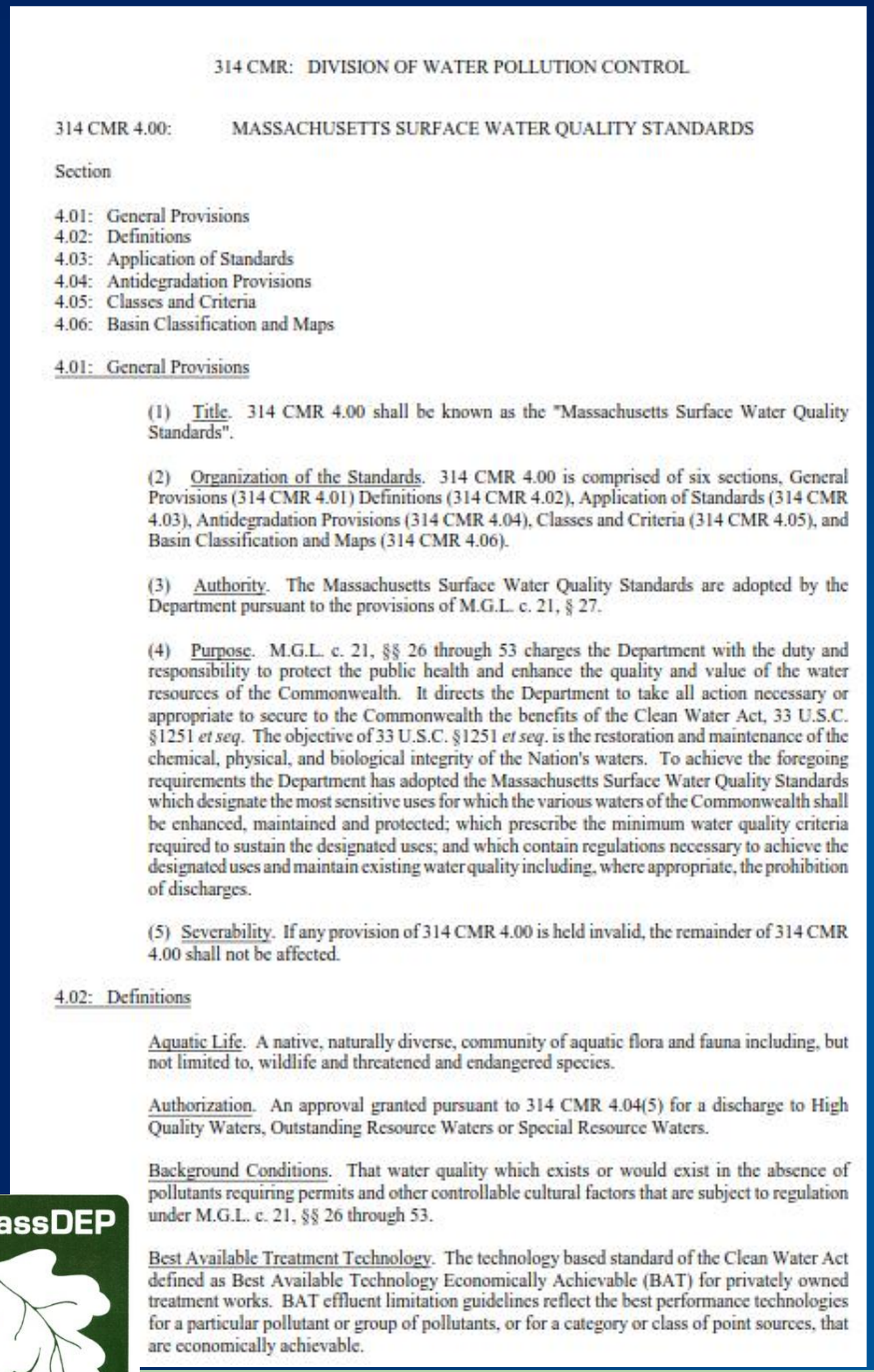


314 CMR: DIVISION OF WATER POLLUTION CONTROL

314 CMR 4.00: MASSACHUSETTS SURFACE WATER QUALITY STANDARDS

Section

4.01: General Provisions
4.02: Definitions
4.03: Application of Standards
4.04: Antidegradation Provisions
4.05: Classes and Criteria
4.06: Basin Classification and Maps

4.01: General Provisions

(1) Title. 314 CMR 4.00 shall be known as the "Massachusetts Surface Water Quality Standards".

