COLORADO
Colorado Water Conservation Board
Department of Natural Resources

# Upper Arkansas Watershed Resiliency Plan
# Phase 1:

Stakeholder Engagement, Needs Assessment, Riparian/ Floodplain Condition

Upper Arkansas Conservation District

Final Progress Report
June 2023

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**Upper Arkansas Watershed Resiliency Plan Phase 1:**

Stakeholder Engagement, Needs Assessment, Riparian/ Floodplain Condition

## Project Information

**Name of Applicant:** Upper Arkansas Conservation District (fiscal agent)

**Name of Water Project:** Upper Arkansas Watershed Resiliency Plan Phase 1: Stakeholder Engagement, Needs Assessment, Riparian/Floodplain Condition

| | |
|---|---|
| **CWCB Watershed Restoration Program Funding:** | $99,000.00 |
| **CWCB Water Plan Program Funding:** | $27,500.00 |
| **Matching Funding (cash):** | $50,000.00 |
| **Matching Funding (In-kind):** | $35,000.00 |
| **Total Project Budget:** | $211,500.00 |

## Project Summary & Objectives

The Upper Arkansas Watershed Resiliency Plan will enhance collaboration and project development within the Upper Arkansas Basin in Chaffee County, CO to build long-term watershed resilience in the region. Phase 1 will build on pre-planning work developed with support from River Network that began in May 2020. The Upper Arkansas Watershed Partnership (UAWP) will oversee the planning process and is a broad coalition of local organizations and water users (led by the Upper Arkansas Conservation District, Central Colorado Conservancy, and Colorado Trout Unlimited). UAWP intends to leverage preliminary stakeholder surveys, local resource management plans, and partner collaboration to protect and enhance water quality and quantity in the Upper Arkansas Basin.

The primary objectives of Phase 1 of the Upper Arkansas Watershed Resiliency Plan are to:

1. Increase community understanding of diverse water uses and issues in the Basin and leverage local expertise to solve important watershed health and water user challenges.
2. Combine and assess existing studies and plans related to ecosystem health, hydrology, geomorphology, wetland/riparian condition, water use, biology, and land use planning.
3. Assess existing riparian/floodplain condition and identify strategies for increased protection and enhancement to mitigate potential impacts associated with flooding and urban development.
4. Provide support for agricultural producers and water users to protect their water rights and identify multi-beneficial opportunities related to storage, conveyance, and application to mitigate challenges and bolster long-term economic viability of agriculture in the region.

## Scope of Work

To complete Phase 1 of this plan, the Upper Arkansas Watershed Partnership has created 6 primary tasks:

1. Project management;
2. Stakeholder and community engagement;
3. Compilation of existing studies and gap analysis;
4. Assessment of riparian/floodplain condition and fluvial hazard mapping;
5. Agricultural needs assessment and coordination; and
6. Creation of work plan for Phase 2.

## Task 1 – Project Management and Coordination

### Description of Task

This task will support the Upper Arkansas Watershed Partnership (UAWP) and the development of the Upper Arkansas Watershed Resiliency Plan - Phase 1 project. The Central Colorado Conservancy (CCC), Upper Arkansas Conservation District (UACD), and Trout Unlimited (TU) will utilize professional staff to provide oversight needs of the Project, specifically: project tracking and management, stakeholder coordination, budgeting, contract management, grant-writing, and reporting.

### Method/Procedure

- Monthly project check-in meetings with UAWP, CCC, UACD, TU and other core partners
- Compile monthly consultant invoices; track project budget, deliverables, and schedule and document in monthly progress reports (includes tracking of in-kind hours and cash match).
- Develop and submit required CWCB 6-month progress reports; final report

### June 2023 Final Report on Deliverables for Task 1

*Regular Progress Reports*

✓ 15 December 2021, first progress report submitted

✓ 30 June 2022, second progress report submitted

✓ 22 June 2023, Final report herein

*Regular Invoices*

✓ December 2021, first invoice submitted

✓ June 2022, second invoice submitted

✓ June 2023, final invoice submitted

## Task 2 – Stakeholder Collaboration and Community Engagement

### Description of Task

The UAWP will update and execute its Stakeholder Engagement Plan that was originally developed during the pre-planning phase of the project. The overarching goals of this task are to: 1) convene watershed stakeholders in peer-to-peer learning and coordination events that facilitate better understanding and collaboration around projects in the Valley; 2) increase community participation and understanding of complex water issues in the Basin; 3) establish working groups of subject-matter experts within the UAWP to facilitate collaboration and problem-solving related to water issues in the Valley.

### Methods/Procedure

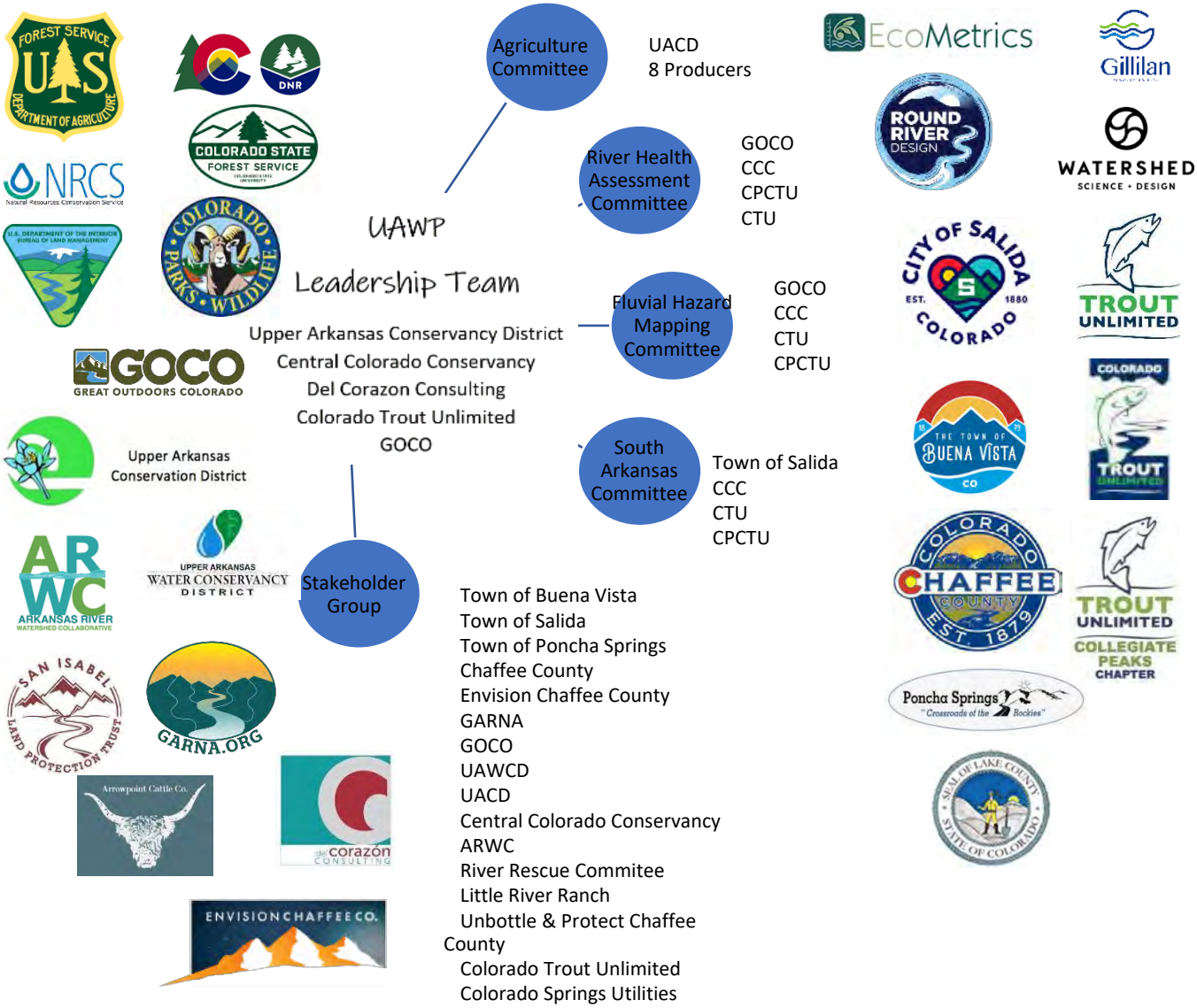
- Utilize a professional facilitator to guide the final development and execution of the UAWP Stakeholder Engagement Plan.
- Host regular UAWP stakeholder meetings, community engagement activities, and learning/collaboration events (average of at least 1 meeting/event every two months).
- Establish topic-specific work groups within UAWP to engage subject-matter experts in issue identification, problem-solving, and collaboration. These groups will also add to the efficiency of the organization and Phase 1 Project by spreading the workload and creating public buy-in.
- Develop surveys to guide the focus of water education programming and track effectiveness over time.
- Create and maintain a UAWP website that will provide information to the public and house relevant water-related studies and local plans.

## June 2023 Final Report on Deliverables for Task 2

*Formalized Stakeholder/Partner List and Organizational Structure*

(Work Groups, Revolving Core Leadership Team, Etc.)

- ✓ After 24 months, we have engaged many stakeholders and partners and our initial organizational structure has been established. Recognizing this will naturally grow and evolve, we are already expanding our network to Lake County and our stakeholder list has grown considerably and is now more inclusive.
- ✓ As of June 2023 the partnership is undergoing a round of facilitation to formalize our structure and decision making processes, synthesize assessment data and establish an action plan for our path forward.
- ✓ Also as of June 2023, we are entering into a Memorandum of Understanding with River Network that includes participation in their "River Smart Communities" program.
- ✓ Link to spreadsheet with names of stakeholders.
- ✓ Charter


UAWP
Leadership Team
Upper Arkansas Conservancy District
Central Colorado Conservancy
Del Corazon Consulting
Colorado Trout Unlimited
GOCO
Agriculture Committee
UACD
8 Producers
River Health Assessment Committee
GOCO
CCC
CPCTU
CTU
Fluvial Hazard Mapping Committee
GOCO
CCC
CTU
CPCTU
South Arkansas Committee
Town of Salida
CCC
CTU
CPCTU
Stakeholder Group
Town of Buena Vista
Town of Salida
Town of Poncha Springs
Chaffee County
Envision Chaffee County
GARNA
GOCO
UAWCD
UACD
Central Colorado Conservancy
ARWC
River Rescue Commitee
Little River Ranch
Unbottle & Protect Chaffee County
Colorado Trout Unlimited
Colorado Springs Utilities
Arkansas Basin Roundtable
Del Corazon Consulting
Arrowpoint Cattle Company
CPW
USFS
USFWS

*List of Priority Issues and Studies*

✓ Compilation of existing data/reports is now available on the UAWP web site. The River Health Assessment and Fluvial Hazard Zone Mapping consultants have submitted their findings and the UAWP technical team is evaluating that data to ensure a robust and effective communication and outreach plan as well as a prioritized list of project possibilities. This information will inform work in Tasks 3 & 4.

*Survey Results*

# Survey Said:

What do you think these are the 3 most critical issues?

| Issue | Percent of Respondents |
|---|---|
| | |
| Development pressure/land use change | 50% |
| Wildlife fire threats | 43% |
| Water quantity | 34% |
| Fragmentation and destruction of habitat | 31% |
| Degradation of the stream/river corridor | 25-28% |
| Forest health | |
| Recreational pressure | |
| Water quality | |
| Threats to water rights | 15% |
| Water distribution infrastructure (condition/capacity) | |

*Educational Materials*

✓ The following materials were developed during peer learning sessions and community engagement events.

✓ UAWP tri-fold brochure (below)

✓ Additional Materials are being developed in the next phase to communicate and educate the results of the Fluvial Hazard Zone Mapping and River Health Assessments and what that means for projects in the future.


*Meetings*

*Upper Arkansas River Basin Restoration & Resiliency Coalition aka: Upper Arkansas Watershed Partnership*

✓ **3 Feb 2020**
SMP Planning Meeting Notes

✓ **28 May 2020**
UAWP Leadership Team Meeting #1 Agenda, and Minutes/ Summary

✓ **9 June 2020**
UAWP Leadership Team Meeting #2 Agenda, and Minutes/ Summary

✓ **24 June 2020**
UAWP Leadership Team Meeting #3 Agenda, and Minutes/ Summary

✓ **16 July 2020**
UAWP Leadership Team Meeting #4 Agenda, and Minutes/ Summary

✓ **24 August 2020**
UAWP Leadership Team Meeting #5 Agenda, and Minutes/ Summary

✓ **9 September 2020**
UAWP Leadership Team Meeting #6 Agenda, and Minutes/ Summary

✓ **22 October 2020**
UAWP Stakeholders Convening Meeting #1 Discussion Background, Minutes/ Summary, Breakout Discussions Group A and Group B, Zoom Recording, and Presentation Slides

✓ **30 November 2020**
UAWP Stakeholders Meeting #2 Agenda, Minutes/ Summary, Breakout Discussions Group A and Group B, ?? Zoom Recording, and Presentation Slides

✓ **25 February 2021**
UAWP Stakeholders Meeting #3 Minutes/ Summary, Zoom Recording, and Presentation Slides: Stream Health Assessment by EcoMetrics, Mark Beardsley & Fluvial Hazard Mapping by CWCB, Round River Design, Watershed Science and Design & WASH Engineering
*Introduction to River Corridor Assessment*

✓ **22 April 2021**
UAWP Stakeholders Meeting #4 Agenda, Minutes/

Summary, and Zoom Recording
*Hazard Planning and Mitigation*

✓ **24 June 2021**
UAWP Stakeholders Meeting #5 Agenda, Minutes/ Summary, and Zoom Recording
*Floodplain Management*

✓ **2 August 2020**
UAWP Technical Team Meeting Agenda, Minuets/ Summary, and Zoom Recording

✓ **26 August 2021**
UAWP Stakeholders Meeting #6 Agenda, Minutes/ Summary, and Zoom Recording
*Formation of Ag Committee*

✓ **23 September 2021**
UAWP Stakeholders Meeting in person! Photos of stickies
*Planning session, created timeline for next year +*

✓ **13 October 2021**
UAWP Leadership Team Meeting

✓ **28 October 2021**
UAWP Stakeholders Meeting Agenda, Summary, Presentation UAWCD, Presentation Poncha Springs, Recording
*Water Supply*

✓ **1 November 2021**
UAWP Leadership Team Meeting
*Project Communication Strategy discussion*

✓ **3 November 2021**
UAWP Leadership Team Meeting

✓ **9 November 2021**
Arkansas Headwaters Wetland Focus Area Committee Meeting

✓ **18 November 2021**
South Arkansas Sub Committee Meeting

✓ **2 December 2021**
UAWP Stakeholders Meeting Pre-Meeting Survey, Agenda, Summary
*Planning for 2022*

✓ **8 December 2021**
UAWP Leadership Team Meeting

✓ **14 December 2021**
South Arkansas Sub Committee Meeting

✓ **5 January 2022**
UAWP Leadership Team Meeting

✓ **27 January 2022**
UAWP Stakeholders Meeting Agenda, Pre-meeting notes, Presentation, Summary

✓ **2 February 2022**
UAWP Leadership Meeting

✓ **24 February 2022**
UAWP Stakeholders Meeting Summary, Recording, Agenda

✓ **2 March 2022**
UAWP Leadership Meeting Agenda, Notes

✓ **24 March 2022**
UAWP Stakeholders Meeting

✓ **6 April 2022**
UAWP Leadership Team Meeting

✓ **April Stakeholder meeting** members encouraged to attend the Arkansas River Basin Water Forum in Salida. CTU offered three scholarships to encourage stakeholders who would otherwise not have been able to attend.

✓ **4 May 2022**
UAWP Leadership Team Meeting

✓ **10 May 2022**
Healthy River Corridors Strategy Session

✓ **1 June 2022**
UAWP Leadership Team Meeting

✓ **23 June 2022**
UAWP Stakeholders Meeting

✓ **6 July 2022**
UAWP Leadership Team Meeting

✓ **7 July 2022**
River Health Assessment deep dive

✓ **27 July 2022**
South Arkansas Field Trip

✓ **3 August 2022**
UAWP Leadership Team Meeting

✓ **25 August 2022**
Stakeholder meeting (meeting documents)

✓ **7 September 2022**
UAWP Leadership Team Meeting

- ✓ **22 September 2022**
  Fluvial Hazard Zone deep dive
- ✓ **27 October 2022**
  Stakeholder meeting (meeting documents)
- ✓ **2 November 2022**
  UAWP Leadership Team Meeting
- ✓ **14 December 2022**
  UAWP Leadership Team Strategy Session Materials
- ✓ **1 February 2023**
  UAWP Leadership Team Meeting
- ✓ **1 March 2023**
  Leadership Meeting
- ✓ **5 April 2023**
  UAWP Leadership Team Meeting
- ✓ **3 May 2023**
  UAWP Leadership Team Meeting - Materials

*UAWP Web Site*

The domain uawp.org has been purchased along with hosting and a web site is now live. Website discussion about design parameters, domain name, and content organization has been very successful and we are pleased with the way it looks. The 23 June 2022 stakeholders meeting announced its launch and further review and additions are encouraged into the future. This site is intended to grow and become more useful over time.

## Task 3 – Preliminary Assessment of Studies and Plans, Gap Analysis

### Description of Task

The UAWP will build on Task 2, utilizing a combination of professional services and stakeholder workgroups to conduct a preliminary assessment of all relevant ecological, agricultural, municipal, recreational, and forest health/wildfire risk studies to: 1) determine current status; 2) identify gaps in knowledge that can be filled in Phase 2; and 3) identify opportunities for enhanced collaboration and/or cooperative funding. The analysis of current studies will also help inform the prioritization of a stream assessment framework and FHZ mapping completed in Task 4.

### Methods/Procedure

- Utilize UAWP workgroups to identify and summarize existing data and priorities relevant to their area of focus (agriculture, land use, environment, recreation, etc.)
- Identify priority reaches for further data gathering and stream health assessment.
- Develop RFP and hire consultant to combine existing data into recommended stream assessment framework (i.e. COSHAF, FACStream, etc.).
- Identify gaps in data or areas that need "ground-truthing". Conduct desktop surveys (EPA tier 1) or rapid field assessments (EPA tier 2) to fill in prioritized data gaps.
- Present stream/riparian health assessment framework and prioritized list of community plan objectives to the UAWP workgroups and larger stakeholder group for feedback.

### June 2023 Final Report on Deliverables for Task 3

*Compilation of Existing Studies and Plan*

✓ A shared spreadsheet continues to be compiled with Existing Reports, Data Sets, Studies Underway, Learning Resources, and Project Examples. (LINK)

✓ **This is now prominently located on the website with the intention of making it more search-able and dynamic in the future. (LINK)**

*Prioritized List of Overlapping Community Plan Objectives and Data Gaps*

✓ Based on review of the resources available, we determined Chaffee County needed Fluvial Hazard Mapping, River Health Assessment, Agricultural needs surveyed, and additional water quality monitoring— water chemistry / heavy metals, benthic surveys/ habitat health, plus a dearth of non-point source water pollution surveys / fieldwork.

✓ Contracts for Fluvial Hazard Zone Mapping with Round River Design and River Health Assessment Reporting from EcoMetrics are completed and reviewed, preliminary report data has been received.

✓ A technical committee has been established with 6 experts including the consultants and it will be grown to include more key stakeholders in specific areas of expertise.

✓ This committee is reviewing and evaluating all the data and integrating it into a communication and outreach plan. Outcome of preliminary reviews will not only inform future areas to focus research but also likely locations to implement projects to conserve, protect, maintain, and improve the watershed.

*Stream Health Assessment Framework*

✓ This framework will be on prioritized stream reaches and tributaries within project area (est. 20-35 tributary stream miles depending on priority and available data).

✓ Results of the reports being reviewed this summer will produce this prioritized framework.

*Identified Project Opportunities and Data Needs for Phase 2.*

✓ This process is underway as of this final report, June 2023.

## Task 4 – Riparian/ Floodplain Condition Assessment and Fluvial Hazard Mapping

### Description of Task

This task will build on current collaborative processes within the County to assess the extent, condition, and enhancement opportunities of riparian areas and floodplains within the project scope. Existing local partnership opportunities include: Chaffee County Community Wildfire Protection Plan; 2020 Chaffee County Comprehensive Plan Update (land use planning); and 2021 update of the Chaffee County Hazard Mitigation Plan. The UAWP will continue to build relationships with stakeholders leading these initiatives to leverage CWCB grant funds and local expertise in order to: 1) assess current function and extent of riparian areas (supported by Task 3); 2) identify critical floodplains and deposition zones; 3) support strategies to protect, reconnect, and enhance areas that contribute to ecological function and flood mitigation.

