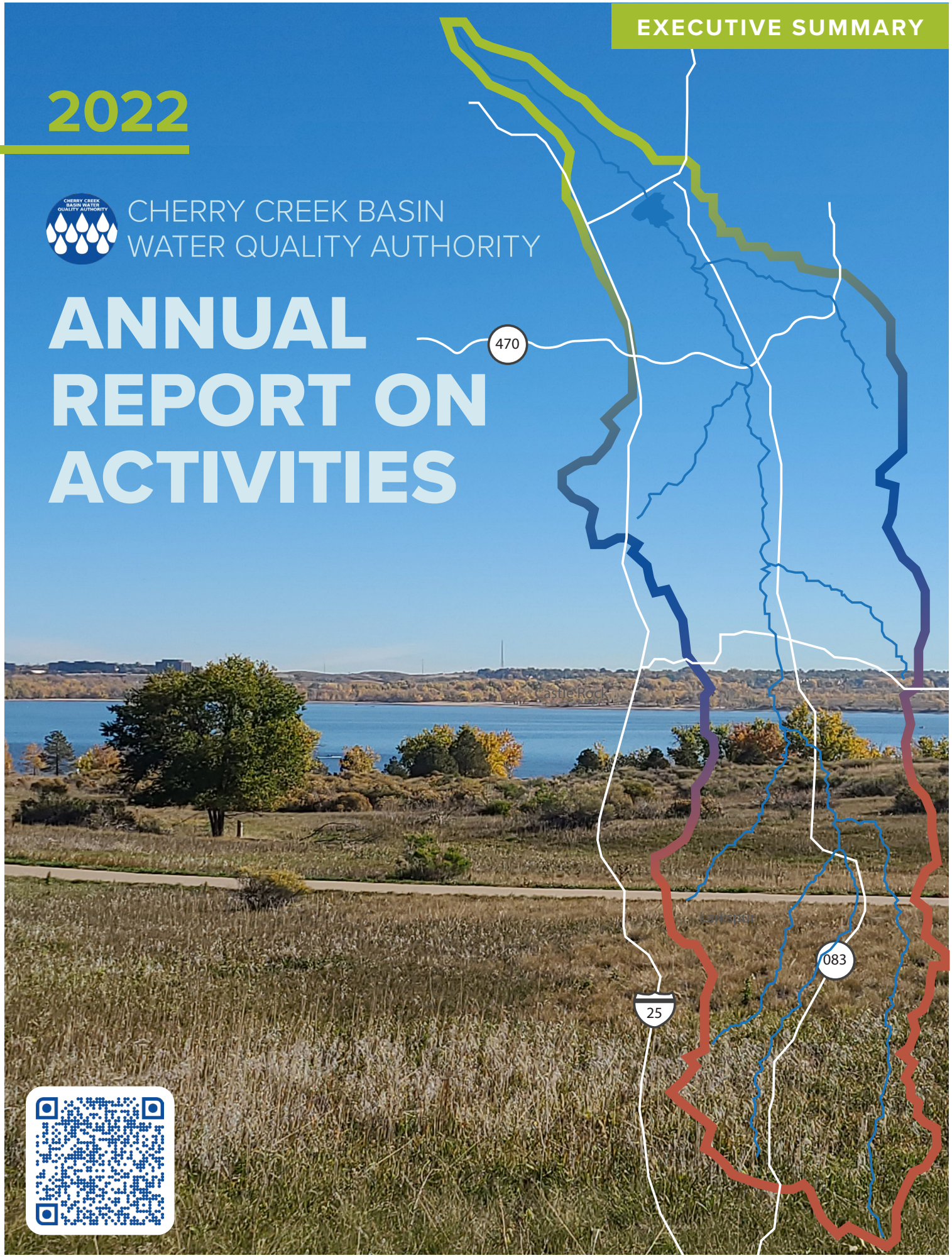
EXECUTIVE SUMMARY

2022

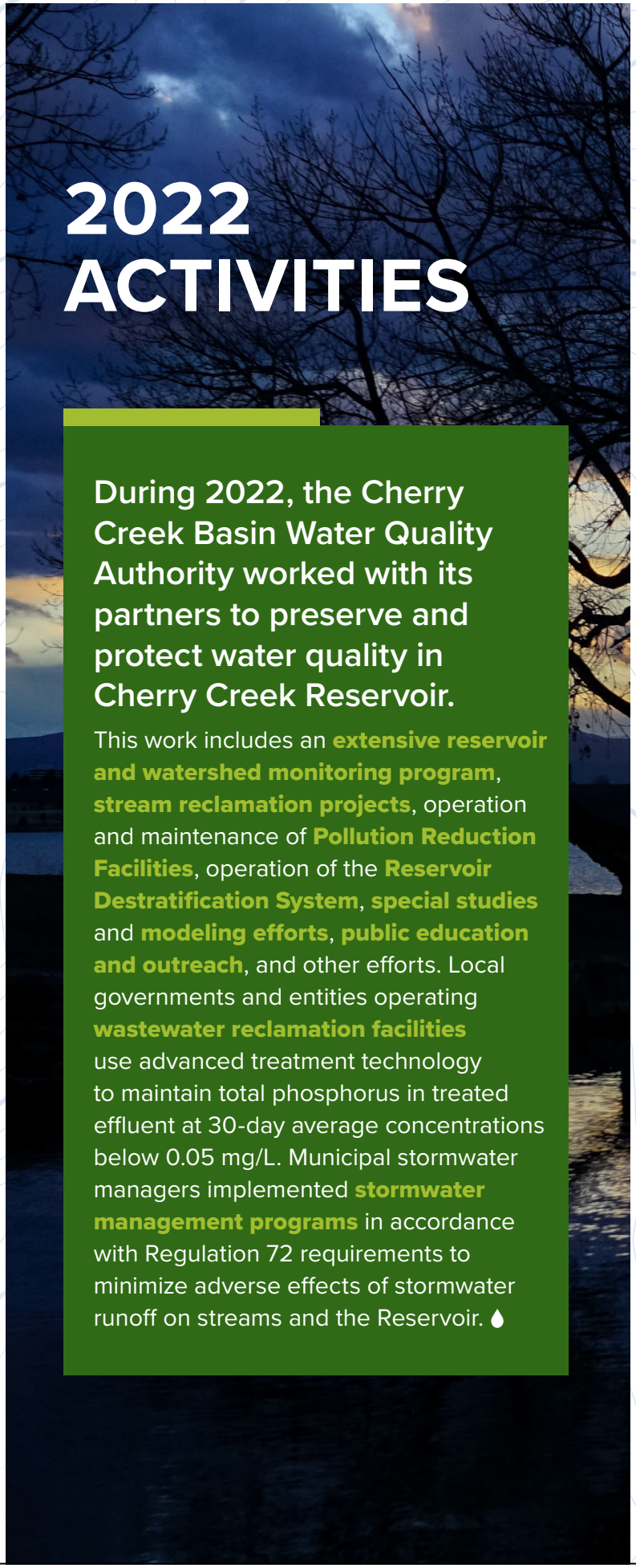
CHERRY CREEK BASIN
WATER QUALITY AUTHORITY

ANNUAL REPORT ON ACTIVITIES



This is an interactive document with hyperlinks. Clicking on bold green text will take you to the referenced material on the CCBWQA **interactive website**.

2022 ACTIVITIES



During 2022, the Cherry Creek Basin Water Quality Authority worked with its partners to preserve and protect water quality in Cherry Creek Reservoir.

This work includes an **extensive reservoir and watershed monitoring program**, **stream reclamation projects**, operation and maintenance of **Pollution Reduction Facilities**, operation of the **Reservoir Destratification System**, **special studies** and **modeling efforts**, **public education and outreach**, and other efforts. Local governments and entities operating **wastewater reclamation facilities** use advanced treatment technology to maintain total phosphorus in treated effluent at 30-day average concentrations below 0.05 mg/L. Municipal stormwater managers implemented **stormwater management programs** in accordance with Regulation 72 requirements to minimize adverse effects of stormwater runoff on streams and the Reservoir.

