

38.90 STATEMENT OF BASIS, SPECIFIC STATUTORY AUTHORITY AND PURPOSE: JUNE 9, 2015 RULEMAKING: FINAL ACTION AUGUST, 2014: EFFECTIVE DATE DECEMBER 31, 2015

The provisions of C.R.S. 25-8-202(1)(a), (b) and (2); 25-8-203; 25-8-204; and 25-8-402; provide the specific statutory authority for adoption of these regulatory amendments. The Commission also adopted in compliance with 24-4-103(4) C.R.S. the following statement of basis and purpose.

BASIS AND PURPOSE:

H. Numeric Standards Changes

Changes were made to the following metals criteria to implement revisions adopted by the Commission in the 2010 Basic Standards rulemaking hearing.

Aluminum: Chronic aluminum standards adopted in 2010 are pH-dependent. When the pH is greater than 7.0, the new chronic aluminum standard uses a hardness-based equation. When pH is less than 7.0, the old chronic criterion of 87 µg/l or the new hardness-based equation applies, whichever is more stringent. The new acute aluminum criterion is a hardness-based equation that applies at all pH values. The hardness for both the chronic and acute aluminum hardness-based equations is capped at 220 mg CaCO₃/l, rather than the typical cap of 400 mg CaCO₃/l. The acute and chronic aluminum equations in 38.6(3) were modified to conform to Regulation No. 31.

Ammonia: Footnote 4 was replaced. The equations for the “NH₃=TVS” were deleted and replaced by language that explains the early life stage presence/absence assumptions.

Molybdenum: In 2010, the Commission adopted a new molybdenum standard of 210 µg/L to protect the Water Supply use.

Uranium: The Commission revised the uranium standard in 2010. The new standard is a hyphenated standard with two values (16.8 – 30 µg/L). The first value, which was added in 2010, is a strictly human health-based standard. The second value, which was the old standard, is EPA’s maximum contaminant level (MCL), which is higher because it takes into account treatability and detection limits. A new section 38.5(3)(c)(i) was added to explain the hyphenated standard. Subsection 38.5(3)(d) was deleted because it was redundant with 38.5(3)(c).

Zinc: The Commission adopted revisions to the zinc equation in 2010. The new chronic zinc equation is slightly more stringent at hardness values less than 157 mg CaCO₃/l. The new acute zinc equation is slightly less stringent at all hardness values. The zinc(sculpin) equation was not adopted in Regulation No. 38 because sculpin are not expected in the South Platte River basin. The acute and chronic zinc equations in 38.6(3) were modified to conform to Regulation No. 31.

J. Numeric Standards: Site-Specific Mercury Standard

The Commission adopted a site-specific total mercury standard of 0.026 µg/L as a chronic, 30-day average standard with a 1-in-3 year exceedance frequency on a portion of Upper South Platte Segment 16i, from Brighton Boulevard to the confluence with the South Platte River. The table value standard of 0.01 µg/L remains the standard for this segment upstream of Brighton Boulevard.

Suncor collected total mercury fish tissue data and unfiltered water samples for total mercury and methylmercury analysis from two sites on Sand Creek between Brighton Boulevard and the Burlington Ditch. Suncor targeted the highest trophic level species in Sand Creek for mercury sampling and collected skinless filets from the largest individuals of each species to analyze for wet-weight total mercury.

Fish tissue bioaccumulation factors (BAFs) were calculated, in part, following EPA’s 2010 *Guidance for*

Implementing the January 2001 Methylmercury Water Quality Criterion. The calculations also follow recommendations from a 2013 study (Riva-Murray et al.) conducted by the U.S. Geological Survey (USGS) and the U.S. EPA National Exposure Research Laboratory to optimize stream water mercury sampling for the purpose of developing mercury fish tissue BAFs. The site-specific standard was derived using the following equations:

Site-specific BAF (L/kg) = [arithmetic mean mercury fish tissue concentration in mg/kg wet weight] / [85th percentile methylmercury water concentration in mg/L]