The initial focus of Phase 1 (Task 4) will be in the valley bottom areas that start below USFS public land boundaries (steeper gradient, constrained valleys) and extend to the Arkansas River mainstem (est. 40 miles of primary tributary streams).

### Methods/Procedure

- Continue to build collaborative partnerships with planning agencies and local landowners to leverage resources and access private property for initial assessments.
- Work with local experts, partners, and landowners to prioritize assessment reaches and tributaries.
- Utilize a combination of desktop assessments (tier 1) and rapid assessments (tier 2, priority areas) to develop map and initial condition assessment of riparian areas on major tributaries. This work will help inform and leverage work completed in Task 3.
- Partner with local planning agencies (i.e. Chaffee County Office of Emergency Management) and experts (hired contractor) to support assessment of floodplain areas and fluvial hazard zones by utilizing a combination of fluvial hazard mapping, FEMA hazard/floodplain maps, and associated background research.

### June 2023 Final Report on Deliverables for Task 4

*Development of Prioritized Stream Reaches for Fluvial Hazard Zone (FHZ) Mapping*

✓ South Arkansas River, Chalk Creek, and Cottonwood Creek were initially identified and studied by Round River Design, and in early June 2022 it was determined that available data and budget would allow additional research including the below reaches. Early data has been received and is being reviewed by the technical committee.

  + 1.5 miles of the N. Fork of the South Arkansas River,
  + 1.5 miles of the bottom of Poncha Creek,
  + 1.5 miles of Ute Creek, and
  + 4.2 miles of Little Cochetopa Creek.

*Maps of FHZs, Active Floodplains, Riparian Corridors, and Identification of Potential Project Opportunities*

✓ The Maps that will be developed are intended to be used as information layers and will not be prescriptive.

✓ These maps with identified opportunities are now being evaluated and overlayed with other data sets for further analysis and collaboration.

*Identified Project Opportunities for Phase 2*

✓ Anticipate deliverable of this project opportunities list in the next phase of funding.

*Report That Identifies Procedure to Combine FHZ Mapping with Riparian/Stream Habitat Analysis*

✓ This report will be designed so that it can be utilized by the CWCB and other communities to perform similar work in the future and build on "Lessons Learned". Anticipate deliverable of this project opportunities list by end of grant cycle.

## Task 5 – Agricultural Needs Assessment & Coordination

### Description of Tasks

The UAWP will build on efforts from the pre-planning phase to better understand and support the issues and priorities of agricultural producers and large landowners in the County.

The primary goals of this task will be to:

1) Strengthen relationships with local agricultural water users;
2) Better understand the critical issues and priorities of agricultural producers and large landowners;
3) Identify mutually beneficial projects that can address those issues; and
4) Provide support for agricultural water users through education and protection of existing water rights.

Information developed in this process will also help inform conversations at the basin and state level regarding supply, abandonment, infrastructure, augmentation, and development.

**Methods/Procedure (Sub-Tasks)**

*Task 5.1: Agricultural Outreach, Education, and Coordination*

#### Description of Task

Task 5.1 will support the overall objectives of the Upper Arkansas Watershed Resiliency Plan and completion of Task 5: Agricultural Needs Assessment and Coordination by utilizing local agricultural liaisons to conduct outreach, facilitate workshops, and coordinate project management activities. The primary goals of this task are to: (1) strengthen relationships with agricultural water users and large landowners; (2) support those groups with topic-specific workshops; (3) facilitate the transfer of information on key issues to the larger planning team.

#### Methods/Procedure

- Develop Agriculture Sub-committee responsible for overseeing Agriculture Liaisons who will act as the primary points of contact for conducting needs assessment site visits.
- Leverage existing relationships to hire 1-2 part-time local agricultural liaisons that have strong connections to the agricultural community and knowledge of producer operations, water infrastructure, and key issues. These liaisons will work closely with the UAWP to develop materials, prioritize landowner outreach, host workshops, track budget and expenses, and report findings to the planning team.
- Conduct educational workshops led by subject-matter experts that address the interests and concerns of local producers and water users. Topics may be solicited through continued user/partner surveys, producer interviews, and/or UAWP focus areas. Workshop topics may include, but are not limited to: CDSS reporting, stream management planning, demonstration projects and group site visits, and Ag Water NetWORK trainings. Notes and key takeaways from each workshop will be included in project reports.
- In addition to direct field visits and irrigator interviews (Task 2), this task will also include regular presentations to key agricultural groups in the Valley (i.e. Chaffee County Stockgrowers Association, Upper

Arkansas Conservation District Board, Upper Arkansas Water Conservancy District, etc.). Topics may include updates on the progress of the project, as well as direct solicitation of feedback on key issues identified in the outreach process.

## June 2023 Final Report on Deliverables for Task 5.1

### Work Plans for Agricultural Liaisons

- ✓ An Ag Committee of 8 local ranchers has formed.
- ✓ This committee has met 4 times to work on development and implementation planning for the Needs Assessment.
- ✓ Instead of circulating a paper or electronic survey, we have learned that our local community of agricultural producers prefer to meet in person and have one-on-one conversations or meet in small groups. Additionally, the Ag Committee has chosen to perform the one-on-one conversations themselves and divided the workload geographically according to ditches and headgates.

### Materials and Minutes from Workshops and Training Events

- ✓ **22 October 2021:** A Small Acres and Good Neighbors workshop was held in collaboration with CSU Extension, NRCS and Realtors of Central Colorado. Topics included grazing on small acres, water rights, ditch easements, soil health and the right to ranch. This workshop reached an audience outside typical agricultural producers (small acreage landowners, new landowners & local realtors) with information on topics identified by members of the agriculture community as their top challenges – Ditches, Fences and Dogs. UAWP purpose, activities and upcoming opportunities were shared with participants. (LINK)
- ✓ **15-16 July 2022:** A Grazing Planning and Soil Health Workshop included drought resilience, grazing planning, innovative technologies (virtual fencing), succession planning and managing for profit. (LINK)
- ✓ **18 August 2022:** A second Small Acres and Good Neighbors workshop is being planned.
- ✓ **24 October 2022:** An Ag Community Peer to Peer learning event was held. Topics included: Virtual Fence and Soil Health Projects – lessons learned, opportunities, i.e. no till drill & drought tolerant seed mix, Irrigation infrastructure – needs assessment results and Sunnyside Ditch project, Funding opportunities including NRCS programs, Colorado Ag Water Alliance, Colorado Ag Water NetWORK, Colorado Water Conservation Board and Colorado State Conservation Board. (LINK)
- ✓ **October 19 2023**: Building on the success of previous Peer to Peer Learning Event a similar event will be held October 19, 2023. Topics will include climate smart practices to increase resilience in a changing climate.
- ✓ **TBD:** An in-depth workshop on water related topics (irrigation, water rights) is being planned. Survey participants were asked if they would be willing to participate including submitting topic related questions prior to the workshop. The curriculum will be developed as this information is compiled.

### List of Key Issues Identified by Agricultural Water Users and Workshop Participants

- ✓ This list was be developed during meetings and outreach events. (LINK)

### At Least (5) Workshops/ Agriculture-Specific Presentations

In addition to the four (4) workshops listed above, the following presentations were made

- ✓ **25 July 2021:** The Upper Arkansas Conservation District (UACD) held the annual Rancher 4H Community Dinner during Fair Week. The Agriculture Committee introduced the UAWP and its purpose as well as what opportunities are and will become available to the community. Participants were informed of an upcoming

needs assessment survey, and irrigation infrastructure project that is being developed collaboratively to serve as a demonstration project.

- ✓ **3 December 2021:** UACD and UAWP Ag committee members participated in Local Envision Chaffee County Ag Outreach Dinner. More detail information on the Ag Needs Assessment was share with opportunity for community feedback. Envision Ag Outreach
- ✓ **29 July 2022:** Annual Rancher 4H Community Dinner during Fair week, an update on the Ag Needs Assessment and resulting opportunities was presented.
- ✓ Monthly updates were presented at the Upper Arkansas Conservation District Board meetings.
- ✓ UAWP Stakeholder meetings were held every other month during 2021 and 2022, updates were presented at each of these meetings.
- ✓ The Ag Needs Assessment project was presented as part of the overarching Upper Arkansas Watershed Resiliency Planning project at the March 2022 Arkansas Basin Roundtable meetings as well as at regular Arkansas Basin Enviro Rec Committee meetings.
- ✓ The Ag Needs Assessment project was presented to members of the Chaffee County Cattleman's Association Board. Three members of Chaffe County Cattleman's Board also served on the Ag Sub-Committee and have shared regular updates with CCCA.

*Task 5.2: Agricultural Needs Assessment – Fieldwork*

### Description of Sub-Task

Develop and Conduct a Needs Assessment to

1. Identify issues, needs, and priorities of agriculture producers,
2. Assess interest/willingness to participate in detailed infrastructure and/or environmental health assessment for the purpose of identifying multi-beneficial improvement projects, and
3. Understand water rights issues and concerns.

### Methods/Procedure

- o The Agriculture Sub-Committee (formed in Task 1) will develop a field worksheet to be completed at each assessment site. As a starting point the following basic information will be collected; total acreage of agriculture operation, land use (crops, grazing, riparian areas, etc.), water rights (irrigation – sprinkler, flood, center pivot, springs and stock water), agriculture production, land management practices, water use documentation practices, landowner questions, concerns, and interests.
- o Agriculture Liaisons will conduct needs assessments through on-site visits, completing field worksheets (including photos and basic mapping utilizing tablets/desktop GIS with landowner permission) and providing information (fact sheets and flyers) on educational workshops, funding, and other opportunities for engagement/involvement. The Agriculture Liaisons will complete on-site needs assessment for 40 local agriculture producers.
- o Identify and compile a list of priority issues and needs of agriculture producers. The Agriculture Sub-committee will compile information collected through the needs assessment process into a report including a prioritization matrix to identify key issues of concern and inform Phase 2 project planning and scope of work.

## June 2023 Final Report on Deliverables for Task 5.2

- ✓ The Agriculture Sub-committee was developed in July 2021 based on recommendations from Board members of the Upper Arkansas Conservation District and other community members. Founded by UACD *board members there are 7 other regular participants.
- ✓ Upon first convening, participants noted the importance of engaging younger members the agriculture community. To satisfy this, 3 members of the Agriculture Committee are "younger generation," meaning **under 40 years old.
- ✓ Agriculture Sub-committee Members:
    1. Nancy Roberts*
    2. Natalie Allio*
    3. Dave Kelly
    4. Ken McMurry
    5. Susie Evans
    6. Deana LaRue
    7. Madison Everett**
    8. Matt Anderson**
    9. Jeffrey Roberts**
- ✓ The Agriculture Sub-committee held 4 meetings between August and December 2022 to develop a field worksheet and work plan for the project. Early in the process the Committee determined the community was not ready for a detailed irrigation infrastructure assessment and more time was needed to build relationships and trust. The Committee chose to use this opportunity to work toward Goal 1 - strengthen relationships with agricultural water users and large landowners by creating a qualitative survey that would identify challenges related specifically to irrigation infrastructure and water rights.
- ✓ Survey questions were developed with guidance from Social Scientists with experience in Human Dimensions in Natural Resources.
- ✓ Link to questions asked.

### Minutes from Agriculture Sub-Committee Meetings

- ✓ 04 August 2021 Ag Committee Meeting
  Discussion Background, Minutes/Summary, Ag Committee Questionnaire
- ✓ 27 September 2021 Ag Committee Meeting
  Minutes/Summary
- ✓ 19 November 2021 Ag Committee Meeting
  Agenda, Draft Survey Questions Updated
- ✓ 16 December 2021 Ag Committee Meeting
  Agenda with meeting notes
- ✓ (2022, Surveys conducted, see below)
- ✓ 18 January 2023
  Met to review survey findings report and discuss identified projects

### Needs Assessment Field Worksheet for use by Agriculture Liaisons

- ✓ **23 June 2021** UAWP convened with 2 social scientists specializing in the Human Dimensions of Natural Resources to ensure our process was driven by producer input to garner buy-in and the results of this qualitative approach are discussed below.
  Discussion Background, Minutes/ Summary, Draft Survey Questions
- ✓ Ag Sub-committee members discussed the best approach for engaging producers in the Needs Assessment Process. It was determined that hiring agricultural liaisons would not have the same impact or level of

engagement as having Committee members perform the surveys in one-on-one dialogue with their community members.

- ✓ The Committee chose to divide the interviews geographically grouped by ditches.
- ✓ 29 Ditch shareholders were engaged in the interview process. Interviews were recorded with the participants permission. Recordings were transcribed by a CSU Graduate student and trends and themes were identified and reported to support project prioritization.
- ✓ The worksheet that was under development at the time of the December 2021 report was discussed and while under development evolved into an oral interview to enable broader participation within the agricultural community. Interviews were conducted by CCC staff and committee members from January – June 2022. Link to questions asked. Report can be read here.

### Report Identifying Key Issues of Concern with Prioritization Matrix & Next-Level Willingness

- ✓ The Agriculture Sub-Committee developed a field worksheet based on the goal of building relationships while gathering qualitative data specific to irrigation water needs including: use of water rights; water use documentation practices; and infrastructure needs, questions, concerns, and interests.
- ✓ Interviews were recorded with permission from participants. A graduate student was engaged to transcribe the recordings and begin the process of identifying trends and themes. The transcribed report, trends and themes will be shared with the Agriculture Sub-Committee who will be tasked with drafting a final report that will identify key issues of concern and prioritize possible projects.
- ✓ On-site interviews were conducted with 29 irrigation ditch shareholders. Interviews were conducted by members of the Agriculture Sub-committee, Project Lead Coordinator and Project Part Time Coordinator. Information was shared on available resources including funding resources, education resources and peer to peer resources.

### List of Interests, Questions and Concerns to Inform Educational Workshop Topics

- ✓ Major interests and concerns that were identified by the Committee included education for the agriculture community on the topics of water rights and related issues (abandonment list), funding opportunities, grazing planning, soil health, payment for ecosystem services, succession planning, and drought resilience strategies.
- ✓ The Committee also identified education for new community (non-agricultural) members as a priority and incorporated solicitation of topics in the Needs Assessment Survey. Topics identified included ditch easements, water rights, right to ranch, and benefits of agriculture (ecosystem services).

*Task 5.3: Data Analysis & Project Identification*

### Description of Sub-Task

Identify and compile list of priority issues and needs of agriculture producers into a final report including a prioritization matrix to identify key issues of concern and inform Phase 2 project planning and scope of work.

### Methods/Procedure

The Agriculture Sub-committee will summarize the findings of the needs assessment into a final report. The report will rank issues and concerns identified based on frequency and weight assigned by participants. The report will also provide recommendations that could be implemented over a longer term, including recommendations for additional field work and data collection (i.e. a detailed assessment of infrastructure, riparian health, etc.). The results will be presented using mapping and photos. The report will be formatted to

assist the Agriculture Sub-committee in presenting the information to the UAWP, Arkansas River Basin Roundtable and stakeholders across the basin.

### June 2023 Final Report on Deliverables for Task 5.3

✓ The information included herein serves as the Ag Resiliency Project Report, including a list of issues and concerns. The prioritization matrix and recommendations for next steps with respect to field work and data collection, as well as topics of interest to inform the educational efforts of the UAWP will be integrated into the final synthesis of the UAWP assessments (Riparian/Floodplain Condition and Fluvial Hazard Zone Mapping, completed in this first phase of the effort.

### Final Report

✓ A final report that provides a list of issues and concerns including a prioritization matrix and recommendations for next steps with respect to field work and data collection, as well as topics of interest to inform the educational efforts of the UAWP and outlines implementable next steps. Ag Resiliency Project Report

## *Task 5.4: Feasibility Assessments & Pre-Project Planning*

### Description of Sub-Task

Once the initial needs assessment (Task 2) and issue identification (Task 3) processes are complete, the UAWP and Agriculture Sub-Committee will begin the process of connecting irrigators with resources to help in the initial project development phase. The grantee will utilize funding from Chaffee County Common Ground and other matching technical resources (NRCS, etc.) to help landowners begin to scope and design prioritized projects. Because the initial Phase 1 funding is smaller than the estimated need, these efforts will likely be prioritized as demonstration projects that can be used to educate other irrigators and the community. This task will also ensure continued momentum (and reduce lag time) from the start of the needs assessment to project development and implementation. By helping irrigators receive pre-planning resources, one of the projected outcomes of this task will be to strengthen future project funding applications on behalf of water users in Chaffee County.

This process will also identify similar projects within the region that may benefit from combined applications to programs such as EQUIP, NRCS, USDA, Chaffee County Common Ground, Basin Roundtables, and CWCB.

### Methods/Procedure

- The Agricultural Sub-Committee will review and prioritize the results of the completed needs assessment and initial regional analysis. Project prioritization criteria will be developed by the Sub-Committee and may include some of the following attributes: project size, type, location, feasibility, timeline/readiness, etc. Standards will also follow attributes included in the BIP IPP list.
- With the consultation of irrigators, landowners, and project partners, the Agricultural Sub-Committee and Ag. Liaisons will work with project proponents to develop basic project work plans that will help identify required technical resources, feasibility assessments, timing, and potential funding sources.
- The UAWP and UACD will contract with qualified technical experts (NRCS, private firms, etc.) to offer technical resources required for project scoping and pre-feasibility analysis to prioritized projects. This work may also include initial review of water rights to mitigate against potential harm to downstream water users.

- Grant-writing and continued project development support may be provided by members of the Agricultural Sub-Committee or UAWP partners to ensure that projects continue to meet implementation goals and the objectives of the Colorado Water Plan and Basin Implementation Plan.

### June 2023 Final Report on Deliverables for Task 5.4

#### Project Prioritization Matrix

✓ This will be included with Task 3 Project Deliverable (List of Issues and Concerns). Agriculture committee has discussed preliminary prioritizations which will be further formalized with input from the Fluvial Hazard Zone & River Health Assessment reports.

✓ The initial needs assessment (Task 2) is complete. Issue identification (Task 3) is in process. The process of connecting irrigators with additional resources to help in the initial project development phase has been initiated. Interested participants have been encouraged to begin the process of obtaining a Farm number with FSA. NRCS staff have met with interested participants to provide technical assistance and begin the feasibility assessment process. One demonstration project has been funded using Chaffee Common Ground, NRCS – EQIP and other matching funds. This project is being used to educate other irrigators and the community. This will ensure continued momentum (and reduce lag time) from the start of the needs assessment to project development and implementation. Similar projects within the region are being identified that may benefit from combined applications to programs such as EQUIP, NRCS, USDA, Chaffee County Common Ground, Basin Roundtables, and CWCB.

✓ The Agricultural Sub-Committee will review and prioritize the results of the completed needs assessment and initial regional analysis. Project prioritization criteria will be developed by the Sub-Committee and may include some of the following attributes: project size, type, location, feasibility, timeline/readiness, etc. Standards will also follow attributes included in the BIP IPP list. – In Process

#### Preliminary Designs, Assessments, and/or Work Plans

✓ The NRCS team has been engaged to work with local producers on the projects identified through the agricultural needs assessment. As of June 2023, there are no preliminary designs, or work plans developed for prioritized projects to report. Stay tuned, this timeline will be NRCS dependent and may occur outside the scope of this grant.

✓ With the consultation of irrigators, landowners, and project partners, the Agricultural Sub-committee and Ag. Liaisons will work with project proponents to develop basic project work plans that will help identify required technical resources, feasibility assessments, timing, and potential funding sources. – In Process

✓ The UAWP and UACD will contract with qualified technical experts (NRCS, private firms, etc.) to offer technical resources required for project scoping and pre-feasibility analysis to prioritized projects. This work may also include initial review of water rights to mitigate against potential harm to downstream water users. – In Process

✓ Grant-writing and continued project development support may be provided by members of the Agricultural Sub-Committee or UAWP partners to ensure that projects continue to meet implementation goals and the objectives of the Colorado Water Plan and Basin Implementation Plan. – In Process

## Task 6 – Develop Final Work Plan for Phase 2

**Description of Task**

The UAWP project team and stakeholders will develop a proposed work plan for Phase 2 of the Upper Arkansas Watershed Resiliency Plan in order to build on the various assessments and stakeholder engagement from

Phase 1. This process will be completed by October 2023 in order to provide sufficient time for application to the Colorado water Conservation Board and other project funders.

### Methods/Procedure

- Work with stakeholder groups and project partners to analyze assessments and reports from Phase 1 tasks to identify stakeholder priorities, data gaps, and project opportunities.
- Develop work plan for Phase 2 based on prioritization of projects and stream reaches.
- Consult with subject-matter experts to assess scope, cost, and projects needed to address priority areas.