(2) Organization of the Standards. 314 CMR 4.00 is comprised of six sections, General Provisions (314 CMR 4.01) Definitions (314 CMR 4.02), Application of Standards (314 CMR 4.03), Antidegradation Provisions (314 CMR 4.04), Classes and Criteria (314 CMR 4.05), and Basin Classification and Maps (314 CMR 4.06).

(3) Authority. The Massachusetts Surface Water Quality Standards are adopted by the Department pursuant to the provisions of M.G.L. c. 21, § 27.

(4) Purpose. M.G.L. c. 21, §§ 26 through 53 charges the Department with the duty and responsibility to protect the public health and enhance the quality and value of the water resources of the Commonwealth. It directs the Department to take all action necessary or appropriate to secure to the Commonwealth the benefits of the Clean Water Act, 33 U.S.C. §1251 *et seq*. The objective of 33 U.S.C. §1251 *et seq*. is the restoration and maintenance of the chemical, physical, and biological integrity of the Nation's waters. To achieve the foregoing requirements the Department has adopted the Massachusetts Surface Water Quality Standards which designate the most sensitive uses for which the various waters of the Commonwealth shall be enhanced, maintained and protected; which prescribe the minimum water quality criteria required to sustain the designated uses; and which contain regulations necessary to achieve the designated uses and maintain existing water quality including, where appropriate, the prohibition of discharges.

(5) Severability. If any provision of 314 CMR 4.00 is held invalid, the remainder of 314 CMR 4.00 shall not be affected.

4.02: Definitions

Aquatic Life. A native, naturally diverse, community of aquatic flora and fauna including, but not limited to, wildlife and threatened and endangered species.

Authorization. An approval granted pursuant to 314 CMR 4.04(5) for a discharge to High Quality Waters, Outstanding Resource Waters or Special Resource Waters.

Background Conditions. That water quality which exists or would exist in the absence of pollutants requiring permits and other controllable cultural factors that are subject to regulation under M.G.L. c. 21, §§ 26 through 53.

Best Available Treatment Technology. The technology based standard of the Clean Water Act defined as Best Available Technology Economically Achievable (BAT) for privately owned treatment works. BAT effluent limitation guidelines reflect the best performance technologies for a particular pollutant or group of pollutants, or for a category or class of point sources, that are economically achievable.

Proposed Revisions to 314 CMR 4.00: Massachusetts Surface Water Quality Standards (SWQS)

MassDEP
Bureau of Water Resources
Division of Watershed Management
Watershed Planning Program

