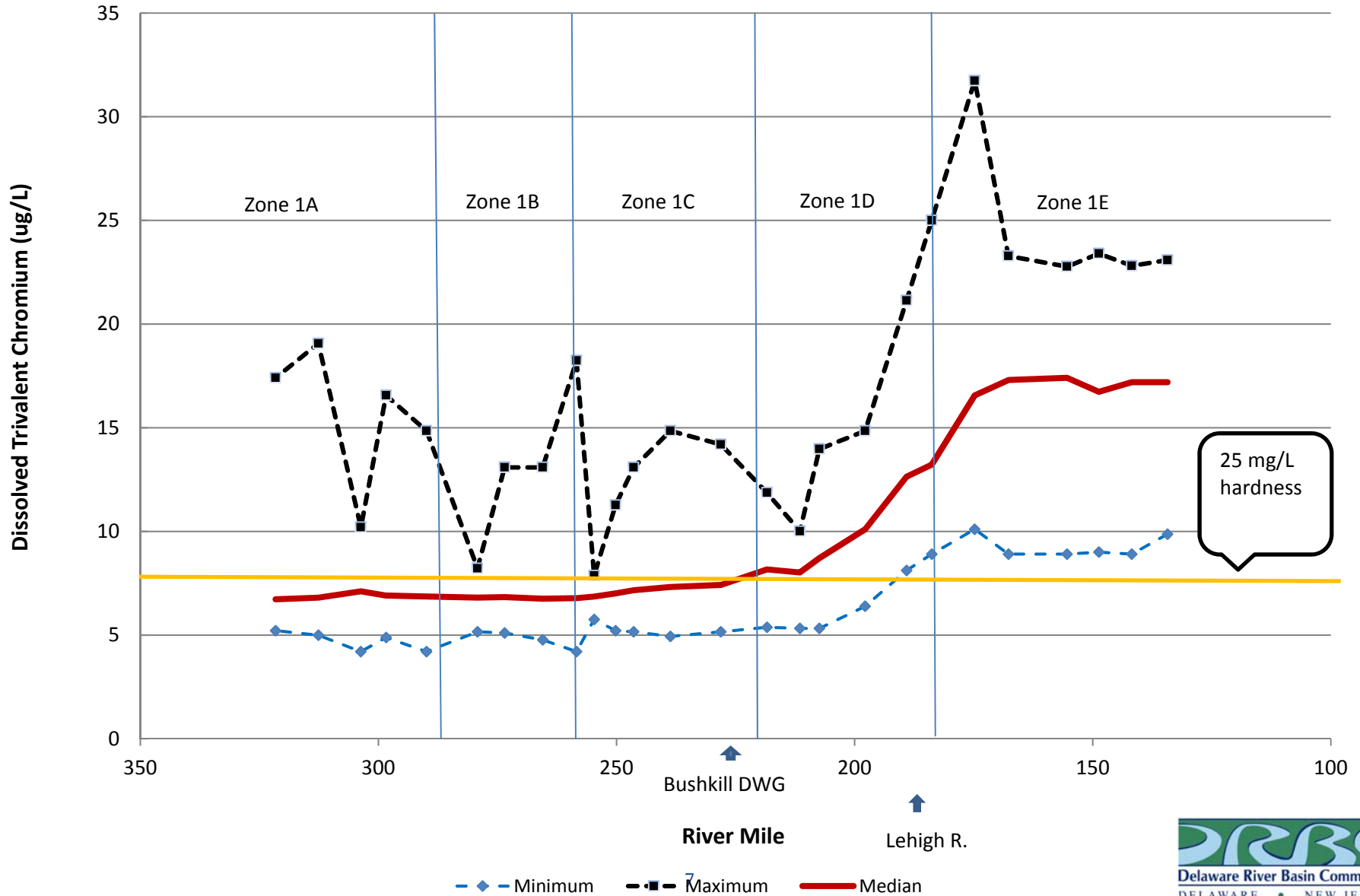


Note: may be adjusted due to effluent hardness in mixing zone

—◆— Minimum -■- Maximum — Median



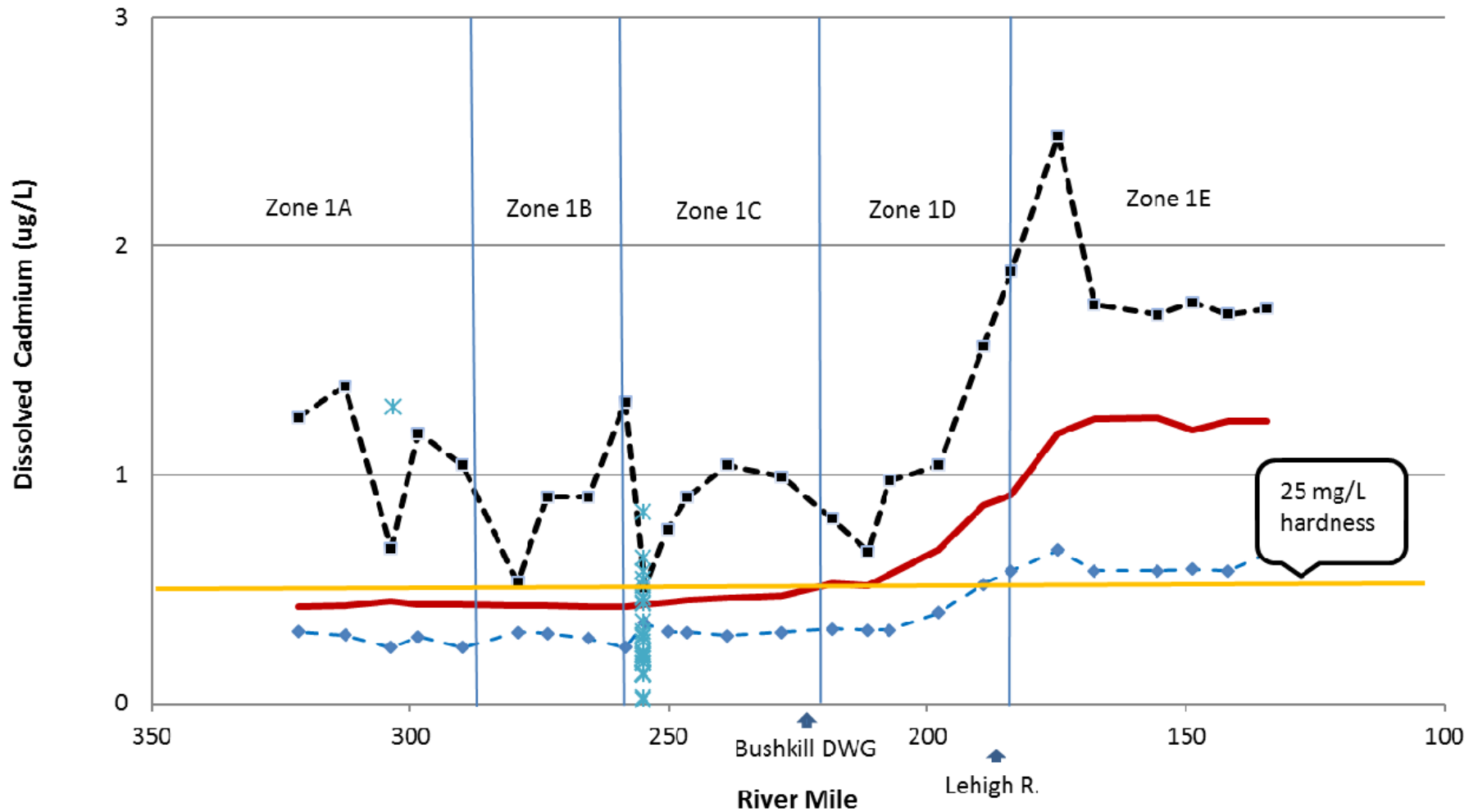
