



**Cherry Creek Basin Water Quality Authority
Technical Advisory Committee Meeting Agenda
Thursday, April 6, 2023, 9:00 a.m.**

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

**Virtual: Zoom¹
<https://us06web.zoom.us/j/87425775963> Passcode: CCBWQA
Phone (646)931-3860 Mtg ID: 874 2577 5963# Passcode: 815374**

TAC Meeting Documents can be found online at the link below.

<https://drive.google.com/drive/folders/12BoEhmFbnnMCxivnpjY2l7T5TzP8Azlq?usp=sharing>

1. Call to Order (9:00)
2. Meeting Minutes from March 2, 2023 (enclosed)
3. Highlights from March 16, 2023 Board Meeting (Clary)
4. Action Items (9:10) (20 minutes)
 - a. Recommend Muller for Alternatives Analysis/Selection of Preferred Alternative and Preparation and Authorization of the Corresponding Agreement (Borchardt, enclosed)*
 - b. Recommend Authorization of Happy Canyon Creek at Jordan Rd. IGA Amendment - MHFD IGA Amendment 21-05.24B (Borchardt, enclosed)
 - c. Recommend Acceptance of 2022 Wetland Harvesting Update and Authorization of the Pilot Project for 2023 (Borchardt and Stewart, enclosed)
5. Discussion Items (9:30) (25 minutes)
 - a. TAC Subcommittees (Clary, enclosed)
 - i. Watershed Plan Update
 - ii. Modeling - Reservoir and Watershed
 - b. Cherry and Piney Creeks Workshop Follow-Up (Borchardt)
 - i. Project Overview and Outreach Handout (enclosed)
 - ii. Discuss Workshop Notes, Follow-Up, and Multi-Pronged Approach
 - c. Cherry Creek Watershed Conference (Davenhill)
 - i. August 24th at the Parker Arts, Culture & Events Center
 - d. Lake Nutrients Criteria RMH (DiToro, enclosed)
6. Presentations
7. Updates (9:55 am)
 - a. Cherry Creek Stewardship Partners (Davenhill)
 - b. TAC Members
 - c. TAC Subcommittees
 - d. Contractors
 - i. [Water Quality Update](#) (Stewart, enclosed)
 - ii. Pollution Abatement Projects - CIP Status Report (Borchardt, enclosed)
 - iii. In-Park PRF and RDS Maintenance and Operations Report (Goncalves)
 - iv. Regulatory (DiToro)
 1. CR72 Informational Hearing
 - v. [Land Use Referral Tracking](#) (Endyk)
 - e. Manager
 - i. Reg 72 Water Quality Control Division Memo to Water Quality Control Commission (Clary, enclosed)
 - f. Other

¹ If you are unable to participate on the CCBWQA's Zoom platform, please email val.endyk@ccbwwqa.org

8. Upcoming Events
 - a. Watershed Plan Process Workshop - September 21, 2023 - 8:30-11:30 am
9. Adjournment (*11:00*)



**Cherry Creek Basin Water Quality Authority
Minutes of the Technical Advisory Committee Meeting
Thursday, March 2, 2023, 9:00 a.m.**

TAC Members Present

Alex Mestdagh, Town of Parker
Ann Woods, City of Greenwood Village
Ashley Byerley, SEMSWA
Caitlin Gappa, Douglas County Health Department
Casey Davenhill, Board Appointee, Cherry Creek Stewardship Partners
David Van Dellen, Town of Castle Rock
Jacob James, City of Lone Tree
James Linden, SEMSWA - Alternate (zoom)
Jessica La Pierre, City of Aurora (zoom)
Jim Watt, Board Appointee, Mile High Flood District
Joseph Marencik, City of Castle Pines (zoom)
Jon Erickson, TAC Chair, Board Appointee, Colorado Parks and Wildlife
Joshua Giovannetti, CDOT - Alternate (zoom)
Lisa Knerr, TAC Vice Chair, Arapahoe County
Marty Easter, Arapahoe County Public Health - Alternate
Rebecca Tejada, Board Appointee, Special Districts, Parker Water and Sanitation District
Rick Goncalves, Board Appointee
Ryan Adrian, Douglas County
Steve Chevaliere, Arapahoe County Public Health
Wanda DeVargas, Board Appointee, E-470

Board Members Present

Bill Ruzzo, Assistant Secretary, Governor's Appointee
Tom Downing, Governor's Appointee (zoom)

Others Present

Alan Leak, RESPEC (zoom)
Erin Stewart, LRE Water
Jane Clary, Wright Water Engineers, CCBWQA Technical Manager
Jessica DiToro, LRE Water (zoom)
Larry Butterfield, CPW (zoom)
Laura Kindt, Castle Rock Water
Michael Grabczyk, Town of Parker (zoom)
Richard Borchardt, R2R Engineers
Val Endyk, CCBWQA

1. Call to Order

Jon Erickson called the meeting to order at 9:00 am.

2. Meeting Minutes from February 2, 2023

Lisa Knerr moved to approve the February 2, 2023 meeting minutes. Seconded by Rick Goncalves. The motion carried.

3. Highlights from January 19, 2023 Board Meeting

Correction to agenda: Highlights from February 16, 2023 Board Meeting

Jane Clary provided an update on actions taken at the February 16, 2023 Board meeting. Minutes from the meeting can be found [here](#). The new [Board binder](#) was presented at the New Member Orientation after the Board meeting. Feedback on future orientations is welcome.

Jon Erickson recognized Ann Woods for her time serving on the TAC.

4. Action Items

a. Recommend Authorization of Cherry Creek at Dransfeldt IGA Amendment - MHFD IGA Amendment 21-05.04B (including a request for additional funding)

Rich Borchardt provided an overview of his [Action Item Memo](#) regarding Cherry Creek Stream Improvements at Dransfeldt Road. Project details and tables summarizing project expenditure options can be found in the AIM linked above.

The TAC was asked to review and discuss:

- [Parker's memo](#) requesting additional funding from CCBWQA.
- [An Amendment to the Intergovernmental Agreement](#) that brings in additional funding.

The TAC was presented with the following options to consider for additional funding:

- \$170,000 from CCBWQA, which includes the current Authority budget plus a Special Funds Transfer from unspent completed MHFD-led partner projects of about \$37,000 of CCBWQA's funds, or
- \$570,000 from CCBWQA, which includes the current budget of \$170,000 and the additional \$400,000 requested from Parker (Attachment 2) plus a Special Funds Transfer from unspent completed MHFD-led partner projects of about \$37,000 of CCBWQA's funds, or
- Another level as determined by TAC.

Rich explained that CCBWQA's additional funding of \$170,000 is included in the 2023 approved budget for Cherry Creek at Dransfeldt. The Authority's 2023 CIP budget also includes \$2,111,000 for East Shade Shelters, Cherry Creek at Arapahoe (R 3-4), and McMurdo Gulch projects. It is likely that these projects will be delayed past 2023 due to partner funding constraints and/or revised schedules; therefore, these budgets could be reallocated to cover additional Authority funding for Cherry Creek at Dransfeldt through reallocation of funds without a 2023 CIP budget increase.

Discussion included:

- Parker thanked the CCBWQA for the consideration for additional funding and provided an opportunity for the TAC to ask questions.
- Mile High Flood District explained that there will be an additional shortfall for project completion that will take place after 2023 and noted that Parker and MHFD will contribute additional funds in 2024 to cover that shortfall.

Ashley Byerley moved to recommend that the Board authorize CCBWQA to execute the IGA Amendment and an expenditure of \$570,000 from CCBWQA 2023 CIP and authorize MHFD to make a Special Funds Transfer of \$37,000 in CCBWQA unused funds from the completed projects of Cherry Creek at Norton Farms and Cherry Creek at Hess Road. Seconded by Jacob James. Alex Mestdagh abstained. The motion carried.

b. Recommend Approval of the 2022 Water Quality Monitoring Report

Erin Stewart presented the [WY 2022 Water Quality Monitoring Report](#) and thanked the TAC for the helpful feedback and comments during the review process.

Discussion included:

- Improvements on future review process including time during a TAC meeting for discussion after a review of the draft report is provided to the TAC.
- Providing a “provisional” report knowing the data could change.
- Using findings to inform CCBWQA actions and activities.

Rebecca Tejada moved to recommend that the Board approve the 2022 Water Quality Monitoring Report. Seconded by Rick Goncalvez. Lisa Knerr abstained. The motion carried.

5. Discussion Items

Jon Erickson moved Discussion Item e on the distributed agenda to Discussion Item a.

a. Pollution Abatement Project/Capital Improvement Program Budget and Schedule

Discussion occurred after agenda item 4a.

Rich Borchardt provided a [memo](#) informing the TAC that the Authority’s 2023 CIP budget includes \$2,111,000 for East Shade Shelters, Cherry Creek at Arapahoe (R 3-4), and McMurdo Gulch projects. It is likely that these projects will be delayed past 2023 due to partner funding constraints and/or revised schedules.

Rich noted that many other projects are experiencing similar challenges so going through this exercise is valuable. The process also highlighted that new projects are expensive and especially when evaluating projects from 15 years ago. If too many projects are delayed due to cost increases, what are the impacts to the Authority in terms of 60-40 expenditures? Jane noted that it will be valuable to read the memo that Rich provided and that the March 16th workshop may also outline additional project opportunities on Cherry Creek in the state park.

b. Committee Formation and Participation

Jon Erickson and Jane Clary requested that the TAC review the [Board Binder Committee Summary](#) for background information on committees.

c. New Subcommittees

i. Watershed Plan Update

ii. Modeling - Reservoir and Watershed

Jane Clary provided a [memo](#) to the TAC requesting the formation of two subcommittees to work with staff for the following purposes:

- Identify next steps for both watershed and reservoir models.
- Provide direction and input on a watershed plan update.

These subcommittees will be known as the Modeling Subcommittee and the Watershed Plan Subcommittee. Additionally, Board member participation on these subcommittees is requested. Two to four meetings of each subcommittee are envisioned for 2023. The meetings may be held virtually, in-person or hybrid, depending on the preference of the subcommittee members. Staff participation and support of these committees is covered under the approved 2023 budget.

An email for signing up to participate in the Modeling Subcommittee and the Watershed Plan Subcommittee will be sent following the meeting.

David VanDellen moved to form a Modeling Subcommittee and a Watershed Plan Subcommittee and requested participation of two or more Board members on each Subcommittee along with all interested TAC Members. Seconded by Ashley Byerley. The motion carried.

d. Lake Nutrients Criteria RMH

Jessica DiToro provided a [memo](#) detailing the updates regarding the Lake Nutrients Criteria RMH scheduled for April 10th and a summary of the rebuttals that referenced the CCBWQA.

e. Combined Southwest Tributaries Master Plan Report with SEMSWA

Jane Clary recommended that one report be prepared for the Southwest Tributaries Master Plan that combines the area upstream and in the state park. MHFD and SEMSWA support the approach of a combined report for continuity and efficiency of report production. TAC agrees with the manager's suggestion to combine the reports. This doesn't change the scope of work.

f. [2022 Annual Report on Activities](#) (Reminder comments due 3/3)

Jane Clary reminded the TAC that comments for the 2022 Annual Report are due March 3, 2023.

Jane noted that CPW was inadvertently not listed as a partner, and this has been updated in the Annual Report, with apologies from LRE and Jane for not catching this.

6. Presentations

7. Updates

a. Cherry Creek Stewardship Partners (Davenhill)

Casey provided an update on the Science Fair.

This year's Spring Equinox Walk will be on March 18th. Details can be found on the [website](#).

Planning is underway for the 2023 Watershed Conference with a focus on the upper watershed. Casey is working on collaboration with local watersheds including Bear Creek (nutrient remediation), Chatfield, Dillon, and Barr Milton.

b. TAC Members

c. TAC Subcommittees

d. Contractors

i. [Water Quality Update](#) (Stewart)

ii. Pollution Abatement Projects (Borchardt/Goncalves)

a. [CIP Status Report](#)

b. Maintenance and Operations Status Report

iii. Regulatory (DiToro)

iv. [Land Use Referral Tracking](#) (Endyk)

e. Manager

f. Other

Working on Lone Tree Creek, Peoria Pond.

8. Upcoming Events

a. Cherry Creek in CCSP Muller Report and BMP Effectiveness Workshop - March 16, 2023 8:30-11:30 am

b. Watershed Plan Process - September 21, 2023 - 8:30-11:30 am

9. Adjournment

Jon Erickson adjourned the meeting at 10:59 am.

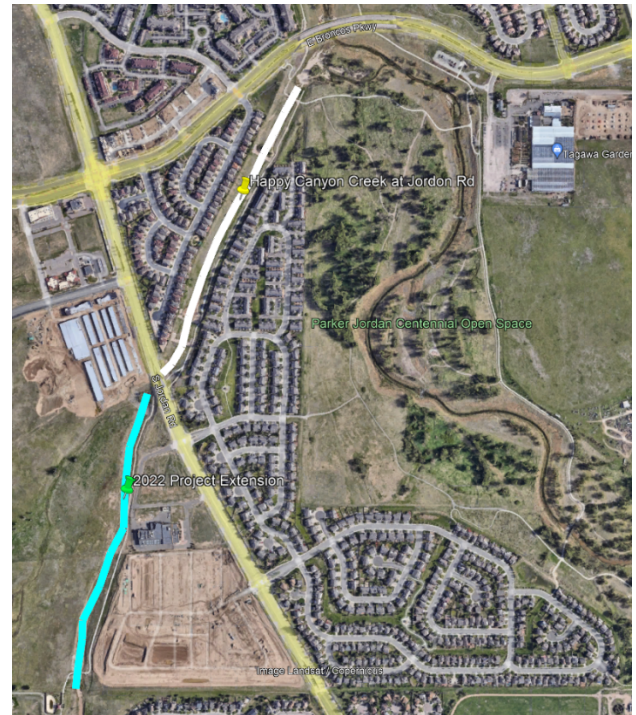


ACTION ITEM MEMORANDUM

To: CCBWQA Technical Advisory Committee (TAC)
From: Richard Borchardt, Pollution Abatement Project Manager
Date: April 6, 2023
Subject: Happy Canyon Creek Stream Reclamation at Jordan – IGA Amendment

Request: Recommend that the Board authorize the execution of the Amendment to the Intergovernmental Agreement (IGA Amendment) for stream improvements on Happy Canyon Creek at Jordan Road (Project), pending satisfactory resolution of CCBWQA’s comments, and an expenditure of \$88,000.

Project: The Project is on Happy Canyon Creek near Jordan Road. Happy Canyon Creek is a tributary to Cherry Creek. The Project sponsors are CCBWQA, the Southeast Metro Stormwater Authority (SEMSWA), and the Mile High Flood District (MHFD) which is the project lead. Jacobs is the design consultant. The proposed stream improvements benefit the water quality in Happy Canyon Creek and the Cherry Creek Reservoir by reducing bed and bank erosion and immobilizing Phosphorus in the adjacent soils. It is estimated that this 0.85 mile long-project will immobilize 77 pounds of phosphorus annually. This IGA Amendment includes additional funding of \$580,000 (\$290,000 MHFD; \$202,000 SEMSWA; and \$88,000 CCBWQA). The IGA Amendment is attached and includes comments from CCBWQA’s legal counsel. The total project is currently estimated at \$1,323,000 in this IGA Amendment, additional amendments will be needed to bring future funding as the partners’ capital improvement programs currently include funding through 2026 when construction is anticipated.



Budget: CCBWQA’s 2023 Budget includes \$88,000 for the Project.

Motion: I move to recommend that the Board authorize CCBWQA execute the IGA Amendment for stream improvements on Happy Canyon Creek at Jordan Road, pending satisfactory resolution of CCBWQA’s comments, and an expenditure of \$88,000.



