



Strontia Springs Reservoir Watershed Sediment Management Plan

ERW Committee
Basin Roundtables
10/25/23

 DENVER WATER

Agenda

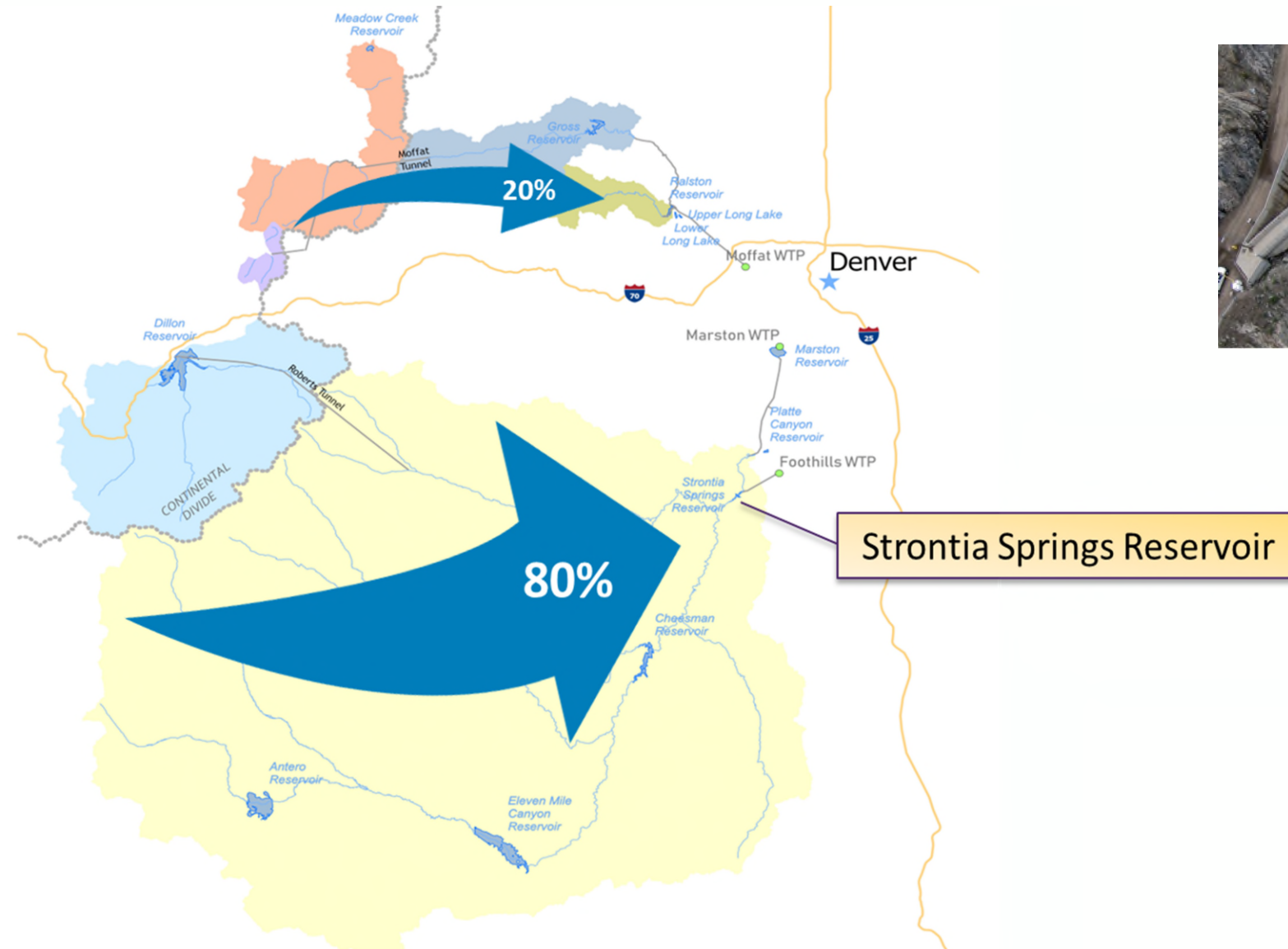
Sediment Issue Summary

Plan Development

Progress To Date



Denver Water Collection System



Strontia Springs Dam and Reservoir

Dam Height: 292 ft

Drainage Area: 2,595 sq mi

First Filled 1982

Capacity: 7,864 ac ft (1.1% of Total Capacity)