Hardness Dependent Chronic Criteria Tivalent Chromium at ICP



25 mg/L
hardness



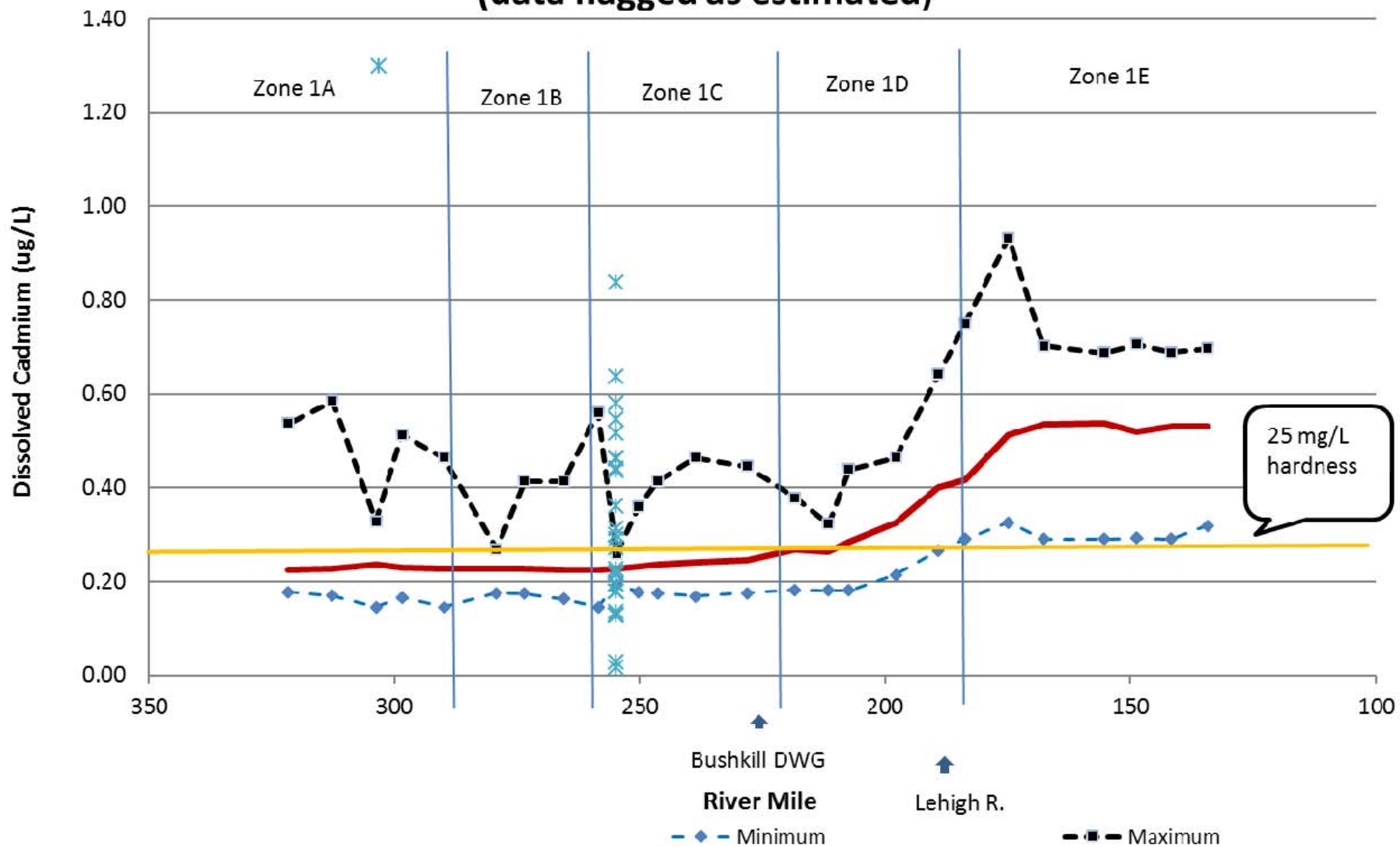
EPA 2016 Equation Acute Criteria Cadmium at ICP (data flagged as estimated)



