

**REVISIONS TO THE BASIC STANDARDS  
AND METHODOLOGIES FOR SURFACE  
WATER (REGULATION #31) AND  
NUTRIENT MANAGEMENT CONTROL  
REGULATION (REGULATION #85)**

WQCC Rulemaking Hearing  
March, 2012

# Commission's Legal Authority to Adopt Control Regulations

C.R.S. § 25-8-205(1): The Commission may promulgate control regulations for the following purposes:

- (a) To describe prohibitions, standards, concentrations, and effluent limitations on the extent of specifically identified pollutants, including, but not limited to, those mentioned in section 25-8-204, that any person may discharge into any specified class of state waters;
- (c) To describe precautionary measures, both mandatory and prohibitory, that must be taken by any person owning, operating, conducting, or maintaining any facility, process, activity, or waste pile that does cause or could reasonably be expected to cause pollution of any state waters in violation of control regulations or that does cause the quality of any state waters to be in violation of any applicable water quality standard.

# Bonny Reservoir State Park



# 25-8-204(4) In promulgating water quality standards, the commission shall consider:

- (a) The need for standards which regulate specified pollutants;
- (b) Such information as may be available to the commission as to the degree to which any particular type of pollutant is subject to treatment; the availability, practicality, and technical and economic feasibility of treatment techniques; the impact of treatment requirements upon water quantity; and the extent to which the discharge to be controlled is significant;
- (c) The continuous, intermittent, or seasonal nature of the pollutant to be controlled;
- (d) The existing extent of pollution or the maximum extent of pollution to be tolerated as a goal;
- (e) Whether the pollutant arises from natural sources;
- (f) Beneficial uses of water; and
- (g) Such information as may be available to the commission regarding the risk associated with the pollutants including its persistence, degradability, the usual or potential presence of the affected organisms in any waters, the importance of the affected organisms, and the nature and extent of the effect of the pollutant on such organisms.

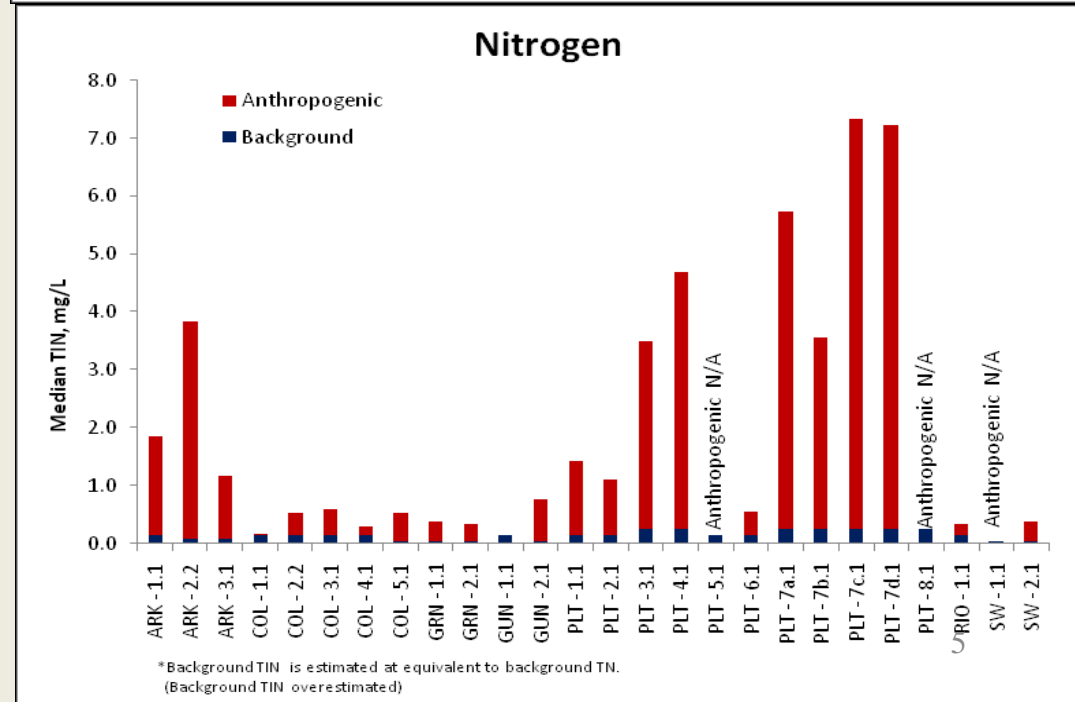
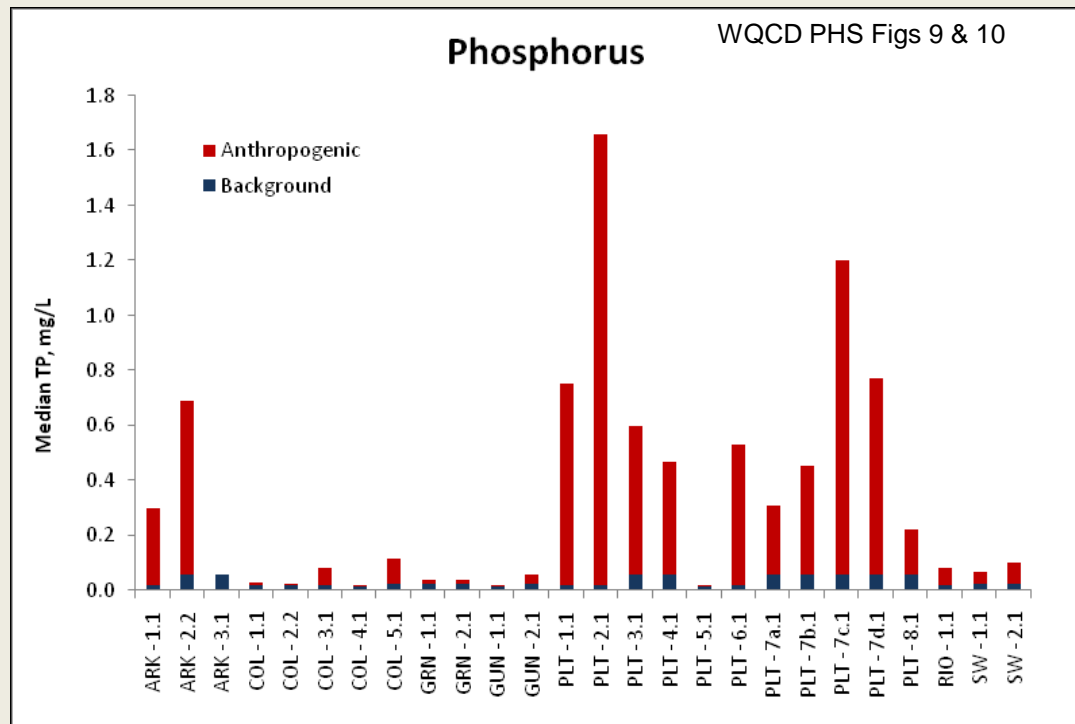
# Nature and Extent of the Problem?

