



EPA's Guidance on Nutrient Criteria Development

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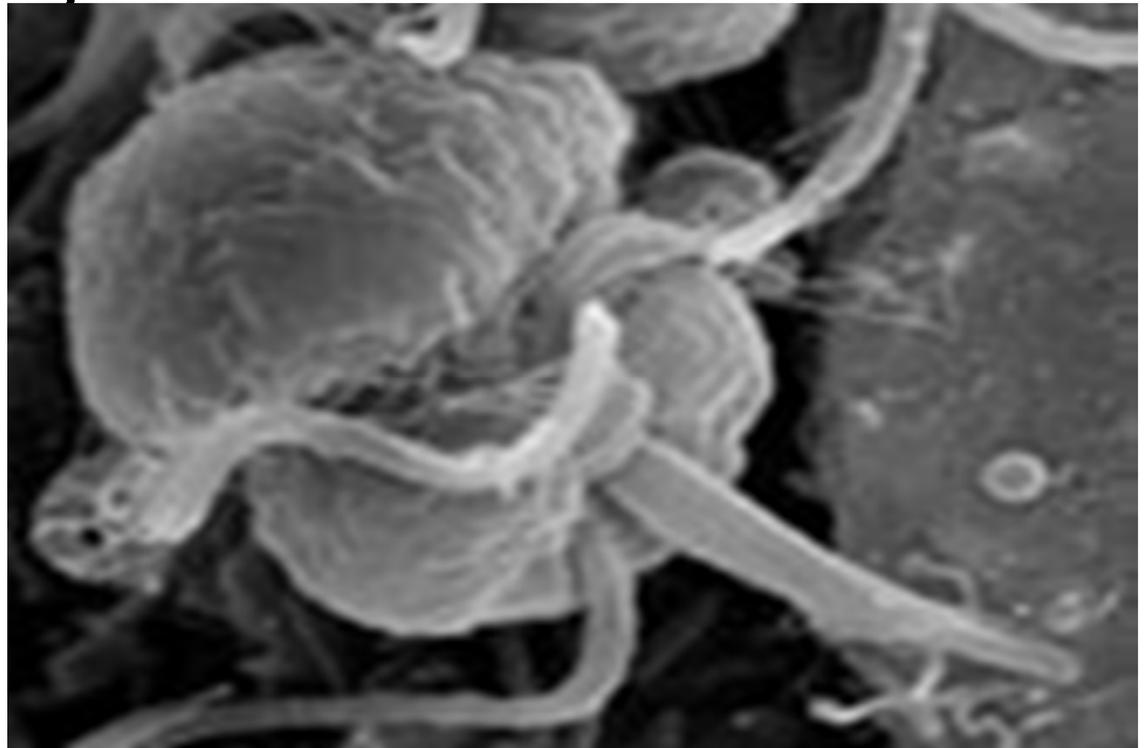


History of Nutrient Criteria

- Nutrients (Nitrogen and Phosphorus) were consistently one of the top pollutants on the CWA Section 303(D) Lists to Congress Reports beginning in the early 1990s.
- The “Nutrient Criteria Program” was initiated in 1995.
- Public recognition of the problem increased in 1998 and the program was accelerated by....

The “Cell from Hell”

- Stories about *Pfiesteria piscicida* were carried *daily* by the Baltimore Sun during the summer of 1997, and hundreds of other newspapers.





Early EPA Actions

- **Principal Goal: Develop Nutrient Criteria across the nation in 3 years.**
- The criteria needed to address nutrient pollution, not natural enrichment.
 - Primary Parameters:
 - Total P, Total N, Chlorophyll a, some measure of water clarity (e.g., Secchi disk depth, turbidity, TSS), response measure
 - Types:
 - Numeric criteria, or narrative with numeric translator



Initial Approach

- EPA calculated “estimated reference conditions” using a frequency distribution of ecoregional data.
- These CWA § 304(a) criteria were recommended for use as **starting points** for states to develop their own criteria, using this, or other scientifically defensible methods.

