Water Quality Standards

COLORADO
Department of Public
Health & Environment

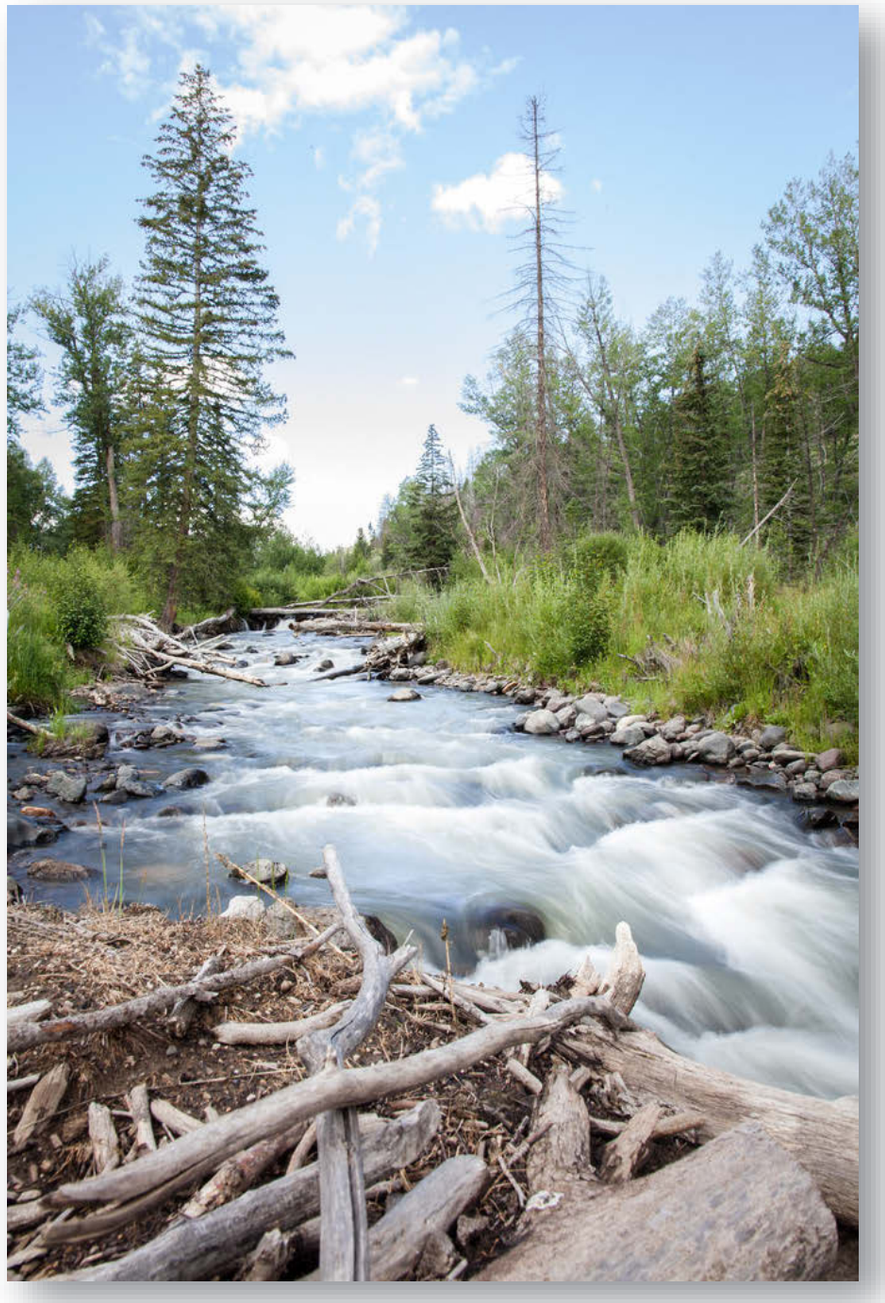
Regulation 31: the Basic Standards and Methodologies for Surface Water

- Regulatory Definitions and Methods
- Use Classifications
- Antidegradation rules
- Basic standards
- Numeric tables
- Procedures for classifying uses, assigning, implementing and reviewing standards

Designated uses

- Aquatic Life ("fishable")
- Recreation ("swimmable")
- Water Supply
- Agriculture
- Wetlands

