

# Middle Co. AG Collaborative-Phase 1

## Final Report



Prepared for:  
Colorado Water Plan Grant Program  
Attn: Nora Flynn

July 7, 2023

Applicant: Trout Unlimited  
Grant Amount: \$20,000.00  
Prepared by: Richard Van Gytenbeek



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## **Introduction**

The Middle Colorado AG Collaborative originated through a progression of successful fish passage projects in Elk and Canyon Creeks, both tributaries to the Colorado River mainstem between Glenwood Springs and New Castle, CO. Project milestones are as follows:

- 1) 2018-Successful completion of the Ware and Hinds fish passage project enables thousands of Colorado River trout to spawn in Elk Creek.
- 2) 2020-Completion of the Middle Colorado Integrated Water Management Plan (MCIWMP) identifies fish passage projects as a major planning goal. This goal is added to the CWCB and CBRT Projects List confirming basin and state support for this MCIWMP goal.
- 3) 2021-Completion of the Canyon Creek fish passage project which now enables both spring and fall spawning fish to access the Canyon Creek drainage.

In 2022, TU created the Middle Colorado AG Collaborative (MCAC) to continue to make fish barriers passable by working with irrigation diversion owners to upgrade diversion infrastructure thereby increasing diversion efficiency and enabling fish passage. This multiple benefit project has three phases:

- 1) Phase 1-Identification of irrigation diversions that are fish barriers or require seasonal in-channel repairs that result in environmental damage. Outreach to irrigation owners to determine willingness to upgrade the structures to improve fish passage and increase diversion efficiency. Willing owners work with the project engineer to create conceptual plans for modifications to their infrastructure.
- 2) Phase 2-Selected engineer to create construction ready plans/specifications from the concept plans.
- 3) Phase 3-Construct the identified partner projects.

Phase 1 is now complete. This report details how the projects were identified, project partners and their conceptual plans to upgrade their irrigation infrastructure to improve diversion efficiency and make them fish friendly.

## **Background**

**Project Goal:** Elk Creek and Canyon Creeks originate on the south side of the Flattop Range and flow south to their confluence with the Co. River main stem. The creeks are perennial, freestone streams that historically provided excellent spawning and rearing habitat to fish from the Co. River main stem. Over time, the creation of agricultural diversion structures has blocked spawning fish from moving upstream. Trout Unlimited has worked in these basins since 2015 with agricultural irrigators to make structures passable and if desired by owners, to upgrade irrigation infrastructure. Recently, Trout Unlimited initiated a project called the Middle Colorado AG Collaborative (MCAC) in the spring of 2022. The project goal is to build on the successful Ware and Hinds and Canyon Creek fish passage projects by continuing to upgrade irrigation infrastructure to increase diversion efficiency and improve fish passage to spawning rainbow and brown trout.

### **Phase 1 Objectives:**

- 1) Inventory and identification of irrigation diversion structures (Elk and Canyon Creeks) that are fish passage barriers and/or are detrimental to the environment through their operation and maintenance.
- 2) Contact the owners of irrigation diversion structures identified in Objective 1 and determine their willingness to collaborate on plans to modify their structures to enable fish passage. Willing owners are encouraged to incorporate additional improvements to their structures that improve the efficiency, operation and maintenance of the diversions. In some cases these improvements may be applied to water delivery systems to further improve efficiencies, operation and maintenance and improve in-channel flow regimes through voluntary bypass flow.
- 3) Work with willing irrigation infrastructure owners to complete mutually agreeable concept design plans to modify structures. These conceptual designs will form the basis for project construction plans and specifications to be used to field construct the improvements.

## **Methods**

The three established project objectives were accomplished throughout the period, mid-summer 2022 through late spring 2023. During this time, the project team has executed agreements with three separate owners to address seven structures that present fish barriers and/or are detrimental to the environment through their operation and maintenance. Concept designs to modify or eliminate identified structures have been completed and approved by the owners. These concept plans will be used as the design basis for construction plans and specifications to be completed in Phase 2.

Concept plans for five diversion projects will address seven total diversions (6 in Elk Creek and 1 in Canyon Creek). A brief description of each diversion project follows with copy of the full conceptual plan set for all 5 diversion projects presented at the end of this section.

**Diversion Project #1 (Elk Creek)** involves the combination of two existing diversions into a single diversion. This will involve abandoning the Ryden No. 1 Ditch point of diversion and moving it upstream to the C.O./C.P. Pierson Ditch point of diversion. The Ryden No. 1 headgate and rock diversion dam will be removed and the stream channel and banks restored. The combination of the two ditches will require that the C.O./C.P. Pierson Ditch be enlarged to accommodate the additional water right in the Ryden No. 1 Ditch including a new permanent diversion dam (with fish passage), redesigned headgate structure (with fish screen) and ditch/pipe enlargement to accommodate increased flows.

Note: This combination of ditches will require a point of diversion change approved by the Colorado water court. Initial contact with the Division 5 engineer indicates that this change will qualify for the abbreviated point of diversion change form which does not require a water court hearing. The landowner will execute this change through his personal attorney.