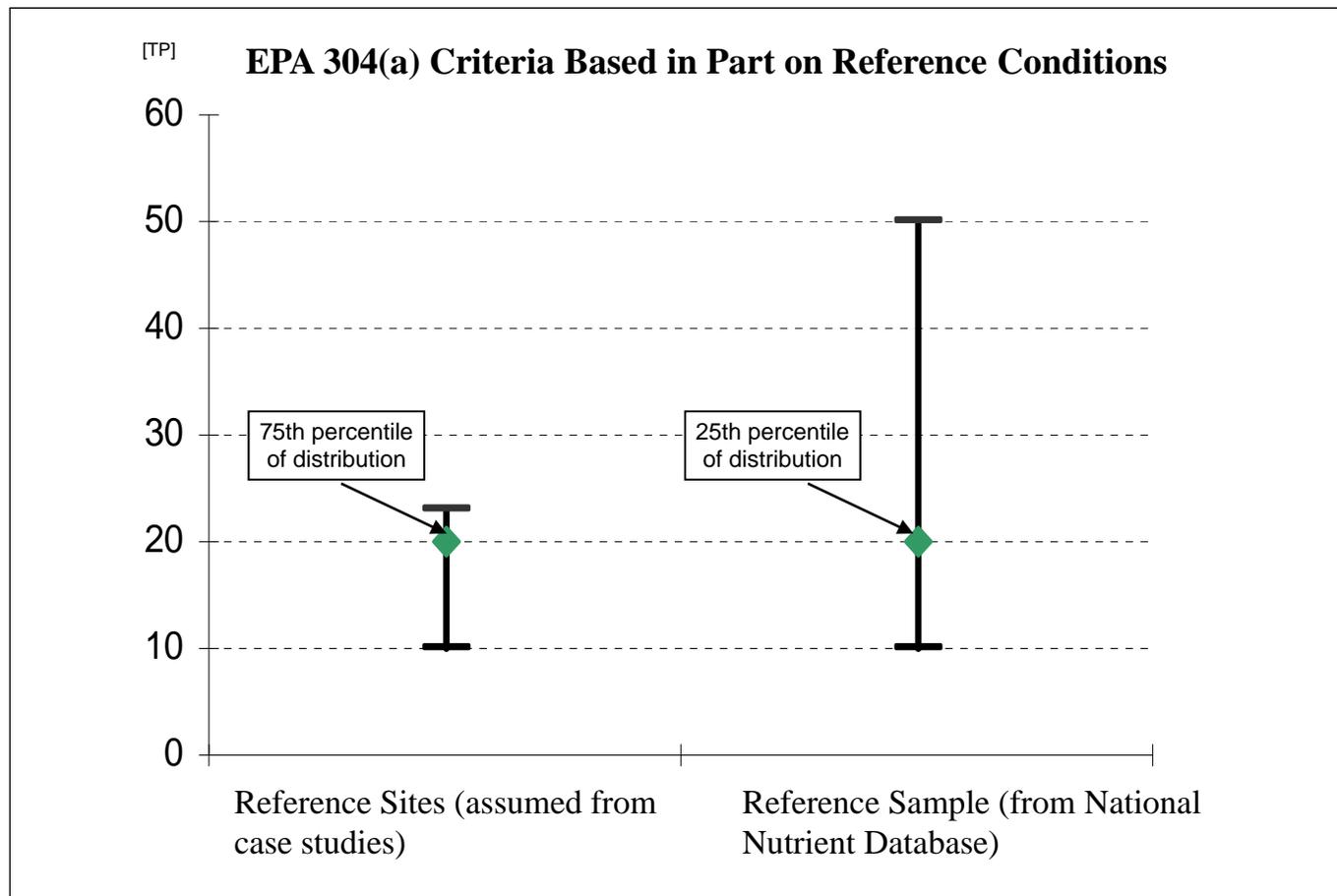
Ecoregional Classification

*Draft Aggregations of Level III Ecoregions
for the National Nutrient Strategy*



Distributional Approach

The 25th or 75th percentiles were an estimate of reference conditions – protective of all uses.





Shift in Policy

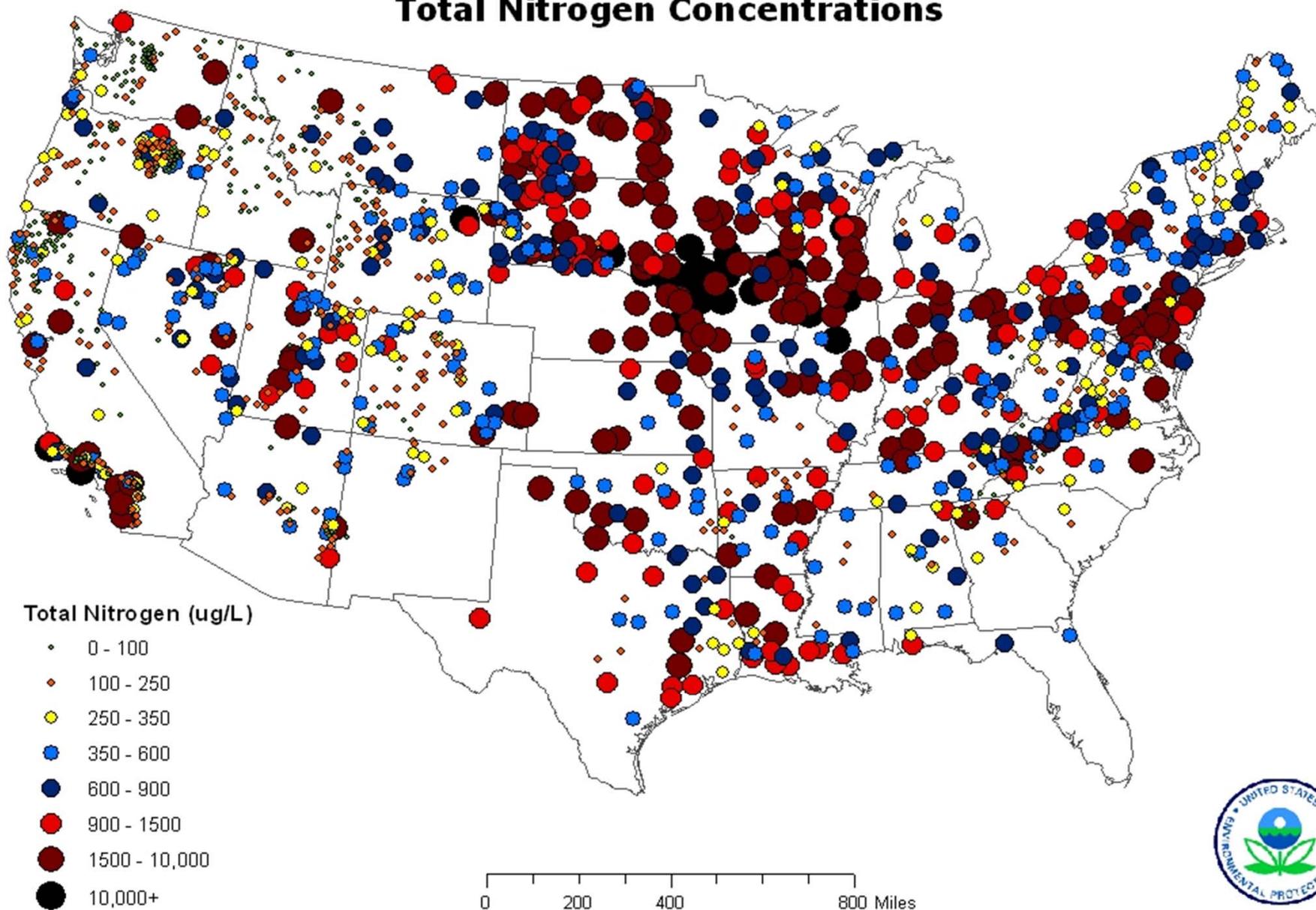
- EPA responded to the critique of the percentile approach in 2001 with a policy of “flexibility”, encouraging states to make progress on developing nutrient criteria using different approaches.
- Many states moved towards a “stressor-response” approach and began field studies to identify the algal (diatom and periphyton) or macroinvertebrate response to N and P.
- Where are we now?