### June 2023 Final Report on Deliverables for Task 6

*Upper Arkansas Watershed Resiliency Plan Phase 2 Work Plan*

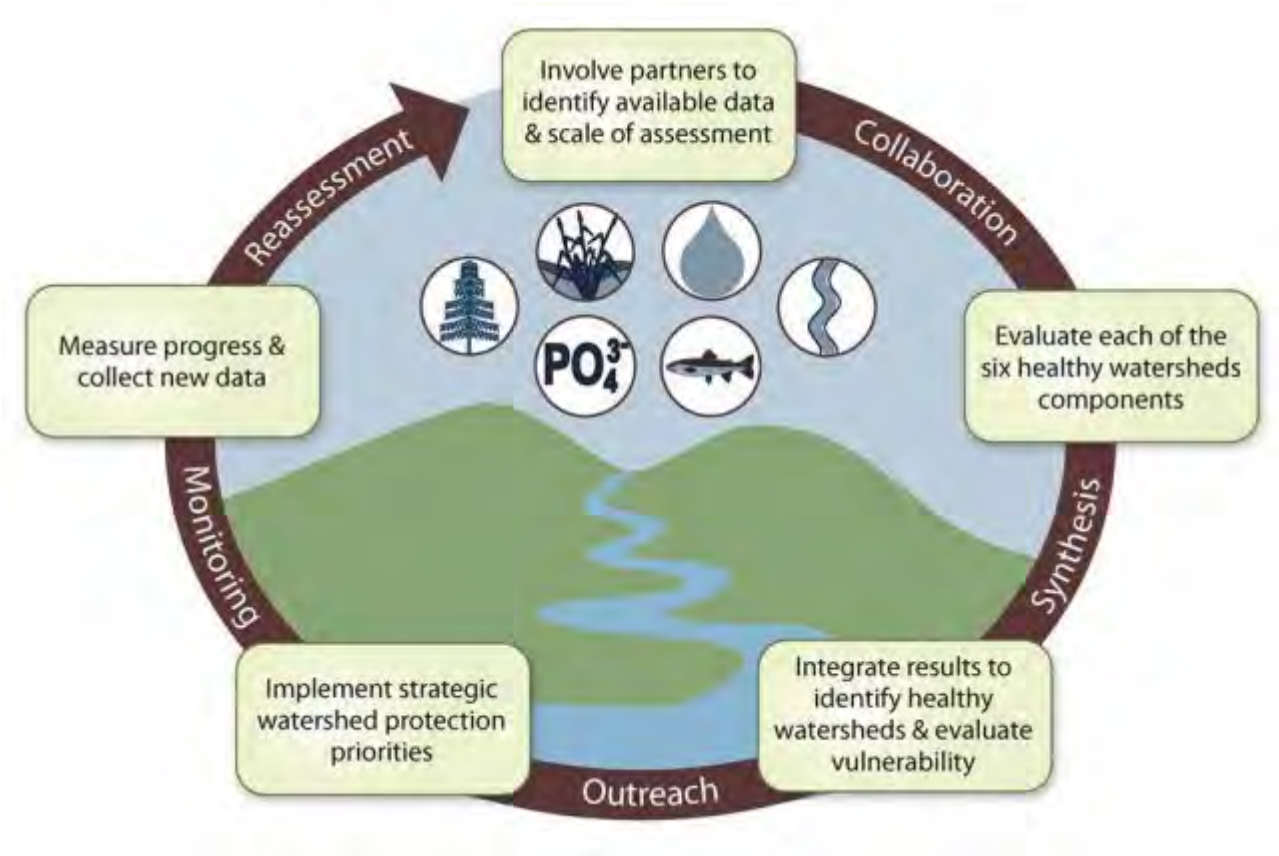
✓ Discussions about Phase 2 with collaborators, stakeholders, and partners began in December 2022. The next phase of activities funded in the Upper Arkansas River Valley will be strategically determined through facilitated dialogue, planning and implementation within the UAWP April – December 2023.

- Facilitator under contract April 7,2023 utilizing Catalyst Funds ($25,000.00) awarded by Network for Landscape Conservation September 2022 to move UAWP from planning (Phase 1) to implementing (Phase 2). Facilitated process will result in:
  - A shared understanding of the fundamental problem being addressed by the UAWP using assessments completed to date;
  - A shared purpose, or why, which brings the UAWP together as a collaborative effort;
  - Finalized/updated group charter, to establish group norms and practices to guide collaborative work going forward;
  - Initial draft of asset and network maps for the UAWP;
  - Prioritized list of project ideas, identifying 1-3 short term projects that can be launched immediately and significantly implemented by November 2023;
  - Short-term action plan with established work teams, and a process for getting work underway;
  - List of strategic priorities for 2024
- Identify and mitigate water quality issues and complete an EPA 9-Element Watershed-based Plan utilizing CDPHE NPS funds ($98,406.00) awarded April 24, 2023.
  - Hire a Watershed Coordinator utilizing CDPHE funds matched by Gate Family Foundation Funds ($30,000.00 awarded June 2023) to coordinate and crosswalk planning efforts accomplished in the planning phase of this CWCB funded effort with those encompassed in the NPS grant.
  - The Watershed Coordinator will oversee all watershed planning efforts with a final deliverable of an Integrated Watershed Management Plan (IWMP) that encompasses both the CWCB SMP requirements and the EPA 9-Element Plan requirements in a single document.
  - Efforts facilitated by the NPS grant funds will:
    - Identify data gaps in current water quality monitoring on targeted tributaries and main stem Upper Arkansas River and develop a monitoring program that addresses those gaps utilizing the established CPW River Watch protocol.
    - Encourage public engagement, awareness, and involvement regarding water quality monitoring and mitigation planning efforts through public planning meetings and volunteer recruitment, and foster protection of watershed health through education

        - Develop an EPA 9-Element watershed-based plan for the targeted tributaries and main stem Upper Arkansas river. This 9-Element Plan will be cross-walked with the CWCB SMP to create and IWMP.
- UAWP was selected to participate in the River Smart Communities program administered by River Network, the purpose of which is to assist communities (e.g., local governments and watershed coalitions) in their efforts to reduce impact and foster resiliency of riverside lands and river health.
    - The primary outcome of this collaborative effort will be preparation of a Phase 1 Integrated Watershed Management Plan that combines the analysis of and summarizes the findings of UAWP's fluvial hazard zone mapping (FHZ), stream health assessment (SHA), and agriculture resilience projects into one document; identify desired land conservation/use policy or regulatory changes; summarize recommendations for short- and long-term actions and strategies.
- UAWP is exploring options for funding in 2023 and beyond including Gates Family Foundation, Bureau of Reclamation WaterSMART Community Watershed Management Program (CWMP), and likely additional funds from CWCB.

## Project Prioritization Matrix (Task 3 and Task 5, sub-task 4)

The EPA Healthy Watersheds Program conceptual framework views watersheds as integrated systems that can be understood through assessments, which capture the interacting dynamics of their essential ecological attributes. This model points out that watersheds are not static systems, and healthy watersheds assessments should incorporate expected future changes, including land and water use changes, and should take into account vulnerability to climate change and population growth.

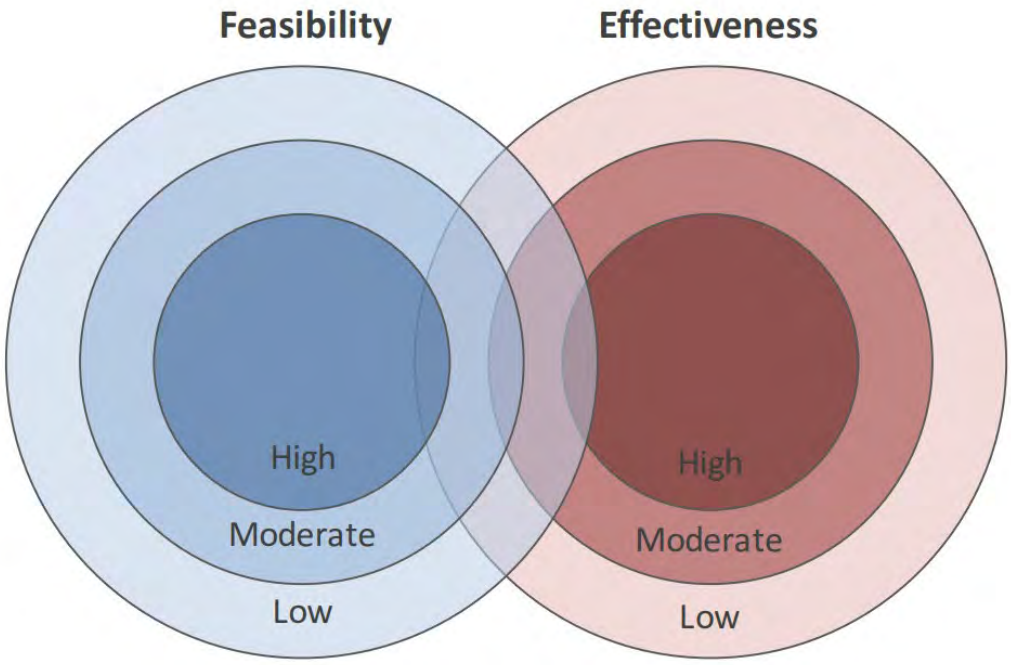



*Reference* Integrated Assessment of Healthy Watersheds | US EPA

UAWP has completed steps one and two of this cycle and partners are currently working with Lupine Collaborative and River Network to "Integrate results to identify healthy watersheds and evaluate vulnerability" in order to prioritize projects as we move through step three and into step four; "Implement strategic watershed protection priorities".

The information generated in the initial steps of this process through the Fluvial Hazard Zone Mapping, Riparian and Floodplain Condition Assessment, and Agriculture Needs Assessment will allow the UAWP to consider ecological conditions of geographic locations and how these needs intersect with our local economies and the value systems of our local communities.

The UAWP is developing a prioritization matrix that will identify actions, projects, and processes that support healthy river corridors in concert with agriculture irrigation needs and the other river services valued by our community.




The prioritization matrix will utilize information from the assessments to demonstrate effectiveness (at meeting project objectives) and feasibility (of implementation) while simultaneously considering the potential impact of each proposed action, process or project, on ecological conditions and the ability of the stream or river to serve the needs and desires of our local community.

**11 July 2023: The UAWP Leadership Team Project Prioritization & Action Planning Meeting**

**Appendix 1: Next Steps**

**Appendix 2: 2023 & Beyond – Upper Arkansas Watershed Partnership Project List**

**Appendix 3: Opportunities for Fluvial Hazard Mitigation and Improved Stream Corridor Function**

Appendix 1

# Step 1
# Alignment with Purpose

The Upper Arkansas Watershed Partnership fosters collaboration among the regional agencies, organizations, governments, and landowners in the Upper Arkansas River Basin to enhance management actions to achieve a healthy and resilient watershed.

# Step 1A
# Geographic Scope

What are the boundaries of the Upper AK Watershed?

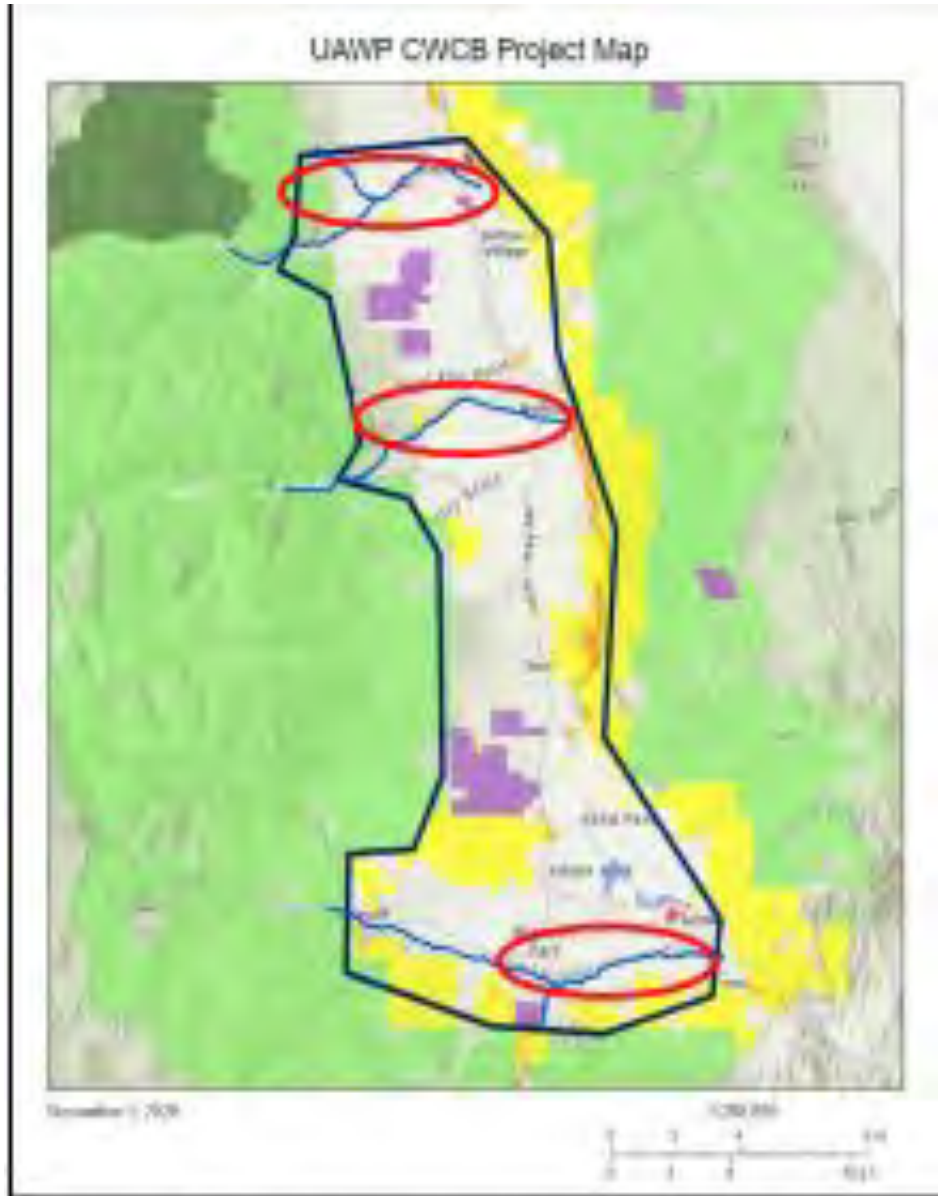


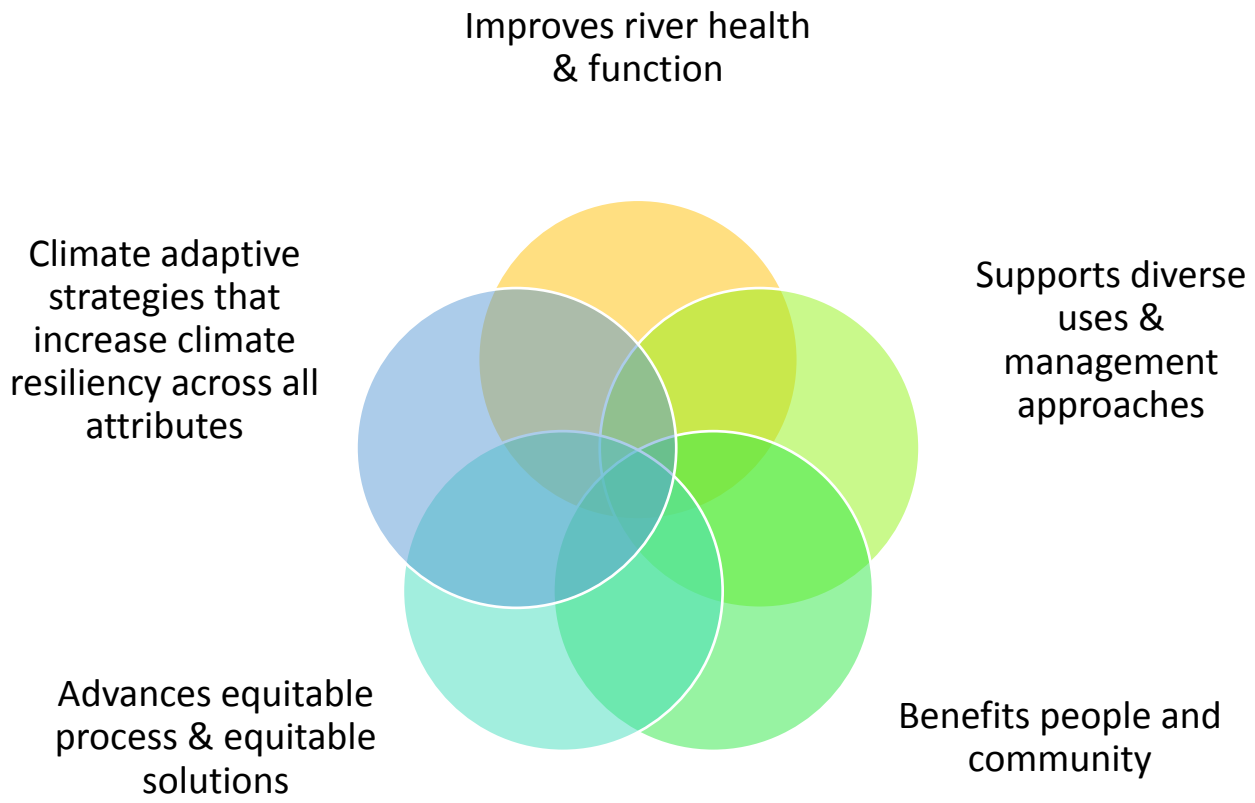

*Figure 1. Working geography for UAWP collaborative initiatives with project areas circled in red.*

# Step 2
# Collaborate vs
# Coordinate & Support

Defining a healthy and resilient watershed and using that to prioritize projects

How close to the center of the venn diagram (next slide) is the idea located?

# Draft Principles / Attributes of Healthy & Resilient Watershed



# Operationalizing & Measuring Healthy & Resilient Watershed Attributes

- River/watershed ecological health & function includes things like:
  - Flow & sediment regimes
  - Water quality
  - Habitat & riverscape connectivity
  - Riparian condition
  - River form, structural complexity
  - Biotic community
- River uses & management includes things like:
  - Recreation (boating, fishing, birding, etc.)
  - Agriculture (irrigation, soil health)
  - River management (non-consumptive water rights, river infrastructure such as dams, diversion structures, road crossings, bank hardening or erosion control, etc)

# Operationalizing & Measuring Attributes

- People & community benefits
  - Economic benefits such as job growth
  - Engagement in government, volunteering, and educational opportunities
  - Community connection – e.g. public access opportunities, amenities, etc.
- Equitable process & outcomes (draft, from Deb – needs discussion)
  - Relationships with organizations that serve front line/marginalized communities, Tribal nations with historic ties to Arkansas Valley
  - Process offers opportunities for under-represented voices to contribute in whatever ways make sense to them
  - Strategies that minimize risk and maximize benefits for low income communities, BIPOC residents, and others disproportionately impacted by climate change, development, wealth disparities, etc.
  - Move at the speed of trust

# Operationalizing & Measuring Attributes

- Increases climate resiliency
  - Strategies that increase resiliency in the face of predicted future impacts (drought, weather extremes, wildfire, ag impacts…)

# Additional Collaborative Principles

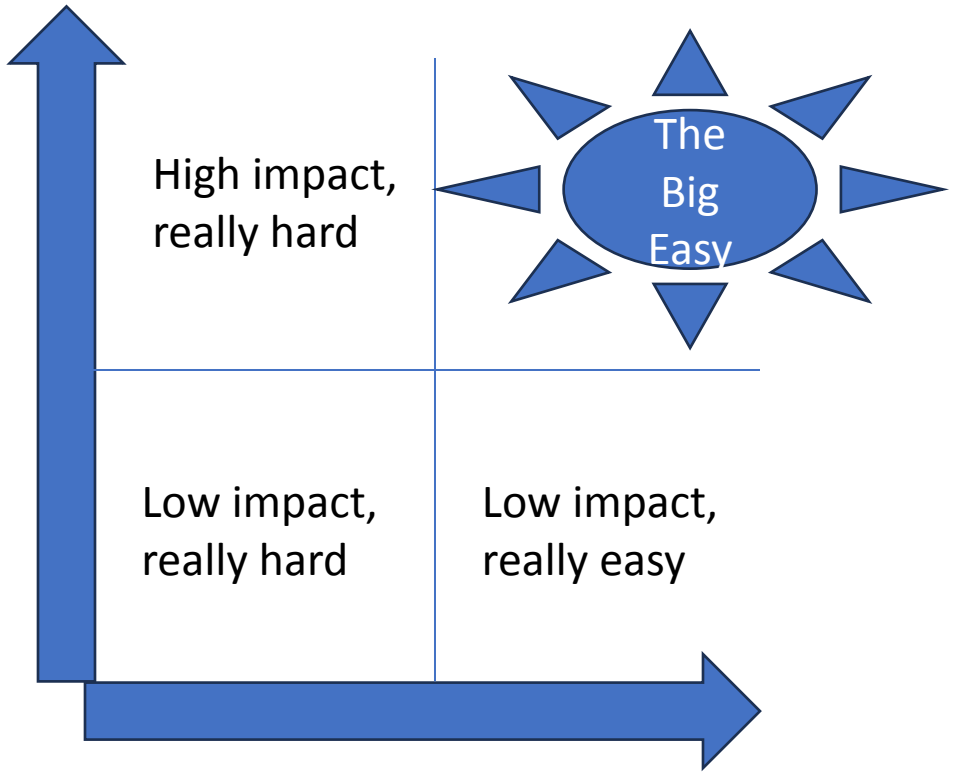
- Any additional attributes to help define & prioritize UAWP collaborative projects? E.G.
  - Identifies and expands partnerships throughout the network and the Upper Arkansas Watershed
  - Addresses multiple interests and needs of impacted communities and ecosystems
  - Increases trust and collaborative relationships among partners & broader network

# Step 3
# The Big Easy

Impact
and

Ease of Implementation

# The Big Easy




**IMPACT**
On healthy and resilient watershed attributes

**EASE**
Of implementation based on available assets & resources

# Step 4
# Action Plan for Limited # of Ideas

Of those ideas falling in the Big Easy, the UAWP will strategically identify initiatives/projects for action planning, establish an action team to get the ball rolling, identify readily available resources and assets that can be mobilized to get things moving forward.