Methylmercury water quality criterion (µg/L) = 10^{-9} x [0.3 mg/kg fish tissue] / [site-specific BAF (L/kg)]

Total mercury water quality criterion (µg/L) = methylmercury criterion * median ratio of total Hg:MeHg

A site-specific BAF was calculated for each species. The methylmercury water quality criterion was calculated using only the species with the highest BAF (*Lepomis cyanellus*, green sunfish) rather than a weighted average of all larger species. While the green sunfish are less than five inches in length and unlikely to be consumed, this ensures that the site-specific standard will prevent average fish tissue concentrations from exceeding 0.3 mg/kg for all species. The median ratio of total mercury to methylmercury was calculated in order to translate the protective methylmercury water column value to a total mercury water column standard. Although methylmercury is the form of mercury that bioaccumulates, the standard is based upon total mercury, because mercury can change forms in the environment.

Existing quality for this chronic standard is defined as the 85th percentile for permitting and assessment purposes. Attainment of the standard shall be assessed by comparing the weighted 85th percentile total mercury concentration from both assessment locations at 38.6(4)(f) to the site-specific criterion.

Fish tissue concentrations in the South Platte River are expected to be protected despite the increase in the site-specific standard on Sand Creek. This is due to the low concentrations of mercury previously found in fish flesh in the South Platte River during a time when the mercury concentrations from Sand Creek were much higher. When the relatively small volume of water in Sand Creek and higher mercury concentrations are combined with the greater volume of water in the South Platte River and low ambient water column concentrations, the change in concentration downstream of the confluence is negligible. Based on permitted low flow conditions, the projected mercury concentrations in the South Platte River would attain the existing 0.01 µg/L standard even when mercury concentrations in Sand Creek were as high as 0.053 µg/L (approximately two times the adopted standard in segment 16i).

K. Temporary Modifications

All existing Temporary Modifications were examined to determine if they should be allowed to expire or if they should be extended, either unchanged or with changes to the numeric limits. Temporary modification of copper standards for Cherry Creek segment 1 is discussed above (section I). Temporary modification temperature standards are discussed below in section M.

The Commission revised or extended Temporary Modification on the following segments:

Bear Creek segment: 1c

To remain consistent with the Commission's decisions regarding arsenic in section 38.85, all existing temporary modifications for arsenic of "As(ch)=hybrid" (expiration date of 12/31/21) were retained. An arsenic temporary modification was added to the following segments, which had an existing or newly added chronic arsenic standard 0.02 µg/L and a permitted discharger with a water quality-based effluent limit compliance problem:

Bear Creek segments: 1b, 4a, 5, 6b and 11

L. Temperature Standards

The Commission adopted new criteria for temperature in 2007. In June 2009, segment-specific temperature standards were adopted by the Commission for all segments with an Aquatic Life use classification in the South Platte River basin.

Changes were made to bring Regulation No. 38 into conformity with all of the 2010 revisions to the Basic Standards for temperature, including updating the temperature tables at 38.6(3).

Ambient temperature standards for lakes

In the 2009 triennial review, the WAT standard was found to be unattainable for a number of cold large lakes and reservoirs with apparently healthy cold-water fish populations. Because summertime temperature in the mixed layer for large lakes and reservoirs is very well correlated to the waterbody's elevation, the Commission adopted ambient temperature standards for large lakes wherever data were available to characterize a WAT and the thermal characteristics of the lakes and reservoirs were determined to be the result of natural or irreversible man-induced conditions.

However, the 2010 revisions to the dissolved oxygen criteria in Regulation No. 31 altered how lakes and reservoirs are assessed for temperature and dissolved oxygen. The Commission decided that dissolved oxygen may be less than the applicable standard in the lower portion of a lake or reservoir except where Regulation No. 31 footnote 5(c)(iii) applies or a site-specific standard has been adopted.

Footnote 5(c)(iii) states:

When a lake or reservoir is stratified, the mixed layer may exceed the criteria in Table 1 provided that an adequate refuge exists in water below the mixed layer. Adequate refuge depends on concurrent attainment of applicable dissolved oxygen standards. If the refuge is not adequate because of dissolved oxygen levels, the lake or reservoir may be included on the 303(d) List as "impaired" for dissolved oxygen, rather than for temperature.