Photo of Happy Canyon Creek downstream of Jordan Road (Courtesy of Molly Trujillo)



Photo of Happy Canyon Creek downstream of Jordan Road (Courtesy of Molly Trujillo)



Photo of Happy Canyon Creek upstream of Jordan Road



Photo of Happy Canyon Creek upstream of Jordan Road

SECOND AMENDMENT TO
AGREEMENT REGARDING
DESIGN AND
CONSTRUCTION
OF DRAINAGE AND FLOOD CONTROL IMPROVEMENTS FOR
HAPPY CANYON CREEK FROM JORDAN ROAD TO BRONCOS PARKWAY

Agreement No. 21-05.24B
Project No. 108514

THIS SECOND AMENDMENT TO AGREEMENT (hereinafter called "SECOND AMENDMENT"), by and between URBAN DRAINAGE AND FLOOD CONTROL DISTRICT D/B/A MILE HIGH FLOOD DISTRICT (hereinafter called "DISTRICT") and SOUTHEAST METRO STORMWATER AUTHORITY (hereinafter called "SEMSWA") and CHERRY CREEK BASIN WATER QUALITY AUTHORITY (hereinafter called "CCBWQA") and collectively known as "PARTIES";

WITNESSETH:

WHEREAS, PARTIES have entered into "Agreement Regarding Design and Construction of Drainage and Flood Control Improvements for Happy Canyon Creek from Jordan Road to Broncos Parkway" (Agreement No. 21-05.24) dated June 30, 2021, (hereinafter called "AGREEMENT"); and

WHEREAS, PARTIES now desire to proceed with design and construction of drainage and flood control improvements for Happy Canyon Creek from Jordan Road to Broncos Parkway (hereinafter called "PROJECT"); and

WHEREAS, PARTIES desire to increase the level of funding by \$580,000; and

WHEREAS, DISTRICT's Board of Directors has authorized additional DISTRICT financial participation for PROJECT (Resolution No. , Series of 2023); and

WHEREAS, the PARTIES Boards of Directors, have authorized, by appropriation or resolution, all of PROJECT costs of the respective PARTIES.

NOW, THEREFORE, in consideration of the mutual promises contained herein, PARTIES hereto agree as follows:

1. Paragraph 4. PROJECT COSTS AND ALLOCATION OF COSTS is deleted and replaced as follows:

4. PROJECT COSTS AND ALLOCATION OF COSTS

A. PARTIES agree that for the purposes of this AGREEMENT, PROJECT costs shall consist of and be limited to the following:

1. Final design services;
2. Construction of improvements;
3. Contingencies mutually agreeable to PARTIES.

B. It is understood that PROJECT costs as defined above are not to exceed \$1,323,000 without amendment to this AGREEMENT.

PROJECT costs for the various elements of the effort are estimated as follows:

<u>ITEM</u>	<u>AS AMENDED</u>		<u>PREVIOUSLY AMENDED</u>
1. Final Design	\$	700,000	\$ 500,000
2. Construction *	\$	623,000	\$ 243,000
3. Contingency	\$	-0-	-0-
Grand Total	\$	1,323,000	\$ 743,000

* It is anticipated that funds for construction shall be added to this Agreement at a future date.

This breakdown of costs is for estimating purposes only. Costs may vary between the various elements of the effort without amendment to this Agreement provided the total expenditures do not exceed the maximum contribution by all PARTIES plus accrued interest, if applicable.

	<u>Percentage Share</u>	<u>Previously Contributed</u>	<u>Additional Contribution</u>	<u>Maximum Contribution</u>
DISTRICT	48%	\$350,000	\$290,000	\$640,000
SEMSWA	38%	\$300,000	\$202,000	\$502,000
CCBWQA	14%	\$93,000	\$88,000	\$181,000
TOTAL	100.00%	\$743,000	\$580,000	\$1,323,000

C. Based on total PROJECT costs, the maximum percent and dollar contribution by each party shall be:

D. DISTRICT and SEMSWA acknowledge that (i) CCBWQA does not by this Agreement irrevocably pledge present cash reserves for payments in future fiscal years, and (ii) It is understood and agreed that notwithstanding any other provision contained herein to the contrary, any additional contribution obligation of CCBWQA hereunder, whether direct or contingent, shall extend only to funds duly and lawfully appropriated and encumbered by the Board of Directors of CCBWQA for the purposes of the Agreement, and paid into the Treasury of CCBWQA, and shall under no circumstances exceed \$181,000 without CCBWQA's prior express written consent.

2. Paragraph 5. MANAGEMENT OF FINANCES is deleted and replaced as follows:

5. MANAGEMENT OF FINANCES

As set forth in DISTRICT policy (Resolution No. 11, Series of 1973, Resolution No. 49, Series of 1977, and Resolution No. 37, Series of 2009), the funding of a local body's share may come from its own revenue sources or from funds received from state, federal or other sources of funding without limitation and without prior DISTRICT approval.

Payment of each PARTY's full share (SEMSWA - \$502,000; CCBWQA - \$181,000; DISTRICT - \$640,000) shall be made to DISTRICT subsequent to execution of this

AGREEMENT and within 30 days of request for payment by DISTRICT. The payments by PARTIES shall be held by DISTRICT in a special fund to pay for increments of PROJECT as authorized by PARTIES, and as defined herein. DISTRICT shall provide a periodic accounting of PROJECT funds as well as a periodic notification to SEMSWA and CCBWQA and COUNTY of any unpaid obligations. Any interest earned by the monies contributed by PARTIES shall be accrued to the special fund established by DISTRICT for PROJECT and such interest shall be used only for PROJECT upon approval by the contracting officers (Paragraph 13).

Within one year of completion of PROJECT if there are monies including interest earned remaining which are not committed, obligated, or disbursed, each party shall receive a share of such monies, which shares shall be computed as were the original shares; or at SEMSWA or CCBWQA or COUNTY request, SEMSWA or CCBWQA or COUNTY share of remaining monies shall be transferred to another special fund held by DISTRICT.

3. All other terms and conditions of this AGREEMENT shall remain in full force and effect.

WHEREFORE, PARTIES hereto have caused this SECOND AMENDMENT to be executed by properly authorized signatories as of the date and year written below.

URBAN DRAINAGE AND FLOOD
CONTROL DISTRICT
D/B/A
MILE HIGH FLOOD DISTRICT

By _____

Name Laura A. Kroeger

Checked By

Title Executive Director

Date _____

SOUTHEAST METRO STORMWATER
AUTHORITY

By _____

Name _____

Title _____

Date _____

CCBWQA Checked by

CHERRY
CREEK BASIN
WATER
QUALITY
AUTHORITY

By _____

Name _____

Title CCBWQA Chairman

Date

Attest: John McCarty, CCBWQA
Secretary

APPROVED AS TO FORM:

Timothy J. Flynn, General Counsel for
CCBWQA



ACTION ITEM MEMORANDUM

To: CCBWQA Technical Advisory Committee (TAC)
From: Richard Borchardt, Pollution Abatement Project Manager and Erin Stewart, LRE Water
Date: April 6, 2023
Subject: Wetland/Cattail Harvesting Pilot Project

Request: TAC recommends that the Board accept the 2022 Wetland/Cattail Harvesting Pilot Project Update (2022 WHPP Update) and authorize Wetland/Cattail Harvesting Pilot Project continue in 2023, an expenditure of not to exceed \$90,000, the direct selection of L&M Enterprises to perform the harvesting, and that the recommendations for the 2023 harvest be implemented.

Project / Issue: CCBWQA has identified phosphorus and nitrogen as two key nutrients that affect the water quality in Cherry Creek Reservoir. In March 2021, CCBWQA authorized a pilot project for Wetland/Cattail Harvesting based on the Cattail Harvesting Pilot Project Memo (CHPPM).

In 2021 and 2022, CCBWQA harvested 6.25 acres of wetlands/cattails removing an estimated 2050 pounds of nitrogen and 270 pounds of phosphorus from the Cottonwood Creek system at a cost of \$172,500. The pilot project to date has an average water quality benefit unit cost of \$640 per pound of phosphorus removed (PPR) which is lower than the estimated water quality benefit unit cost of \$1,000 PPR in the CHPPM. For additional information and details see the attached 2022 WHPP Update.

In 2022, CCBWQA changed the harvesting approach based on input from the TAC and Board which incorporated the lessons learned during the 2021 harvest. These changes included some minor

adjustments like starting coordination earlier to get the contractor's input and starting the harvest date a week earlier to minimize the cattails from moving nutrients out of above-ground biomass into their roots. The TAC and Board provided additional directions to work with the contractor to optimize the harvest area and biomass removed (see **Figure 1**),

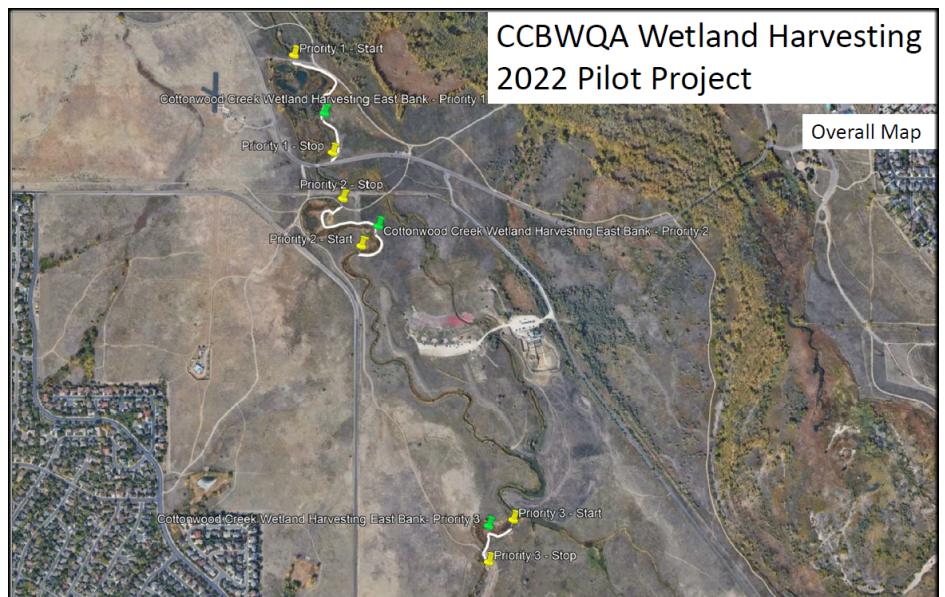


Figure 1 – Approach to Optimize of Harvest

1), to have the harvest areas independently measured by LRE Water, and to contract with L&M Enterprises to do the harvest.

The 2022 WHPP Update includes lessons learned from the 2022 harvesting and recommendations for the 2023 harvest are included in **Table 1**.

Table 1. Lessons Learned and Recommendations

Lessons learned from 2022	Recommendations for 2023
Phragmites are present in the Cottonwood Creek wetlands.	Continue monitoring of noxious weeds and coordination with Colorado Parks and Wildlife.
Aquatic vegetation (coontail) clogged the outlet structure grate.	Cleaning of the outlet structure grate and opening of the outlet gate at Peoria Pond may be required if elevated water levels impact harvesting operations.
The revised harvesting approach had better results based on removing a higher amount of biomass and increasing the mass of nutrients removed.	Continue this approach going forward.
LRE Water’s independent measurement of the harvest areas included a mapping layer which allows for comparison of the remaining harvests in the pilot project.	Continue to have LRE Water independently measure the harvest areas and provide a mapping layer.
When the right bank (looking downstream) is harvested, the impacts on the native grasses and compaction of topsoil were notable, see Appendix H . Decompaction and reseeded of this area are included in the 2023 CCBWQA maintenance budget.	Evaluate ways to mitigate impacts of harvesting on native vegetation and topsoil compaction. Consider having the contractor use a clockwise traffic pattern that uses Lake View Drive, then over the dam embankment, and then over concrete path to minimize the impacts of loaded trucks and trailers on the native grasses and topsoil on the dam embankment. If there are continued impacts to native grasses and topsoil, then it may be worth looking at an improved surface for the access route.
There is limited access off the main trail system for the right bank (looking downstream). Increased traffic conflicts led to vehicles departing from mowed routes.	Consider additional mowed access points and coordinate/evaluate with Colorado Parks and Wildlife.

Multiple factors may affect the fraction of the nutrient load that would have reached the Reservoir in the absence of wetland harvesting. CCBWQA will continue to review water quality over the course of the pilot project to evaluate if estimates of the nutrient load reduction achieved as a result of the harvesting project can be calculated.

L&M has successfully completed the harvesting for 2 years and was critical to the optimization effort in 2022, so it is recommended that CCBWQA continue their partnership for 2023. For 2023, LRE Water will be managing the wetlands harvesting.

Budget: CCBWQA’s 2023 budget includes \$90,000 for the pilot project.

Motion: **TAC recommends that the Board accept the 2022 Wetland/Cattail Harvesting Pilot Project Update and authorize Wetland/Cattail Harvesting Pilot Project continue in 2023, an expenditure of not to exceed \$90,000, the direct selection of L&M Enterprises to perform the harvesting, and that the recommendations for the 2023 harvest be implemented.**



RIFFLES TO RIPPLES

MEMORANDUM

DATE: March 30, 2023

TO: Jane Clary, Wright Water Engineers – CCBWQA Technical Manager
Jon Erickson, CCBWQA TAC Chairman

FROM: Richard G. Borchardt, R2R Engineers – CCBWQA Pollution Abatement Project Manager and Erin Stewart, LRE Water

SUBJECT: 2022 Wetland/Cattail Harvesting Pilot Project Update

Introduction:

The Cherry Creek Basin Water Quality Authority’s (CCBWQA) mission and vision include improving water quality and protecting the beneficial uses in Cherry Creek Reservoir (Reservoir). CCBWQA is working in the Cherry Creek Watershed to reduce nutrients (such as phosphorus) through Pollution Abatement Projects (PAPs). In March 2021, CCBWQA authorized a pilot project for Wetland/Cattail Harvesting based on the Cattail Harvesting Pilot Project Memo (CHPPM, included in **Appendix A**) through review and action taken by the Technical Advisory Committee (TAC) and Board of Directors (Board).

The CHPPM proposed harvesting about 2.1 acres of cattails annually at an estimated cost of \$60,000 per year for a 6-year period, removing an estimated 60 pounds of phosphorus from the Cottonwood Creek system per year. The water quality benefit unit cost was estimated at \$1000 per pound of phosphorus removed. The pilot project proposed alternating sides of the stream to be harvested annually, left bank (facing downstream) in odd years and right bank (facing downstream) in even years. This approach allows for one side of the creek to remain undisturbed for wildlife habitat, minimizes the visual impact of harvesting, while improving visibility to the creek during regrowth (an observation/concern noted from birding community). During harvesting, the plant material is cut about 6 inches above the ground or near the water level, which leaves the root structure in place for regrowth and stream stability.

Ideally, harvesting should be completed in the Fall (September/October) after cattails have absorbed nutrients during the growing season, carbohydrate storage in the root structures (for overwintering) is limited, and the plants are still standing up to facilitate cutting. The pilot project includes annual updates, intermediate milestones (about 2-year intervals), and a final report after 6 years which allows for a review of effectiveness/costs/efficacy, optimization (i.e. maximizing nutrient removal while efficiently using resources allocated for harvesting), and if needed intervention/redirection/stopping the pilot project.

2022 Wetland/Cattail Harvesting Data:

In 2022, the pilot project harvested the cattails on the right bank (facing downstream) on Cottonwood Creek, as recommended in CHPPM. CCBWQA changed the harvesting approach based on input from the TAC and Board which incorporated the lessons learned during the 2021 harvest. These changes included some minor adjustments like starting

R2R Engineers Memorandum

coordination earlier to get the contractor's input and starting the harvest date a week earlier to minimize the cattails from moving nutrients out of above-ground biomass into their roots. On May 19, 2022, the CCBWQA Board provided direction to continue the pilot project, contract on a not to exceed basis with L&M Enterprises for \$90,000, to work with the contractor to optimize the harvest area and biomass removed, and to have the harvest areas independently measured by LRE Water.

