

# Proposed Revision of Cadmium Aquatic Life Water Quality Criteria

September 7, 2017

Associated Industries of Missouri

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# Cadmium Criteria Revisions

- 2001 EPA Cadmium Criteria Revision
- U.S. Geological Survey 2010 revision - *Cadmium Risks to Freshwater Life: Derivation and Validation of Low-Effect Criteria Values using Laboratory and Field Studies*
- Idaho, Colorado, and New Mexico – revised criteria approved by EPA
- MN – drafted, proposed for rulemaking



# Chronology of Proposed Revisions

- 2012 – AIM proposed revisions to MDNR
- AIM petitioned Clean Water Commission October 2014
  - MDNR response (December 2014): consider for triennial review
- EPA 2016 revision - 81 FR 19176, April 4, 2016 (<https://www.epa.gov/wqc/aquatic-life-criteria-cadmium#2016>)
- AIM submitted revised proposal in May 2016 including draft RIR





# Importance of Revisions

	Example Limits – Existing Missouri Criteria (µg/l)		Example Limits – Proposed Revised Criteria (µg/l)	
	Monthly Avg	Daily Max	Monthly Avg	Daily Max
Cadmium	0.3	0.6	0.9	1.9

- Example calculation at hardness = 200 mg/l and upstream low flow = 0 cfs
- Chronic criteria in this example

# History of Cadmium Criteria Updates

- EPA criteria previously updated in 2001
  - Basis for MO criteria
- New data – new EPA criteria April 2016
  - Additional species
  - More data for existing species

**Table 2. Number of Aquatic Species Included in Cadmium AWQC.**

	Freshwater Acute	Freshwater Chronic	Estuarine/Marine Acute	Estuarine/Marine Chronic
1980	29	13	31	1
1985	52	16	35	2
1995	NA <sup>a</sup>	NA	NA	NA
2001	65	21	61	2
2016	101	27	94	2