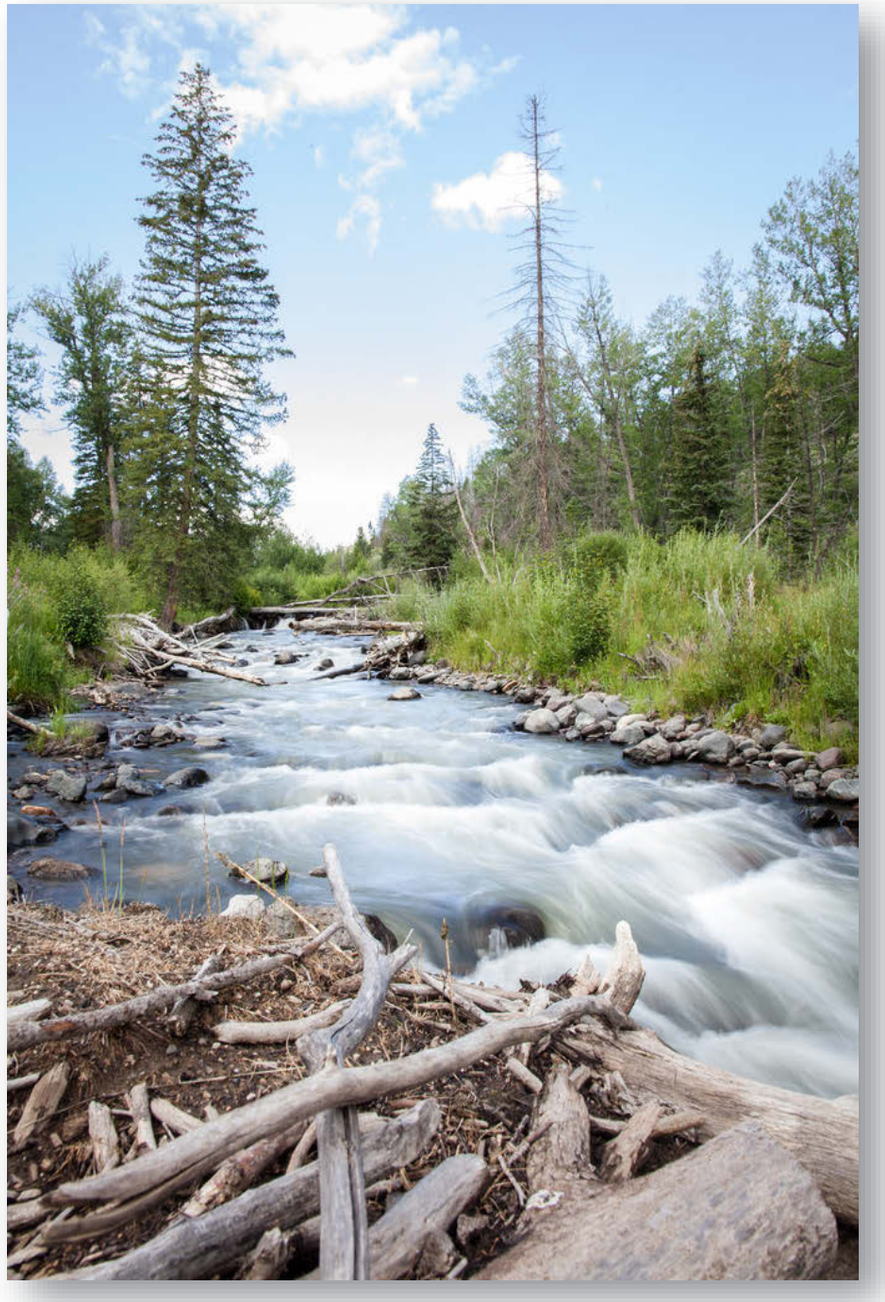
CWA 101(a)2 uses



Basic Standards

31.11 State waters shall be *free from* point or non point source pollutants which:

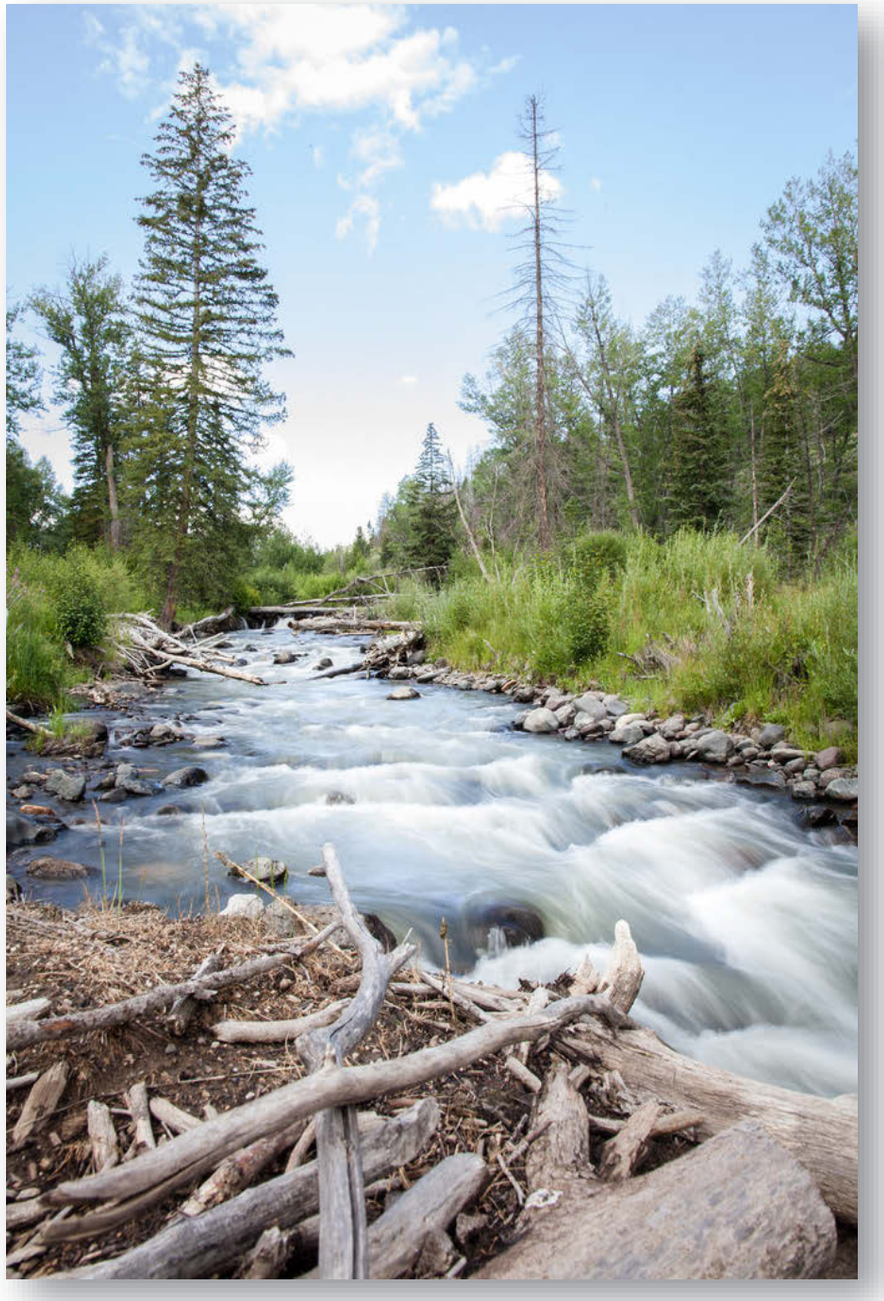
i) can settle to form bottom deposits detrimental to the beneficial uses. Depositions are stream bottom buildup of materials which include but are not limited to anaerobic sludges, mine slurry or tailings, silt, or mud; or
(ii) form floating debris, scum, or other surface materials sufficient to harm 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



“Free from’s”

Table Value Standards (TVS)

- Based upon toxicological and epidemiologic (human health) studies
- Levels determined by the Commission after analysis of available information and generally considered protective of beneficial use classifications
- Always evolving – being updated and reviewed



