



Notice of Regular Meeting
Cherry Creek Basin Water Quality Authority
Board of Directors Meeting
Thursday, September 21, 2023 at 8:30 a.m.

The meeting will be conducted in-person and virtually as set forth below.
In-person attendance is encouraged due to audio limitations in the meeting room.

In-Person: SEMSWA
7437 S. Fairplay St.
Centennial, CO 80112

Virtual: Zoom
<https://us06web.zoom.us/j/87425775963> Passcode: CCBWQA
Phone (646)931-3860 Mtg ID 874 2577 5963# Passcode: #815374

CCBWQA Board of Directors Meeting Documents can be found online at the link below.
https://drive.google.com/drive/folders/1KqGcDC9eS_gMEdSiXPPPBGefAHTib7pf?usp=share_link

1. Call to Order and Pledge of Allegiance
2. Consent Agenda (5 minutes)
(Items on the consent agenda can be approved with a single motion or, items can be requested to be moved from the consent agenda and moved to the "discussion" or "direction and/or action" section.)
 - a. Approval of the August 17, 2023 Minutes (enclosed)
 - b. Acceptance of the Schedule of Cash Position Dated September, 2023 (enclosed)
 - c. Acceptance of the Paid Claims for August, 2023 (enclosed)
 - d. Approval of Unpaid Claims as of September, 2023 (enclosed)
 - e. Approval of the First Amendment to Muller's Agreement for the Cherry Creek Reach 1 Alternatives Analysis (enclosed)
3. Direction and/or Action (5 minutes)
 - a. Approval for Executive Committee to Pursue Level of Interest for Governor Appointees (McCarty, enclosed)
4. Discussion (5 minutes)
 - a. 2023 CIP Budget Update (Borchardt, enclosed)
 - b. 2024-2033 CIP Schedule and Update (Borchardt)
5. Presentations (none)
6. Board Member Items
 - a. Request for Board Participation in Reviewing Technical Scopes for 2024 Budget
7. Updates (10 minutes)
 - a. Technical Manager
 - i. Hydros Draft Technical Memorandum to Support Initial Site Specific Nutrient Standards Discussion with CDPHE (Clary, enclosed)
 - ii. Watershed Plan Workshop Agenda (Clary, enclosed)
 - b. Cherry Creek Stewardship Partners Update and [Events](#) (Davenhill)
 - c. TAC (Erickson)
 - d. Contract Staff
 - i. PAPM
 - a. CIP Status Report (Borchardt, enclosed)
 - b. Maintenance and Operations Status Report (Goncalves, enclosed)
 - ii. [Water Quality Update](#) (Stewart, enclosed)
 - iii. Regulatory (DiToro, enclosed)
 - a. Informational Memo on WQCC Rulemaking Hearings
 - b. Reg 93 Data Call Submission
 - iv. Land Use Referrals - [2023 Tracking](#) (Endyk)
 - e. Legal
 - i. December Board Meeting (Flynn)
 - f. Other
8. Executive Session pursuant to Section 24-6-402(4) C.R.S., if necessary.

9. Adjournment

[Watershed Plan Workshop Agenda](#)

[Board Binder](#)



Cherry Creek Basin Water Quality Authority
Minutes of the Board of Directors
Thursday, August 17, 2023 at 9:00 a.m.

Board Members Present

Abe Laydon, Douglas County
Bahman Hatami, Governor's Appointee (zoom)
Bill Ruzzo, Assistant Secretary, Governor's Appointee
Christopher Lewis, Vice Chair, Governor's Appointee
Jessica LaPierre, City of Aurora - Alternate
John McCarty, Secretary/Treasurer, Governor's Appointee
Joshua Rivero, Chair, Town of Parker
Luis Tovar, Special District Representative
Margaret Medellin, Governor's Appointee
Max Brooks, Town of Castle Rock (zoom)
Mike Anderson, City of Lone Tree
Rebecca Tejada - Special Districts, Parker Water and Sanitation District - Alternate
Ryan Adrian, Douglas County - Alternate
Stephanie Piko, City of Centennial
Tom Downing, Governor's Appointee

TAC Members Present

Alex Mestdagh, Town of Parker (zoom)
Ashley Byerley, SEMSWA (zoom)
Caitlin Gappa, Douglas County Health Department (zoom)
David Van Dellen, Town of Castle Rock
Jacob James, City of Lone Tree (zoom)
James Linden, SEMSWA - Alternate (zoom)
Joe Marencik, City of Castle Pines (zoom)
Jon Erickson, TAC Chair, Board Appointee, Colorado Parks and Wildlife (zoom)
Lisa Knerr, TAC Vice Chair, Arapahoe County (zoom)

Others Present

Alan Leak, RESPEC (zoom)
Erin Stewart, LRE Water
Jessica DiToro, LRE Water
Michelle Seubert, CPW, Cherry Creek State Park (zoom)
Richard Borchardt, R2R Engineers
Tim Flynn, Collins Cole Flynn Winn & Ulmer, PLLC
Val Endyk, CCBWQA

1. Call to Order and Pledge of Allegiance

Director Rivero called the meeting to order at 9:00 am and led in the pledge of allegiance.
Director Rivero introduced Michelle Seubert, the new park manager at Cherry Creek State Park.

2. Consent Agenda

- a. **Approval of the July 20, 2023 Minutes**
- b. **Acceptance of the Schedule of Cash Position Dated August, 2023**

- c. **Acceptance of the Paid Claims for July, 2023**
- d. **Approval of Unpaid Claims as of August, 2023**
- e. **Approval of Restated and Amended Bylaws**

Director Anderson moved to remove Consent Agenda item e from Consent and move to Direction and/or Action. Seconded by Director Ruzzo. The motion carried.

Director McCarty moved to approve consent agenda items a, b, c, and d. Seconded by Director Piko. The motion carried.

3. **Direction and/or Action**

a. **Approval of Restated and Amended Bylaws (Moved from Consent Agenda)**

Legal Counsel provided [Resolution 2023-8-1](#) to adopt the Restated and Amended Bylaws.

Director Anderson noted that a correction is needed on page 9 Article VII, 1, b, (4) of the [Restated and Amended Bylaws](#). Legal counsel will update.

Director Anderson moved to adopt Resolution 2023-8-1 adopting the Restated and Amended Bylaws as updated by legal counsel. Seconded by Director Piko. The motion carried.

b. **Governor Appointees to the Board (Added)**

Director Rivero added a direction/action item regarding the governor appointees. Director Rivero requested the Board consider a response to the governor's office requesting Director Woodling serve on the Board for an additional term.

Director Laydon moved to recommend the Board draft and send a letter to the Governor's Office supporting Director Woodling serve an additional term. Seconded by Director Piko. The motion carried.

4. **Discussion**

a. **[Site Specific Standards Update](#)**

Erin Stewart provided a brief summary of the progress on the development of the Site Specific Standards (SSS) for CCR based on the presentation provided by Christine Hawley to the TAC. The next steps include technical documentation of the process and setting up two meetings with the WQCD to seek buy-in on the methodology Hydros used to develop the draft SSS. A formal proposal would not be submitted to the WQCC until late 2026.

Discussion topics included:

- Why appropriate standards matter and the importance of standards that match the unique conditions of Cherry Creek Reservoir.
- Potential metrics of success that go beyond chlorophyll-a, TP and TN.
- Emerging technologies for nutrient remediation in the watershed and reservoir that could help meet the standard.
- Additional partnership opportunities to help with solutions.
- Considerations for in-reservoir management in addition to the ongoing watershed management program.

b. **Mid-Year [Financial Report](#), Draft (Ruzzo, enclosed)**

Director Ruzzo provided a summary of the mid-year financial report.

Staff will be starting the budget process and will report to the Board at a future meeting.

5. **Presentations**

a. **[Water Quality Standards 101](#)**

Jessica DiToro presented an overview of water quality standards and how they apply to the CCBWQA.

6. **Board Member Items**

Director Piko met with Senator Bennet regarding federal funding and coordination with USACE on Cherry Creek projects from the Reservoir to the trailhead south of Arapahoe Rd.

USACE agreed to coordinate with Staff regarding supporting funding.

Director Laydon updated the Board that Douglas County is creating a Douglas County Water Commission, which will look forward to future partnership with CCBWQA.

7. Updates

a. Technical Manager (Ruzzo for Clary)

i. Status of Staff Review of Groundwater Phosphorus (Ruzzo/ Stewart)

Director Ruzzo updated the Board that staff is considering recommendations made by Director Woodling during his presentation at the July Board meeting. Staff will bring proposed recommendations and next steps to the Board at a future meeting.

b. Cherry Creek Stewardship Partners Update and [Events](#) (Davenhill)

- i. Cherry Creek Watershed Conference - August 24, 2023 at the Parker Arts, Culture, and Events Center - [Register Here](#)

c. TAC (Erickson)

Jon Erickson updated the Board that at the August TAC meeting the TAC voted to create a Cherry Creek Reservoir to Lakeview Drive Alternatives Analysis TAC Subcommittee.

d. Contract Staff

i. PAPM

a. [CIP Status Report](#) (Borchardt, enclosed)

Rich Borchardt presented the updates for the East Shade Shelters Phase III and the Cherry Creek Stream Reclamation at Dransfeldt projects. The remaining project updates can be found in the CIP Status Report.

b. [Maintenance and Operations Status Report](#) (Goncalves, enclosed)

- i. [June Flood Report](#)

- ii. [Water Quality Update](#) (Stewart, enclosed)

- iii. Regulatory (DiToro)

- a. [Regulation 72 Dewatering Exemption Stakeholder Process Update](#) (enclosed)

Jessica DiToro provided an [update](#) to the Board on the status of the CR72 RMH stakeholder process. The next meeting will be September 14th.

- b. [Regulation 86 \(Graywater\) RMH Update](#) (enclosed)

Jessica DiToro provided an [update](#) to the Board on the proposed changes to Regulation 86 (graywater control regulation) and specifically the proposed changes that are relevant to the CCBWQA. Staff recommends monitoring the RMH, but not participating.

- iv. Land Use Referrals - [2023 Tracking](#) (Endyk)

e. Legal (none)

f. Other - Reminder of Watershed Plan Process Workshop - September 21, 2023 8:30-11:30 am

i. Draft Watershed Plan Outline, Subcommittee Update, and Board Member Input Requests

Erin Stewart provided a brief update on the progress of the Watershed Plan and encouraged interested Board members to attend next month's meeting which will be extended to incorporate the Workshop.

8. Executive Session pursuant to Section 24-6-402(4) C.R.S., if necessary.

No Executive Session held.

9. Adjournment

There being no further business to come before the Board, Director Rivero adjourned the meeting at 10:51 am.

Cherry Creek Basin Water Quality Authority
Schedule of Cash Position
June 30, 2023
as of September 15, 2023

	General Fund	Pollution Abatement Fund	Enterprise Fund	Total
<u>1st Bank - Checking Account</u>				
Balance as of 06/30/23	\$ 31,714.31	\$ 26,954.61	\$ 5,813.09	\$ 64,482.01
Subsequent activities:				
07/13/23 VISA Charges	(370.75)	-	-	(370.75)
07/18/23 Monthly Transfer for AP	41,000.00	156,000.00	17,000.00	214,000.00
07/25/23 Bill.com Payments	(44,756.18)	(145,687.19)	(16,833.53)	(207,276.90)
07/25/23 Bill.com Refund	-	280.00	-	280.00
07/25/23 Bill.com Payment	-	(280.00)	-	(280.00)
07/25/23 Verizon ACH	(51.46)	-	-	(51.46)
07/27/23 XCEL ACH	-	(10,781.06)	-	(10,781.06)
07/31/23 Interest Income	6.69	-	-	6.69
08/02/23 Get Stream Online VISA	(200.00)	-	-	(200.00)
08/17/23 Monthly Transfer for AP	97,000.00	64,000.00	8,000.00	169,000.00
08/22/23 Bill.com Payments	(96,929.47)	(53,335.18)	(8,574.25)	(158,838.90)
08/24/23 XCEL ACH	-	(9,986.37)	-	(9,986.37)
08/25/23 Verizon ACH	(51.46)	-	-	(51.46)
08/30/23 Bill.com Refund	-	280.00	-	280.00
08/30/23 Bill.com Payment	-	(280.00)	-	(280.00)
08/31/23 Interest Income	7.43	-	-	7.43
09/08/23 VISA Charges	(215.23)	-	-	(215.23)
<i>Anticipated Activities</i>				
Transfer from ColoTrust for bills	95,000.00	78,000.00	19,000.00	192,000.00
Bill.com open claims	(94,381.89)	(70,229.65)	(18,650.78)	(183,262.32)
September XCEL ACH	-	(8,483.03)	-	(8,483.03)
September Verizon ACH	(51.46)	-	-	(51.46)
<i>Anticipated balance</i>	<u>\$ 27,720.53</u>	<u>\$ 26,452.13</u>	<u>\$ 5,754.53</u>	<u>\$ 59,927.19</u>
<u>ColoTrust General - (8001)</u>				
Balance as of 06/30/23	\$ 792,339.93	\$ 3,165,817.98	\$ 1,460,291.11	\$ 5,418,449.02
Subsequent activities:				
07/10/23 Ptax Arapahoe Cty (Jun)	307,887.72	-	-	307,887.72
07/10/23 Ptax Douglas Cty (Jun)	469,808.77	-	-	469,808.77
07/18/23 Monthly Transfer for AP	(41,000.00)	(156,000.00)	(17,000.00)	(214,000.00)
07/31/23 Deposits Dev Checks	-	-	48,659.84	48,659.84
07/31/23 Interest Income	26,575.03	-	-	26,575.03
08/10/23 Ptax Arapahoe Cty (Jul)	15,818.00	-	-	15,818.00
08/10/23 Ptax Douglas Cty (Jul)	26,901.47	-	-	26,901.47
08/17/23 Monthly Transfer for AP	(97,000.00)	(64,000.00)	(8,000.00)	(169,000.00)
08/31/23 Deposits Dev Checks	-	-	123,817.14	123,817.14
08/31/23 Interest Income	28,096.02	-	-	28,096.02
09/08/23 Ptax Arapahoe Cty (Aug)	13,619.09	-	-	13,619.09
09/08/23 Ptax Douglas Cty (Aug)	19,731.76	-	-	19,731.76
09/12/23 Deposits Dev Checks	-	-	4,150.88	4,150.88
<i>Anticipated Activities</i>				
Monthly Transfer for AP	(95,000.00)	(78,000.00)	(19,000.00)	(192,000.00)
<i>Anticipated balance</i>	<u>\$ 1,467,777.79</u>	<u>\$ 2,867,817.98</u>	<u>\$ 1,592,918.97</u>	<u>\$ 5,928,514.74</u>
<u>ColoTrust Pollution Abatement - (8002)</u>				
Balance as of 06/30/23	\$ -	\$ 55,745.02	\$ -	\$ 55,745.02
Subsequent activities:				
07/31/23 Interest Income	-	250.79	-	250.79
08/31/23 Interest Income	-	259.77	-	259.77
<i>Anticipated balance</i>	<u>\$ -</u>	<u>\$ 56,255.58</u>	<u>\$ -</u>	<u>\$ 56,255.58</u>
<u>CSAFE - Savings Account</u>				
Balance as of 06/30/23	\$ 859,161.30	\$ 42,246.04	\$ 386,563.24	\$ 1,287,970.58
Subsequent activities:				
07/31/23 Interest Income	-	-	5,729.24	5,729.24
08/31/23 Interest Income	-	-	5,939.04	5,939.04
<i>Anticipated balance</i>	<u>\$ 859,161.30</u>	<u>\$ 42,246.04</u>	<u>\$ 398,231.52</u>	<u>\$ 1,299,638.86</u>
Total funds available as of date above	<u>\$ 2,354,659.62</u>	<u>\$ 2,992,771.73</u>	<u>\$ 1,996,905.02</u>	<u>\$ 7,344,336.37</u>
<u>Effective monthly yield (as of 8/31/2023)</u>				
1st Bank - 0.100%* if Balance >\$20,000				
ColoTrust Plus - 5.4503%				
CSAFE - 5.39%				

Cherry Creek Basin Water Quality Authority
Paid Claim August 11, 2023 through September 14, 2023

Process Date	Vendor	Invoice Number	Payment Reference	Amount
8/21/2023	Ingersoll-Rand Company	31072471	P23082101 - 7588027	10,637.98
8/22/2023	Cherry Creek Stewardship Partners	2023004	P23082101 - 7588004	14,000.00
8/22/2023	CliftonLarsonAllen LLP	3812848	P23082101 - 7588011	6,343.03
8/22/2023	Collins Cole Flynn Winn & Ulmer, PLLC	3888	P23082101 - 7588022	7,683.00
8/22/2023	Fiscal Focus Partners, LLC	23041	P23082101 - 7587997	8,000.00
8/22/2023	L & M Enterprises, Inc.	4935	P23082101 - 7588073	1,500.00
8/22/2023	LRE Water	23656	P23082101 - 7588041	48,484.69
8/22/2023	Muller Engineering Company	36902	P23082101 - 7588035	3,526.53
8/22/2023	Pinpoint Systems Inc.	10013	P23082101 - 7588058	307.50
8/22/2023	R2R Engineers, Inc.	2023-07	P23082101 - 7588065	16,089.19
8/22/2023	RESPEC	Multiple	P23082101 - 7587984	4,243.23
8/22/2023	RG and Associates LLC	153315	P23082101 - 7588069	6,913.50
8/22/2023	Valerie Endyk	19	P23082101 - 7588047	3,881.25
8/22/2023	Wright Water Engineers, Inc.	Multiple	P23082101 - 7587967	27,229.00
8/30/2023	CH2M Hill - Jacobs Engineering	D3150300-040	Re-issued check	280.00
			Subtotal	\$ 159,118.90
Other Payments				
8/24/2023	XCEL Energy		ACH	51.46
8/25/2023	Verizon		ACH	9,986.37
9/6/2023	Get Streamline.com Website		Visa	200.00
9/8/2023	Alpine Trophies		Visa	15.23
			Subtotal	\$ 10,253.06
			Total Payments	\$ 169,371.96

Cherry Creek Basin Water Quality Authority
Unpaid Claims as of 09/14/23

Invoice date	Invoice	Vendor*	Fund	Chart of account	Invoice amount
7/31/2023	3868084	CliftonLarsonAllen LLP	10	7000 - Accounting	5,421.60
8/31/2023	4133	Collins Cole Flynn Winn & Ulmer	10	7460 - Legal	8,929.00
7/31/2023	4009	Collins Cole Flynn Winn & Ulmer	10	7460 - Legal	10,676.50
8/29/2023	INV-230627	Hydrologik LLC	40	7618 - Equipment	6,654.56
8/31/2023	547-006	Hydros Consulting Inc.	11	7440 - District management	7,654.40
7/31/2023	547-005	Hydros Consulting Inc.	11	7440 - District management	11,209.10
8/25/2023	23919	LRE Water	10	Various budget codes GenFund	49,971.04
8/25/2023	23919	LRE Water	11	7503 - Monitoring - Laboratory	161.25
8/19/2023	37089	Muller Engineering Company	11	7762 - SR - Reservoir to LV Road	21,264.96
8/31/2023	10047	Pinpoint Systems Inc.	10	7480 - Miscellaneous	210.00
8/31/2023	2023-08	R2R Engineers, Inc.	10	7440 - District Management	10,530.00
8/31/2023	2023-09	R2R Engineers, Inc.	11	7440 - District Management	10,407.71
7/31/2023	INV-0723-481	RESPEC	11	7440 - District management	1,622.98
7/29/2023	INV-0723-480	RESPEC	11	7511 - RSS East Shade Shelter	442.50
8/31/2023	153387	RG and Associates LLC	10	7415 - TAC Coordination	825.00
8/31/2023	153387	RG and Associates LLC	11	7510 - RDS Rehabilitation	82.50
8/14/2023	24WC-54669-0773	TCW Risk Management	10	1280 - Prepaid Insurance	450.00
8/25/2023	20	Valerie Endyk	10	7201 - Administration fees	7,368.75
9/30/2023	AUG	Verizon	10	7480 - Miscellaneous	51.46
8/31/2023	67618	Wright Water Engineers, Inc.	11	7440 - District management	17,384.25
8/31/2023	67617	Wright Water Engineers, Inc.	40	7685 - BMP Effectiveness	3,898.00
7/31/2023	67494	Wright Water Engineers, Inc.	40	7677 - CCBWQA Planning	8,098.22
9/1/2023	843277099	Xcel Energy	11	7818 - Utilities - Reservoir Destratifica	8,483.03
					191,796.81

General Fund - 10	\$	94,433.35
Pollution Abatement Fund - 11		78,712.68
Enterprise Fund - 40		18,650.78
Total Claims by Funding Source		191,796.81

* by vendor

FIRST AMENDMENT TO
AGREEMENT FOR PROFESSIONAL ENGINEERING SERVICES
FOR
CHERRY CREEK REACH 1 ALTERNATIVES ANALYSIS
AND
CONCEPTUAL DESIGN

THIS FIRST AMENDMENT TO AGREEMENT FOR PROFESSIONAL ENGINEERING SERVICES FOR CHERRY CREEK REACH 1 ALTERNATIVES ANALYSIS AND CONCEPTUAL DESIGN (“First Amendment”) is made and entered into to be effective as of July 20, 2023 (“Effective Date”) by and between the **CHERRY CREEK BASIN WATER QUALITY AUTHORITY**, a quasi-municipal corporation and political subdivision of the State of Colorado (“Authority”), whose address is PO Box 3166, Centennial, Colorado 80161, and **MULLER ENGINEERING COMPANY, INC.**, a Colorado corporation (“Consultant”) whose address is 7245 West Alaska Drive, Suite 300, Lakewood, Colorado 80226. Authority and Consultant may hereinafter singularly be referred to as a “Party” and collectively as the “Parties.”

RECITALS

WHEREAS, Authority and Consultant entered into the above referenced Agreement for Professional Engineering Services dated to be effective April 20, 2023 (“Agreement”); and

WHEREAS, pursuant to the Agreement, Consultant agreed to develop an alternatives analysis for that portion of Cherry Creek identified by the Parties as Reach 1; and

WHEREAS, subsequent to and unrelated to the Agreement, flooding occurred in Cherry Creek State Park that caused a portion of Lakeview Drive located within Cherry Creek State Park to fail (“Damaged Lakeview Drive Area”); and

WHEREAS, for the purpose of assisting Colorado Parks and Wildlife (“CPW”) in repairing the Damaged Lakeview Drive Area, Authority requested a proposal from Consultant for recommendations for improving the hydraulic capacity and in particular the culverts that go beneath the Damaged Lakeview Drive Area (“Proposal”); and

WHEREAS, the Parties understand that the work described in the Proposal is for services that were not described in the Agreement and are therefore considered by the Parties to be additional services (“Additional Services”); and

WHEREAS, after reviewing the Proposal dated July 26, 2023 and based upon the recommendations of the Authority’s Technical Advisory Committee, the Authority desires to retain Consultant to perform the Additional Services upon the terms and conditions set forth in this First Amendment.