**Diversion Project #2 (Elk Creek)** also involves the combination of two existing diversions into a single diversion. This combination will involve the abandonment of the Benson-Pierson-Nelson Ditch existing point of diversion and moving it upstream to the Ryden No. 2 point of diversion. Like Diversion Project #1 removal of the Benson-Pierson-Nelson ditch will include the removal of the headgate and rock diversion dam and remediation of the stream channel and stream banks. The Ryden No. 2 Ditch will be reconstructed to accommodate the additional water right in the Benson-Pierson-Nelson Ditch including a new permanent diversion dam (with fish passage), redesigned headgate structure (with fish screen) and ditch/pipe enlargement to accommodate increased flows.

Note: This combination of ditches will require a point of diversion change approved by the Colorado water court. Initial contact with the Division 5 engineer indicates that this change will qualify for the abbreviated point of diversion change form which does not require a water court hearing. The landowner will execute this change through his personal attorney.

**Diversion Project #3 (Elk Creek)** Currently the Trout Ditch conveys water downstream on the east side of the Elk Creek valley to a siphon that conveys diverted water under the Elk Creek channel to the west side of the valley where it is used for flood irrigation. The new point of diversion will use the siphon tube to pump water to the decreed point of use. The concept plans indicate a stilling basin, pumphouse, electrical connections, new pressure line to deliver water to the decreed lands and other ancillary project components. Some stream

channel and bank restoration will be performed at the old Trout Ditch diversion point, however, this will be minimal since the diversion has historically been a push-up type dam which will rehabilitate in future seasonal high water runoff periods.

**Diversion Project #4 (Elk Creek)** This project will address fish passage at the Roseman Ditch Company diversion and headgate structure. It will also address diversion efficiency and channel bedload aggregation behind the diversion structure. While a number of different designs were considered, TU and the Roseman Ditch Co. will incorporate the following: rebuild the headgate and weir structure to incorporate a fish ramp, install two sluiceways on opposite sides of the fish ramp, telemetry actuated headgate with fish screen and a new flow measuring device. These improvements will enable fish passage, move channel bedload downstream more efficiently and improve diversions which may allow for voluntary bypass flows.

**Diversion Project #5 (Canyon Creek)** This project will be almost identical to the Roseman Ditch project without the double sluiceway. As the concept plans show the project will employ a fish ramp, rebuilt headgate with telemetry actuated capabilities and fish screen, new measuring device and roughly 1000 feet of down ditch piping to eliminate transmission losses.

**Concept Design Drawing Package for Diversion Projects #1-#5** (highlight icon, right click, scroll to object on menu and open).



Colorado Ag  
Collaborative Concept

## **Conclusions and Discussion**

### **Meeting Objectives.**

Objective #1- Inventory and identification of irrigation diversion structures (Elk and Canyon Creeks) that are fish passage barriers and/or are detrimental to the environment through their operation and maintenance.

In both Elk Creek and Canyon Creek the project team identified problem diversions immediately upstream of TU's past fish passage projects to ensure that new projects provided an unobstructed path for migrating fish. By successively moving upstream to

identify problem structures the project will open an additional 7 miles of Elk Creek and at least 1 mile of Canyon Creek.

*Objective #2- Contact the owners of irrigation diversion structures identified in Objective 1 and determine their willingness to collaborate on plans to modify their structures to enable fish passage. Willing owners are encouraged to incorporate additional improvements to their structures that improve the efficiency, operation and maintenance of the diversions. In some cases these improvements may be applied to water delivery systems to further improve efficiencies, operation and maintenance and improve in-channel flow regimes.*

In Elk Creek the project team contacted the Roseman Ditch Company and the owner of the Meadow Creek Ranch. The Roseman Ditch Co. has 65 shareholders and the project team initially reached out to the board of directors with a request to partner. With the board approval the project team made presentations to the shareholders. The shareholders agreed to partner with TU and explore a number of design options, the result is memorialized in the concept design package.

The owner of Meadow Creek Ranch was very receptive to combining and upgrading diversion infrastructure. The owner is an absentee owner and the ranch is managed by the Robertson family, longtime sheep ranchers in the area. In addition to upgrading diversions, both the Roberson's and the owner are very interested in continuing to convert from flood irrigation to sprinkler irrigation.

In Canyon Creek TU has partnered with the J-Wolverton Ditch Co. to redevelop their diversion and headgate system. This is next fish barrier upstream from the recently retrofitted CDOT culvert system conveying Canyon Creek under I-70. In addition to the diversion/headgate the ditch company was very concerned about ditch transmission losses. This will be addresses by piping the first 1000 feet of ditch which will enable the company to voluntarily bypass flows during the late season. The project team initially met with the board and then with shareholders to secure the partnership.

*Objective #3- Work with willing irrigation infrastructure owners to complete mutually agreeable concept design plans to modify structures. These conceptual designs will form the basis for project construction plans and specifications to be used to field construction the improvements.*

Project partners have successfully completed conceptual designs for their respective infrastructure upgrades and are ready to proceed to refining the concepts into field ready construction plans and specifications.

### **Final Project Budget.**

The project budget was executed as proposed. There has been additional time necessary to partner with the two ditch companies that required shareholder approval. That time was provided pro bono to the project by TU and Wright Water Engineers. The original CWCB budget is attached for reference (highlight icon, right click, scroll to object on menu and open).



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