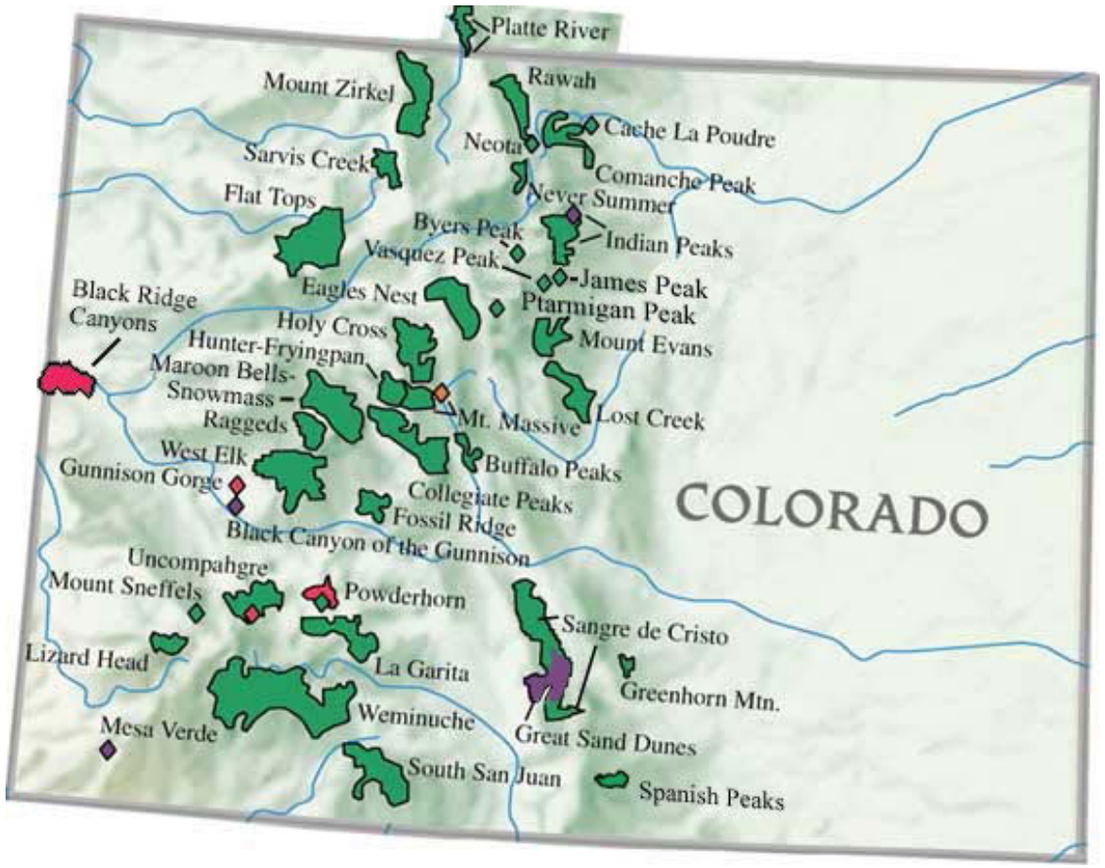
Assigning Use Classifications

WQCC is responsible for classifying state waters for present uses and uses “reasonably expected” in the future.

<u>31.6(1) – Considerations</u>

- Federal/State statutes and regulations
- Prevent degradation of current uses
- Protect current and downstream uses
- Highest water quality <u>attainable</u>
- Account for physical chemical and biological characteristics

Antidegradation Designation



- Outstanding Waters
  - No degradation: Water quality must be maintained and protected at the existing levels.
- Reviewable Waters
  - Antidegradation applies: AD Review. *Significant degradation is prohibited unless necessary to accommodate important economic or social development.*
- Use-Protected
  - Antidegradation does not apply: Assimilative capacity can be exhausted to the level of the standards

Standards Flexibility

- Site-specific standards
  - Ambient-based, feasibility based, Criteria based standards.
- Temporary modifications
  - Uncertainty regarding standard/sources, compliance issue, apply to whole segment
- Discharger specific variances (DSVs)
  - Temporary variance of standards for individual discharger, focus on improvement over time
- Areas requiring special protection
  - Control Regulations, use sub-classifications (DUWS), etc

Site-Specific Standards

Two types:

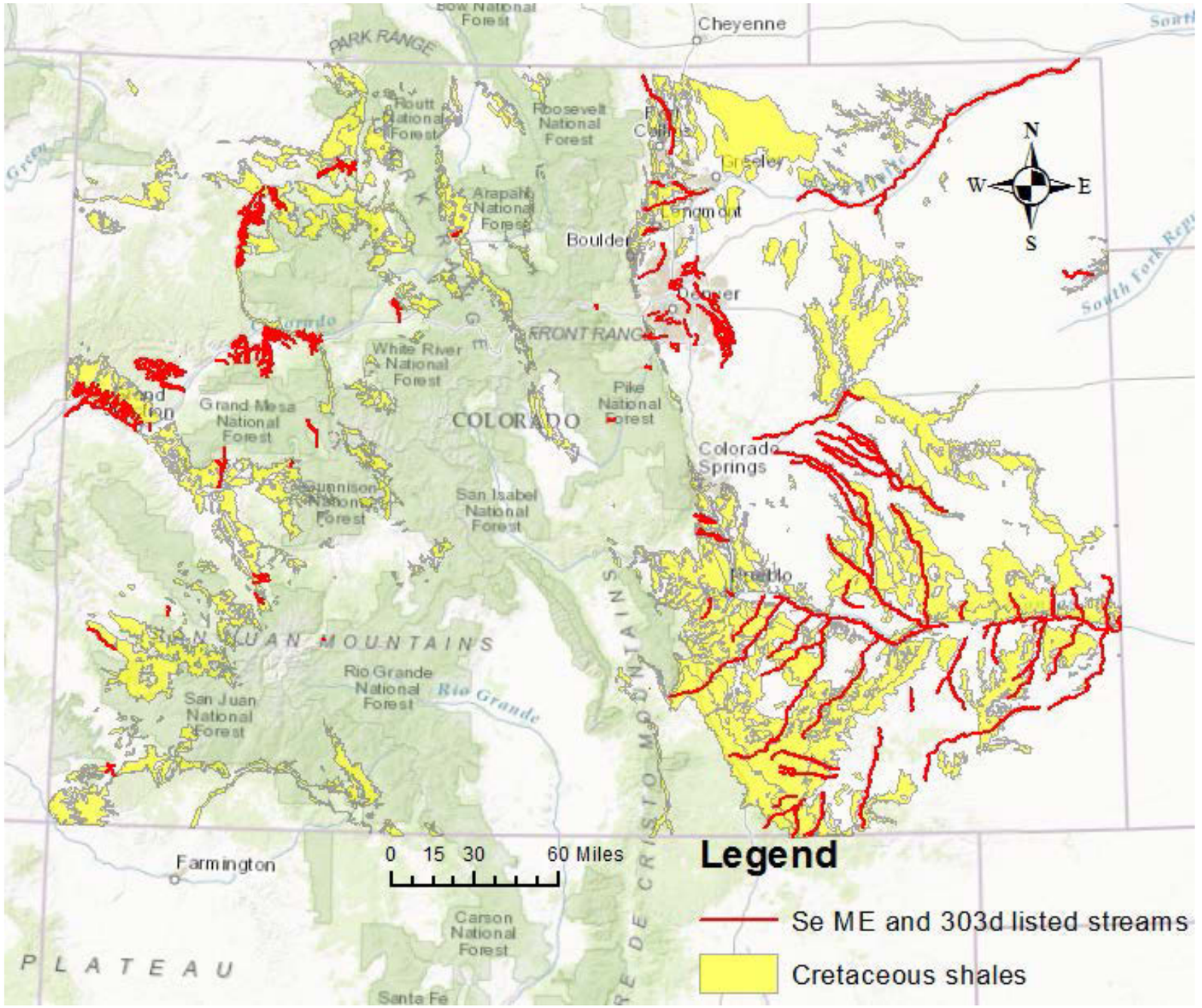
- Ambient standards protect the highest attainable use, given natural or man-induced irreversible water quality conditions
- Criteria-based standards are calculated to protect species expected to occur in the water body.

Ambient Site-Specific Standards

Example:

Natural/Irreversible Ambient Standard

- High selenium concentrations attributable to watershed draining cretaceous marine shales in Colorado.
- 95th and 85th Percentile based standards
- Characterize the highest attainable use



Ambient Site-Specific Standards

Example: Feasibility Based Standard

- Water quality can be improved, but not to the level required by the current numeric standard, a feasibility-based numeric ambient standard may be adopted.
- Requires alternatives analysis
- Characterize the highest attainable use

Other scientifically defensible methods…

Examples include the
- Biotic Ligand Model,
- WER (Water Effect Ratio)

Future Colorado selenium concentration/ fish tissue criteria.

UAAs and Downgrading

- A Use Attainability Analysis (UAA) is required to downgrade (less stringent standard) or remove a Aquatic Life or Recreation use (31.6(2)b). A similar analysis is required for Water Supply and Agriculture use changes resulting in less stringent standards.