Nationwide: EPA Priority

Colorado:

Concentrations are elevated above background

Reservoirs with pH, DO impairments

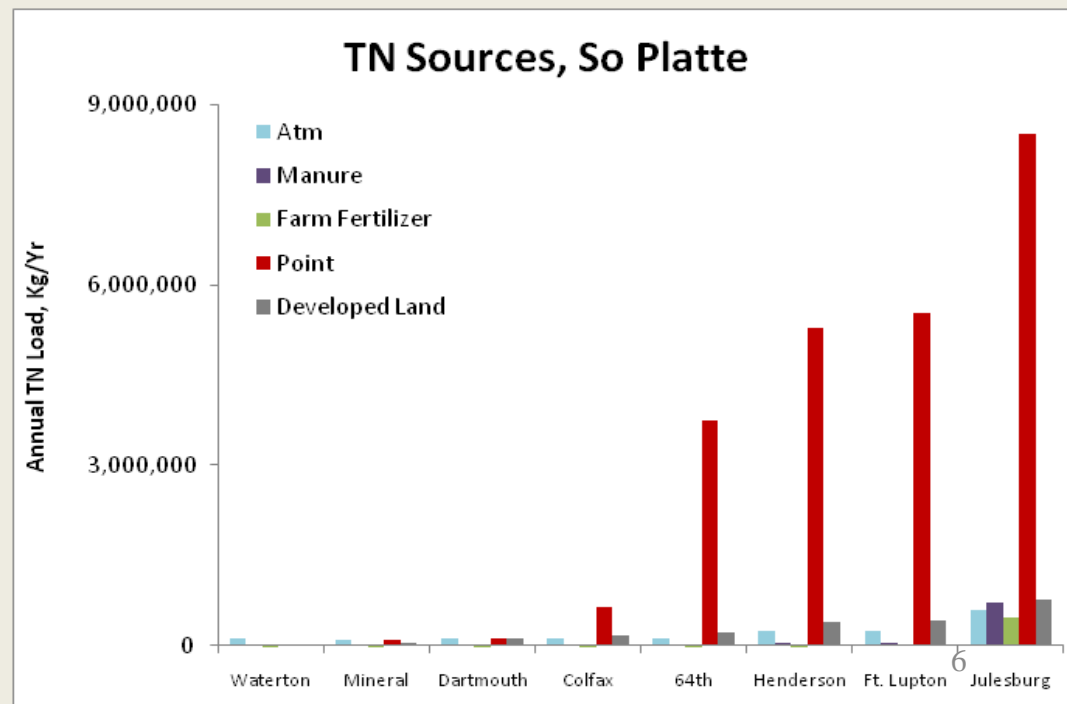
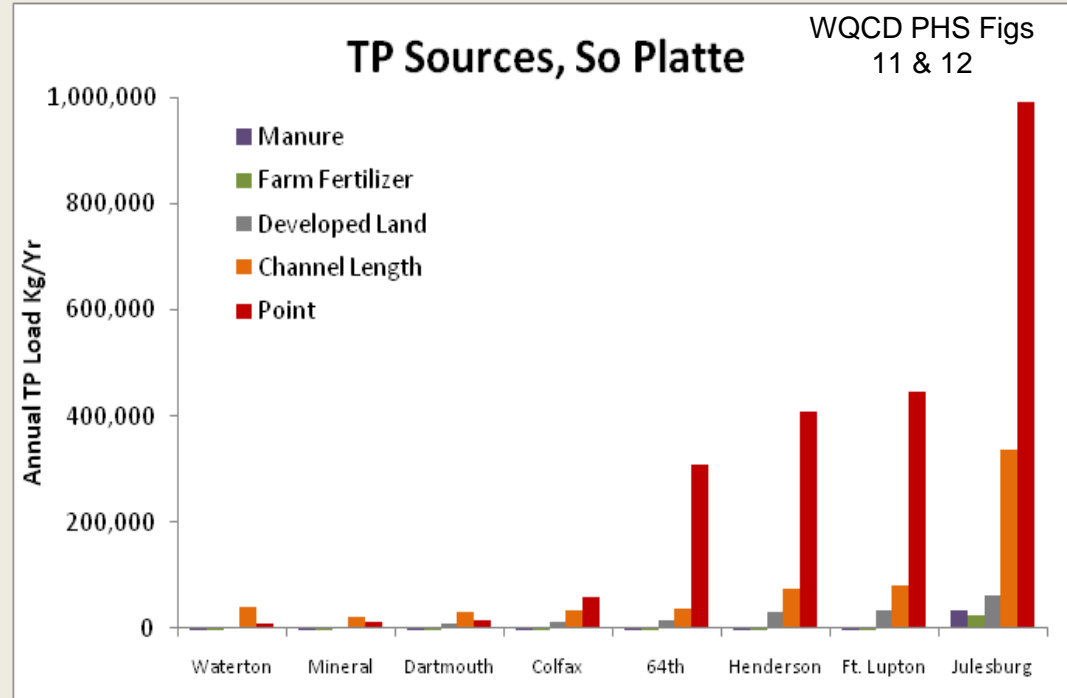


# Nature and Extent of Sources

SPARROW Modeling of Upper Missouri Basin (USGS, 2011)