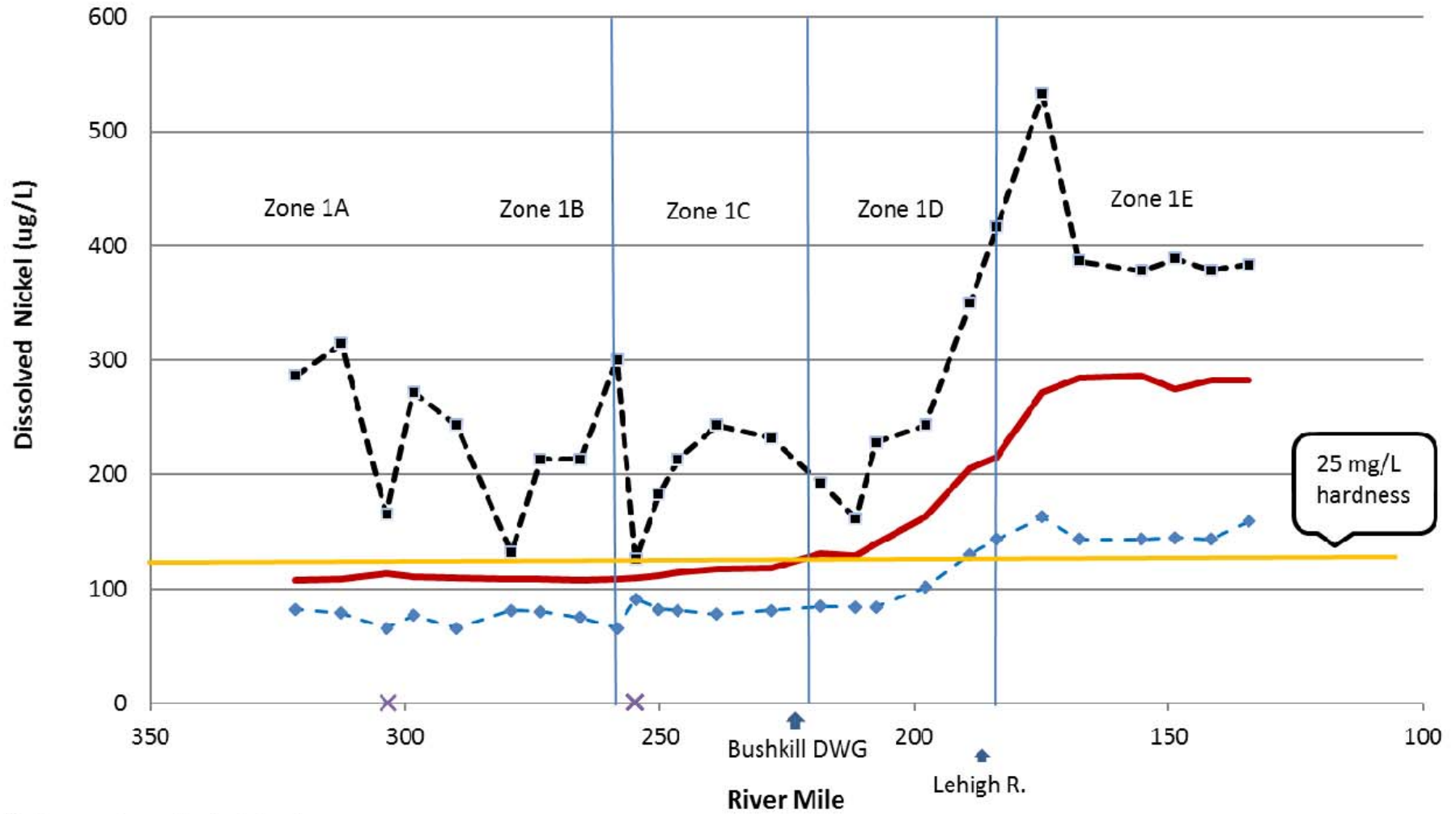
Note: may be adjusted due to effluent hardness in mixing zone