M. Temperature Temporary Modifications

At the basin hearing in 2009 and in subsequent hearings, concerns have been registered about the implementation of temperature standards. In particular, major POTWs discharging to streams with an Aquatic Life Warm classification have expressed reservations about the technical basis for winter standards and concerns about compliance prospects.

These concerns have occupied much of the Commission's time at this hearing and are likely to do so again at the Basic Standards hearing next year. Although the issues cannot be resolved completely today, the Commission has taken two actions that will provide some guidance for future actions. The first is to adopt temporary modifications in a way that acknowledges compliance problems common to most dischargers to warm streams, and the second is to comment on what has been learned about resolving temperature problems.

Temporary modifications have been adopted for all segments with an Aquatic Life Warm classification where a discharger has shown a compliance problem. The temporary modifications are restricted for most segments, to the winter season (December-February).

The Commission is aware that not all parties are satisfied with temporary modifications at this time. In particular, Littleton/Englewood put considerable effort into development of a site-specific proposal that was not adopted. Consequently, it may be helpful for the Commission to comment again on possible approaches to resolving temperature issues.

At the last South Platte basin hearing in 2009 (see 38.74(M)), temporary modifications and site-specific standards were adopted in some of the same segments that were considered at the present hearing. Specifically with respect to Upper South Platte segments 14, 15, and 16g, the Commission stated its expectation that "domestic wastewater facilities will, in cooperation with other dischargers and the Division, explore options for developing new underlying site-specific temperature standards including

refined numeric site-specific standards, ambient-based site-specific standard and narrative site-specific standards although permit implementation strategies are not yet fully developed for all of these.” In addition, the Commission commented on a “facility-specific variance approach ... [that] may be an appropriate solution....” It is apparent now that the facilities in question have worked largely independently and have relied on different approaches.

In the years following adoption of temperature criteria, interested parties have amassed temperature data from many segments in the South Platte basin. The extensive records of spatial and temporal temperature patterns have done much to inform the Commission about the influence of POTW discharges on stream temperature. In warm streams, a large discharge can increase stream temperature as much as 10 degrees C in the winter, but may cause relatively little change in the summer. This potential compliance problem occurs primarily in the winter months.

The options for addressing temperature issues remain essentially the same now as they were in 2009, except that the “facility-specific variance” (now the DSV) is officially available. What has changed is that there is now a more complete appreciation of the level of difficulty for developing a successful proposal. Development of a site-specific standard (criterion or ambient; numeric or narrative) is a challenging undertaking that is hampered by the paucity of scientific information regarding wintertime thermal requirements of warm water fish communities. The challenge is compounded by having to determine which species are expected to occur in the fish community. These are not new difficulties and they will continue to confront future efforts.

The record in this hearing included expressions of concerns about the implementation of temperature standards, the feasibility of meeting temperature standards, and the scientific basis for the warm-water winter temperature standards. These concerns involve multiple aspects of the State’s clean water program, including standards, permitting, and engineering. The Commission supports the use of Division resources across multiple units to address uncertainties about the temperature standards and their implementation.

From the Commission’s perspective, it is important to see a showing that a proposed change to a temperature standard will protect the use. The bar for demonstrating protectiveness of temperature standards was set high in previous hearings and documents, and it has not changed. In adopting changes to temperature regulations in 2007 (see 31.45), the Commission broadened provisions protecting spawning to “ensure that the thermal requirements for successful migration, spawning, egg incubation, fry rearing and other reproductive functions are met”. The Commission specifically linked winter criteria to protection of reproductive functions.

While the Commission understands that the absence of formal guidance may make the development of a standard more difficult, it does not absolve the proponent of the responsibility to show that the proposed standard will meet the intent of the regulation. Proposals submitted to date have encountered stiff challenges from the Division, EPA and CPW largely on the question of protectiveness. The alternative to developing a new use-based standard, which was suggested as early as 2007, would be to seek a variance (DSV). A DSV, perhaps sector-based, would provide the foundation for reasonable incremental progress to reduce winter heat load to streams without imposing an unachievable compliance schedule.