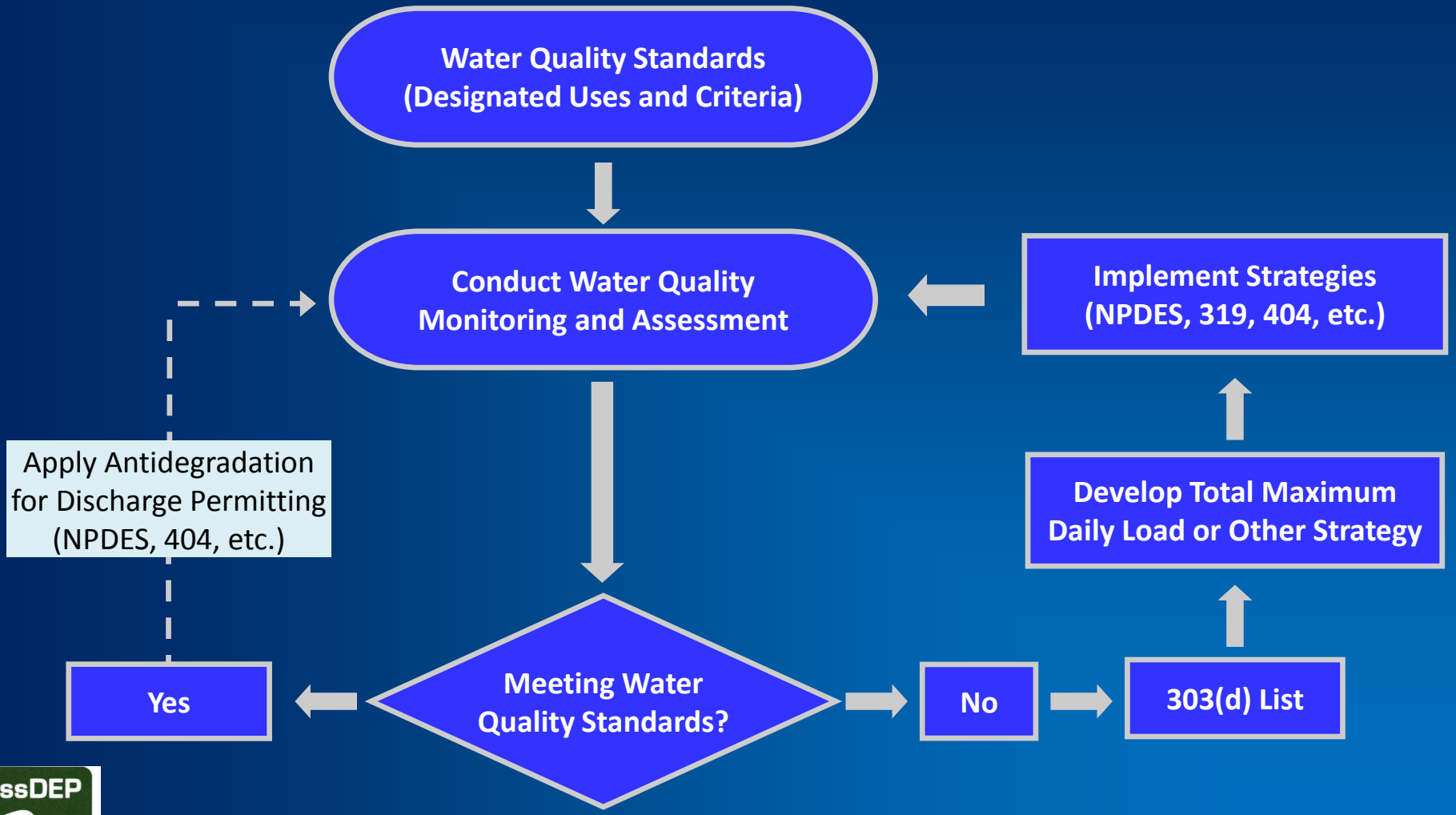
www.Mass.Gov/DEP

314 CMR 4.00: MASSACHUSETTS SWQS

DISCLAIMER: The descriptions of the current SWQS regulation and the proposed revisions to it included in this document are for informational purposes, only. The actual SWQS regulation shall control in the event of any discrepancy with the description provided. The proposed revisions may or may not be adopted into law, and are subject to change without notice. As a result, no person in any administrative or judicial proceeding shall rely upon the content of this document to create any rights, duties, obligations or defenses, implied or otherwise, enforceable at law or in equity.

Overview of Clean Water Act Framework and Water Quality Standards

Clean Water Act Framework



Surface Water Quality Standards

- Define the water quality goals of a water body by designating the use(s) of the water body and by setting criteria necessary to protect those uses
- Core components of surface water quality standards
  1. Designated uses
  2. Water quality criteria
  3. Antidegradation provisions
  4. General policies
- Do not apply to ground water

Establishing Surface Water Quality Standards

- The Federal Clean Water Act requires state promulgation and periodic reviews of SWQS
  - First promulgated in Massachusetts in 1967 and periodically revised (314 CMR 4.00)
  - Updates to Massachusetts SWQS last made in 2006 and 2013
- EPA has oversight authority for review and approval
  - SWQS do not take effect until EPA approves them
  - EPA has 60 days to approve and 90 days to disapprove after receipt

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Overview of Proposed Revisions to 314 CMR 4.00: Massachusetts SWQS

314 CMR 4.00: Massachusetts SWQS

- Divided into two parts
  1. Narrative section
  2. Tables and figures
- Revisions are proposed for both portions of the regulation