This revised approach resulted in providing start and stop points (instead of providing areas for harvest) for the north, middle, and south harvest reaches; then, discussions would be held with L&M to optimize their harvest through setting the goal to maximize harvest area and plant material removed for \$90,000. To facilitate this discussion, a pre-proposal meeting was held with L&M on July 19, 2022, which helped inform the priority of the reaches, access routes, and their initial plan to work each reach. This not-to-exceed approach and the contractor coordination were incorporated into the 2022 Wetland/Cattail Harvesting Maps included in **Appendix B**.

CCBWQA worked with Colorado Parks and Wildlife on a public notice and posted the work area before the project began, see **Appendix C2** for further information. LRE Water collected samples of wetland plants from each of the harvest areas which were sent to the lab for analysis of nutrient concentrations. L&M recorded a total weight of 284,020 pounds or 142 tons of material removed and disposed of, see **Appendix D2** for more information. LRE Water measured the harvest area to be 3.79 Acres. Based on the nutrient levels found in the samples, LRE Water estimated that approximately 1,451 -1,527 pounds (mean of 1489 pounds) of total nitrogen and approximately 194-207 pounds (mean of 201 pounds) of total phosphorus were removed from the system through the 2022 cattail harvesting efforts, see **Appendix E2** for more information. Photos of the work are included in **Appendix F2**.

2021 Wetland/Cattail Harvesting Data:

In 2021, CCBWQA planned on harvesting 2.11 acres of wetlands/cattails on the left bank (facing downstream) on Cottonwood Creek, as recommended in the CHPPM. CCBWQA contracted with L&M Enterprises at a cost of \$82,486.53. The Board was updated at their meeting on December 16, 2021, that the actual cost exceeded the estimated cost of \$60,000 (which was based on similar projects done by SEMSWA) due to the extra work (longer route into Cherry Creek State Park, robustness of wetlands/cattails on Cottonwood Creek, and landfill disposal fees) required for the project. CCBWQA worked with Colorado Parks and Wildlife on a public notice and posted the work area before the project began, see **Appendix C1** for further information. Solitude Lake Management collected samples of wetland plants from the/cattail areas planned to be harvested which were sent to a lab for analysis of nutrient concentrations. Upon completion of the work, L&M measured the actual harvest area at 106,976 square feet or 2.46 acres, and a total weight of 105,330 pounds or 52.67 tons was recorded, see **Appendix D1** for more information. Based on the nutrient levels found in the samples, LRE Water estimated that approximately 561 pounds of total nitrogen and approximately 69 pounds of total phosphorus were removed from the system through the 2021 Wetland/Cattail Harvesting effort, see **Appendix E1** for more information. Photos of the work are included in **Appendix F1**.

Summary of Wetland/Cattail Harvesting Pilot Project

The CHPPM proposed a 6-year period (estimated time for 6 harvests) that includes evaluation and optimization through:

- Annual evaluation of the pilot project through sampling and testing of harvest areas to determine nutrient levels, estimation of nutrients removed with harvest, and determination and evaluation of unit cost for pound of phosphorus removed with harvest; and,
- Intermediate milestones (approximately every 2 years) to evaluate if there are correlation in reductions of nutrient concentrations in the stream based on the cattail harvesting efforts; and,
- Evaluation of harvesting around the Perimeter Pond to see whether additional areas are feasible to harvest; and,
- Optimization through comparison of total biomass weights and estimated nutrients removed per harvest will be compared to evaluate the 2-year regrowth period.

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Table 1 summarizes the estimated and actual results of cattail harvesting by year and as outlined in the CHPPM and summarizes the annual updates of the Pilot Project. Additional years can be added as available.

Table 1. Wetland Harvesting Project Summary

Year	Estimated in wetland/cattail harvesting					Actual wetland/cattail harvesting results				
	Area (Acres)	N (#)	P (#)	Cost (\$)	Cost (\$)/P #	Area (Acres)	N (#)	P (#)	Cost (\$)	Cost (\$)/P #
2021	2.11	409	59	\$ 59,800	\$ 1,000	2.46	561	69	\$ 82,500	\$ 1,200
2022	2.15	417	60	\$ 59,900	\$ 1,000	3.79	1489	201	\$ 90,000	\$ 450
2023	2.11	409	59	\$ 59,800	\$ 1,000					
2024	2.15	417	60	\$ 59,900	\$ 1,000					
2025	2.11	409	59	\$ 59,800	\$ 1,000					
2026	2.15	417	60	\$ 59,900	\$ 1,000					
Total =	12.78	2477	356	\$ 359,100	\$ 1,000	6.25	2050	270	\$ 172,500	\$ 640

Vegetation regrowth after harvest appears robust. Comparison photos from October 2021 (after 2021 harvest) to May 2022 are included in **Appendix G** show that the harvest areas are indistinguishable from the non-harvested areas. A similar comparison of regrowth will be made for the 2022 harvest and included in the 2023 Wetland/Cattail Harvesting Pilot Project update.

Initial evaluation of the water quality on Cottonwood Creek downstream of the harvesting activities, CT-2 water quality does not indicate significant changes in nutrient concentrations when comparing data from up to 5 years prior to the project. However, additional water quality monitoring data that includes the summer of 2023 will be included in the 2023 Wetland/Cattail Harvesting Pilot Project update for the 2-year milestone. However, it is likely that more than two years of data may be required to see any notable changes in nutrient concentrations. Phosphorus concentrations are already relatively low in Cottonwood Creek which may make it difficult to identify statistically significant changes.

The revised approach in 2022 had better results based on removing a higher amount of biomass and increasing the mass of nutrients removed. Accordingly, it is recommended that CCBWQA continue this process for the duration of the pilot project. CCBWQA’s budget includes \$90,000 annually for the wetland/cattail harvesting.

Lessons Learned and Recommendations:

Lessons learned from the 2022 harvesting and recommendations for 2023 are included in **Table 2**.

Table 2. Lessons Learned and Recommendations

Lessons learned from 2022	Recommendations for 2023
Phragmites are present in the Cottonwood Creek wetlands.	Continue monitoring of noxious weeds and coordination with Colorado Parks and Wildlife.
Aquatic vegetation (coontail) clogged the outlet structure grate.	Cleaning of the outlet structure grate and opening of the outlet gate at Peoria Pond may be required if elevated water levels impact harvesting operations.
The revised harvesting approach had better results based on removing a higher amount of biomass and increasing the mass of nutrients removed.	Continue this approach going forward.
LRE Water’s independent measurement of the harvest areas included a mapping layer which allows for comparison of the remaining harvests in the pilot project.	Continue to have LRE Water independently measure the harvest areas and provide a mapping layer.
When the right bank (looking downstream) is harvested, the impacts on the native grasses and compaction of topsoil were notable, see Appendix H . Decompaction and reseeded of this area are included in the 2023 CCBWQA maintenance budget.	Evaluate ways to mitigate impacts of harvesting on native vegetation and topsoil compaction. Consider having the contractor use a clockwise traffic pattern that uses Lake View Drive, then over the dam embankment, and then over concrete path to minimize the impacts of loaded trucks and trailers on the native grasses and topsoil on the dam embankment. If there are continued impacts to native grasses and topsoil, then it may be worth looking at an improved surface for the access route.
There is limited access off the main trail system for the right bank (looking downstream). Increased traffic conflicts led to vehicles departing from mowed routes.	Consider additional mowed access points and coordinate/evaluate with Colorado Parks and Wildlife.

Results:

During the last 2 years of the pilot project, 6.25 acres of wetlands/cattails have been harvested at a cost of \$172,500 removing an estimated 270 pounds of phosphorus from the Cottonwood Creek system at a water quality benefit unit cost of approximately \$640 per pound of phosphorus removed. The actual water quality benefit unit cost of \$640 is lower than the \$1,000 per pound of phosphorus removed that was estimated in the CHPPM. CCBWQA’s budget includes \$90,000 annually for the balance of the Pilot Project.

Multiple factors may affect the fraction of the nutrient load that would have reached the Reservoir in the absence of wetland harvesting. CCBWQA will continue to review water quality over the course of the pilot project to evaluate if estimates of the nutrient load reduction achieved as a result of the harvesting project can be calculated.

Appendix A – Cattail Harvesting Pilot Project Memo (CHPPM)



RIFFLES TO RIPPLES

MEMORANDUM

DATE: October 29, 2020

TO: Jacob James, P.E.; CCBWQA – TAC Chairman

CC: Chuck Reid, CCBWQA - Manager

FROM: Richard G. Borchardt PE, CFM

SUBJECT: Cattail Harvesting Pilot Project

Introduction:

The Cherry Creek Basin Water Quality Authority (CCBWQA) mission and vision include improving water quality and protecting the beneficial uses in Cherry Creek Reservoir (Reservoir). CCBWQA is working in the Cherry Creek Watershed to reduce nutrients (such as Phosphorus) through Pollution Abatement Projects (PAPs). In 2017, Tetra Tech proposed that one way to reduce nutrients and maintenance of existing PAPs was to consider a wetland harvesting program. CCBWQA formed a sub-committee¹ to evaluate the feasibility and determine the potential water quality benefits of wetland harvesting. Through the sub-committee’s work, a Cattail Harvesting Pilot Project was developed for CCBWQA’s consideration.

Background:

The Southeast Metro Stormwater Authority (SEMSWA) is studying a cattail harvesting and the associated benefits. CCBWQA partnered with SEMSWA and utilized their study to help shape and inform this work. The direct removal of nutrients from the harvesting were estimated. **Table 1** shows the nutrient benefits obtained from the SEMSWA study. The green highlighted values represent the lowest nutrients levels over all samples.

Sample	Total Mass (g)	Bag Mass (g)	Cattail Dry Mass (g)	Cattail Dry Mass per meter (g/m)	% N	g N/m ²	% P	gP/m ²
Piney Jon Inlet	350.4	55.4	295	2950	0.0409	120.7081	0.00749	22.09462
Piney Jon Outlet	390	59.7	330.3	3303	0.0205	67.61241	0.00266	8.772768
Cottonwood @ Peoria Inlet	214.8	54.5	160.3	1603	0.0136	21.738283	0.00199	3.193978
Cottonwood @ Peoria Outlet	259	53	206	2060	0.016	32.8982	0.00162	3.3269
Trib C Inlet	327.2	47.3	279.9	2799	0.0115	32.322852	0.00112	3.124244
Trib C Outlet	374.2	45.3	328.9	3289	0.0101	33.12023	0.00102	3.364647

Table 1 – Sample Results from SEMSWA Study

¹ Sub-committee members are Rick Goncalves – TAC Vice-Chairman; Bill Ruzzo- Board Member; Jon Erickson, Jason Trujillo, Lanae Raymond/ Ashley Byerley, and Casey Davenport – TAC Members; Dan Olsen – SEMSWA; Chuck Reid – Manager; Erin Stewart and Chris Holdren – Solitude; Carolyn Nobel – LRE, Rich Borchardt – R2R Engineers; Andy Herb – AlpineEco; and Jeremy Sueltenfuss – CSU Associate Professor.

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The SEMSWA data was compiled by site (see **Table 2**) and the yellow highlight shows the mean average nutrient values.

Site	Area (sq m)	AVG g N/m	AVG g P/m	TOTAL Site N (g)	TOTAL Site N (kg)	TOTAL Site P (g)	TOTAL Site P (kg)
Piney Jon	975	94.1603	15.4336915	91806	91.8	15048	15.0
Cottonwood @ Peoria	6719	27.3182	3.26043875	183551	183.6	21907	21.9
Trib C	3543	32.7215	3.2444454	115932	115.9	11495	11.5
	g/m ²	51.4	7.31285855				

Table 2 – Sample Results from SEMSWA Study

The SEMSWA data was converted imperial units of (see **Table 3**). The orange highlighted values represent the anticipated average and lowest nutrient removal per acre.

Nutrient lab results from 2020 SEMSWA Study of above Ground Biomass

	N Mass per Area		P Mass per Area	
	Average	Low	Average	Low
g/m ²	51.4	21.7	7.3	3.1
#/sf	0.010527547	0.004444509	0.001495158	0.00063493

Examples

Area	N Mass #		P Mass #	
	Average	Low	Average	Low
100	1.05	0.44	0.15	0.06
43560	458.58	193.60	65.13	27.66

Table 3 – Conversion to Imperial Units

These values of nutrient removal appeared promising, so the committed decided to look into possible locations for harvesting. The sub-committee looked at several potential sites for studying and selected the Cottonwood Creek within Cherry Creek State Park (see **Figure 1**) for several reasons:

1. Previous PAPs created an effective treatment train,
2. The stream has healthy and thriving wetland and riparian corridor,
3. The stream is stable, and
4. Upstream and downstream monitoring sites (CT-P2 and CT-1) are in place and history of water quality data.

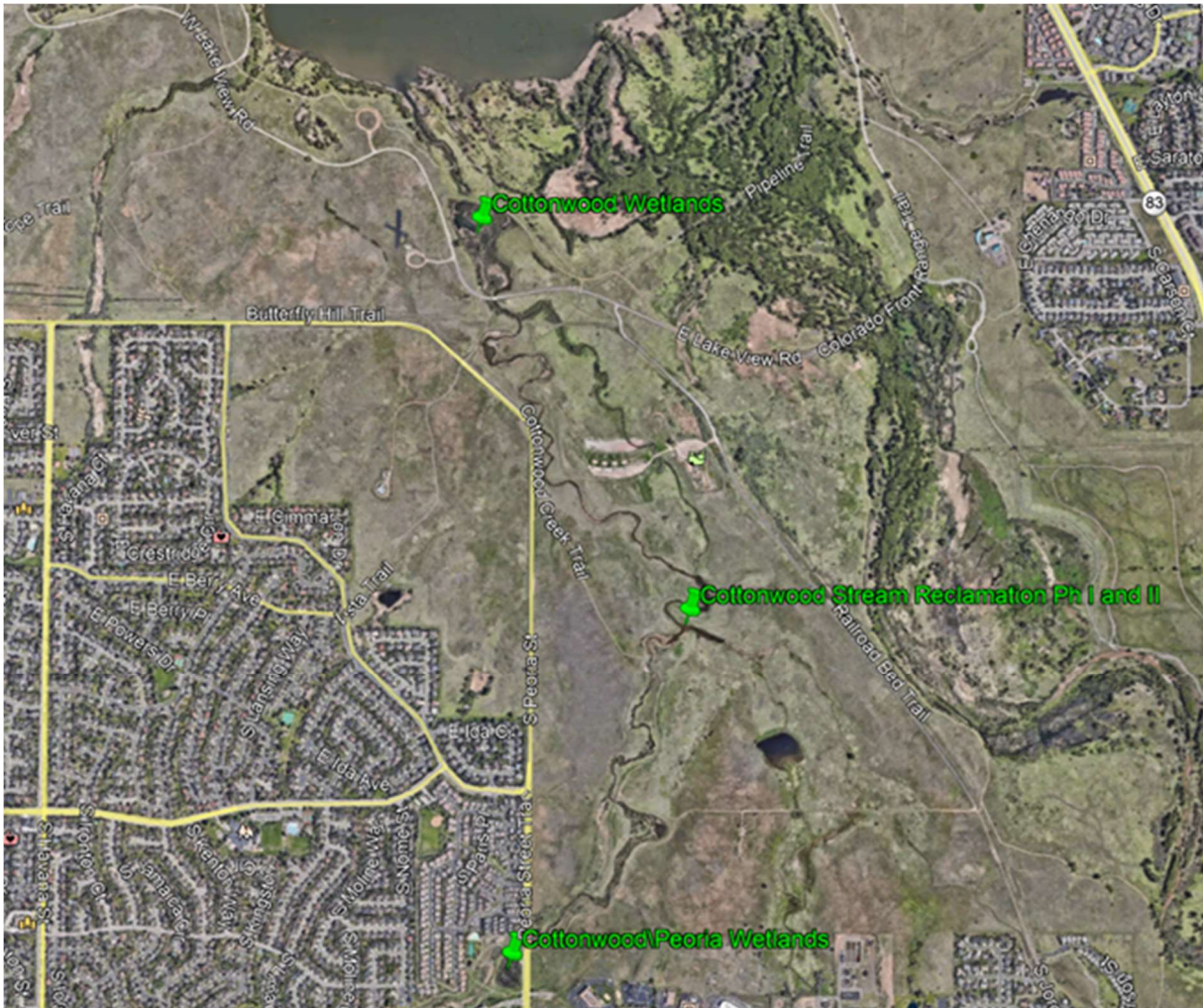


Figure 1 – Cottonwood Creek within Cherry Creek State Park (downstream of Cottonwood Peoria Wetlands Pond to Reservoir)

Harvesting is defined as cutting the above ground bio-mass of cattails at 6 inches above soil, gathering and removing cuttings, and hauling of cuttings to recycling/compost facility or disposing of them in a landfill.