- A UAA is an assessment of the factors affecting the attainment of aquatic life uses, which may include physical, chemical, biological, and economic factors.

Use Attainability Analyses

A UAA is required to downgrade a use classification.

Downgrading factors at 31.6.2(b):

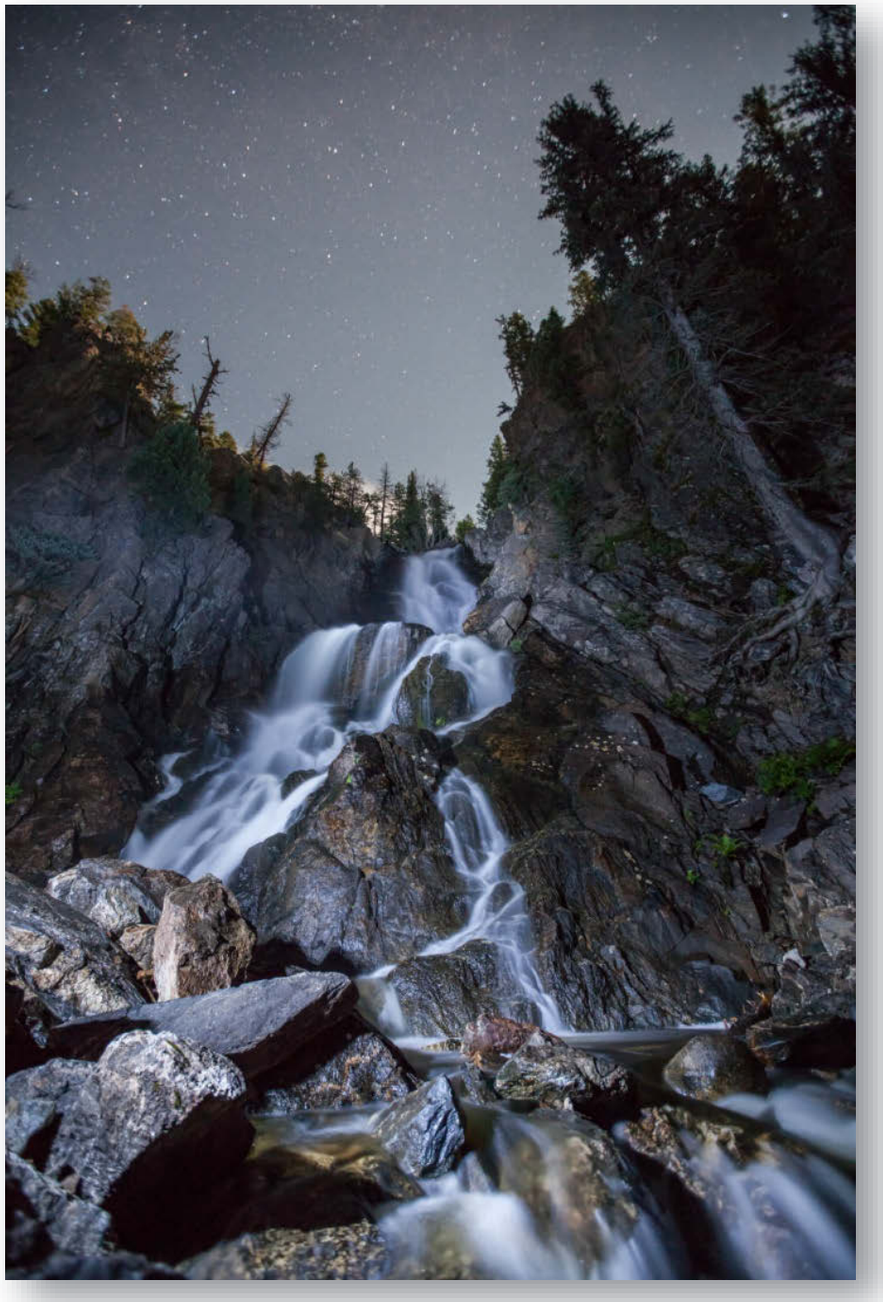
- Naturally occurring pollutant concentrations
- Flow conditions
- Irreversible conditions
- Hydrologic modifications where it is not feasible to operate in a way that would result in the attainment or the use;
- Physical conditions related to the natural features of the water body
- Substantial and widespread economic and social impact
- Agricultural practices which are considered satisfactory for the locality