# Appendix 2

# 2023 & Beyond – Upper Arkansas Watershed Partnership

List of possible grantors: (google doc)
Calendar of grant opportunities, a work in progress (google calendar)

| DELIVERABLE/ TASK | COST ESTIMATE | POSSIBLE FUNDER$ | TIMING/ STATUS | FISCAL AGENT/ POC |
|---|---|---|---|---|
| **"FACILITATION"**<br><br>- Support of UAWP leadership team with strategic conversation facilitation<br>- Engage more partners<br>- Gaining consensus from the UAWP partners on the conservation plan<br>- Drafting the conservation plan in a user-friendly format for review by partners<br>- Begin outlining a public engagement strategy for the conservation plan<br>- Gaining consensus on the charter and an operational model required to implement the conservation plan, across all partner organizations | $25k over 2yr | Catalyst Fund<br><br>$+++? | Funded, need to contract facilitator, have bid from | CCC (NA & WM) |
| **Internal capacity/ CCC "Watershed Coordinator"**<br>- Grant writing, reporting (maybe invoicing)<br>- Public outreach including online Story Map<br>- Report/ Plan document (combine tech reports)<br>  - Watershed history/ Need/ Summary<br>  - Fluvial Hazard Mapping<br>  - Agricultural Needs Assessment<br>  - River Health Assessment<br>  - NPS water quality planning<br>  - Fire Hazard Mapping ?<br>  - County(s) & City(s) planning status ? | 1 FTE<br>@ ~$65k? / yr | BoR CWMP<br>$200k for 2yr<br><br>CWCB Technical assistance<br><br>GOCO | Spring 2023?<br><br>JP reached out 1/26 to M. Reagan at CWCB for timeline.<br><br>Apply in August 2023 | ARWC (JP & SWCA) |

| | | | | |
|---|---|---|---|---|
| - Projects/ target areas for focus | | | | |
| **Finish Chaffee FHZ Mapping with Round River Design**<br>- Roads, Bridges, and culverts<br>- OEM<br>- Story Map | | | | |
| **Agriculture PROJECTS**<br><br>- Eroding Ditch (#1) Bank on private property (PBR)<br>- Ditch #2 off Chalk Creek near Mesa Antero and Chaffee county landfill<br>- Ag Needs Assessments Projects:<br><br>*Ditch #3*<br>● Remove the invasive plants (poison hemlock, water grasses) - *#1 priority*<br>● Put in a smaller retention pond<br>● Switch from flooding to overhead sprinkling<br>● Lining or piping ditch<br>*Ditch #3*<br>● Invasive species (water grass, pondo weed, elodea)<br>● Pipe/line the ditch - can help reduce invasive plants<br>● Install a camera at the weir<br>*Ditch #4*<br>● Extend the pipe on the ditch<br>*Ditch #5*<br>● Conduct study on fluctuations in water over the years<br>● Install automatic measuring devices on flumes<br>● Pipe the ditch<br>*Ditch #6*<br>● Line ditches | $15-30k $design<br>$200-50k construction | ? CW<br>Climate smart commodities grant<br><br>Biophilia Foundation? | | |

| | | | | |
|---|---|---|---|---|
| ● Install sprinklers<br>Ditch #6<br>● Measure the amount of water going through Sand Park<br>○ Put devices on each end and determine if water is lost going through Sand Park<br>○ Potentially pipe the ditch going through Sand Park (would hurt the aquifer recharge)<br>*Ditch #7*<br>● An automated/digital flow reader that is accessible through a smartphone (*pie-in-the-sky)*<br>● Help with ditch maintenance, especially with big machinery experience, and repair various sections of the ditch<br>○ Several breeched sections of ditch that need to be revitalized<br>○ Section that runs through the trash dump needs to be rerouted (too steep and need an engineer)<br>● Remove the small culverts put in by the county<br>○ Will most likely require a water lawyer<br>● Ditch in Antero that would benefit from the Hands for Lands group<br>*Ditch #8*<br>● Line or pipe the ditch<br>● Help with measuring water flow along various points of the ditch--would like to see where water loss occurs<br>*Ditch #9*<br>● Pivot irrigators--some just need new nozzles (Lockwood)<br>○ Important to match the type of irrigation to the crop<br>● Piping projects<br>● Maintenance program<br>○ Ability to loan/lease heavy equipment<br>*Ditch #10*<br>● Pipe section on hillside (hill is sloughing off into the ditch)<br>*Ditch #11* | | | | |

| | | | | |
|---|---|---|---|---|
| ● Pipe some critical sections<br>○ Has legal concerns that it may cause willows and cottonwoods to fall, and people will sue them<br>○ Wants to preserve the beauty of the valley, while also losing less water<br>● Has benefitted from the Hands for Lands volunteers (and is extremely grateful)--would love to make it a paid position and have more consistent, paid workers to help maintain the ditch (5 days rather than 3 hours)<br>○ Mentions it could be beneficial to offer course credits for students<br>○ Maybe offer tax credits to retired folks<br>- | | | | |
| **PUBLIC OUTREACH/ "WATERSHEDUCATION"**<br>- Process Based Restoration workshop<br>- Fluvial Hazard Zone mapping<br>- River Health Assessment<br>- Grazing Planning and Soil Health<br>- Innovations in grazing (virtual fencing)<br>- Role of agriculture in conserving land and water | | | | |
| **NPS 9-point plan & Crosswalk/ Integration into IWMP**<br>- WatershEducation → move to other grant scope??<br>- RiverWatch expansion<br>- Laboratory infrastructure<br>- Community outreach program<br>- Watershed data compilation | $100k over 18 months | ~$95k + CDPHE | ~31 Jan 2023 | GARNA (CL, DN, NJ) |
| **SOUTH ARK River Corridor Improvements**<br>- SCC (& Snyder!) Design & CE from Engineer<br>- Construction - boardwalk<br>- riparian | $20-50k? design<br><br>~ $300-500k?? construction | $20k CWA Healthy Rivers Fund<br><br>OREC | discuss project with Matt Nuñez | CL. (CPC TU) Anna Hendricks (SCC) |

| | | | | |
|---|---|---|---|---|
| **CITY OF SALIDA ENGAGEMENT (VANDERVEER)**<br>- CPCTU leading | ^^ | | | |
| **Monarch Ponds Campground**<br>- ADA fishing pier Design & CE from Engineer<br>- Pier acquisition & installation | <br>$20k<br>$80k | <br>CPW Fishing is Fun<br><br>https://gatesfamilyfoundation.org/types-of-support/capital-grants/ | 28 Feb 2023 | CL. (CPC TU), JW (NTU AML). Alex Townsend (CPW) |
| **Chaffee County Low-Tech Process Based Restoration (PBR) Projects**<br>- Wetland restoration on Hutchinson Ranch<br>- 3-5 PBR on private lands as identified through assessments, to build resilience to fire, flooding, and draught<br>- | $20-40k concept planning with technical expertise (engineering, hydrology, ecology)<br><br>$30-75k final design, cost estimate & permitting<br><br>~$30k / mile (construction) | CPW Wetlands (Brian Sullivan),<br><br>CWCB Watershed Restoration,<br><br>Restore CO | | |

Appendix 3

# Upper Arkansas Watershed Partnership:

## Stream Corridor Hazard and Floodplain Connectivity Assessment

## Opportunities for Fluvial Hazard Mitigation and Improved Stream Corridor Function

**November 25, 2022**

Limitations and Disclaimer

The Fluvial Hazard Zone boundary attempts to delineate the extent of the area likely to be influenced by fluvial processes. While fluvial processes are unlikely to occur outside of the Fluvial Hazard Zone boundary, events such as debris flows, debris jams, landslides, earthquakes, dam failures, and diversion channel captures may trigger geomorphic responses not mapped within the Fluvial Hazard Zone. Furthermore the Fluvial Hazard Zone does not capture all flood hazards such as water inundation, that may occur. In addition to the aforementioned, the following is a list of acknowledged limitations of the Fluvial Hazard Zone maps:

Fluvial Hazard Zone mapping may not capture geomorphic hazards resulting from catastrophic events such as a dam failure.

Fluvial Hazard Zone mapping may not account for all bedrock that may be controlling vertical or lateral channel movements, especially if this bedrock is covered by alluvial or aeolian deposits.

The Fluvial Hazard Zone map identifies fluvial geomorphic hazards within and adjacent to the stream corridor that has been mapped (i.e., the study reaches). Adjacent hazards related to tributary streams, gullies, and fans may not be mapped or identified unless explicitly stated.

The Fluvial Hazard Zone (FHZ) summary for the Chaffee FHZ Study and FHZ mapping products were developed using remotely-sensed data products, statistical analysis, and expert judgment. FHZ maps are intended to delineate the area a stream has occupied in recent history, may occupy, or may physically influence as the stream stores and transports water, sediment, and debris. They do not predict the magnitude, frequency, or rate of fluvial geomorphic hazards. The intended use of FHZ maps is to inform land-use planning, emergency planning, floodplain management, and stream corridor conservation efforts. Further investigation may be necessary to inform site-scale development.

The FHZ map authors make no representations or warranties, expressed or implied, as to the accuracy, completeness, timeliness, or rights to the use of FHZ maps. The authors shall not be liable for any errors, omissions, or inaccuracies in such information regardless of their cause, and shall not be liable for any decision made, action taken, or action not taken by the user in reliance upon such information. The authors shall not be liable for any general, special, indirect, incidental, or consequential damages including, but not limited to, lost revenues or lost profits resulting from the use or misuse of the information contained on FHZ maps.

It is the responsibility of the FHZ map sponsor agency to evaluate the FHZ and revise the FHZ maps as conditions in the watershed change over time based on the best data and technical guidance available.

## Introduction

This memo identifies potential specific projects/actions that could be taken to increase the long-term resilience of the stream corridors studied as part of the Upper Arkansas Watershed Partnership's FHZ project. The projects concepts were identified during the fluvial hazard zone mapping process. While ecological uplift (i.e., improved stream corridor health) may be part of a multi-benefit of many of these projects the main perspective of this exercise was hazard reduction.

**The following County-wide actions are recommended to improve information and communication related to fluvial hazards:**

- Debris flow hazard mapping is available for the county through the Colorado Geological Survey whom has funding to complete these studies on a first-come first-serve basis. Chaffee County does not have any comprehensive mapping or information about debris flow locations, susceptibility, or likelihood despite many private residences living in these high hazard areas.
- Establish a stream corridor overlay district.
- Incorporate a fluvial geomorphic hazard review where development is proposed within or adjacent to Active Stream Corridors and ephemeral drainages.
- Begin a stream corridor crossing upgrade process - prioritize and fund crossing retrofits and/or replacements along with improvements to roadways to make them more resilient to fluvial processes. These investments are often multibenefit projects (see structures GIS file and photos developed for this study for additional information).
- Evaluate opportunities for flood warning systems for our most high hazard drainages (Cottonwood, Chalk, North Fork, South Ark (Maysville area particularly), Poncha Creek (for Poncha Springs), Ute Creek, and Little Cochetopa.
- Incorporate fluvial hazard planning into county planning (see https://www.coloradofhz.com/s/CWCB-FHZ-Quick-Start-v12.pdf for starting point ideas).
    - Local hazard mitigation plans are used to identify, assess, and reduce the impact of disasters. A local hazard mitigation plan should corporate an assessment of a community's susceptibility to fluvial hazards via FHZ mapping. Local hazard mitigation plans should also seek to identify mitigation opportunities (such as asset relocation), or social measures (such as education or insurance), in order to help safeguard life, property, and the economic vitality of communities.
    - Pre-disaster recovery plans identify specific actions aimed at minimizing the impact and cost of recovery. Pre-disaster recovery planning should incorporate the areas of known susceptibility to fluvial hazards (i.e., FHZ maps) and promote recovery actions that are commensurate with long-term risk reduction (e.g., asset relocation, property buyouts, floodplain reconnections, etc.)
    - Emergency response planning should utilize FHZ maps when planning for evacuation routes and evacuation centers, as well as to assess the viability of proposed emergency response facilities (e.g., fire and police stations, medical facilities, critical transportation infrastructure, etc.) should a flood event occur.
    - Comprehensive recovery ordinances typically establish the framework for a variety of post-disaster tasks such as: stream channel and debris management; stabilization of damaged buildings; identification of other life/safety risks; repair of damaged infrastructure; and mitigation options and funding to rebuild to

different standards or to potentially relocate certain uses. The FHZ may be used to help identify a boundary within which these activities are regulated.

**At the reach level, recommendations are divided into four overarching strategies and broadly summarized below:**

- **Strategy 1: Land and Water Protection**
- **Strategy 2: Corridor Rehabilitation, Reconnection, and/or Restoration**
- **Strategy 3: Infrastructure Considerations and Retrofits**
- **Strategy 4: Mitigate Existing Hazards**

*Note: Recommended activities did not attempt to identify land ownership, the willingness of landowners to participate, or other aspects of project feasibility.*

### Strategy 1: Land and Water Protection

Ultimately the most cost-effective and resilient option to minimize damage from future flood events is to avoid investments in infrastructure that is not compatible or adaptable to fluvial processes (erosion and deposition) through forward-looking land-use planning that directs land development and infrastructure away from areas subject to fluvial hazards. Limiting development within the FHZ may also:

- Provide for temporary flood water storage and allow for a reduction of peak flood flows in adjacent and downstream communities (Habersack et al., 2015; Sholtes and Doyle, 2010).
- Reduce reliance on channelization, levees, and bank armoring, which are often detrimental to stream health, are expensive to maintain, and often increase erosion and deposition processes in adjacent and downstream communities (Brierley and Fryirs, 2005; Brookes, 1988; Huggett, 2003; Nagle, 2007).
- Increase channel stability by improving floodplain connection and sediment transport.
- Reduce costs of future flood recovery efforts.
- Reduce public expenditures for disaster response and recovery.

#### Stream Corridor Easements and/or Fee Simple Purchases

Strategies for preserving land within the fluvial hazard zone may include conservation or stream corridor easements for parcels (whole or in part) identified in the mapping. The implementation of a stream corridor easement program may be a means to balance human use of the corridor with a dynamic stream channel. A stream corridor easement allows landowners to divest from areas where repetitive losses are experienced or anticipated, while the easement purchaser makes a long-term investment in the soils, property, infrastructure, and ecosystem in the watershed. The resulting protected corridor provides relief to landowners and taxpayers as the need for channel controlling interventions and maintenance goes away.

Through a Stream Corridor Easement, the landowner sells or donates their right to modify a stream's channel thereby allowing the natural processes of erosion and deposition to continue in perpetuity within the protected easement corridor. The Stream Corridor Easement has no effect on land use or activities outside of the contractual boundary and the landowner may be able to use the land within the easement for agricultural, forestry, and recreational purposes in a manner that does not interfere with the basic intent to allow the stream channel to move and access its floodplain. In general, Stream Corridor Easements are prioritized for areas in stream corridors

with existing or easily rehabilitated floodplains in areas where human actions have not already limited natural movement.

#### Conservation of Agricultural Land and Practices

Many lands adjacent to streams are currently being used for agriculture and/or grazing. Generally speaking, these land uses are considered compatible for areas within a Fluvial Hazard Zone. This mapping could be used as a basis for incorporating and prioritizing agricultural land uses in stream corridors.

#### Land Management

There are many ways for local governments to incorporate Fluvial Hazard Zone mapping into their long-term and land-use planning. The CWCB has produced a Planning for Fluvial Hazards QuickStart Guide outlining the many different ways that FHZ mapping can be incorporated into local planning and administration. Some of these include integration with comprehensive plans and parks and open space plans. Among many strategies, it may be possible to adopt the Fluvial Hazard Zone mapping as the county's Best Available Floodplain within the existing county floodplain regulations. Currently, there is not a comprehensively mapped and adopted FEMA floodplain through these river corridors and this mapping may be able to be used in its place until such products become available.

### Strategy 2: Corridor Rehabilitation, Reconnection, and Restoration

Fluvial Hazard Zone maps can be used to identify and prioritize the restoration and rehabilitation of natural depositional areas which can trap debris and sediment that erodes from upstream reaches in locations where the consequence of aggradation is low. These areas can act as a sediment sink and energy sponge, absorbing material and energy from debris flows and mitigating impacts to downstream residents and communities. This strategy seeks to recommend measures that can be taken in storage reaches to dissipate energy and store sediment upstream of developed areas in order to reduce fluvial geomorphic hazards in populated areas.

### Strategy 3: Infrastructure Retrofits and Upgrades

Infrastructure may create circumstances that increase the sensitivity of the creek or the type and magnitude of a geomorphic response during a flood. The two consistent culprits in the Chaffee County study streams are road crossings and road and railway embankments.

#### Road Crossings

Bridges and culverts are important infrastructure assets that too frequently disrupt the natural movement of water and sediment. Commonly this disruption results in aggradation (build up) of sediment above them (which can cause a channel to shift in search of a new path), degradation (erosion of sediment below them), and even avulsion (a process where a stream creates a new channel in a different location). The resulting instability caused by poorly designed bridges and culverts often leads to damages to streambanks, damage to roadways and road

embankments and other nearby infrastructure, and can even threaten life and property well outside of mapped floodplains. Geomorphic-compatible design of bridges and crossing structures is an emerging topic as there is great interest to have resilient infrastructure that is also sensitive to aquatic and terrestrial organism passage.

#### Roads and Railway Bed Improvement

Roads and railway beds impact the stream corridors in two ways. When built parallel to the river valley river meanders are often straightened out by means of fill and armoring resulting in the truncation of former river meanders. The shortened meanders force the river into bends that are too tight, increase the slope and energy of the river, and reduce floodplain services as well as habitat. Over time a river will attempt to adjust to this imposition transferring energy downstream and often causing ongoing problems with protection and maintenance of highway or railway embankments. Second, when built perpendicular to a river valley Active Stream Corridor processes and functions are impeded. Like de facto dams made of earthen and stone fill, these structures impact flow depths, shear stresses, and sediment transport capacities of channels. These constrictions can affect both upstream and downstream areas.

Because both of these impacts often legacy issues, immediate change may be impractical, however, discussion and documentation are important for several reasons. First, it is possible to quickly retrofit crossings and road/rail beds with a series of culverts (or even additional pre-fabricated bridges) that will provide more opportunity for water moving across a floodplain to pass through road embankments. Second, crossings are consistently being redesigned and rebuilt, especially at the county level, and flagging specific structures and lengths of roadway for re-assessment by and including geomorphic and stream process experts will add resiliency to the transportation network. Such assessment and planning may also illuminate opportunities redesign or relocate roadways and crossings for better safety, and may present an opportunity for consolidation of infrastructure. Lastly, in the event of a major flood disaster where the road and crossing systems will need to be completely rebuilt, concepts for doing so in a more resilient manner will already be developed and available so that any future tax-supported infrastructure investments are made with the goal of long term river and infrastructure resilience.

### Strategy 4: Mitigate Existing Hazards

In contrast to the strategies outlines in Strategy 2, Fluvial Hazard Zone maps can also be used to identify reaches where the transfer of sediment and debris to natural or restored depositional areas should be prioritized. These areas are generally reaches that are highly altered, developed, inhabited and have little to no floodplain connection. This section describes measures that can be taken in the transfer reaches to facilitate energy and sediment movement through the reach and into the planned storage reaches described above.

#### Plan for a Disaster

Ensure that loss of function is recognized in local hazard mitigation and emergency response plans. Consider secondary/alternative options.