Three scenarios were evaluated to determine feasibility and benefits of cattail harvesting.

1. 3 feet either side of stream (desktop analysis from Google Earth)
2. Full wetland and riparian corridor (desktop analysis from Google Earth)
3. Opportunistic areas of cattails that have large areas over short distances and easy access is available for contractor (determined by field visit)

Pilot Project:

The opportunistic scenario was selected based on the ability to get the biggest benefit at the smallest cost and that large-dense cattail communities with heights up to 8 feet tall could be targeted. Three harvest areas were identified in a field visit to identify large areas of cattails over short distances with access available. These areas are described and shown here.

1. Around the Perimeter Road Pond/Wetlands PRF



2. Upstream of the Cottonwood Trail Crossing (just south of the Lake View Drive)



3. At the confluence of Cottonwood Creek and Lone Tree Creek.



The pilot project harvests the left banks (facing downstream) in odd years and right banks (facing downstream) in even years. This allows for one side of the creek to remain for habitat, minimizes visual impact of harvesting, while improving visibility to the creek during regrowth (an observation/concern noted from birding community). Harvesting (as defined previously) leaves root structure in place to provide for regrowth and stream stability. Ideally the harvest would be done in Fall (late September/October) after cattails have absorbed as much nutrients as possible during the growing season and are still standing up to facilitate cutting. Harvest areas utilize existing trails where available or provide a 10' wide mowed path for truck/trailer access to minimize fire risk (hot vehicle parts in contact with dry grass) while performing this work. During the site visit, upland vegetation was 1 to 2 feet tall.

Harvest Benefits:

The harvesting benefits are the direct removal of nutrients from the system and any reduction of nutrients observed water samples.

The anticipated nutrient removal are estimated in the **Table 4a** for the Left Bank and **Table 4b** for Right Bank.

Reach	Area (SF)	N (#/sf)	p (#/ sf)	N # / Area	P #/ Area
Area 1 Left Mowed Access	18593	0.00445	0.000640	82.78	11.90
Area 2 Left Mowed Access	23285	0.00445	0.000640	103.67	14.90
Area 2 Left Existing Trail	19086	0.00445	0.000640	84.98	12.21
Area 3 Mowed Access	30930	0.00445	0.000640	137.71	19.79
	91894			409.14	58.80

2.11

Table 4a

Reach	Area (SF)	N (#/sf)	p (#/ sf)	N # / Area	P #/ Area
Area 1 Right Mowed Access	8693	0.00445	0.000640	38.70	5.56
Area 1 Right Existing Trail	7592	0.00445	0.000640	33.80	4.86
Area 2 Right Mowed Access	35842	0.00445	0.000640	159.58	22.94
Area 3 Right Mowed Access	41712	0.00445	0.000640	185.72	26.69
	93839			417.80	60.05

2.15

Table 4b

It is anticipated that it will take awhile for the nutrient removed from the system to be detectable in the nutrient concentration in the water quality sampling.

Harvest Costs:

Table 5 shows opinion of probable cost and estimated cost per pound of Phosphorus removed.

Left Bank

Item	Description	Quantity	Unit	Unit Cost	Item Cost
1	Wetland Harvesting off Mowed Access - Left Bank	1.67	Acres	\$ 20,000.00	\$ 33,428.83
2	Wetland Harvesting - Left Bank off of Existing Trail (longer hand transport)	0.44	Acres	\$ 25,000.00	\$ 10,953.86
3	Access Route Mowing - Left Bank	0.76	Acres	\$ 10,000.00	\$ 7,617.08

SubTotal = \$ 51,999.77

Contingency = \$ 7,799.97

Total = \$ 59,799.74

Cost per Pound

of P = \$ 1,016.96

Right Bank

Item	Description	Quantity	Unit	Unit Cost	Item Cost
1	Wetland Harvesting off Mowed Access - Right Bank	1.98	Acres	\$ 20,000.00	\$ 39,599.17
2	Wetland Harvesting - Right Bank off of Existing Trail (longer hand transport)	0.17	Acres	\$ 25,000.00	\$ 4,357.21
3	Access Route Mowing -Right Bank	0.81	Acres	\$ 10,000.00	\$ 8,112.95

SubTotal = \$ 52,069.33

Contingency = \$ 7,810.40

Total = \$ 59,879.73

Cost per Pound

of P = \$ 997.21

Table 5 – Cost Estimates of Pilot Project

Evaluation and Optimization of Pilot Project:

It is expected that the pilot project will be evaluated every year. The evaluation process will include sampling and testing of harvest areas to determine nutrient levels, estimation of nutrients removed with harvest, and determination and evaluation of unit cost for pound of Phosphorus removed with harvest.

At 2-year milestones, evaluation of the nutrient concentrations at the monitoring sites (for similar time periods before and after harvest) will be compared to see whether a reduction in nutrient concentrations in the stream can be

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detected. It is anticipated that it will take several years before significant reduction can be detected. A 6-year period for the pilot project is proposed to allow for decay and possible detection of a reduction.

Optimization of harvesting is included around the Perimeter Pond to see whether additional areas are feasible to harvest. The initial harvest areas around the pond were limited to widths that I could walk into with waterproof boots and not get stuck or fill the boots with water.

Optimization through comparison of total biomass weights and estimated nutrients removed per harvest will be compared to evaluate the 2-year regrowth period.

Conclusion:

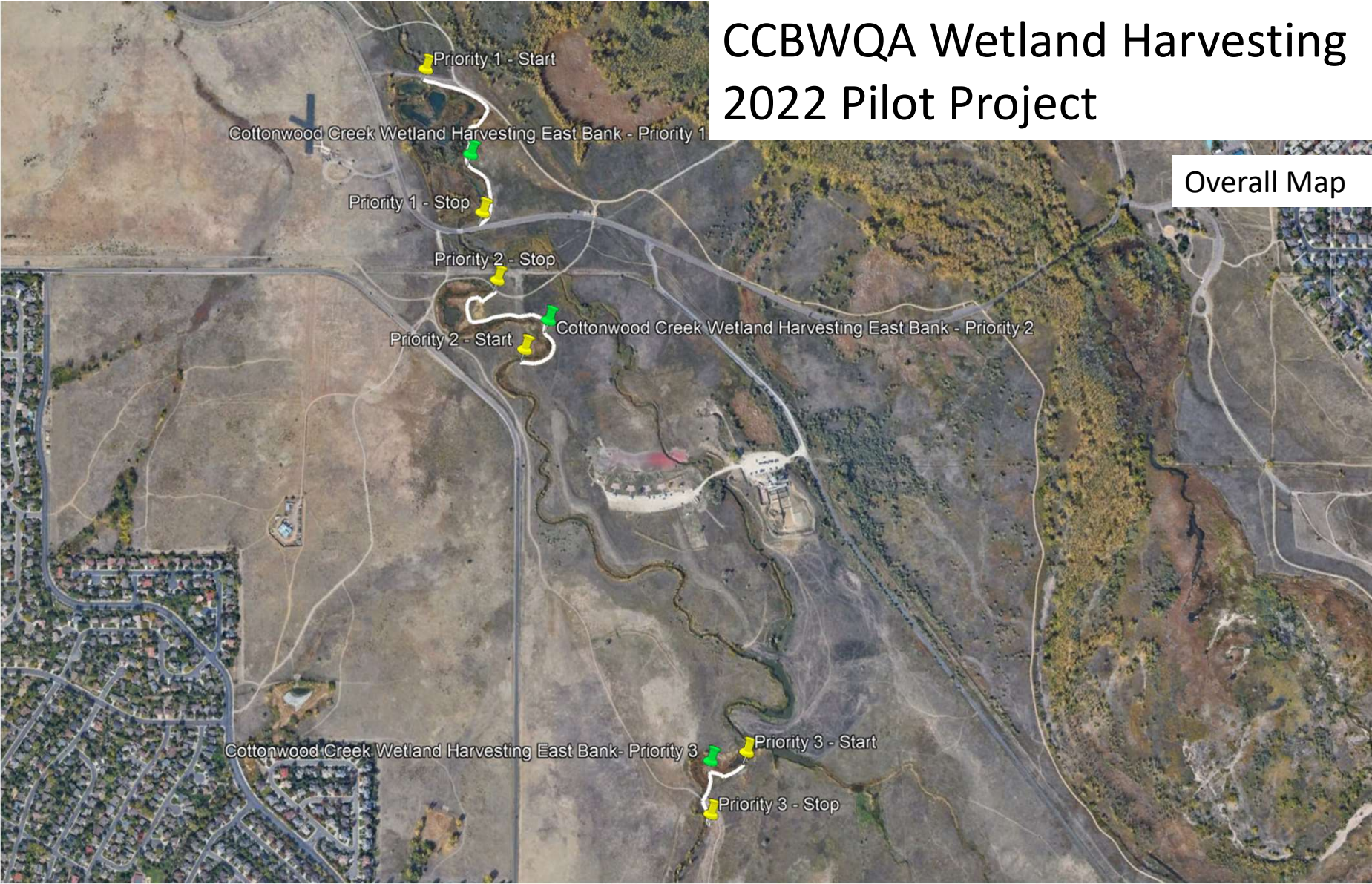
The Pilot Project harvests about 2.1 Acres of Cattails Annually at an estimated cost of \$60,000 per year, removing an estimated 59-60 pounds of Phosphorus from the Cottonwood Creek system per year. The unit cost is around \$1000 per pound of Phosphorus removed. This unit cost is comparable to other PAP that CCBWQA participates in. The correlation between Phosphorus removed from the system and reduction in nutrient concentration in the water samples is not known at this time; a comparison of nutrient concentrations for 2-year periods before and after harvesting will be used to see whether a correlation can be made.

Evaluation of Pilot Project annually allows for verification of benefits and costs of Cattail Harvest. It provides decisions point each year on whether continuing the pilot makes sense for CCBWQA.

At 2-year milestones and at the end of the 6-year pilot project, reports summarizing results and findings of the pilot project are anticipated.

Appendix B – 2022 Wetland/Cattail Harvesting Maps

CCBWQA Wetland Harvesting 2022 Pilot Project

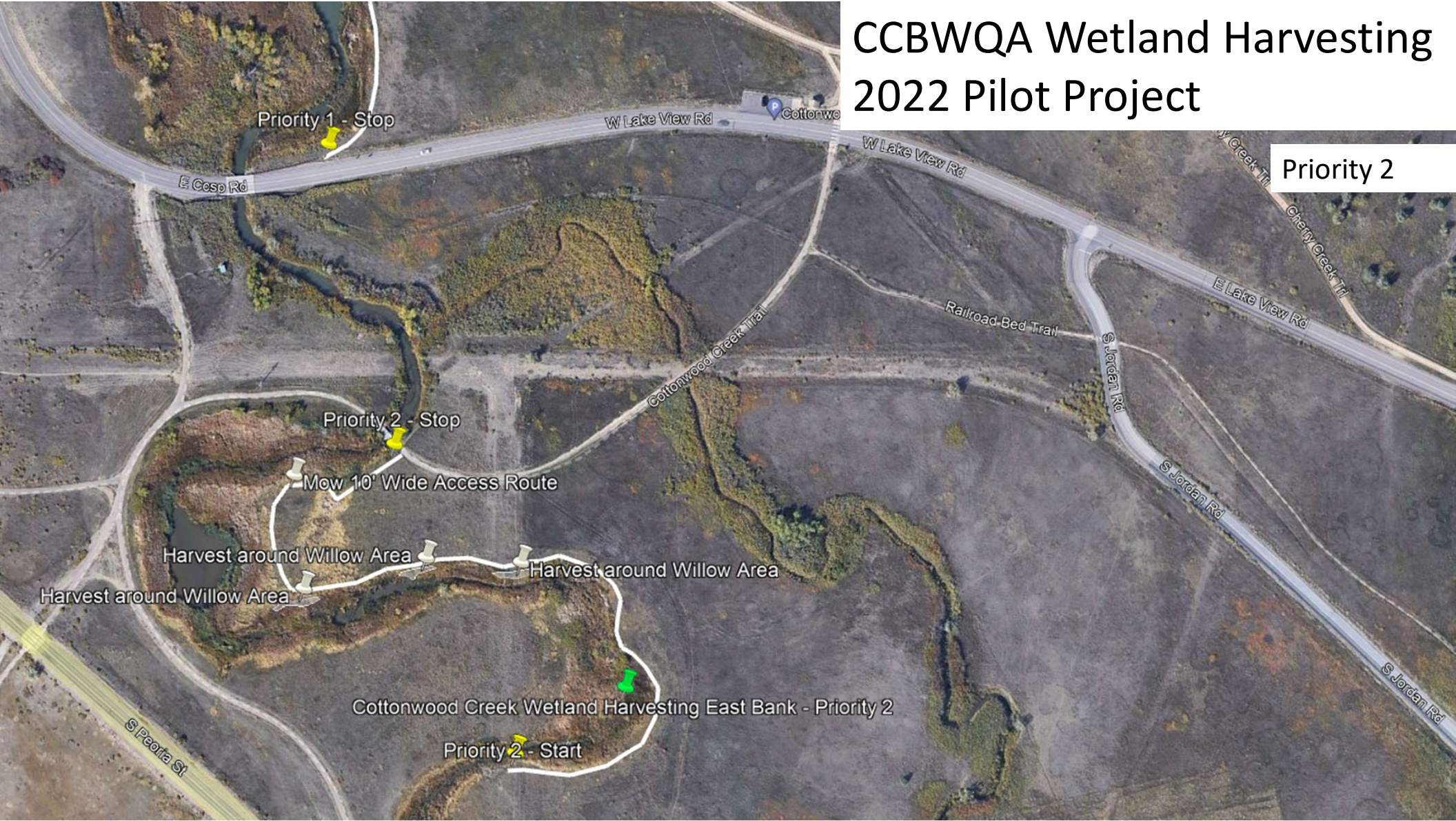


CCBWQA Wetland Harvesting 2022 Pilot Project

Priority 1



CCBWQA Wetland Harvesting 2022 Pilot Project



Priority 2

Cottonwood Creek Wetland Harvesting East Bank - Priority 2

CCBWQA Wetland Harvesting 2022 Pilot Project



Priority 3

Cottonwood Creek Wetland Harvesting East Bank- Priority 3

Mow 10' Wide Access Route

Priority 3 - Start

Priority 3 - Stop

Appendix C1 – 2021 Work Notice for Vegetation Removal (aka Wetland/Cattail Harvesting)

Vegetation Cutting and Disposal Work Notice

- Where:** Cottonwood Creek in Cherry Creek State Park
Who: The Cherry Creek Basin Water Quality Authority's contractor (L&M Enterprises)
What: Vegetation (primarily cattails) cutting and disposal
Why: To maintain Cottonwood Creek and improve water quality in Cherry Creek Reservoir
When: late September to late October 2021

More Information:

The Cherry Creek Basin Water Quality Authority's (CCBWQA) mission is to improve, protect, and preserve water quality in Cherry Creek Reservoir. CCBWQA built and maintains the Cottonwood Creek Wetland Pond and Stream Reclamation projects. This work includes vegetation (primarily cattails) cutting and disposal (see map). The roots will be left in place so the vegetation is expected to regrow and regenerate (like mowing a lawn), except that it may take a little longer. The removal of this vegetation will benefit water quality by preventing two key nutrients (Phosphorus and Nitrogen) from being carried to Cherry Creek Reservoir after the plants decay. The vegetation effectively acts as a natural treatment plant (literally several thousands of them) to aid water quality in the reservoir. The removal and regrowth of the vegetation provides a sustainable and natural way to improve water quality. Care has been taken to maintain suitable habitat for birds and other wildlife during this project. CCBWQA loves vegetation and wetlands, please join our appreciation of the natural beauty and benefits of these vital resources in Cherry Creek State Park.