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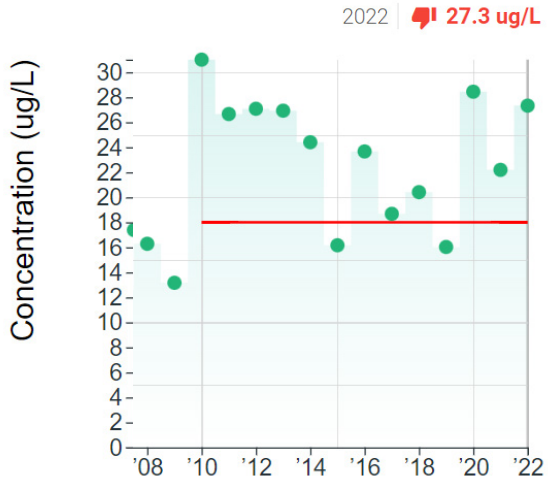
HOW IS THE RESERVOIR?

Cherry Creek State Park has a record number of visitors every year, and the Reservoir continues to provide space where people enjoy recreating and connecting. Colorado Parks and Wildlife biologists reported that the **walleye fishery** is doing well. In 2022, the Reservoir supplied over 61 million eggs for rearing in the hatcheries to be used in the state stocking programs and 4.3 million walleye were stocked to maintain healthy populations.

Seasonal **phosphorus concentrations in the Reservoir** were lower during the past two years than they have been relative to the average over the past 20 years. Despite on-going efforts to reduce nutrient loading to the Reservoir, the Reservoir did not attain its chlorophyll-a standard of 18 ug/L during 2022. The average chlorophyll-a concentration was **27.3 ug/L** for the growing season of July through September. The Reservoir has exceeded the standard for four of the past five years. Additionally, several undesirable **blue-green algae blooms** occurred during the hot summer months, and a bloom in June was responsible for closure to human contact due to detection of toxins. A major storm event in August helped disrupt the algal blooms, but also caused a drop in **dissolved oxygen** that resulted in the Reservoir not meeting the criteria of being above 5 mg/L throughout the water column as set forth in Regulation 38. The Reservoir attained water quality standards for pH and temperature.

Some of the factors affecting conditions in the Reservoir are challenging to control and result in year-to-year variations in water quality and environmental conditions. Some of these factors include weather conditions such as **temperature, wind, and precipitation patterns**. Other factors include **natural sources of phosphorus** loading from the watershed and **alluvial groundwater** and release of **stored nutrients from reservoir sediments (internal loading)**. CCBWQA operates a Reservoir Destratification System from April through October to help mitigate some of these influences.



Seasonal Mean Concentrations of Chlorophyll-a Measured in Cherry Creek Reservoir

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HOW IS THE WATERSHED?

The 386-square mile watershed has **experienced significant growth** since Control Regulation 72 was implemented. Baseline loading of phosphorus from **wastewater reclamation facilities** is well controlled, with these point sources contributing less than 3 percent of the phosphorus load to the Reservoir.

CCBWQA **monitors phosphorus and nitrogen concentrations in Cherry Creek and Cottonwood Creek** since they are the two main inflows to the Reservoir. Key findings from 2022 include:

- Cherry Creek's **streamflow** was less than half of the 5-year average. Cherry Creek accounted for two-thirds of the streamflow and Cottonwood Creek accounted for one-third of the streamflow into the Reservoir. Although lower inflows often correspond to lower nutrient loads to the reservoir, lower inflows also lead to lower water levels, higher temperatures, and longer residence time of water stored in the reservoir. These factors create conditions that are conducive to increased algal growth potential.
- Total phosphorus concentrations in both Cherry Creek and Cottonwood Creek were higher than the previous five-year (2017-2021) average, but lower than the historical (WY 2000-2016) values.
- Phosphorus concentrations in Cottonwood Creek are 70% lower than concentrations in Cherry Creek.
- Total nitrogen concentrations in both Cherry Creek and Cottonwood Creek were higher than both the previous five-year (2017-2021) average and the historical (WY 2000-2016) values.
- Nitrogen concentrations in Cherry Creek were 25% lower than concentrations in Cottonwood Creek.
- The CCBWQA **pollution reduction facilities (PRFs)** are effectively reducing phosphorus and suspended solids during storm flows.