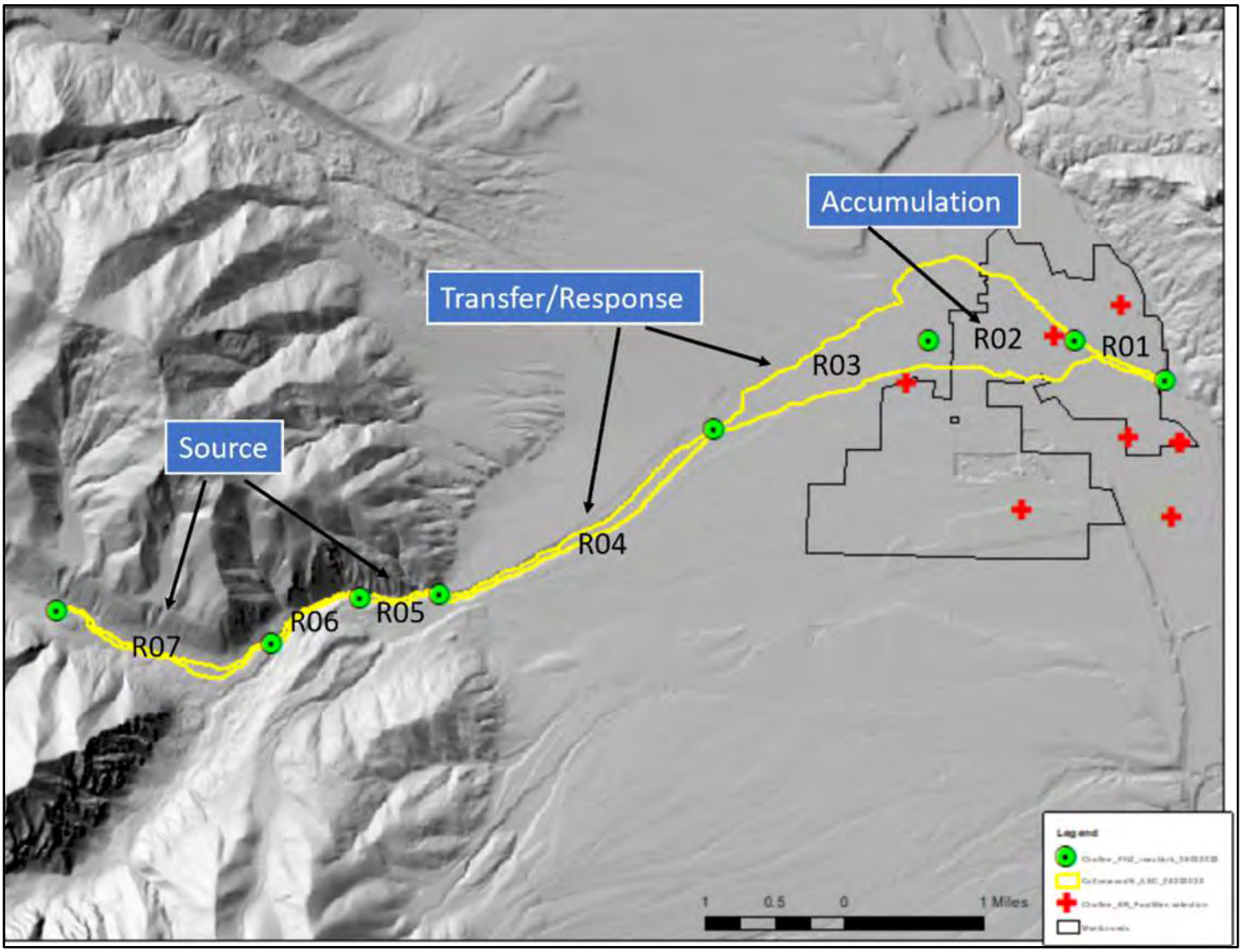
**For each project the following information is provided:**

<table>
<tr><td>Project ID</td><td colspan="3">Location</td></tr>
<tr><td rowspan="3"></td><td colspan="3">Brief description of project location (see accompanying polygon file for additional general area).</td></tr>
<tr><td colspan="3">Justification</td></tr>
<tr><td colspan="3">Brief description of hazard/opportunity.</td></tr>
<tr><td>Project Type</td><td>Project Description</td><td>Cost</td><td>Partners</td></tr>
<tr><td rowspan="2">One of the four project categories listed above.</td><td>Brief description of project idea.</td><td>$ = <$100k<br>$$ = <$500k<br>$$$ = <$1m<br>$$$$ = >$1m</td><td>Educated guess of which groups may be involved in bringing a project to bear.</td></tr>
<tr><td colspan="3">Photo or aerial of the project (generalized and when available).</td></tr>
</table>

Evaluation of these projects is entirely up to the UAWP. One suggestion is to consider the following criteria:

- Feasibility
- Multiple benefits
- Upstream/Downstream linkages
- Costs

## Cottonwood Creek



**Cottonwood R07**

<table>
<tr><td>Project ID</td><td colspan="3">Location</td></tr>
<tr><td rowspan="3">CW7</td><td colspan="3">Vicinity of CR 344 crossing over Cottonwood Creek.</td></tr>
<tr><td colspan="3">Justification</td></tr>
<tr><td colspan="3">Crossing is undersized relative to the potential sediment and debris coming from the watershed (further exacerbated by the dam-effect of the roadway as it bisects the Active Stream Corridor). Development on d/s side of CR 344 bridge vulnerable if bridge plugs and flanks (large wood loading upstream of structure is excellent habitat, however mobility of this material through the culvert is not guaranteed even though the culvert is better-sized than most found in the County.</td></tr>
<tr><td>Project Type</td><td>Project Description</td><td>Cost</td><td>Partners</td></tr>
<tr><td>Mitigate Existing Hazards</td><td>Further engineering, sediment, and debris analysis/study to consider existing structure limitations, risks, and consequences as well as whether options for improvement exist.</td><td>$</td><td>County, Private landowner(s)</td></tr>
<tr><td colspan="3"> 
</td></tr>
</table>

**Cottonwood R06**

<table>
<tr><td>Project ID</td><td colspan="3">Location</td></tr>
<tr><td rowspan="3">CW6</td><td colspan="3">Where CR 306 contacts that channel and or is placed on fill in the Active Stream Corridor.</td></tr>
<tr><td colspan="3">Justification</td></tr>
<tr><td colspan="3">Highway washout is all but assured in a significant flow event due to the confined corridor, high shear stresses and stream power, and debris loads both from upstream and adjacent hillslopes. There are also at least three drainages, and several possible debris flow paths, from the north that could block the highway and creek.</td></tr>
<tr><td>Project Type</td><td>Description</td><td>Cost</td><td>Partners</td></tr>
<tr><td>Mitigate Existing Hazards</td><td>County should be prepared for having this roadway become impassable following a flood event. Ensure this topic is discussed in local hazard and emergency planning.</td><td>$</td><td>County</td></tr>
<tr><td colspan="4"> 
</td></tr>
</table>

**Cottonwood R05**

<table>
<tr><td>Project ID</td><td colspan="3">Location</td></tr>
<tr><td rowspan="3">CW5a</td><td colspan="3">CR306 crossing u/s of Cottonwood Hot Springs</td></tr>
<tr><td colspan="3">Justification</td></tr>
<tr><td colspan="3">Bridge washout/flanking and roadway damage of CR306 and crossing likely during flood event. County crossing forces the channel into a sharp bend. Plugging of the bridge may cause the channel to avulse as it flows down valley eroding a new channel out of the roadway before re-entering the existing channel further downstream toward the hot springs.</td></tr>
<tr><td>Project Type</td><td>Description</td><td>Cost</td><td>Partners</td></tr>
<tr><td rowspan="2">Infrastructure Retrofits and Upgrades</td><td>Further engineering, sediment, and debris analysis/study to consider existing structure limitations, risks, and consequences as well as whether options for improvement exist.</td><td>$$</td><td>County</td></tr>
<tr><td colspan="3">  </td></tr>
</table>

**Cottonwood R05 (cont.)**

| Project ID | Location | | |
|---|---|---|---|
| CW5b | Vicinity of Cottonwood Hot Springs - commercial and residential development. | | |
| | Justification | | |
| | Commercial business and private property damage possible. | | |
| Project Type | Description | Cost | Partners |
| Mitigate Existing Hazards | Evacuation plans for moving staff, customers, and residents out of the valley bottom during a flood may be the only way to prepare for the existing hazard. | $ | Private |
| |  | | |

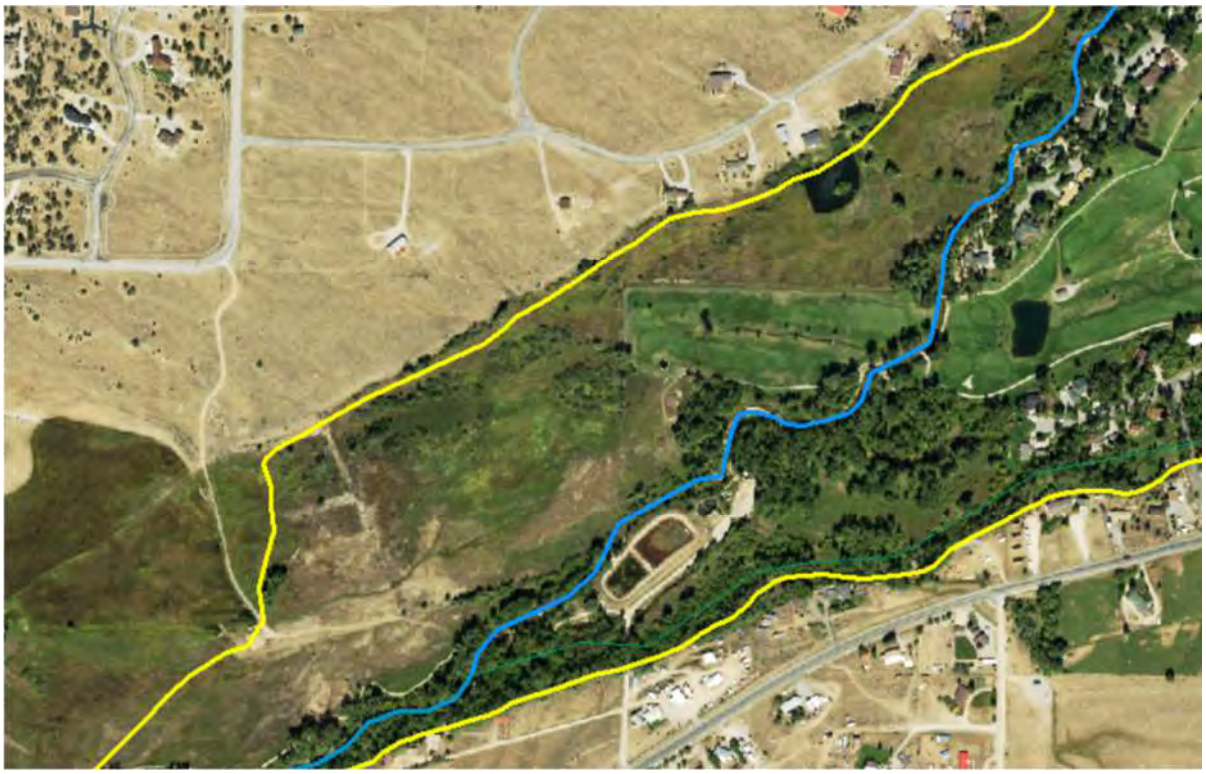
**Cottonwood R04**

<table>
<tr><td>Project ID</td><td colspan="3">Location</td></tr>
<tr><td rowspan="3">CW4a</td><td colspan="3">Vicinity of Michigan Ditch diversion to CR 340 crossing.</td></tr>
<tr><td colspan="3">Justification</td></tr>
<tr><td colspan="3">Reach appears to have good riparian health and large wood accumulation. It has, thus far, been spared from development. This is an important corridor to protectas it has the potential to capture and accumulate large amounts of sediment and debris; doing so may provide protection to downstream residents and infrastructure.</td></tr>
<tr><td>Project Type</td><td>Description</td><td>Cost</td><td>Partners</td></tr>
<tr><td rowspan="2">Corridor Rehabilitation, Reconnection, and/or Restoration<br><br>Land and Water Protection</td><td>Work with landowners to assess stream corridor connectivity and riparian function. Specific management recommendations beyond these are limited due to access which prevented our ability to evaluate the current condition of the reach beyond what was visible from public roads. Further design/implementation (if warranted) would increase the cost of this project.</td><td>$</td><td>NGO, Private</td></tr>
<tr><td colspan="3">  </td></tr>
</table>

**Cottonwood R04 (cont.)**

| Project ID | Location | | |
|---|---|---|---|
| CW4b | Vicinity of CR 340 and CR 338 crossings | | |
| | Justification | | |
| | Development in ASC in the vicinity of both these county road crossings seems particularly vulnerable to flooding due to undersized road crossings and water backing up behind the road prisms. | | |
| Project Type | Description | Cost | Partners |
| Mitigate Existing Hazards | Conceptual design project needed to evaluate avulsion pathway to the north, enhanced crossings, and debris passages concerns specific to this area. | $$$ | Private |
| |  | | |
| |  | | |

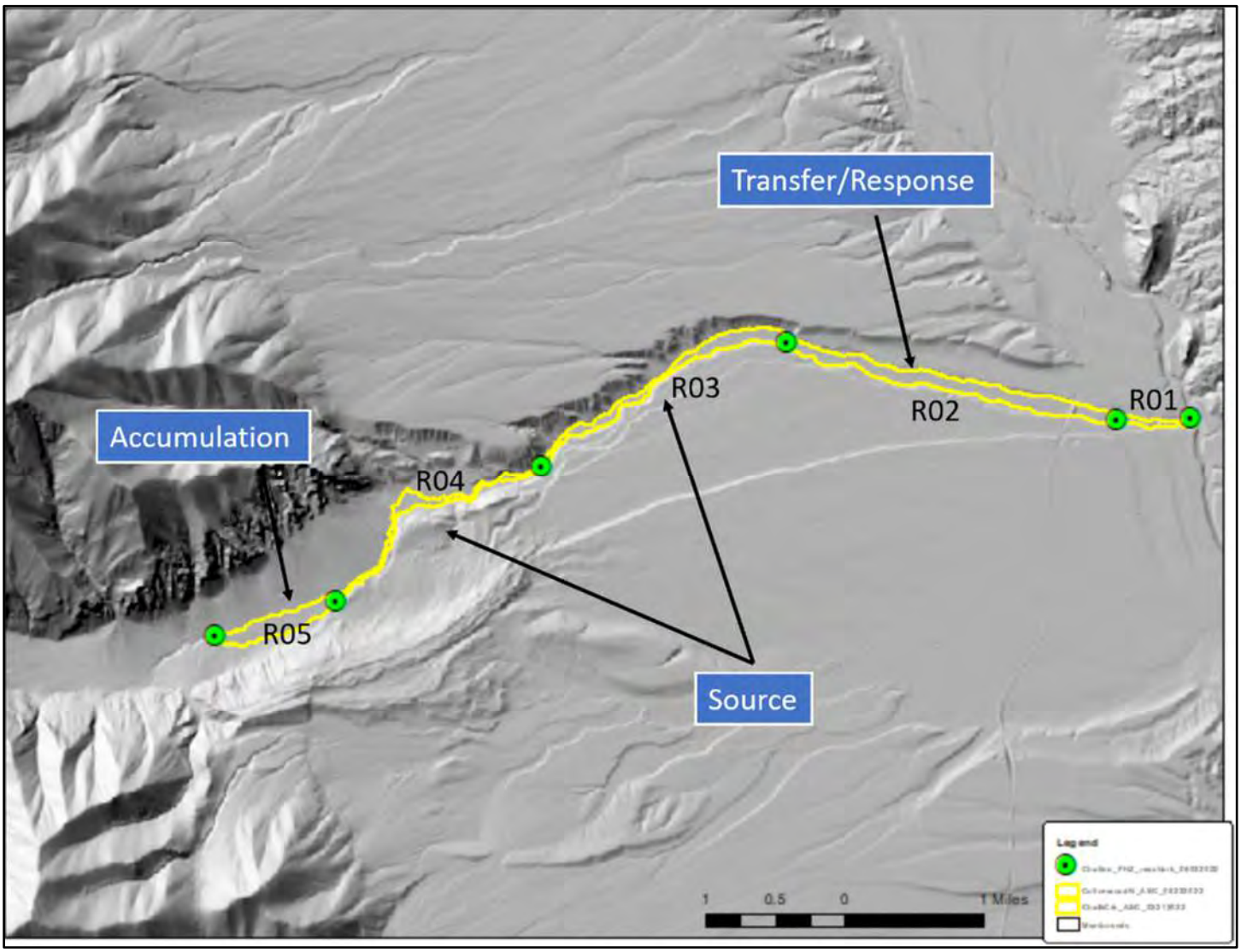
**Cottonwood R03**

<table>
<tr><td>Project ID</td><td colspan="3">Location</td></tr>
<tr><td rowspan="3">CW3a</td><td colspan="3">Downstream from CR 361 crossing (generally)</td></tr>
<tr><td colspan="3">Justification</td></tr>
<tr><td colspan="3">Area where geomorphic floodplain width expands dramatically which could become a natural deposition area for sediment and debris.</td></tr>
<tr><td>Project Type</td><td>Description</td><td>Cost</td><td>Partners</td></tr>
<tr><td>Corridor Rehabilitation, Reconnection, and/or Restoration<br><br>Land and Water Protection</td><td>Maintain field in agricultural use. Investigate opportunity for stream corridor restoration.</td><td>$-$$</td><td>Private, NGO</td></tr>
<tr><td colspan="3">  </td></tr>
</table>

**Cottonwood R03 (cont.)**

| Project ID | Location | | |
|---|---|---|---|
| CW3b | CR 350 crossings | | |
| | Justification | | |
| | Undersized road crossings at sharp angles combined with historic lengthening of stream channel (reducing the slope) make an avulsion likely here. | | |
| Project Type | Description | Cost | Partners |
| Land and Water Protection | Maintain field in agricultural use. | $-$$ | Private, NGO |

## Chalk Creek


Transfer/Response
Accumulation
R01
R02
R03
R04
R05
Source
1
0.5
0
1 Miles

**Chalk R05**

| Project ID | Location | | |
|---|---|---|---|
| CK5 | Upstream of CR 290 crossing of Chalk Creek. Vicinity of Bunny Lane. | | |
| | Justification | | |
| | A unique natural depositional pockets that exists on Chalk Creek downstream of Alpine Lake. This is an expansive floodplain with good energy dissipation potential coming from the ponds and vegetation. Most of the land is in public trust with Colorado Parks and Wildlife. | | |
| Project Type | Description | Cost | Partners |
| Corridor Rehabilitation, Reconnection, and/or Restoration<br><br>Land and Water Protection | Meet with CPW to discuss challenges and opportunities of stream corridor health (there is private landowner development and clearing of vegetation in the vicinity of the stream corridor) and ensure long-term protection for this reach. Maybe an opportunity to enhance this site further with a low-tech restoration project.<br><br>  | $-$$ | NGO, Private |

**Chalk R04**

<table>
<tr><td>Project ID</td><td colspan="3">Location</td></tr>
<tr><td rowspan="3">CK4a</td><td colspan="3">TreeHouse Hot Springs vicinity - unnamed County Road.</td></tr>
<tr><td colspan="3">Justification</td></tr>
<tr><td colspan="3">Low clearance bridge has the potential to be blocked given the sediment and debris supply upstream from the Chalk Cliffs. Existing infrastructure located within the Active Stream Corridor vulnerable to fluvial hazards.</td></tr>
<tr><td>Project Type</td><td>Description</td><td>Cost</td><td>Partners</td></tr>
<tr><td rowspan="2">Mitigate Existing Hazards</td><td>Concept designs that address hazards, bank erosion, and whether debris accumulation issues can be mitigated. Evacuation planning and awareness is highly recommended.</td><td>$-$$$$</td><td>Private, County</td></tr>
<tr><td colspan="3">  </td></tr>
</table>

**Chalk R04 (cont.)**

<table>
<tr><td>Project ID</td><td colspan="3">Location</td></tr>
<tr><td rowspan="3">CK4b</td><td colspan="3">Vicinity of Mount Princeton Hot Springs.</td></tr>
<tr><td colspan="3">Justification</td></tr>
<tr><td colspan="3">New development at Mt Princeton Hot Springs in the 1) Active Stream Corridor and 2) below erodible hillslopes, and 3) adjacent to small bridges is at risk from compounding and complex natural processes.</td></tr>
<tr><td>Project Type</td><td>Description</td><td>Cost</td><td>Partners</td></tr>
<tr><td rowspan="2">Mitigate Existing Hazards</td><td>Concept designs that address depositional hazards, bank erosion, and debris accumulation issues. Evacuation planning and awareness, including staff training, is highly recommended.</td><td>$$</td><td>Private, County</td></tr>
<tr><td colspan="3">  </td></tr>
</table>