Conveys 80% Denver Water Supply

Conveys 90% Aurora Water Supply

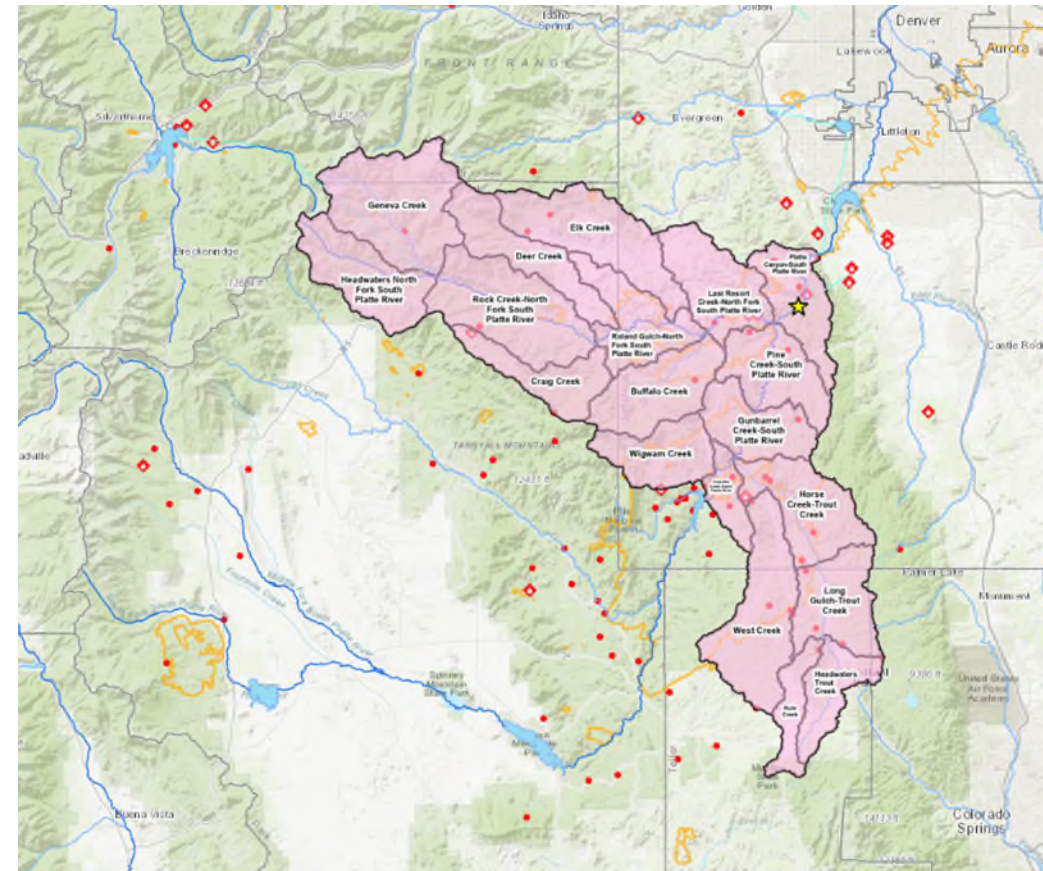
Sediment Issue Summary

Sources

- Pikes Peak Granite
- Steep Topography
- Wildfires
- Roads and Road Cuts
- Recreational Trails and Fishing Access
- Managed Water Delivery System

Sediment inflow is
~50,000 cy/year.

