Regulating Nutrients Through "Control Regulations" A Longtime Colorado Approach

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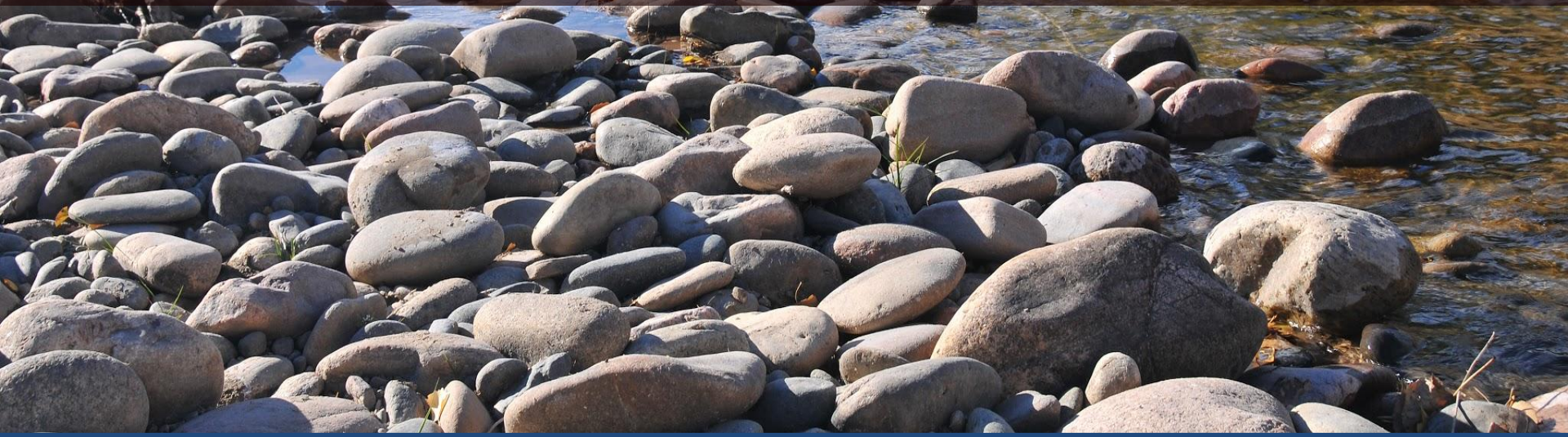
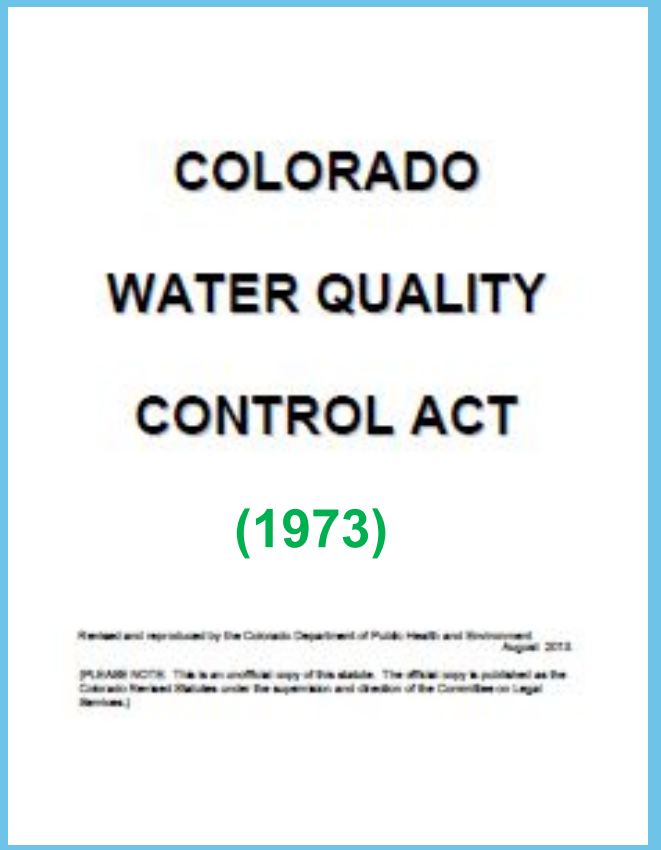


Introduction to Control Regulations in Colorado: What they are, where they are

History

National Pollutant Discharge Elimination System (NPDES)



Colorado Discharge Permit System (CDPS)

Legal Background: What are Colorado Control Regulations?