Temporary Modifications

Allows status quo

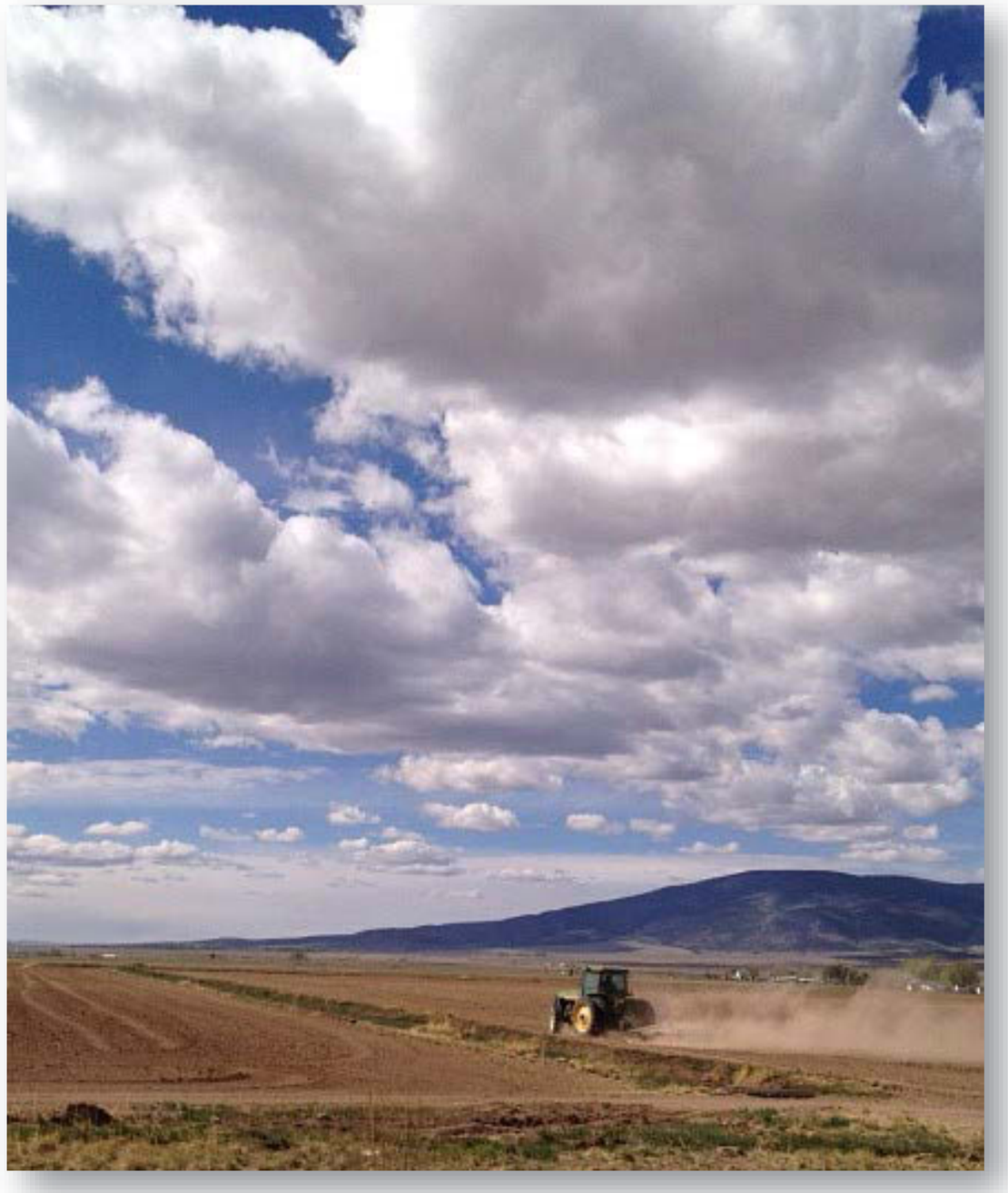
31.7(3)(a) Temp Mod requirements

- Existing permitted discharge
- Demonstrated or predicted WQBEL compliance problem
- Significant uncertainty regarding the standards
- Plan to resolve uncertainty

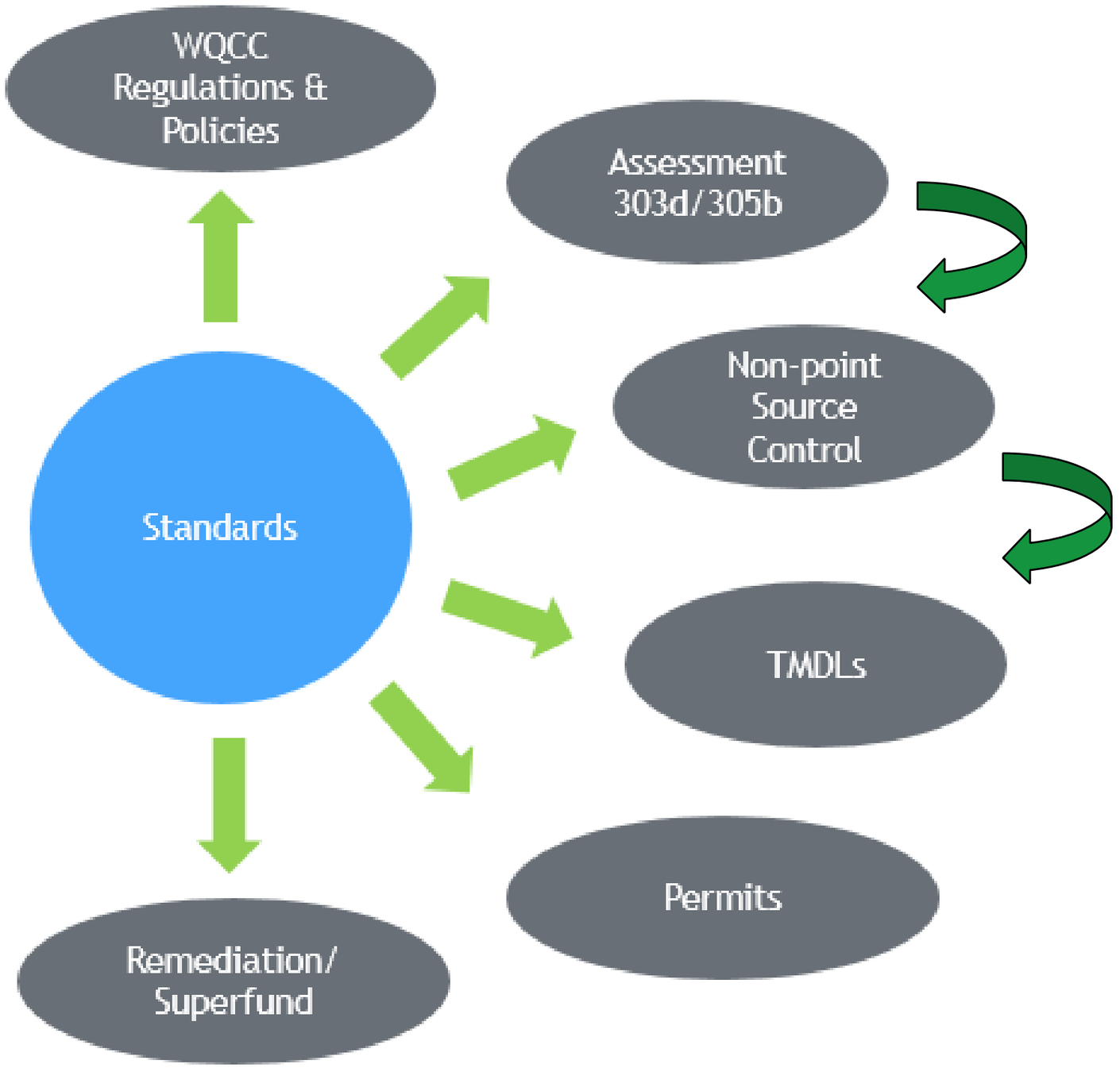


Discharger Specific Variances

A discharger-specific variance acts as a revised water quality standard for a particular discharge



Standards Implementation



Regulation 33/37 Basin Review

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Routine Review Cycle

Reg No. 31 → 34/35 → 32/36 → 33/37 → 38

Triennial rulemaking cycle

One triennial rulemaking cycle per basin - three years per issue/hearing.

Year 1 - Issues scoping

October

Early identification of potential issues.

Public Notice:

- 30 days prior.

Year 2 - Issues formulation

November

Identification of specific issues to be addressed.

Public Notice:

- 30 days prior.

Year 3 - Rulemaking

June

Hearing to consider revisions to the water quality classifications and standards.

Public Notice:

- Four months prior to hearing.
- Formal deadlines and process.
- Formal publication in the Colorado Register.