Overview of Proposed Revisions to Tables & Figures

Tables & Figures 1-27: Improve Clarity

- Modifications to overall format (including arranging basins alphabetically)
- Corrections (spelling, boundary descriptions, missing information)
- Added definitions as footnotes to the tables
- Two coastal figures updated to ensure consistency with major basin delineations in MassGIS
- Updated Combined Sewer Overflow and Public Water Supply qualifiers
- Where surface water names were listed with a qualifier (e.g., Cold Water) but without a class, the class was determined and listed
  - Note: only one substantive change was made to a surface water classification

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Tables 1-27: Cold Water Designations

- Proposed regulations will add 153 *Cold Water* stream designations to Tables 1-27
- The Division of Fisheries and Wildlife (DFW) has already designated these 153 streams as *Cold Water Fishery Resources* (CFR)
- Adding these 153 stream designations will better align DEP's SWQS with DFW's CFR designations

Table 28: Site-Specific (SS) Criteria

- In 2013, 15 copper and 1 zinc SS criteria were added, derived using EPA's Water Effect Ratio (WER) approach
  - EPA recently determined that the 15 copper SS criteria are not sufficiently protective
  - DEP proposes to remove these criteria from Table 28
  - DEP proposes to update the zinc SS criteria based on EPA's technical review
- In 2006, 17 Cape Cod nitrogen SS criteria were added based on draft or preliminary TMDLs
  - The criteria have been revised to reflect the final TMDLs

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Overview of Proposed Revisions to Narrative Sections

Key Revisions to SWQS Narrative Section

- Procedures for Sampling and Analyses (314 CMR 4.03(6))
  - Updates to procedures for collecting, preserving, and analyzing samples in connection with surface water quality standards
- Bacteria Criteria (314 CMR 4.05)
  - Update for consistency with EPA 2012
- Toxic Pollutants (314 CMR 4.05(5)(e))
  - Updates to model- and equation-based criteria
  - Addition of a new Table 29--Generally Applicable Criteria, consistent with EPA recommended ambient water quality criteria (AWQC)

Bacteria Criteria (314 CMR 4.05)

- In 2012, EPA released new recommended recreational bacteria criteria for the protection of human health
  - Minor change to the geometric mean criteria
  - Replaced a single-sample maximum value with a value not to be exceeded more than 10% of the time
- DEP coordinated with Department of Public Health (DPH) on the revisions
  - No changes to the criteria in DPH's regulation used to make determinations for beach closures
- DEP's criteria used to assess water quality for long-term recreational use

Bacteria Criteria (314 CMR 4.05)
Geometric Mean

- **Geometric Mean:** DEP selected EPA's recommended criteria at an illness rate of 36 illnesses per 1,000 persons.
- The 5-sample minimum requirement in the SWQS is proposed to be eliminated per EPA recommendation.

		Criteria (colony-forming units per 100 milliliters; cfu/mL)	
Bacterial Indicator	**Type of Water**	**Existing**	**Proposed New**
Enterococci*	Marine and Fresh Water	35 cfu/mL (marine) 33 cfu/mL (fresh)	35 cfu/mL
Escherichia coli (E. coli)	Fresh Water	126 cfu/mL	126 cfu/mL

*The enterococci change from 33 to 35 cfu/mL is not considered significant and will ensure consistency with EPA's 2012 guidance.

Bacteria Criteria (314 CMR 4.05) Averaging Period

- **Criteria calculation changes:** The time period over which the bacteria levels are averaged to compare to criteria will change in the proposed revisions to the SWQS.

		Calculation of the Geometric Mean	
Type of Water	**Applicable Season**	**Existing**	**Proposed New* (no minimum sample requirement)**
Bathing Waters	Bathing Season	5 most recent samples taken over the bathing season	30-day or smaller interval
Bathing Waters	Non-Bathing Season	6-month averaging period with a minimum of 5 samples	90-day or smaller interval
All Other Waters	Entire Year	6-month averaging period with a minimum of 5 samples	90-day or smaller interval

*For CSO- and POTW-impacted segments in the proposed revisions: 30-day-or-smaller interval.

Bacteria Criteria (314 CMR 4.05) Statistical Threshold Values

- DEP is proposing to adopt statistical threshold values (STVs) as recommended in the 2012 EPA guidance.
- STVs would replace existing single-sample maximums (SSMs) in the proposed revisions to the SWQS.