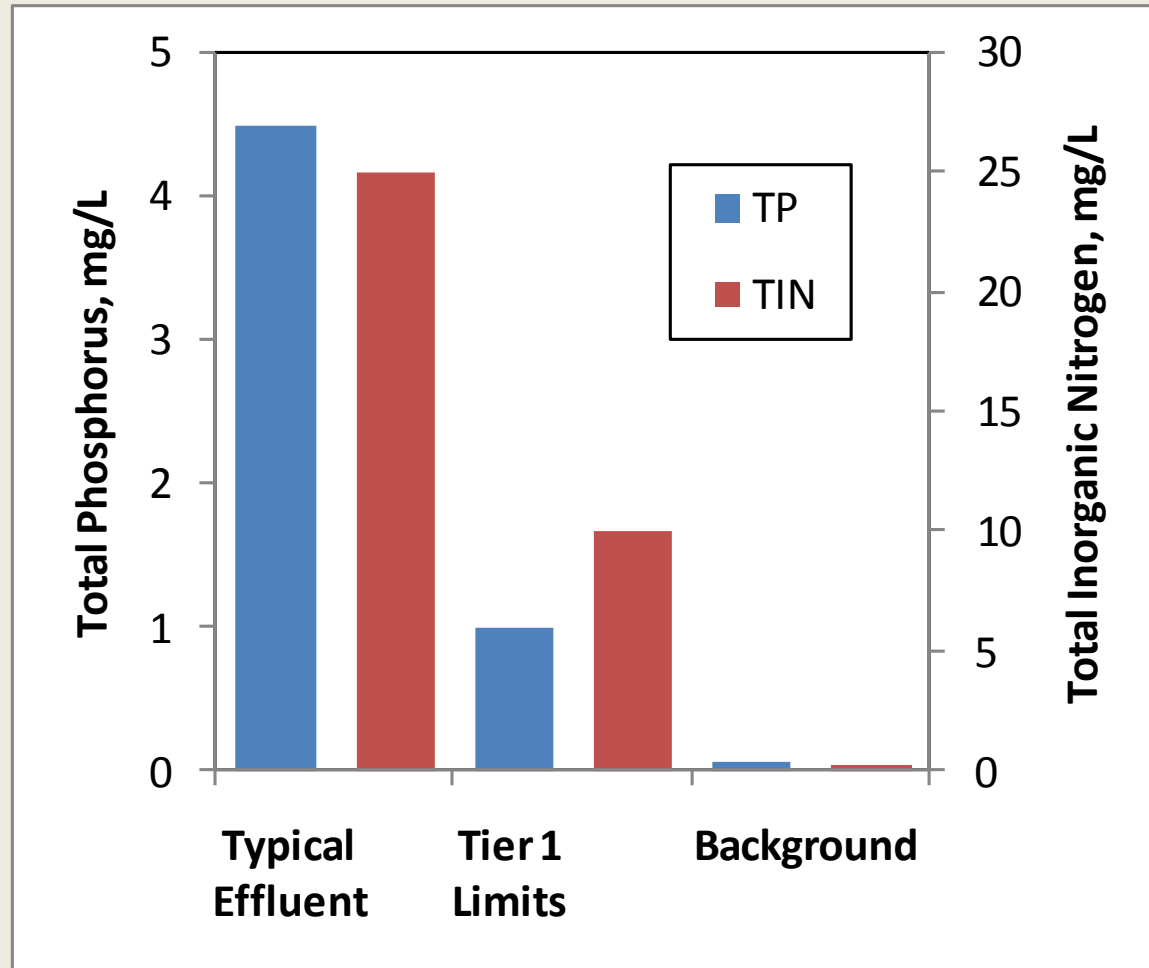
TP and TN annual loading

Colorado's South Platte Basin, below Colfax Ave, the most significant sources are Point Sources



# Nature and Extent of Sources

- Domestic Effluent is high in N and P
- > 700 MGD authorized discharge of treated domestic effluent



Typical effluent concentrations and Tier 1 limits from C B Study.  
Background concentrations from WQCD PHS Table 2, p 12



# Effects on Uses?

- Scientific literature
- Colorado Data
- Waters impaired by consequences of Nutrient Enrichment





# Protection, avoid impairment

- CWQCA at 25-8-102 (1)
- ...it is declared to be the policy of this state to *prevent* injury to beneficial uses made of state waters...



## 31.11 Basic Standards Applicable to Surface Waters of the State

- (1) ...state surface waters shall be free from substances attributable to human-caused point source or nonpoint source discharge in amounts, concentrations or combinations which:
  - (a) for all surface waters except wetlands;
    - (i) can settle to form bottom deposits detrimental to the beneficial uses. Depositions are stream bottom buildup of materials which include but are not limited to anaerobic sludges, mine slurry or tailings, silt, or mud; or
    - (ii) form floating debris, scum, or other surface materials sufficient to harm existing beneficial uses; or
    - (iii) produce color, odor, or other conditions in such a degree as to create a nuisance or harm existing beneficial uses or impart any undesirable taste to significant edible aquatic species or to the water; or
    - (iv) are harmful to the beneficial uses or toxic to humans, animals, plants, or aquatic life; or
    - (v) produce a predominance of undesirable aquatic life; or
    - (vi) cause a film on the surface or produce a deposit on shorelines;

# Interpreting the Narrative Standards 303(d) List, Permits

- Weight of evidence approach to be developed for 303(d) Listing Methodology (not use the interim numeric values directly)
- In the event that a waterbody is identified as Impaired, rely on Reg 85 requirements for Permits.









# Nutrient Technical Guidance Manual: Lakes and Reservoirs

- **If only one factor**, such as phosphorus, **was always limiting**, the task of **developing nutrient criteria would be a simple matter** of determining limits on that single factor. Unfortunately, the factor that limits plant biomass may (1) change seasonally or over longer periods of time, (2) vary depending on the land use, or (3) vary regionally. **It would make little sense to construct a single nutrient criterion when that nutrient may not necessarily limit a target lake or lakes.**

# 40 CFR 131.10 (b)

- the State shall take into consideration the water quality standards of downstream waters and shall ensure that its water quality standards provide for the attainment and maintenance of the water quality standards of downstream waters.