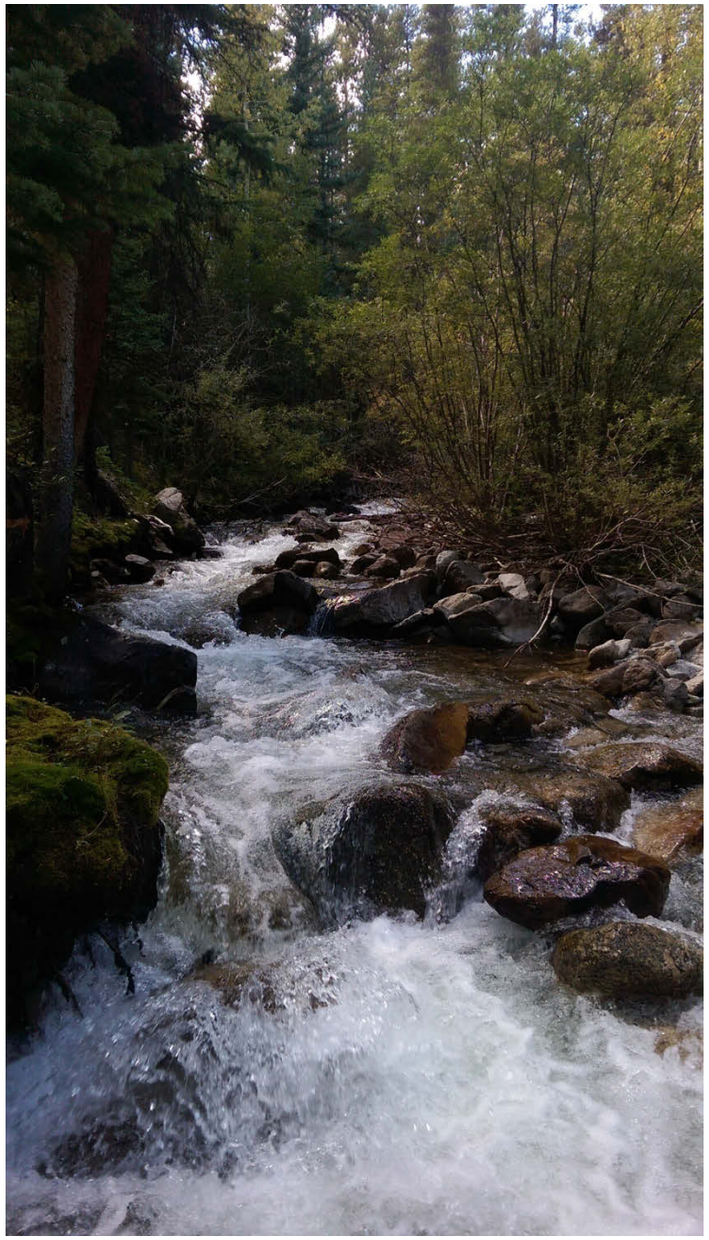
Upper Colorado River Basin– Regulation #33

Lower Colorado River Basin – Regulation #37

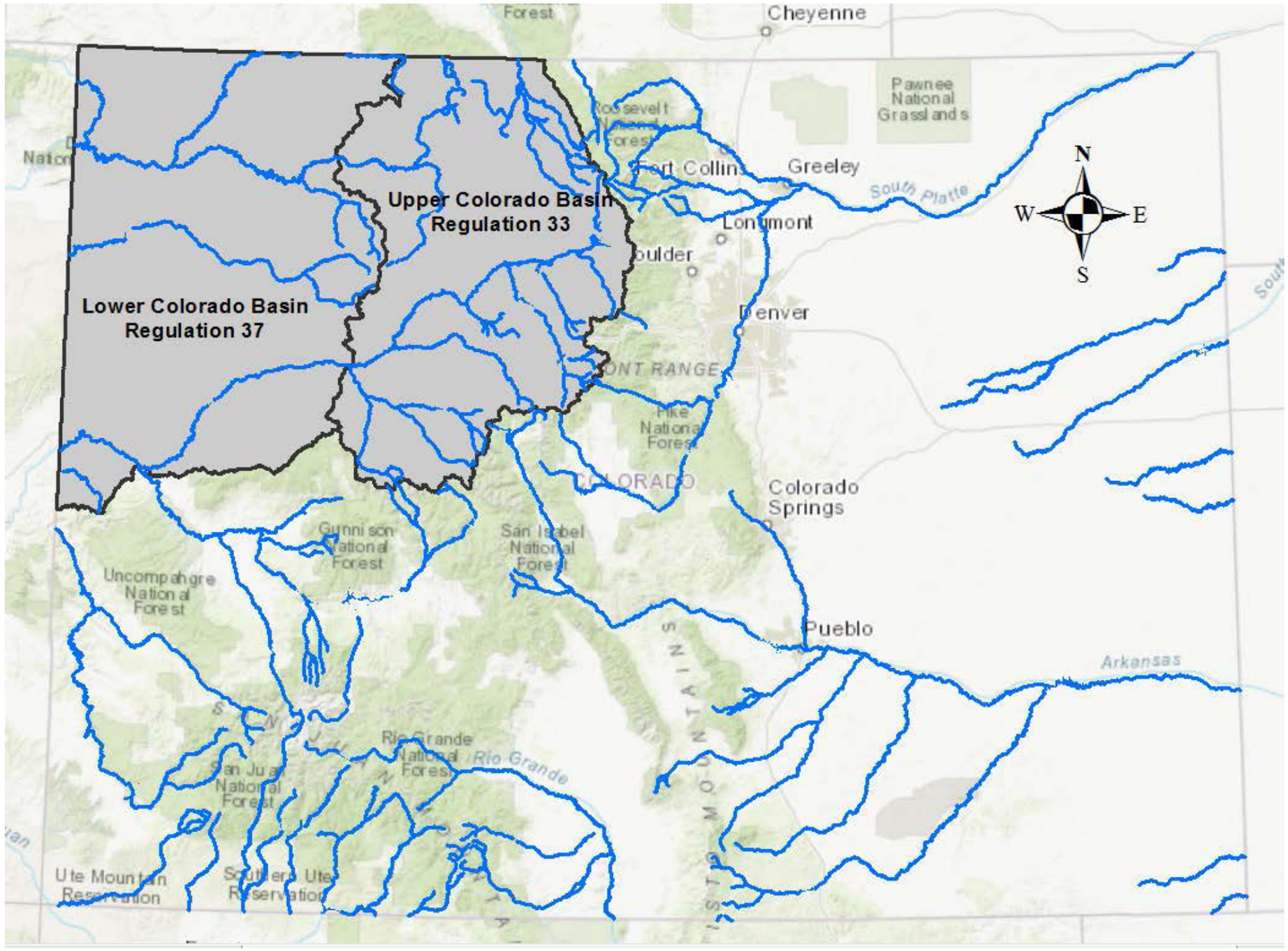
Regulations #33 and #37 Triennial Review Schedule		
October 2017	November 2018	June 2019
Issues Scoping Informational Hearing	Issues Formulation Informational Hearing	Rulemaking Hearing

Items to Consider

- **Any new information that indicates a change to classifications or standards may be appropriate**
  - E.g., water quality data, biological information, EPA 304(a) criteria updates
- **General updates, clean up, and corrections**
- **Site-specific issues**



Upper Colorado River Basin (Reg #33)
Lower Colorado River Basin (Reg #37)



Elements of the Review of New Information

- 101(a)(2) uses (i.e., Fishable-Swimmable)
- Water Supply and Agriculture uses
- Other criteria
- Antidegradation designations
- Temperature standards
- Nutrient standards
- Temporary modifications
- Site-specific standards

101(a)(2) Uses: Fishable-Swimmable

It is the national goal that wherever attainable, ...water quality shall provide for the protection and propagation of fish, shellfish and wildlife, and provide for recreation in and on the water.