Bacterial Indicator	Type of Water	Existing SSM	Proposed New STV * (not to be exceeded by more than 10% of samples)
Enterococci	Marine and Fresh Water	104 cfu/mL (marine) 61 cfu/mL (fresh)	130 cfu/mL
Escherichia coli (E. coli)	Fresh Water	235 cfu/mL	410 cfu/mL

*The proposed intervals for calculating the geomean (30-day or smaller interval and 90-day or smaller interval) also apply to STVs.

Toxic Pollutant Criteria (314 CMR 4.05(5)(e)) Generally Applicable Criteria

- Under CWA Section 303(c)(2)(B), states are required to adopt *Ambient Water Quality Criteria* (AWQC) for all toxic pollutants for which criteria have been published by EPA
  - If states do not adopt the criteria, they are required to provide an explanation to EPA
- In 2006, MassDEP incorporated EPA's 2002 toxic pollutant criteria by reference
- EPA has requested that MassDEP incorporate the AWQC directly into 314 CMR 4.00

Toxic Pollutant Criteria (314 CMR 4.05(5)(e)) Generally Applicable Criteria

EPA's Updated or New Criteria Since 2002

Aquatic Life Criteria	
Pollutant	**Fresh or Marine**
Acrolein (2009)	Fresh
Aluminum (2018, update to 1988 guidance)	Fresh
Ammonia (2013, update to 1999 guidance)	Fresh
Cadmium (2016, update to 2001 guidance)	Fresh and Marine
Carbaryl (2012)	Fresh and Marine
Copper (2007, update to 1996 guidance)	Fresh
Diazinon (2005)	Fresh and Marine
Nonylphenol (2005)	Fresh and Marine
Selenium (2016, update to 1999 guidance)	Fresh
Tributyltin (2004)	Fresh and Marine

Human Health Criteria
100 updated criteria
11 new criteria

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Toxic Pollutant Criteria (314 CMR 4.05(5)(e)) Generally Applicable Criteria

- DEP proposes to adopt all new or updated EPA recommended criteria since 2002, except for the 2016 selenium criteria update, which requires further evaluation before adoption
- All pollutant criteria will be incorporated into a new Table 29
  - Table 29a: Aquatic Life Criteria
  - Table 29b: Human Health Criteria
- Most criteria are presented as absolute values
- Some criteria use model- or equation-based formulas:
  - 7 metals (models and equations)
  - Ammonia (temperature- and pH-based equation)
  - Pentachlorophenol (pH dependent)

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Toxic Pollutant Criteria (314 CMR 4.05(5)(e)) Generally Applicable Criteria

- The proposed revisions will allow for use of EPA's recommended *Water Effect Ratio* (WER) method to adjust aquatic life criteria
- For certain metals, the WER may be used where adjustments to local conditions are desired
  - Will require data collection, toxicity testing, and analysis
- WER-adjusted criteria need approval by DEP and EPA for use in establishing effluent limits in NPDES permits

Toxic Pollutant Criteria (314 CMR 4.05(5)(e)) Freshwater Aluminum Criteria

- Existing SWQS include aluminum criteria based on 1988 EPA guidance
  - Fixed values: 87 µg/L chronic & 750 µg/L acute
- In 2018, EPA published updated aluminum criteria guidance that recommends use of Multiple Linear Regression (MLR) models
  - Criteria are derived based on local water chemistry: pH, hardness, and dissolved organic carbon (DOC)
- The *variable* 2018 MLR-based aluminum criteria supersede the fixed 1988 aluminum criteria (87 µg/L chronic and 750 µg/L acute)
- DEP proposes to include the 2018 aluminum MLR criteria in the new Table 29a

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Toxic Pollutant Criteria (314 CMR 4.05(5)(e)) Freshwater Aluminum Criteria