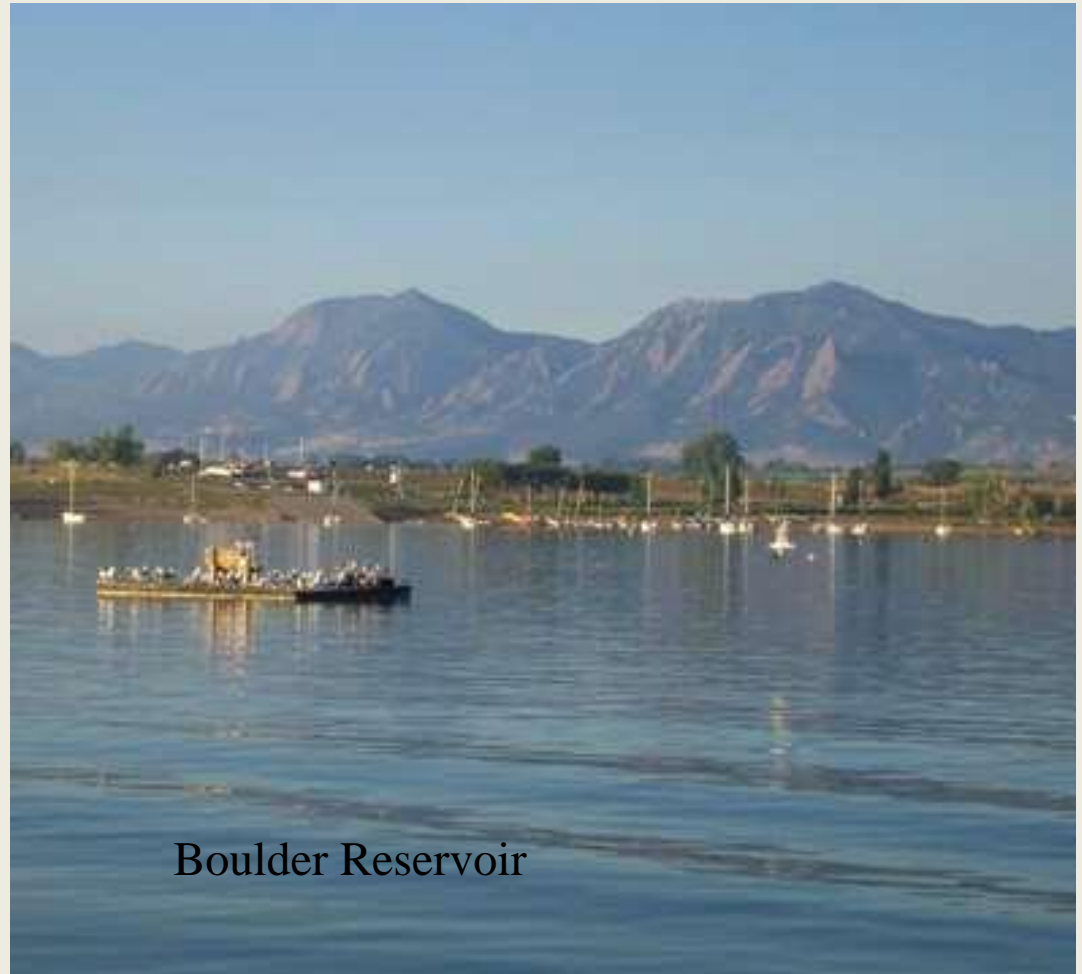




## Trout Lake

# DUWS Proposal

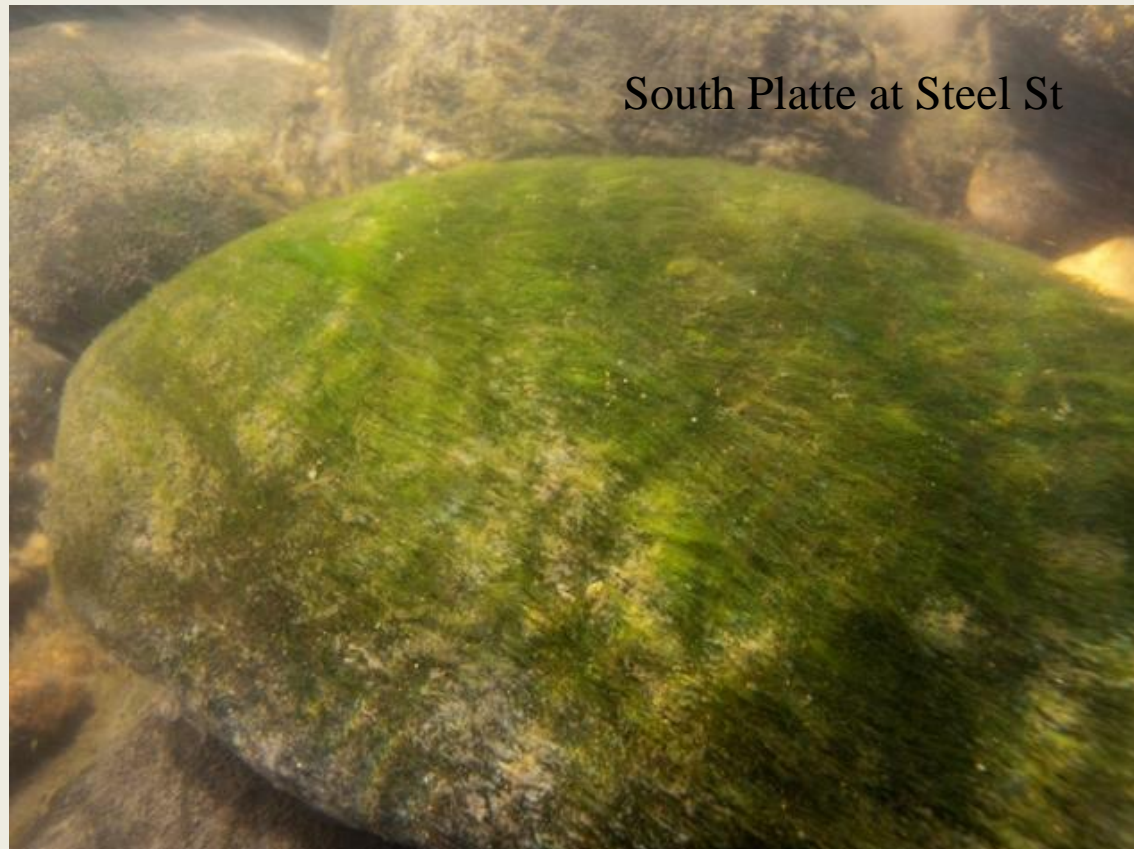
- Policy Concept
  - Control algal contribution to DBP precursors
- Scope
  - Interim value: chlorophyll
  - Discretionary application to lakes classified DUWS
- Assessment
  - Mar-Nov average
  - 1/5-y exceedance