Elements of Triennial Review

- Review Aquatic Life uses
- Review Recreational uses

Beaver Creek Reservoir

Fishable

- **Aquatic Life use upgrades or downgrades**

  Water+Fish, Fish Ingestion

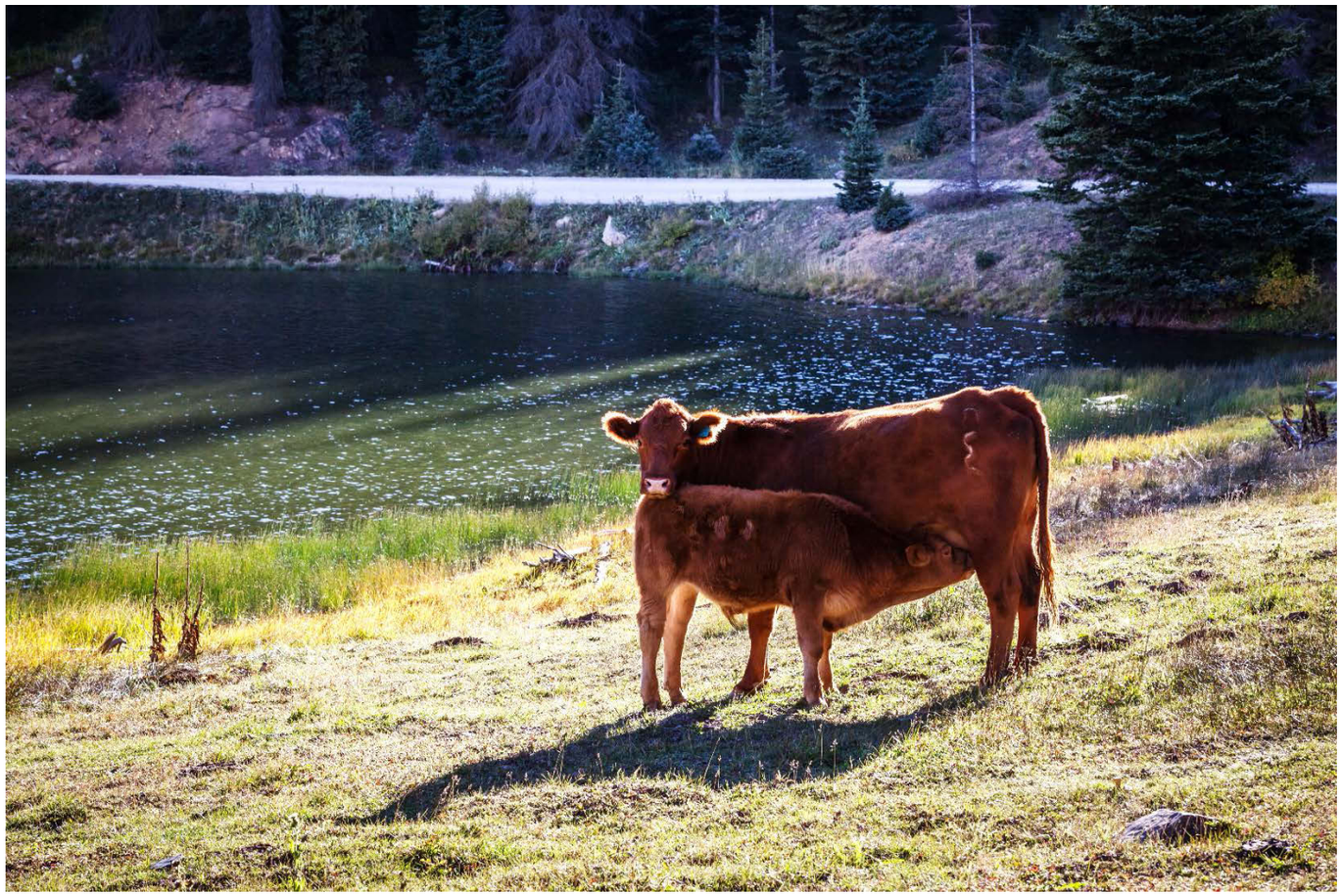
Swimmable

- **Recreation use classification upgrades or downgrades**

  e.g., Recreation N classification

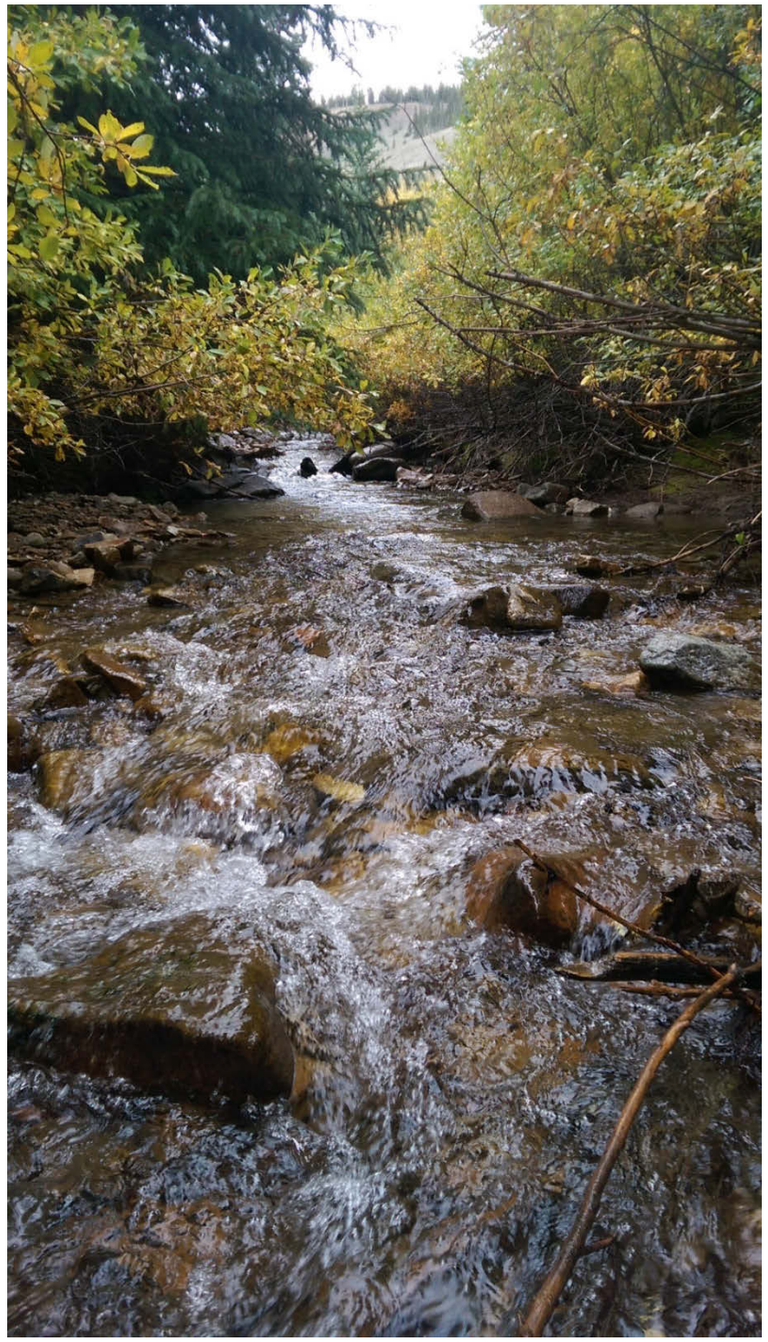
Water Supply and Agriculture

- **Are all uses applied where needed?**
  - E.g., alluvial well search
- **Are any standards to protect those uses missing?**
- **Other issues**
  - E.g., Mo