Default Freshwater Aluminum Criteria by Watershed (River Basin or Coastal Drainage Area)*		
River Basin or Coastal Drainage Area	**CMC† (Acute) µg/L**	**CCC† (Chronic) µg/L**
Blackstone	542	270
Boston Harbor/Charles	970	390
Buzzards Bay/Mt. Hope Bay/Narragansett Bay/Taunton/Ten-Mile	490	260
Cape Cod Coastal	**	**
Chicopee (5th percentile)	291	171
Connecticut (5th percentile)	630	300
Deerfield	450	220
Farmington/Westfield (5th percentile)	309	180
French/Quinebaug	580	280
Housatonic/Hudson	1400	520
Ipswich/North Coastal/Parker	954	406
Islands Coastal	**	**
Merrimack/Shawsheen (5th percentile)	470	259
Millers	340	210
Nashua (5th percentile)	350	200
South Coastal	1200	460
Sudbury, Assabet, and Concord (SuAsCo)	954	394

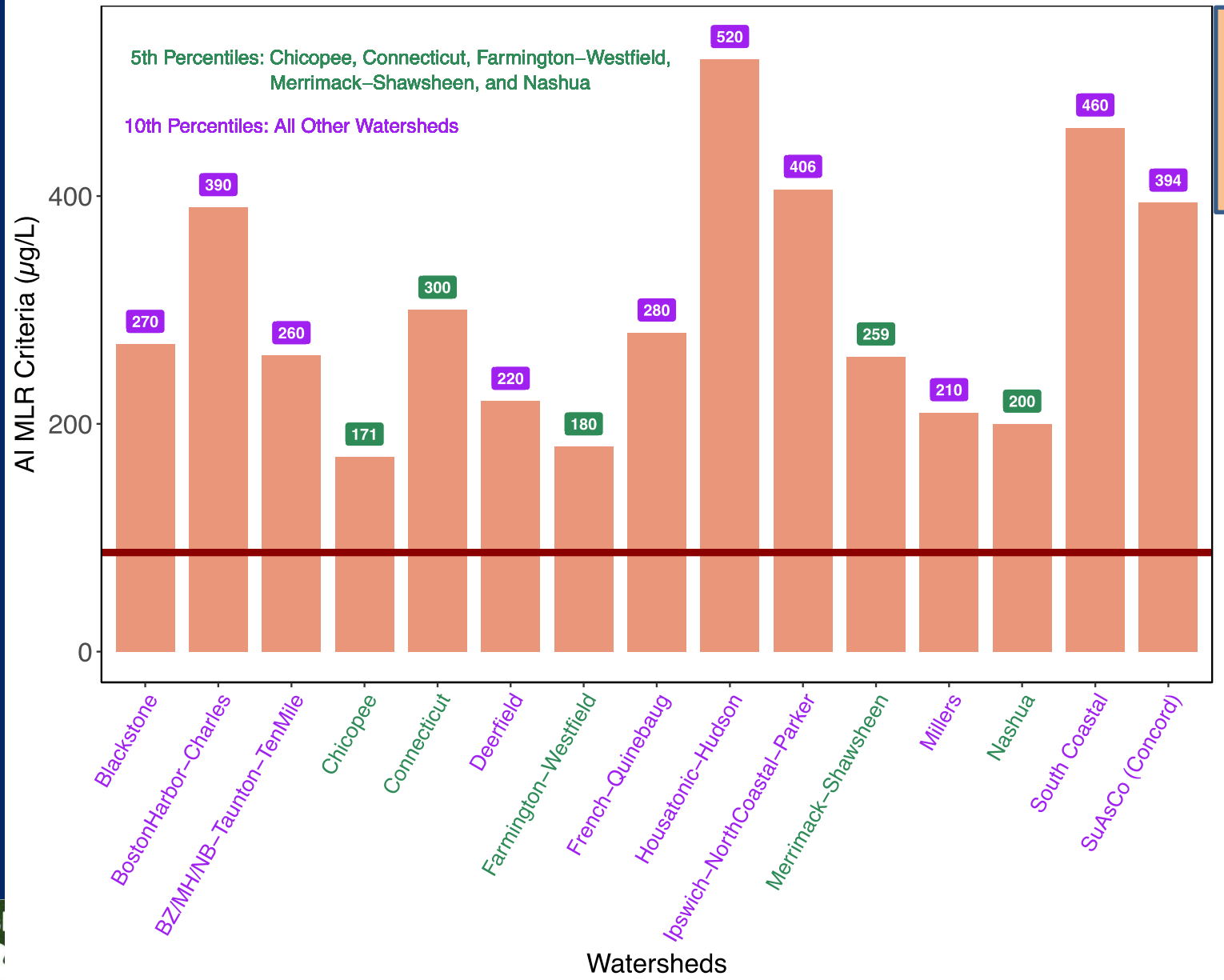
***Defaults are based on 10th percentile criteria calculated from concurrent pH, DOC, and hardness data, except watersheds marked as 5th percentile to protect state and federal endangered species.**