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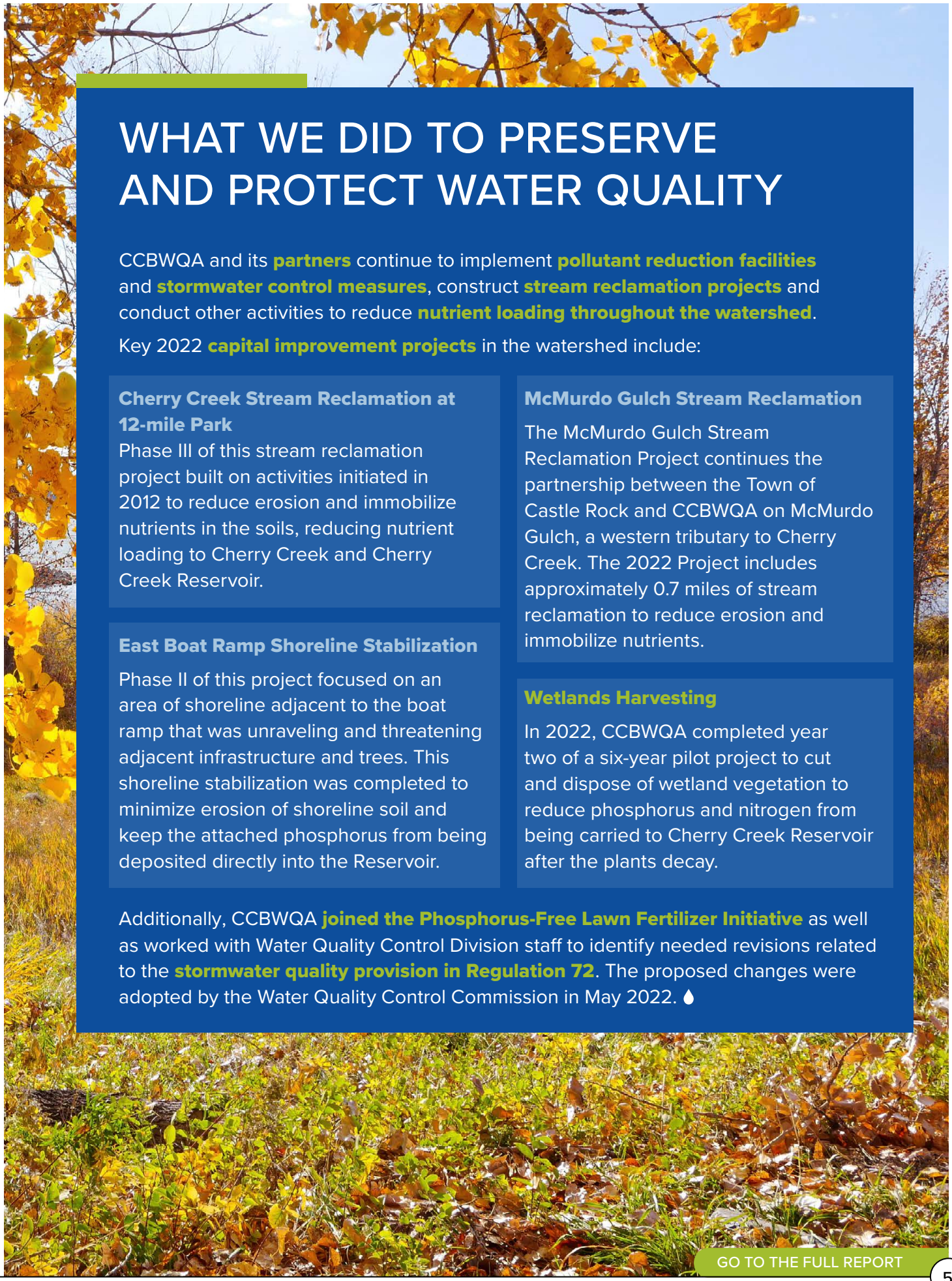

WHAT WE DID TO PRESERVE AND PROTECT WATER QUALITY

CCBWQA and its **partners** continue to implement **pollutant reduction facilities** and **stormwater control measures**, construct **stream reclamation projects** and conduct other activities to reduce **nutrient loading throughout the watershed**.

Key 2022 **capital improvement projects** in the watershed include:

Cherry Creek Stream Reclamation at 12-mile Park

Phase III of this stream reclamation project built on activities initiated in 2012 to reduce erosion and immobilize nutrients in the soils, reducing nutrient loading to Cherry Creek and Cherry Creek Reservoir.

East Boat Ramp Shoreline Stabilization

Phase II of this project focused on an area of shoreline adjacent to the boat ramp that was unraveling and threatening adjacent infrastructure and trees. This shoreline stabilization was completed to minimize erosion of shoreline soil and keep the attached phosphorus from being deposited directly into the Reservoir.