<sup>a</sup> NA = Not Available



# Overview of Proposed Cadmium Criteria Revision

- Acute criteria

- Adopt EPA 2016 criterion for cold-water protection

- Dataset includes salmonids
- Criterion is driven by rainbow trout

- Apply EPA procedures to derive criterion for cool and warm-water protection

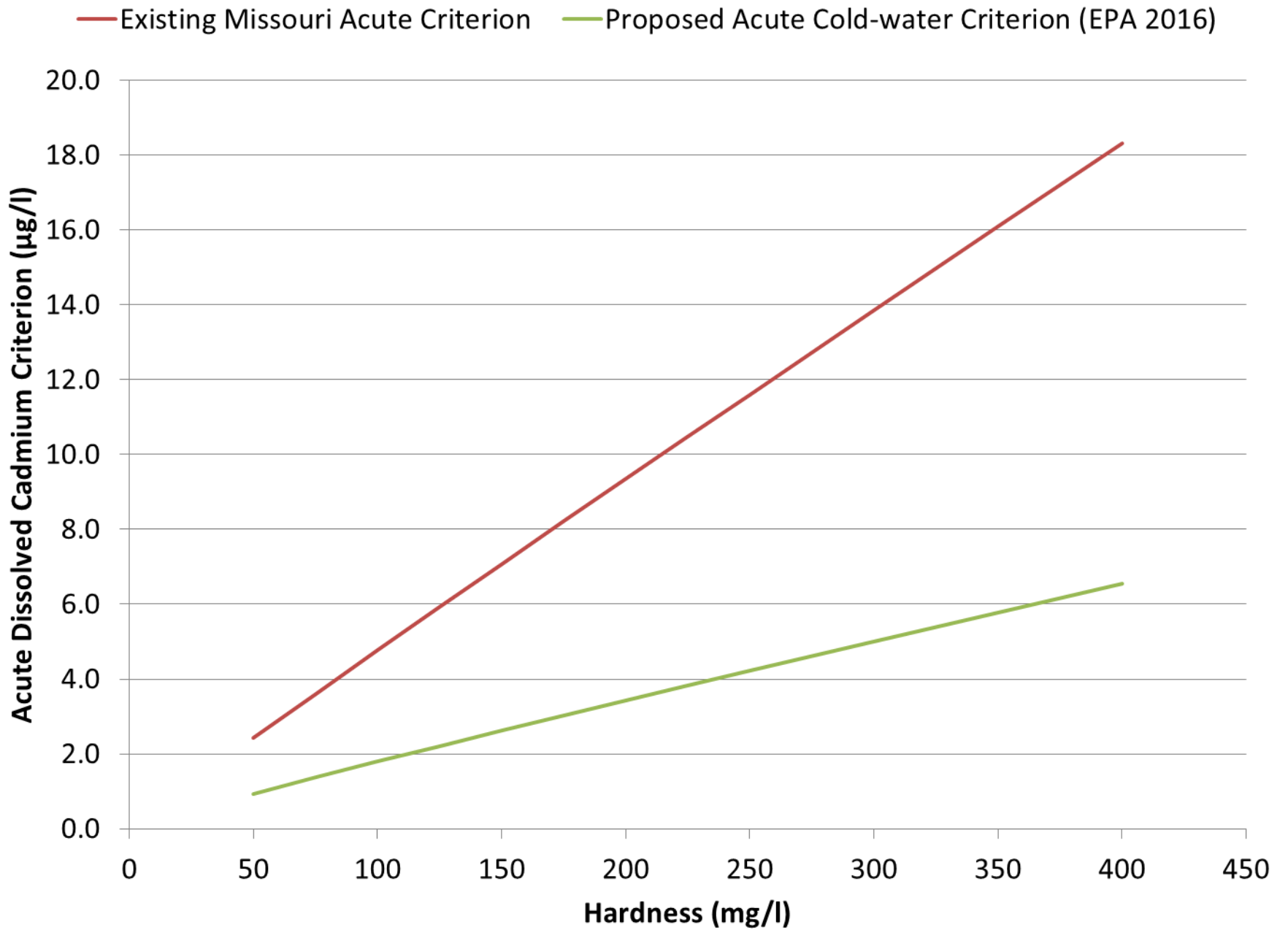
- Remove salmonids from EPA dataset

- Chronic criteria

- Apply EPA 2016 criteria for all waters