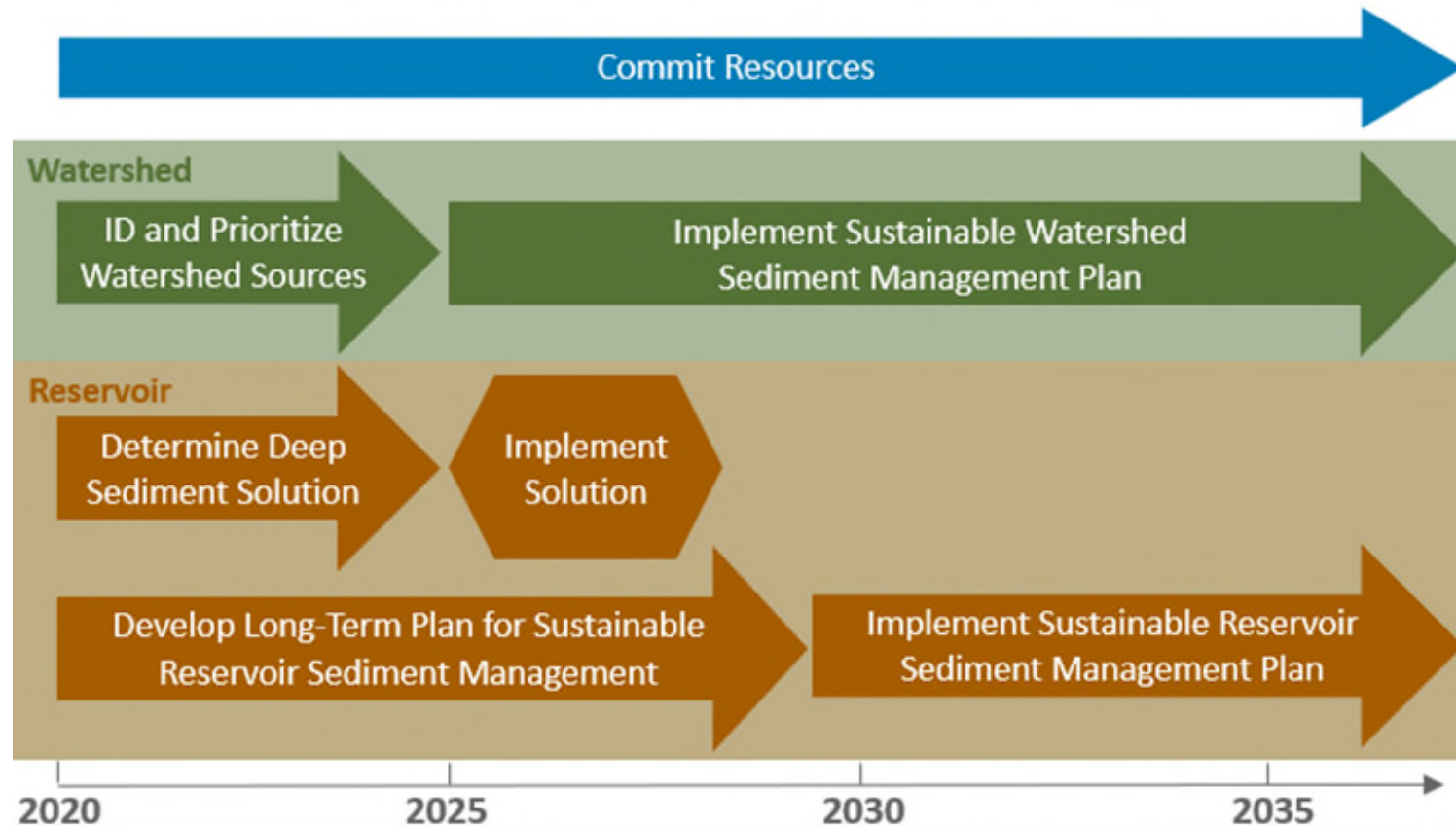
Priority Area (with Fires)



Sediment and Debris in Strontia Springs Reservoir Following Buffalo Creek Fire in 1996