**Chalk R03**

<table>
<tr><td>Project ID</td><td colspan="3">Location</td></tr>
<tr><td rowspan="3">CK3</td><td colspan="3">From Princeton Parkway (approximately) to downstream of the fish hatchery.</td></tr>
<tr><td colspan="3">Justification</td></tr>
<tr><td colspan="3">Further study to understand the condition of this reach is needed. Reach may an area where ecological uplift and stream corridor function can be enhanced for the benefit of watershed health without significant intervention.</td></tr>
<tr><td>Project Type</td><td>Description</td><td>Cost</td><td>Partners</td></tr>
<tr><td rowspan="2">Corridor Rehabilitation, Reconnection, and/or Restoration<br><br>Land and Water Protection</td><td>Meet with landowners to discuss challenges and opportunities of stream corridor health and protection in this reach. Could be a candidate for PALS and other low-tech improvements.</td><td>$-$$$</td><td>NGO, Private</td></tr>
<tr><td colspan="3"> 
</td></tr>
</table>

**Chalk R02**

| Project ID | Location | | |
|---|---|---|---|
| CK2a | CR 286 and US 285 crossing vicinity. | | |
| | Justification | | |
| | US 285 bridge has significant impacts on the lower end of the reach. It also appears that there may be a fish passage blockage created by the roadway crossings here. | | |
| Project Type | Description | Cost | Partners |
| Infrastructure Retrofits and Upgrades | Conceptual design to address crossing impacts on stream corridor health and hazards. Evacuation planning and awareness consideration for upstream property. | $-$$$$ | County, CDOT, Private |
| |  | | |

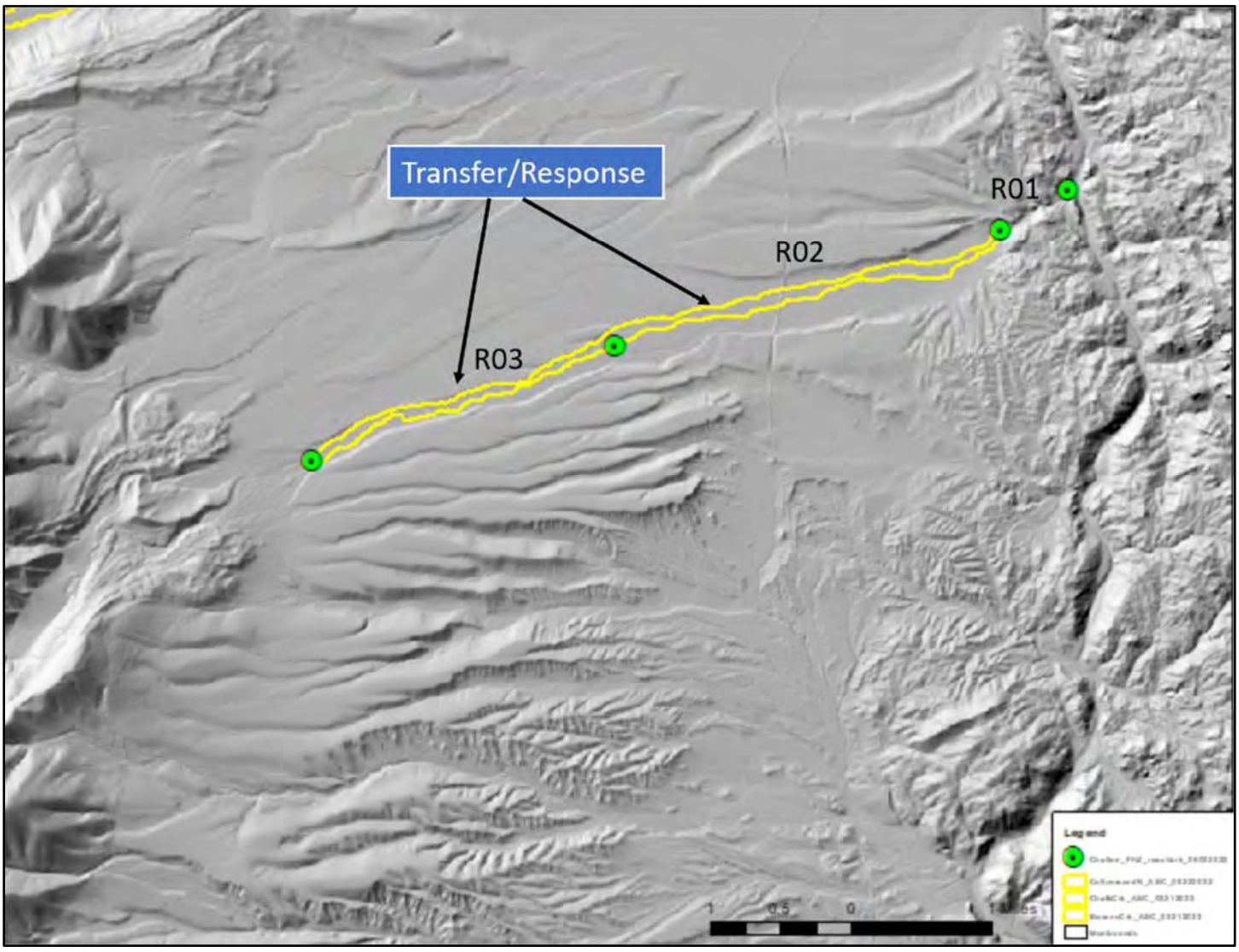
**Chalk R02 (cont.)**

<table>
<tr><td>Project ID</td><td colspan="3">Location</td></tr>
<tr><td rowspan="3">CK2b</td><td colspan="3">Upstream and downstream of Highway 285 crossing</td></tr>
<tr><td colspan="3">Justification</td></tr>
<tr><td colspan="3">Undeveloped stream corridors - appears to have evidence of past beaver ponds downstream of highway. Upstream channel has been straightened for agriculture.</td></tr>
<tr><td>Project Type</td><td>Description</td><td>Cost</td><td>Partners</td></tr>
<tr><td>Corridor Rehabilitation, Reconnection, and/or Restoration<br><br>Land and Water Protection</td><td>Investigate landownership and conservation/restoration potential.</td><td>$</td><td>NGO, Private</td></tr>
</table>


**Chalk R01**

| Project ID | Location | | |
|---|---|---|---|
| CK1 | CR197A and Railroad crossing vicinity. | | |
| | Justification | | |
| | Road to trailer park causes a localized constriction (under railroad bridge). Increased shear stress and stream power likely to result in erosion in this reach during flood as a result of sediment supply disruption from CO 285 crossing upstream. | | |
| Project Type | Description | Cost | Partners |
| Infrastructure Retrofits and Upgrades | Relocate road bed fill to reestablish channel floodplain. Ensure railroad bridge modifications/improvements reduce constrictrictions of the stream corridor. | $ | |
| |  | | |

## Browns



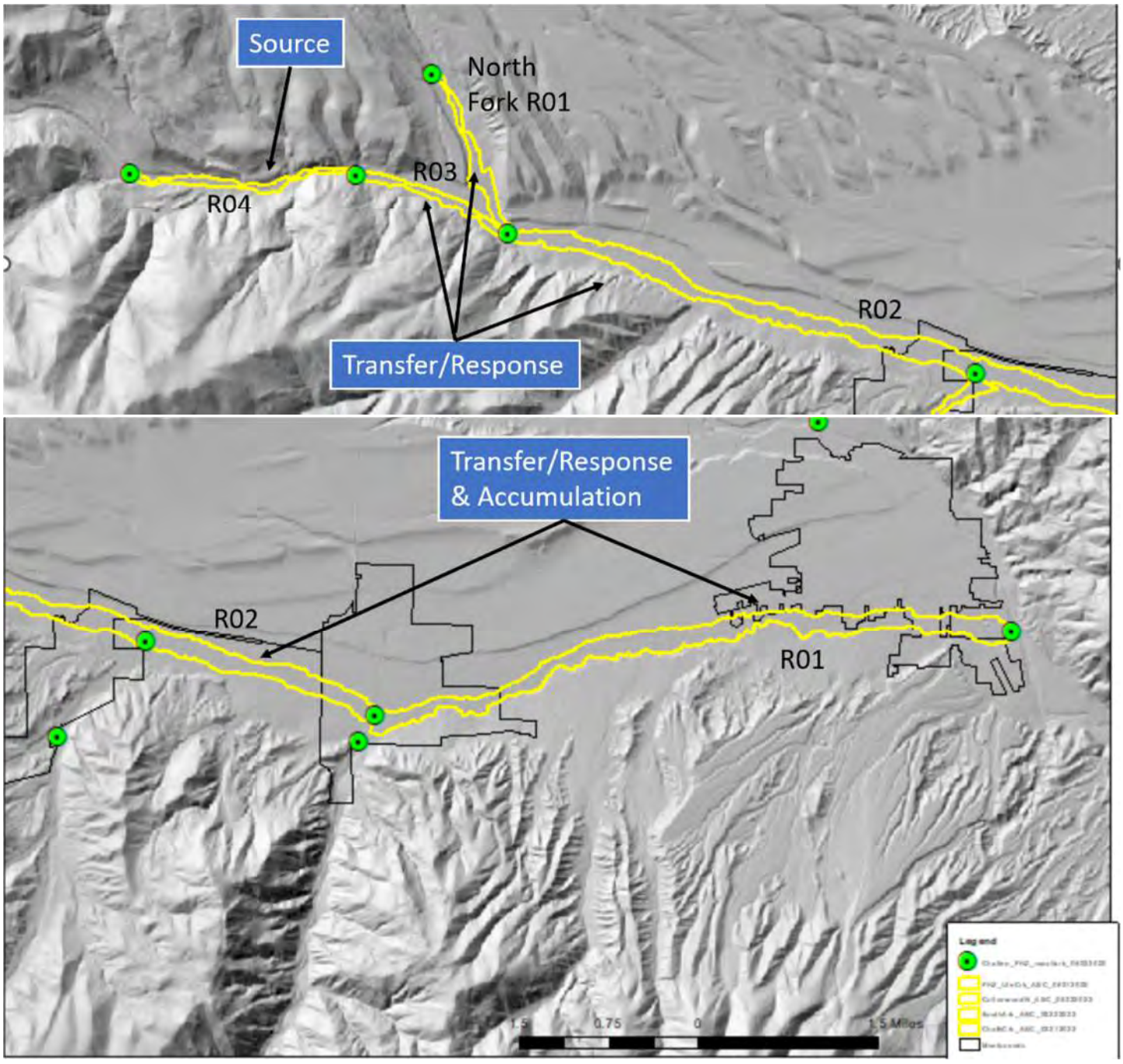
**Browns R03**

<table>
<tr><td>Project ID</td><td colspan="3">Location</td></tr>
<tr><td rowspan="3">BC3</td><td colspan="3">Entire reach.</td></tr>
<tr><td colspan="3">Justification</td></tr>
<tr><td colspan="3">Roadways perpendicular to valley are likely to act as dams during a flood when numerous undersized culvert crossings plug. CR 261C (river right (south) side) seems to follow a secondary drainage and may be at times lower than existing Creek bed creating a potential avulsion pathway. Floodfactor modeling has nearly whole valley bottom as wet/vulnerable to flooding.</td></tr>
<tr><td>Project Type</td><td>Description</td><td>Cost</td><td>Partners</td></tr>
<tr><td>Infrastructure Retrofits and Upgrades<br><br>Mitigate Existing Hazards</td><td>Conceptual design to address numerous undersized crossings. Evacuation planning and awareness consideration for landowners.</td><td>$$</td><td>Private, County</td></tr>
<tr><td colspan="3">  </td></tr>
</table>

**Browns R02**

<table>
<tr><td>Project ID</td><td colspan="3">Location</td></tr>
<tr><td rowspan="3">BC2</td><td colspan="3">Entire reach.</td></tr>
<tr><td colspan="3">Justification</td></tr>
<tr><td colspan="3">Existing open space with compatible land use (ranching). Stream corridor is degraded.</td></tr>
<tr><td>Project Type</td><td>Description</td><td>Cost</td><td>Partners</td></tr>
<tr><td rowspan="2">Corridor Rehabilitation, Reconnection, and/or Restoration</td><td>Meet with landowners to discuss challenges and opportunities of stream corridor health and protection in this reach. Could be a candidate for PALS and other low-tech improvements (e.g., restore floodplain connectivity and riparian vegetation). Riparian corridor pasture management practices and possible conservation easement(s) could also be discussed.</td><td>$-$$$</td><td>Private, NGO</td></tr>
<tr><td colspan="3">  </td></tr>
</table>

## South Ark


Source
North
Fork R01
R03
R04
R02
Transfer/Response
Transfer/Response
& Accumulation
R02
R01
1.5
0.75
0
1.5 Miles

**South Ark R04**

<table>
<tr><td>Project ID</td><td colspan="3">Location</td></tr>
<tr><td rowspan="3">SA4</td><td colspan="3">Vicinity of Monarch River Estates</td></tr>
<tr><td colspan="3">Justification</td></tr>
<tr><td colspan="3">Development in Monarch River Estates appears to be vulnerable to future flooding and/or fluvial hazards - especially if watershed conditions change due to a wildfire or in the case of a large flood event.</td></tr>
<tr><td>Project Type</td><td>Description</td><td>Cost</td><td>Partners</td></tr>
<tr><td rowspan="2">Mitigate Existing Hazards</td><td>Use FloodFactor and new DEM to model the site and provide guidance to landowners about flood risk.</td><td>$</td><td>Private</td></tr>
<tr><td colspan="3">  </td></tr>
</table>

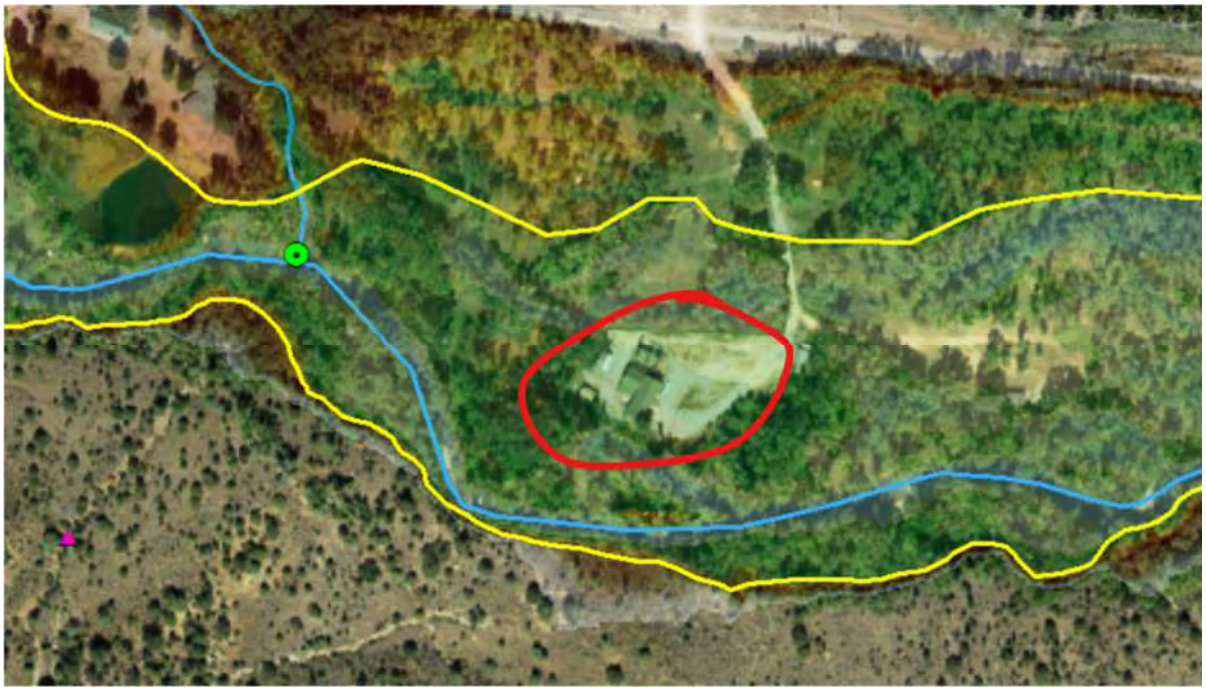
**South Ark R03**

<table>
<tr><td>Project ID</td><td colspan="3">Location</td></tr>
<tr><td rowspan="3">SA3a</td><td colspan="3">Maysville</td></tr>
<tr><td colspan="3">Justification</td></tr>
<tr><td colspan="3">Roadways and undersized crossings are preventing the proper transport of sediment and debris. A known issue in Maysville based on observance of excavated channel materials up and downstream of bridge(s). These structures are likely to cause the channel to avulse during a flood thus threatening nearby existing infrastructure (lives/property).</td></tr>
<tr><td>Project Type</td><td>Description</td><td>Cost</td><td>Partners</td></tr>
<tr><td rowspan="2">Infrastructure Retrofits and Upgrades<br><br>Mitigate Existing Hazards</td><td>Flood hazard mitigation study and infrastructure upgrade study. Consider sediment supply from upstream and whether opportunities exist to trap more of it upstream, most likely channel is naturally aggradational here and deposition opportunities should be maintained within the reach.</td><td>$$$</td><td>County, Private</td></tr>
<tr><td colspan="3">  </td></tr>
</table>

**South Ark R03 (cont.)**

<table>
<tr><td>Project ID</td><td colspan="3">Location</td></tr>
<tr><td rowspan="3">SA3b</td><td colspan="3">Maysville</td></tr>
<tr><td colspan="3">Justification</td></tr>
<tr><td colspan="3">Several houses in Maysville are built on debris fans.</td></tr>
<tr><td>Project Type</td><td>Description</td><td>Cost</td><td>Partners</td></tr>
<tr><td>Mitigate Existing Hazards</td><td>Debris fan mapping and mitigation study for Maysville. Near term and immediate hazard communication with residents.</td><td>$-$$$$</td><td>Private, County</td></tr>
<tr><td colspan="3">  </td></tr>
</table>

**South Ark R02**

<table>
<tr><td>Project ID</td><td colspan="3">Location</td></tr>
<tr><td rowspan="3">SA2a</td><td colspan="3">Vicinity of confluence of North Fork with the South Arkansas River off CR 220 d/s of Maysville.</td></tr>
<tr><td colspan="3">Justification</td></tr>
<tr><td colspan="3">Electric substation located in the Active Stream Corridor just downstream of the confluence of the North Fork. May be vulnerable to floods.</td></tr>
<tr><td>Project Type</td><td>Description</td><td>Cost</td><td>Partners</td></tr>
<tr><td rowspan="2">Mitigate Existing Hazards</td><td>Further understand the vulnerability of substation and whether mitigation measures can be made. Consider ramifications of substation going offline.</td><td>$</td><td>Private company, County</td></tr>
<tr><td colspan="3">  </td></tr>
</table>