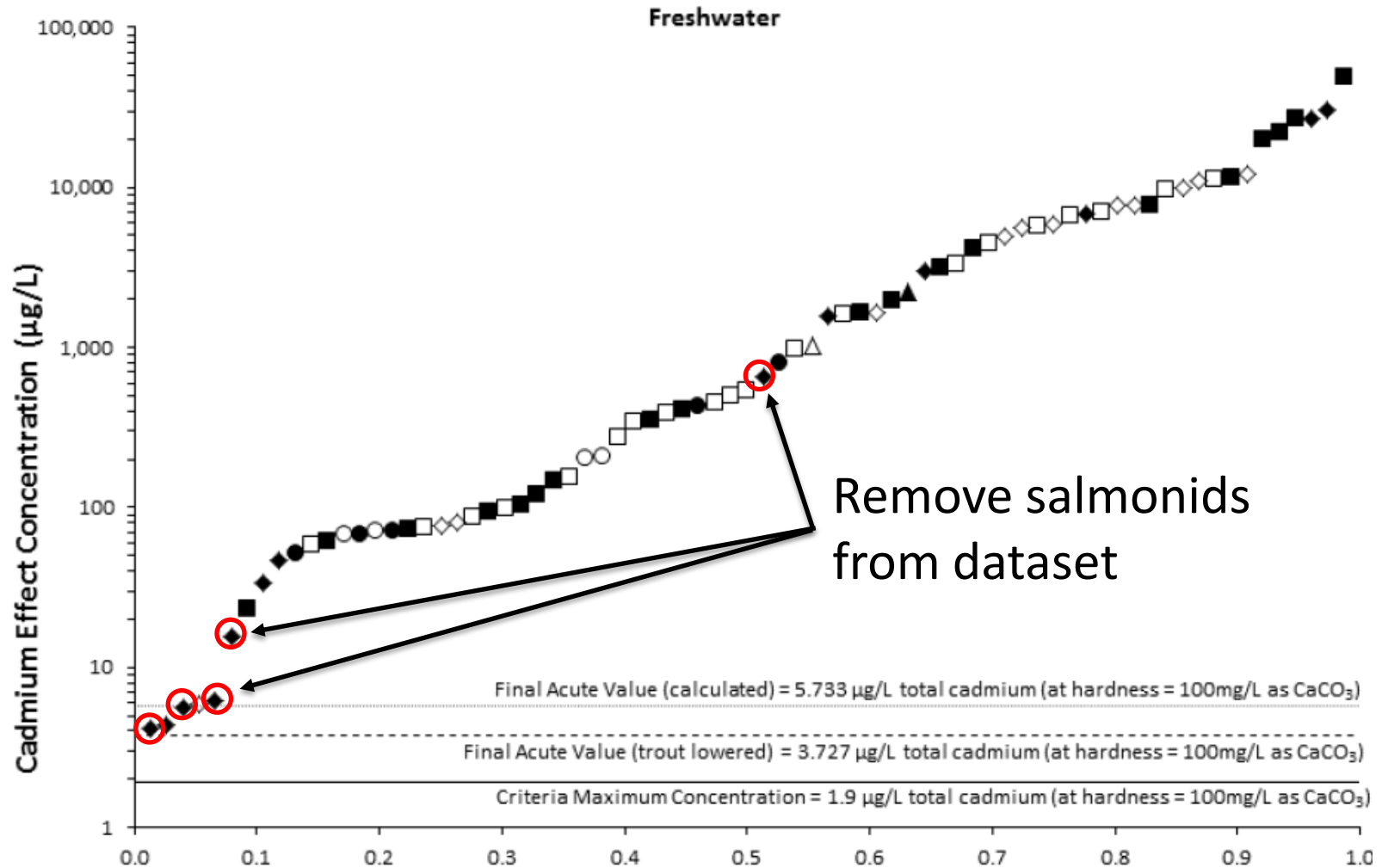
- Chronic not driven by salmonids



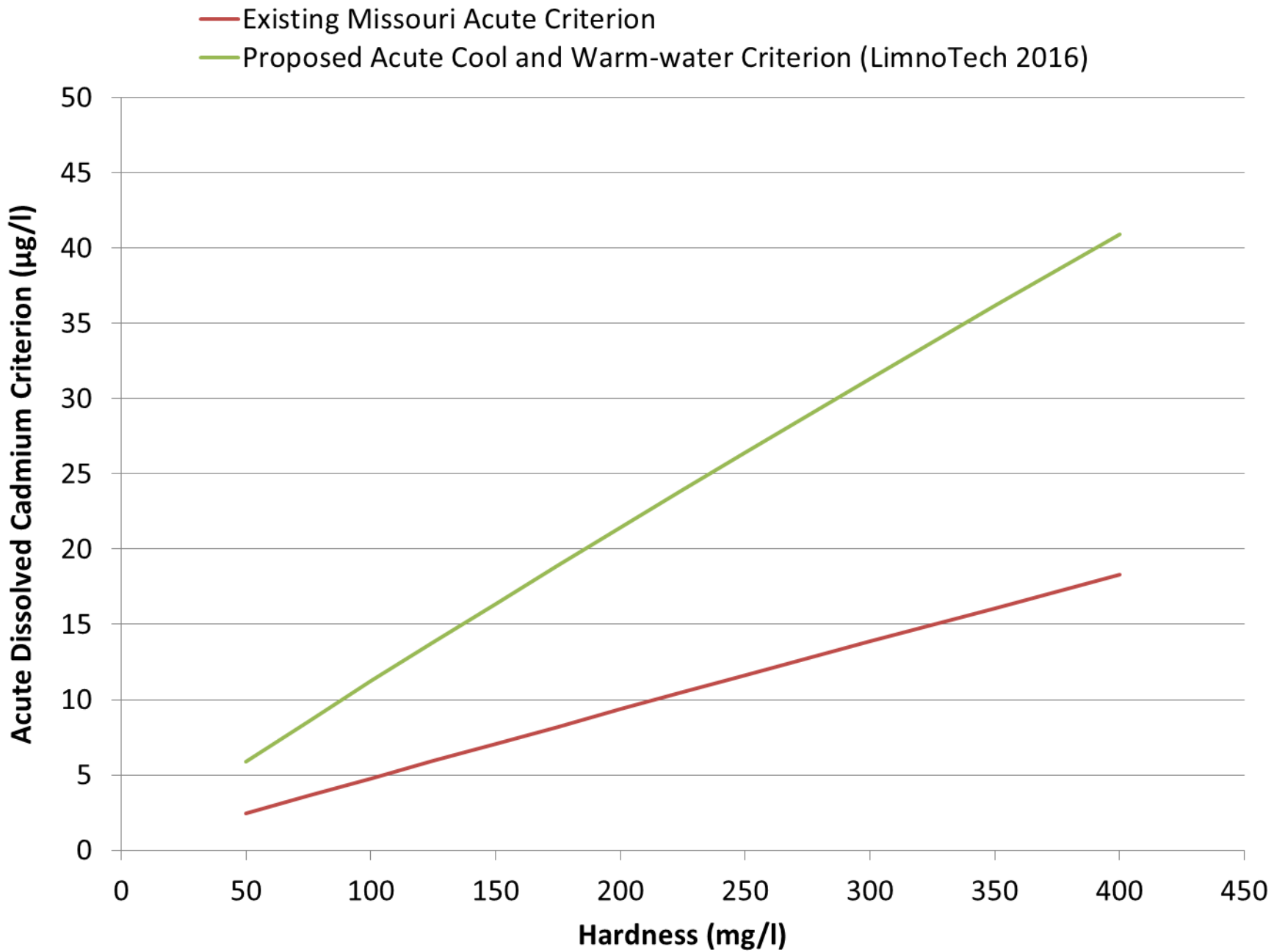


# Proposal includes Recalculating for Cool and Warm-water Acute Cadmium Criteria

## Summary of Ranked Cadmium GMAVs







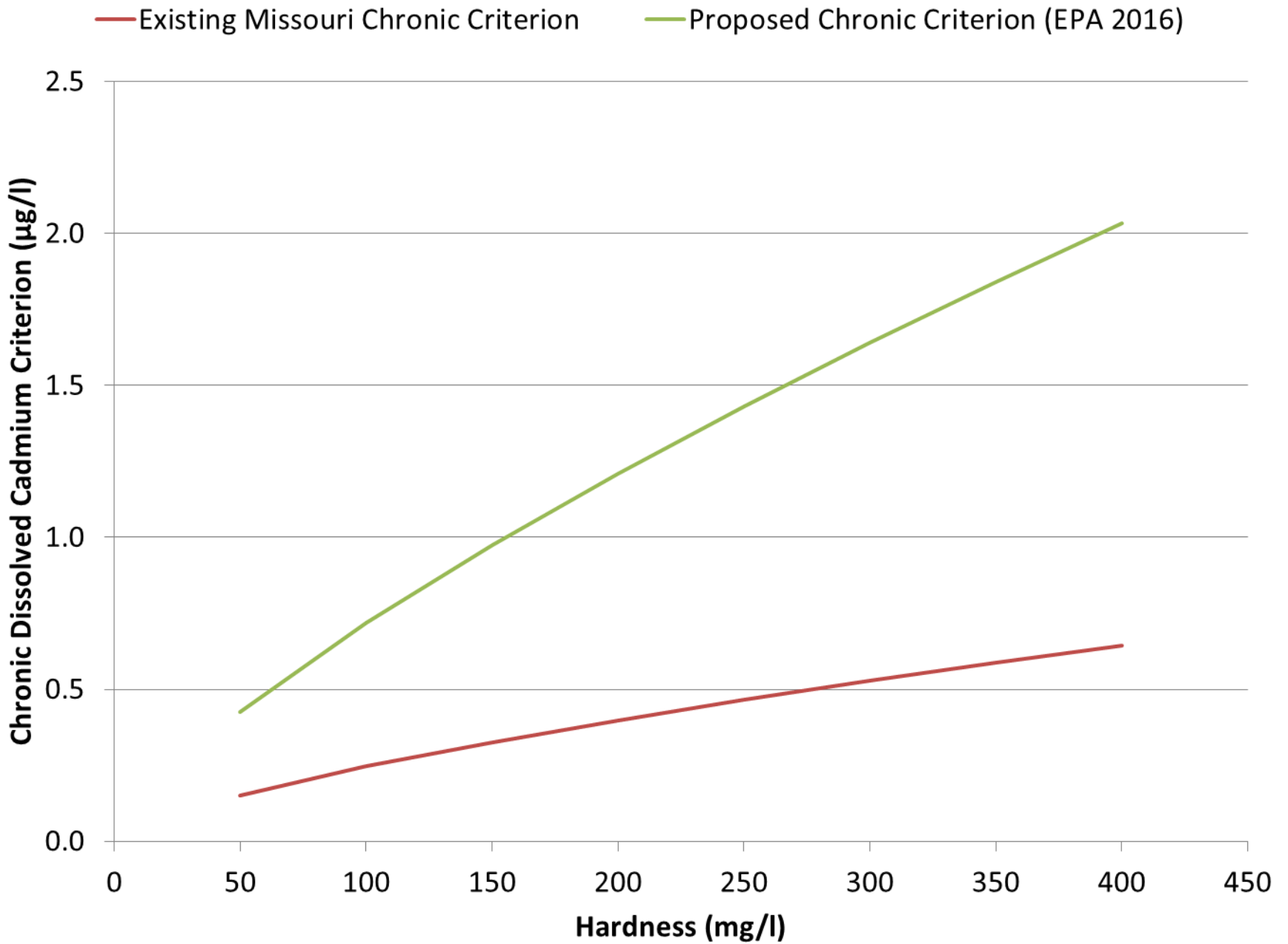
# Proposed Chronic Criteria Revision

- Adopt EPA 2016 revision as is
- Additional data
  - New species
  - More data for existing species
- Non-salmonid criteria not necessary
  - Most sensitive organisms not salmonids

Proposed chronic criteria for cold, cool and warm-water:

$$e^{(0.7977 * \ln(\text{Hardness}) - 3.909)} * (1.101672 - (\ln(\text{Hardness}) * 0.041838))$$





# Recommendation

- Adopt EPA criteria in Missouri for:
  - Cold-water acute
  - Cold, cool and warm-water chronic
- Adopt proposed cool and warm-water acute criteria