—◆— Minimum
 -■- Maximum
 — Median
 × Cadmium
 × Cadmium

EPA 2016 Equation Chronic Criteria Cadmium at ICP (data flagged as estimated)



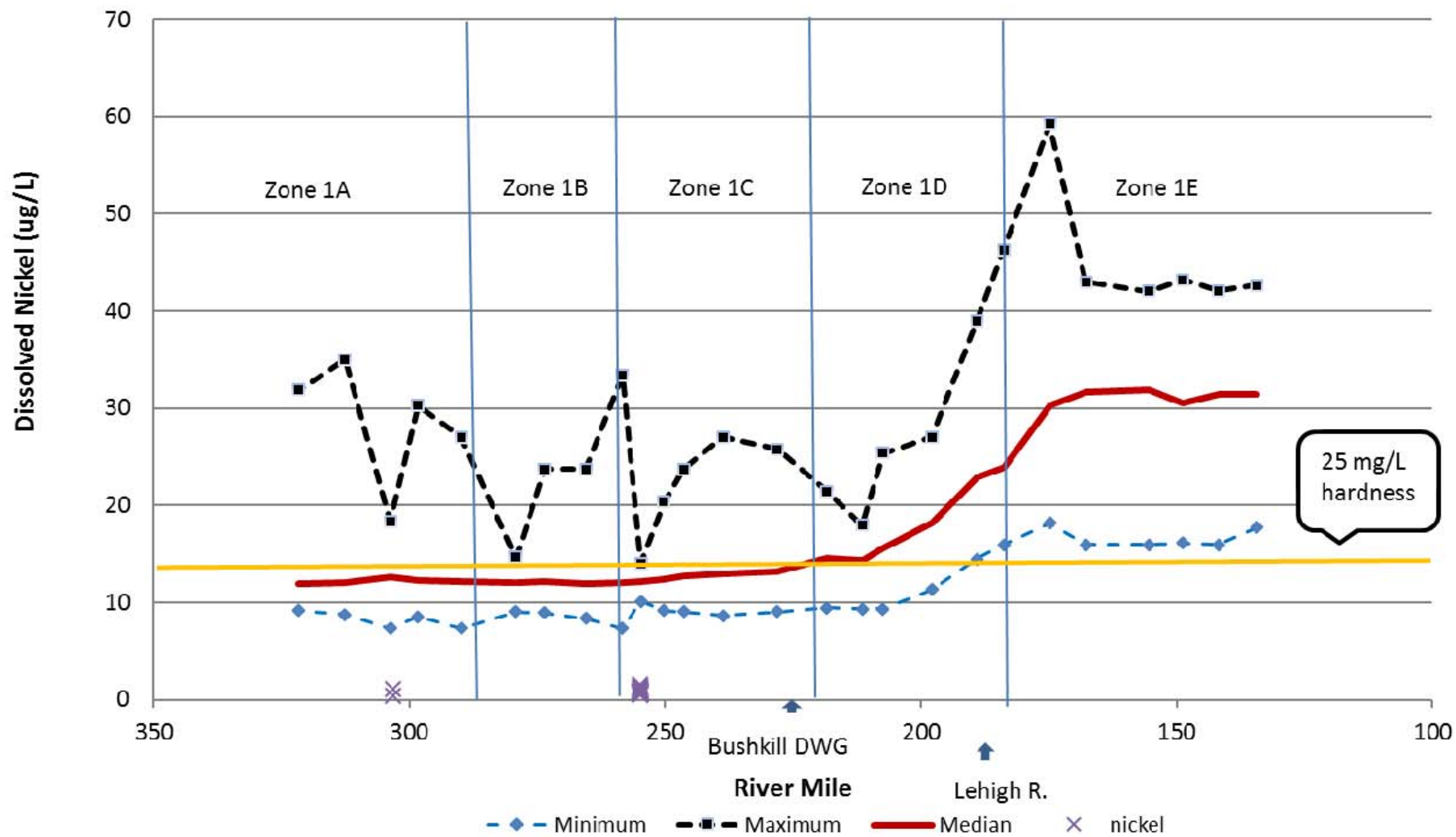
Hardness Dependent Acute Criteria Nickel at ICP