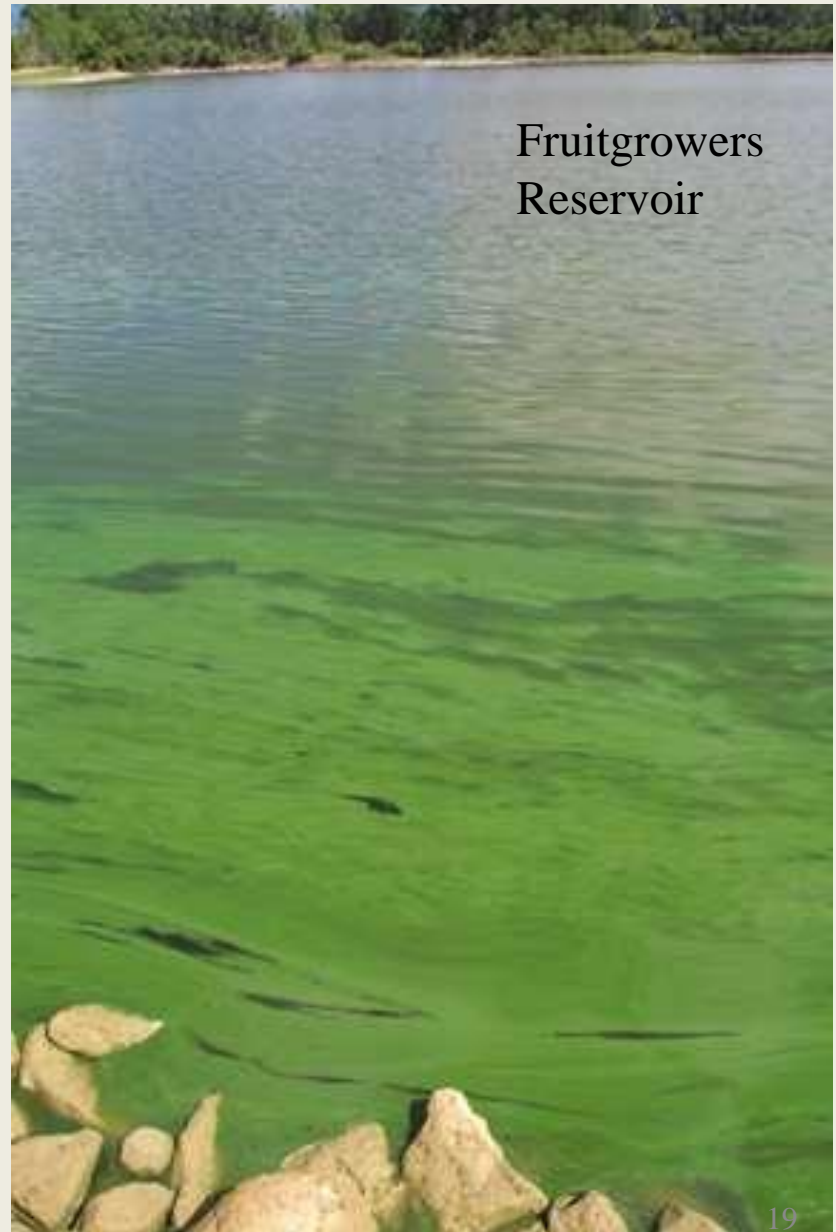
# Stream Recreation Proposal

- Policy Concept
  - Visual perception; “desirability” for recreational experience
- Scope
  - Interim value: benthic algal chlorophyll
- Assessment
  - Summer maximum
  - Representative sample by WQCD protocol
  - Not to exceed



# Lakes Proposal

- Policy Concept
  - Target trophic condition (or less productive)
    - Maintain ecosystem health
    - Balance competing interests
    - Minimize WQ impacts
- Scope
  - Interim values: chlorophyll, TP, and TN
  - Cold and Warm lakes
- Assessment
  - Summer average
  - 1/5-y exceedance







Escalante Cr at  
Escalante SWA



Roaring Fork River at Fothergill Park



Bear Creek above Bear Cr Res



# Rivers and Streams

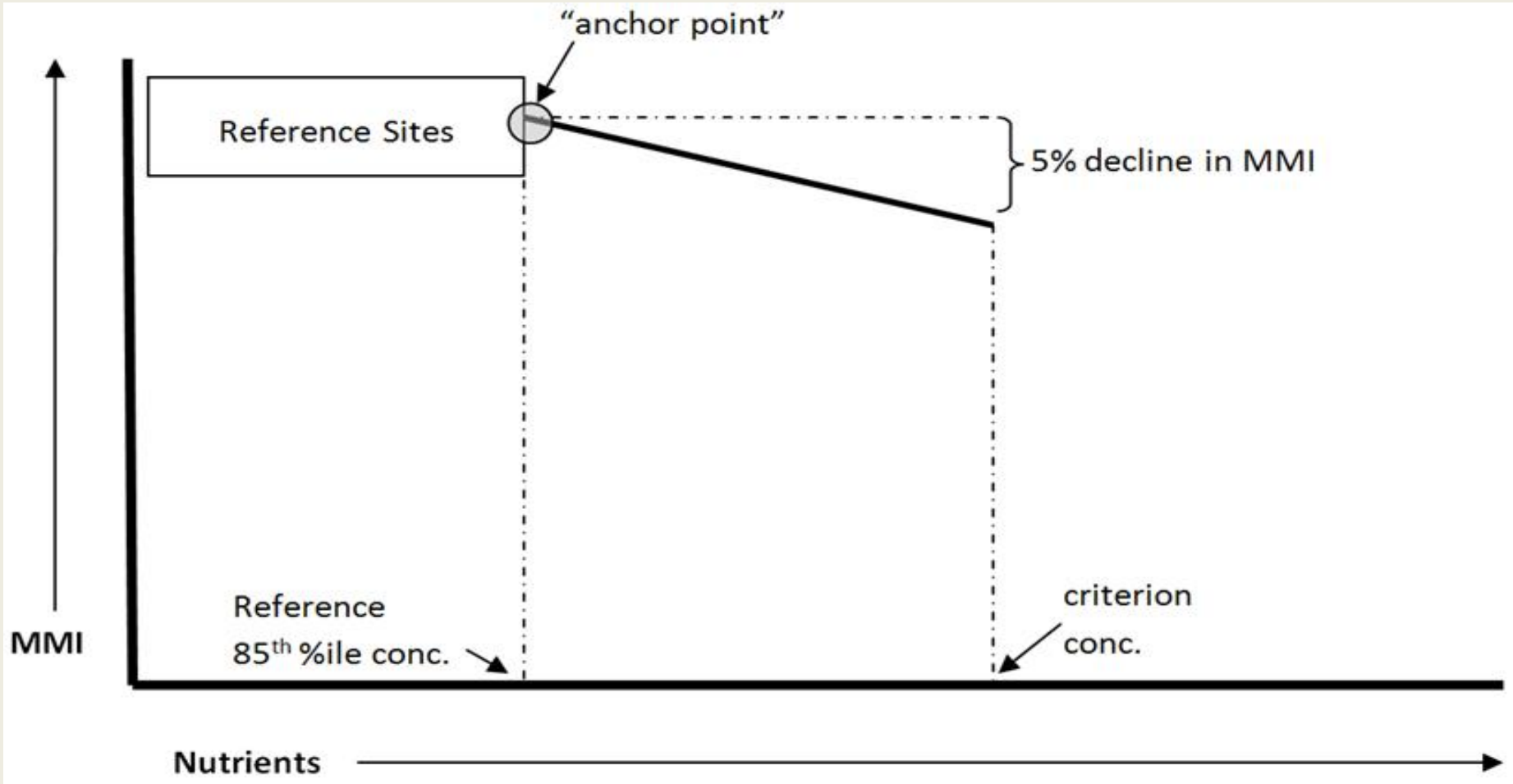


Figure 1. Schematic of the Colorado hybrid approach used to develop the proposed interim nutrient values for rivers and streams. The proposed values are anchored in the nutrient and biological reference condition and an allowable 5 percent decline in biological condition is calculated. The nutrient concentration that corresponds to end of this decline is proposed as the interim nutrient values.