NOW, THEREFORE, in consideration of the promises set forth herein, Authority and Consultant agree as follows:

1. **Additional Services.** Consultant’s Scope of Work under the Agreement is hereby modified to include the Additional Services as more particularly described in the Proposal attached hereto as Exhibit A, consisting of three pages, and incorporated herein by this reference.

2. **Additional Compensation.** For the performance of the Additional Services, Consultant shall be compensated in accordance with Consultant’s hourly rates and costs as set forth in Proposal in an amount not to exceed \$17,628.00.

3. **Effective Date.** This First Amendment shall become effective as of the Effective Date set forth above when fully executed by the Parties hereto.

4. **Reaffirmance of Agreement.** Upon the execution of this First Amendment by both Parties, the Agreement shall remain in full force and effect in accordance with its terms and provisions, as amended by this First Amendment. In the event of a conflict between the terms and provisions of this First Amendment and the Agreement, this First Amendment shall control.

5. **Binding Effect.** This First Amendment shall be binding upon and inure to the benefit of the Parties hereto and their respective successors and assigns.

6. **Severability.** In the event any one or more of the provisions of this First Amendment shall, for any reason, be held to be invalid or unenforceable, the remaining provisions of this First Amendment shall be unimpaired and shall remain in full force and effect and binding upon the Parties hereto.

7. **Governing Law.** This First Amendment shall be governed by and construed in accordance with the laws of the State of Colorado.

IN WITNESS WHEREOF, the Parties have executed this First Amendment as of the date set forth above.

AUTHORITY:
CHERRY CREEK BASIN WATER
QUALITY AUTHORITY, a quasi-municipal
corporation and political subdivision of the State
of Colorado

By: _____
Joshua Rivero, Chair

This First Amendment is accepted by:

CONSULTANT:
MULLER ENGINEERING COMPANY,
INC., a Colorado corporation

By: _____
A. Gray Clark, President

Date: _____

By execution, signer certifies that he/she is authorized to accept and bind Consultant to the terms of this Agreement.

Approved as to Form:

Timothy J. Flynn, General Counsel
For the Cherry Creek Basin Water
Quality Authority



July 26th, 2023

Bill Ruzzo
 Cherry Creek Basin Water Quality Authority
 PO Box 3166
 Centennial, CO 80111

RE: Scope of Services for Cherry Creek State Park Lakeview Drive Repair Recommendations

Dear Bill:

Muller Engineering Company, Inc. (Muller) would like to thank you for the opportunity to assist the Cherry Creek Basin Water Quality Authority (CCBWQA) and Colorado Parks and Wildlife (CPW) with the Lakeview Drive Repair Recommendations Analysis. The purpose of the analysis is to determine the failure mechanism of the culverts under Lakeview Drive which occurred during the heavy rainfall event on May 11th, 2023, and to develop recommendations for the repair that will help to improve the hydraulic operations and maintenance routine for these culverts in the near term until a more robust improvement plan for Lakeview Drive is developed and constructed. The following sections outline the scope, fee, and schedule. These scopes of services are anticipated to become an amendment to the Cherry Creek Reach 1 Alternatives Analysis and Conceptual Design agreement effective April 20th, 2023.

A. Scope of Work

The scope of work will include the following items summarized below:

1. Project management, Meetings, and Coordination

The following tasks are included in the scope of work:

- **Analysis of Lakeview Drive:** Muller will complete an analysis of Lakeview Drive including a site visit with a GPS unit to verify grades at culvert entrance and outfalls, review of existing information (culvert replacement plans and as-built utility plans), determination of the culvert failure mechanism, and development of recommendations for hydraulic operations and maintenance improvements including thoughts on changing pipe sizes, pipe shapes, trash and debris racks, and downstream embankment protection.
- **Lakeview Drive Repair Recommendations Memo:** Prepare a memo summarizing the failure mechanism and recommendations for hydraulic operations and maintenance improvements.
- **Meetings and Coordination:** Muller will attend 2 virtual meetings with the CCBWQA and CPW and complete general phone and e-mail coordination.



Bill Ruzzo
June 5, 2020
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2. Deliverables

The following deliverables are included in the scope of work:

- **Lakeview Drive Repair Recommendations Memo:** Muller will prepare a memo summarizing the failure mechanism and recommendations for hydraulic and operations and maintenance improvements.
- **CAD Sketches of Selected Improvements:** Muller will provide conceptual level construction cost estimates for each of the three alternatives.

B. Assumptions and Exclusions

The following is a list of assumptions and exclusions used in preparation of this scope and fee:

- Construction drawings for the replacement of the culverts will be completed by others.
- CAD sketches of entrance and outfall improvements and any other CAD assistance will be as directed by the CCBWQA and CPW.
- Construction services are not included in this scope and fee.

C. Fee

We estimate that the fee associated with this scope of work will not exceed **\$17,628**. A project fee estimating sheet from Muller is attached which provides a breakdown of our anticipated staff time by task using the same rates as the original Cherry Creek Reach 1 Alternatives Analysis and Conceptual Design agreement effective April 20th, 2023.


D. SCHEDULE

We anticipate completing the analysis within three weeks of the notice to proceed date of July 19th, 2023.

We look forward to working with you and assisting the Cherry Creek Basin Water Quality Authority with this analysis. If you have any questions or concerns related to the scope and fee, please don't hesitate to call.

Sincerely,

MULLER ENGINEERING COMPANY, INC.



John Yager
Water Resources Project Manager



Derek Johns
Principal

Enclosures: Muller Fee Estimate
CC: CCBWQA Manager (Jane Clary and Val Endyk), R2R (Rich Borchardt)

EXHIBIT A
MULLER ENGINEERING COMPANY
PROJECT FEE ESTIMATE



CLIENT:

Cherry Creek Basin Water Quality Authority

PROJECT:

Lakeview Drive Repair Recommendation

PROPOSAL NO.: 923.22

PROJECT NO.: 20-023.04

PREPARED BY: JAY

DATE: 7/17/2023

CHECKED BY: JTW

PROPOSED TOTAL FEE: \$ 17,628

TASK NO.	ITEM DESCRIPTION	LABOR (HOURS)					EXPENSES					TOTALS			
		Staff Member Initials >>>					OUTSIDE SERVICES	TRAVEL	REPRODUCTION	DELIVERY	MISCELLANEOUS	TIME (HOURS)	LABOR COST	EXPENSES	SUBTOTAL
		JTW	DDI	JAY	CRV	PBS									
	2023 Billing Rate >>>	Senior Project Manager 9	Senior Project Manager 9	Project Manager 7L	Design Engineer 3	Technician/CADD Operator 4									
		\$242	\$242	\$208	\$140	\$123									
100	Lakeview Drive Repair Recommendation														
	Site Visit with GPS unit to verify grades at culvert entrance and outfall.	3	3	5				\$ 60		\$ 250		11	\$ 2,492	\$ 310	\$ 2,802
	Review of existing information: Culvert Replacement Plans and As-Built Utility Plans	2		2								4	\$ 900		\$ 900
	Determine failure mechanism fo the Culverts 2 and 5.	2		2								4	\$ 900		\$ 900
	Develop recommendations for hydraulic and operations and maintenance improvements including thoughts on changing pipe sizes/shapes, trash/debris racks, downstream embankment protection.	4	4	8	8							24	\$ 4,720		\$ 4,720
	Prepare sketches of selected improvements and provide CAD support for design drawings for haedwalls and trash rack as needed (assume 1 sheet).	2		4	8	8						22	\$ 3,420		\$ 3,420
	Prepare memo summarizing the failure mechanism and recommendations for hydraulic and operations and maintenance improvements.	4		8	2							14	\$ 2,912		\$ 2,912
	Meetings and coordination, including up to 2 meetings with CCBWQA and CPW and general phone and e-mail coordination.	3		6								9	\$ 1,974		\$ 1,974
	SUBTOTAL											88	\$ 17,318	\$ 310	\$ 17,628
	TOTAL HOURS	20	7	35	18	8						80			
	TOTAL LABOR	\$ 4,840	\$ 1,694	\$ 7,280	\$ 2,520	\$ 984							\$ 17,318		
	TOTAL EXPENSES						\$ -	\$ 60	\$ -	\$ -	\$ 250			\$ 310	
	TOTAL FEE														\$ 17,628



To: CCBWQA Board of Directors
From: Bill Ruzzo, Governor Appointee, Executive Committee
John McCarty, Governor Appointee, Executive Committee
Date: September 21, 2023
Subject: Governor Appointee

Request: That the CCBWQA Board of Directors direct the Executive Committee to pursue contacting potential candidates for Governor Appointee positions on the Board to determine their level of qualifications and interest in the position and report back to the Board on their findings.

Issue: Recently, the Governor's Office of Boards and Commissions has requested that the CCBWQA identify potential candidates for Governor appointed positions on the Board to replace those Governor appointees whose terms have expired. As of August 2023, there are three Governor appointees whose terms have expired; Tom Downing, John Woodling, and Bahman Hatami. Mr. Downing has reapplied and has been accepted by the Governor's Office. The Board has submitted a letter to the Governor requesting the reappointment of Mr. Woodling for a third term. Mr. Hatami has chosen not to apply for a second term; therefore, this position is available. Mr. Hatami filled the position identified as someone with a *background in or professional training regarding water quality issues*.

Budget: Contact with potential candidates may be made by the Technical Manager or Legal Counsel under their current scope of services and expended time would be limited to phone calls, review of CV, and Executive Committee coordination. Contacts may also be made by Executive Committee members.

Motion: The CCBWQA Board of Directors moves to direct the Executive Committee to pursue contacting potential candidates for Governor Appointee positions on the Board to determine their level of qualifications and interest in the position and report back to the Board on their findings.



MEMORANDUM

DATE: September 14, 2023

TO: CCBWQA Board of Directors (Board)

FROM: Richard G. Borchardt PE, CFM
Jane Clary, Wright Water Engineers, CCBWQA Technical Manager

SUBJECT: CCBWQA, Update on 2023 Pollution Abatement Fund Budget and Capital Improvement Program

PURPOSE: The purpose of this memorandum is to provide information to the Board regarding potential opportunities for reallocation of CCBWQA's 2023 Pollution Abatement Fund (PAF) to allow funding of projects that are "shovel ready" during 2023. Opportunities for fund reallocation are due to project delays resulting from significant inflation and other factors.

DISCUSSION: CCBWQA's Board adopted their 2023 Budget on November 17, 2022. The 2023 Pollution Abatement Fund budgeted \$3,872,400 in expenditures for CCBWQA's Capital Improvement Program (CIP).

Projects in the CIP have been affected by current market conditions and inflationary pressures have increased costs by about 27.5% from August 2020 to February 2023.¹ The projects have been value engineered and scopes reduced to try and fit within current budgets, but with limited success. In addition, the extended delays by the USACE in reviewing permit applications have also caused schedule uncertainties and delays. As a result, CCBWQA's consulting staff and our project partners have determined that the impacted projects need additional funding to be secured before they can go to construction, which has resulted in schedule delays and impacts to the CCBWQA's 2023 PAF budget.

The likely delays in project construction will reduce the CCBWQA's PAF capital expenditures for 2023 by \$1,310,000 as shown in **Table 1**. Note that the values in **Table 1** refer to the CCBWQA's budget for participation and are not total project costs. If approved by the Board, these funds could be reallocated to other projects in 2023 and still remain within the 2023 PAF budget of \$3,872,400. Reallocation of funds does not require a budget amendment if the total PAF budget is not increased.

Three projects have been identified for consideration for additional funding. These include:

1. The Dove Creek project from Otero to Chambers (PAF account 117885), CCBWQA could add the next planned phase of construction from Pond D1 to Chambers to increase our 2023 budget

¹ Engineering News-Record, Building Cost Index. Additionally, a recent cost analysis completed by Naranjo Civil Constructors for MHFD showed cost increases from 2020 to 2022 at 35% for rock and 28% for concrete.

from \$138,000 to \$678,000, which is an increase of \$540,000. To assure that the Dove Creek funds are included in CCBWQA's 2023 PAF budget, the IGA with the project partners would note that the funds are encumbered in 2023.

2. The Cherry Creek at Scott Road project (PAF account 117882) has experienced cost increases, and the Mile High Flood District (MHFD) and Douglas County are contributing additional funding for 2023, including \$300,000 from MHFD and \$300,000 from Douglas County. No additional funding from CCBWQA was budgeted for 2023. CCBWQA has received a request from MHFD and Douglas County to help cover project cost increases. CCBWQA could assist up to an additional \$409,000 in 2023 to get up to a 24.8% participation level, which is needed to get this project to construction. This would be consistent with CCBWQA's participation level in the project in 2021 and the typical historical percentage match of 25% CCBWQA participation on partner projects.
3. The Cherry Creek from Reservoir to Lake View Drive (aka Reach 1) Alternatives Analysis (PAF account 117869) was contracted with Muller Engineering for \$256,765 and an amendment for \$17,628 is expected for engineering support related to the replacement of the culverts at Lake View Drive. The original agreement included Phase II services of \$180,847 for the conceptual design of the selected alternative, which could be authorized in 2023.

The total of these three projects is about \$1,130,000, which is less than the available funds of \$1,310,000 for potential reallocation. As suggested by **Table 1**, other partner requests for additional funding could be considered and remain with the 2023 PAF budget. If additional funding increase requests are made, CCBWQA staff will evaluate the requests with those discussed above and make recommendations to the TAC and Board.

CCBWQA has a statutory requirement to spend at least 60% of its revenues on Pollution Abatement Projects. CCBWQA evaluates compliance with the 60% requirement using a 5-year schedule. The adopted 2023 budget projected that CCBWQA would be reasonably close to meeting the 60% requirement. Unfortunately, with the impacted projects and the resulting budget implications, CCBWQA may not meet the 60% requirement; therefore, it is important to consider potential reallocation of PAF project budgets.

TABLE 1. POSSIBLE VARIANCE IN CCBWQA PAF BUDGET DUE TO INFLATION

Project	Impact	2023 Planned Budget	2023 Projected Expenditures	Variance
East Shade Shelter	Value engineering required and construction delayed	\$599,000	\$99,000	\$500,000
Cherry Creek from Reservoir to Lake View Drive	Cost increases ²	\$200,000	\$275,000	(\$75,000)
McMurdo Gulch	Construction delay requested by Castle Rock	\$907,000	\$0	\$907,000
Cherry Creek at Dransfeldt	Cost increase	\$170,000	\$570,000	(\$400,000)
Cherry Creek at Arapahoe (Reaches 3 and 4)	Partner funding limited	\$605,000	\$300,000	\$305,000
Lone Tree Creek (Centennial Trail Project)	Construction requested for 2023 by Centennial	\$0	\$112,000	(\$112,000)
Contingency	N/A	\$185,000	\$0	\$185,000
TOTAL	Funds available for reallocation			\$1,310,000

TAC REVIEW: TAC discussed the projects and potential 2023 PAF budget reallocation shown in **Table 1** and no concerns were raised. TAC is interested in seeing the Draft 2024-2033 CIP next month. TAC will consider staff recommendations and evaluations when brought back for further discussion, direction, and action. TAC was asked to provide any additional projects for consideration by 9/15/23, and none were received.

REQUEST: Staff requests that the Board review and provide input on potential 2023 PAF budget reallocation and discuss which projects, if any, should be reviewed for possible funding increases in 2023. This reallocation could consider the projects in this memorandum or other projects. Staff will then evaluate all requests and bring the project funding requests back with recommendations to the TAC and Board at a future meeting for discussion, direction, and action.

² Alternatives analysis cost is more than planned budget and additional design cost for the Lake View Drive repair from the 2023 storms.



DRAFT TECHNICAL MEMORANDUM

TO: Jane Clary, Cherry Creek Basin Water Quality Authority (CCBWQA) Technical Manager
FROM: Christine Hawley and Kevin Bierlein, Hydros Consulting Inc.
SUBJECT: **DRAFT** Development of Site-Specific Standard Values for TP and TN in Cherry Creek Reservoir
DATE: September 15, 2023

The Cherry Creek Basin Water Quality Authority (CCBWQA) asked Hydros Consulting (Hydros) to provide technical support in development of site-specific standards for total phosphorus (TP) and total nitrogen (TN) for Cherry Creek Reservoir. This memorandum explains the need for site-specific TP and TN standards in Cherry Creek Reservoir, the analysis conducted to generate those values, and associated longevity plan recommendations. This memorandum is organized in seven sections, followed by a listing of references cited:

Section 1: Background

Section 2: Need for Site-Specific TP and TN Standards

Section 3: Consideration of the 'Site-Specific Light' Option

Section 4: Site-Specific TP and TN Standard Development

Section 5: Discussion of Site-Specific TP and TN Standard Values

Section 6: Longevity Plan Recommendations

Section 7: Summary

1 Background

The Water Quality Control Commission (WQCC) adopted new table value standards (TVSs) for TP and TN in Regulation 31 during the recent April 2023 rulemaking hearing. The standards now apply to lakes and reservoirs that have aquatic life and recreational (AL/Rec) use designations and are located above permitted dischargers. At this time it is anticipated that the TVSs for TP and TN will be adopted for all

remaining lakes and reservoirs with AL/Rec uses by 2027. Because Cherry Creek Reservoir is below permitted discharges, TP and TN standards have not yet been adopted but are anticipated by 2027¹.

The TP and TN standards for lakes and reservoirs are designed to correspond to the chlorophyll *a* (Chl*a*) standard for AL/Rec uses, recognizing the critical role that nutrient concentrations play in algal growth. Therefore, TP and TN standards provide a secondary level of protection to support meeting the Chl*a* standard. It is important to recognize that there are no toxicity concerns stemming directly from TP and TN for aquatic life or recreational contact at the concentrations typically observed in Colorado lakes and reservoirs, and the standards are therefore based on TP and TN relationships to Chl*a*.

In the absence of a successful site-specific standard proposal, it is expected that the WQCC will adopt TP and TN standards of 42 ug/L and 620 ug/L, respectively, for Cherry Creek Reservoir. Throughout this document, these values are referred to as the “default” TP and TN standard for Cherry Creek Reservoir. The default values reflect the use of the Water Quality Control Division’s (WQCD) warm lakes Chl*a*:nutrients relationships, with input of Cherry Creek Reservoir’s 18 ug/L site-specific Chl*a* standard (Table 1). Note that these values are more stringent than the warm lakes TVSs because they are based on 18 ug/L Chl*a* instead of the warm lakes Chl*a* TVS of 20 ug/L (Table 1). Note also that TP and TN TVSs are notably more stringent than the 2012 Interim Criteria (Table 1), which were the anticipated values until 2022 (WQCD, 2022a).

Table 1. Relevant State Nutrient Standards and Interim Criteria, Including the Default WQCD Standard for Cherry Creek Reservoir

Constituent	Warm Lakes Nutrient Regulatory Values		Default** Cherry Creek Reservoir Standards
	2012 Interim Criteria	TVSs* (TN and TP Adopted in April 2023)	
Chl <i>a</i> (ug/L)	20	20	18
TN (ug/L)	910	670	620
TP (ug/L)	83	47	42

Note: All are/would be assessed as July-September averages with a one- in five-year allowable exceedance frequency.

*Currently only applicable to warm lakes above permitted discharges.

**Default TP and TN standards are those likely to be adopted for Cherry Creek Reservoir in the absence of a successful site-specific standard proposal. The TN and TP values were developed from the WQCD State-wide relationships used in the April 2023 RMH, applying the Cherry Creek Reservoir Chl*a* standard of 18 ug/L, in lieu of the warm lakes Chl*a* TVS of 20 ug/L.

¹ The WQCC is planning to consider site-specific nutrient standard proposals for lakes and reservoirs at the next corresponding basin hearing. For Cherry Creek Reservoir, that is the South Platte Basin hearing in June 2025.

2 Need for Site-Specific TP and TN Standards for Cherry Creek Reservoir

The default TP and TN standard values for Cherry Creek Reservoir (Table 1; 42 ug/L TP and 620 ug/L TN) are based on State-wide, warm lake TP:Chl α and TN:Chl α relationships developed by the WQCD and used to define the TVSSs. For these values to be appropriate for Cherry Creek Reservoir, the underlying relationships must reasonably approximate TP:Chl α and TN:Chl α relationships in Cherry Creek Reservoir. Cherry Creek Reservoir is fortunate to have an extensive dataset (1992-2022; 31 years) to support a detailed evaluation of this premise, as discussed in the following subsections.

2.1 Observed Concentrations Compared to Default Nutrient Standards

As a first step in evaluating the appropriateness of the default TP and TN standards for Cherry Creek Reservoir, observed data² were plotted against the default TP and TN standard values (Figure 1). The observed data indicate that the average summer Chl α concentrations were below the Chl α standard value in 13 of 31 years of record. In contrast, Cherry Creek Reservoir TP and TN concentrations would have been below the default TP and TN standard values in zero of 31 years of record. This comparison indicates a fundamental disconnect between the underlying Chl α :TP and Chl α :TN relationships used to develop the default TN and TP standards and the actual algal response to TP and TN concentrations in Cherry Creek Reservoir.

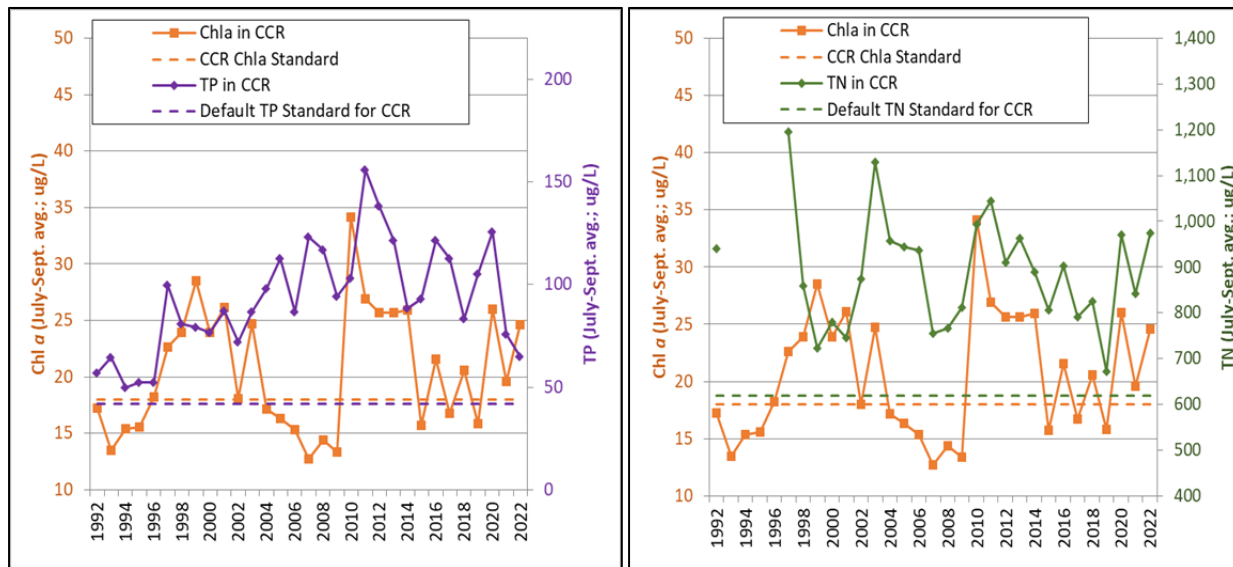


Figure 1. Comparison of Observed Chl α and Nutrient Data from Cherry Creek Reservoir to Existing Chl α Standard and Default TP and TN Standards for Cherry Creek Reservoir

² Note that the observed dataset was compiled from the CCBWQA database. Data reflect sampling results from the deepest location (CCR2). In a few earlier year of record (1994, 1995, and 2001 for Chl α ; and 2001 for TP and TN), the database only includes CCR-Composite sample results (an average result of CCR1, CCR2, and CCR3). Analysis of the full dataset indicates that CCR-Composite results (July-September averages) exhibit excellent predictive capability for CCR2 July-September averages ($R^2 = 0.94$ for both Chl α and TN, and $R^2 = 0.93$ for TP). Therefore, CCR-Composite results were used to fill in CCR2 values for Chl α in 1994, 1995, and 2001, as well as TP and TN in 2001. There were no TN results at any locations in the database for 1993-1996.