Standards Protective of Uses

- **Chromium III**
  Agriculture and Water Supply
  - Not always protected by hardness-based Aquatic Life standards
- **Cadmium, Lead, and Nickel**
  Water Supply
  - Not always protected by hardness-based Aquatic Life standards
- **Chlorine**
  Aquatic Life
  - 3 segments in Reg 32 and 2 segments in Reg 36 do not have acute chlorine standard



Use Protection Matrix

Aquatic Life Standards			Mean Hardness in mg/L as $CaCO_3$										Agri-culture	Water Supply
			25	50	75	100	150	200	250	300	350	400		
Cadmium	Ac	$cf_a * e^{(0.9151[\ln(hardness)]-3.1485)}$	0.82	1.50	2.13	2.74	3.90	**5.01**	**6.08**	**7.12**	**8.15**	**9.15**	10 (30-day)	5 (1-day)
	Ac(tr)	$cf_a * e^{(0.9151[\ln(hardness)]-3.6236)}$	0.51	0.93	1.33	1.70	2.43	3.11	3.78	4.43	**5.06**	**5.69**		
	Ch	$cf_c * e^{(0.7998[\ln(hardness)]-4.4451)}$	0.15	0.25	0.34	0.42	0.58	0.72	0.85	0.97	1.09	1.20		
Chromium III	Ac	$e^{(0.8190*[\ln(hardness)]+2.5736)}$	**183**	**323**	**450**	**570**	**794**	**1005**	**1207**	**1401**	**1590**	**1773**	100 (30-day)	50 (1-day)
	Ch	$e^{(0.8190*[\ln(hardness)]+0.5340)}$	24	42	59	74	**103**	**131**	**157**	**182**	**207**	**231**		
Lead	Ac	$cf * e^{(1.273*(\ln(hardness))-1.460)}$	14	30	47	**65**	**100**	**136**	**172**	**209**	**245**	**281**	100 (30-day)	50 (1-day)
	Ch	$cf * e^{(1.273*[\ln(hardness)]-4.705)}$	0.54	1.17	1.84	2.52	3.90	5.31	6.72	8.13	9.54	10.94		
Nickel	Ac	$e^{(0.8460[\ln(hardness)]+2.253)}$	145	260	367	468	660	842	1017	1186	1351	1513	200 (30-day)	100 (30-day)
	Ch	$e^{(0.8460*[\ln(hardness)]+0.0554)}$	16	29	41	52	73	93	**113**	**132**	**150**	**168**		

Higher than Water Supply standard

Higher than Agriculture standard

New 304(a) Criteria

- **Cadmium**
  Aquatic Life
  - March 2016
  - Updated hardness-based equations
  - Early adoption on site-specific basis
- **Selenium**
  Aquatic Life
  - June 2016
  - Complete overhaul: 4-part tissue-based criterion
  - Studies underway
- **Ammonia**
  Aquatic Life
  - 2013
  - Studies underway

Antidegradation

- Review information pertinent to AD designations, such as new water quality data
- Focus on Use Protected segments
- Also consider Outstanding Waters designations

Basic Standards 2016

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Temperature Revisions

- **Temperature table value standards were updated during the 2016 Basic Standards hearing**
  - Warm water winter acute standards
  - Overall database and TVS updates
  - Criteria to protect mountain whitefish and lake trout
- **Continue making progress to refine temperature standards**

Nutrients

Last Basin Review

- TP/Chla above Qualified Dischargers
- DUWS use for Lakes

Next Steps

- 10-year roadmap to develop and refine nutrient criteria

DUWS Sub-Classification

Regulation 33

Lake Granby
Wolford Mountain Reservoir
Yampa Holding Pond

Regulation 37

None

Temporary Modifications Site Specific Standards Use-Attainability Analyses

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Use Attainability Analyses

A site-specific **UAA** is an assessment of factors affecting the attainment of a use classification and associated standards for a particular water body.

- Review UAAs included in prior hearings and determine if new information indicates a change would be appropriate.

- Develop UAAs to support any proposed changes that result in less protective standards.

10 Year Water Quality Roadmap

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10-Year Water Quality Roadmap

Roadmap begins

2018

2019

Reg. #85 Review

2020

Draft cadmium and arsenic criteria

Draft lakes TN & TP criteria

2021

Reg. #31 RMH clean-up, cadmium, arsenic, temperature standards revisions

Adopt chl*a* for streams, TN & TP for DUWS/Swim Beaches

2022

Reg. #85: NPS controls, incentive efforts

Outreach

10-Year Water Quality Roadmap

2023

Draft ammonia criteria

Outreach

2024

Draft selenium criteria

2025

Reg. #85 Review

2026

Draft streams TN & TP criteria

2027

Adopt TN & TP for remaining waters and adopt ammonia and selenium statewide.

Regulatory actions

- 2021 - Reg. #31 RMH
  - Cadmium, arsenic, and temperature - statewide
  - Delay adoption of ammonia and selenium
- 2022 - Reg. #31/#85 RMH
  - Chlorophyll ‘a’ statewide
  - Adopt TN and TP for targeted lakes and reservoirs
  - Nonpoint source
  - Other TRIH items
- 2026 - Reg. #31 RMH
  - Clean-up and corrections
- 2027 - Reg. #31/#85 RMH
  - Ammonia and selenium - statewide
  - TN and TP for remaining waters - statewide

Standards Development Technical Efforts

- 2020
  - Draft cadmium criteria available
  - Draft arsenic criteria available
- 2021
  - Draft updated TN and TP criteria for lakes
- 2022
  - Feasibility study results available (temperature, ammonia, selenium, nitrogen, and phosphorus)
- 2023
  - Draft ammonia criteria available
- 2024
  - Draft selenium criteria available
- 2026
    - Draft TN and TP criteria for stream available
- 2020-2027
  - Focus on implementation strategies

Feasibility studies and implementation efforts

- 2022
  - Feasibility study results available (temperature, ammonia, selenium, nitrogen, and phosphorus)
- 2020-2027
  - Focus on implementation strategies

Work group efforts and outreach

- Quarterly Roadmap meetings - start spring 2018
- TACs - technical work by parameter
- Annual updates
  - WQCC
  - WQ Forum membership meetings

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Regulation Nos. 33 and 37 Rulemaking Hearing Schedule

- Issues Formulation Hearing - November 13, 2017
- Notice of Public Rulemaking Hearing - January 2019
- Proponent's Prehearing Statements - March 2019
- Responsive Prehearing Statements - April 2019
- Rebuttal Statements - May 2019
- Rulemaking Hearing – June 10-11, 2018, Grand Junction

Upcoming meetings in your area

October 24, 2018, Grand Junction: Grand Valley TMDL stakeholder meeting

November 13, 2018, Frisco: Reg 33/37 Issues Formulation Hearing (Standards)

November 14, 2018, Glenwood Springs: Nutrient Roadmap

June 10-11, 2019, Grand Junction: Reg 33/37 Rulemaking Hearing (Standards)

Contact information

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WQCC website
www.Colorado.gov/pacific/cdphe.wqcc

Nonpoint Source
www.Colorado.gov/pacific/cdphe/nonpoint-source-pollution-management

Roadmap
www.Colorado.gov/pacific/cdphe/WQ-10-Year-Roadmap

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