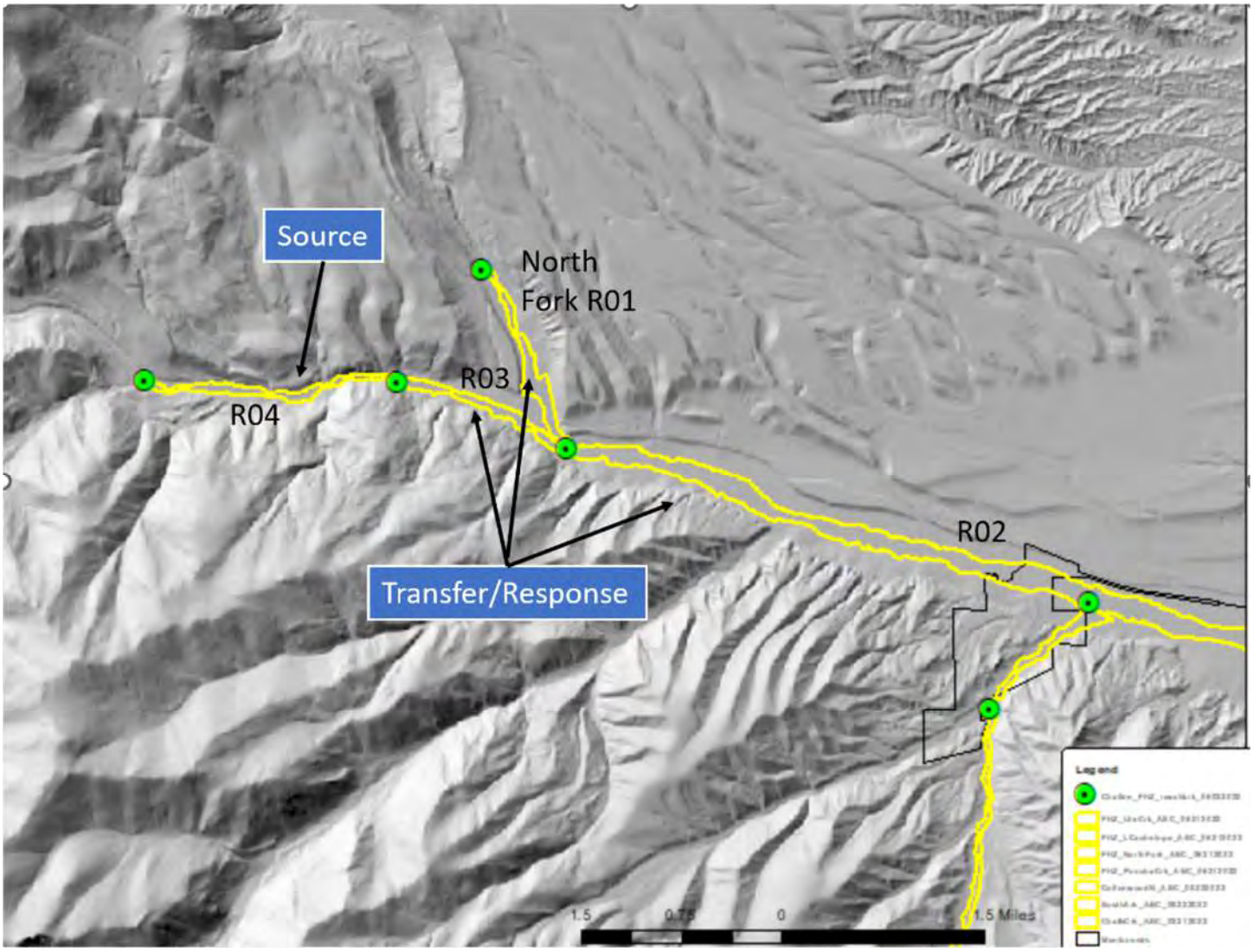
**South Ark R02 (cont.)**

<table>
<tr><td>Project ID</td><td colspan="3">Location</td></tr>
<tr><td rowspan="3">SA2b</td><td colspan="3">Entire reach</td></tr>
<tr><td colspan="3">Justification</td></tr>
<tr><td colspan="3">Maintain current open space land use; Restore floodplain connectivity and riparian vegetation (beavers).</td></tr>
<tr><td>Project Type</td><td>Description</td><td>Cost</td><td>Partners</td></tr>
<tr><td rowspan="2">Corridor Rehabilitation, Reconnection, and/or Restoration</td><td>Meet with landowners to discuss challenges and opportunities of stream corridor health and protection in this reach. Could be a candidate for PALS and other low-tech improvements.</td><td>$-$$$</td><td>Private, NGO</td></tr>
<tr><td colspan="3">  </td></tr>
</table>

**South Ark R01**

<table>
<tr><td>Project ID</td><td colspan="3">Location</td></tr>
<tr><td rowspan="3">SA1</td><td colspan="3">Numerous sites in South Ark 01.</td></tr>
<tr><td colspan="3">Justification</td></tr>
<tr><td colspan="3">Existing development in Active Stream Corridor combined with undersized crossing and elevated road decks threaten life and property.</td></tr>
<tr><td>Project Type</td><td>Description</td><td>Cost</td><td>Partners</td></tr>
<tr><td>Mitigate Existing Hazards</td><td>Numerous hazards exist here. Simple projects include lowering road deck at Little River Lane to protect existing houses (provide preferentially flow paths for flood waters). More complex projects include infrastructure retrofits, buyouts of non-compatible land use, and infrastructure retrofits. Also include hazard communication with landowners.</td><td>$-$$$$</td><td>Private, County</td></tr>
<tr><td colspan="3">  </td></tr>
</table>

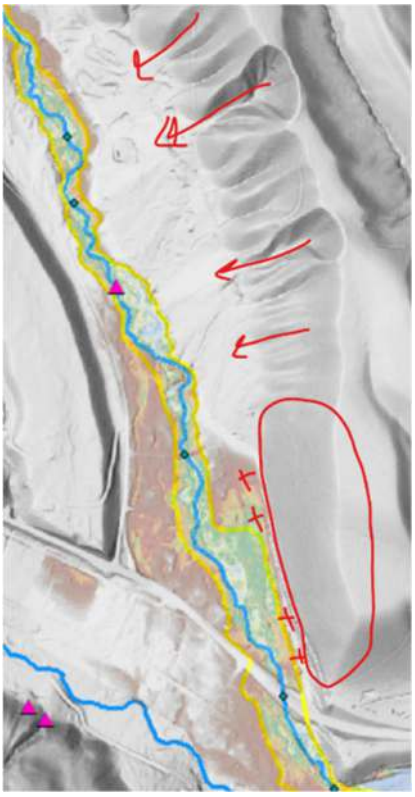
## North Fork of the South Ark



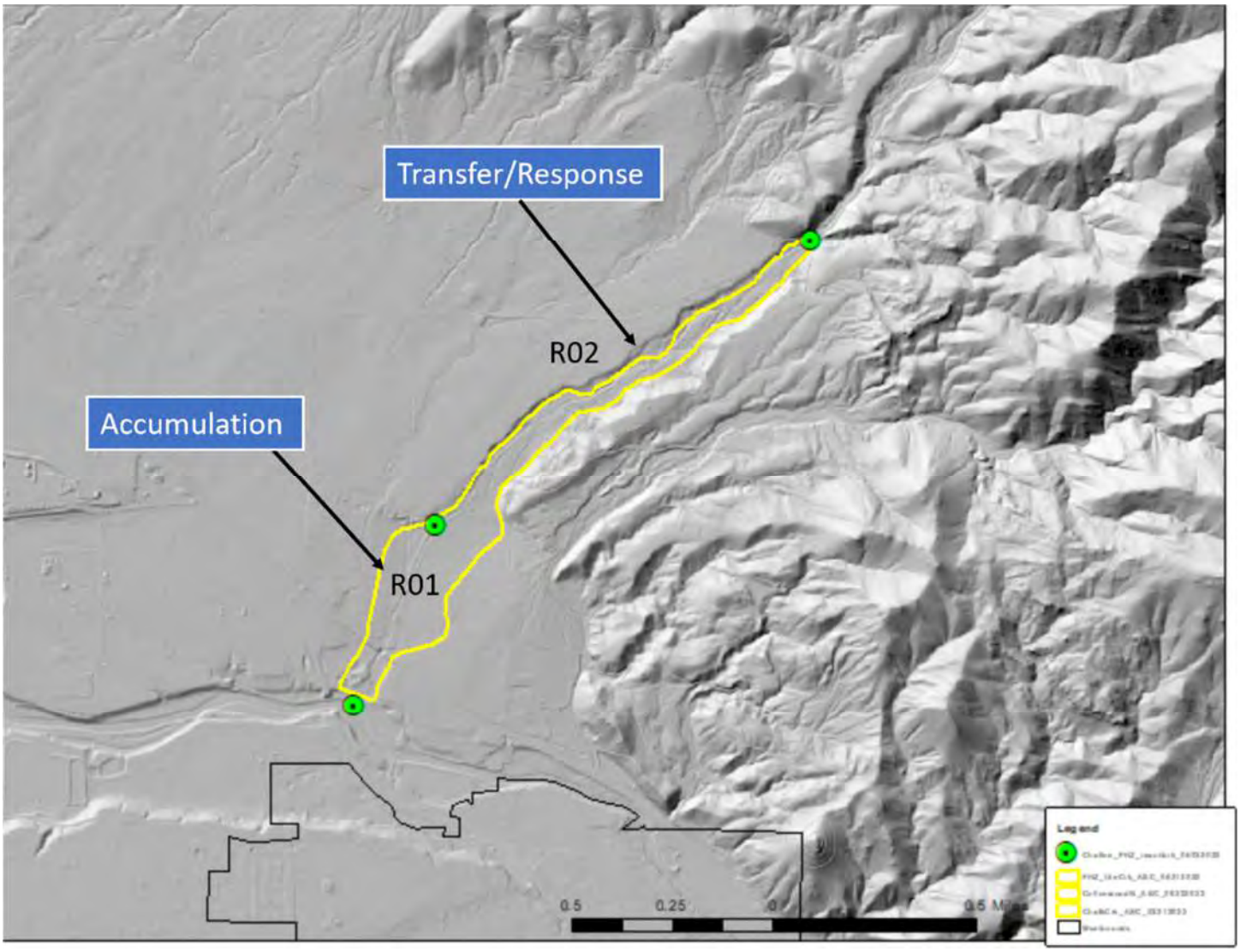
**North Fork R01**

<table>
<tr><td>Project ID</td><td colspan="3">Location</td></tr>
<tr><td rowspan="3">NF1a</td><td colspan="3">Entire reach.</td></tr>
<tr><td colspan="3">Justification</td></tr>
<tr><td colspan="3">Development on both sides of the channel in a response reach. Watershed above is mostly forested and vulnerable to wildfire. Not much corridor exists upstream to attenuate sediment and debris.</td></tr>
<tr><td>Project Type</td><td>Project Description</td><td>Cost</td><td>Partners</td></tr>
<tr><td>Mitigate Existing Hazards<br><br>Infrastructure Retrofits and Upgrades</td><td>Conduct a study to further define the flood, debris flow, and avulsion hazard potential of this area and to identify specific mitigation strategies for these homeowners.</td><td>$$</td><td>County, Private landowner(s)</td></tr>
<tr><td colspan="3">  </td></tr>
</table>

**North Fork R01**

<table>
<tr><td>Project ID</td><td colspan="3">Location</td></tr>
<tr><td rowspan="3">NF1b</td><td colspan="3">Lower end of reach, east side of valley above CO 50 crossing.</td></tr>
<tr><td colspan="3">Justification</td></tr>
<tr><td colspan="3">LiDAR indicates hillslope failure potential as does surficial geology map. Houses are constructed in an area that may be susceptible to landslide.</td></tr>
<tr><td>Project Type</td><td>Project Description</td><td>Cost</td><td>Partners</td></tr>
<tr><td>Mitigate Existing Hazards</td><td>Contact Colorado Geologic Survey to determined landslide hazard potential of this area and to identify specific mitigation strategies for these homeowners.</td><td>$</td><td>County, Private landowner(s)</td></tr>
<tr><td colspan="4">  <br>Red arrows indicate area upvalley where landsliding has occurred. The southern end of this geologic formation (red circle) has not had these type of failures. Houses exist at the toe of this slope (approximated by red “x”).</td></tr>
</table>

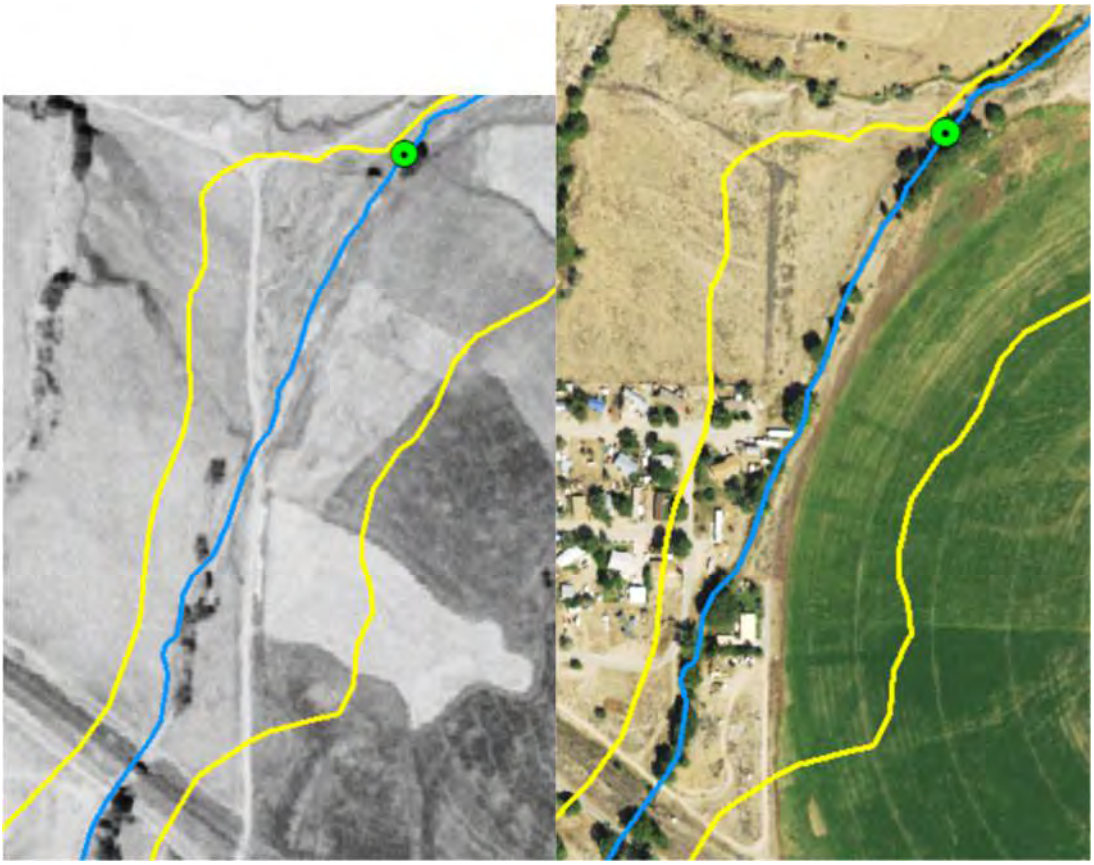
## Ute Creek


Transfer/Response
RO2
Accumulation
RO1
0.5
0.25
0
0.5 Miles
Legend

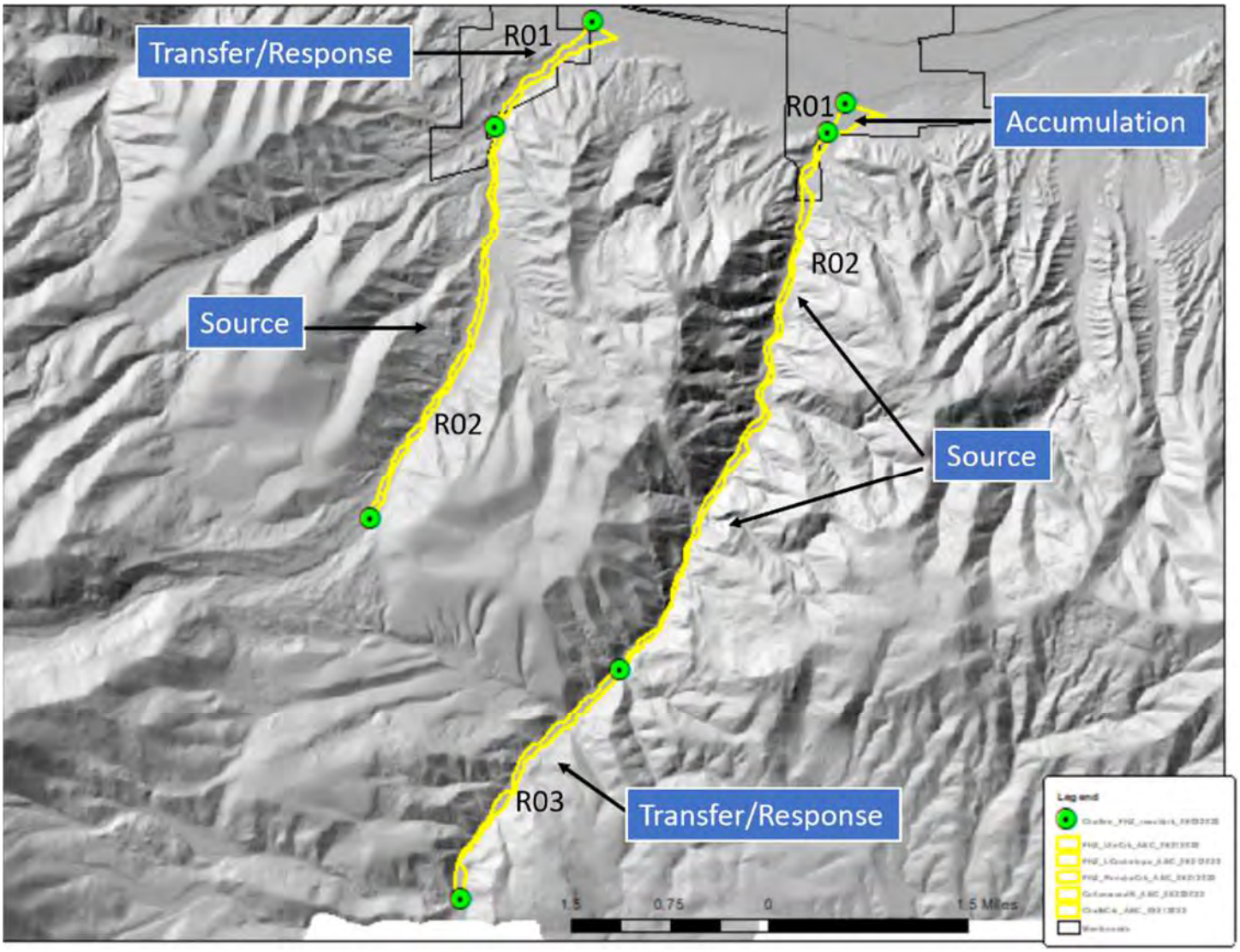
**Ute Creek R02**

<table>
<tr><td>Project ID</td><td colspan="3">Location</td></tr>
<tr><td rowspan="3">UC2</td><td colspan="3">CR 156 crossing (top of reach)</td></tr>
<tr><td colspan="3">Justification</td></tr>
<tr><td colspan="3">Significantly undersized crossing along with unpermitted dams and sediment basins create significant avulsion hazard potential as well as increasing threat to development in the Active Stream Corridor downstream of the crossing.</td></tr>
<tr><td>Project Type</td><td>Description</td><td>Cost</td><td>Partners</td></tr>
<tr><td>Infrastructure Retrofits and Upgrades</td><td>Replace existing “dam” with appropriately sized bridge (see photo below of bridge that exists further up the Ute Creek corridor). Restore corridor. Relocate sediments downstream to reconnect the incised channel.</td><td>$$$</td><td>County</td></tr>
<tr><td colspan="4">  </td></tr>
</table>

**Ute Creek R01**

<table>
<tr><td>Project ID</td><td colspan="3">Location</td></tr>
<tr><td rowspan="3">UC1</td><td colspan="3">CR 156a and 156c vicinity</td></tr>
<tr><td colspan="3">Justification</td></tr>
<tr><td colspan="3">Homes lie in Active Stream Corridor.</td></tr>
<tr><td>Project Type</td><td>Description</td><td>Cost</td><td>Partners</td></tr>
<tr><td>Mitigate Existing Hazards</td><td>Educational campaign to raise awareness of flood potential in this area and work on evacuation planning. Possible land trade opportunity to relocate some of these structures. At least campaign to get flood insurance for these structures. Consult updated FEMA regulatory maps when they become available in 2023.</td><td>$-$$$$</td><td>County</td></tr>
<tr><td colspan="4">  <br>1953 2019</td></tr>
</table>