# Rivers and Streams

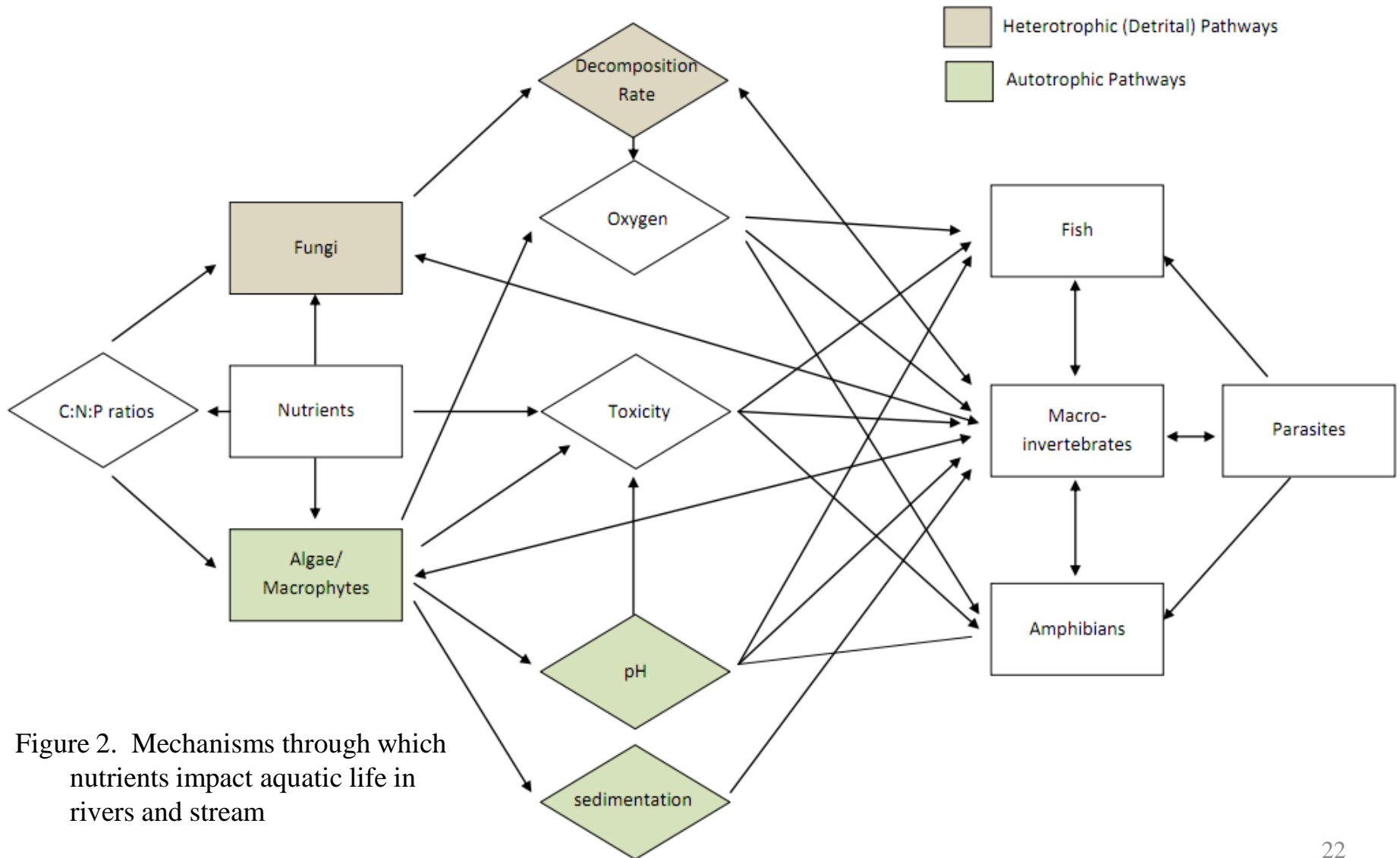


Figure 2. Mechanisms through which nutrients impact aquatic life in rivers and stream