National Scope of Nutrient Problem

- **Well Documented Problem and Impacts:**
 - EPA:
 - Science Advisory Board (2007)
 - Wadeable Streams and Lakes Assessments (2006, 2008),
 - National Coastal Condition Report III (2008)
 - National Research Council:
 - Mississippi River Water Quality (2008)
 - Urban SW (2008)
 - USGS: Impact of Nutrients on Groundwater (2010), SPARROW Loadings (multiple)
 - Many published articles, State and university reports
 - State EPA Nutrient Innovations Task Group (NITG) *Call to Action* Report

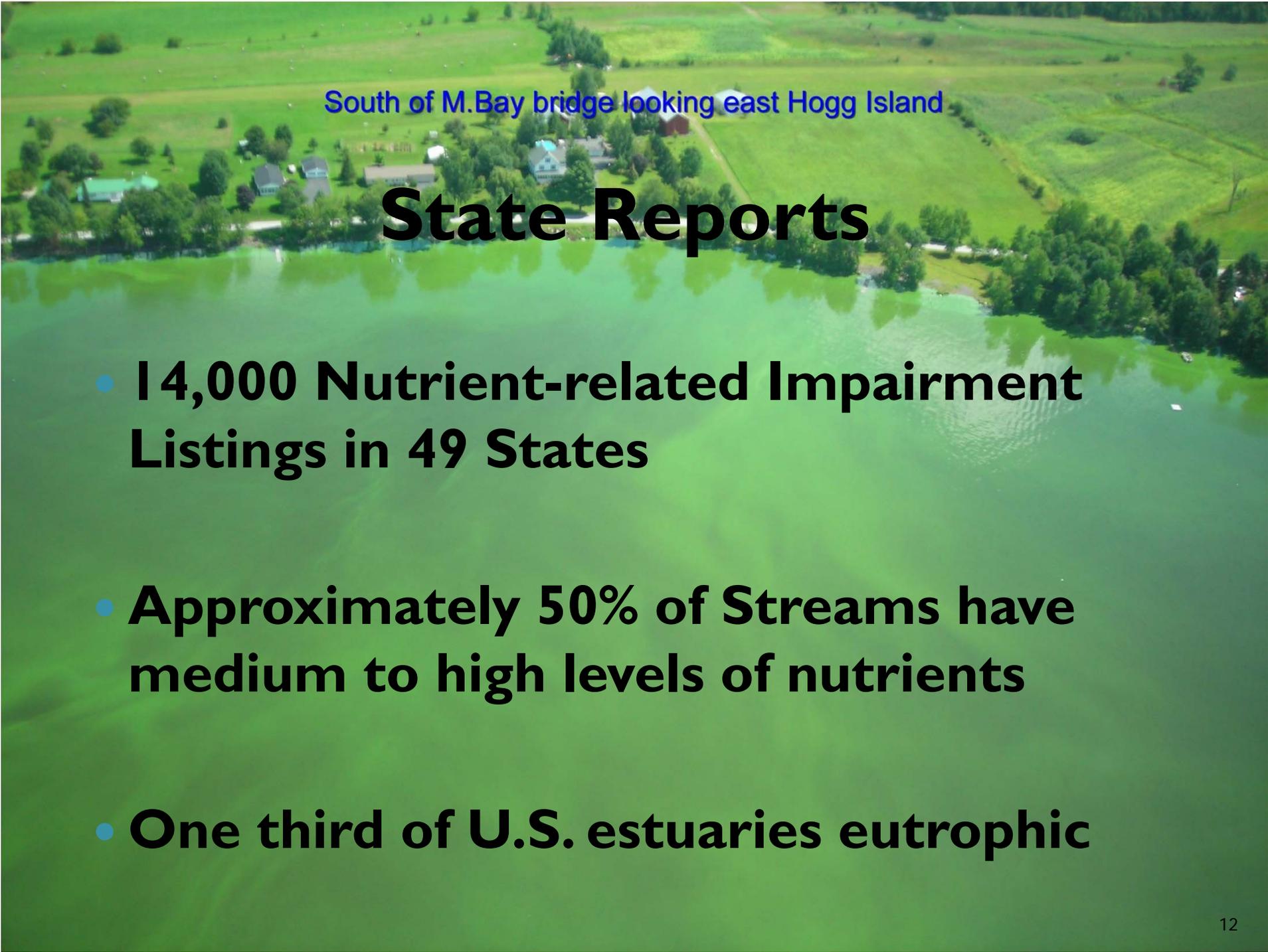
WSA Survey Results: Total Nitrogen Concentrations