- Special authority given to state Water Quality Control Commission to establish "extra" regulations from those specifically required by the CWA to protect state waters
  - General authority - "To describe prohibitions, standards, concentrations, and effluent limitations on the extent of specifically identified pollutants ... that any person may discharge into any specified class of state waters"
- Provides a framework for developing innovative approaches to complex water quality problems - even in the absence of standards

CWA Section 314 Lakes Program

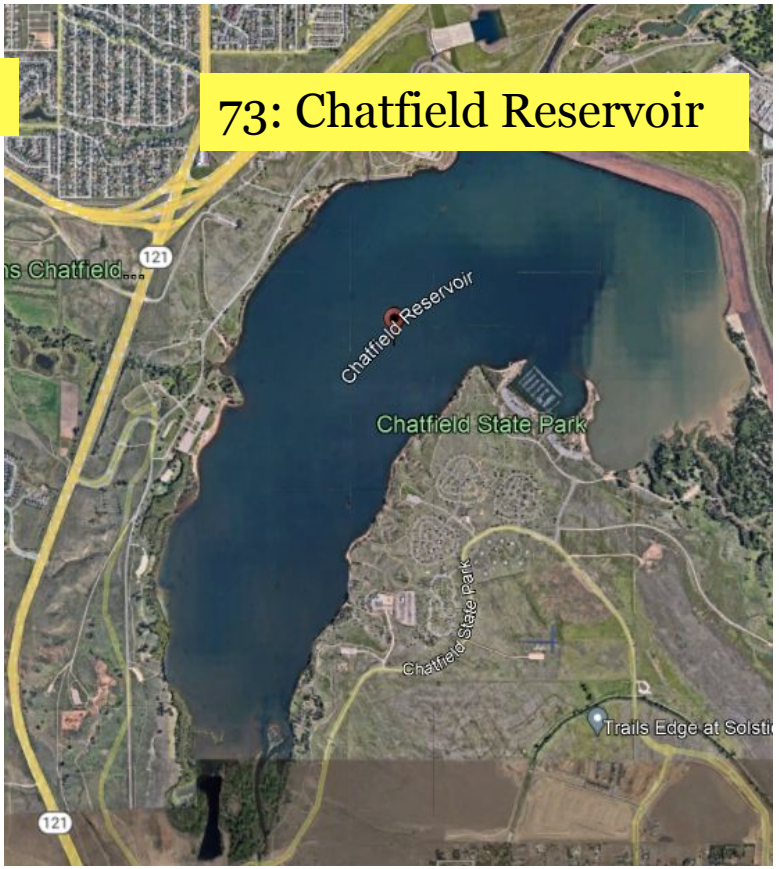
- 1972 under the Federal Water Pollution Control Act
- Funded 1976-1995
- Restore and manage publicly owned lakes
- 1980s Diagnostic/Feasibility studies and restoration efforts
- Colorado Control Regulations

The site-specific nutrient control regulations

- Site-specific TMDL-like things adopted as regulations
- Applicable at the watershed scale
- Include specific mechanisms for control of point and nonpoint sources.
- Comprehensive approach to eutrophication
- Context: at the time adopted, no statewide nutrient criteria, standards, or tech-based limits
  - since then, Colorado has adopted state tech-based nutrient limits and current permittees within the control reg areas are excluded

