

# USEPA National Nutrient Program Updates



October 2, 2024

- **Background – nutrient criteria 101**
- **Program Updates – resources / recent releases**
- **N-STEPS – current projects**





## Background – Clean Water Act

**CWA Objective:** “restore and maintain the chemical, physical and biological integrity of the Nation’s waters”

### Congressional Act or Statute

- U.S. Code (U.S.C.)
- **Clean Water Act**,  
*33 U.S.C. § 1251 et seq.*

### EPA Regulations

- Code of Federal Regulations (CFR)
- *30 CFR 131*

### State, Territorial, or Tribal Law

- **Water Quality Standards**

- Water Quality Standards define goals for surface waters and criteria to support those goals

Water Quality Standards

303(d) Listing (“impaired waters”)

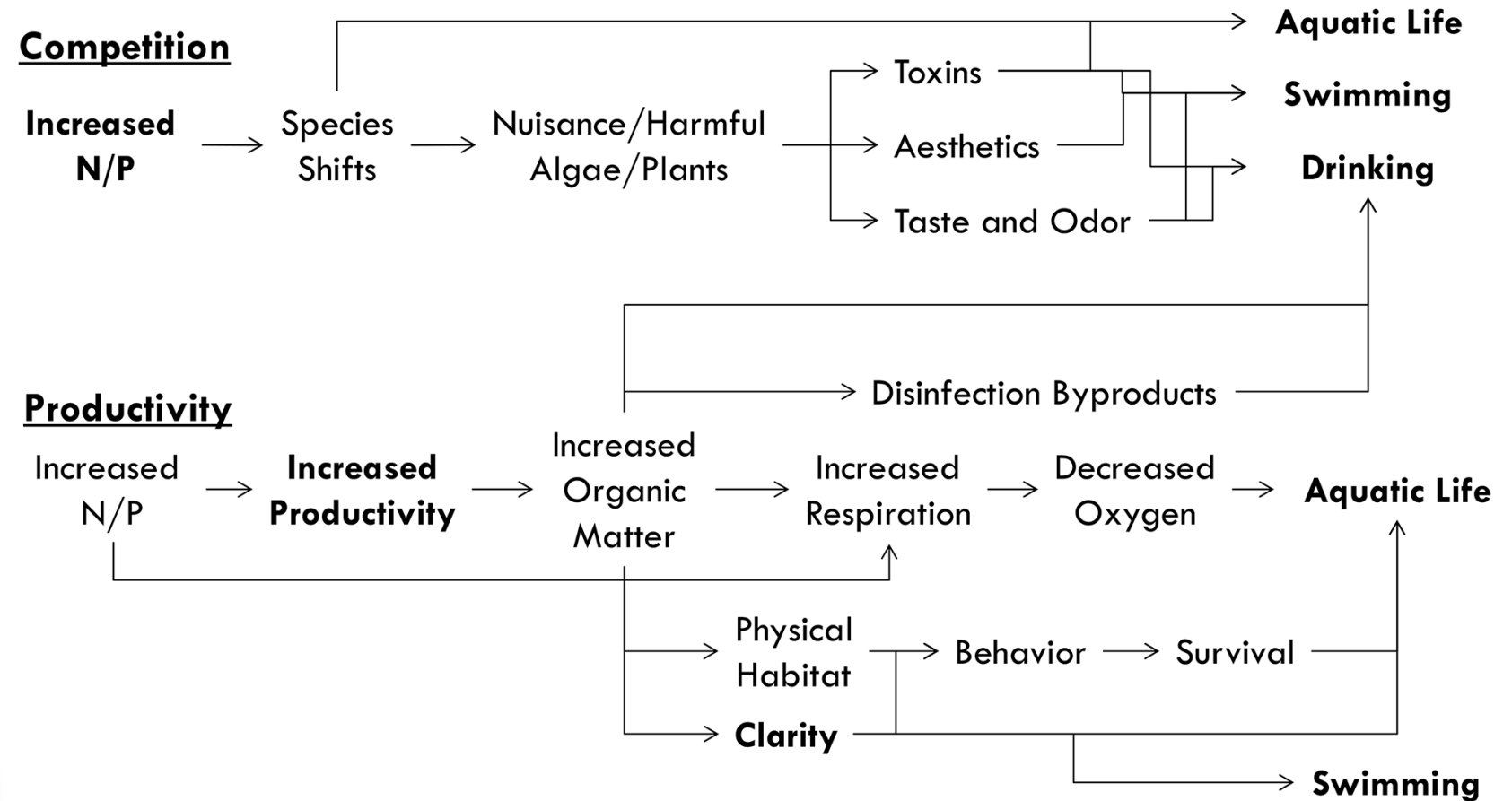
Restoration Planning (e.g., TMDL)

Permitting (e.g., NPDES)