National Scope of Nutrient Problem

- **14,000 Nutrient-related Impairment Listings in 49 States...**
 - 2.5 Million Acres of Lakes and Reservoirs & 80,000 Miles of Rivers and Streams
 - >47% of Streams have Med to High P; >53% have Med to High N
- **168 Hypoxic Zones in U.S. Waters**
- **78% of Assessed Continental U.S. Coastal Area Exhibits Eutrophication Symptoms**
- **Public Health Risks** – Contaminated Drinking Water is Significant & Costly
 - Rate of nitrate violations in community water systems doubled over past 7 years

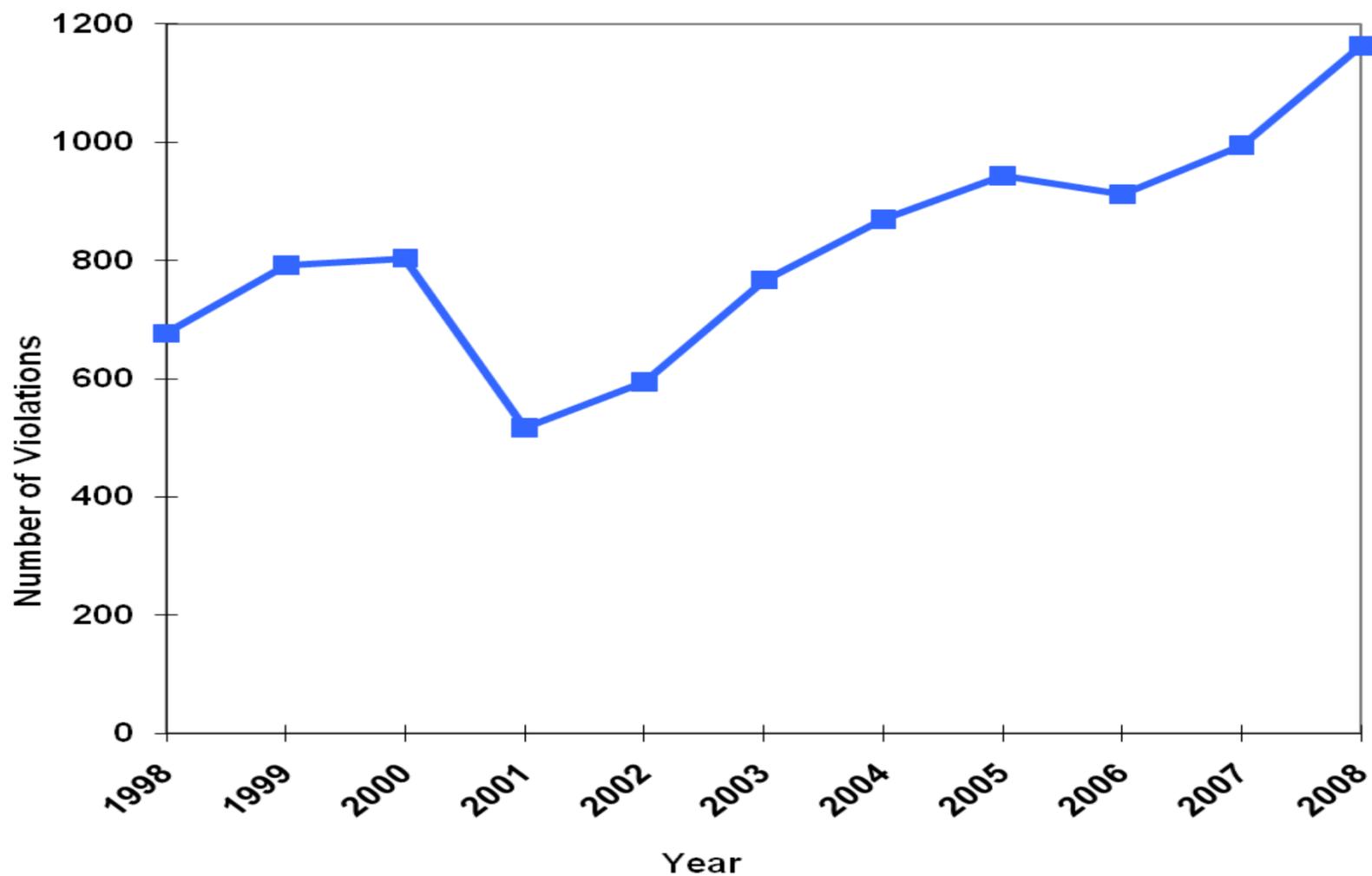


South of M. Bay bridge looking east Hogg Island

State Reports

- **14,000 Nutrient-related Impairment Listings in 49 States**
- **Approximately 50% of Streams have medium to high levels of nutrients**
- **One third of U.S. estuaries eutrophic**