<https://www.cherrycreekbasin.org/>



Green Highlighted Areas will have
vegetation cutting and disposal

Appendix C2 – 2022 Work Notice for Vegetation Removal (aka Wetland/Cattail Harvesting)

Vegetation Cutting and Disposal Work Notice

Where: Cottonwood Creek in Cherry Creek State Park

Who: The Cherry Creek Basin Water Quality Authority's contractor (L&M Enterprises)

What: Vegetation (primarily cattails) cutting and removal

Why: To maintain Cottonwood Creek and improve water quality in Cherry Creek Reservoir

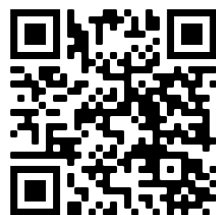
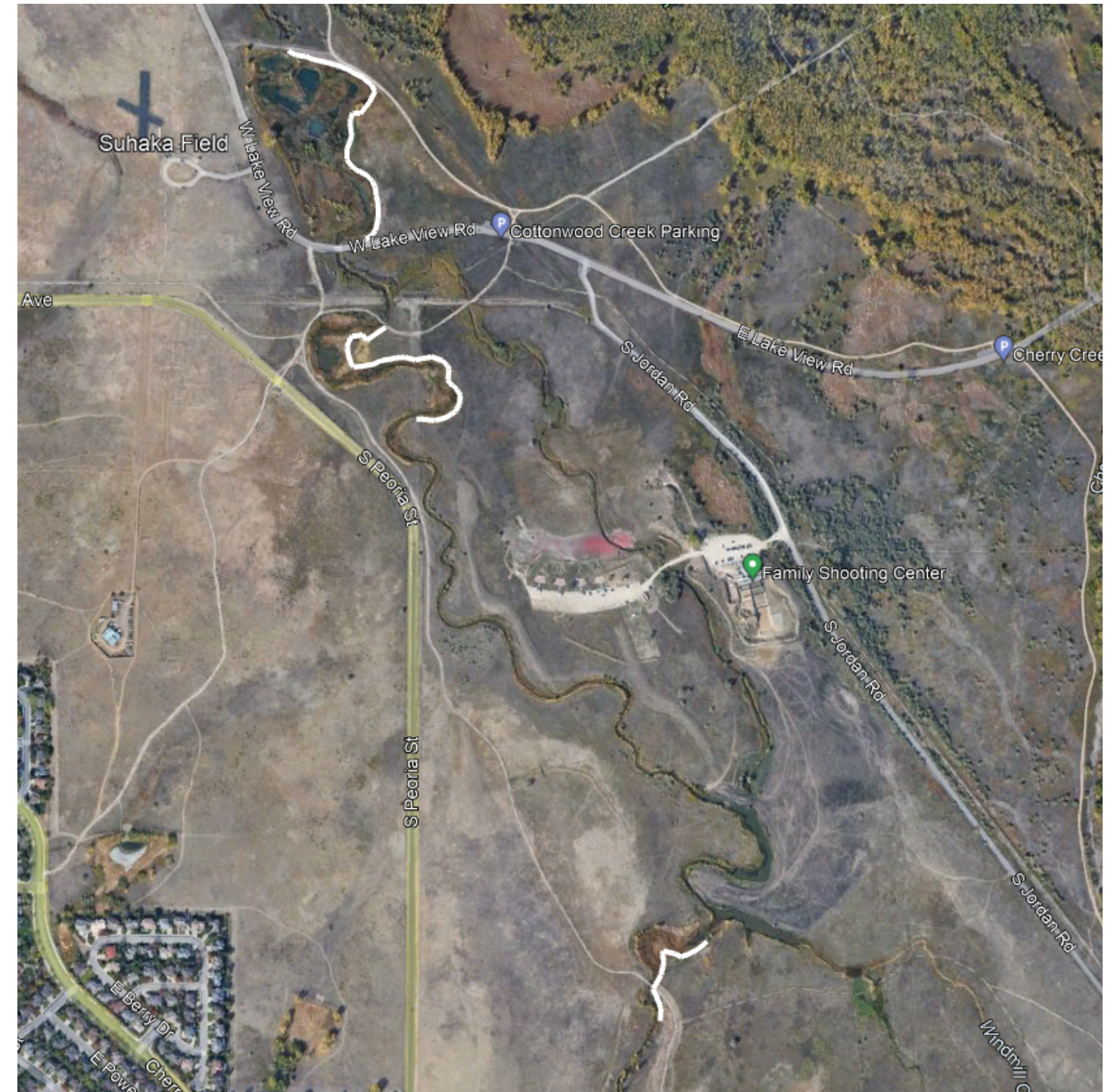
When: Mid to late September 2022

More Information:

The Cherry Creek Basin Water Quality Authority's (CCBWQA) mission is to improve, protect, and preserve water quality in Cherry Creek Reservoir. CCBWQA built and maintains the Cottonwood Creek Wetland Pond and Stream Reclamation projects which includes this vegetation cutting and removal project (see map). The wetland plant roots will be left in place so the vegetation will regrow and regenerate (like mowing a lawn).

The removal of this vegetation will benefit water quality by reducing two key nutrients (Phosphorus and Nitrogen) from being carried to Cherry Creek Reservoir after the plants decay. The vegetation effectively acts as a natural treatment plant (literally several thousands of them) as the removal and regrowth of the vegetation provides a sustainable and natural way to improve water quality in Cherry Creek Reservoir.

Care has been taken to maintain suitable habitat for birds and other wildlife during this project. CCBWQA loves vegetation and wetlands, please join our appreciation of the natural beauty and benefits of these vital resources in Cherry Creek State Park.



<https://www.cherrycreekbasin.org/>

Appendix D1 – 2021 Harvest Area and Weight of Cuttings

Load Ticket #	Date	Gross Weight (LBS)	Tare Weight (LBS)	Net Weight (LBS)
33951	10/11/2021	14060	14940	880
33949	10/11/2021	12820	13880	1060
33967	10/12/2021	14070	15220	1150
33957	10/12/2021	14640	15640	1000
33959	10/12/2021	14560	15100	540
33968	10/12/2021	13600	15280	1680
33978	10/13/2021	12840	16020	3180
33973	10/13/2021	13640	15140	1500
33975	10/13/2021	12840	14620	1780
33974	10/13/2021	12840	15360	2520
33976	10/13/2021	13600	15040	1440
33977	10/13/2021	13640	15420	1780
33986	10/14/2021	12840	15420	2580
33985	10/14/2021	12840	14820	1980
33988	10/14/2021	13600	15480	1880
33991	10/14/2021	13640	14600	960
33990	10/14/2021	12840	15280	2440
33992	10/14/2021	12840	15940	3100
34002	10/15/2021	13680	16660	2980
34003	10/15/2021	13600	16580	2980
34008	10/15/2021	13680	15000	1320
34006	10/15/2021	13680	15580	1900
33996	10/15/2021	13640	15840	2200
33995	10/15/2021	12840	14900	2060
33997	10/15/2021	13600	16780	3180
33998	10/15/2021	13600	16880	3280
33999	10/15/2021	13840	16300	2460
34017	10/18/2021	13840	17620	3780
34022	10/19/2021	12840	15820	2980
34021	10/19/2021	12840	16240	3400
34020	10/19/2021	13860	16660	2800
34030	10/20/2021	12840	18,820	5980
34029	10/20/2021	12840	15720	2880
34031	10/20/2021	12840	17,600	4760
34035	10/21/2021	13600	15,880	2280
34038	10/21/2021	13600	17,660	4060
34040	10/21/2021	13640	17,460	3820
21741164	10/22/2021	18,200	32980	14780
	Total	514850	620180	105330
Summary:				
Total Loads:	38 EA			
Total Weight:	105,330 LBS (52.67 TONS)			
Total Area Cut:	106,976 SF			

Appendix D2 – 2022 Harvest Weight of Cuttings

Load Ticket #	Date	Gross Weight (LBS)	Tare Weight (LBS)	Net Weight (LBS)	Trailer
34834	9/16/2022	13140	15940	2800	5
34828	9/16/2022	13140	14800	1660	5
34832	9/16/2022	17820	23340	5520	4
34827	9/16/2022	17820	21360	3540	4
34830	9/16/2022	13540	15280	1740	45
34829	9/16/2022	13540	14740	1200	45
34842	9/19/2022	13140	16760	3620	5
34847	9/19/2022	13280	16760	3480	5
34853	9/19/2022	13340	18420	5080	5
34856	9/19/2022	13340	18220	4880	5
34846	9/19/2022	17820	23240	5420	4
34851	9/19/2022	17820	24700	6880	4
34854	9/19/2022	17820	25020	7200	4
34859	9/20/2022	13260	14200	940	5
34862	9/20/2022	13340	14200	860	5
34870	9/20/2022	13260	18060	4800	5
34860	9/20/2022	12900	14620	1720	45
34868	9/20/2022	12900	16460	3560	45
34858	9/20/2022	17820	24360	6540	4
34861	9/20/2022	17820	24380	6560	4
34871	9/20/2022	17820	24300	6480	4
34875	9/21/2022	12860	17760	4900	45
34876	9/21/2022	17820	25180	7360	4
34801	9/26/2022	12820	16340	3520	45
34904	9/26/2022	12820	14380	1560	45
34902	9/26/2022	20120	24120	4000	4
34903	9/26/2022	20120	24120	4000	4
34905	9/26/2022	20820	24120	3300	4
34910	9/27/2022	12860	14200	1340	45
34914	9/27/2022	12860	15020	2160	45
34919	9/27/2022	12860	14620	1760	45
34913	9/27/2022	17820	21,720	3900	4
34915	9/27/2022	17820	24300	6480	4
34921	9/28/2022	13040	16,180	3140	45
34926	9/28/2022	13040	14,120	1080	45
34928	9/28/2022	13040	14,900	1860	45
34922	9/28/2022	17820	23,500	5680	4
34922	9/28/2022	17820	23,640	5820	4
34927	9/28/2022	17820	19,580	1760	4
34936	9/29/2022	12900	14,180	1280	45
34940	9/29/2022	12900	14,460	1560	45
34944	9/29/2022	12900	14,960	2060	45
34937	9/29/2022	17820	20,960	3140	4
34939	9/29/2022	17820	20,620	2800	4
34942	9/29/2022	17820	21,380	3560	4
34946	9/29/2022	17820	21,280	3460	4

34952	9/30/2022	12860	15,200	2340	45
34954	9/30/2022	12860	16,140	3280	45
34959	9/30/2022	12860	14,580	1720	45
34953	9/30/2022	17820	23,680	5860	4
34955	9/30/2022	17820	24,680	6860	4
34961	9/30/2022	17320	22,320	5000	4
34964	10/3/2022	12860	16,120	3260	45
34967	10/3/2022	12860	18,880	6020	45
34970	10/3/2022	12860	16,120	3260	45
34966	10/3/2022	17320	22,160	4840	4
34969	10/3/2022	17320	20,940	3620	4
34976	10/3/2022	13140	15,080	1940	45
34980	10/4/2022	13140	16,760	3620	45
34977	10/4/2022	17820	21,560	3740	4
34981	10/4/2022	17820	25,060	7240	4
34993	10/5/2022	13140	17,440	4300	45
34995	10/5/2022	13140	19,360	6220	45
34996	10/5/2022	13140	17,500	4360	45
35000	10/6/2022	13140	17,620	4480	45
35001	10/6/2022	13140	16,880	3740	45
35002	10/6/2022	13140	19,020	5880	45
35014	10/7/2022	13140	21,020	7880	45
35015	10/7/2022	13140	18,380	5240	45
4110559	10/7/2022	17820	24,000	6180	4
4110505	10/7/2022	17820	25,000	7180	4
	Total	1076280	1360300	284020	
Summary:					
Total Loads:	71 Loads				
Total Weight:	284020 (142.01 TONS)				

Appendix E1 – 2021 Wetland/Cattail Sampling and Estimate of Nutrients Removed

MEMORANDUM

To: Rich Borchart R2R Engineers, Cherry Creek Basin Water Quality Authority
From: Erin Stewart, LRE Water
Date: March 21, 2022
Subject: 2021 Wetland Harvesting Sampling Summary

In the fall of 2021, a study to identify and analyze wetland vegetation in order to determine the density, composition, and nutrient content of plants in the wetland harvest area was completed in the wetland areas off Cottonwood Creek in Cherry Creek State Park. The goal of the project was to estimate the total nitrogen and phosphorus that would be removed during the wetland harvesting project planned for future years. Solitude Lake Management completed the sampling in the fall of 2021 and the lab summary was finalized by LRE Water.

Six (6) sampling sites of 0.5 m² each were identified in multiple areas throughout the specified removal area (Figure 1). At each site, individual plants in the sampling area were cut at approximately 6” above the ground (the estimated cutting height), counted, weighed, and measured. Tables 1 and 2 summarize the results of the collection and field measurements.

The plants in the “harvest area” were identified as primarily cattails and bullrush. Although there were a few other plants found during the study, they were not present in the sample sites and were not included in the study. Due to the fact that there were dead-standing plants from previous years in the harvest area, these plants were included in the study and some were selected for the analysis. A total of 180 plants were measured and weighed, ~30% were dead standing plants. Of the plants measured in the 6 areas, 94% were cattails, and 6% were bullrushes. From each sampling site, 1-2 individual plants were randomly selected and sent to the lab for analysis of nutrients (TKN, TP) and moisture content.

Table 1. Field Sampling Summary 2021

Total plants sampled	180		Plant Type	#	Percentage
Density (# plants/m ²)	60		Cattails	170	4.4%
Selected for Analysis (#/plants)	11		# cattails with seed head	8	5.6%
Average Height (m) *	1.83		bullrushes	10	29.4%
Average Weight (g) *	51.71		# of dead plants	53	4.4%

Table 2. Average Height/ Mass Table 2021

	Cattail	Cattails (dead)	Cattails (Seedhead)	Cattails All	Bullrush	Bullrush (dead)	Bullrush All
Average Height (m)	2.18	1.00	1.54	1.82	1.81	1.60	1.73
Average Weight (g)	68.17	13.67	95.83	53.81	13.93	6.25	11.14



Figure 1 . Sampling Site Locations 2021



Image 1. 0.5m² Sample Area



Image 2. Samples for Analysis

Eleven (11) plants collected during the project were selected for laboratory analysis of nitrogen and phosphorus concentrations at ACZ Laboratories. The plants were dried, pulverized, and analyzed in the lab and the results were provided. Based on the results of the laboratory analysis, plant density, composition, and field measurements, a weighted concentration of Total Kjeldahl Nitrogen (TKN) and Total Phosphorus (TP) were calculated (Table 3). Using the total weight of the plants harvested and disposed of during the project (105,330 lbs), estimates of nitrogen and phosphorus removed during the project could be calculated. The wetland harvesting project removed an estimated ~561 lbs of TKN and ~69 lbs of TP.

Table 3. Nutrient Concentration of Plants and Removal 2021

	Cattails	Bullrush	Dead	Weighted	Weighted	Total Removed (lbs)
Percent	65.0%	5.6%	29.4%			
	% dry				mg/kg	
TKN	1.64	4.69	0.57	1.49	5.32	560.69
TP	0.18	0.81	0.07	0.18	0.66	68.99

Appendix E2 – 2022 Wetland/Cattail Sampling and Estimate of Nutrients Removed

MEMORANDUM

Date:	12/22/22
To:	Rich Borchardt - R2R Engineers, Cherry Creek Basin Water Quality Authority
From:	Erin Stewart, LRE Water
Subject:	Wetland Harvesting Project – Plant Sampling, Analysis, and Nutrient Removal

Wetland Harvesting Project Background

The CCBWQA Wetland Harvesting has been completed on Cottonwood Creek for the last 2 years as part of a 6-year pilot project. Prior to cutting and removal wetland plants from areas within planned areas of wetland harvesting are sampled to determine the composition and analyzed to calculate the nutrient mass removed. Annually, multiple sites are sampled to determine plant density distribution and average length and weights are measured. Samples from each area are sent to an analytical laboratory for processing and analysis of total phosphorus and total nitrogen content.