**** Insufficient data are available to calculate watershed-based default criteria.**

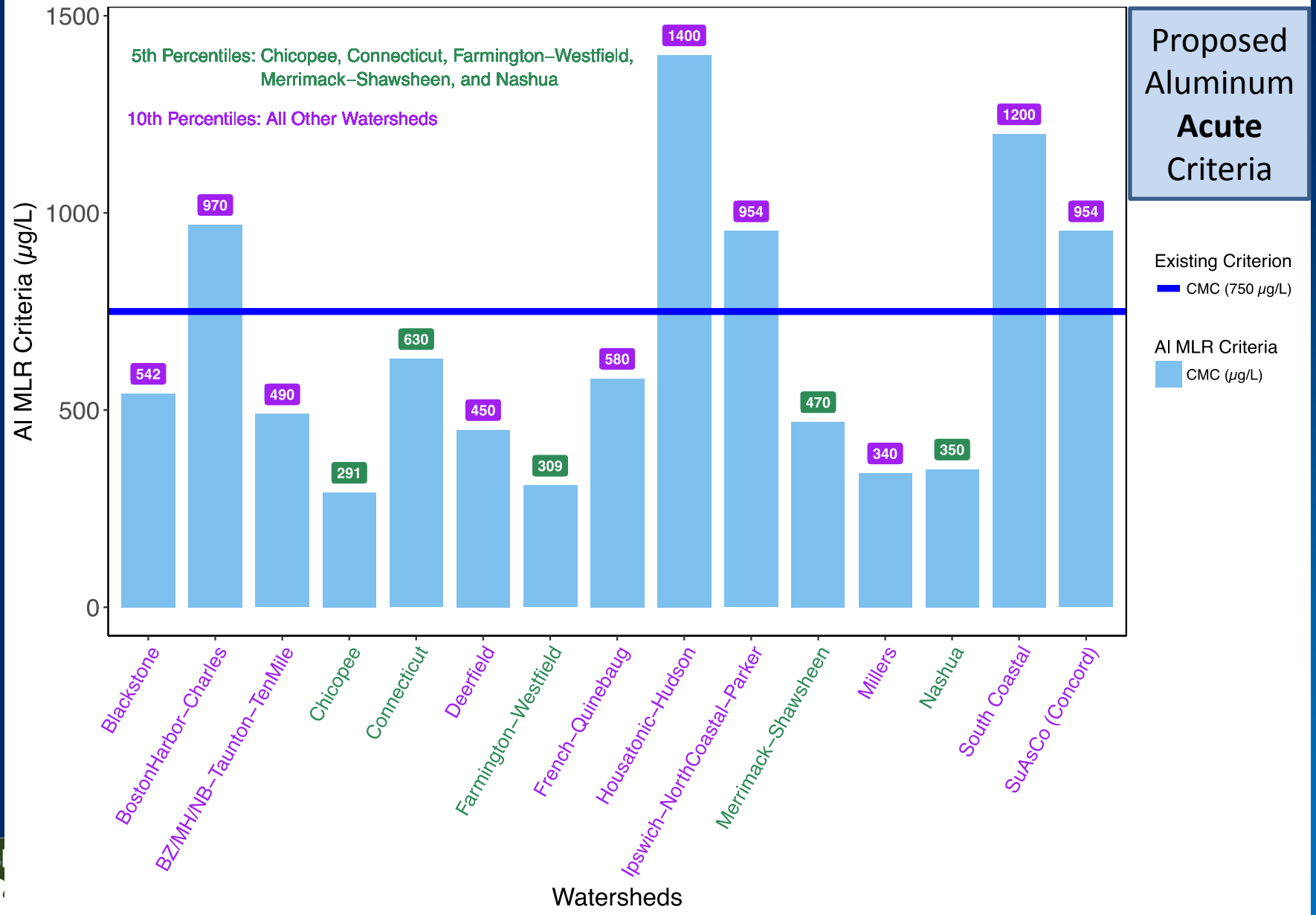
†The CMC = Criterion Maximum Concentration and the CCC = Criterion Continuous Concentration