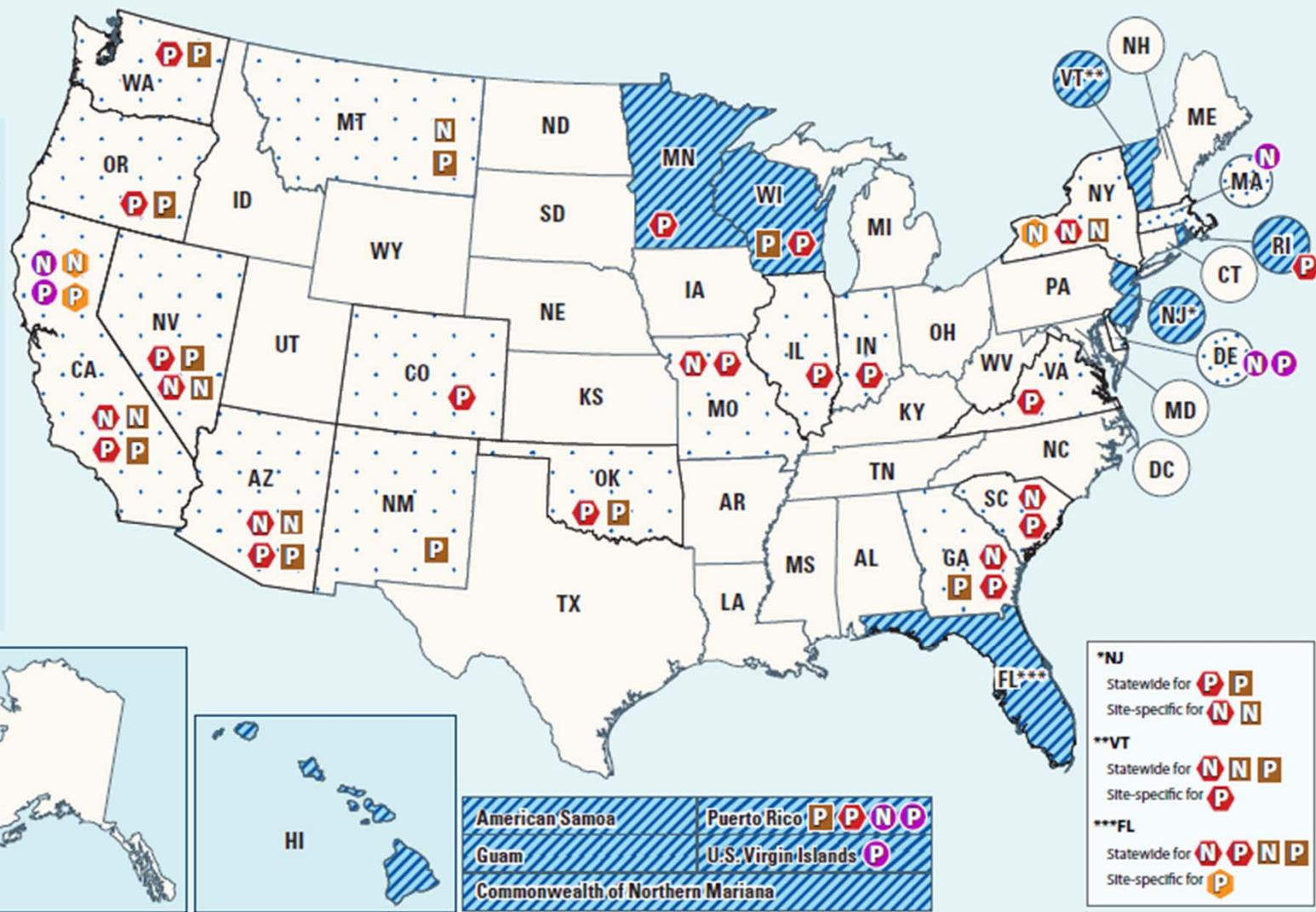
Nitrate Violations at Public Water Supplies National Trend



Progress Toward Clean Water Act Adopted Numeric Nutrient Criteria

Legend

-  Statewide numeric nutrient criteria for one or more class of waterbodies
-  Some site-specific numeric nutrient criteria
-  No numeric nutrient criteria
-  N for rivers/streams
-  P for rivers/streams
-  N for lakes/reservoirs
-  P for lakes/reservoirs
-  N for wetlands
-  P for wetlands
-  N for estuaries
-  P for estuaries



- *N**
Statewide for  
Site-specific for  
- **VT**
Statewide for   
Site-specific for 
- ***FL**
Statewide for    
Site-specific for 

And Then, There was Florida

- **January 2009:** EPA determination
 - Florida's existing narrative nutrient criterion ("In no case shall nutrient concentrations of a body of water be altered so as to cause an imbalance in natural populations of aquatic flora and fauna." 62-302.530(47)(b), F.A.C.) insufficient to meet requirements of the Clean Water Act
- **December 2009:** Consent decree to establish criteria in 2 phases
 - Phase 1: Florida's lakes and flowing waters
 - Phase 2: Florida's estuaries and coastal waters



Photo credit: Charlotte Sun Newspaper



Phase I Rule:

Florida's Lakes and Flowing Waters

- **January 2010:** EPA proposed numeric nutrient criteria
- **November 2010:** EPA finalized numeric nutrient criteria (Published December 6, 2010 – 75FR 75762)
 - Final rule included delayed effective date – Site-specific Alternative Criteria (SSAC) provision effective on Feb. 4, 2011; remainder of rule effective on Mar. 6, 2012
- **December 2011:** EPA proposes to extend Mar. 6, 2012 effective date of Phase I rule to June 4, 2012



Phase 2 Rule:

Florida's Estuaries and Coastal Waters

- **November 2010:** OST submits proposed approaches to EPA's Science Advisory Board (SAB) for review
- **July 2011:** SAB concludes their review
- **March 15, 2012:** Consent Decree deadline for EPA Administrator to sign **proposed** rule
- **November 15, 2012:** Consent Decree deadline for EPA Administrator to sign **final** rule



EPA's Nutrient Framework

- Serious problem that is getting worse; potential to become one of the costliest and most challenging environmental problems
- Growing population = more N and P pollution from urban stormwater, municipal and industrial wastewater discharges, air dep., agriculture
- To protect public health and the environment, need to act *now* to reduce N and P loadings -- while states continue to develop numeric nutrient criteria and standards
- Focuses on flexibility and partnering with state to address nutrient reductions



Elements of the Nutrient Framework

- Prioritize watersheds on a statewide basis for nutrient loading reductions
- Set watershed load reduction goals based upon best available information
- Ensure effectiveness of point source permits in priority watersheds
- Ag areas– develop watershed scale plans targeting BMPs
- Stormwater and septic systems – assure N and P reductions
- Verify that load reductions are in place
- Annual public reporting
- Develop a workplan and schedule for adopting criteria



Other EPA National Activities

- **State-EPA Numeric Nutrient Criteria Implementation Workgroup**

- Purpose: Evaluate key barriers and tools within the CWA; identify opportunities for addressing these barriers
- Examples of barriers identified by the group include:
 - Use of variances as a tool for addressing nutrient criteria issues.
 - Need for additional guidance for using biological indicators in conjunction with NNC.
 - Additional clarification needed for use of adaptive management approaches in TMDL development and implementation
 - Evaluate BMP cost-effectiveness
 - Nutrient permitting issues



EPA Technical Assistance: N and P Pollution Data Access Tool (NPDAT)

- Consists of a geospatial viewer, introductory website, and data download tables, available at:
www.epa.gov/nutrientpollution/npdatt
- Generally contains “Pre-assembled” data that is publicly available elsewhere
 - Provides streamlined access to these data in one place, in commonly-used formats
- Supports states as they consider
 - Extent and magnitude of N and P pollution
 - Water quality problems and vulnerabilities related to this pollution
 - potential pollution sources

Nutrient Permitting Guidance

- EPA HQs (OWM) is discussing development of a permitting guidance document
 - Document would provide tools to develop WQBELS for nutrients
 - Guidance would clarify recommendations for WQ-based permits for nutrients
 - Would be similar to the TSD for toxics



Region 8 Nutrient Activities

- Recent efforts have focused on providing support to states (i.e., CO, MT) that are proposing to adopt numeric nutrient criteria





Colorado

- CO is proposing a 15-yr (2011-2025) phased implementation approach for nutrients.
- Rulemaking scheduled for March 2012.
- Two components: Reg #85 and #31
- New Regulation 85:
 - Proposes effluent limits for municipal and industrial dischargers
 - Effluent limits based on BNR technology: 1 mg/l TP; 10 mg/l TIN effluent limits (annual medians)
 - Exemptions for lagoons and disadvantaged and smaller towns
 - NOT a WQS rule; NOT subject to EPA review and approval
 - To be implemented as permits expire, beginning in 2012



Colorado

- Regulation #3 I:
 - Criteria are proposed for protection of aquatic life, recreation uses, and direct use water supplies.
 - Phased adoption of WQS:
 - 2012-2022: numeric values may be adopted for DUWS reservoirs and segments upstream of dischargers.
 - Adoption of total nitrogen criteria for the same universe of waters will begin in 2017.
 - Post 2022: Criteria adoption may begin for waters downstream of point source discharges
 - The WQCD plans to list waters as impaired for nutrients (based on the narrative) starting in 2014.

Colorado

**Table 4. Draft Interim Values for Rivers and Streams
for Aquatic Life Use Protection**

	Cold Water	Warm Water
Chlorophyll <i>a</i>	150 mg/m ²	150 mg/m ²
Total Phosphorus	110 µg/L	170 µg/L
Total Nitrogen	1250 µg/L	2010 µg/L