4 Site-Specific Nutrient Control Regulations

71: Dillon Reservoir

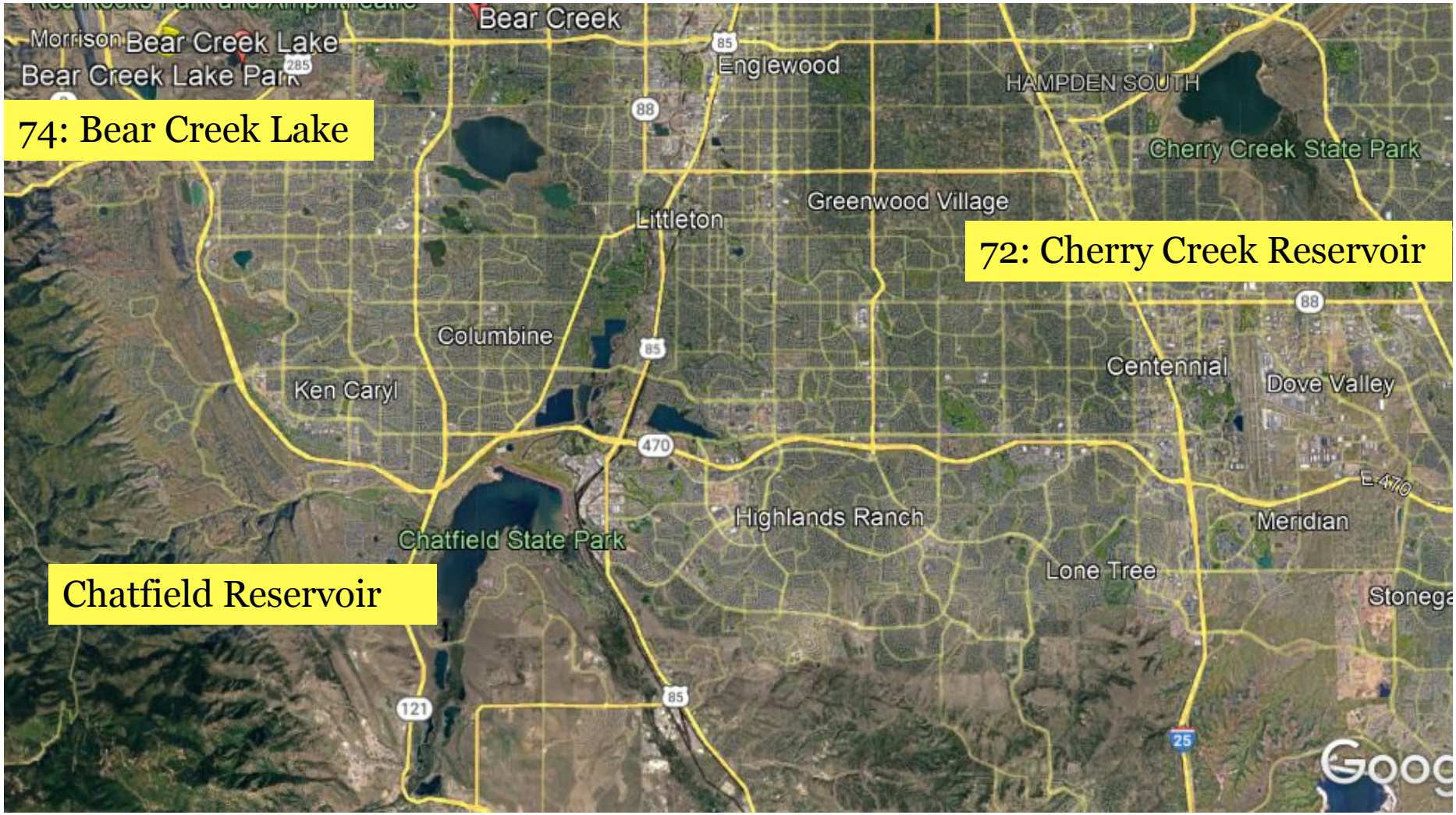


73: Chatfield Reservoir

72: Cherry Creek Reservoir

74: Bear Creek Reservoir

3 Control Regulations in Denver Metro




The Science Behind the Control Regs

What is Eutrophication?

- Excessive growth of algae
- Nutrient enrichment
- Common outcome of development/ land use changes
- Mix of point and nonpoint sources
- Consequences
  - excessive algal growth
  - elevated pH
  - decreased dissolved oxygen

Commonalities of Control Regs

- General purpose is attainment of water quality standards
- Achieve or maintain a particular trophic status or level of productivity
- All control regulations defined a target condition that referred to a certain level of algae
- Regulate GROUNDWATER discharges as well as surface water

Dillon Reservoir

Dillon Reservoir Intent and Goals

- Intent: Maintain trophic status at or below historical level (1982) that is consistent with existing uses
  - adopted 1984; amended 1987, 1996, 1997, 2001, 2003, 2007
  - TMAL based on loads observed in 1982 when conditions were determined acceptable
  - Target TP load of 10,162 lb/Year referenced to inflow of 212,000 AF,
    - revised to 8,350 lb/Year
  - TP standard set at 7.4 ug/L
  - Acceptable that higher inflows could yield higher TP loads under which in-lake TP could exceed 7.4 ug/L