# Rivers and Streams

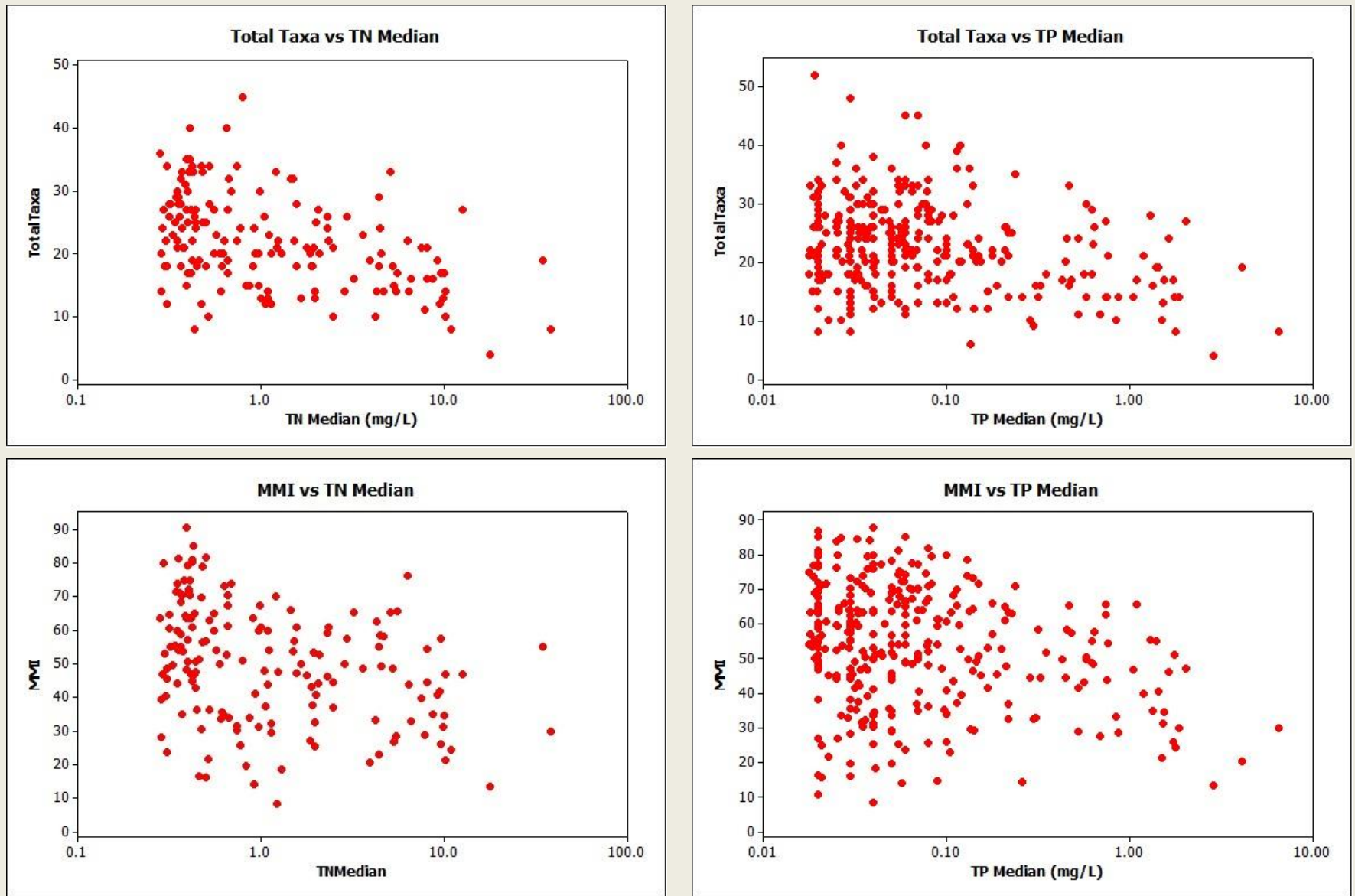



Figure 3. Wedge plots showing the response of the biological metrics to nutrients.



A photograph of a small stream flowing over rocks in a wooded area. The water is clear and shallow, with white foam from the rapids. The rocks are covered in green moss and algae. The surrounding vegetation is dense and green, with some bare branches visible. The stream flows from the background towards the foreground.

Beaver Creek at  
Avon, Exh 20, #4



# WQS Rulemaking Schedule

- 2013 - Consider TP, Chl, upstream & DUWS: Ark/Rio Grande Basins
  - 2014 - Consider TP, Chl, upstream & DUWS Up/Low Colo Basins
  - 2015 - Consider TP, Chl, upstream & DUWS: So Platte Basin
  - 2016 - (Basic Standards Review)
  - 2017 - Consider TP, Chl, upstream & DUWS: San Juan/ Gunn Basins
  - 2018** - Consider **TN**, TP, Chl, upstream & DUWS: Ark/Rio Grande Basins
  - 2019 - Consider **TN**, TP, Chl, upstream & DUWS Up/Low Colo Basins
  - 2020 - Consider **TN**, TP, Chl, upstream & DUWS: So Platte Basin
  - 2021 - (Basic Standards Review)
  - 2022 - Consider **TN**, TP, Chl, upstream & DUWS: San Juan/ Gunn Basins
  - 2023** - Consider TN, TP, Chl, **all waters** & DUWS: Ark/Rio Grande Basins
- ...and so forth

## 31.17(h) Site-Specific Flexibility to Consider Alternatives to the Interim Values

Both before and after May 31, 2022, in considering adoption of numeric standards for specific water bodies in Colorado, the Commission may review relevant site-specific factors and conditions in determining what numeric standard is most appropriate, and may adopt standards, either more or less stringent than the 31.17(b)(c) and (d) interim values

- (i) Where evidence based on expected conditions demonstrate that an alternative numeric standard would be more appropriate for the protection of use classifications the Commission may consider assigning ambient quality-based standards or site-specific criteria based standards as outlined in 31.17(b)(ii-iii),
- (ii) Where it has been demonstrated that interim values are not feasible to achieve the Commission may consider modifying the use classification as outlined in Section 31.6(2)
- (iii) Where the conditions established in Section 31.7(3) a) are met, the Commission may consider granting a temporary modification.



# Developing Technology-based Numeric Nutrient Limits and Associated Compliance Monitoring



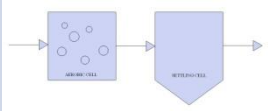
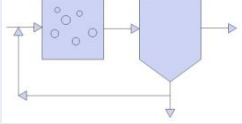
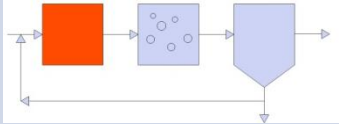
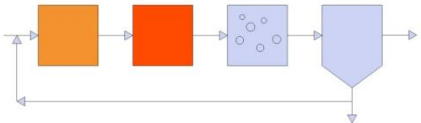
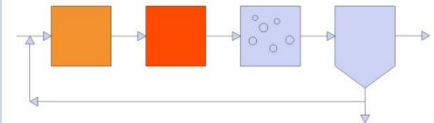
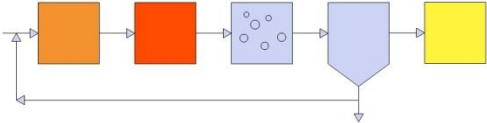
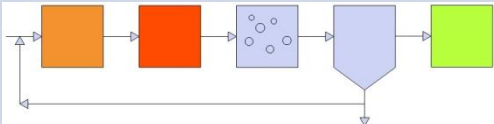
# Guiding Principles

- Promote immediate nutrient treatment improvement for Nitrogen and Phosphorus
- Establish reliably achievable limits for well engineered, operated, and maintained treatment facilities
- Establish compliance monitoring periods appropriate for chronic contaminants
- Encourage facilities to select processes that provide flexibility for future improvements

# Technology Performance by Treatment Bin

Bin	Treatment Process	Total Nitrogen		Total Phosphorus	
		Annual Average Performance (TPS 50%)	Reliable Process Performance (TPS 95%)	Annual Average Performance (TPS 50%)	Reliable Process Performance (TPS 95%)
1	Lagoon	-	-	-	-
2	Activated Sludge	-	30 mg/L	4 mg/L	6 mg/L
3	Biological Nutrient Removal (BNR)	6.7 mg/L	10 mg/L	0.7 mg/L	1 mg/L
4	Enhanced Biological Nutrient Removal (EBNR)	4 mg/L	6 mg/L	0.43 mg/L	0.65 mg/L
5	BNR or EBNR with Chemical Addition	~	~	0.43 mg/L	0.65 mg/L
6	BNR or EBNR with Chemical Additional and Tertiary Filtration	2.7 mg/L	4 mg/L	0.24 mg/L	0.36 mg/L
7	BNR or EBNR with Chemical Addition and Reverse Osmosis or Ultra Filtration	0.7 mg/L	1 mg/L	0.05 mg/L	0.07 mg/L

# Technology Performance by Treatment Bin

Bin	Treatment Process	Process Schematic
1	Lagoon	
2	Activated Sludge	
3	Biological Nutrient Removal (BNR)	
4	Enhanced Biological Nutrient Removal (EBNR)	
5	BNR or EBNR with Chemical Addition	
6	BNR or EBNR with Chemical Addition and Tertiary Filtration	
7	BNR or EBNR with Chemical Addition and Reverse Osmosis or Ultra Filtration	



# Monitoring



## **85.6 MONITORING REQUIREMENTS**

- (1) Monitoring requirements are established by this Control Regulation to evaluate the effectiveness of this control regulation and to determine the sources and load of nutrients at selected locations, and eventual implementation of appropriate and necessary source controls.