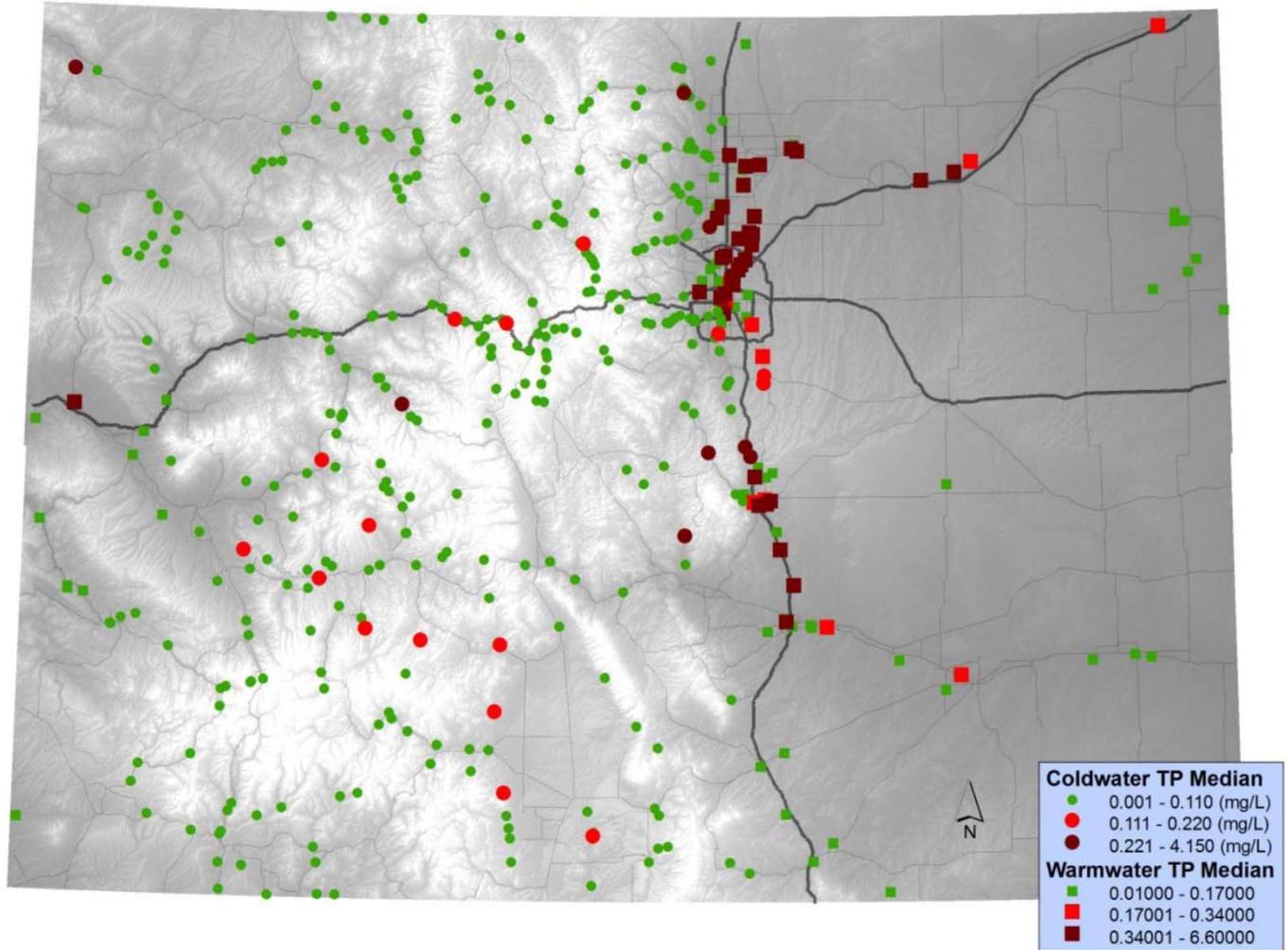
Table 7. Interim Nutrient Values for Lakes and Reservoirs

(summer average concentrations, allowable exceedance frequency of once in five years)

	Cold Water	Warm Water
Chlorophyll <i>a</i> (ug/L)	8	20
Total Phosphorus (ug/L)	25	83
Total Nitrogen (ug/L)	426	910