2.2 Evaluation of Observed Chl α Response to Nutrients Using Cherry Creek Reservoir’s Full Dataset

As a first step in direct comparison of site-specific Chl α :TN and Chl α :TP relationships in Cherry Creek Reservoir to the WQCD State-wide relationships, Cherry Creek Reservoir observed correlations were evaluated (Figure 2 and Figure 3). The first key finding from these graphics showing the full Cherry Creek dataset is the striking lack of a significant relationship between Chl α and TP ($R^2 = 0.06$) and between Chl α and TN ($R^2 = 0.12$), in the 30+ years of record. The lack of relationships is indicative of the underlying complexity and numerous factors driving Chl α response in Cherry Creek Reservoir. Nutrient concentrations are, of course, important drivers of Chl α response, but the data show that they are far from exclusive and independent controls of Chl α response in Cherry Creek Reservoir.

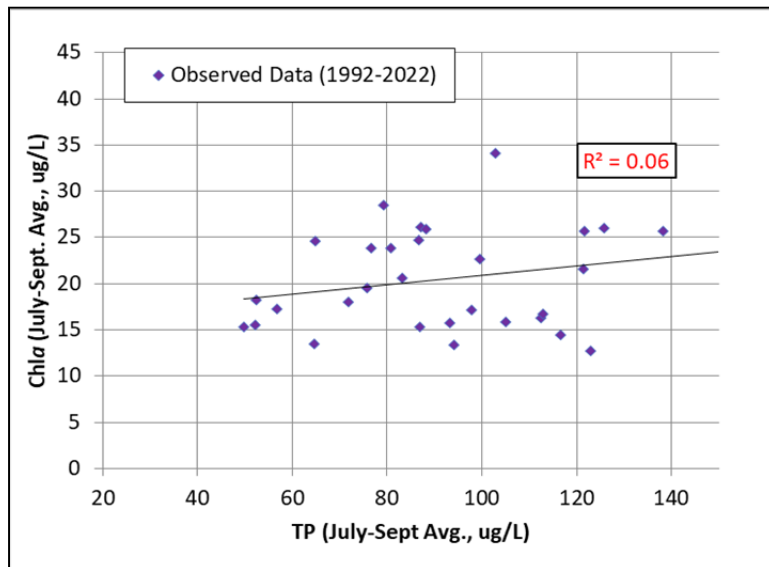


Figure 2. Observed Cherry Creek Dataset; Summer Chl α Response to TP Concentrations; 1992-2022

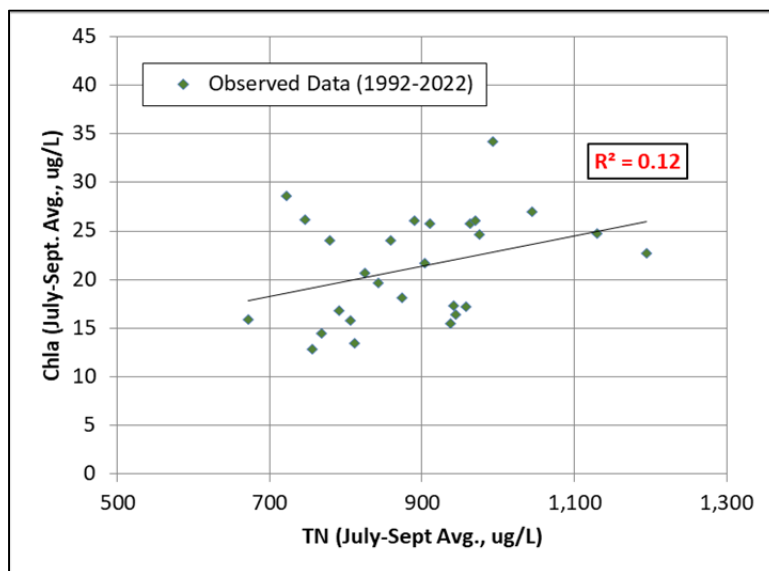


Figure 3. Observed Cherry Creek Dataset; Summer Chl α Response to TN Concentrations; 1992-2022

2.3 Comparison of Cherry Creek Reservoir Data to State-Wide Warm Lakes Relationships

Direct comparison shows that the Cherry Creek Reservoir dataset is not well described by the WQCD warm lakes State-wide relationships used to develop the default TP and TN standards (Figure 4 and Figure 5). Specifically, the majority of Cherry Creek Reservoir lake-years (i.e., July-Sept averages) exhibit notably lower production of Chl_a for a given nutrient concentration than what is predicted by the State-wide relationship.

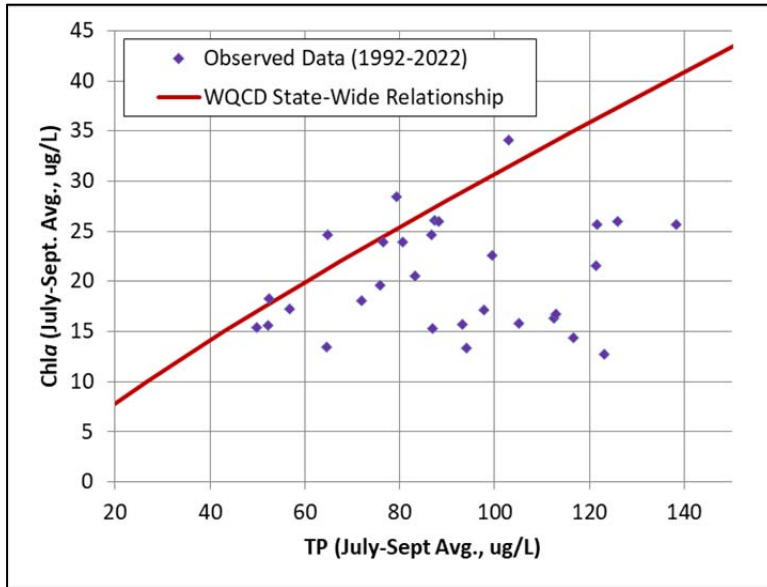


Figure 4. Observed Cherry Creek Dataset Compared to WQCD State-Wide Warm Lakes Relationship for Chl_a and TP

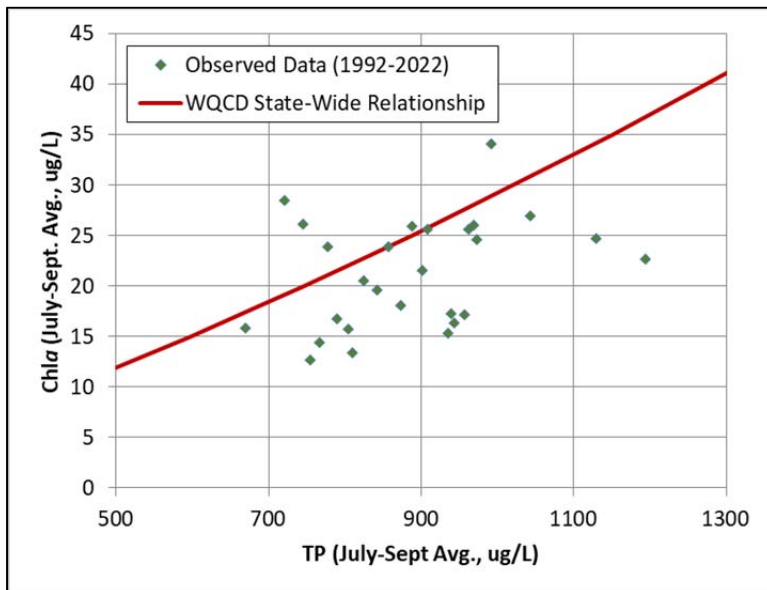


Figure 5. Observed Cherry Creek Dataset Compared to WQCD State-Wide Warm Lakes Relationship for Chl_a and TN

2.4 Quadrant Plot Review of Default WQCD Nutrient Standards for Cherry Creek Reservoir

The mismatch between the observed response and the default TP and TN standards is also apparent when the Chl a standard and the default TP and TN standards are included in the Chl a :TP and Chl a :TN observed data graphics (Figure 6 and Figure 7). The standards lines on these graphics create quadrant plots similar to those presented by WQCD (WQCD, 2022a), which are helpful to evaluate how the data align with the related standards. Specifically, the quadrants on the plots effectively categorize the observed data into groups. These groups indicate how well the underlying relationships used to develop the TN and TP standards reflect the patterns in the observed data, as follows:

- Aligned:** As shown in Figure 6, the upper right and lower left quadrants correspond to conditions where the observations generally align with the expected response inherent in the standards. These two “aligned” quadrants indicate cases where both Chl a and nutrient standards are exceeded (upper right quadrant) or neither Chl a nor nutrient standards are exceeded (lower left quadrant). These conditions match the overall intent of the nutrient standards (i.e., supporting the Chl a standard).
- Not Aligned:** Lake-year data in the lower right quadrant, where the Chl a standard value is met but the nutrient standard value is not met, indicate cases when the nutrient standards is apparently overly-stringent. Lake-year data in the upper left quadrant correspond to cases when the Chl a standard value is not met, but the nutrient standard value is met, indicating that the nutrient standard may be under-protective for the Chl a concentration.

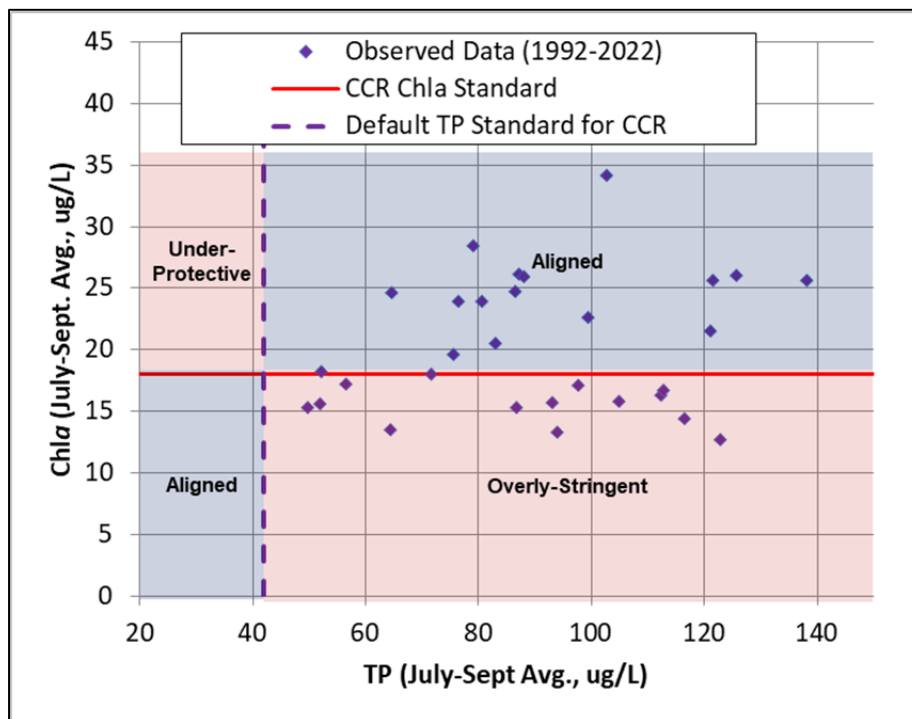


Figure 6. Cherry Creek Reservoir (CCR) Chl a : TP Quadrant Plot with the Default TP Standard

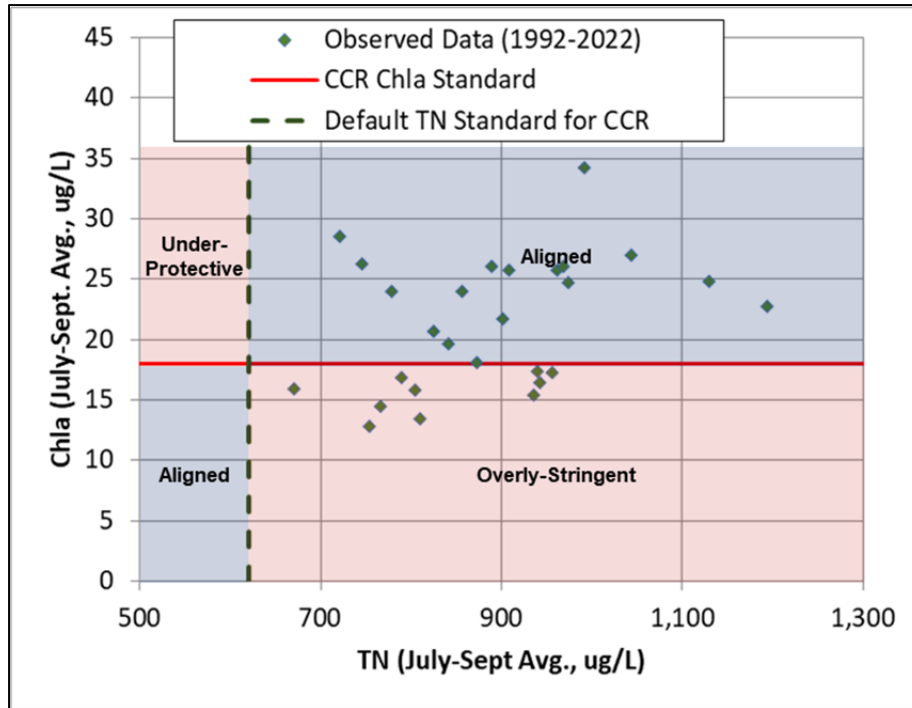


Figure 7. Cherry Creek Reservoir Chl_a: TN Quadrant Plot with the Default TN Standard

While all lake-year data are not necessarily expected to exhibit perfect alignment on such quadrant plots, given the complexity of Chl_a response to nutrients, the Cherry Creek Reservoir data show notably poor alignment for both TP (Figure 6) and TN (Figure 7). The quadrant plots indicate that the presumed WQCD TP and TN standards would be overly-stringent in more than 1/3 of the years of record. This further illustrates that the State-wide Chl_a:TP and Chl_a:TN relationships are not a good fit for Cherry Creek Reservoir.

Many site-specific factors may explain why Cherry Creek Reservoir does not fit well with the State-wide relationships used by WQCD in standards development. For example, Cherry Creek Reservoir receives high concentrations of TP in inflows, the majority of which is in the form of soluble reactive phosphorus (SRP). The high SRP concentrations lead to frequent nitrogen limitation, affecting the algal response and types of algal species present (Hydros, 2015 and 2019). Further, Cherry Creek Reservoir has a notably shallow bathymetric profile and is in a very windy location, creating a polymictic system that exhibits significant internal loading of nutrients (Hydros, 2015 and 2019). All of these factors affect the Chl_a response in the Cherry Creek Reservoir and may help to explain why the reservoir does not fit well into the State-wide Chl_a:TP and Chl_a:TN relationships used to develop the lake nutrient TVSSs.

2.5 Summary of Need for Site-Specific TP and TN Standards for Cherry Creek Reservoir

In summary, the comparisons presented in the preceding sections indicate that the default³ TP and TN standards are not a good reflection of Chl_a response to nutrient concentrations in Cherry Creek Reservoir. Further, the default TN and TP standards tend to be overly stringent, which is a significant

³ Note that, as with the default TP and TN standards, the TVSSs would also be overly stringent for Cherry Creek Reservoir and would fail to reflect the observed Chl_a response to nutrients in this system.

concern for CCBWQA. It is recognized that Cherry Creek Reservoir routinely exceeds the $Chl a$ standard, and therefore, TMDLs for nutrients will eventually be established. If these TMDLs were to be based on in-lake nutrient standards that were notably more stringent than needed to meet the target $Chl a$ concentrations, this would translate to significant additional costs and feasibility challenges for TMDL implementation. CCBWQA seeks to set appropriate site-specific nutrient standards that are neither under-protective nor overly-stringent, based on the extensive available dataset.

3 Consideration of the ‘Site-Specific Light’ Option

During development of the TP and TN TVSs adopted in April of 2023, the WQCD also developed additional relationships that could be used on a site-specific basis to develop site-specific standard proposals. These additional relationships were developed to include Secchi-depth data as a covariate, recognizing the important role that water clarity can play in $Chl a$ response to nutrient concentrations in some lakes. As such, the equations, termed ‘Site-Specific Light’ in Roadmap meetings, were provided by WQCD (WQCD, 2022a) as an optional tool to readily develop site-specific TP and/or TN proposals. These equations may be useful for lakes and reservoirs where non-algal turbidity is an important driver of algal response and where adequate Secchi data exist to apply the equations as specified in WQCD (2022b). Therefore, as a first step in site-specific TP and TN standard development for Cherry Creek Reservoir, the potential utility of the Site-Specific Light equations was evaluated.

Fortunately, Cherry Creek Reservoir has an extensive Secchi-depth dataset, meeting the frequency and timing requirements specified in WQCD (2022b) in 29 years of record between 1992 and 2022. Based on that dataset, the critical Secchi O/E^4 value (80th percentile) for Cherry Creek Reservoir was found to be 1.08 m. Applying the WQCD Site-Specific Light equations (WQCD, 2022b) for a $Chl a$ standard of 18 $\mu g/L$, this corresponds to a TP standard of 28 $\mu g/L$ and a TN standard of 490 $\mu g/L$ for Cherry Creek Reservoir. These values are even more stringent than the default TP and TN standards (Figure 8 and Figure 9), which were deemed to be overly-stringent in the analysis in Section 2. Therefore, the Site-Specific Light Equations do not serve to improve the agreement between the $Chl a$ standard and the nutrient standards in Cherry Creek and only exacerbate concerns delineated in Section 2 regarding the overly-stringent nature of the default nutrient standards. While the Site-Specific Light equations may improve estimates of the $Chl a$:nutrient relationships in some lakes/reservoirs, the inclusion of Secchi depth as a covariate does not improve the match for the State-wide relationship to Cherry Creek Reservoir data.

⁴ O/E refers to the ratio of “observed” to “expected” Secchi depth, where the “expected” value is based on an empirical relationship between $Chl a$ and Secchi depth developed by Carlson (1977).

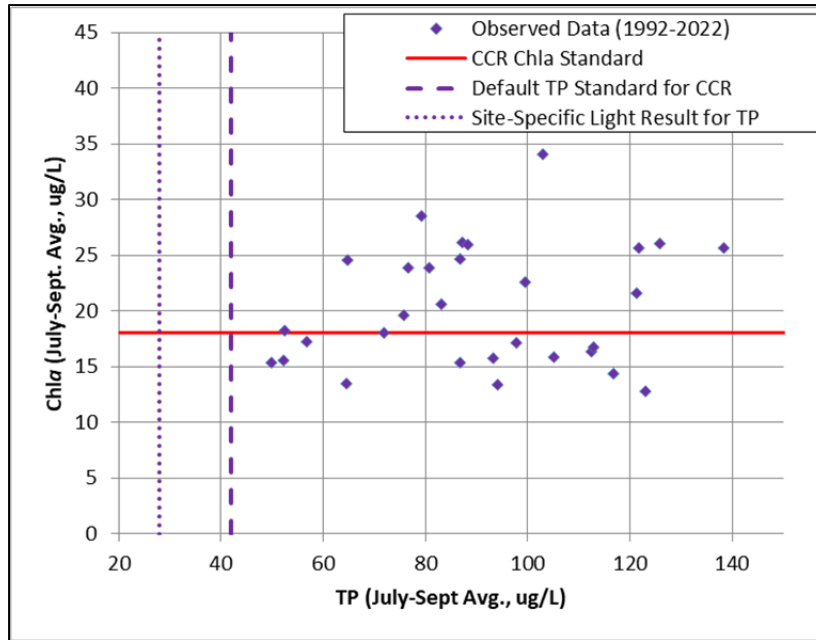


Figure 8. Observed Summertime Chl α and TP compared to the Default TP Standard and Site-Specific Light TP Standard for Cherry Creek Reservoir

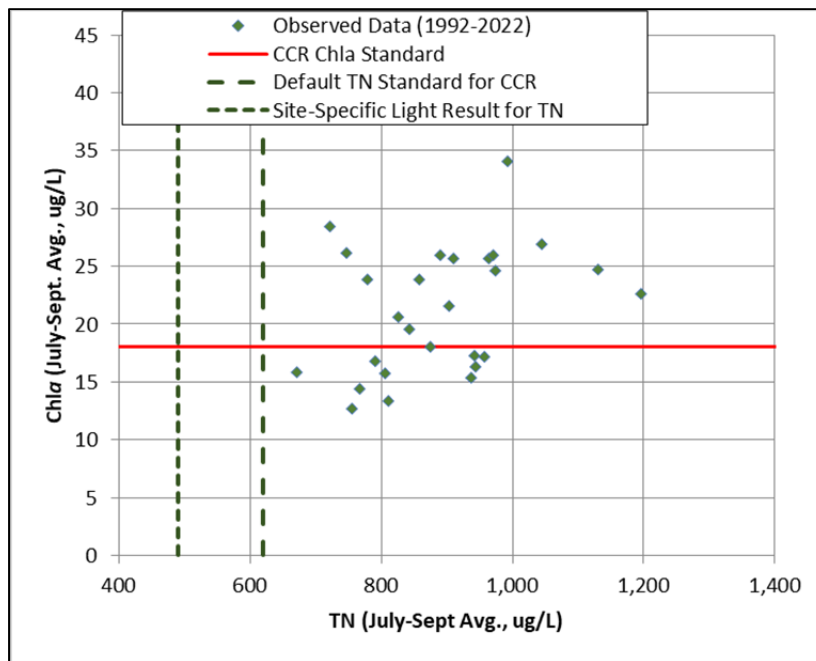


Figure 9. Observed Summertime Chl α and TN compared to the Default TN Standard and Site-Specific Light TN Standard for Cherry Creek Reservoir

4 Site-Specific TP and TN Standard Development

For the reasons explained in Section 2, Cherry Creek Reservoir needs site-specific standards for TP and TN. Further, WQCD’s Site-Specific Light approach does not work for this system (see Section 3);

therefore, the site-specific TP and TN standards must be developed from site-specific relationships. This section describes the approach taken to develop the proposed site-specific standard values. Overall the approach follows the WQCD's 4-step method, which was used to develop the TP and TN TVSS adopted in the 2023 Rulemaking Hearing. The discussion begins with an overview of the WQCD's 4-steps (Section 4.1), followed by a detailed presentation of each step as applied to Cherry Creek Reservoir for the site-specific standard development (Section 4.2). Finally, additional analysis to further evaluate the proposed site-specific TP standard is presented in Section 4.3. Note that the approach and findings presented here are specific to Cherry Creek Reservoir, which has an extensive dataset and benefits from a detailed site-specific model. Therefore, this approach to site-specific nutrient standard development may not necessarily be appropriate for other Colorado lakes/reservoirs.