Wetland Plant Analysis

LRE Water sampled and collected data from six (6) sites in the area scoped to be harvested. (see map)



At each site area, all plants within equal (0.25 m²) plots were counted, identified by type, and lengths and weights were measured and recorded. One sample from each zone, six (6) samples total were sent to ACZ Laboratory for processing to analyze moisture content, and concentrations of total phosphorus (TP), nitrate and nitrite (NO₂+NO₃), and total kjeldahl nitrogen (TKN). The sum of NO₂+NO₃ and TKN were used to calculate total nitrogen (TN).

ANALYTE	Site					
	WH #1-14	WH #2-12	WH #3-22	WH #4-2	WH #5-6	WH #6-8
Moisture Content (%)	71	17.9	65.3	45.3	70.4	67.4
Nitrogen, Total Kjeldahl (%)	3.95	0.283	1.03	1.71	1.32	1.39
Phosphorus, Total (%)	0.397	0.069	0.141	0.136	0.251	0.226

Nitrate/Nitrate as N, soluble (Water) mg/kg	4.21	4.83	12.4	4.11	2.64	8.19
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Two methods were used to calculate the total pounds of nitrogen and phosphorus removed. For each method, the weight of the sample prior to processing and the dry weight were used to convert mg/Kg concentrations to mg/g. Then a weighted total was calculated using one of the following methods:

1. using the percent density of each type of plant or
2. the percentage of each plant based on the average weight of each type of plant weighed during the field measurements

For the 2022 calculations, the 2021 concentrations of each type of plant were also incorporated in the final calculations to represent the variability of plant distribution, mass, and nutrient content more accurately.

2022 Wetland Harvesting Summary

- Total material hauled and disposed: 284,020 lbs
- Total area harvested: 3.79 Acres
- Total phosphorus removed: 194-207 lbs (Mean 201 lbs)
- Total nitrogen removed: 1,451-1,527 lbs (Mean 1,489 lbs)

Analysis	Total removed (lbs)	
	TN	TP
% based on density	1,451	194
% based on weight	1,527	207
Average	1,489	201

Appendix F1 – 2021 Photos

CCBWQA Wetland Harvesting 2021 Pilot Project



Photo – Example Work Notice

CCBWQA Wetland Harvesting 2021 Pilot Project



Photo – Sampling Effort and Robustness of Wetlands/Cattails



Photo – North Site Before Harvesting



Photo – North Site After Harvesting



Photo – North Site Before Harvesting



Photo – North Site After Harvesting

CCBWQA Wetland Harvesting 2021 Pilot Project

Middle Site



Photo – Crew Working on Middle Site



Photo – Middle Site Before Harvesting



Photo – Middle Site After Harvesting

CCBWQA Wetland Harvesting 2021 Pilot Project

South Site



Photo – Collected and Stockpiled Cuttings



Photo – South Site Before Harvesting



Photo – South Site After Harvesting

CCBWQA Wetland Harvesting 2022 Pilot Project

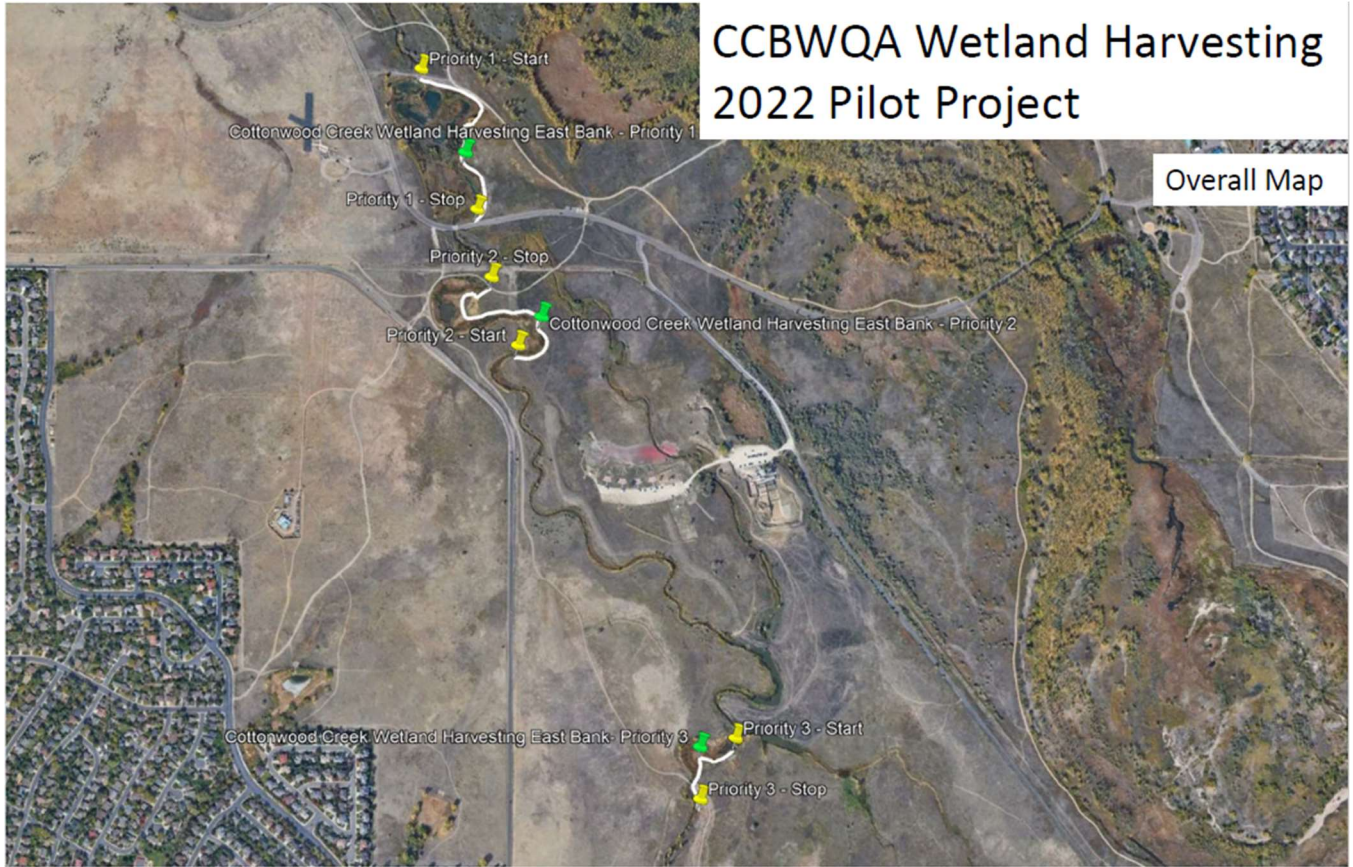


Photo – Example Work Notice

Appendix F2 – 2022 Photos

CCBWQA Wetland Harvesting 2022 Pilot Project

Priority 1



Photo – Priority 1 Possible Marshy Area



Photo – Priority 1 Site Before Harvesting



Photo – Priority 1 Site After Harvesting



Photo – Priority 1 Site Before Harvesting



Photo – Priority 1 Site After Harvesting



Photo – Contractor cleaning out Peoria Pond Outlet Grate



Photo – Peoria Pond Outlet Grate after cleaning

CCBWQA Wetland Harvesting 2022 Pilot Project

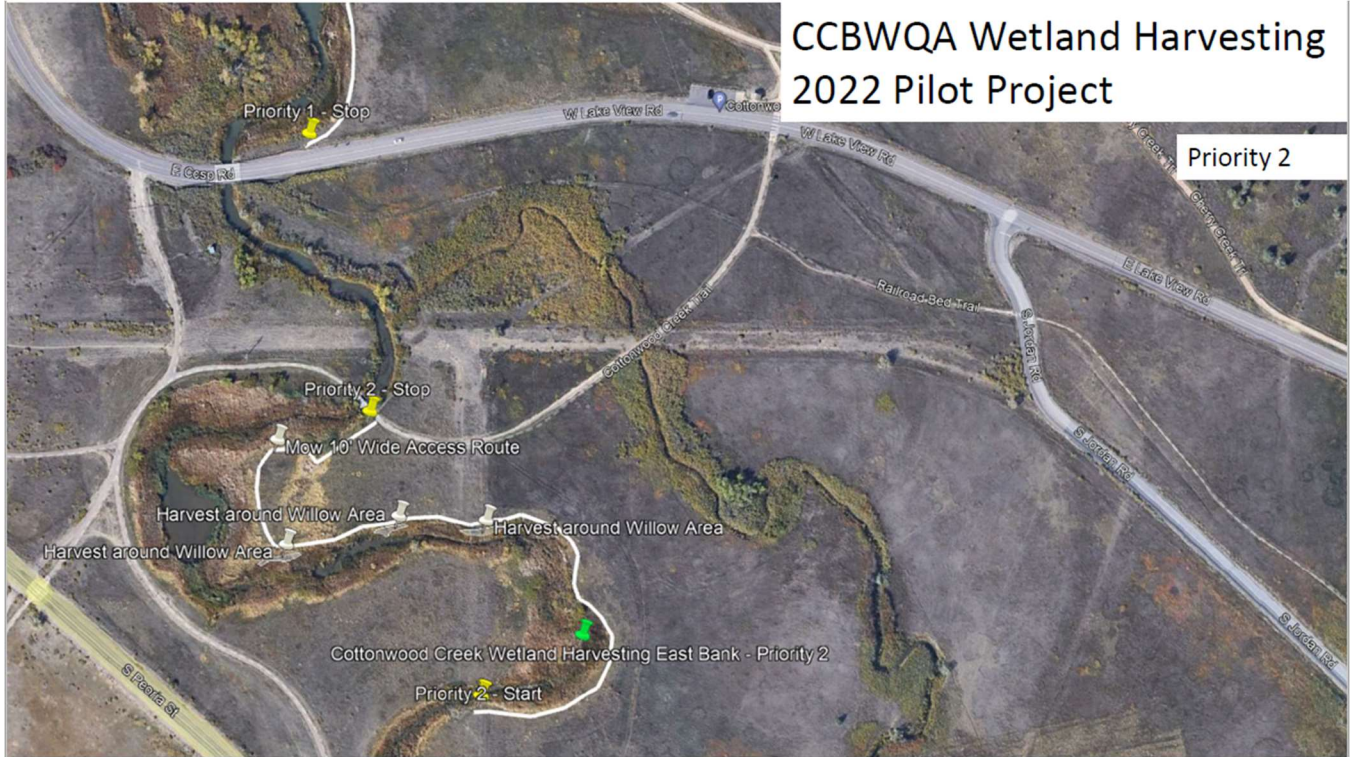


Photo – Contractor working on Priority 2 Site



Photo – Priority 2 Site Before Harvesting



Photo – Priority 2 Site After Harvesting



Photo – Priority 2 Site Before Harvesting



Photo – Priority 2 Site During Harvesting

CCBWQA Wetland Harvesting 2022 Pilot Project

Priority 3

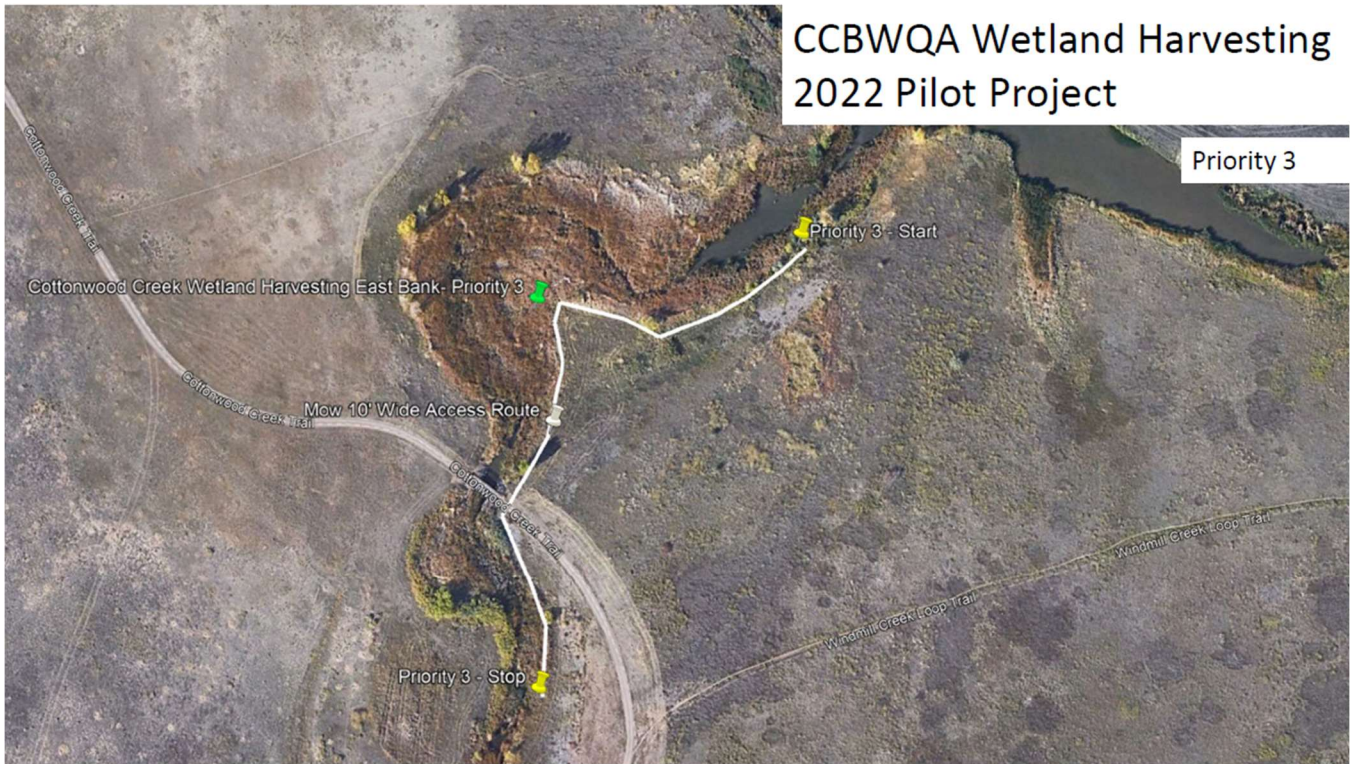


Photo – Contractor harvesting



Photo – Priority 3 Site Before Harvesting



Photo – Priority 3 Site After Harvesting



Photo – Priority 3 Site Before Harvesting



Photo – Priority 3 Site After Harvesting

Appendix G – Regrowth Comparison Photos from 2021 Harvest



10/25/21



5/23/22

6/14/22



10/25/21



5/23/22



6/14/22

Appendix H – Native Grasses and Topsoil Compaction



Photo 12 (before heavy access use in 2022)



Photo 13 (after heavy use in 2022)



Photo 14 (Compaction test along access)



Photo 15 (Compaction test outside of access)



ACTION ITEM MEMORANDUM

To: CCBWQA TAC
From: Jane Clary, Technical Manager
Date: March 30, 2023
Subject: 2023 Subcommittee Formation Update

Background: CCBWQA has completed watershed and reservoir models during the past five years, as well as a watershed plan in 2012. Additional action is needed regarding the models and the watershed plan. Direction on these issues is better suited to more in-depth, smaller group interactive discussion that can occur in subcommittees. Recommendations from these subcommittees can then be directed back through the TAC and Board for further action. Both of these subcommittees will provide direction and input to CCBWQA staff and consultants to ensure that the direction taken on models and the watershed plan is consistent with CCBWQA objectives and priorities.