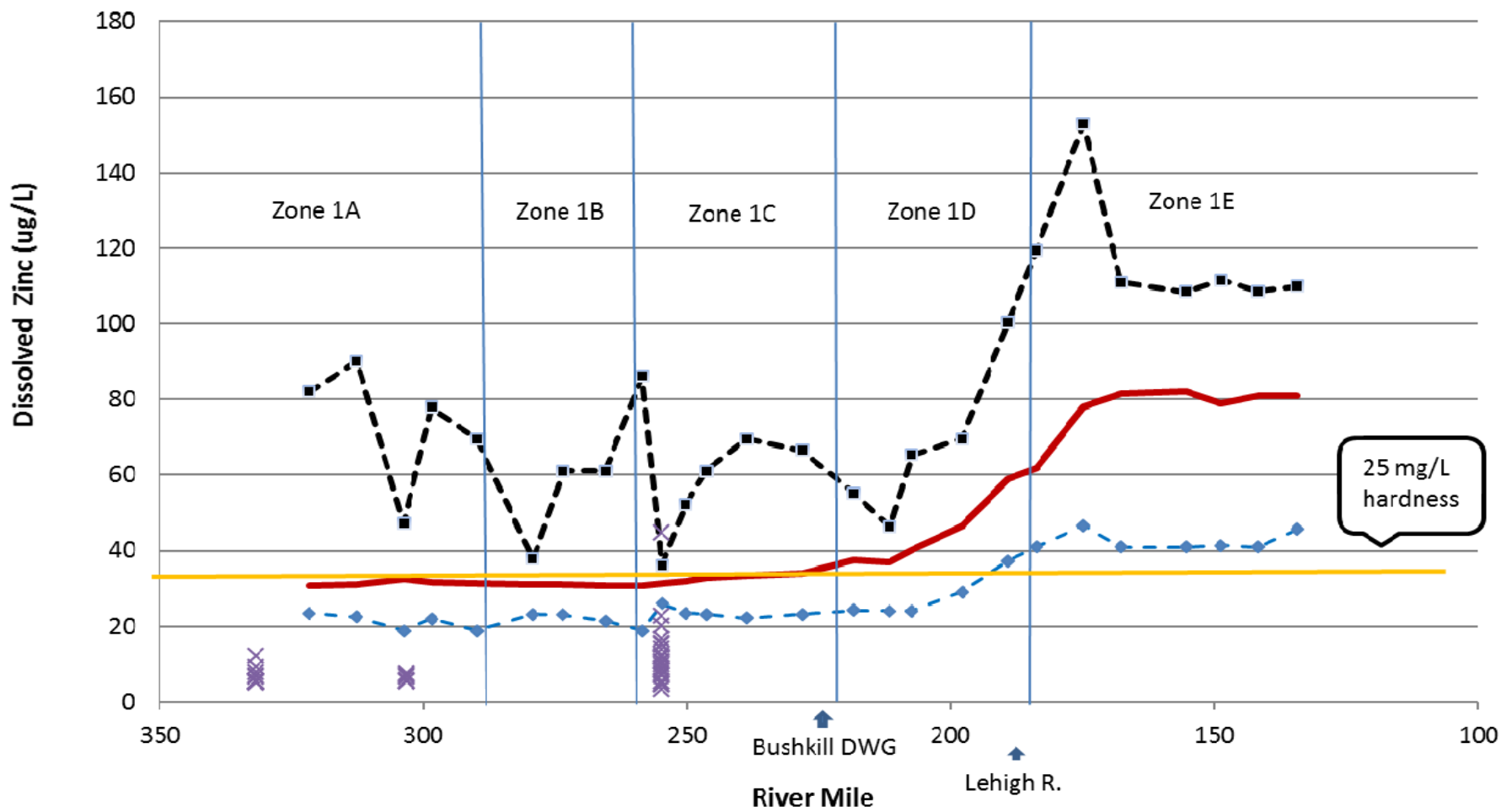
Note: may be adjusted due to effluent hardness in mixing zone

—◆— Minimum -■- Maximum — Median × nickel

Hardness Dependent Chronic Criteria Nickel at ICP



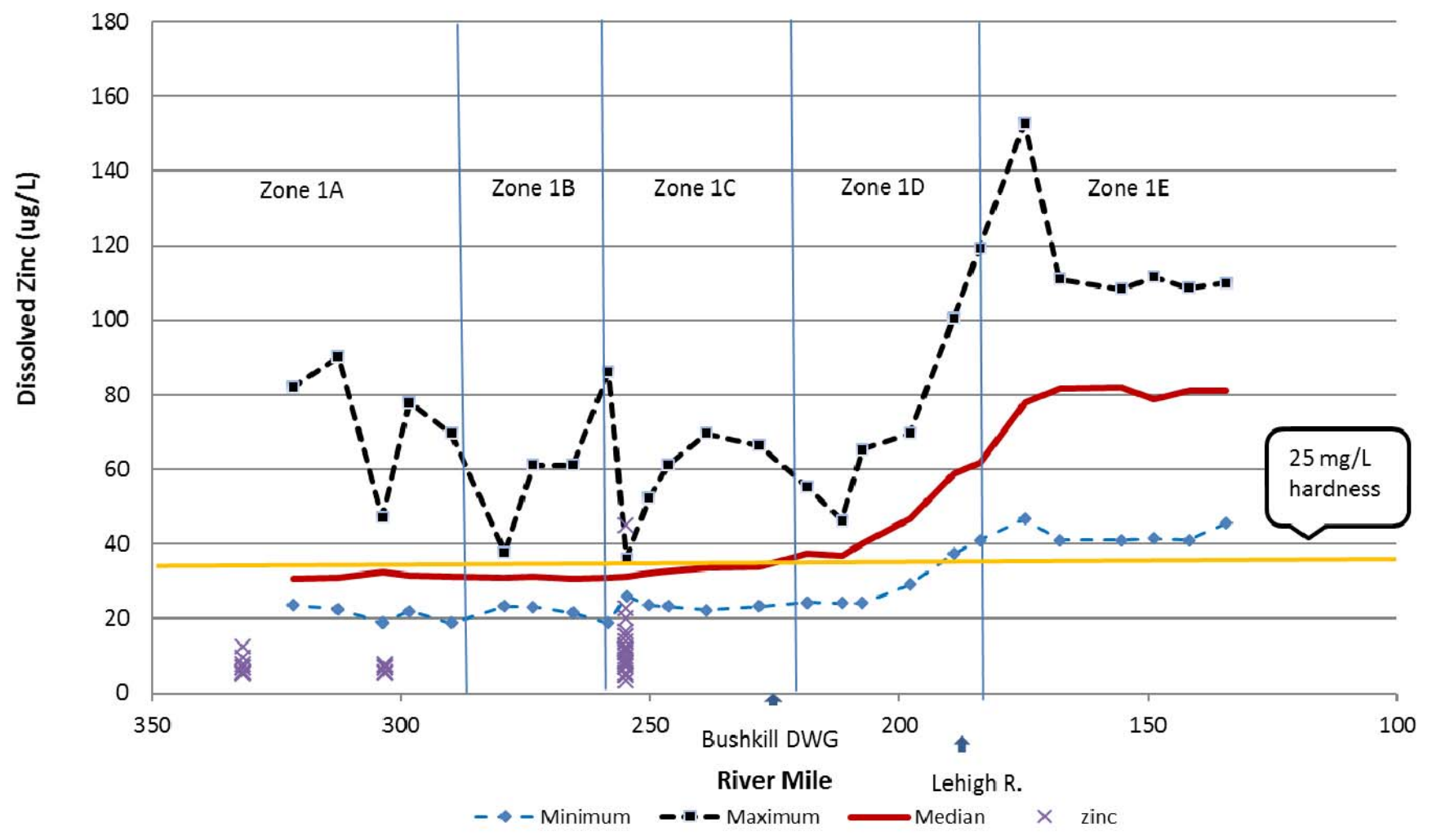
Hardness Dependent Acute Criteria Zinc at ICP