4.1 Overview of the WQCD 4-Step Approach for TP and TN Standard Development

The approach taken to develop the proposed site-specific TP and TN standards for Cherry Creek Reservoir follows the 4-step method applied by the WQCD in development of the TP and TN lakes and reservoirs TVSS (WQCD, 2022a) which were adopted in the 2023 Rulemaking Hearing. The four steps apply relationships based on observed data to translate the $Chl a$ standard into corresponding TP and TN standards. The translation approach further underscores that the fundamental purpose of the TP and TN standards is to protect lakes and reservoirs from algal growth in excess of the applicable $Chl a$ standard. The four steps can be summarized as follows:

Step 1: Define the $Chl a$ standard value.

The $Chl a$ standards for lakes and reservoir are already established; therefore, this step simply involves identifying the applicable $Chl a$ standard value.

Step 2: Translate the $Chl a$ standard to a 50th percentile.

$Chl a$ standards are evaluated as a July through September average, with a one- in five-year allowable exceedance frequency. Because of the one- in five-year allowable exceedance frequency, the WQCD considers the $Chl a$ standard to be reflective of an 80th percentile. To support graphical comparison of observed $Chl a$ and nutrient data, the $Chl a$ standard value must first be translated from an 80th percentile to a 50th percentile. WQCD developed a State-wide relationship between the 80th percentile and the 50th percentile for summertime $Chl a$ concentrations using data from well-sampled lakes and reservoirs. This relationship is used to translate the applicable $Chl a$ standard value from Step 1 (reflective of an 80th percentile) to a corresponding $Chl a$ concentration reflective of a 50th percentile (Figure 10).

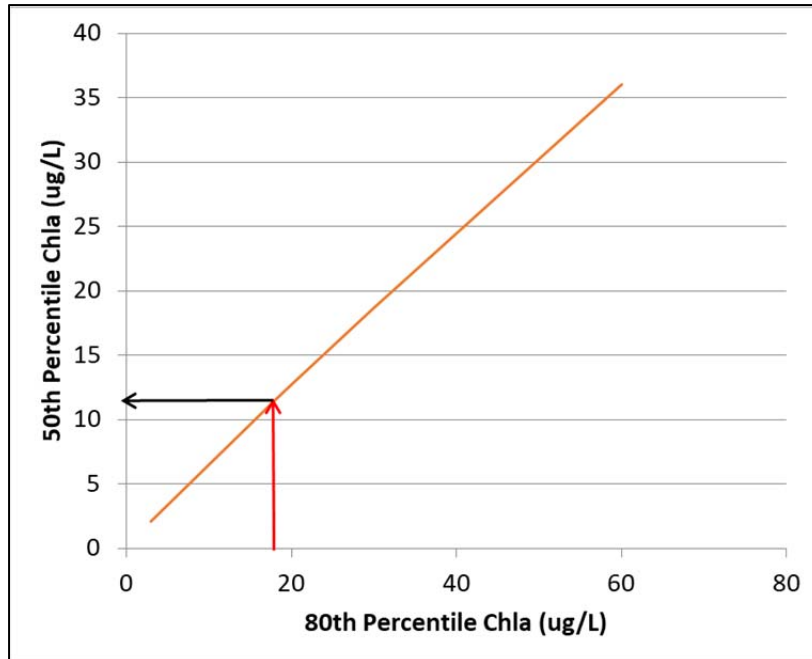


Figure 10. WQCD State-Wide Relationship for Translating Chla Standard Value (80th Percentile) to a 50th Percentile (Step 2); Arrows Show Translation for Chla Standard of 18 ug/L to 50th Percentile of 11.5 ug/L

Step 3: Translate Chla as a 50th Percentile to TP and TN.

The next step is to translate the Chla value (50th percentile) identified in Step 2 to TP and TN concentrations. To do this, the WQCD created State-wide relationships between observed July-September Chla concentrations and TP and TN concentrations. Warm and Cold lakes were distinguished in this step. A fit to the data was found using quantile regression, resulting in an equation relating Chla and TP or Chla and TN. Use of quantile regression, which is generally less sensitive to the influence of outliers (as compared to a least squares regression fit), is considered a good choice in this case given the high variability in the observed datasets. The resulting relationships were then used to translate the 50th percentile Chla value to TP and TN concentrations (Figure 11 and Figure 12).

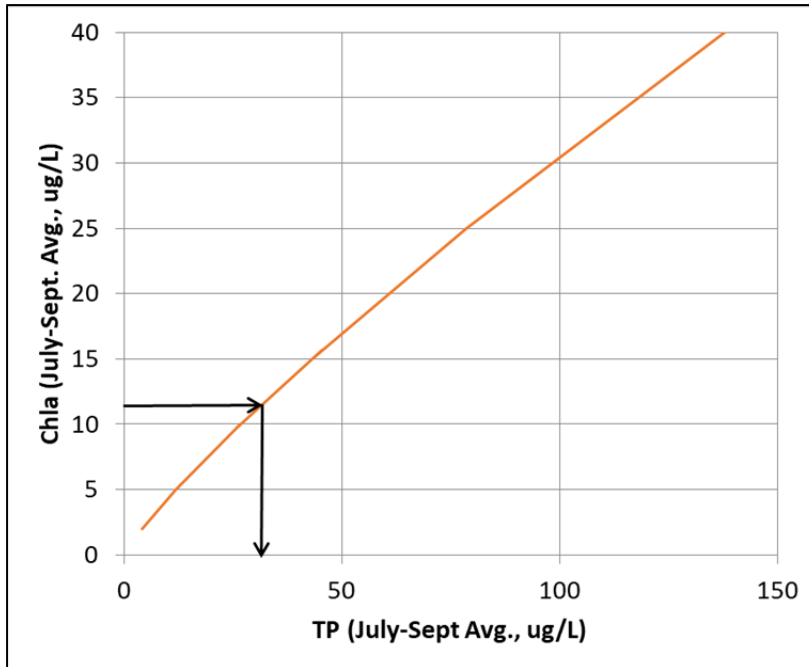


Figure 11. WQCD State-Wide Warm Water Relationship for Translating Chl α Standard (as a 50th Percentile) to Average Summertime TP Concentrations; Arrows Show Translation for Chl α 50th Percentile of 11.5 ug/L to a TP Concentration of 31.6 ug/L

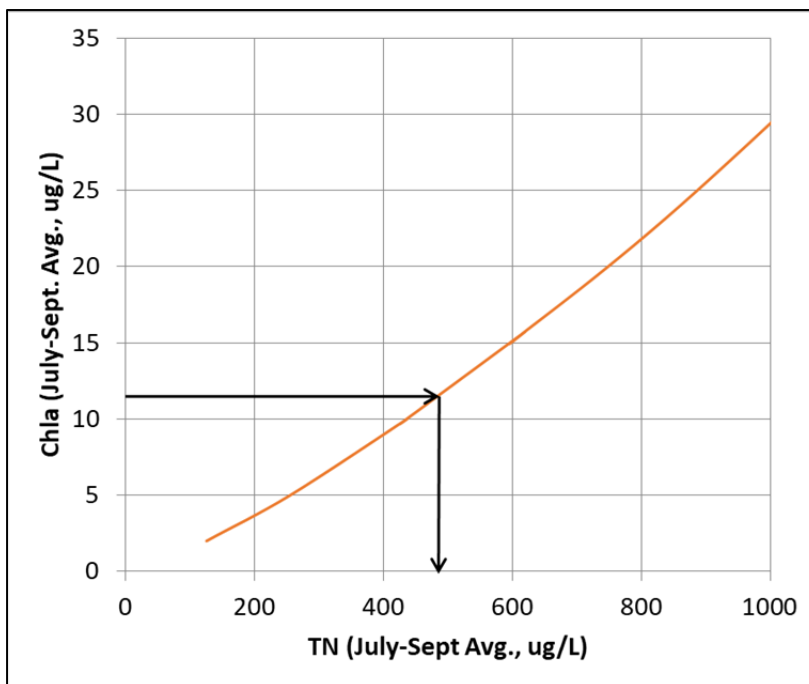


Figure 12. WQCD State-Wide Warm Water Relationship for Translating Chl α Standard (as a 50th Percentile) to Average Summertime TN Concentrations; Arrows Show Translation for Chl α 50th Percentile of 11.5 ug/L to a TN Concentration of 487 ug/L

Step 4: Translate TP and TN concentrations to 80th percentiles.

The final step of the 4-step process is to convert the summertime average TP and TN concentrations identified in Step 3 to 80th percentiles. The WQCD included this step to create TP and TN standard values that are applicable with a one- in five-year allowable exceedance frequency. Following the same logic used in Step 2, the WQCD developed State-wide relationships between the 50th percentile and the 80th percentile summertime TP (or TN) concentrations, based on observed data from well-sampled lakes and reservoirs. These relationships were then used to translate the 50th percentile TP and TN values determined in Step 3 into 80th percentile TP and TN concentration values (Figure 13 and Figure 14). The resulting 80th percentile concentration values are the resulting TP and TN standard values, assessed as July through September averages with a one- in five-year allowable exceedance frequency. Note that WQCD rounds the resulting TP and TN standard values to two significant figures.

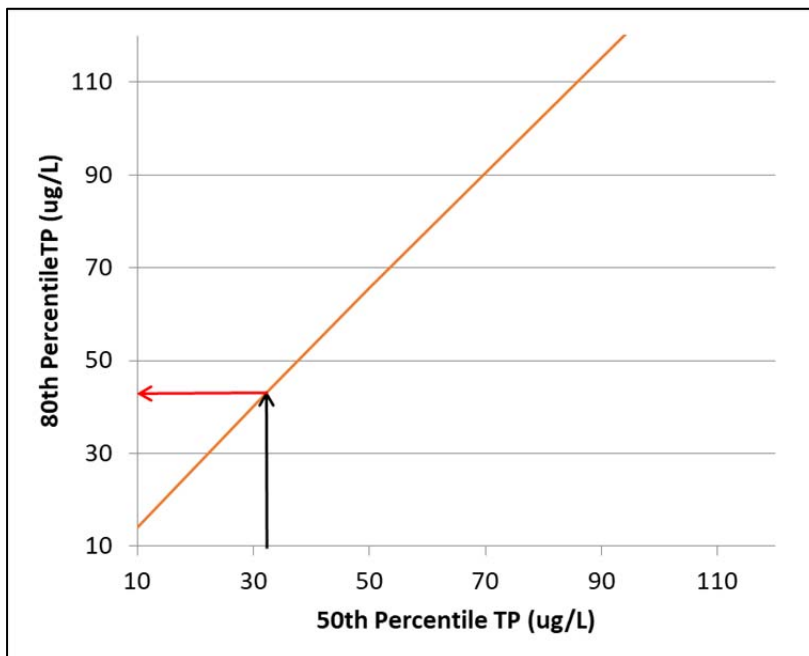


Figure 13. WQCD State-Wide Relationship for Translating Average Summertime TP (as a 50th Percentile) to Average Summertime TP as an 80th Percentile; Arrows Show Translation for 50th Percentile TP of 31.6 ug/L to the 80th Percentile TP Concentration of 42 ug/L

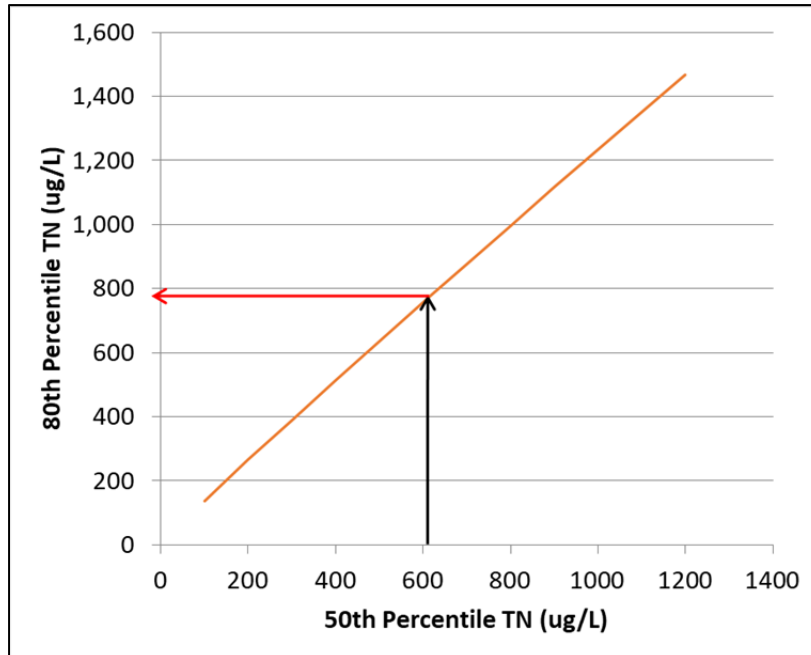


Figure 14. WQCD State-Wide Relationship for Translating Average Summertime TN (as a 50th Percentile) to Average Summertime TN as an 80th Percentile; Arrows Show Translation for 50th Percentile TN of 487 ug/L to the 80th Percentile TN Concentration of 620 ug/L

4.2 WQCD 4-Step Method Applied to Cherry Creek Reservoir

To develop the site-specific TP and TN standards, the WQCD's 4-step method described in Section 4.1 was applied using Cherry Creek Reservoir data instead of the State-wide dataset used to develop the TVSSs. The discussion is organized by the four steps:

- **Step 1:** Define the Chl a standard value.
- **Step 2:** Translate the Chl a standard to a 50th percentile.
- **Step 3:** Translate Chl a as a 50th Percentile to TP and TN.
- **Step 4:** Translate TP and TN concentrations to 80th percentiles.

4.2.1 Cherry Creek Reservoir – Step 1: Define the Chl a standard Value

The first step is to define the Chl a standard value. For Cherry Creek Reservoir, there is an existing, site-specific Chl a standard value of 18 ug/L.

4.2.2 Cherry Creek Reservoir – Step 2: Translate the Chl a Standard to a 50th Percentile

Continuing to follow the WQCD's 4-step method, the second step is to translate the Chl a standard to a 50th percentile. While the WQCD has a strong State-wide relationship based on well-sampled lakes, Cherry Creek Reservoir has an extensive⁵ site-specific dataset that exhibits a strong site-specific

⁵ Note that use of Cherry Creek Reservoir data for Step 2 is considered reasonable relative to the WQCD definition of well-sampled lakes/reservoir (at least five years relevant records), given that the Cherry Creek dataset includes 6 to 14 Chl a observations each year in the months of July through September from 1992-2022 (31 years).

relationship (Figure 15). Further, the WQCD relationship does not do a good job reflecting the Cherry Creek Reservoir dataset (Figure 16). Specifically, the State-wide relationship is consistently biased low relative to the Cherry Creek Reservoir dataset.

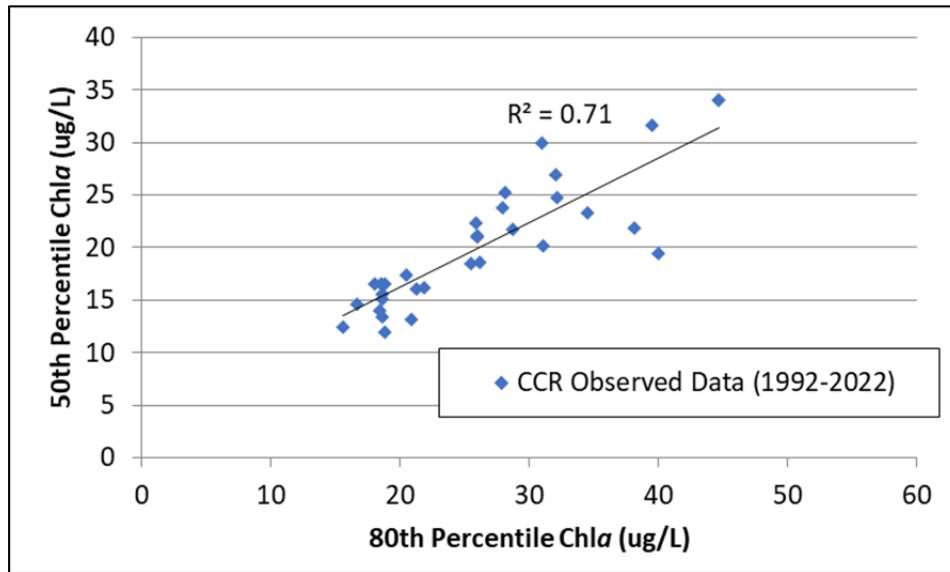


Figure 15. Cherry Creek Reservoir Site-Specific Relationship between Summertime Chl a 80th Percentile and 50th Percentile Concentrations

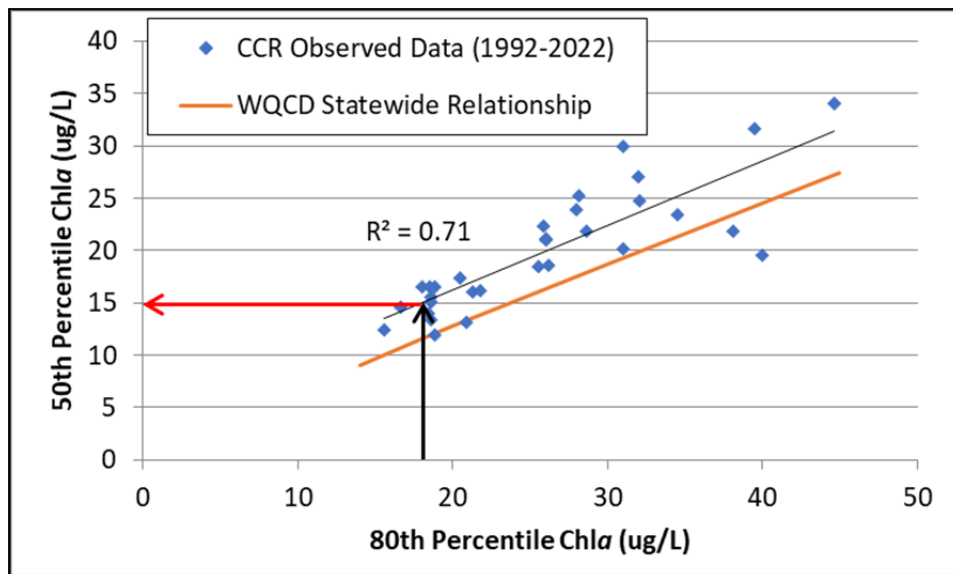


Figure 16. Cherry Creek Reservoir Site-Specific Relationship between Summertime Chl a 80th Percentile and 50th Percentile Concentrations Compared to the WQCD State-Wide Relationship; Arrows Show Translation for Chl a Standard of 18 ug/L to 50th Percentile of 15 ug/L

It is reasonable to expect that a given water body may exhibit a summertime *Chl a* concentration distribution that differs from a relationship based on a State-wide dataset. Therefore, given the extensive dataset available for Cherry Creek Reservoir, the site-specific relationship was applied.

$$\text{Chl}a_{50^{\text{th}} \text{ \%ile}} = 0.6157 * \text{Chl}a_{80^{\text{th}} \text{ \%ile}} + 3.8828$$

The equation translates the 80th percentile *Chl a* standard value of 18 ug/L to a 50th percentile *Chl a* value of 15 ug/L (Figure 16).

4.2.3 Cherry Creek Reservoir – Step 3: Translate *Chl a* as a 50th Percentile to TP and TN

Step 3 is the critical step translating summertime *Chl a* concentrations to summertime TP and TN concentrations based on the observed relationships. As established in Section 2, the WQCD's State-wide warm lakes relationships for *Chl a*:TP and *Chl a*:TN do not perform well in describing the observed algal response in Cherry Creek Reservoir to TP and TN concentrations (Figure 4 and Figure 5). However, it is also noted that the full Cherry Creek dataset lacks clear relationships between *Chl a* and TP (Figure 2) and *Chl a* and TN (Figure 3). Therefore, additional analysis was needed to identify a site-specific relationship to support completion of Step 3.

In review of the 31-year dataset for *Chl a* and nutrients in Cherry Creek Reservoir, an apparent pattern was noted. Specifically, a general pattern match was identified between the response of summertime *Chl a* to TN concentrations from ~2004 through 2022 (Figure 17). In other words, the data show that over that time period there is general agreement between *Chl a* and TN in terms of the direction of change (i.e., when TN increases, *Chl a* generally increases and vice versa). Interestingly, over the same set of years, the pattern is completely absent for TP (Figure 18). This may indicate the dominance of TN (vs. TP) as a primary control on algal growth (nitrogen limitation) in these years (~2004-2022).

Correspondingly, there appears to be a general pattern match between TP and *Chl a* in the preceding set of years in the record (1992-~2003; Figure 18). For 1992-~2003, there is a general pattern match for TP and *Chl a* (1992-~2003), while there is no similar match between TN and *Chl a* in the same years (Figure 17). This may indicate the dominance of TP (vs. TN) as a primary control on algal growth (phosphorus limitation) in this portion of the record (1992-~2003). These earlier years also correspond to a period when TP concentrations were generally lower than the average observed in the more recent years, further supporting the possibility that the patterns indicate TP limitation followed by TN limitation.