In March, the TAC passed a motion to form a Modeling Subcommittee and a Watershed Plan Subcommittee and requested participation of two or more Board members on each Subcommittee along with all interested TAC Members. Several Board members expressed interest in participating in the subcommittees. Updated subcommittee membership is provided below for Board, TAC and special consultants as of March 30, 2023 (participation lists are not final). Staff support and facilitation will be provided for each subcommittee by Jane Clary and Val Endyk, with additional support by targeted staff consultants (LRE, R2R, RG).

Key [technical references](#) for the subject matter for these committees are included in the Board Binder.

Modeling Subcommittee

Purpose:

- Review RESPEC's recommendations for additional model runs and other potential model runs.
- Prepare technical direction for watershed model runs.
- Review necessary steps for watershed-reservoir model linkage to ensure future reservoir model runs are supported.
- Identify reservoir models runs requested for late 2023 or 2024.
- Other items as identified by the Subcommittee, TAC or Board.

Subcommittee Members (as of 3/30/2023)

- Ryan Adrian, Douglas County
- Lisa Knerr, Arapahoe County
- Jon Erickson, Colorado Parks and Wildlife
- Jason Trujillo, Cherry Creek State Park
- Bill Ruzzo (Board)
- John Woodling (Board)
- Margaret Medellin (Board)
- Alan Leak (Consultant)
- Christine Hawley (Consultant)

Watershed Subcommittee

Purpose:

- Review existing watershed plan and develop an outline for a watershed plan update.
- Identify missing content that needs to be developed to support update to the watershed plan in 2024.
- Provide feedback to staff on initial work on the watershed plan.
- Participate in the September 2023 Watershed Plan Workshop.
- Other items as identified by the Subcommittee, TAC or Board.

Watershed Plan Subcommittee Members (as of 3/30/2023)

- Ryan Adrian, Douglas County
- Ashley Byerley, SEMSWA
- Steven Chevalier, Arapahoe County Public Health
- Lisa Knerr, Arapahoe County
- Alex Mestdagh, Town of Parker
- Casey Davenhill, Cherry Creek Stewardship Partners
- Caitlin Gappa, Douglas County Health Department
- Jon Erickson, Colorado Parks and Wildlife
- Jason Trujillo, Cherry Creek State Park
- Jim Watt, Mile High Flood District
- Topher Lewis (Board)
- Bill Ruzzo (Board)

Process and Time Commitment: Two to four meetings of each subcommittee are envisioned for 2023. The meetings may be held virtually, in-person or hybrid, depending on the preference of the subcommittee members. The first meeting of each committee will be scheduled in April or May.

Budget: Staff participation and support of these committees is covered under the approved budget for 2023.

Next Steps: Schedule initial meetings with TAC and Board participants on each subcommittee, refine committee objectives and develop meeting schedule. The Technical Manager and Administrative Assistant will provide facilitation and administrative support for the subcommittees. CCBWQA staff and contractor support will vary depending on the subject matter of the subcommittee.

We Need Your Help to Protect Cherry Creek and the Reservoir!

Where:

Cherry Creek State Park (CCSP, see Figure 1) and Cherry Creek Reservoir serve as an oasis for the Denver metro area and Colorado Front Range. CCSP is in Arapahoe County, surrounded by Denver, Greenwood Village, Aurora, and Centennial. CCSP sees over 2 million park visitors annually that enjoy the natural resources and recreation provided by Cherry Creek and the Reservoir.

Who:

The Cherry Creek Basin Water Quality Authority (CCBWQA) and Colorado Parks and Wildlife (CPW) are working to protect the water quality in Cherry Creek and the Reservoir. For more, see <https://www.cherrycreekbasin.org/>.

Issue:

Severe erosion (see photos 1 and 2) is occurring in Cherry Creek in CCSP and in Piney Creek immediately upstream. The erosion is threatening the surrounding environment, wildlife corridors, critical infrastructure, and water quality. Additionally, downed trees could become debris in a large flood event potentially impacting the flood control purpose of the Reservoir.

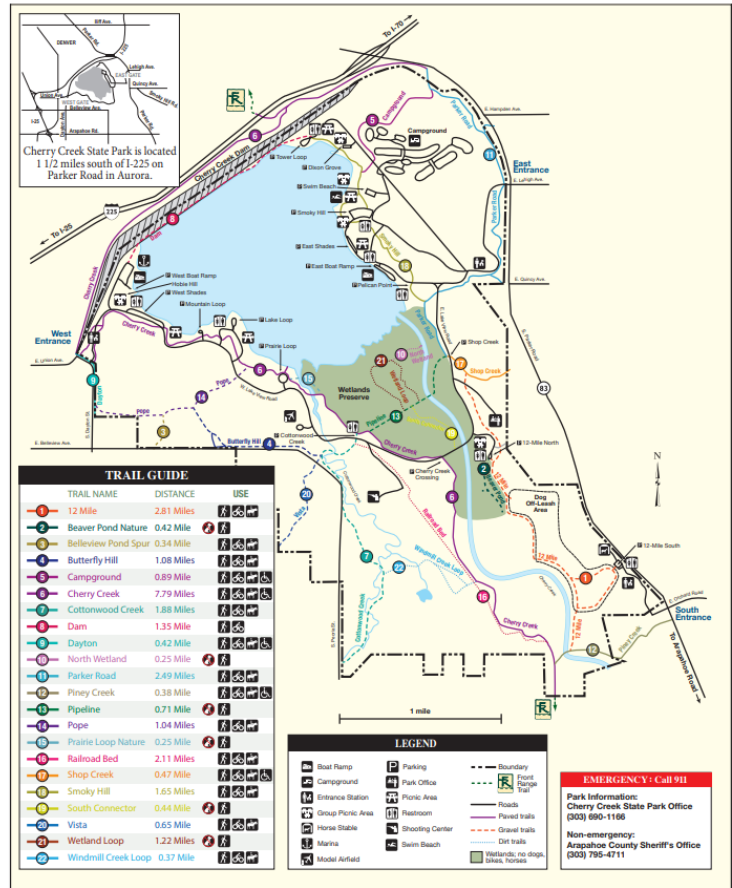


Figure 1 - Cherry Creek State Park



Photo 1 – Cherry Creek in CCSP



Photo 2 – Cherry Creek upstream of CCSP



We Need Your Help to Protect Cherry Creek and the Reservoir!

Background:

Muller Engineering Company recently completed a stream channel and water quality assessment on Cherry and Piney Creeks (see Figure 2) for CCBWQA that identified serious issues requiring a major capital investment to repair. Key findings include:

- erosion in the lower reach of Cherry Creek is estimated to contribute over 1,700 pounds of phosphorus per year, which can contribute to harmful algal blooms in the reservoir,
- initial estimate of channel reclamation cost is over \$23 million within the park and an additional \$10 million upstream of the park, which exceeds the combined resources of CCBWQA and Cherry Creek State Park. A more detailed alternatives evaluation is being completed to identify a phased approach to the project and to refine project costs, and
- risks of inaction include continued erosion, environmental impacts, loss of wildlife habitat and natural resources, risk to infrastructure including a water supply pipeline and roads, significant on-going phosphorus and sediment loading to the Reservoir, and increased damages when flooding occurs.

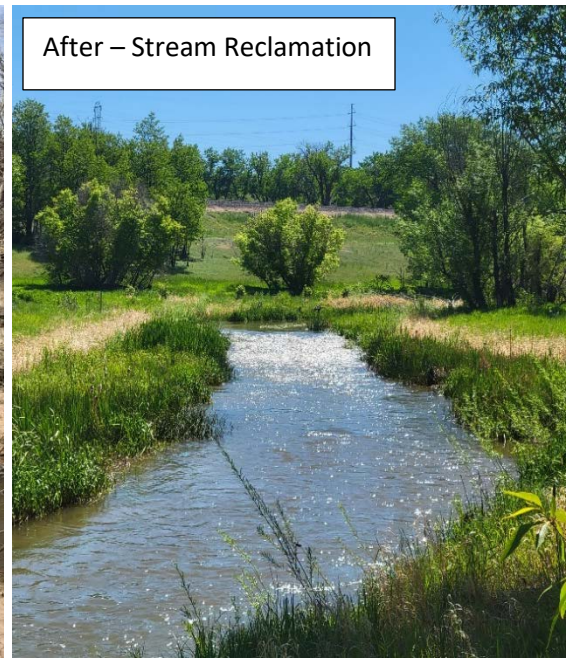
Our Request:

Because of the high capital cost needed to complete these repairs in a timely manner, CCBWQA and CPW are seeking funding partners to support stream reclamation similar to the example shown in Photos 3 and 4 in Chatfield State Park. In 2023, CCBWQA is preparing an alternatives analysis that will result in a refined plan for reclamation and a refined cost estimate. We are currently identifying partners who may be able to help fund this high priority project.



Before – Eroded Stream

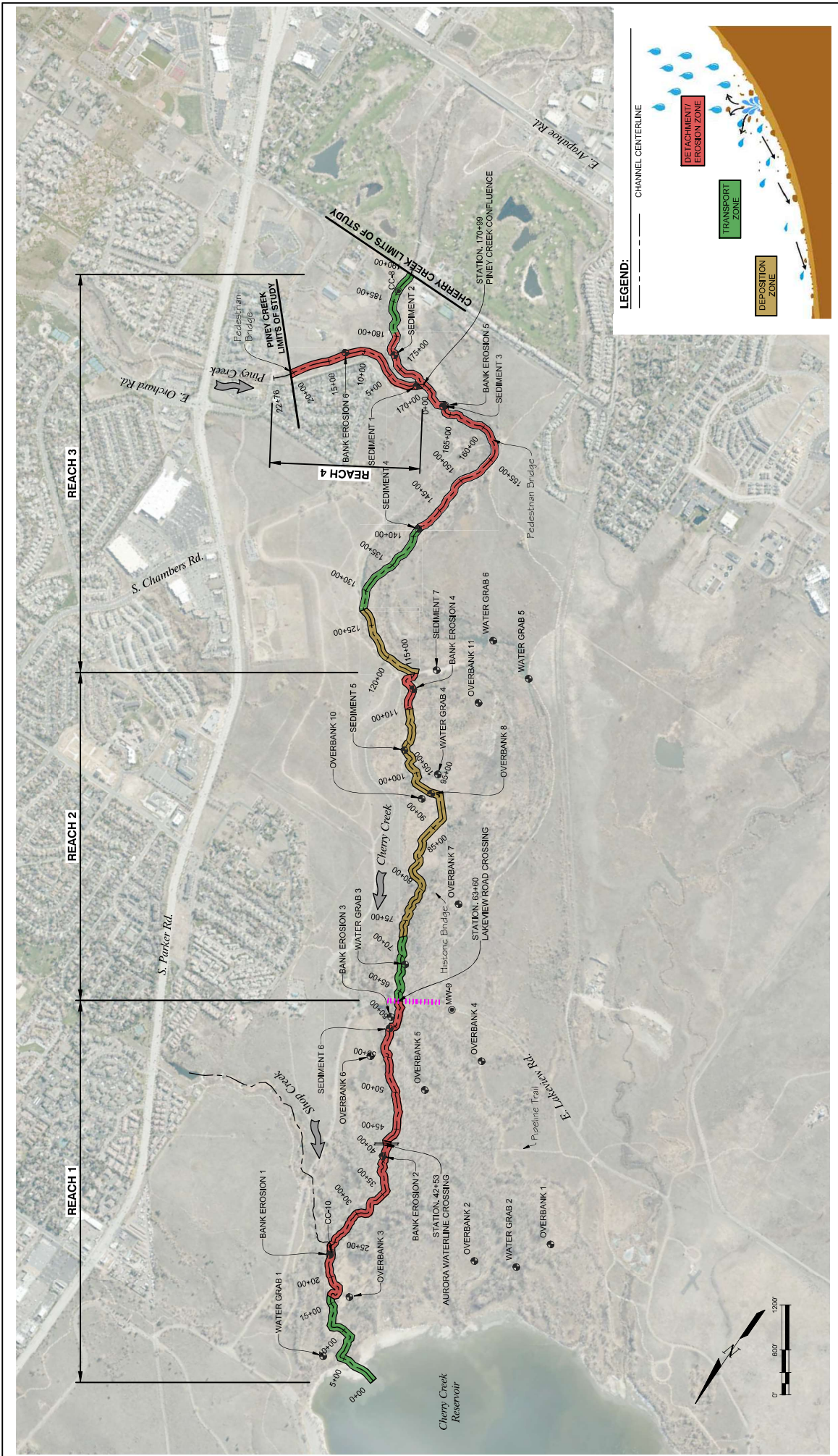
Photo 3 – Example of Similar Degraded in Plum Creek in Chatfield State Park Prior to Stabilization



After – Stream Reclamation

Photo 4 – Example Reclaimed Channel of Plum Creek in Chatfield State Park





DATE	5/20/2021
DRAWING NO.	
SHEET NO.	1 OF 1

FIGURE 2

**CHERRY CREEK RESERVOIR TO 12 MILE
GEOMORPHIC SUMMARY**



PLOTTED: 8/12/2022 11:54:28 AM P:\2020\PROJECTS\2022\02 SITE SEGMENT EXHIBIT 2.DWG • CBW\A\ADMIN\HBT\2022\02 SITE SEGMENT EXHIBIT 2.DWG



Memorandum

To: CCBWQA Technical Advisory Committee
From: Jessica DiToro, PE, and Erin Stewart, LRE Water
Reviewed by: Jane Clary, Wright Water Engineers
Date: April 6, 2023
Subject: Lake Nutrients Criteria Rulemaking Hearing

Issue Update: CCBWQA remains a party to the Lakes Nutrients Rulemaking Hearing (RMH). Originally, CCBWQA requested a delayed effective date of 12/31/2025 to allow time to develop site specific standards. Although the Water Quality Control Division (Division) originally opposed this request, at the March 7, 2023 Prehearing Conference, the Division proposed a major change in direction for standards adoption that would result in a statewide delayed effective date of 12/31/2027. This change in direction effectively addresses CCBWQA's request.

CCBWQA submitted a Surrebuttal to the Water Quality Control Commission (Commission) on March 30, 2023 requesting that CCBWQA's Statement of Basis of Purpose language regarding development of site specific standards continue to be included in Regulation 38 with revised dates aligning with the Division's revised proposal. The CCBWQA's Regulation 38 Special Board Committee was informed of and supported the submission of this Surrebuttal to the Commission. The Surrebuttal and updated Statement of Basis and Purpose language are provided in Attachment A.

Next Steps: The RMH is scheduled for April 10-11, 2023. The CCBWQA has been given 7 minutes to present orally to the Commission. Staff is preparing a presentation for the Regulation 38 Special Board Committee to approve (this is the last TAC meeting before the RMH and there are no additional Board meetings prior to the RMH). The RMH deadlines overlaid with the CCBWQA meetings schedule is provided in Attachment B.

**WATER QUALITY CONTROL COMMISSION
STATE OF COLORADO**

**SURREBUTTAL STATEMENT OF CHERRY CREEK BASIN WATER QUALITY
AUTHORITY**

**IN THE MATTER OF PROPOSED ADOPTION OF REVISIONS TO THE
CLASSIFICATIONS AND NUMERIC STANDARDS FOR SOUTH PLATTE RIVER
BASIN, LARAMIE RIVER BASIN, REPUBLICAN RIVER BASIN, SMOKY HILL
RIVER BASIN, REGULATION #38 (5 CCR 1002-38)**

The Cherry Creek Basin Water Quality Authority (“CCBWQA” or the “Authority”), by and through its counsel, Davis Graham & Stubbs LLP, submits this Surrebuttal Statement for the above captioned matter to the Colorado Water Quality Control Commission (“Commission”), pursuant to the Commission’s Prehearing Order dated March 10, 2023.