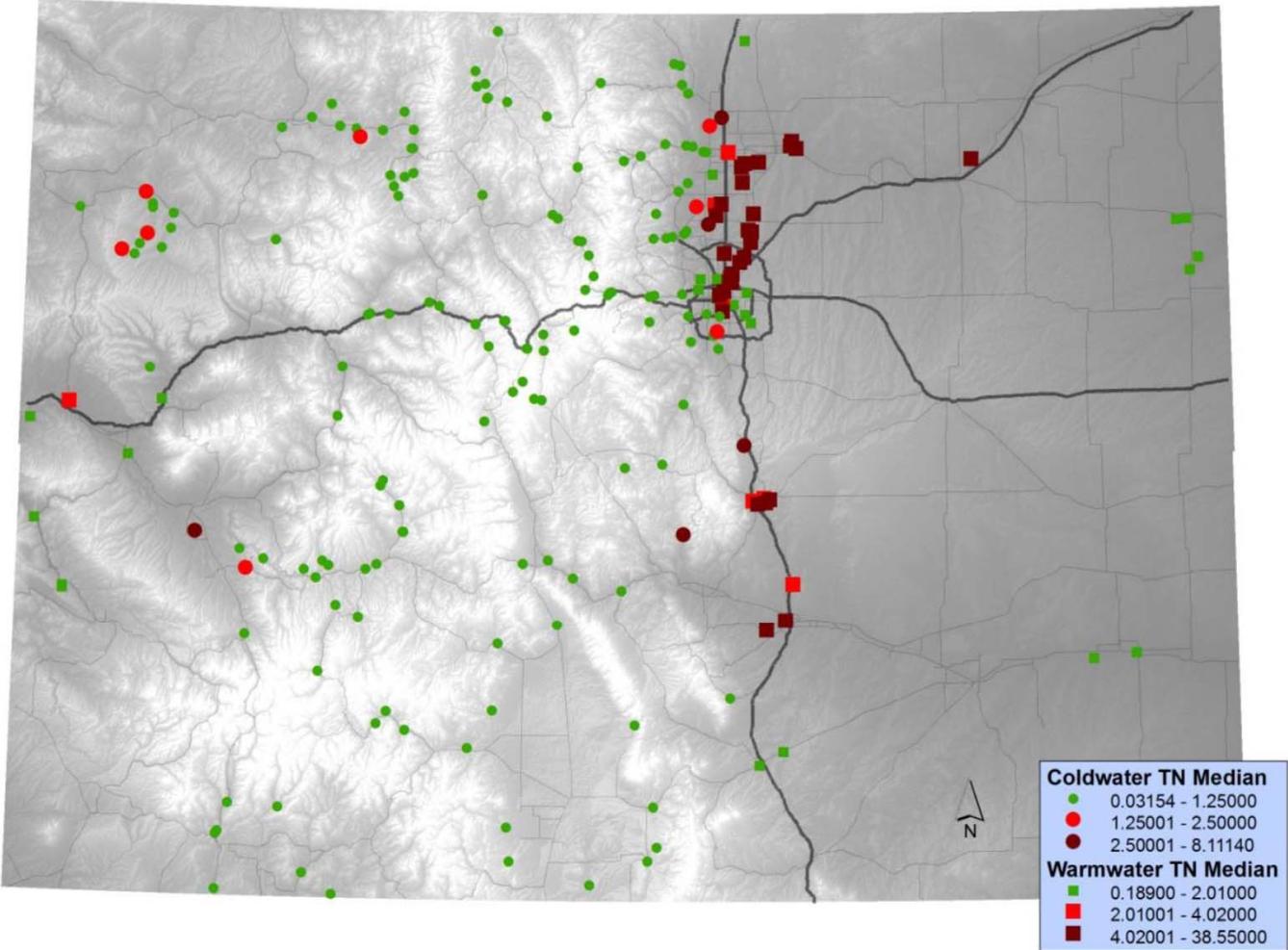
Median Phosphorus Concentrations

Colorado Rivers and Streams



Median Nitrogen Concentrations

Colorado Rivers and Streams



Montana



- MDEQ plans to initiate rulemaking for numeric nutrient criteria in Summer 2012.
- WQS variances are a key aspect of MT program for nutrients
- MDEQ also plans to adopt a trading policy

Montana's Draft Criteria

Table 1. Montana Draft Nutrient Criteria

Level III Ecoregion	Period When Criteria Apply	Parameter		
		Total P (mg/L)	Total N (mg/L)	Benthic Algae Criteria
Northern Rockies	July 1 -Sept. 30	0.025	0.3	120 mg Chl <i>a</i> /m ² (36 g AFDW/m ²)
Canadian Rockies	July 1 -Sept. 30	0.025	0.3	120 mg Chl <i>a</i> /m ² (36 g AFDW/m ²)
Middle Rockies	July 1 -Sept. 30	0.030	0.3	120 mg Chl <i>a</i> /m ² (36 g AFDW/m ²)
Idaho Batholith	July 1 -Sept. 30	0.030	0.3	120 mg Chl <i>a</i> /m ² (36 g AFDW/m ²)
Northwestern Glaciated Plains	June 16-Sept. 30	0.12	1.1	n/a
Northwestern Great Plains, Wyoming Basin	July 1 -Sept. 30	0.12	1.0	n/a
Yellowstone River (Bighorn R. confluence to Powder R. confluence)	Aug 1 -Oct 31	0.09	0.70	Nutrient concentrations based on limiting pH impacts
Yellowstone River (Powder R. confluence to stateline)	Aug 1 -Oct 31	0.14	1.0	Nutrient concentrations based on limiting nuisance algal growth



Montana

- Montana's legislature passed SB 367 in 2011.
- Statute requires that MDEQ grant general variances for 3 categories of dischargers:
 - Facilities discharging > 1 MGD --1 mg/l TP and 10 mg/l TN;
 - Facilities discharging < 1 MGD --2 mg/l TP and 15 mg/l TN; and
 - Lagoons capped at their current load.
 - Values will be revisited in 2016 and could be lowered if the costs for treatment technologies are reduced.
- EPA has indicated support for MT's proposed approach



Areas for Flexibility

- Phased adoption of WQS
- Implementation efforts that achieve incremental progress in reducing nutrient loads
- Use of variances to address stringent numeric nutrient criteria
- Use of trading
- Use compliance schedules in permits to meet nutrient WQBELs
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CWA Context

- Impaired Water Listing
- Permitting Issues
- Adoption of Criteria





CWA Compliance Issues

- CWA Section 303(d) and 40 C.F.R. Section 130.7 303(d):
 - Effective process needed for identifying waters impaired for nutrients
- 40 C.F.R. 122.44(d): Requires WQBELs that derive from and comply with WQS (where there is Reasonable Potential)

WQS Considerations

- State adopted criteria must meet the following requirements (40 CFR 131.11(a)):
 - Protect the designated uses, using the criterion most protective of the most sensitive use
 - Be based on a sound scientific rationale
 - Include sufficient parameters (e.g., acceptable concentrations) to protect the designated use
- CWA § 303(c) requires EPA to review and approve/disapprove State WQS





WQS Considerations

- Adopting numeric criteria helps to:
 - restore impaired waters
 - facilitate using antidegradation to protect high quality waters.
 - Streamlines development of TMDLs
- States should also consider what WQS provisions are needed to provide protection for downstream WQS as required by 131.10(b).

Questions?



Photo Credit: Peter Ismert