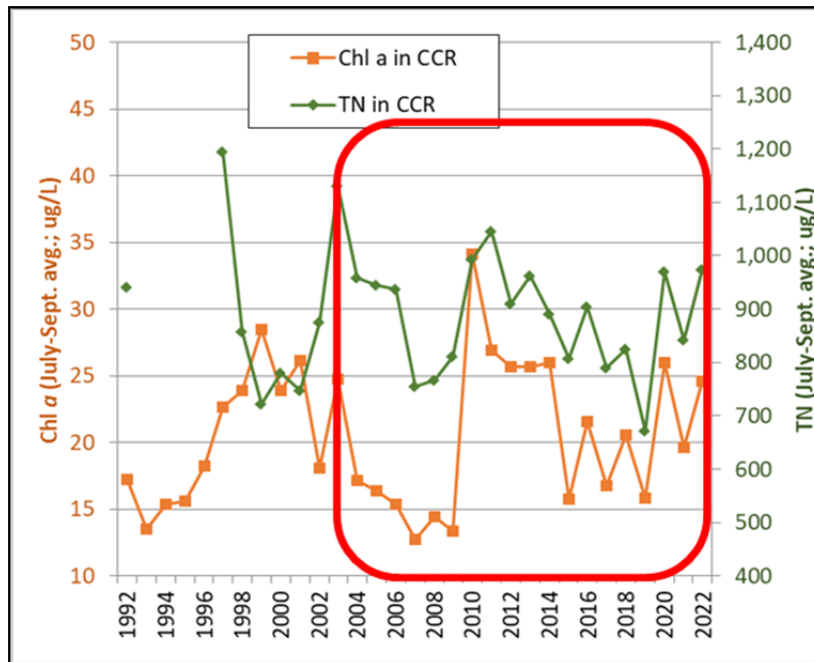


Figure 17. Summertime TN and Chl_a Concentrations in Cherry Creek Reservoir; Red Outline Indicates Period of Apparent Pattern Match and Possible Dominance of N-Limitation

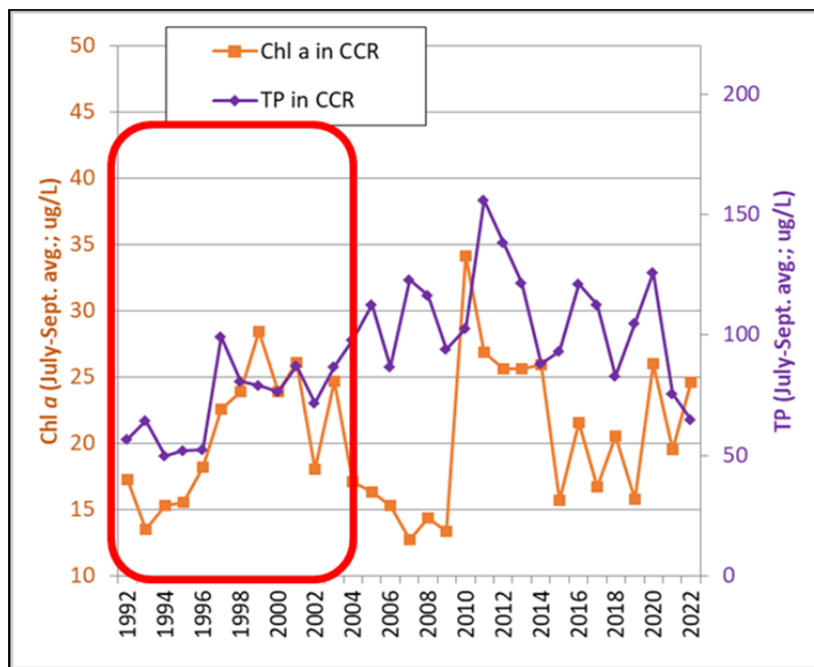


Figure 18. Summertime TP and Chl_a Concentrations in Cherry Creek Reservoir; Red Outline Indicates Period of Apparent Pattern Match and Possible Dominance of P-Limitation

This pattern change in the observed dataset appears to offer a glimpse into the underlying relationships between TP and Chl_a and TN and Chl_a that are not readily apparent in the full dataset. When TP and Chl_a data from 1992-2003 are plotted, the data exhibit a reasonable correlation ($R^2 = 0.59$; Figure 19), which is a dramatic improvement over the lack correlation in the full dataset ($R^2 = 0.06$; Figure 2).

Similarly, when TN and Chl a data from 2004-2022 are plotted, the data exhibit a reasonable correlation ($R^2 = 0.48$; Figure 20), which is a dramatic improvement over the lack of correlation in the full dataset ($R^2 = 0.12$; Figure 3).

Based on this finding, site-specific relationships for Step 3 were developed by dividing the data into two parts (1992-2003 to identify the Chl a :TP relationship, and 2004-2022 to identify the Chl a :TN relationship). Fortunately, due to the long (31-year) period of record available for Cherry Creek Reservoir, even the subdivided datasets are still reasonably long (12 years of record used to define the Chl a response to TP, and 19 years of record used to define the Chl a response to TN).

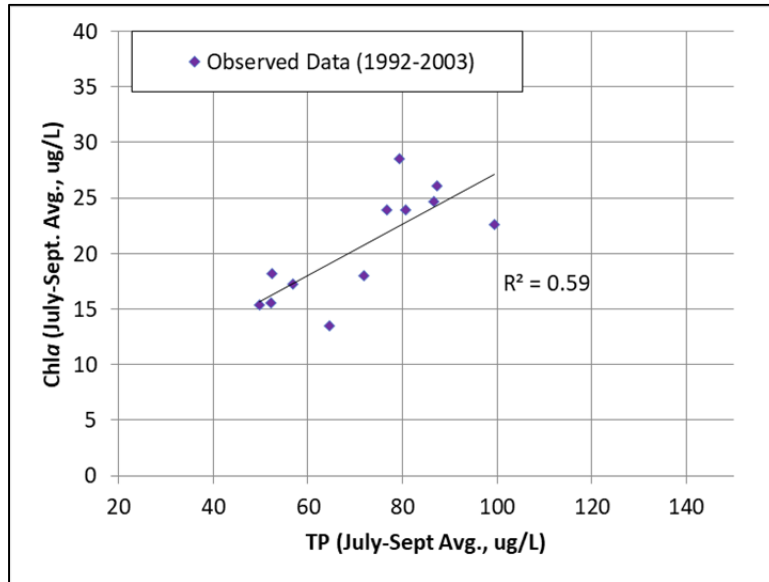


Figure 19. Observed Cherry Creek Dataset; Summer Chl a Response to TP Concentrations; 1992-2003

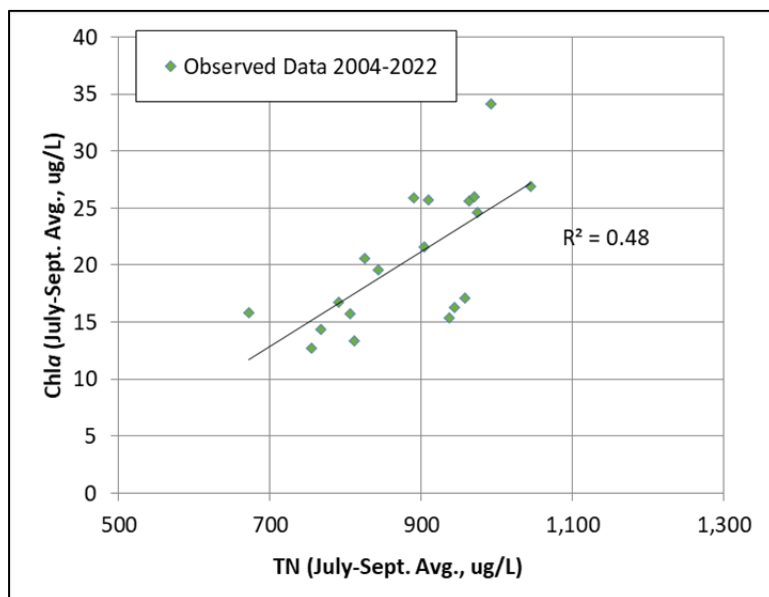


Figure 20. Observed Cherry Creek Dataset; Summer Chl a Response to TN Concentrations; 2004-2022

50th quantile regressions⁶ were fit to the subsets of data shown in Figure 19 and Figure 20 to support completion of Step 3. As with the least squares fits shown in Figure 19 and Figure 20, the 50th quantile regression lines (Figure 21 and Figure 22) also exhibit much improved fits⁷ to the data, as compared to the lack of correlation found for the entire dataset. The site-specific 50th quantile relationships for Cherry Creek Reservoir are:

$$TP(ug/L) = 10^{((\log_{10}[Chla]+4.09425)/1.83521)}$$

$$TN(ug/L) = 10^{((\log_{10}[Chla]+0.31154)/0.88261)}$$

Using these relationships, the Chla value from Step 2 (15 ug/L) translates to 48 ug/L TP and 744 ug/L TN (Figure 21 and Figure 22).

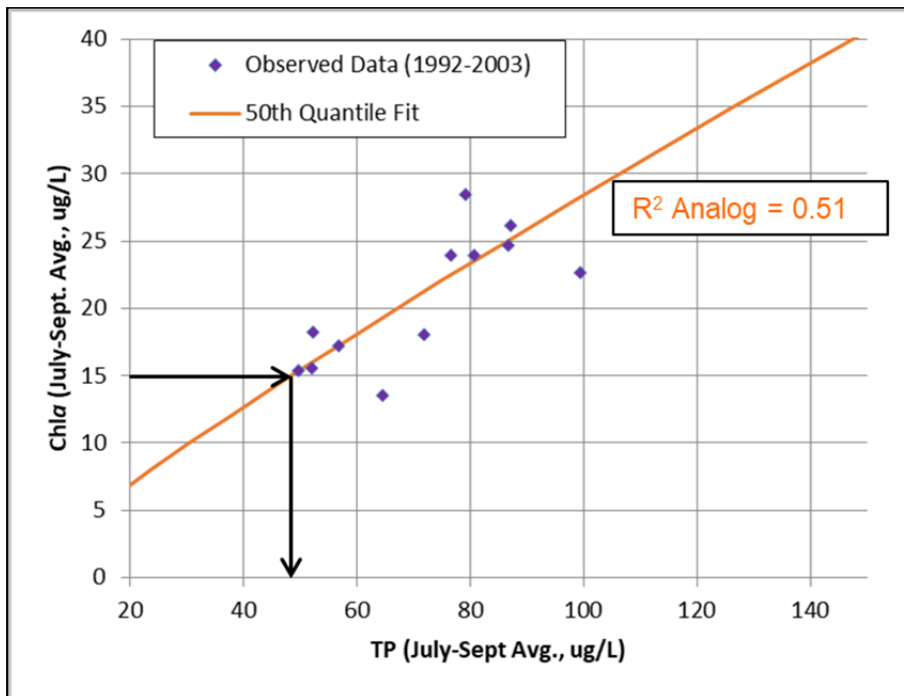


Figure 21. 50th Quantile Fit to Cherry Creek Reservoir Summer Chla Response to Summer TP Concentrations; 1992-2003; Arrows Show Translation for Chla 50th Percentile of 15 ug/L to a TP Concentration of 48 ug/L

⁶ While the WQCD applied a 75th quantile regression fit to the State-wide warm lakes dataset in an effort to identify the response of highly-productive lakes, it is appropriate to use a 50th quantile fit in a site-specific analysis for a single lake/reservoir.

⁷ The correlation for the 50th quantiles is presented as an R² analog term applicable to quantile regression (Koenker and Machado, 2012).

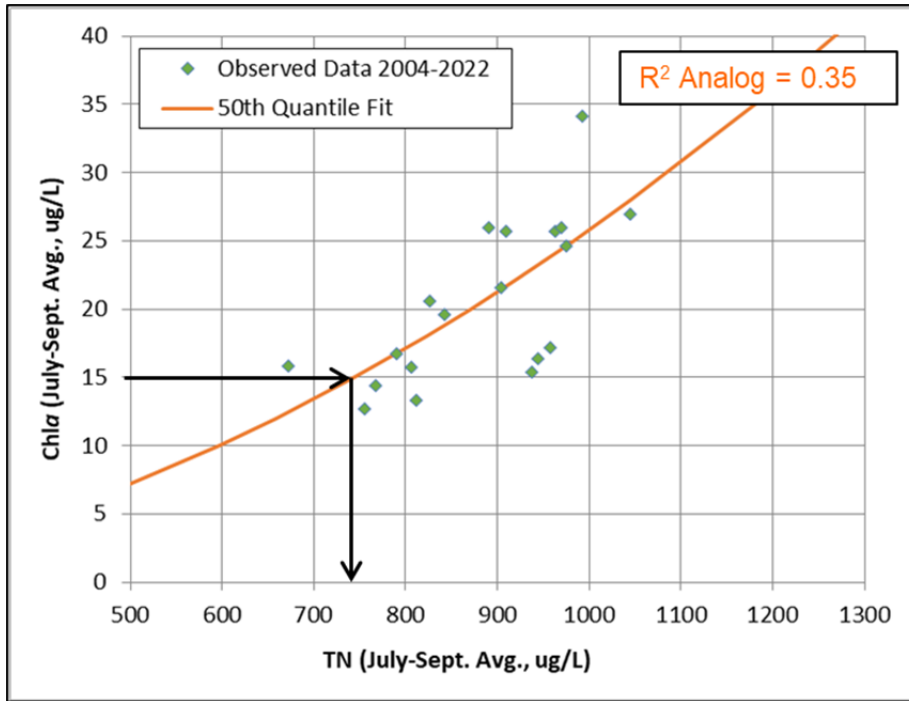


Figure 22. 50th Quantile Fit to Cherry Creek Reservoir Summer Chl_a Response to Summer TN Concentrations; 2004-2022; Arrows Show Translation for Chl_a 50th Percentile of 15 ug/L to a TN Concentration of 744 ug/L

4.2.4 Cherry Creek Reservoir – Step 4: Translate TP and TN Concentrations to 80th Percentiles

In the final step, the summertime average TP and TN concentrations identified in Step 3 were converted to final standard values reflective of 80th percentiles. While the WQCD also has a strong State-wide relationship to translate TP and TN summertime averages (reflective of 50th percentiles) to values reflective of summertime 80th percentiles, Cherry Creek Reservoir has an extensive dataset that exhibits strong site-specific relationships for TP and TN (Figure 23 and Figure 24). Further, the site-specific relationships do not agree well with the WQCD relationships, exhibiting a consistent high bias in 80th percentile response.

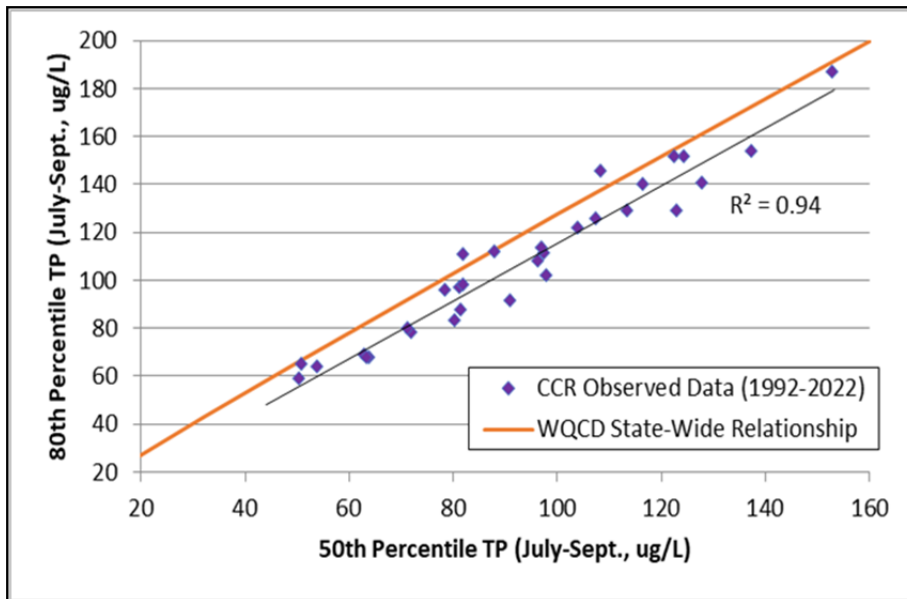


Figure 23. Cherry Creek Reservoir Site-Specific Relationship between Summertime TP 50th Percentile and 80th Percentile Concentrations Compared to WQCD State-Wide Relationship

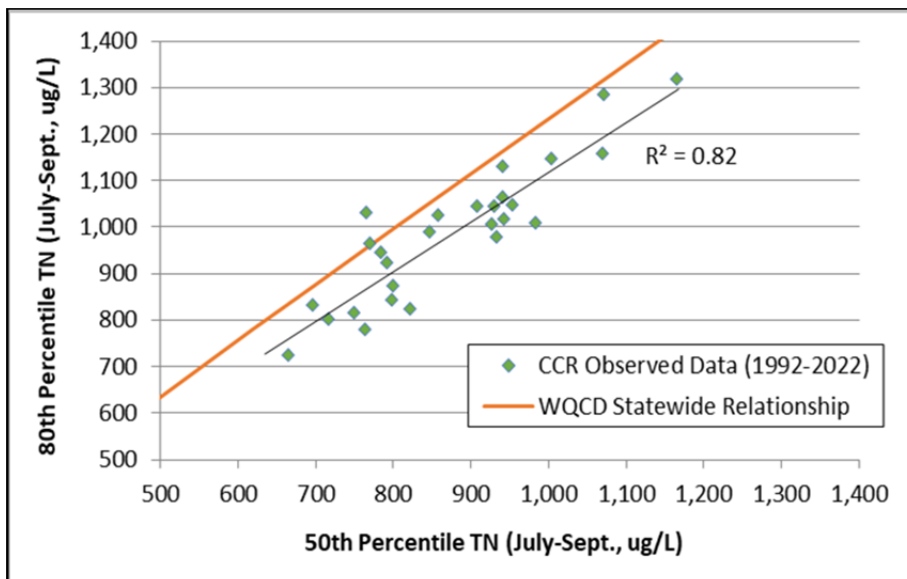


Figure 24. Cherry Creek Reservoir Site-Specific Relationship between Summertime TN 50th Percentile and 80th Percentile Concentrations Compared to WQCD State-Wide Relationship

As noted for *Chla* in Section 4.2.2, it is reasonable to expect that a given water body may exhibit summertime TP and TN concentration distributions that differ from relationships based on the State-wide dataset. Therefore, given the extensive dataset available for Cherry Creek Reservoir and the strong relationships, the site-specific 50-80 translations for TP and TN () were applied (Figure 25 and Figure 26).

$$TP_{80th \%ile} = 1.1930 * TP_{50th \%ile} - 3.0586$$

$$TN_{80th \%ile} (ug/L) = 1.0673 * TN_{50th \%ile} + 54.4198$$

The resulting proposed site-specific nutrient standard values are:

- Proposed Site-Specific Standard for TP: 55 ug/L TP, and
- Proposed Site-Specific Standard for TN: 850⁸ ug/L TN.

As with the TVSSs, these site-specific standards would be assessed based on July through September averages, with a one- in five-year allowable exceedance frequency.

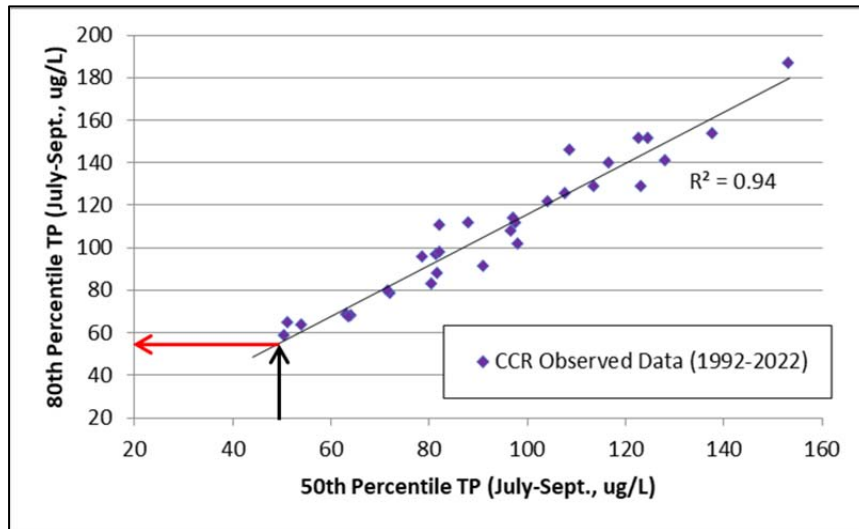


Figure 25. Cherry Creek Reservoir Site-Specific Relationship between Summertime TP 50th Percentile and 80th Percentile Concentrations; Arrows Show Translation for 48 ug/L TP (50th Percentile) to 80th Percentile TP Standard Value of 55 ug/L

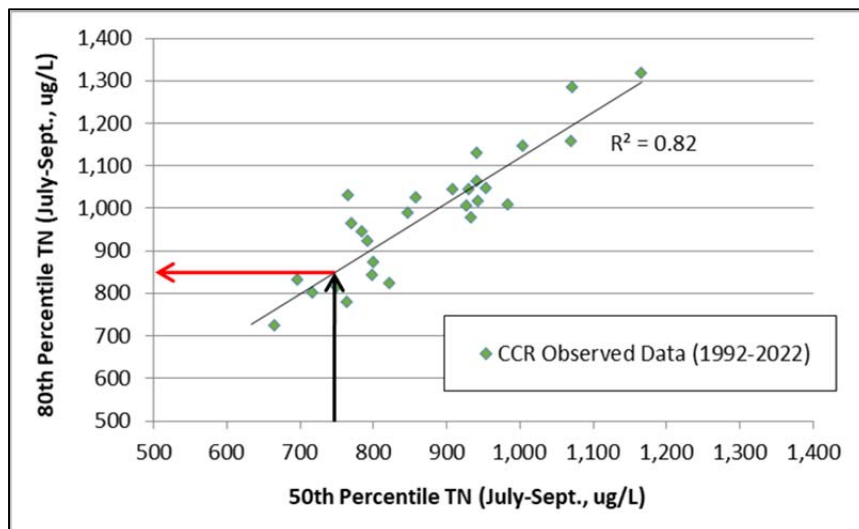


Figure 26. Cherry Creek Reservoir Site-Specific Relationship between Summertime TN 50th Percentile and 80th Percentile Concentrations; Arrows Show Translation for 744 ug/L TN (50th Percentile) to 80th Percentile TN Standard Value of 850 ug/L

⁸ Note that these values follow the WQCD precedent of rounding the standard values to the nearest integer for TP and to the tens place for TN.

4.3 Additional Analysis for TP

The following subsections present additional analysis conducted to further evaluate the proposed site-specific TP standard. Additional analysis was considered useful for TP for two reasons. First, the Chl α :TP relationship applied to develop the proposed TP standard is based on the older portion of the observed dataset (1992-2003). Next, the translations for TP in the 4-step process tend to fall at or even slightly below the lower end of the observed range of TP concentrations (e.g., Figure 21). In contrast, the TN proposal is based on the recent 19 years of observed record and does not use extrapolations below the observed ranges.

4.3.1 Clean Lakes Study TP Data Comparison

To further evaluate the site-specific Chl α :TP relationship used in Step 3 (Section 4.2.3), historical data from the Cherry Creek Reservoir Clean Lakes Study (DRCOG, 1984) were considered. Samples for TP and Chl α were collected through the summer of 1982, providing an additional data point⁹ at the lower range of TP concentrations. This data point falls reasonably close to the 50th quantile relationship developed from the 1992-2003 dataset (Figure 27), providing additional confidence in the relationship and in its extrapolation to a TP concentration that is slightly lower than the 1992-2003 observed range (Figure 21). Unfortunately, TN data were not available from the Clean Lakes Study for a similar analysis; however, the TN relationship is based on the 19 years of recent record and the translation is taken from within the observed range of TN concentrations (though it is on the lower end of the range).