How the Dillon Control Reg Works

- Summit Water Quality Committee (SWQC)
  - central role in implementation
- Lbs/year load allocations for point sources
  - new sources need to trade to get an allocation
- Concentration limits
  - 0.5 mg/L daily max (facilities >2000 gpd), 0.2 mg/L 30-d avg for new facilities
- Balance of the TMAL is for nonpoint
- Some trading is allowed

Cherry Creek Reservoir

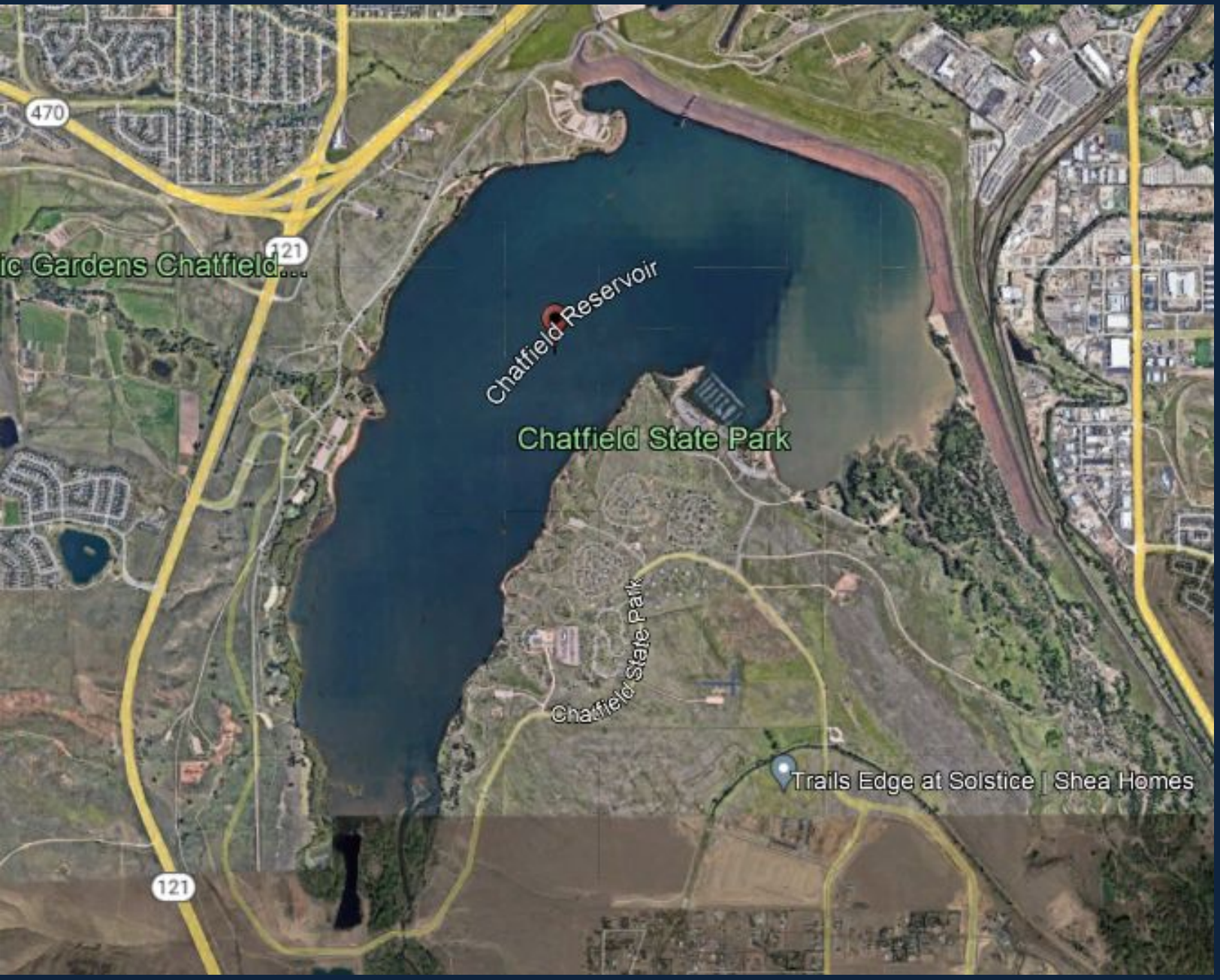
Cherry Creek Intent and Goals

- Intent: Target trophic status allowed some degradation
  - 1982 used as base year
- Chlorophyll standard was “protective of the uses”
- Control Regulation originally adopted in 1985
- Goals:
  - TP standard = 0.035 mg/L (growing season average)
  - Chlorophyll a standard = 15.0 ug/L
  - Indexed future TP yields to 1982 base year
  - At higher inflows TP loads and in-lake concentrations may be exceeded.
  - Since 2010, only chlorophyll a standard = 18 ug/L
  - Since 2010 concentration-based rather than load-based, so no TMAL, no WLAs