Other Non-CWA Management Actions

## Background – Nutrient Criteria

- Nutrients affect waterbody function and use via many pathways





## Background – Criteria Development

Multiple approaches can be used to analyze data and derive numeric nutrient criteria

### Mechanistic Modeling

- Mathematical model of environmental processes used to estimate system response to change

### Stressor-Response

- Relationship between nutrients and response measure(s), also called empirical modeling

### Reference Condition

- Based on data from sites or time periods that are protective of designated uses

### Other Approach

- Scientific literature
- Expert judgment
- Weight of evidence
- Other defensible approach



# Resources – Criteria Development

United States Environmental Protection Agency  
Office of Water  
Office of Science and Technology  
Washington, DC 20460  
EPA-822-B-00-002  
July 2000  
www.epa.gov



## Nutrient Criteria Technical Guidance Manual

Rivers and Streams



## Nutrient Criteria Technical Guidance Manual

Lakes and Reservoirs

United States Environmental Protection Agency  
Office of Water  
4304  
EPA-822-B-01-003  
October 2001



## Nutrient Criteria Technical Guidance Manual

Estuarine and Coastal  
Marine Waters



## Nutrient Criteria Technical Guidance Manual

Wetlands

## Chlorophyll – Microcystin Model

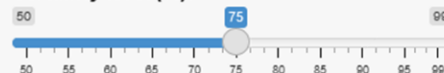
Target MC concentration ( $\mu\text{g/L}$ ):



Allowable exceedance probability:

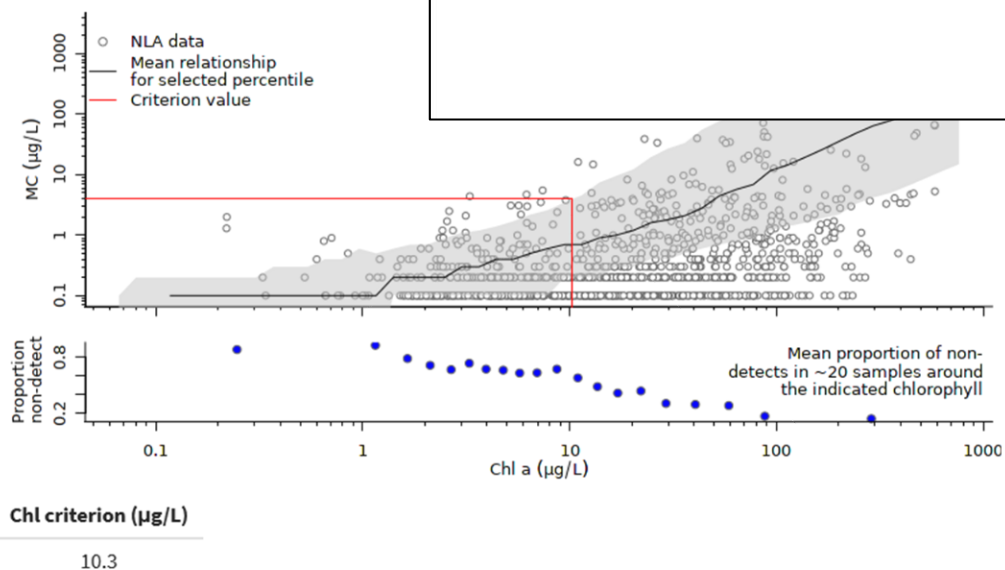


Certainty level (%):



Background

Model



United States Environmental Protection Agency  
Office of Water  
Mail code 4304T  
EPA-820-S-10-001  
November 2010

## Using Stressor-response Relationships to Derive Numeric Nutrient Criteria

## U.S. EPA Expert Workshop: Nutrient Enrichment Indicators in Streams

Proceedings  
April 16–18, 2013

## EPA's Recommended Ambient Water Quality Criteria for Nutrients



# Resources – Criteria Development

- **N-STEPS Online**
  - <https://nsteps.epa.gov/>



The screenshot shows the N-STEPS Online website. At the top is the EPA logo and the text "United States Environmental Protection Agency". Below this is a navigation bar with links for "Environmental Topics", "Laws & Regulations", and "About EPA". A search bar is also present. The main header area includes "N-STEPS Online", "Develop Criteria" (with a dropdown arrow), "Case Studies", and "Resources" (with a dropdown arrow). On the right side of the header are links for "CONTACT US", "SHARE", and social media icons for Facebook, Twitter, Pinterest, and Email. A left sidebar contains a list of navigation links: "Home" (highlighted), "Planning", "Problem Formulation", "Analysis", "Criteria Derivation", "Case Studies", and "Resource Library". The main content area features the title "Nutrient Scientific Technical Exchange Partnership & Support (N-STEPS) Online" in a large, bold font, followed by the subtitle "A Resource for Numeric Nutrient Criteria Development". Below this is a section titled "Overview of Numeric Nutrient Criteria" which contains two paragraphs of text. The first paragraph discusses nutrient pollution from excess nitrogen (N) and phosphorus (P) as a leading cause of water quality degradation. The second paragraph discusses the impacts of excess nutrients on aquatic life and recreational waters, and mentions Figure 1 illustrating the process of nutrient pollution affecting water body uses.