N. Nutrients

In March 2012, the Commission adopted interim nutrient values in the Basic Standards (Regulation No. 31) and created a new statewide control regulation (Regulation No. 85) to address nutrients in Colorado. Regulation 31.17 includes interim nutrient values for total phosphorus, total nitrogen, and chlorophyll *a* for both lakes and reservoirs, and rivers and streams. Due to the phased implementation approach adopted with these criteria (31.17(e)), the Commission adopted only total phosphorus and chlorophyll *a* standards at this time. Nitrogen standards were not considered as part of this rulemaking hearing, but will be considered in the next triennial review, currently scheduled for June 2020.

Total phosphorus and chlorophyll *a* standards were adopted for waters upstream of all permitted domestic wastewater treatment facilities discharging prior to May 31, 2012 or with preliminary effluent limits

requested prior to May 31, 2012, and any non-domestic facilities subject to Regulation No. 85 effluent limits and discharging prior to May 31, 2012. A new section (4) was added at 38.5 describing implementation of the interim nutrient values into the tables at 38.6, and includes a table which lists these facilities and the segment to which they discharge.

For segments located entirely above these facilities, nutrient standards apply to the entire segment. For segments with portions downstream of these facilities, *nutrient standards only apply above these facilities*. A footnote "C" was added to the total phosphorus and chlorophyll *a* standards in these segments. The footnote references the table of qualified facilities at 38.5(4).

For segments located entirely below these facilities, nutrient standards do not apply.

For rivers and streams segments, total phosphorus standards were adopted for segments with an aquatic life use. Chlorophyll *a* standards were adopted for segments with either an E or P recreation use classification.

For lakes and reservoirs segments, a Footnote B was added to total phosphorus and chlorophyll standards adopted for lakes in the tables at 38.6, as these standards only apply to lakes larger than 25 acres.

31.17(e)(iii) also allows the Commission to adopt numeric nutrient standards for Direct Use Water Supply (DUWS) lakes and reservoirs. No proposals were made to adopt standards based on this provision in this rulemaking (see section O).

31.17(e)(iii) also allows the Commission to adopt numeric nutrient standards for circumstances where the provisions of Regulation No. 85 are not adequate to protect waters from existing or potential nutrient pollution. No proposals were made to adopt standards based on this provision in this rulemaking.

Chlorophyll *a* standards were adopted for the following segments:

Bear Creek segments: 1a, 3, 5, 6a, 7, 8 and 9

Total Phosphorus standards were adopted for the following segments:

Bear Creek segments: 1a, 3, 5, 6a, 7, 8, and 9

1. Site-Specific Total Phosphorus Standards

The Commission continues to support a phased implementation approach to adoption of nutrient criteria. However, it is also clear from evidence on the record that some segments merit special consideration. The Cherry Creek Basin Water Quality Authority (CCBWQA) submitted data in its responsive statement showing that background phosphorus levels exceed TVS. The Division concurs with this finding, which also has been documented in previous hearings related to Watershed Control Regulation No. 72. A background concentration has been established to support estimation of phosphorus loads to Cherry Creek Reservoir, but it is not yet known if that concentration should be applied uniformly as a stream standard throughout the basin.

A similar situation, albeit with less supporting evidence, has been identified by the Bear Creek Watershed Association (BCWA) in Bear Creek Segment 7. In this case, the evidence suggests that fen wetlands have background phosphorus levels that exceed TVS even though streams in the same segment do not have elevated phosphorus levels. It is not yet known what background level would be appropriate or if it varies among the fens.