**Table 7 Summary of How Proposed Effluent Limits  
In Regulation #85 Determine Domestic Facilities Monitoring Requirements**

	<b>&lt; 0.5 MGD</b>	<b>0.5 – 1.0 MGD</b>	<b>1.0-2.0 MGD</b>	<b>&gt;2.0 MGD</b>
<b>De minimus</b>	Effluent Only (bimonthly)	Effluent Only (bimonthly)	Effluent Only (monthly)	Effluent Only (monthly)
<b>Disadvantaged</b>	Effluent Only (bimonthly)	Effluent Only (bimonthly)	Effluent Only (monthly)	Effluent Only (monthly)
<b>Lagoon</b>	Effluent Only (bimonthly)	Effluent Only (bimonthly)	Effluent and Instream (monthly)	Effluent and Instream (monthly)
<b>In Current Control Reg. Basin</b>	Effluent Only (bimonthly)	Effluent and Instream (bimonthly)	Effluent and Instream (monthly)	Effluent and Instream (monthly)
<b>In low priority basins</b>	Effluent Only (bimonthly)	Effluent and Instream (bimonthly)	Effluent and Instream (monthly)	Effluent and Instream (monthly)
<b>In high priority basins</b>	Effluent Only (bimonthly)	Effluent and Instream (bimonthly)	Effluent and Instream (monthly)	Effluent and Instream (monthly)

Report

*COST/BENEFIT STUDY OF  
THE IMPACTS OF POTENTIAL  
NUTRIENT CONTROLS FOR  
COLORADO POINT SOURCE  
DISCHARGES*

December 2011



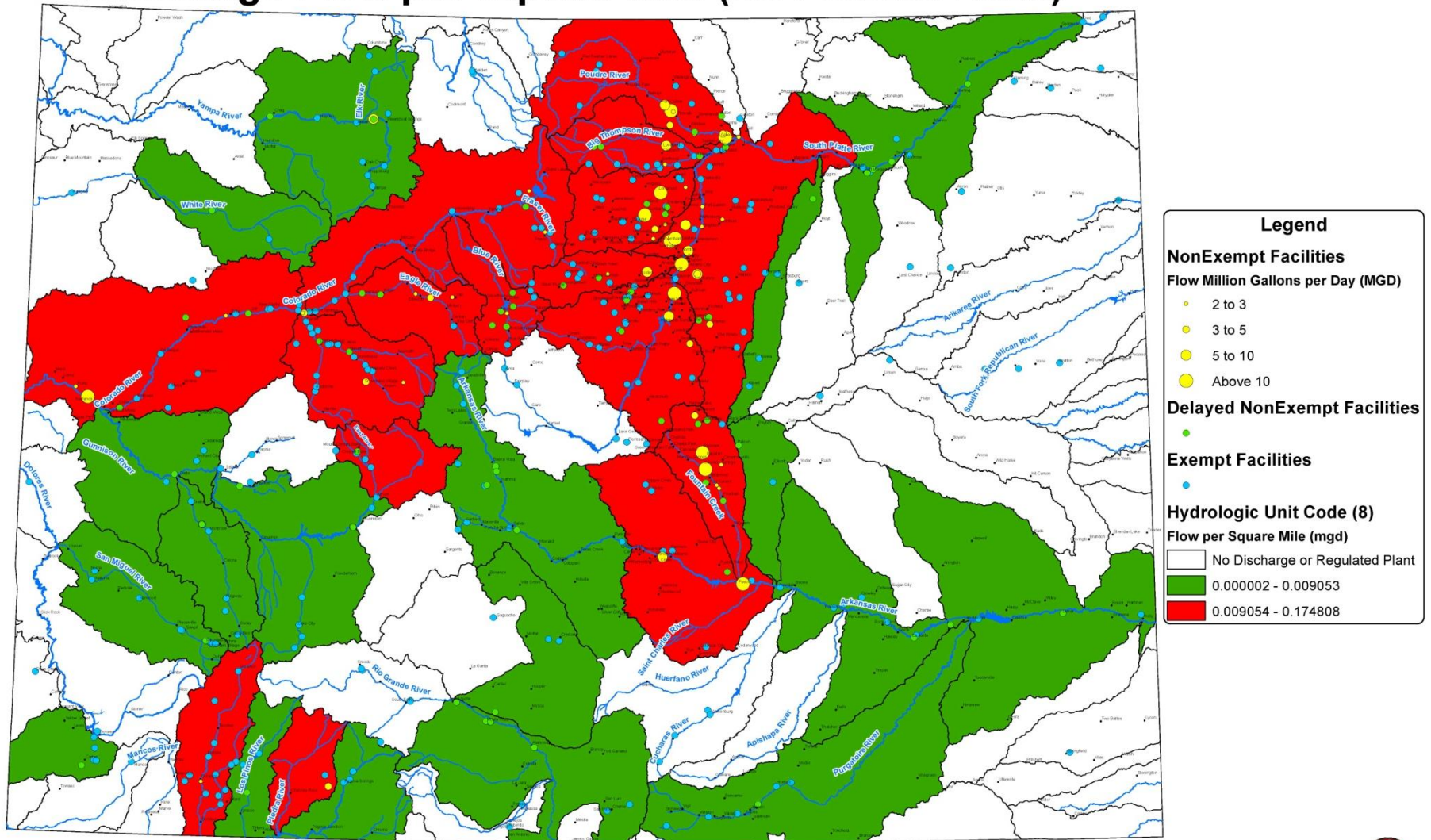
On behalf of



# Cost/ Benefit Study

# Cost Benefit Study Facilities

## Discharge Flow per Square Mile (No Federal Land)





# McPhee Reservoir



# Blue Mesa Reservoir