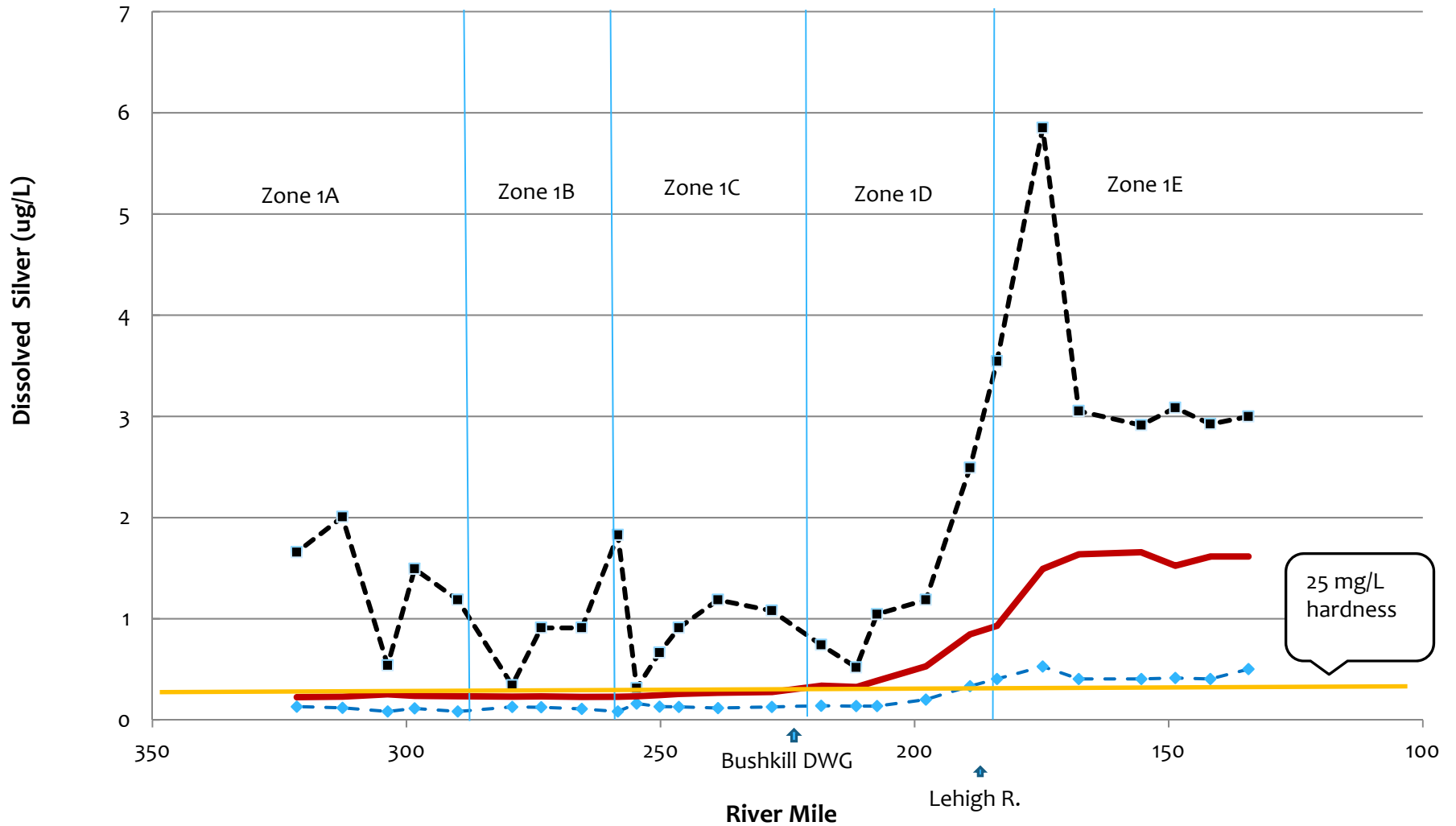
Note: may be adjusted due to effluent hardness in mixing zone