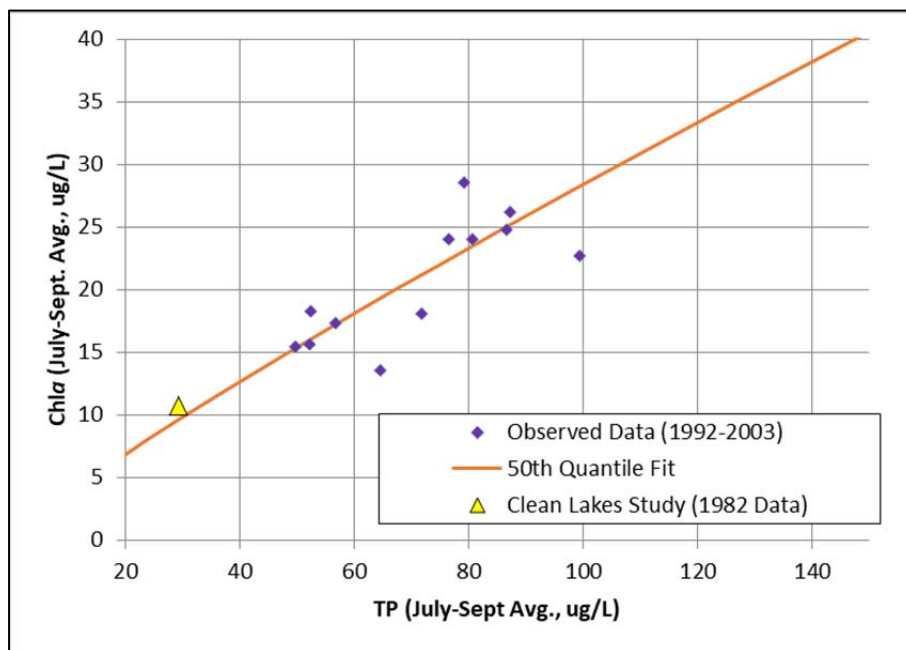


Figure 27. 50th Quantile Fit to Cherry Creek Reservoir Summer Chl α Response to Summer TP Concentrations; 1992-2003; Clean Lakes Study 1982 Data Also Shown

⁹ The average summertime TP concentration for Cherry Creek Reservoir in 1982 (29.3 ug/L) was based on the average of the July, August, and September values reported on page 72 of the Clean Lakes Study document for Cherry Creek Reservoir (DRCOG, 1984), and the summer average Chl α in 1982 (10.7 ug/L) was based on the value reported on page 73 of the document.

4.3.2 Modeling Analysis for TP

To provide further review of the proposed site-specific TP standard for Cherry Creek Reservoir, the existing hydrodynamic and water-quality model of the reservoir (Hydros, 2017 and 2019) was applied. The Cherry Creek Reservoir model is a two-dimensional hydrodynamic and water-quality model developed using CE-QUAL-W2 (Cole and Wells, 2017). The model simulates hydrodynamics, temperature, dissolved oxygen, nutrients, and Chl a in Cherry Creek Reservoir from 2003 through 2017, including representation of the effects of the destratification system. The original model development and its extension are documented in detail in Hydros (2017) and Hydros (2019), respectively. The model is considered a useful tool for this purpose because it incorporates much of the complexity absent in the empirical Chl a :TP relationships, such as year-to-year differences in residence time, light, water temperature, wind, etc.

The goal in application of the Cherry Creek Reservoir model was to see what the model suggests as an appropriate TP standard corresponding to the Chl a standard and consider that relative to the site-specific TP standard developed from the observed data (as described in Sections 4.2 through 4.2.4). This was done by conducting a series of runs that simulated Chl a response to reductions in reservoir TP concentrations extending below the current observed range. Run results for summertime TP and Chl a concentrations were then used in place of observed data in Step 3 of the WQCD's 4-Step method.

4.3.2.1 Model Runs

Reductions in TP concentrations in the reservoir were simulated in a series of model runs reflecting the two general nutrient control strategies concepts of watershed controls and in-reservoir nutrient management. In addition to the calibration run simulating observed conditions from 2003-2017, the following ten modeling runs were conducted:

- 20% Less TP Inflow (uniform 20% reduction in inflow TP concentrations);
- 50% Less TP Inflow (uniform 50% reduction in inflow TP concentrations);
- 80% Less TP Inflow (uniform 80% reduction in inflow TP concentrations);
- 20% Less TP Int. Load (20% reduction in internal loading rates for TP);
- 50% Less TP Int. Load (50% reduction in internal loading rates for TP);
- 80% Less TP Int. Load (80% reduction in internal loading rates for TP);
- 20% Less TP Inflow; 80% Less TP Int. Load (uniform 20% reduction in inflow TP concentrations and 80% reduction in internal loading rates for TP);
- 50% Less TP Inflow; 50% Less TP Int. Load (uniform 50% reduction in inflow TP concentrations and 50% reduction in internal loading rates for TP);
- 50% Less TP Inflow; 80% Less TP Int. Load (uniform 50% reduction in inflow TP concentrations and 80% reduction in internal loading rates for TP); and
- 80% Less TP Inflow; 80% Less TP Int. Load (uniform 80% reduction in inflow TP concentrations and 80% reduction in internal loading rates for TP)

Note that simulation designs were not constrained to fractional reductions that are currently considered achievable, particularly in terms of watershed controls. Inclusion of such runs is considered reasonable recognizing that the objective of this effort is not to assess attainability but instead to evaluate the modeled relationship between Chl a and TP, ideally including conditions below the Chl a standard.

4.3.2.2 Modeling Results

Modeling results for the runs listed above were compiled in terms of July through September average concentrations for TP and Chl a . A 50th quantile regression was then fit to the full set of run results (Figure 28). The R² analog for the 50th quantile regression fit is 0.70 indicating a relatively good correlation. Interestingly, modeling results show that the Chl a response to summertime TP predictions becomes more consistent (a better fit) at lower TP concentrations (<~70 ug/L), which may reflect a general turning point to (or toward) phosphorus limitation in the reservoir. Another interesting finding in the results is that TP concentration reductions on the order of 20% (as inflow loading reductions or as internal loading rate reductions) do not change the Chl a response enough to bring most years below the Chl a standard. To get most years below the Chl a standard, the modeling indicates that major reductions are needed (50% to 80% reductions), and a combination of inflow and in-reservoir strategies produce the best results.

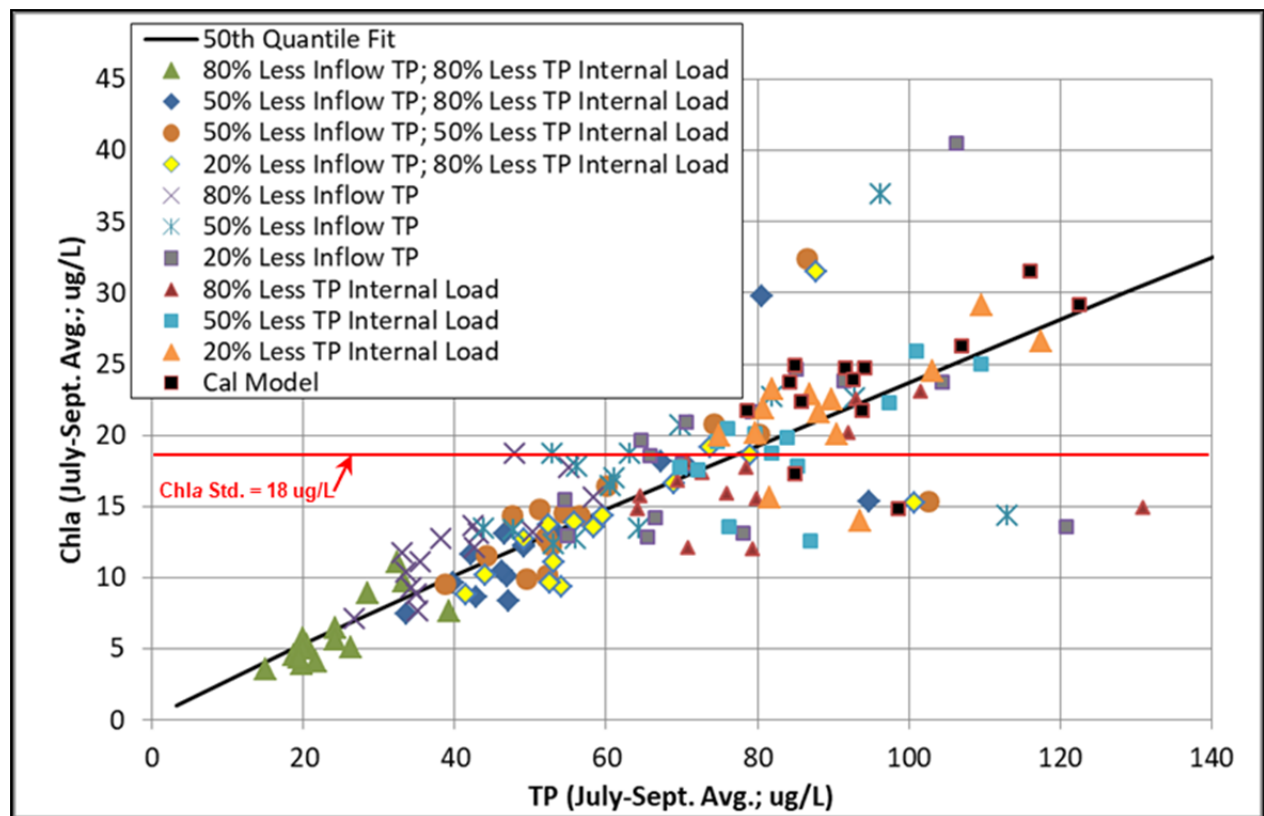


Figure 28. Results of Cherry Creek Reservoir Model Runs Showing Chl a Response to Progressive Reductions of Inflow Phosphorus Concentrations and Internal Phosphorus Loading Rates

Using the 50th quantile regression fit from the modeling results¹⁰ in Step 3 of the WQCD's 4-step process (note: all other steps use relationships presented in Sections 4.2, 4.2.2, and 4.2.4), the modeling results produce a site-specific TP standard value of 69 ug/L. This value is higher (less stringent) than the 55 ug/L site-specific TP standard developed from the observed data. The CCBWQA is not planning to propose the modeling-based TP standard (69 ug/L) at this time, but is instead planning to propose the more stringent observation-based site-specific standard value of 55 ug/L TP. The modeling results are considered to provide supporting evidence that a standard value less stringent than the default TP standard for Cherry Creek Reservoir (42 ug/L TP) is justifiable. Further, the modeling results are considered to be an indication that future refinements to the site-specific TP standard for Cherry Creek Reservoir may be warranted, particularly as in-reservoir TP concentrations decrease and the observed data record better reflects the underlying Chl_a:TP relationship at lower concentrations.

4.4 Summary of Site-Specific TP and TN Standard Development

Site-specific TP and TN standards for Cherry Creek Reservoir were developed following the same 4-step process applied by WQCD to develop the TVSSs. In each step, the extensive Cherry Creek Reservoir dataset was used in lieu of the WQCD's State-wide database. The resulting proposed site-specific nutrient standard values are:

- Proposed Site-Specific Standard for TP: 55 ug/L TP, and
- Proposed Site-Specific Standard for TN: 850¹¹ ug/L TN.

As with the TVSSs, these site-specific standards would be assessed based on July through September averages, with a one- in five-year allowable exceedance frequency.

5 Discussion of Site-Specific TN and TP Standard Values Developed for Cherry Creek Reservoir

Based on the analysis described in Section 4, site-specific TP and TN standards of 55 ug/L TP and 850 ug/L TN were developed for Cherry Creek Reservoir. In this section, these values are discussed in the context of State-wide TP and TN standards for warm lakes as well the observed data record for Cherry Creek Reservoir. The intent of this discussion is to offer perspective on the site-specific standard values relative to the broader regulatory framework and relative to the range of observed conditions in the reservoir.

While the site-specific TP and TN standard values developed for Cherry Creek are less stringent than the default values that the WQCC would assign to the reservoir, they are more stringent than the 2012 Interim Criteria values for lakes and reservoirs that were approved by the Environmental Protection Agency (EPA, 2016; site-specific TP and TN standard values). As such, the site-specific TP and TN

¹⁰ $TP(ug/L) = 10^{((\log_{10}[Chl_a] + 0.47309)/0.92469)}$

¹¹ Note that these values follow the WQCD precedent of rounding the standard values to two significant figures.

standard values are considered to fall within a reasonable range from a regulatory context (i.e., between two sets of EPA-approved nutrients standards for warm lakes in Colorado)¹².

Table 2. Cherry Creek Reservoir Site-Specific TP and TN Standards Compared to Relevant State Nutrient Standards and Interim Criteria

Constituent	Warm Lakes Nutrient Standards		Default** Cherry Creek Reservoir Standards	Site-Specific Standards Developed for Cherry Creek Reservoir
	2012 Interim Criteria	TVSs* (TN and TP Adopted in April 2023)		
Chla (ug/L)	20	20	18	18
TN (ug/L)	910	670	620	850
TP (ug/L)	83	47	42	55

Note: All are/would be assessed as July-September averages with a one in five year allowable exceedance frequency.

*Currently only applicable to warm lakes above permitted discharges.

** Default TP and TN standards are those expected to be adopted for Cherry Creek Reservoir in the absence of a successful site-specific standard proposal. The TN and TP values were developed from the WQCD State-wide relationships used in the April 2023 RMH, applying the Cherry Creek Reservoir Chla standard of 18 ug/L, in lieu of the general warm lakes Chla standard of 20 ug/L.

When compared to the Cherry Creek Reservoir water-quality records, the proposed site-specific TP and TN standards fall on the low end of the observed dataset (Table 3 and Figure 29). While the Chla standard value is not routinely met, it is met¹³ in 13 of the 31 years of record (Figure 29). Similarly, the proposed site-specific standard for TN would have been met in a similar number of years of record (10 of 27). In contrast, the proposed site-specific standard for TP would have only been met in 3 early years of record (Figure 29). This pattern agrees with the overall conceptual understanding of the system, which is generally considered to be further from the optimal TP concentration than the optimal TN concentration. The relevant point is that meeting the proposed site-specific standards for both TP and TN would require in-reservoir summer concentrations well below typically-observed concentrations. As such, the proposed site-specific standards comprise challenging targets for CCBWQA as they continue their mission to protect and improve water quality in the reservoir. The challenge of meeting these targets is further underscored by the modeling results presented in Section 4.3, which indicate that major reductions in inflow nutrient concentrations and/or in-reservoir nutrient internal loading rates (on the order of 50 to 80%) are needed to meet the Chla standard (and, correspondingly, the nutrient standards).

¹² While this is considered to be a reasonable range based of EPA-approved standard values, it should be noted that site-specific standard values outside of this range may be appropriate for some warm lakes, depending on the observed system response.

¹³ Note the terminology used here is purposeful, referring to a direct comparison of the standard value to the observed data, as opposed to an assessment of compliance with the standard. This analysis is not intended to evaluate compliance. Compliance analysis would require consideration of the one-in five-year allowable exceedance frequency and does not match the purpose of this comparison conducted here.

Table 3. Comparison of Site-Specific TP and TN Standards Developed for Cherry Creek Reservoir to Range of Summertime Average Observations

Constituent	Site-Specific Standards* Developed for Cherry Creek Reservoir	Cherry Creek Reservoir Observed Data (1992-2022) July-Sept. Averages (Avg., Range)
Chl a (ug/L)	18	21 (13-34)
TN (ug/L)	850	889 (672-1,195)
TP (ug/L)	55	93 (50-156)

*All would be assessed as July-September averages with a one in five year allowable exceedance frequency.

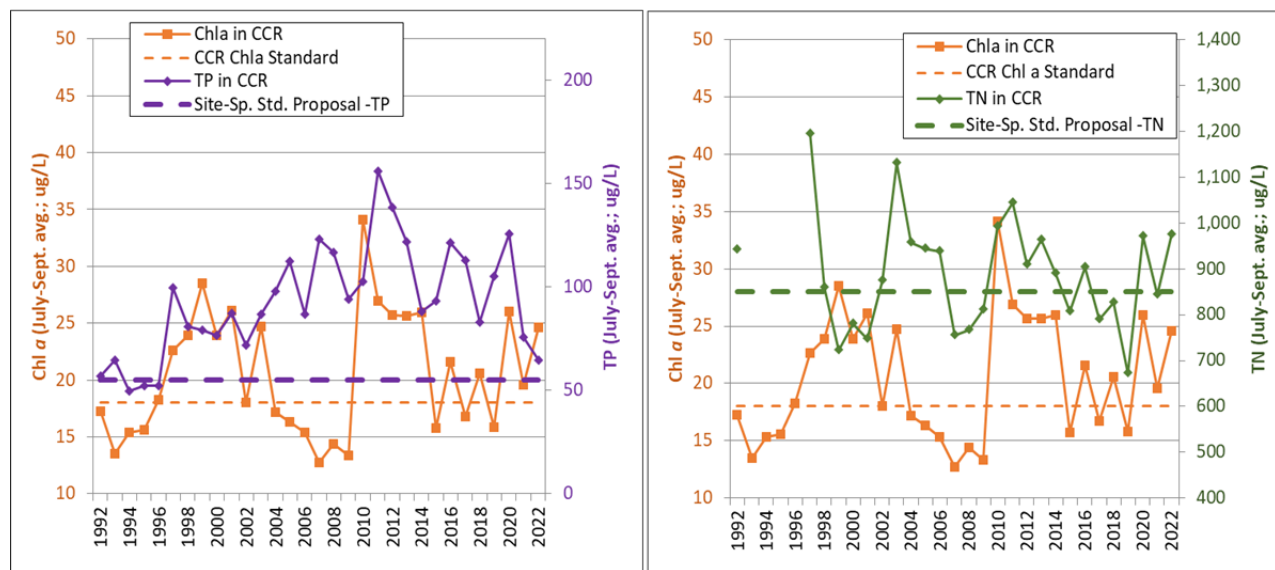


Figure 29. Comparison of Observed Chl a and Nutrient Data from Cherry Creek Reservoir to Existing Chl a Standard and Site-Specific TP and TN Standards Developed for Cherry Creek Reservoir, 1992-2022

The site-specific TP and TN standards developed for Cherry Creek Reservoir were also reviewed against the observed dataset using the quadrant plot approach (described in Section 2.4). Even with the site-specific proposal values, there are still numerous years of record that fail to show alignment between the Chl a standard and the TP and TN standards (Figure 30). In fact, there is no ideal value for the TP and TN standards to lead to good alignment with the full observed dataset. This underscores the underlying complexity of the Chl a response to nutrient concentrations in Cherry Creek Reservoir. In other words, TP and TN are clearly not independent controls on Chl a in Cherry Creek Reservoir as effectively assumed in the standard development process. That said, following the WQCD’s 4-step process using site-specific data is expected to have produced TP and TN standard values that better reflect the underlying relationships between nutrients and Chl a in Cherry Creek Reservoir.

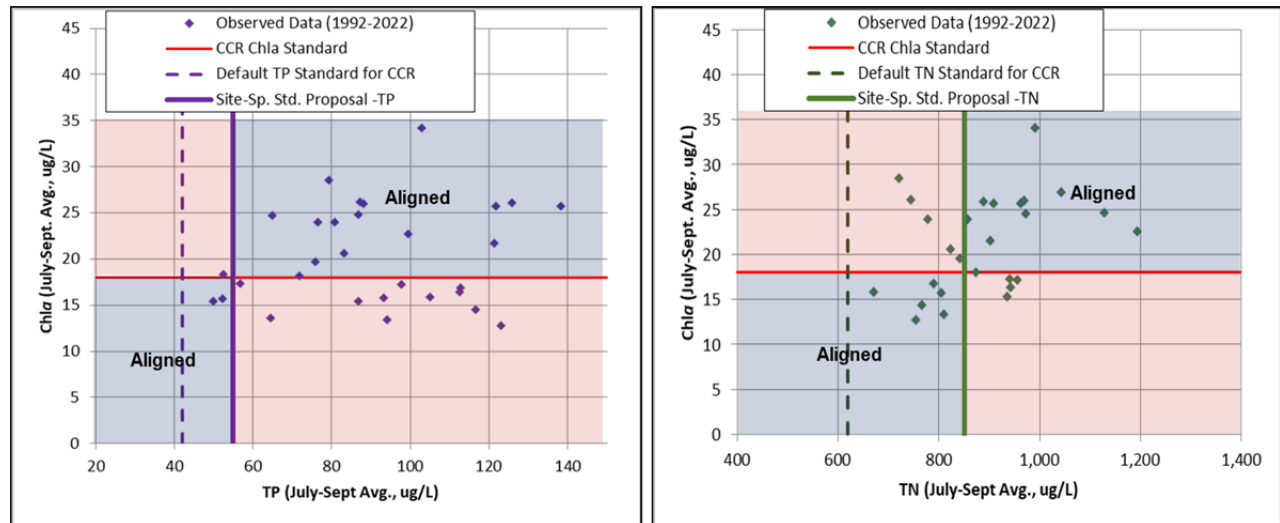


Figure 30. Cherry Creek Reservoir Chl α : TP and Chl α : TN Quadrant Plots with Site-Specific TP and TN Standards Developed for Cherry Creek Reservoir, 1992-2022

The underlying relationships become more apparent when the quadrant plots are reviewed focusing on the subsets of years used in standard development (Figure 31). As a reminder, the subsets of years used in the site-specific standard development (1992-2003 for TP and 2004-2022 for TN) are expected to generally differentiate between years with a greater tendency toward phosphorus limitation and years with a greater tendency toward nitrogen limitation. Using those data subsets, the proposed site-specific TP and TN standards align reasonably well with the Chl α standard in Cherry Creek Reservoir (Figure 31). Further, the site-specific TP and TN standards show much better alignment with the observed dataset as compared to the default TP and TN standards for Chery Creek Reservoir (Figure 31). As noted previously, future refinement of the site-specific standards, particularly for TP, may be needed as concentrations in the reservoir decrease and the observed dataset further illuminates the underlying relationship between TP and Chl α at lower concentrations.

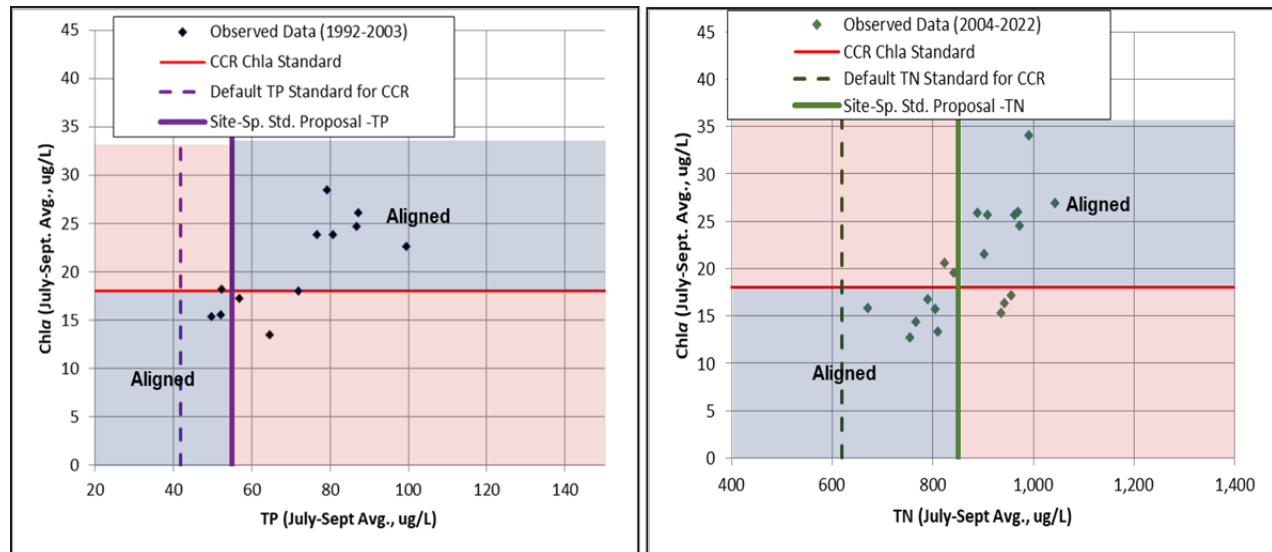


Figure 31. Cherry Creek Reservoir Chl α : TP and Chl α : TN Quadrant Plots with Site-Specific TP and TN Standards Developed for Cherry Creek Reservoir, Observed Data Limited to Year Sets Used in Standard Development

6 Longevity Plan Recommendations

It is recommended that a Longevity Plan be developed and included in the proposal for site-specific TP and TN standards for Cherry Creek Reservoir. As noted in Regulation 31 (WQCC, 2023) in the Statement of Basis and Purpose for the June 2021 Rulemaking Hearing, the purpose of a Longevity Plan for a site-specific standard is “to guarantee the collection and analysis of information that will be necessary to ensure that a site-specific standard is maintained over time, continues to be scientifically sound, protects the beneficial uses, and can be updated or revised as needed.”