McMurdo Gulch Stream Reclamation

The McMurdo Gulch Stream Reclamation Project continues the partnership between the Town of Castle Rock and CCBWQA on McMurdo Gulch, a western tributary to Cherry Creek. The 2022 Project includes approximately 0.7 miles of stream reclamation to reduce erosion and immobilize nutrients.

Wetlands Harvesting

In 2022, CCBWQA completed year two of a six-year pilot project to cut and dispose of wetland vegetation to reduce phosphorus and nitrogen from being carried to Cherry Creek Reservoir after the plants decay.

Additionally, CCBWQA **joined the Phosphorus-Free Lawn Fertilizer Initiative** as well as worked with Water Quality Control Division staff to identify needed revisions related to the **stormwater quality provision in Regulation 72**. The proposed changes were adopted by the Water Quality Control Commission in May 2022.

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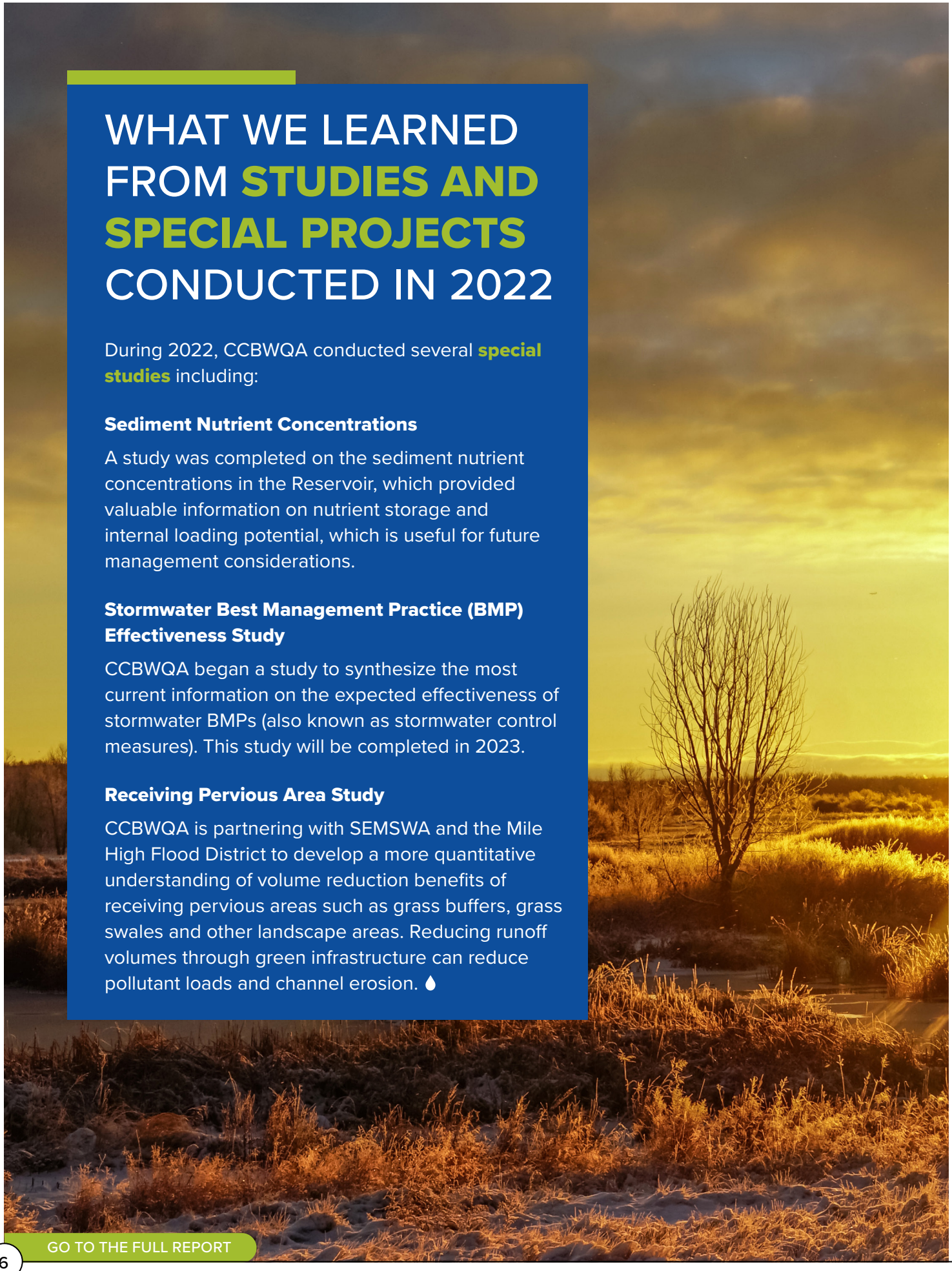