Sediment Issue Summary

Selected Alternative: Alt. 4 Sustain Reservoir @ 80% Capacity



Watershed Sediment Management Plan Development



Strontia Watershed Sediment Management Plan

2019 – 2020: Initial assessments and data gathering

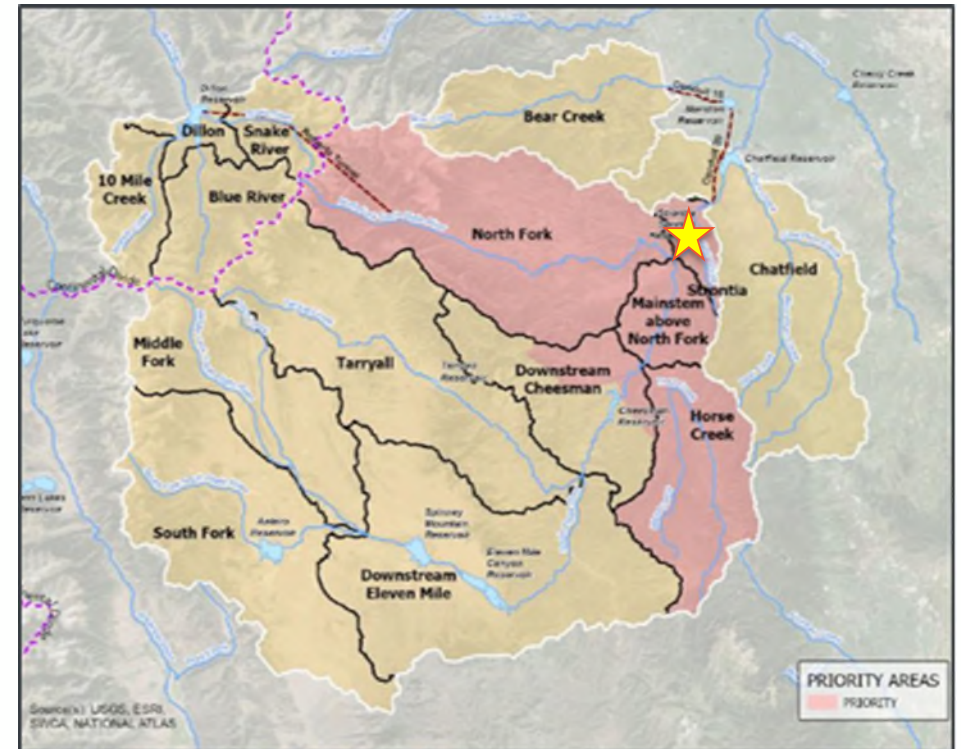
Watershed Assessment of River Stability and Sediment Supply (WARSSS) (SWCA)

- Reconnaissance Level Analysis (included Lit Review) and Predictive Level Analysis
- Two channel assessment (Lower North Fork and Main Stem)
- Two burned subwatersheds (Buffalo Creek and Wigwam)

Roads Draft Assessment using GRAIP_Lite Model (LRE Water)

North Fork Windshield Assessment (CUSP)

North Fork Abandoned Mine Land White Paper (Trout Unlimited)