—◆— Minimum
 -■- Maximum
 — Median
 × zinc

Hardness Dependent Chronic Criteria Zinc at ICP



Hardness Dependent Acute Criteria Silver at ICP



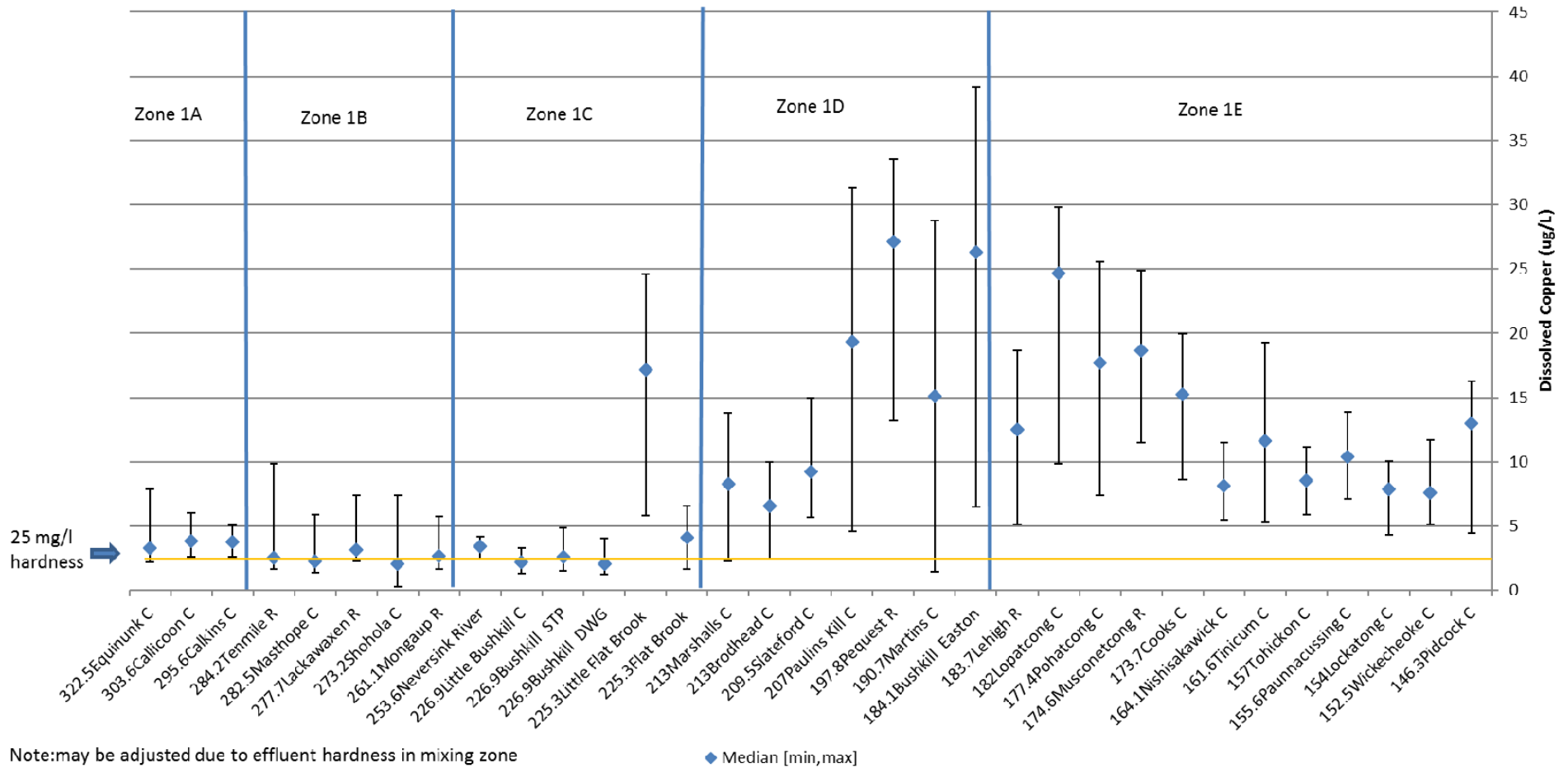
Note: may be adjusted due to effluent hardness in mixing zone