**I. SUBMISSION OF REVISED STATEMENT OF BASIS AND PURPOSE IN
RESPONSE TO DIVISION’S REVISED PROPOSAL FOR DELAYED
EFFECTIVE DATE**

The Water Quality Control Division (“Division”) initially proposed to add table value standards for total phosphors (TP) and total nitrogen (TN) to Cherry Creek Reservoir (COSPCH02) in April 2023. CCBWQA opposed adoption of the Division’s proposed TP and TN standards on this time frame and requested the Commission adopt a delayed effective date for the Cherry Creek Reservoir to allow CCBWQA time to develop appropriate and protective site-specific standards. *See* CCBWQA’s Responsive Prehearing Statement dated December 21, 2022 and Rebuttal Statement dated February 15, 2023. CCBWQA submitted proposed language for the statement of basis and purpose (SBP) that explains its ongoing work to develop site-specific standards. *Id.* On March 6 and 10, 2023, the Division sent emails to all parties in this rulemaking outlining its revised proposal for a delayed effective date of December 31, 2027 for TP and TN standards for all water bodies that are the subject of this rulemaking, including Cherry Creek Reservoir. The Division’s revised proposal of a 2027 effective date has addressed CCBWQA’s prior request for a delayed effective date and CCBWQA accordingly does not oppose the Division’s proposed delayed effective date. Nonetheless, CCBWQA is submitting revised SBP language shown in Exhibit 1 hereto, which includes minor edits from the SBP language CCBWQA previously provided to the Commission to align the proposed SBP language with the Division’s revised proposed timeline. The Authority is submitting this revised SBP language to reflect on the record CCBWQA’s intent to propose site-specific standards in 2027.

Attachment A


II. EXHIBITS

The CCBWQA's exhibits include the following:

Exhibit 1: Revised Proposed Statement of Basis and Purpose

Respectfully submitted this 30th day of March 2023.

Davis Graham & Stubbs LLP

By:  _____
Andrea M Bronson, Reg. No. 40620
Zach C Miller, Reg. No. 10796

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Attachment A
EXHIBIT 1
CCBWQA SURREBUTTAL STATEMENT

3. Site-specific Standards for Nutrients

Cherry Creek Segment 2 (COSPCH02): The commission continues to support a phased implementation approach to adoption of nutrient criteria and declined to consider any site-specific standards during this rulemaking. However, evidence on the record attests that consideration of site-specific standards on some segments may be warranted in future commission reviews of water quality standards and classifications. The Cherry Creek Basin Water Quality Authority (CCBWQA) submitted an analysis indicating that conditions in the Cherry Creek Reservoir are not well represented by the proposed table value standards; therefore, site-specific standards are expected to be more appropriate to protect the Public Swim Beach use for Cherry Creek Reservoir (COSPCH02). The analysis is further supported by the fact that a site-specific standard is already in place for chlorophyll *a*, the uniqueness of the Reservoir, demonstration of incremental progress in reducing TN and TP concentrations entering the Reservoir, and concerns with nitrogen-limitation in the Cherry Creek Reservoir. CCBWQA is committed to developing site-specific TP and TN standards by the 2027 Nutrients Rulemaking Hearing. If at that time the commission does not adopt site-specific standards for COSPCH02, the division's table value standards will apply as of December 31, 2027.

The commission appreciates the efforts of CCBWQA to obtain, and make available for this hearing, data that improve the understanding of existing conditions and uniqueness of Cherry Creek Basin and Cherry Creek Reservoir. The division is committed to supporting CCBWQA's efforts to develop appropriate site-specific standards for Cherry Creek Reservoir as resources become available and practical implications are considered. The division's efforts to support the development of a site-specific standard will include coordination of interdisciplinary staff from across the division, including drinking water, engineering, and water quality, as well as the toxicology and environmental epidemiology office.

Attachment B

Lakes Nutrients Criteria (Regulations 31-38) RMH Schedule + CCBWQA Meeting Schedule		
Event	Date	Activity
Nutrient Town Hall	May 2 nd	Proposed criteria released by WQCD
May TAC	May 5 th	1 st discussion related to draft criteria at TAC level
May Board	May 19 th	1 st discussion related to draft criteria at Board level
June TAC	June 2 nd	2 nd discussion related to draft criteria at TAC level
June Board	June 16 th	2 nd discussion related to draft criteria at Board level
July TAC	July 7 th	3 rd discussion related to draft criteria at TAC level – Motion for Party Status
July Board	July 21 st	3 rd discussion related to draft criteria at Board level – Motion for Party Status
PPHS	August 3 rd	Review WQCD's PPHS
August TAC	August 4 th	4 th discussion related to draft criteria at TAC level – Motion for RPHS
Party Status Requests	August 17 th	Submit Party Status Request
August Board	August 18 th	4 th discussion related to draft criteria at Board level – Motion for RPHS
September TAC	September 1 st	5 th discussion related to draft criteria at TAC level – Discuss Rebuttal
September Board	September 15 th	5 th discussion related to draft criteria at Board level – Motion for Rebuttal if needed
Supplemental PPHS	October 5 th	Review WQCD's Supplemental PPHS
October TAC	October 6 th	6 th discussion related to draft criteria at TAC level – Update on status
October Board	October 20 th	6 th discussion related to draft criteria at Board level – Update on status
November TAC	November 3 rd	7 th discussion related to draft criteria at TAC level – Discuss RPHS
November Board	November 17 th	7 th discussion related to draft criteria at Board level – Motion for RPHS
December TAC	December 1 st	8 th discussion related to draft criteria at TAC level – Discuss Board Subcommittee
December Board	December 15 th	8 th discussion related to draft criteria at Board level – Motion for Board Subcommittee
RPHS	December 21 st	Submit Supplemental RPHS – TBD + Review other parties' RPHSs
January TAC	January 5 th	9 th discussion related to draft criteria at TAC level – Discuss Rebuttals
January Board	January 19 th	9 th discussion related to draft criteria at Board level – Motion for Rebuttals(?)
February TAC	February 2 nd	10 th discussion related to draft criteria at TAC level – Update on status
Rebuttals	February 15 th	Submit Rebuttal Statement – TBD + Review other parties' Rebuttals
February Board	February 16 th	10 th discussion related to draft criteria at Board level – Update on status
Motions	February 22 nd	TBD
Complex Outstanding Issues Index	March 1 st	Review Index
March TAC	March 2 nd	11 th discussion related to draft criteria at TAC level – Discuss RMH Presentation
Prehearing Conference	March 7 th	Participate (virtually) in conference to maintain Party Status
March Board	March 16 th	11 th discussion related to draft criteria at Board level – Motion for RMH Presentation
Negotiation Cutoff	March 16 th	Final negotiations with WQCD and other parties today
Consolidated Proposal	March 30 th	Review Proposal + Surrebuttals Due
Cost Benefit Analysis	March 31 st	Review Cost Benefit Analysis
Regulatory Analysis	April 5 th	Review Regulatory Analysis
April TAC	April 6th	12th discussion related to draft criteria at TAC level – Update on status
RMH	April 10th	Participate (virtually) in RMH
April Board	April 20th	Update on RMH outcome
May TAC	May 4th	Update on RMH outcome

MEMORANDUM

Date:	March 29, 2023
To:	Cherry Creek Basin Water Quality Authority Technical Advisory Committee Jane Clary, WWE and CCBWQA Technical Manager
From:	Erin Stewart, LRE Water
Subject:	Water Quality Update – April 2023

CCBWQA Data Portal Water Quality Update Page Link - <http://ccbwwportal.org/wq-update/chlorophyll-a>

- Navigate to Chl- α, CCR Inflow Concentrations and Comparison, Field Depth Profile, Nutrients Depth Profile

The Water Quality Update pages provide a brief visual of the data collected during the current water year (WY 2023 - October 2022 through September 2023) with the data from previous years available as a reference. This memo provides a brief description of the highlights from the most recent monitoring data available on the data portal.

CCR Inflow Phosphorus and Nitrogen Concentrations and Comparison to Previous 5-Year Average

Site	Month	Flow	Cherry Creek @ CC-10		Cottonwood Creek @ CT-2	
			Total Phosphorus (µg/L)	Total Nitrogen (µg/L)	Total Phosphorus (µg/L)	Total Nitrogen (µg/L)
	October	Base	172 (190)	814 (895)	34 (48)	2520 (2970)
	November	Base	150 (152)	776 (1526)	46 (42)	2940 (2622)
	December	Base	112 (138)	1320 (1688)	23 (38)	3860 (4138)
	January**	Base	102 (123)	1680 (1855)	25 (35)	3830 (4130)

* 5-year mean concentration values are shown in parentheses for reference. Values in green or red are respectively lower or higher than the previous 5 year mean.

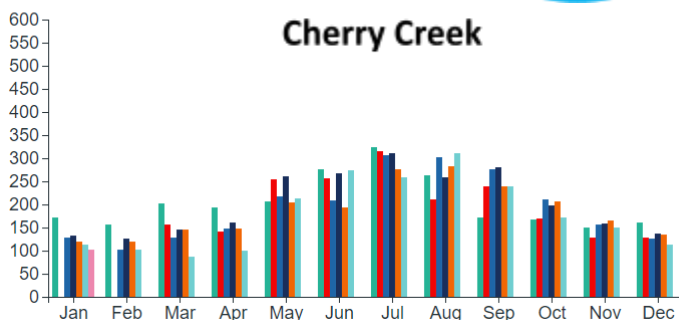
**2018-2022 5-year mean.

The averages of the base flow and storm flow concentrations are calculated monthly. Although the values do not represent flow-weighted concentrations, the simple averages are included to provide a comparison to long-term monthly average concentrations.

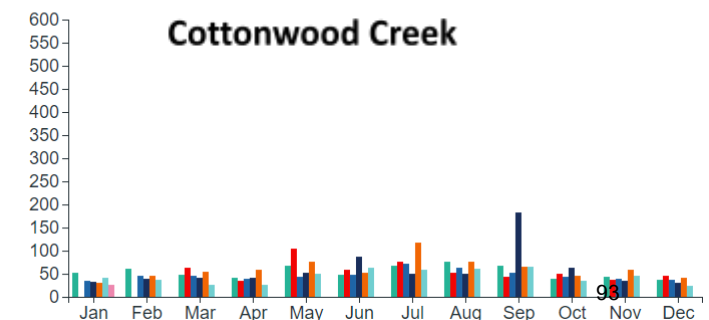
Total Phosphorous (ug/l)

● 2015 ● 2016 ● 2017 ● 2018 ● 2019 ● 2020 ● 2021 ● 2022 ● 2023

cc-10



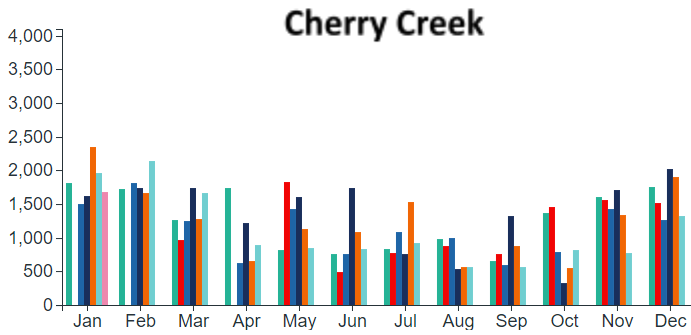
CT-2



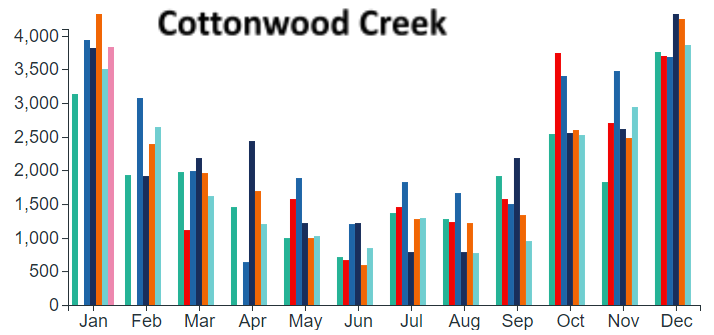
Total Nitrogen (ug/l)

● 2015 ● 2016 ● 2017 ● 2018 ● 2019 ● 2020 ● 2021 ● 2022 ● 2023

cc-10



CT-2



Monitoring Schedule and Updates

The monitoring for Cherry Creek Reservoir for March was completed on March 28th, 2023. CPW was wrapping up the walleye egg harvest.

CHERRY CREEK BASIN WATER QUALITY AUTHORITY
2023 Capital Project Status Report
March 30, 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.

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).
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).

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.*

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).

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 is scheduled for the TAC and Board for April (3/30/23).*

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 and initial construction is in place and construction of stream reclamation is underway for downstream sections of the project (3/30/23).*

- 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 and initial construction is in place and construction of stream reclamation is on-going (3/30/23)*.
- 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.
- 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).
- 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).



COLORADO

Department of Public
Health & Environment

MEMORANDUM

DATE: March 20, 2023

TO: Water Quality Control Commission
Jojo La, Acting Administrator, WQCC, Director of Environmental Boards and Commissions

FROM: Joni Nuttle, Senior TMDL Specialist, Restoration & Protection Unit, WQCD
Aimee Konowal, Watershed Section Manager, WQCD
Nathan Moore, Clean Water Program Manager, WQCD

RE: 2023 Triennial Review Informational Hearing for Cherry Creek Reservoir Control Regulation No. 72

INTRODUCTION

The Water Quality Control Division (division) is providing recommendations to the Water Quality Control Commission (commission) pertinent for the triennial review informational hearing (TRIH) on the Cherry Creek Reservoir Control Regulation No. 72, 5 CCR 1002-72, scheduled for April 10, 2023. This memorandum includes background information on the control regulation and the division's recommendations for a future rulemaking hearing (RMH).

BACKGROUND

The Cherry Creek Reservoir Control Regulation No. 72, 5 CCR 1002-72 is a watershed-scale implementation plan that focuses on limiting algal biomass, measured as chlorophyll *a*, in Cherry Creek Reservoir through a concentration-based control of total phosphorus in the inflow to the reservoir. The purpose of the regulation is to ensure attainment of site-specific water quality standards for chlorophyll *a* in the reservoir through implementation of activities throughout the watershed that reduce the inflow total phosphorus concentration to the reservoir. In addition to discharge effluent limitations for point sources, the control regulation specifies that nonpoint source and regulated stormwater projects be implemented to reduce phosphorus concentrations.

The Cherry Creek Basin Water Quality Authority (CCBWQA) is identified as the organization to oversee implementation of the control regulation. The CCBWQA develops and implements phosphorus reduction projects, manages water quality monitoring in the reservoir and watershed and reports on these activities to the commission. The CCBWQA also develops and maintains watershed and reservoir models used to evaluate reservoir responses to nutrient reduction activities implemented in the watershed.

RECENT COMMISSION ACTIONS

In 2021, the division recommended that the commission schedule two RMHs. The first RMH was a limited-scope RMH to address only specific issues related to municipal separate stormwater sewer systems (MS4) (generally 72.7). The division also recommended that a second, more comprehensive, RMH be scheduled for late 2023.

The commission held the limited-scope RMH in 2022 to update definitions and revise Regulation 72.7, which addresses municipal separate stormwater sewer systems (MS4). The commission did not schedule the second RMH, but an additional Regulation No. 72 Interim Informational Hearing was scheduled for 2023 to follow up on the outstanding issues from the 2021 TRIH. The CCBWQA and the division both have agreed the outstanding issues have been resolved through other means or are not high enough priority to require a RMH at this time.

DIVISION RECOMMENDATION

The division has worked with the CCBWQA on the RMH topics that were initially scoped. Based on these discussions, the timing of the lakes nutrients hearing, and the lack of urgency in the topics initially scoped, the division is not proposing

a RMH at this time. Based on the CCBWQA's letter to the commission dated January 19, 2023, it is the division's understanding that the CCBWQA does not intend to propose a RMH hearing at this time either.

However, the division is aware that Parker Water and Sanitation District will also be submitting a memo with a recommendation for a RMH in 2023 or 2024. At this time, the division has not seen the details of the proposal but understands that they are interested in reviewing and changing the provisions regarding inclusion of construction dewatering in the definition of industrial process wastewater sources that are subject to point source effluent limitations for total phosphorus in 72.4(1). The division has no current position on their proposal but would be ok with a limited scope RMH.

Should the commission decide to move forward with the RMH in 2023 or 2024, the division will work with stakeholders and the proponent of the proposal leading up to the RMH.