How the Cherry Creek Control Reg Works

- Cherry Creek Basin Water Quality Authority
  - established by statute
  - has a central, well-defined role in implementation
- TP Effluent limits wastewater facilities, industrial process wastewater sources, and developing [semi-urban] areas
  - 0.05 mg/L for a 30-d avg applied to most direct dischargers
  - 0.20 mg/L for DW facilities
- MS4 practice-based controls and approvals
  - unlike Dillon, surrounded by suburbs
- Nonpoint source requirements

Chatfield Reservoir



Chatfield Intent and Goals

- Intent: Target trophic status allowed some degradation
  - 1982 used as base year
- Chlorophyll standard to maintain beneficial uses
- Control Regulation originally adopted in 1989
- Goals:
  - TP standard = 0.027 mg/L (growing season average)
  - Chlorophyll a standard = 17 ug/L
  - Indexed future TP yields to 1982 base year
  - TMAL - 59,000 lb/Year based on hydrology
    - WLA = 7,533 lb/Year
  - Standards and TMAL revised in 2009, but allocations not yet revised

How the Chatfield Control Reg Works

- Chatfield Watershed Authority
  - central role in implementation and allocation efforts
    - scope of responsibility limited geographically
  - dischargers and land-use agencies

- Wastewater facilities and other process water must meet concentration limits and must possess load allocations
  - concentration limits are 1.0 mg/L as 30-day avg
  - new dischargers must try and find a trade
- Stormwater is excluded, even MS4s

Bear Creek Lake

Bear Creek Lake Intent and Goals

- Intent: Current conditions (1982) considered not desirable, needed to improve trophic state
- Control Regulation originally adopted in 1992
- Goals
  - Narrative standard expressed in terms of trophic state
    - Reduce algal bloom severity/frequency
    - Shift from hypertrophic to mesotrophic/eutrophic
  - No TMAL, but WLA = 5,255 lb/Year
  - Numeric standards adopted 2010, revised 2015
    - TP=22.2; Chlorophyll a - 12.2
    - Allowed exceedance frequency

How the Bear Creek Lake Control Reg Works

- Bear Creek Watershed Association

- TP Effluent Limits wastewater facilities, industrial process wastewater sources
- WWTFs 1.0 mg/L, whether direct discharge or discharge to groundwater.
- Does not include MS4 WLA
- Nonpoint source controls


So do they work?

Yes and Yes, But!

- Big picture
  - Definitely limited eutrophication/ maintained trophic status before TMDLs
  - Some control regulations more successful than others
    - Bear Creek Reservoir goals not attained
- Regs also moved the science about nutrients in Colorado lakes forward
  - 20-30 years before statewide nutrient criteria
  - Long-term data and efforts to inform nutrient criteria development
- Has authorized some pollution controls that would have been impossible without control regulation authority
  - Example - construction stormwater controls for sites under 1 acre

The But….

- Implementation can take a lot of resources
  - 5 nutrient control regiments instead of 1
  - LOTS of coordination required for each permit with agencies, engineering
- Some parts of the regs are showing their age
  - Allocations may be out of date
  - Lack of consideration for stormwater in all but Cherry Creek
  - Relying on lysimeters for groundwater compliance
    - these rarely work in Colorado
- What if WWTPs can't go lower?
  - Stakeholders are interested in options for controlling internal loads, such as alum treatment


Future

Additional Thoughts

- Control Regulations are not approved TMDLs
- TMDLs may still be needed
  - Bear Creek Reservoir and Cherry Creek Reservoir are on 303(d) List
  - TMDL for Bear Creek under development
- Colorado is developing statewide nutrient criteria
  - It is possible that stream nutrient standards could be drivers for future nutrient controls, not the control regulations
- Trading can be complicated
  - permitting logistics
  - environmental tradeoffs

Thank you!

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