—◆— Minimum -■- Maximum — Median

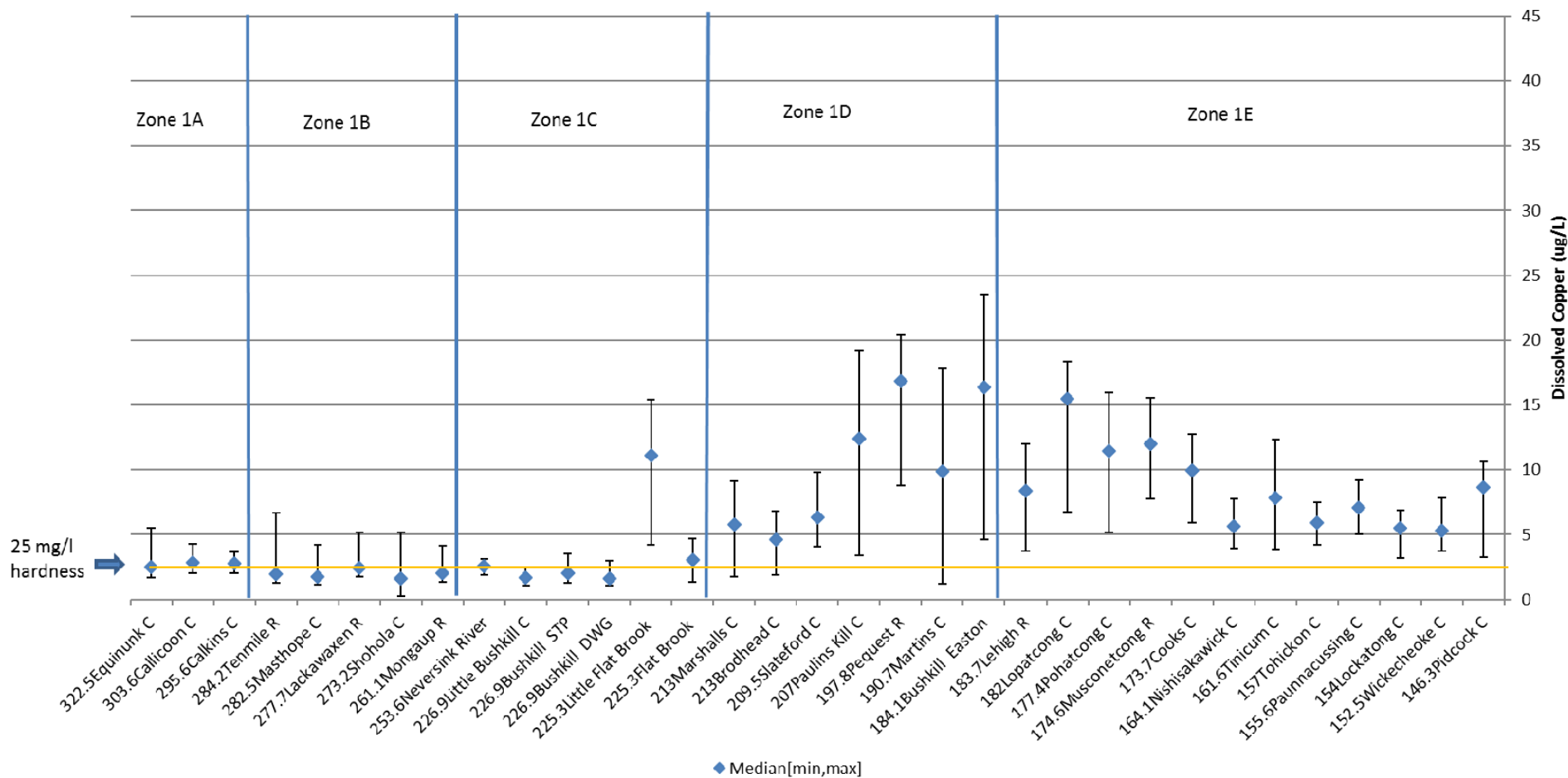
25 mg/L
hardness



Hardness Dependent Acute Criteria Copper at Tributary BCP



Hardness Dependent Chronic Criteria Copper at Tributary BCP



Assumptions for DRBC stream quality objectives

- * median pH value of 7.1 (Zones 2 to 6)
- * median pH (Zone 1) EWQ at ICPs (7.4 to 7.78)

- * PCP criteria pH dependent
- * PCP (not detected in Zone 1 > 4 µg/L DL Method 8270D)

Commission established adjustment factors

The DRBC procedure for converting total recoverable WQC for metals to dissolved criteria should be reviewed and compared to basin state procedures.

Metal @ 21 mg/L hardness	Conversion factor EPA, NJ, NY, PA Freshwater CMC	Conversion factor EPA, NJ, NY, PA Freshwater CCC	Conversion factor DRBC Freshwater CMC	Conversion factor DRBC Freshwater CCC
Cadmium	$1.136672 \cdot [(\ln \text{hardness})(0.041838)]$ 0.4 (NY 0.66)	$1.101672 \cdot [(\ln \text{hardness})(0.041838)]$ 0.08 (NY 0.62) (EPA 2016 0.22)	0.651 0.28	0.651 0.06
Chromium III	0.316 159	0.860 21	0.277 139	0.277 7
Copper	0.960 3	0.960 2.4	0.908 3	0.908 2.2
Lead	$1.46203 \cdot [(\ln \text{hardness})(0.145712)]$ 11 (NY 17)	$1.46203 \cdot [(\ln \text{hardness})(0.145712)]$ 0.4 (NY 0.7)	0.723 38	0.723 5.4
Nickel	0.998 125	0.997 14	0.846 106	0.846 12
Zinc	0.978 31	0.986 31 (NY 22)	0.95 30	0.95 30

Next Steps

- * Consider inclusion of hardness caps.
- * Review conversion factors total to dissolved metals.
- * Clarification on pH dependent criterion if needed.

DRBC staff in consultation with basin states and TCS to propose uniform AL criteria for Zone 1 *and two AL changes in Zones 2 to 6.*

- * *Carbaryl (add to all Zones with EPA 2012 criteria)*
- * *Cadmium (revise all Zones with EPA 2016 update)*