Key elements of the Longevity Plan for the site-specific TP and TN standard for Cherry Creek Reservoir should include:

- **Sampling** – The plan should include a commitment by CCBWQA to continue July through September monthly (at a minimum) sampling in the mixed layer at CCR2 for ammonia, nitrate+nitrite, total Kjeldahl nitrogen, SRP, TP, and Chl α , with current sampling and analysis methods.
- **Data Analysis** – The plan should include a commitment for analysis of the sampling results to evaluate Chl α :TP and Chl α :TN response relative to the historical dataset and review of apparent agreement in reservoir response relative to the TP and TN standards as compared to response relative to the Chl α standard.
- **Reporting** – The plan should include a commitment to generate a report every three years for the WQCC, corresponding to the triennial review cycle for the basin. Each report should provide the dataset corresponding to data collection commitment, a summary of the data analysis conducted, and a statement of the finding as to whether or not the site-specific TP and TN standards are still considered appropriate for Chery Creek Reservoir and adequately protective of the AL/Rec beneficial uses.

These data collection, analysis, and reporting commitments in a Longevity Plan should support ongoing review of the appropriateness and protectiveness of the site-specific TP and TN standards. It is anticipated that the data analysis may also support subsequent proposals to adjust the site-specific standards in the future, as needed. Note that the sampling and data analysis commitments in the Longevity Plan are intended to provide the minimum adequate information needed to support the WQCC in determining whether there have been any major changes in reservoir response which could indicate that the basis and assumptions used to support adoption of the original site-specific standards have become invalid. As such, the Longevity Plan is not intended to limit, in any way, the information that may be considered or the approach that may be taken to develop revised site-specific TP and TN standard for Cherry Creek Reservoir in the future, as needed.

7 Summary

The State-wide $Chl a:TP$ and $Chl a:TN$ relationships for warm lakes that were used to develop the AL/Rec TP and TN TVSs do not reflect the observed $Chl a$ response to nutrient concentrations in Cherry Creek Reservoir. This mismatch may be due to the polymictic nature of the reservoir, high inflow concentrations of SRP, and/or the existence of strong nitrogen limitation in much of the observed record. Ultimately, the observed data indicate that the default standards are not appropriate for Cherry Creek Reservoir. Further, WQCD's Secchi-based Site-specific equations do not provide improved approximations of observed conditions in Cherry Creek Reservoir. Therefore, site-specific TP and TN standards are needed for Cherry Creek Reservoir.

An analysis of the observed dataset was conducted to identify site-specific nutrient standards for Cherry Creek Reservoir that are neither under-protective nor overly-stringent. The resulting proposed site-specific standards for Cherry Creek Reservoir are

- Proposed Site-Specific Standard for TP: 55 ug/L TP, and
- Proposed Site-Specific Standard for TN: 850¹⁴ ug/L TN.

The site-specific TP and TN standards would be assessed with annual July through September averages and a one-in five-year allowable exceedance frequency. These standards are considered to be defensible and appropriately protective for Cherry Creek Reservoir for the following reasons:

- The site-specific standards presented here were developed using the Cherry Creek Reservoir's extensive dataset (31-year record).
- The site-specific standards presented here were developed using the same 4-step method developed and applied by WQCD to define the TP and TN TVSs for lakes and reservoirs.
- The proposed values better reflect the apparent underlying $Chl a:TP$ and $Chl a:TN$ relationships present in the Cherry Creek Reservoir datasets, as compared to the default standards for Cherry Creek Reservoir.
- Historical TP data from 1982 (Clean Lakes Study) further support the proposal.
- Reservoir water-quality modeling of $Chl a$ response to TP further supports the proposal.

¹⁴ Note that these values follow the WQCD precedent of rounding the standard values to two significant figures.

- The proposed site-specific standard values fall into the range between the EPA-approved warm lakes TVSSs (adopted in April of 2023) and the EPA-approved 2012 Interim Criteria, suggesting the magnitude of the values is reasonable.
- The proposed site-specific TP and TN standards comprise challenging targets that will not in any way deter CCBWQA from continuing its long-term efforts to drastically reduce nutrient concentrations in the reservoir.

A longevity plan is recommended for inclusion with the site-specific proposal. The longevity plan would include data collection, analysis, and reporting commitments to support ongoing review of the appropriateness and protectiveness of the site-specific TP and TN standards.

In summary, this analysis provides a strong technical basis for proposal of site-specific TP and TN standards of 55 ug/L TP and 850 ug/L TN for Cherry Creek Reservoir to the WQCD then to the WQCC. These values are considered to be protective of the AL/Rec beneficial uses and more appropriate for Cherry Creek Reservoir than the default TP and TN standards.

8 References

- Carlson, R. E. 1977. A Trophic State Index for Lakes. *Limnology and Oceanography*, March 1977, v. 22(2); pp 361-369.
- Cole, T.M. and S.A. Wells. 2017. CE-QUAL-W2: A Two-Dimensional, Laterally Averaged, Hydrodynamic and Water Quality Model, Version 4.1. User Manual. Department of Civil and Environmental Engineering. Portland State University.
- DRCOG (Denver Council of Governments). 1984. Cherry Creek Reservoir Clean Lakes Study; Prepared in Cooperation with CDPHE WQCD with Funding in Part from USEPA.
- EPA (Environmental Protection Agency). 2016. Letter from M. Hestmaker (EPA Region 8) to L. Evans (Water Quality Control Commission), Re: PEA Action on Revisions to Regulation #31 Regarding Nutrients. July 14, 2016.
- Hydros. 2015. Cherry Creek Reservoir Water-Quality Modeling Project: Model Calibration and Sensitivity Analyses. Prepared by: Hawley C., J.M. Boyer, and T. Adams. Prepared for the Cherry Creek Basin Water Quality Authority. July 31, 2015.
- Hydros. 2017. Cherry Creek Reservoir Water-Quality Model Documentation. Prepared by: Hawley C., J.M. Boyer, and B. Johnson (CSU). Prepared for the Cherry Creek Basin Water Quality Authority. April 5, 2017.
- Hydros. 2019. 2014-2017 Update to the Cherry Creek Reservoir Water-Quality Model. Technical Memo from C. Hawley and J.M. Boyer to the Cherry Creek Basin Water Quality Authority. March 8, 2019.
- Hydros. 2022. Applicability of WQCD-Proposed TN and TP Standards to Cherry Creek Reservoir. Technical Memorandum from C. Hawley (Hydros) to J. Clary (CCBWQA). August 8, 2022.
- Koenker, R. and J. A. F. Machado. 2012. Goodness of Fit and Related Inference Processes for Quantile Regression. *Journal of American Statistical Association*; 94:448, 1296-1310. ISSN: 0162-1459.
- WQCC. 2023. Regulation No. 31 – The Basic Standards and Methodologies for Surface Water; 5 CCR 1002-31. Effective June 14, 2023.
- WQCD. 2022a. WQCD Prehearing Statement. November 2022 Regulation Numbers 31-38/ Regulation Number 85 Rulemaking Hearing: August 3, 2022.
- WQCD. 2022b. WQCD Exhibit C_Lakes - Secchi-Based Site-Specific Equations; Spreadsheet Tool; Updated August 3, 2022.



**Cherry Creek Basin Water Quality Authority
Watershed Plan Workshop Meeting Agenda
Thursday, September 21, 2023 at 9:00 a.m.**

**The meeting will be conducted in-person and virtually as set forth below.
The workshop is intended to be an in-person meeting. Although a hybrid option will be provided, audio limitations in the room will limit effective virtual participation.**

**In-Person: SEMSWA
7437 S. Fairplay St.
Centennial, CO 80112**

**Virtual: Zoom
<https://us06web.zoom.us/j/87425775963> Passcode: CCBWQA
Phone (646)931-3860 Mtg ID 874 2577 5963# Passcode: #815374**

Agenda

1. Introduction
2. Watershed Plan Purpose & Approach
3. Draft Watershed Plan Outline
(We will discuss content areas and obtain input on general direction in these areas during the workshop.)
 - a. Background Information
 - b. Current Conditions
 - c. Risks and Vulnerabilities
 - d. Relative Source Contributions
 - e. Potential Management Strategies
 - f. Evaluate and Prioritize Actions
 - g. Implement Priority Actions
 - h. Monitor Implementation Outcomes
 - i. Adaptive Management
4. Questions & Considerations
5. Next Steps & Information Requests

CHERRY CREEK BASIN WATER QUALITY AUTHORITY
2023 Capital Project Status Report
September 15, 2023

RESERVOIR PROJECTS

1. East Shade Shelters Phase III and Tower Loop Phase II Shoreline Stabilization (CCB-17.5 and CCB-17.7)
 - a. Description: These projects were identified in 2014 through the annual inspection. The Tower Loop Phase II connects to the Phase I project and extends shoreline protection 570 feet to the southeast towards Dixon Grove. The East Shade Shelters Phase III starts on the north end of the Shade Structure and goes 400-feet to the south.
 - b. Status: Consultant selection is scheduled for the 1st quarter. A consultant selection committee will be set in February (1/29/21). At the February TAC meeting Jason Trujillo, Jon Erickson, Lanae Raymond, Bill Ruzzo were interested in serving on the consultant selection committee (2/11/21). This selection committee was discussed at the 3/18/21 Board Meeting, and no further members were added. The Request for Proposals (RFP) has been posted on BidNet and Proposals are due 04/21/21 (3/25/21). The pre-proposal meeting was held on 4/7/21. 5 proposals were received on 4/28/21; the selection committee is reviewing them. Interviews were held and a selection is being brought to the May Board meeting (5/14/21). Board authorized negotiations with RESPEC (5/27/21). Agreement has been executed with RESPEC (10/15/21). Field Survey of project areas and topographic mapping is underway (12/30/21). A design kickoff meeting was held on 4/22/22. A design sprint workshop was held on 7/12/22 which included a site visit and evaluation of alternatives. RESPEC is developing a recommended alternative (9/8/22). RESPEC provided updated project costs for budgeting (10/13/22). The 30% submittal was received on 11/16/22 and is under review. CCBWQA provided comments on 30% review on 1/17/23; a value engineering effort is recommended as the project costs exceed the budget. The value engineering meeting was held on 2/24/23. RESPEC's request for additional services was approved by TAC and Board in May (5/25/23). The reservoir water level has come down since the May and June storms and additional erosion was observed on 7/14/23; a site visit was made with RESPEC on 8/1/23 and the erosion areas at East Shade Shelters were measured. *It has been estimated that roughly 14 cubic yards of soil was eroded from the 2023 storms (9/15/23). A progress meeting was held on 9/15/23, RESPEC will refine the breakout of components between recreational (CPW responsibility), water quality (CCBWQA responsibility), and shared (both CPW and CCBWQA responsibilities) costs and work on 408 review submittal to US Army Corps of Engineers.*

STREAM RECLAMATION PROJECTS

1. Cherry Creek Stream Reclamation at Arapahoe Road aka Reaches 3 and 4 (CCB-5.14C)
 - a. Description: This project continues the work on Cherry Creek by CCBWQA, MHFD, and local partners. It ties into the previous stream reclamation projects of Cherry Creek Eco Park to Soccer Fields (CCB-5.14A) and Cherry Creek at Valley Country Club (CCB-5.14B). The 5,167 Linear Feet of stream reclamation reduces bed and bank erosion immobilizing approximately 88 pounds of phosphorus annually. The project is anticipated to be funded over several years and likely be broken into phases.
 - b. Status: In 2021, an IGA was executed between CCBWQA, MHFD, City of Aurora, and SEMSWA to begin this work. IGA Amendment that brings in 2022 funding is under review (5/13/22). Board authorized IGA Amendment for 2022 funding on 7/21/22 (8/12/22). IGA Amendment has been revised to show Aurora's lower participation; CCBWQA's participation was lowered accordingly to meet 25% partner project level; revised IGA Amendment received TAC recommendation and is being taken to Board for their consideration in October (10/13/22). Board authorized the IGA Amendment for 2022 funding at their 10/22/22 meeting. It appears that CCBWQA's 2023 participation will be reduced as a result of less

partner funding available for this project (2/24/23). The IGA Amendment that brings in 2023 funding was recommended by the TAC and authorized by the Board at their June meetings (6/29/23).

2. Cherry Creek Stream Reclamation – Upstream of Scott Road (CCB-5.17)
 - a. Description: Design and construction of stream reclamation is in partnership with Douglas County and MHFD. It improves 4,100 feet of Cherry Creek and is located upstream of Scott Road.
 - b. Status: IGA was approved by the Board at their April 2020 meeting. Muller had been selected as consultant, and design scope of work is being prepared. Kickoff meeting was held on 12/11/20; a follow-up field visit will be scheduled for early 2021. Site visit was held on 1/29/21. Conceptual design is complete, negotiations are underway to contract for 60% design (4/8/21). Muller is working on alternatives (4/30/21). Muller is working on preliminary design and an IGA Amendment to bring in additional 2021 funding from Douglas County is being brought to the Board in October (10/15/21); IGA Amendment has been executed (11/11/21). Muller is preparing 60% Design Submittal (1/28/22). Muller submitted 60% Design on 2/2/22; comments have been provided on 60% Design Submittal (3/10/22). IGA Amendment bringing in 2022 funding is scheduled for TAC and Board consideration in June (5/27/22). IGA Amendment was authorized at the June 16th Board Meeting (6/30/22). Muller is working on Final Design and held a progress meeting on 4/14/23, a site visit is being scheduled to support the 90% design submittal. The 90% site visit was held on 5/22/23. *Muller submitted their 90% design submission on 9/14/23; the engineer's estimate confirms that additional funding is needed for construction.*
3. Cherry Creek Stream Reclamation at Dransfeldt (CCB-5.17.1B)
 - a. Description: Design and construction of stream reclamation is in partnership with Town of Parker and MHFD. It improves 2,400 feet of Cherry Creek near the future location of Dransfeldt bridge which is just downstream of the Cherry Creek at KOA project.
 - b. Status: Initial scoping has begun, and a partners meeting was held on 1/30/21. IGA is scheduled for CCBWQA's May TAC and Board meetings (4/30/21). IGA was approved by all parties and has been executed (6/25/21). Muller Engineering has submitted their Draft Scope of Work for Design Services, and the project sponsors have reviewed it (7/8/21). Design kickoff meeting was held on 10/14/21. Alternatives are being evaluated (12/9/21). Pre-submittal meeting for the 404 permit is being scheduled (12/30/21). CLOMR is being prepared for project (3/10/22) and was submitted to FEMA on 3/31/22. CEI was selected for as project partner to provide contractor input during the design (5/27/22). CLOMR is under review by FEMA (8/12/22). Muller has received comments on CLOMR and is preparing responses; 90% Submittal is scheduled for early February (1/27/23). Comments on 90% Submittal were provided on 2/22/23; project is experiencing substantive cost increases due to current market conditions (2/24/23). TAC at their 3/2/23 meeting recommended that the Board authorized the IGA Amendment to bring in 2023 funding along with an increase in CCBWQA's 2023 funding from \$170,000 to \$570,000. The Board authorized the IGA Amendment with the increased 2023 funding of \$570,000 at their 3/16/23 meeting. The Conditional Letter of Map Revision (CLOMR) was issued by the Federal Emergency Management Agency (FEMA) on April 28, 2023 (5/12/23). The sanitary sewer relocation will be contracted to start with, in order to avoid a pipe material cost increase, and to get it out of the way for the forthcoming stream reclamation (7/13/23). The sanitary sewer relocation has been contracted for with Concrete Express Inc. or CEI (8/11/23).
4. McMurdo Gulch Priority 3 Stream Reclamation (CCB-7.2)
 - a. Description: The design and construction of stream reclamation is in partnership with Castle Rock. Castle Rock is the lead agency. This phase continues the work from the previous phase. Muller Engineering is the design consultant.
 - b. Status: Board authorized IGA for Priority 3 at their May 19,2022 meeting. Muller submitted their 30% deliverable on 10/31/22, review comments were returned on 11/8/22. Easements needed for projects have been identified (1/23/22). The 60% Submittal was received on

1/30/23 and comments have been provided on 2/7/23. Muller is working on updating their construction cost estimate (2/8/23). On 2/23/23, Castle Rock requested that CCBWQA's 2023 funding be deferred to 2024 to match their schedule.

5. Lone Tree Creek in Cherry Creek State Park (CCB-21.1)
 - a. Description: This project includes a trail connection to Cherry Creek State Park and includes 570 linear feet of stream reclamation on Lone Tree Creek from the State Park Boundary to the Windmill Creek Loop Trail. The City of Centennial is the project lead. CCBWQA participation is for stream reclamation only.
 - b. Status: 95% submittal is under review (5/13/22); review comments have been returned (5/27/22). Project funding was brought to TAC at their 7/7/22 meeting, during drafting of IGA it was discovered that future maintenance of stream reclamation should be considered, project will be brought back to TAC at an upcoming meeting for maintenance discussion and recommendation (8/12/22). A stakeholder meeting was held on 9/29/22 to discuss maintenance. A stakeholder meeting was held on 11/2/22 to discuss findings from CCBWQA's site visit and findings included in Wright Water Engineers report. The Board supports CCBWQA's partnering with Centennial at their 11/17/22 meeting. A Memo of Understanding is under review by Colorado Parks and Wildlife (CPW) affirming maintenance responsibilities for the stream reclamation fit under the current agreement between CCBWQA and CPW (3/30/23). CCBWQA sent the Draft IGA to Centennial for review on 5/23/23.

6. Happy Canyon Creek – County Line to Confluence with Cherry Creek (aka Jordan Road, CCB-22.1)
 - a. Description: The design and construction are in partnership with Southeast Metro Stormwater Authority and MHFD and includes 2,500 feet of stream reclamation. The Authority's water quality component share for design and construction is estimated to be \$325,000. The total project cost is estimated at \$1,300,000.
 - b. Status: IGA is scheduled for June TAC and Board meetings (5/27/21). IGA has been approved and executed by all parties (7/29/21). Jacobs has been selected as design consultant and project scoping is underway; limits have been extended upstream to the County Line and sediment capture area and transport will be included with the project (10/15/21). Jacobs has submitted their scope of work and fee for design which is under review by project sponsors (11/11/21). Project sponsors have completed a review of Jacobs' fee and scope of work and the agreement is being routed for signatures (1/28/22). IGA Amendment to bring in 2022 funding is in process (3/10/22). A project kickoff meeting was held on 3/28/2022. A site visit was performed on 4/12/22 to document existing conditions and identify sediment source/transport/deposition areas. Project Team is preparing a sampling plan for bank and bed materials to determine phosphorous content (5/13/22). The project team met on 5/24/22 to discuss project goals and Jacobs is progressing through the study. Jacobs and ERC are working on sediment transport analysis and model (6/30/22). The results from the sediment transport model were presented at the 8/23/22 progress meeting and an upstream sediment capture area just south of the JWPP was included in the alternatives analysis (8/26/22). The alternative analysis report is expected to be completed before the end of 2022 (10/13/22). Lab results from stream soil samples were sent to Jacobs so that they include phosphorus reduction in the alternatives analysis report; a groundwater investigation is needed to inform sediment capture facility and stream reclamation alternatives, scoping and negotiations are in progress (11/11/22). Groundwater scope of work has been reviewed and approved by project sponsors (1/13/23). The IGA Amendment bringing in the 2023 funding was recommended by TAC and authorized by the Board in April (5/12/23).