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Default Aluminum Multiple Linear Regression (MLR) Chronic Criteria vs. Existing Aluminum Chronic Criterion



Proposed Aluminum **Chronic** Criteria


Default Aluminum Multiple Linear Regression (MLR) Acute Criteria vs. Existing Aluminum Acute Criterion
5th Percentiles: Chicopee, Connecticut, Farmington–Westfield, Merrimack–Shawsheen, and Nashua
10th Percentiles: All Other Watersheds
Al MLR Criteria (µg/L)
1500
1000
500
0
542
970
490
291
630
450
309
580
1400
954
470
340
350
1200
954
Blackstone
BostonHarbor–Charles
BZ/MH/NB–Taunton–TenMile
Chicopee
Connecticut
Deerfield
Farmington–Westfield
French–Quinebaug
Housatonic–Hudson
Ipswich–NorthCoastal–Parker
Merrimack–Shawsheen
Millers
Nashua
South Coastal
SuAsCo (Concord)
Watersheds
Proposed Aluminum Acute Criteria
Existing Criterion
CMC (750 µg/L)
Al MLR Criteria
CMC (µg/L)

Toxic Pollutant Criteria (314 CMR 4.05(5)(e)) Freshwater Aluminum Criteria

- The proposed SWQS also allow for the use of local ambient water quality data to derive site-specific criteria.
- If site-specific criteria are derived, those criteria will supersede the watershed default criteria.
- Site-specific criteria derived for use in establishing effluent limits in NPDES permits require approval by DEP and EPA, and will be subject to public notice in connection with the NPDES permitting process.

Toxic Pollutant Criteria (314 CMR 4.05(5)(e)) Freshwater Copper Criteria

- EPA Guidance
  - In 2007, EPA recommended a bioavailability model (Biotic Ligand Model; BLM) to calculate freshwater criteria for copper
- DEP Proposed Regulation
  - Continue use of the hardness-based equation for copper criteria in Table 29a
  - Allow for the use of the 2007 copper BLM in Table 29a

Toxic Pollutant Criteria (314 CMR 4.05(5)(e)) Freshwater Copper Criteria

- Copper Biotic Ligand Model (BLM)
  - The BLM allows the criteria to be derived based on local water chemistry.
  - This approach requires 10 water chemistry parameters as inputs (pH, dissolved organic carbon (DOC), major cations (Ca, Mg, Na, & K), major anions (SO_4 & Cl), temperature, and alkalinity).
  - Use of the BLM requires sample collection to develop the criteria.

Toxic Pollutant Criteria (314 CMR 4.05(5)(e)) Freshwater Copper Criteria

Hardness-Based Equations

- Copper criteria are derived using local water chemistry and equations
- Local water chemistry:
  - Hardness (Ca and Mg)

Biotic Ligand Model (BLM)

- Copper criteria are derived using local water chemistry and equations (model)
- Local water chemistry:
  - 10 parameters
  - pH, DOC, major cations (Ca, Mg, Na, & K), major anions (SO_4 & Cl), temperature, and alkalinity

For More Information on Proposed Revisions to 314 CMR 4.00: Massachusetts SWQS

MassDEP Website

www.mass.gov/regulations/314-CMR-4-the-massachusetts-surface-water-quality-standards

- Available documents
  - Summary of proposed revisions and notice to reviewers
  - 314 CMR 4.00 with proposed revisions
  - Fact sheets (8) with supplemental information

To Submit Comments on Proposed Revisions to 314 CMR 4.00: Massachusetts SWQS

- Comments, submitted orally or in writing, will be accepted at public hearings in Boston (October 25th) and Worcester (October 28th).
- Written comments will be accepted until 5:00 p.m. on Friday, November 8, 2019.
- Written comments must be submitted to

Richard.Carey@mass.gov

or

Richard Carey
MassDEP, Watershed Planning Program
8 New Bond Street
Worcester, MA 01606