WHAT WE LEARNED FROM **STUDIES AND SPECIAL PROJECTS** CONDUCTED IN 2022

During 2022, CCBWQA conducted several **special studies** including:

Sediment Nutrient Concentrations

A study was completed on the sediment nutrient concentrations in the Reservoir, which provided valuable information on nutrient storage and internal loading potential, which is useful for future management considerations.

Stormwater Best Management Practice (BMP) Effectiveness Study

CCBWQA began a study to synthesize the most current information on the expected effectiveness of stormwater BMPs (also known as stormwater control measures). This study will be completed in 2023.

Receiving Pervious Area Study

CCBWQA is partnering with SEMSWA and the Mile High Flood District to develop a more quantitative understanding of volume reduction benefits of receiving pervious areas such as grass buffers, grass swales and other landscape areas. Reducing runoff volumes through green infrastructure can reduce pollutant loads and channel erosion.

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OUR PLANS FOR 2023

CCBWQA will continue its routine activities along with some new activities in 2023 including:

- Continue the **extensive long-term monitoring** program that includes: **weather** and **stream flow** conditions; **water quality in the Reservoir**, **groundwater**, **Cherry Creek and Cottonwood Creek**, and other tributaries; **Pollutant Reduction Facility performance**; and **phytoplankton** and **zooplankton dynamics** in the Reservoir.
- Use long-term Reservoir data and the Reservoir model to develop appropriate **site-specific nutrient standards** for the Reservoir.
- Begin a major update to the 2012 Watershed Plan, including a kickoff workshop in September 2023. The updated Watershed Plan includes a significant effort **to integrate geospatial data** from multiple partners into the CCBWQA's Data Portal.
- Identify and execute additional scenarios for the **watershed model** to help identify and prioritize future nutrient-reduction strategies.
- **Invest over $3.1 million** in stream reclamation projects in the watershed. These include projects on Cherry Creek, McMurdo Gulch, Happy Canyon, Dove Creek, and Piney Creek. Project partners include Mile High Flood District, SEMSWA, Castle Rock and Parker.
- Host a workshop to identify follow-up actions needed to stabilize and reclaim the portion of Cherry Creek between the Reservoir and the Park Boundary.
- Support extension of a **drainage master plan** on Lone Tree Creek, Windmill Creek and Cottonwood Creek from Park boundary to the Reservoir, collaborating with SEMSWA and Mile High Flood District.
- Operate the Reservoir Destratification System from April through October.
- Continue the **wetland harvesting pilot project** for the Pollution Reduction Facility on Cottonwood Creek.
- Host the Cherry Creek Stewardship Partners **annual conference** in the fall of 2023.

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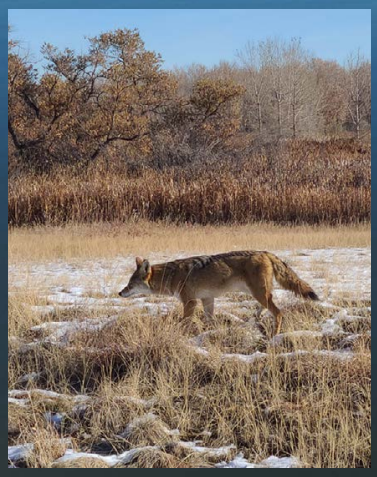

LEARN MORE ABOUT THE PROGRAM

- CCBWQA WY 2022 Annual Report on Activities
- WY 2022 Monitoring Program Annual Report
- CCBWQA Data Portal
- Cherry Creek Basin Water Quality Authority Website
- Cherry Creek Stewardship Partners
- Cherry Creek State Park
- CCBWQA Interactive Map

THANK YOU TO OUR PARTNERS

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WWTFs

Report created by LRE WATER + CCBWQA

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