7. Happy Canyon Creek - Upstream of I-25 (CCB-22.2)
 - a. Description: The design and construction are in partnership with Douglas County, City of Lone Tree, and MHFD and includes 2,500 feet of stream reclamation. The Authority's water quality component share for design and construction is estimated to be \$500,000. The total project cost is estimated at \$2,000,000.
 - b. Status: Douglas County, City of Lone Tree, and MHFD have initially funded and selected

Muller Engineering as the design engineer. Design has started and a progress meeting was held on 1/27/21. Design is progressing (2/11/21). Muller has submitted 60% Design Deliverables (5/27/21). IGA for 2021 Funding is being brought to Board in September (9/9/21). 2021 IGA Amendment has been executed (11/11/21). Coordination with CDOT and easement acquisitions are on-going (1/13/22). Board authorized 2022 funding and IGA Amendment at their June 16th meeting (6/30/22). The project received environmental clearance from CDOT (8/12/22). The 90% design submittal is scheduled for delivery by end of September (8/26/22). The 90% design submittal is being reviewed (10/13/22). Comments were provided on 90% submittal (11/11/22). Muller completed the 100% design submittal on 11/22/22. CDOT permit was issued, and pre-construction meeting was held on 1/10/23; construction start is scheduled for 1/30/23 pending execution of easement documents from Surrey Ridge which has agreed to terms and easement language. Notice to Proceed on construction is pending execution of easement documents (1/27/23). Easements have been signed by property owners and Notice to Proceed has been issued to Naranjo Civil Constructors (2/8/23). Construction is underway with initial construction BMPs/stormwater controls in place; water diversion and control is being set up for the downstream section of the project (3/10/23). Water control is in place and construction of stream reclamation is underway for downstream sections of the project (3/30/23). Riffle and Boulder Cascade drop structures on downstream third of project are nearing completion (4/13/23). Construction is underway in the middle third of the project; efforts consist of stream grading and installation of Riffle and Boulder Cascade drop structures (5/12/23). The storm damage from May 11 to 13, 2023 event is being identified and repaired (5/25/23). Construction on the middle third is substantially complete and work has begun on the upstream third (7/27/23). *The construction is nearly complete with the punch list walk on 9/13/23; contractor is working on completing plantings and resolving punch list items.*

8. Dove Creek - Otero to Chambers Rd. (CCB-23.1)

- a. Description: The design and construction are in partnership with Southeast Metro Stormwater Authority (SEMSWA) and with Mile High Flood District (MHFD) being a key stakeholder; it includes 1,300 feet of stream reclamation. The Authority's water quality component share for design and construction is estimated to be \$175,000. The total project cost is estimated at \$700,000.
- b. Status: SEMSWA is drafting the Intergovernmental Agreement to bring in the 2021 funding for the project (3/12/21). RESPEC is the design consultant; two conceptual design alternatives have been prepared and reviewed during meeting on 3/15/21. IGA is scheduled for CCBWQA's May TAC and Board meetings (4/30/21). IGA has been approved and executed by all parties (7/29/21). 30% Design Review Meeting was held on 8/23/21. A Progress meeting is scheduled for 2/26/22 with 60% Plan submittal expected to follow (1/28/22). The 60% Design was submitted on 2/16/2022, comments were provided, and a design review meeting was held on 2/23/2022. IGA Amendment to bring in 2022 funding is in process (3/10/22). Construction costs were prepared by CEI based on 60% submittal (5/13/22). A design progress meeting was held 6/14/22 and 90% design submittal is being prepared (6/30/22). 90% design submittal is expected by the end of July (7/15/22). The 90% design submittal was reviewed, and comments were submitted on 8/22/22. *Construction is anticipated in 2023 (10/13/22).* A progress meeting was held on 11/8/22, project will likely be done in 2 phases, IGA Amendment will be needed early in 2023 so that construction can start ahead of storm season. Dove Creek IGA for construction of Phase 1 is scheduled for TAC and Board in January 2023, construction is expected to start shortly afterwards (12/30/22). Construction is scheduled to start mid-February; construction agreement and engineering construction services amendment are currently being reviewed (1/27/23). Construction and engineering construction services have been finalized and a preconstruction meeting was held on 2/2/23. Notice to Proceed has been issued to Concrete Express; construction is underway with initial construction BMPs/stormwater controls in place (3/10/23). Water control is in place and construction of stream reclamation is on-going (3/30/23). Step pool drop structures have been constructed and work on soil wraps is underway (4/13/23). Low-flow or bank full channel work (soil wraps and erosion control blanket) and step-pool structures are

complete, water diversion has been removed, and is active to storm flows; work continues in upland areas and higher elevations of stream reclamation (5/12/23). Storm damage from May 11 to 13, 2023 event is being repaired (5/25/23). Construction punch list is being completed (6/29/23). Construction is complete (7/27/23).

9. Piney Creek from Fraser Street to Confluence with Cherry Creek aka Reaches 1 and 2 (CCB-21.1)
 - a. Description: This project includes 2900 liner feet of stream reclamation on Piney Creek. The project partners are SEMSWA and CCBWQA.
 - b. Status: Project coordination meeting was held with SEMSWA on 6/29/22. IGA drafted and is being reviewed by SEMSWA (8/12/22). IGA was approved by CCBWQA at the 9/15/22 Board meeting. IGA Amendment to bring in 2023 funding was recommended by the TAC and authorized by the Board in May (5/25/23). CCBWQA sent the Draft IGA Amendment to SEMSWA for review on 6/29/23. SEMSWA has no comments on the IGA Amendment and plans to take it to their Board in October (8/11/23). *The project site was walked with SEMSWA and Olsson and Associates on 8/30/23, Olsson is preparing their scope of work and fee for design.*

10. Mountain and Lake Loop Shoreline Stabilization Phase II (OM 4.6)
 - a. Description: This project was identified in through the 2020 annual inspection and design and permitting started in 2021. It adds about 40 feet of shoreline protection where it has eroded leaving a 1-2 foot tall vertical bank.
 - b. Status: Construction Plans have been prepared and the GESC was submitted to Arapahoe County for review (1/13/22). Plans are being reviewed by US Army Corps of Engineers for 408 clearance (5/13/22). *Comments were received from the US Army Corps of Engineers on 8/29/23.*

11. Cherry Creek from Reservoir to Lake View Drive (OM 4.6)
 - a. Description: This project is in follow up to CCBWQA's study of Cherry and Piney Creeks in Cherry Creek State Park (CCSP). Muller completed two reports on Cherry Creek from Reservoir to State Park Boundary, Stream and Water Quality Assessment and Baseline Channel Monitoring Report, in 2022. These reports highlight the need for this project.
 - b. Status: A workshop is scheduled for the 3/16/23, to seek CCBWQA Board and TAC input on this project and Cherry and Piney Creeks in CCSP (3/10/23). *The follow up from workshop is underway – project overview and funding flyer has been created, Muller is scoping the next step of design for Reach 1 and providing a fee, and multi-pronged approach is in development for workshop priority reaches that prioritizes Reach 1 and reduces risk from upstream reaches; these items will be brought to TAC and Board for discussion, direction, and/or action at upcoming meetings (3/30/23). A site visit for partner outreach and funding was held on 5/25/23 at 1-4 pm (6/8/23). A coordination meeting was held with Aurora on 6/23/23 and they showed interest in partnering on the project to protect their water lines. The Mile High Flood District has provided their budget/CIP schedule and Arapahoe County Open Space has been contacted to investigate potential partnering opportunities (7/13/23). The TAC created a subcommittee for this project on 8/3/23; which will attend progress meetings, provide timely feedback to Muller, and to coordinate with TAC as-needed. *The alternatives analysis kickoff meeting was held on 8/29/23.**



Task Memorandum

Task: RDS Operations Report-No. 2

Date: 9/07/23

To: Board and TAC

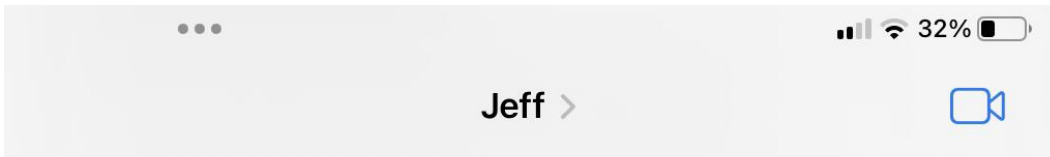
By: Ricardo Gonçalves, PE

Short Shutdown- On August 21, 2023 at 3:17 pm MDT, I received a notice from Ingersoll Rand by email that the compressor had shut down due to high bearing oil temperature. I actually received the notification at 10:15 pm GMT at my location while on vacation out of the country, our first test of the Remote Monitoring System that we had set up with Ingersoll Rand earlier this year.

I immediately called Jeff Handley, who responded immediately by text message. He dispatched himself to investigate the issue. The problem was that the oil coolers had built up significant dust to clog the oil coolers on a day that was in the high 90 degrees. He blew the dust off the cooler fins with the compressed air stored in the receiver tank and had the system back running again in just three hours and fifteen minutes from the initial shutdown.

I have asked Jeff for a proposal to add a monthly maintenance check and blow-out for the coolers to their maintenance contract but have not received it yet.

Following are screenshots of Jeff's and my correspondence by text message on this issue.



Mon, Aug 21 at 3:17 PM

Trying to get a technician there. If I can't I will go by this evening after 6 to get it reset myself

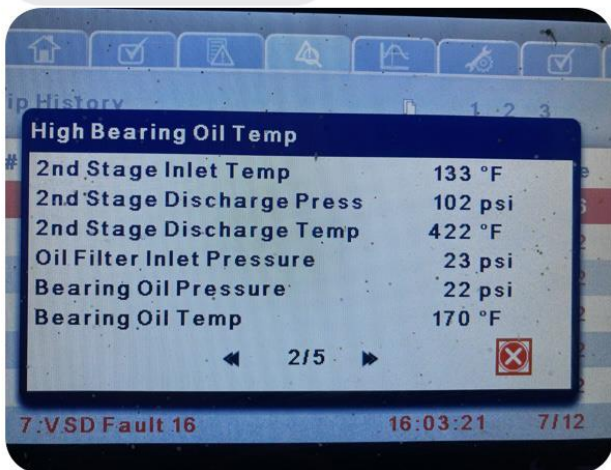
Ok, let me know. Thank you!

Jeff, the code for the lock box is

Mon, Aug 21 at 6:05 PM



Other page at 171

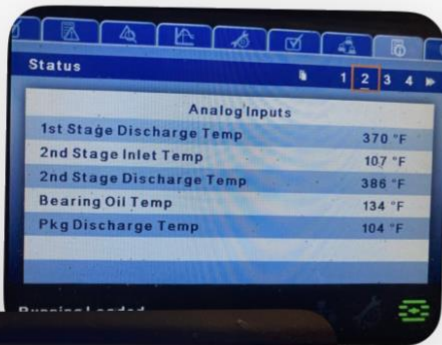


This is the bearing temp that tripped it

170



This is the issue. All the dust gets stuck on the oil cooler. This is before and after





The trips why I was building pressure was because the room was just real hot so I opened the door fully.

I hooked the hose you had to the wet tank to get the 100 psi to blow everything out.

This should be regular maintenance beyond our tri annual.

Tue, Aug 22 at 5:40 AM

Jeff, thanks for handling all that. I was out of the country, over in Europe, in fact, when I got the shut down notice and called you. All those messages that you sent me were received while I was asleep. I am now on my way back, while you are asleep!

Wed, Aug 23 at 8:48 AM

Is that maintenance something that we can have added to our triannual maintenance?

And, how long was the compressor down?

From the time you called me to the time I had it running it was approximately three hours and 15 minutes

If I were to add a monthly visit to blow out or vacuum out the coolers, it would be two hours a visit so would be about an extra \$450 a visit. We're already coming out three times it would be six times it would add about \$3000 a year or thousand dollars an invoice for us to take care of that to just make sure it's all the dust and debris and everything are cleaned out at least once a month I can talk to my service manager about that because you're looking at roughly 30 to 45 minute drive time and then a 30 to 45 minute cleanup each time

Great!! The notification system that you set up for us did its job! Can you send us a proposal to do that additional maintenance, please?

Delivered

Memorandum

To: CCBWQA Board
From: Jessica DiToro, PE, LRE Water
Jane Clary, CCBWQA Technical Manager, Wright Water Engineers
Date: September 21, 2023
Subject: Colorado Water Quality Rulemaking Hearing Information

In the Colorado water quality world there are four types of hearings¹:

1. Water Quality Control Commission (WQCC) Rulemaking Hearing (RMH) Proceedings:
 - RMH proceedings are where formal WQCC rules (e.g., Regulations 31-38²) are approved³.
 - Currently upcoming/ongoing WQCC RMHs can be found at the following webpage: <https://cdphe.colorado.gov/wqcc-rulemaking-proceedings>
 - Recently completed WQCC RMHs can be found at the following webpage: <https://cdphe.colorado.gov/completed-wqcc-hearings>
 - If you would like older RMHs that are no longer available on the Recently Completed Webpage, call me. These take some effort to dig up.
2. Administrative Action Hearings (AAH):
 - AAHs are where documents that are not formal rules (i.e., WQCC policies⁴, 208 water quality management plans, nonpoint source management programs, etc.) are approved.
 - Ongoing and recently completed AAHs can be found at the following webpage: <https://cdphe.colorado.gov/wqcc-administrative-action-hearings>
3. Public Informational Hearings (IH):
 - Public IHs are informal WQCC hearings that do not result in any formal action by the WQCC. Some examples of public IHs include issues scoping hearings⁵ (ISH) and issues formulation hearings⁵ (IFH).

¹ WQCC Hearings: <https://cdphe.colorado.gov/wqcc-hearings>

² WQCC Regulations: <https://cdphe.colorado.gov/water-quality-control-commission-regulations>

³ From Regulation 21, p. 3, a RMH may be conducted through written comments only: *"The Commission may determine that receipt of only written comments on a published proposal, and any substantive written response(s) to such comments or issues raised in such comments, is sufficient public participation to establish an adequate record for Commission deliberation and decision-making. If the proponent of a proposal disagrees with any written comments submitted, the proponent shall submit a written response in accordance with the deadline established in the rulemaking proceeding notice. An opportunity shall be provided to other interested persons to submit written responses to comments in accordance with a deadline established in the rulemaking proceeding notice."*

⁴ WQCC Policies: <https://cdphe.colorado.gov/wqcc-policies>

⁵ *"For surface water quality classifications and standards which are organized by river basin and for the Basic Standards and Methodologies for Surface Water, the Commission has established a three-step triennial review process. The Issues Scoping Hearing is the first step in the process. In short, the Issues Scoping Hearing provides an opportunity for early identification of potential issues*

- With respect to Control Regulations (i.e., Regulations 71-74 and 81-86²), the WQCC will first hold an IH to receive staff input and public comment. Depending on the outcome of the IH, the WQCC will decide if a formal RMH is needed.
- Upcoming and recently completed IHs can be found at the following webpages: <https://cdphe.colorado.gov/wqcc-public-informational-hearings>
https://drive.google.com/drive/folders/1vWZlpzixW4Y0_CJ2adoFY2ldcoZ7Wh3

4. Adjudicatory Hearings:

- Adjudicatory hearings are quasi-judicial proceedings by the WQCC or the Water Quality Control Division (WQCD) to review specific types of decisions by the WQCD with respect to individual regulated entities⁶. The procedures for these hearings are spelled out in WQCC Regulation 21⁷ (Procedural Rules).
- Ongoing and recently completed WQCC adjudicatory hearings can be found at the following webpage: <https://cdphe.colorado.gov/wqcc-adjudicatory-hearings>

Anyone can sign up to receive notice of any of the described upcoming hearings at the following WQCC webpage. The link below will send you to a google form where you can “pick your own adventure” and choose exactly what regulations, policies, etc. you would like to be notified about:

https://docs.google.com/forms/d/e/1FAIpQLSeKpmSyDnGrMZFPGBqHxMmWvKEzp-xktDqpoAD_q0jX4Qrtnw/viewform

For additional information on the above hearings, please reference the WQCC’s Public Participation Website and Public Participation Handbook (February 2017):

Website: <https://cdphe.colorado.gov/wqcc-public-participation>

Handbook: https://drive.google.com/file/d/166i2sWZ8c-59MLp7kDhQOWTDbCo_TQGS/view

The following table lists the scheduled upcoming hearings through 2027, with hearings of interest to the Cherry Creek Basin Water Quality Authority (CCBWQA) highlighted in red and bolded. This information can also be found online in two places:

that may need to be addressed in the next major rulemaking hearing for particular regulations, and for identification of any issues that may need to be addressed in rulemaking prior to that time. The second step in the triennial review process – the Issues Formulation Hearing – results in the identification of the specific issues to be addressed in the next major rulemaking hearing. The third step is the Rulemaking Hearing, where any revisions to the water quality classifications and standards are formally adopted. The timing of the three steps is as follows: (1) the Issues Scoping Hearing is held in October of Year 1; (2) the Issues Formulation Hearing is held in November of Year 2; and (3) the Rulemaking Hearing is held in June of Year 3. More complete descriptions of these three steps in the triennial review process for surface water quality classifications and standards are posted on the Commission’s web site, under the section entitled ‘Water Quality Standards.’” Public Participation Handbook, p. 4-5.

⁶ This is not to be confused with a permit adjudication which is an administrative hearing requested by a Colorado Discharge Permit Systems (CDPS) permittee or other stakeholder, to challenge the terms and conditions of an issued permit, challenge permit denials, or challenge other permitting actions. These hearings are held by the Office of Administrative Courts, not the WQCC.

⁷ Regulation 21: <https://www.sos.state.co.us/CCR/GenerateRulePdf.do?ruleVersionId=7100&fileName=5%20CCR%201002-21>

1. The WQCC Long-Range Schedule – Usually covers the upcoming two to three years of hearings in detail, and is updated regulatory. The Long-Range Schedule can be found at the following link⁸:
<https://drive.google.com/file/d/14UKyKRF4mIVdM8bmeJNuLXVuKUIA2RT2/view>⁹
2. The Index of WQCC Regulations and Policies – Usually covers the upcoming two to three years of Regulatory and Policy hearings. Also includes the date of last WQCC action. The Index of WQCC Regulations and Policies can be found at the following link¹⁰:
https://drive.google.com/file/d/11cxHB5ce76Dp34UYaIWefvgqg9xq_wL1/view⁹

⁸ Please note that as of the date of this memorandum, the WQCC Long-Range Schedule was last updated in July 2023.

⁹ Main website for access: <https://cdphe.colorado.gov/wqcc-meetings>

¹⁰ Please note that as of the date of this memorandum, the Index of WQCC Regulations and Policies was last updated May 2023.

Table 1. Water Quality Control Commission Regulation Hearing Timeline

Hearing Date	Rule	Event ¹¹	Potential Relevance to CCBWQA
October 2023	Regulation 61 – Colorado Discharge Permit System Regulations	RRIH	Relevance low, but should track to understand changes being proposed and if any changes are relevant to Regulation 72
November 2023	Regulation 38 – South Platte Water Quality Standards	ISH	Relevance high, monitor to see potential issues
	Regulation 86 – Graywater Control Regulation	RMH	Relevance potentially high, scope includes the use of graywater in P Control Basins – Staff monitoring RMH but will not request party status
February 2024	Regulation 72 – Cherry Creek Reservoir Control Regulation	RMH	Relevance high, PWSD + CR’s proposal re short-term construction dewatering discharge TP limit – Continue to participate in stakeholder workgroup and determine if CCBWQA will take a position and if so what one
March 2024	Regulation 73 – Chatfield Reservoir Control Regulation	TRIH	Relevance low, but of interest if CCBWQA wants to learn more about its sister-entity
August 2024	Regulation 64 – Biosolids Regulation	RMH	Relevance low, but applicable to Basin WWTFs
November 2024	Regulation 31 – Basic Standards for Surface Water	ISH	Relevance potentially high, CCBWQA should attend ISH to see what potential issues are planned for RMH in 2026, particularly changes to Lakes Nutrient Criteria (if any)

¹¹ “Event” Definitions:

TRIH – Triennial Review Informational Hearing; ISH – Issues Scoping Hearing; IFH – Issues Formulation Hearing; RMH – Rulemaking Hearing; AAH – Administrative Action Hearing; RRIH – Routine Review Informational Hearing

Hearing Date	Rule	Event ¹¹	Potential Relevance to CCBWQA
	Regulation 38 – South Platte Water Quality Standards	IFH	Relevance high, CCBWQA should attend IFH to see what will likely be proposed for RMH in 2025
December 2024	Regulations 32-38 - Temporary Modifications	RMH	Relevance low, unless temporary modifications applied to Cherry Creek Reservoir
March 2025	Regulation 22 – Site Location and Design Approval Regulation for Domestic Wastewater Treatment Works	RMH	Relevance potentially high, likely to address outstanding issues from March 2020 RMH such as historical lift stations. (Designated Mgmt. Agency roles revisited?)
	Regulation 43 – Onsite Wastewater Treatment System Regulations	RRIH	Relevance low, but should track to understand changes being proposed and if any changes are relevant to Regulation 72
May 2025	Regulation 93 – Colorado's Section 303(d) List and M&E List	RMH	Relevance likely low, Cherry Creek Reservoir is currently on the 303(d) List for DO and Chlorophyll-a, Windmill Creek for selenium, and the Mainstem of Cherry Creek is on the M&E List for manganese
	Regulation 84 – Reclaimed Water Control Regulation	TRIH	Relevance low, but should track to understand changes being proposed and if any changes are relevant to Regulation 72
June 2025	Regulation 38 – South Platte Water Quality Standards	RMH	Relevance high, CCBWQA should monitor and determine if party status is needed based on issues identified at 2024 IFH
April 2026	Regulation 85 – Nutrients Management Control Regulation	TRIH	Relevance high, could revisit nonpoint source progress, and assess whether additional regulatory requirements are needed to replace current voluntary approach, focusing on

Hearing Date	Rule	Event ¹¹	Potential Relevance to CCBWQA
			agriculture (upper basin may be affected)
November 2025	Regulation 31 – Basic Standards for Surface Water	IFH	Relevance high, CCBWQA should attend IFH to see what will likely be proposed for RMH in 2026
	Regulations 85 – Nutrients Management Control Regulation	RMH	Relevance potentially high
June 2026	Regulation 31 – Basic Standards for Surface Water	RMH	Relevance high, CCBWQA should monitor and determine if party status is needed based on issues identified at 2025 IFH
TBD 2027	Regulations 31-38 – Lakes & Reservoirs Nutrients	RMH	Relevance high, TN and TP standards for Cherry Creek and Reuter-Hess Reservoirs to be set – Developing site-specific standards for this RMH
	Regulations 31-38 – Stream Nutrients	RMH	Relevance potentially high, TP and TN water quality standards applied to all streams and rivers in Colorado

Water Quality 10-Year Roadmap for Work Groups, Documents and Schedules:

<https://cdphe.colorado.gov/water-quality-10-year-roadmap>


2023 Work Group Documents here: [2023 Roadmap Meeting Materials - Google Drive](#)

From: **CDPHE Regulation #93 Data Submittal** <noreply@formresponse.com>

Date: Fri, Sep 1, 2023 at 10:26 AM

Subject: We have received your response for Colorado Water Quality Control Division - Reg # 93 Data Call Submission

To: <erin.stewart@lrewater.com>

 Colorado Water Quality Control Division - Reg # 93 Data Call Submission	
Name	Erin Stewart
Phone Number	(720) 556-8896
Email	erin.stewart@LREWater.com
Organization	CCBWQA
Sub-basin(s) I am submitting data for...	South Platte (<i>basin updated by email</i>)
Data Type?	Stream Chemistry Lake/Reservoir Chemistry Lake/Reservoir Temperature
Additional Comments	CCBWQA's SAP can be accessed here: https://www.cherrycreekbasin.org/water-quality . Flow monitoring is not included in this submittal, but can be accessed through the CCBWQA data portal https://www.ccbwqportal.org/ .
Dataset Upload	CCBWQA CDPHE-WQCD Lakes-Physical Chemical.xlsx
Dataset Upload (optional)	CCBWQA CDPHE-WQCD Rivers - Physical Chemical.xlsx
Data Certification	Certified



**Cherry Creek Basin Water Quality Authority
Watershed Plan Workshop Meeting Agenda
Thursday, September 21, 2023 at 9:00 a.m.**

**The meeting will be conducted in-person and virtually as set forth below.
The workshop is intended to be an in-person meeting. Although a hybrid option will be provided, audio limitations in the room will limit effective virtual participation.**

**In-Person: SEMSWA
7437 S. Fairplay St.
Centennial, CO 80112**

**Virtual: Zoom
<https://us06web.zoom.us/j/87425775963> Passcode: CCBWQA
Phone (646)931-3860 Mtg ID 874 2577 5963# Passcode: #815374**

Agenda

1. Introduction
2. Watershed Plan Purpose & Approach
3. Draft Watershed Plan Outline
(We will discuss content areas and obtain input on general direction in these areas during the workshop.)
 - a. Background Information
 - b. Current Conditions
 - c. Risks and Vulnerabilities
 - d. Relative Source Contributions
 - e. Potential Management Strategies
 - f. Evaluate and Prioritize Actions
 - g. Implement Priority Actions
 - h. Monitor Implementation Outcomes
 - i. Adaptive Management
4. Questions & Considerations
5. Next Steps & Information Requests