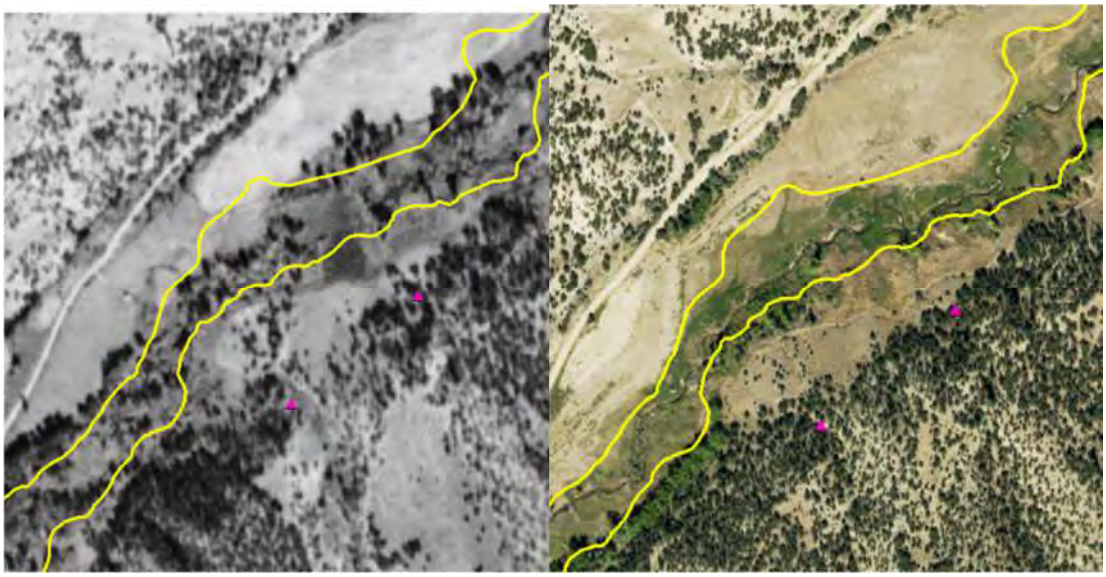
## Little Cochetopa Creek



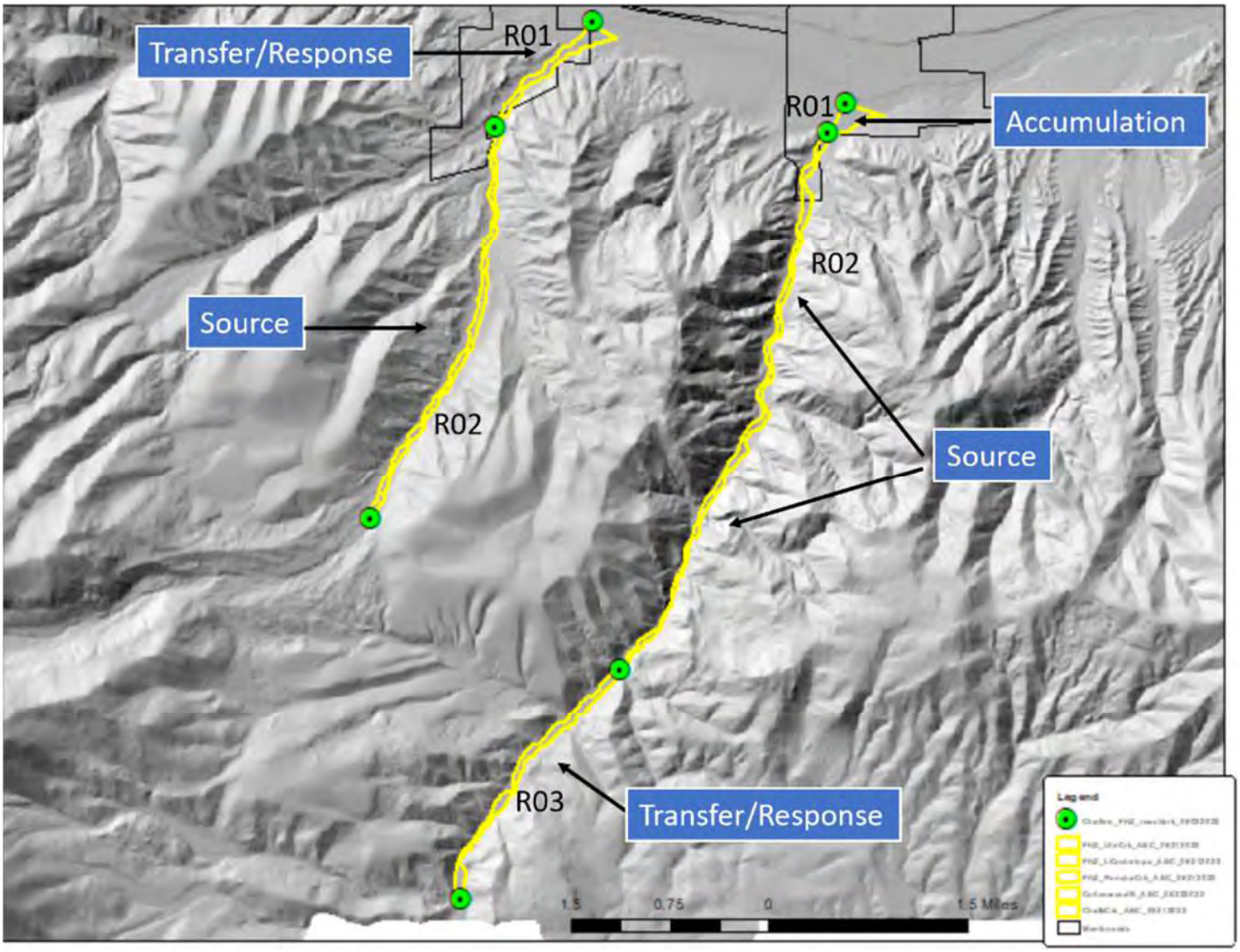
**Little Cochetopa R02**

<table>
<tr><td>Project ID</td><td colspan="3">Location</td></tr>
<tr><td rowspan="3">LC2</td><td colspan="3">Entire reach where crossings/development intersect the fluvial hazard zone.</td></tr>
<tr><td colspan="3">Justification</td></tr>
<tr><td colspan="3">Development on both sides of the channel in source reach. Watershed above is mostly forested and vulnerable to wildfire. Not much corridor exists upstream to attenuate sediment and debris. Recent flooding damaged many crossings.</td></tr>
<tr><td>Project Type</td><td>Project Description</td><td>Cost</td><td>Partners</td></tr>
<tr><td>Infrastructure Retrofits and Upgrades</td><td>Provide guidance and assistance to landowners for crossing upgrades.</td><td>$$</td><td>County, Private landowner(s)</td></tr>
<tr><td colspan="4">  undersized crossing and road dam spring ‘22<br>  replacing washed out culvert summer ‘22.</td></tr>
</table>

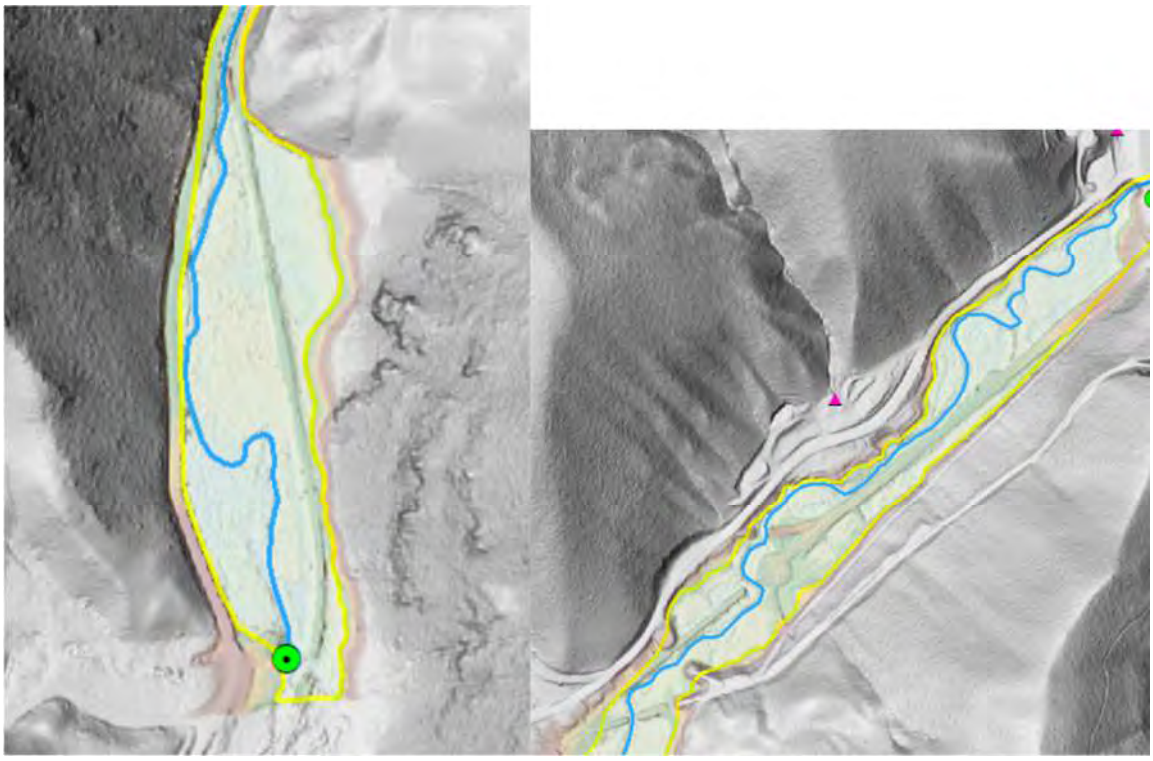
**Little Cochetopa R01**

| Project ID | Location | | |
|---|---|---|---|
| LC1 | Near confluence of L.Cochetopa and S. Arkansas River | | |
| | Justification | | |
| | Steep fire and flood prone watershed upstream. This is a response reach with an accumulation zone near the confluence with the South Ark (alluvial fan). Floodplain alterations have degraded stream health. Riparian vegetation and beaver dams removal has contributed to channel incision and floodplain disconnection. | | |
| Project Type | Description | Cost | Partners |
| Corridor Rehabilitation, Reconnection, and/or Restoration<br><br>Land and Water Protection | Meet with landowners to discuss challenges and opportunities of stream corridor health and protection in this reach. *(Note: It is our understanding that this property was notified of a violation from the ACOE and is currently working with a consultant on a restoration project).* | $-$$$ | NGO, Private |
| |  Cottonwood trees visible along the creek in 1953 (left) are all but absent in 2019 (right). | | |

## Poncha Creek



**Poncha Creek R03**

<table>
<tr><td>Project ID</td><td colspan="3">Location</td></tr>
<tr><td rowspan="3">PC3a</td><td colspan="3">Entire reach.</td></tr>
<tr><td colspan="3">Justification</td></tr>
<tr><td colspan="3">Unused railbed bifurcates floodplain. Sediment and water storage is reduced and habitats are disconnected.</td></tr>
<tr><td>Project Type</td><td>Description</td><td>Cost</td><td>Partners</td></tr>
<tr><td>Corridor Rehabilitation, Reconnection, and/or Restoration<br><br>Land and Water Protection</td><td>Reach-scale concept design to identify areas where railbed can be removed and floodplain reconnected.</td><td>$-$$$</td><td>Federal, private</td></tr>
<tr><td colspan="4">  </td></tr>
</table>

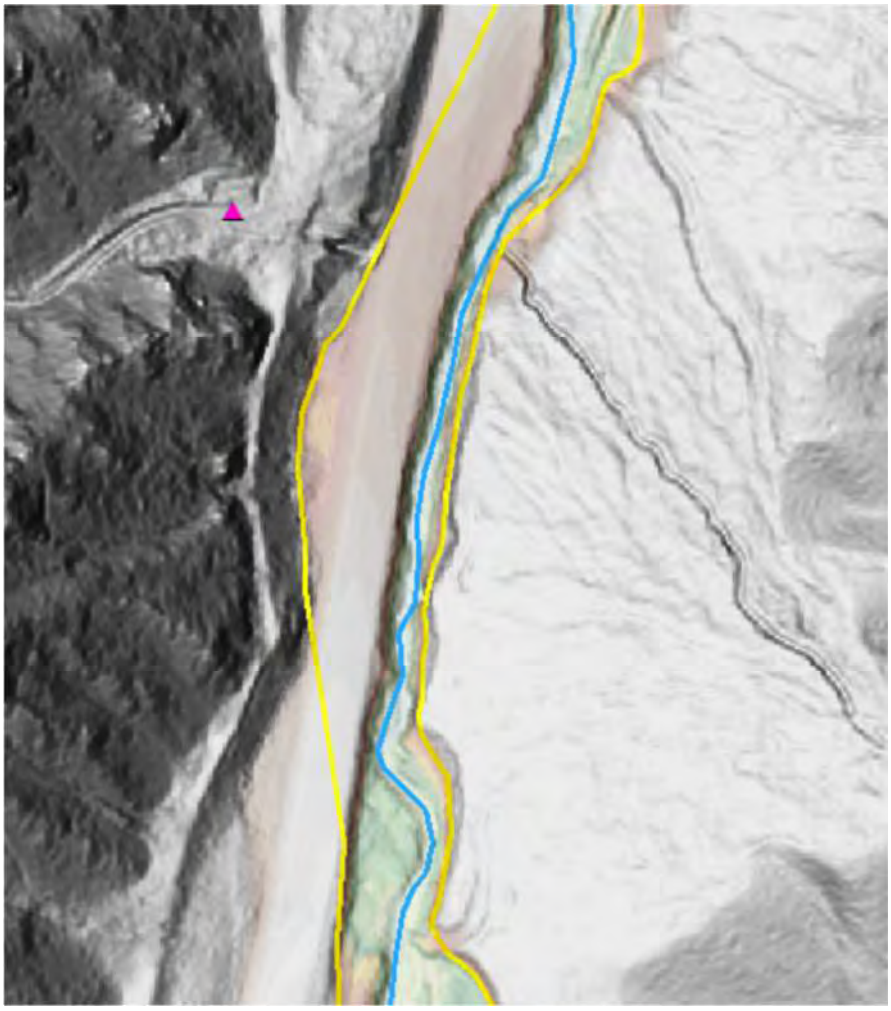
**Poncha Creek R03 (cont.)**

<table>
<tr><td>Project ID</td><td colspan="3">Location</td></tr>
<tr><td rowspan="3">PC3b</td><td colspan="3">SH 285 crossing over Poncha Creek near Marshall Pass Road.</td></tr>
<tr><td colspan="3">Justification</td></tr>
<tr><td colspan="3">Culvert under highway is grossly undersized. Roadway creates a dam which will pond water affecting upstream property owners but more importantly if it overtops could run down the highway causing much damage.</td></tr>
<tr><td>Project Type</td><td>Description</td><td>Cost</td><td>Partners</td></tr>
<tr><td rowspan="2">Infrastructure Retrofits and Upgrades</td><td>Design plan for crossing improvement(s).</td><td>$$$</td><td>CDOT, County</td></tr>
<tr><td colspan="3">  </td></tr>
</table>

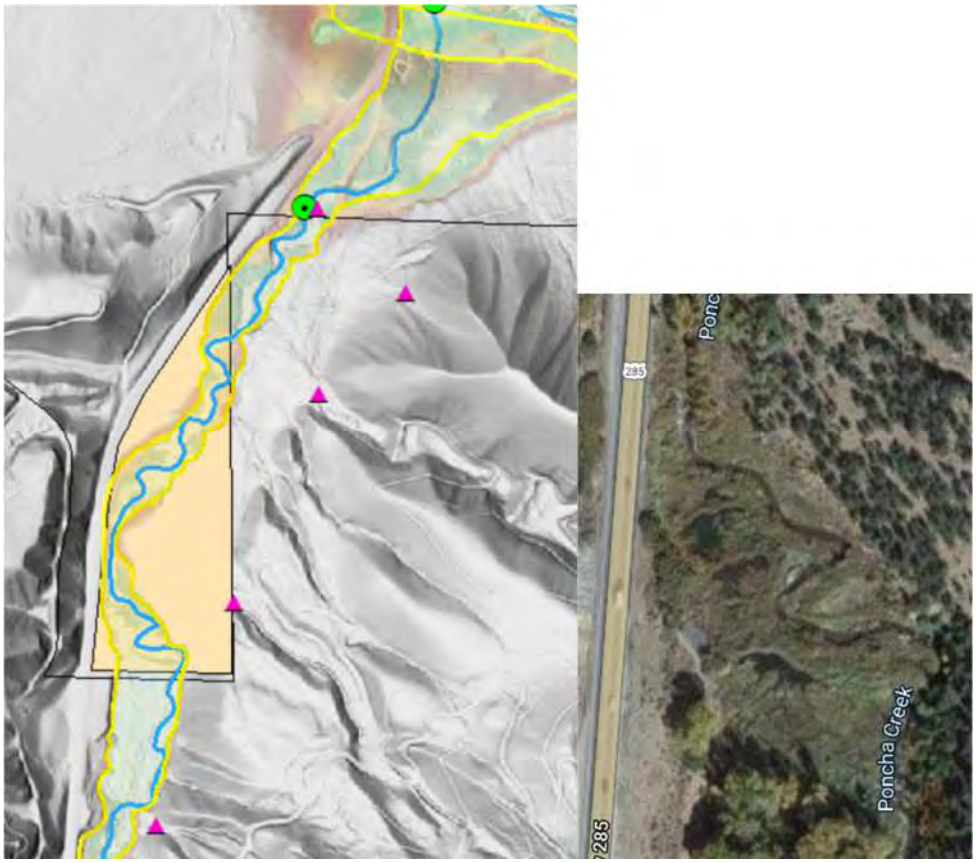
**Poncha Creek R02**

<table>
<tr><td>Project ID</td><td colspan="3">Location</td></tr>
<tr><td rowspan="3">PC2a</td><td colspan="3">Near upper end of reach in vicinity of Willow Lane</td></tr>
<tr><td colspan="3">Justification</td></tr>
<tr><td colspan="3">Significant channel and floodplain alteration. Conversion of response reach to transport reach.</td></tr>
<tr><td>Project Type</td><td>Description</td><td>Cost</td><td>Partners</td></tr>
<tr><td>Corridor Rehabilitation, Reconnection, and/or Restoration</td><td>Evaluate landowner concerns in this reach and investigate whether opportunities to restorate floodplain connection.</td><td>$-$$$</td><td>Private, NGO</td></tr>
<tr><td colspan="4"> 
</td></tr>
</table>

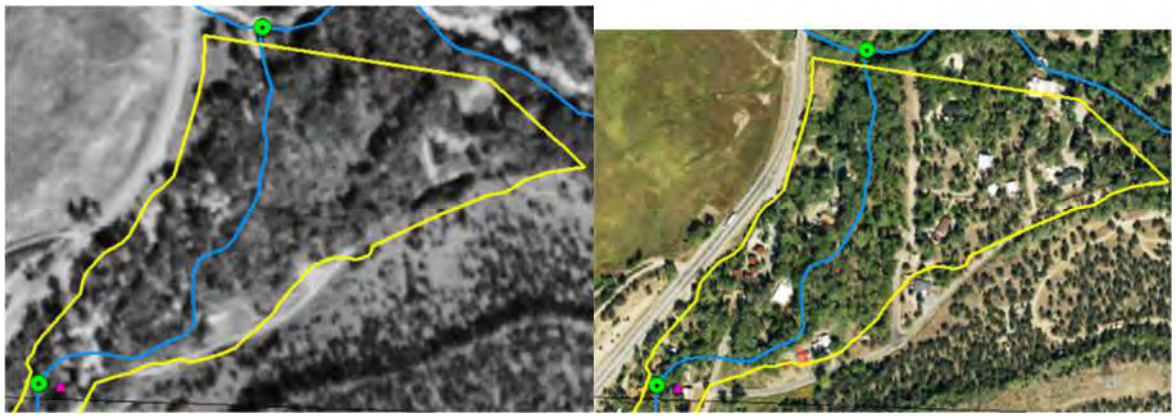
**Poncha Creek R02 (cont.)**

<table>
<tr><td>Project ID</td><td colspan="3">Location</td></tr>
<tr><td rowspan="3">PC2b</td><td colspan="3">Entire reach but most specifically where CO 285 contacts that channel and or is placed on fill in the Active Stream Corridor.</td></tr>
<tr><td colspan="3">Justification</td></tr>
<tr><td colspan="3">Highway washout is all but assured in a significant flow event. State/County should be prepared for having this roadway become impassable following a flood event.</td></tr>
<tr><td>Project Type</td><td>Description</td><td>Cost</td><td>Partners</td></tr>
<tr><td rowspan="2">Mitigate Existing Hazards</td><td>Ensure this topic is discussed in local hazard and emergency planning.</td><td>$</td><td>CDOT/County</td></tr>
<tr><td colspan="3">  </td></tr>
</table>

**Poncha Creek R02 (cont.)**

| Project ID | Location | | |
|---|---|---|---|
| PC2c | Lower end of reach in vicinity of Town of Poncha Springs Park | | |
| | Justification | | |
| | Poncha Creek R02 is a steep confined transport reach with numerous debris fans. A large flood will deliver this material directly into the development located at the mouth of the canyon. Small floodplain pockets do exist upstream of this development and may help buffer flood impacts. | | |
| Project Type | Description | Cost | Partners |
| Corridor Rehabilitation, Reconnection, and/or Restoration<br><br>Land and Water Protection | Field investigation to evaluate opportunities to maximize floodplain connection and storage potential to buffer downstream development from flood and debris impacts. | $ | Town of Poncha Springs, Private |
| |  | | |

**Poncha Creek R01**

| Project ID | Location | | |
|---|---|---|---|
| PC1 | Entire reach. | | |
| | Justification | | |
| | Numerous homes lie in Active Stream Corridor at mouth of steep canyon with significant flood and debris loading potential. | | |
| Project Type | Description | Cost | Partners |
| Mitigate Existing Hazards | Educational campaign to raise awareness of flood and avulsion potential in this area and develop actionable evacuation plans. Consult updated FEMA regulatory maps but also discuss likilihood of sediment and debris to fill channel(s) and cause water to seek new routes.. | $-$$$$ | County |
| |  1953 2019 | | |