**Nutrient Scientific Technical Exchange Partnership & Support (N-STEPS) Online**  
A Resource for Numeric Nutrient Criteria Development

### Overview of Numeric Nutrient Criteria

Nutrient pollution resulting from excess nitrogen (N) and phosphorus (P) is a leading cause of water quality degradation and an environmental challenge facing communities throughout the United States. N and P are essential elements that support the growth of algae and aquatic plants, which provide food and habitat for fish, shellfish, and other organisms that live in water. Excess N and P inputs from human activities, however, can result in *eutrophication*—stimulating the productivity of plant (e.g., algae and vascular plants) and microbial biomass. Eutrophication leads to depletion of dissolved oxygen, reduced transparency, and changes in biotic community composition through competition (Smith et al. 1999).

In addition to the impacts on aquatic life, excess nutrients also can degrade aesthetics of recreational waters (Smith et al. 1995; Suplee et al. 2009; Sylvan et al. 2007) and increase the incidence of harmful algal blooms, which can endanger human health through the production of toxins that can contaminate recreational and drinking water resources (Anderson et al. 2008; Chorus and Bartram 1999). Figure 1 illustrates the process by which nutrient pollution can affect the uses of a water body.



- **User Perception White Paper**

## Development of User Perception Surveys to Protect Water Quality from Nutrient Pollution: A Primer on Common Practices and Insights

Office of Water | EPA 823-R-21-001 | April 2021





# Resources – Advisory Groups

## Overview of Numeric Nutrient Criteria Development for Scientific and Technical Assistance Groups

### Overview of Numeric Nutrient Criteria Development

U.S. Environmental Protection Agency  
Office of Water, Office of Science & Technology

Adapted by [Group] on [Date]



Other logo(s)

#### Overview of Numeric Nutrient Criteria Development

This document provides a basic overview of how numeric nutrient criteria are developed, including background on the Clean Water Act and relevant regulatory programs.

##### Clean Water Act

The Clean Water Act provides a connected toolbox of regulatory programs through which federal agencies, states, tribes, and territories work to restore and maintain the integrity of surface waters.

	Water Quality Standards 33 USC § 1313(c)	Assessment and Reporting 33 USC § 1313(d)(1)(A)	Restoration Planning 33 USC § 1313(d)(1)(C)	Discharge Permitting 33 USC § 1342
<b>Purpose</b>	Protect public health or welfare, enhance water quality, and restore and maintain chemical, physical, and biological integrity	Identify waters not attaining standards and thus not protecting uses	Set allowable pollutant loads to a listed waterbody	Set allowable levels of pollutants in point source discharges
<b>Function</b>	Specify waterbody designated uses, criteria to protect such uses, and anti-degradation policies	Monitor water quality, identify waters not meeting standards, and rank restoration priority	Calculate and allocate Total Maximum Daily Loads (TMDLs), including margin of safety	Issue National Pollutant Discharge Elimination System (NPDES) permits with technology and water quality-based limits

Regulatory partners play different roles in implementing these programs:

- **Congress** passes and modifies the overarching laws or statutes, including the Clean Water Act.
- **Federal agencies** propose and codify regulations, provide guidance on how to implement them, and have other delegated authorities, such as regulatory oversight.
- **States, territories, and authorized tribes** propose and adopt new or revised regulations, such as



## Additional Programming

- **Lake Criteria Support**
  - Pilots underway
- **Nutrient Criteria Technical Webinar Series**
  - Upcoming schedule TBD
- **National HAB Program**
  - Newly formed in 2023
  - [www.epa.gov/habs](http://www.epa.gov/habs)

## Nutrient Scientific Technical Exchange Partnership and Support

- EPA's technical support and outreach program for nutrient criteria development
- Projects range from planning to threshold development
- State and Tribal water quality agencies are encouraged to submit proposals



## FY24/25 Projects

- 12 projects across 7 regions and 15 states
  - i. Lakes – MA, NJ, SC, WI, IN, NM, WY, ND
  - ii. Rivers/Stream – DC, MD, VA, PA, WV, WI
  - iii. Estuarine and Coastal – MA, FL





- **Consider N-STEPS proposals!**
  - <https://www.epa.gov/nutrientpollution/n-steps-program>
- **Contact info**
  - [walsh.brannon@epa.gov](mailto:walsh.brannon@epa.gov)
- **Questions/Comments?**