The Commission applauds the efforts of CCBWQA and BCWA to obtain, and make available for this hearing, data that improve our understanding of existing conditions within each basin. Site-specific standards are needed for all, or part, of the segments for which phosphorus standards

have been proposed, but there is uncertainty about the habitat type or the geographic scope of applicability for site-specific standards (or conversely for the TVS). Resolving the uncertainty will require additional sampling to obtain representative data. A temporary modification cannot be used to provide the additional time because adoption of the phosphorus standard, as proposed in this hearing, would not result in a compliance problem for a discharger. However, delaying the effective date by five years would give CCBWQA, BCWA, and/or any other interested party or parties time to collect additional data and propose site-specific phosphorus standards as appropriate.

Total Phosphorus standards were given a delayed effective date of 12/31/2020 in the following segments:

Bear Creek Segment 7 (wetland fens)

2. Bear Creek Reservoir Total Phosphorus and Chlorophyll a Standards

The site-specific standards for chlorophyll a and total phosphorus have been revised in response to US EPA's disapproval of the Commission's 2009 action. The purpose for the revised standards remains consistent with the Commission's original goal of shifting the trophic condition to the mesotrophic- eutrophic boundary. The numeric values for chlorophyll and phosphorus have changed because the data set has been expanded by several years and an improved methodology has been applied. As before, the standards were developed using only data from Bear Creek Reservoir. Each standard is defined for average summer concentrations and has an allowable exceedance frequency of once in five years.

- A. Chlorophyll Standard: The Commission revised the chlorophyll standard to 12.2 µg/L. If summer average chlorophyll concentrations in the reservoir exceed 12.2 µg/L more than once in five years, it would be firm evidence that the trophic condition goal of the pre-existing narrative (mesotrophic-eutrophic boundary) was not being met. The exceedance threshold of 12.2 µg/L was derived with a "translator" developed with data from Bear Creek Reservoir. The translator connects the concentration at the allowable exceedance frequency (once in five years) to the typical concentration at the mesotrophic-eutrophic boundary (8 µg/L).
- B. Phosphorus Standard: The Commission revised the phosphorus standard to 22.2 µg/L. The standard is calculated in two steps based on the methodology used to develop statewide nutrient criteria for the 2012 Nutrient hearing. The first step involves the creation of a statistical "linkage" between phosphorus and chlorophyll based on summer average concentrations measured in Bear Creek Reservoir. The linkage is used to define the phosphorus concentration corresponding to the mesotrophic-eutrophic boundary in this reservoir; that concentration is 16 µg/L. The second step involves a translator for phosphorus that performs the same function described for the chlorophyll translator described above. The concentration at the exceedance threshold is 22.2 µg/L.
- C. Assessment: The phosphorus and chlorophyll standards are defined as seasonal averages. Samples are to be collected at a site in deep water near the dam and should be representative of conditions in the mixed layer. Past monitoring has resulted in 5 or 6 samples during the summer months (July, August, and September); it is anticipated that the same level of effort will be applied in the future. For assessment, the average (arithmetic mean) is calculated for the summer samples in each year.
- D. Independent Applicability: The chlorophyll and phosphorus standards are considered independently applicable. That is, impairment can be determined with either parameter without confirmation by the other parameter. Although the parameters are linked biologically – algae require phosphorus to grow – the linkage is "noisy" in a statistical sense because phosphorus cannot compel algae to grow (i.e., other limiting factors complicate the relationship). Independent applicability establishes a more sensitive basis for assessing departures from the target trophic condition since regulation of phosphorus

cannot be used to guarantee attainment of the chlorophyll standard. Independent applicability is a practical way to adapt regulation to a complex natural relationship where neither constituent is toxic (at least not at the target levels).

- E. Adoption of a Temporary Modification for Chlorophyll and Phosphorus: The underlying standards are not attained presently due to the seasonal augmentation of phosphorus concentrations from internal sources. A temporary modification set at “current conditions” to expire 12/31/2020, is adopted in order to recognize the uncertainty regarding how soon the internal load will be reduced. The Division, in conjunction with the Bear Creek Watershed Association, is working on studies to determine what management strategies might be feasible for reducing or controlling internal phosphorus release. Progress on resolving uncertainty will be reviewed in the annual temporary modification hearings in December 2018 and 2019.

O. Direct Use Water Supply Sub-classification

Also in the March 2012 rulemaking hearing, the Commission adopted a sub-classification of the Domestic Water Supply Use called “Direct Use Water Supply Lakes and Reservoirs Sub-classification” (Regulation 31, at 31.13(1)(d)(i)). This sub-classification is for Water Supply lakes and reservoirs where there is a plant intake location in the lake or reservoir or a man-made conveyance from the lake or reservoir that is used regularly to provide raw water directly to a water treatment plant that treats and disinfects raw water. The Commission has begun to apply this sub-classification and anticipates that it will take several basin reviews to evaluate all the reservoirs in the basin. The Commission adopted the DUWS sub-classification on the following reservoirs and added “DUWS” to the classification column in the standards tables. The public water systems are listed along with the reservoirs and segments.

Bear Creek segment 1d: Evergreen Lake (Evergreen Metro District)

31.17(e)(iii) also allows the Commission to adopt numeric nutrient standards for Direct Use Water Supply (“DUWS”) lakes and reservoirs. No standards were adopted based on this provision in this rulemaking.

P. Chromium III Standards

A review of the chromium III standards showed that uses were not always adequately protected by the standards currently in the tables. For example, the acute Aquatic Life standard is not protective of Water Supply at any hardness, so the Water Supply standard of CrIII(ac)=50(Trec) was added to all segments with a Water Supply use. Additionally, the chronic standard to protect the Aquatic Life use classification may not be protective of the Agriculture use in some high-hardness situations. Therefore, a chromium III standard of CrIII(ch)=100(Trec) was added to segments with Aquatic Life and Agriculture use classifications, but no Water Supply use. At hardness less than 145 mg/L, the Agriculture standard is not protective of the Aquatic Life use, so the chronic chromium III Aquatic Life standard should be included/retained in all segments with an Aquatic Life use.

Uses	Acute	Chronic
Water supply (with or without Agriculture)	CrIII(ac) = 50(Trec)	CrIII(ch) = TVS
No water supply (with Agriculture)	CrIII(ac) = TVS	CrIII(ch) = TVS and CrIII(ch) = 100(Trec)
Aquatic Life Only (without Water Supply or Agriculture)	CrIII(ac) = TVS	CrIII(ch) = TVS

The Commission updated chronic chromium III standards to be consistent with the matrix for the following segments:

Bear Creek segments: 1c, 2, 4a, 5, 6a, 6b, 10, 11 and 12

Q. Other Standards for the Protection of Agriculture and Water Supply Uses

Similar to the issue identified in Section P above, there were additional segments where one or more uses are not adequately protected by current standards. For instance, depending on hardness, the Aquatic Life standards for cadmium, lead, and nickel were not protective of the Water Supply use. The Division reviewed all segments in Regulation No. 38 to determine if the current standards applied to each segment are fully protective of the assigned uses, and revised or added standards where appropriate.

A cadmium Water Supply standard was added to the following segments because the acute Aquatic Life standard is not protective when the hardness was greater than 200 mg/L in non-trout streams and 345 mg/L in trout streams. A lead Water Supply standard was added to the following segments because the acute Aquatic Life standard is not protective when hardness is greater than 79 mg/L. A nickel Water Supply standard was added to the following segments because the chronic Aquatic Life standard is not protective when hardness is greater than 216 mg/L. Cadmium, lead, and nickel Water Supply standards were added to the following segments:

Bear Creek segments: 1a, 1b, 1c, 1d, 1e, 2, 3, 4a, 5, 6a, 6b, 7, 8, 9, 10, 11 and 12

S. Typographical and Other Errors

The following edits were made to improve clarity and correct typographical errors:

- For Bear Creek segments 1c, 1d, 1e, 2, and 3, the “equals” sign was missing from the chronic iron standard for water supply. The Division corrected this typo.
- For Bear Creek segment 1c, the temporary modifications were reformatted for consistency.
- For Bear Creek segment 9, specific naming of Summit Lake was included to increase clarity.
- For Bear Creek segment 11, there was an extra space in the segment description. The Division corrected this typo.