Plan Overview

2021 Watershed Sediment Management Plan Accomplishments

Modeled baseline sediment risk assessment

31 Areas of Concern created

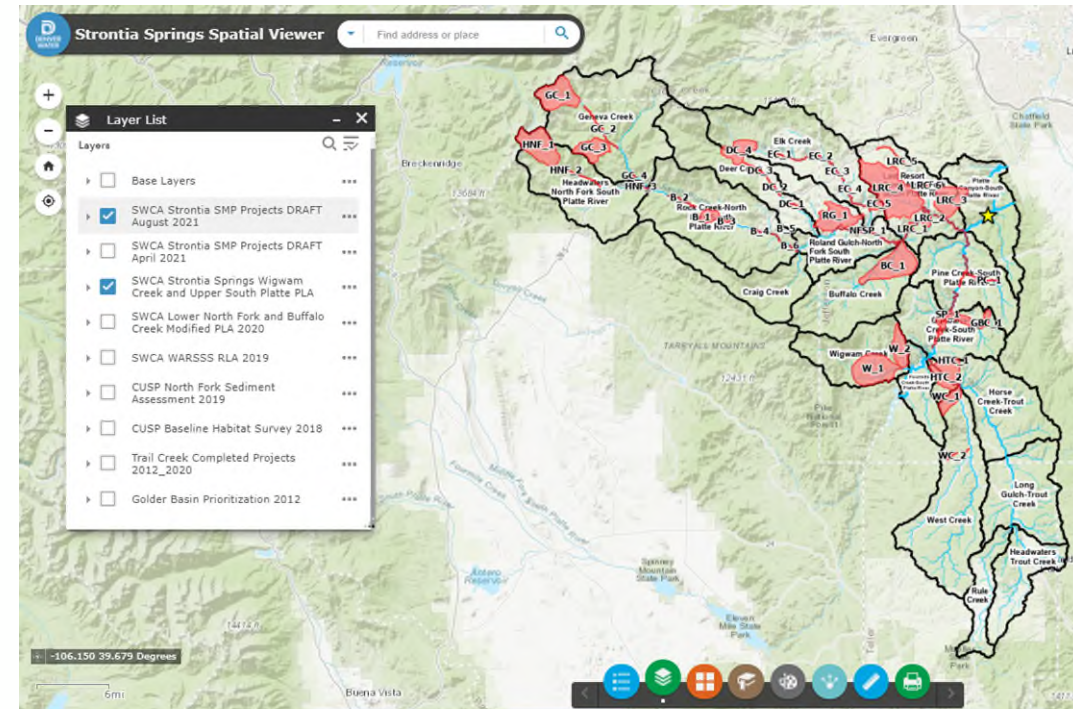
81 Projects and studies identified

6 Near-term projects drafted

3 Spreadsheet tools and 1 report created

1 StoryMap created for internal communication

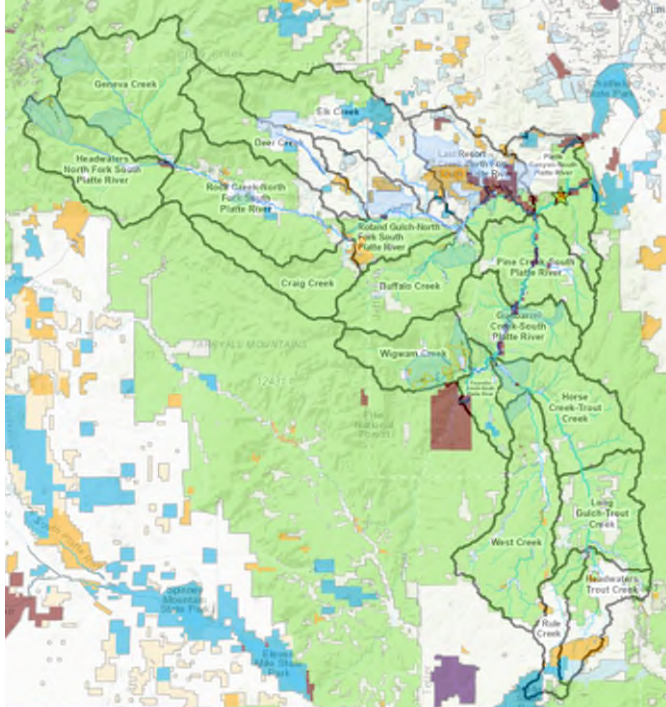
Extensive outreach to watershed stakeholders



Project Funding and Selection

Land Ownership

- US Forest Service (50%)
- Denver Water and DW ROW (2%)
- County (Jefferson, Douglas, Park)
- CPW/State Parks
- Private



Funding

- \$500,000/(calendar) year approved for 5-years in long term forecast
 - DW lands, ROW, and DW-led projects: \$250,000
 - USFS lands or led projects: \$250,000
 - Within From Forests to Faucets MOU, but is not intended for proactive forest treatments
- New cost-sharing MOU with Aurora Water

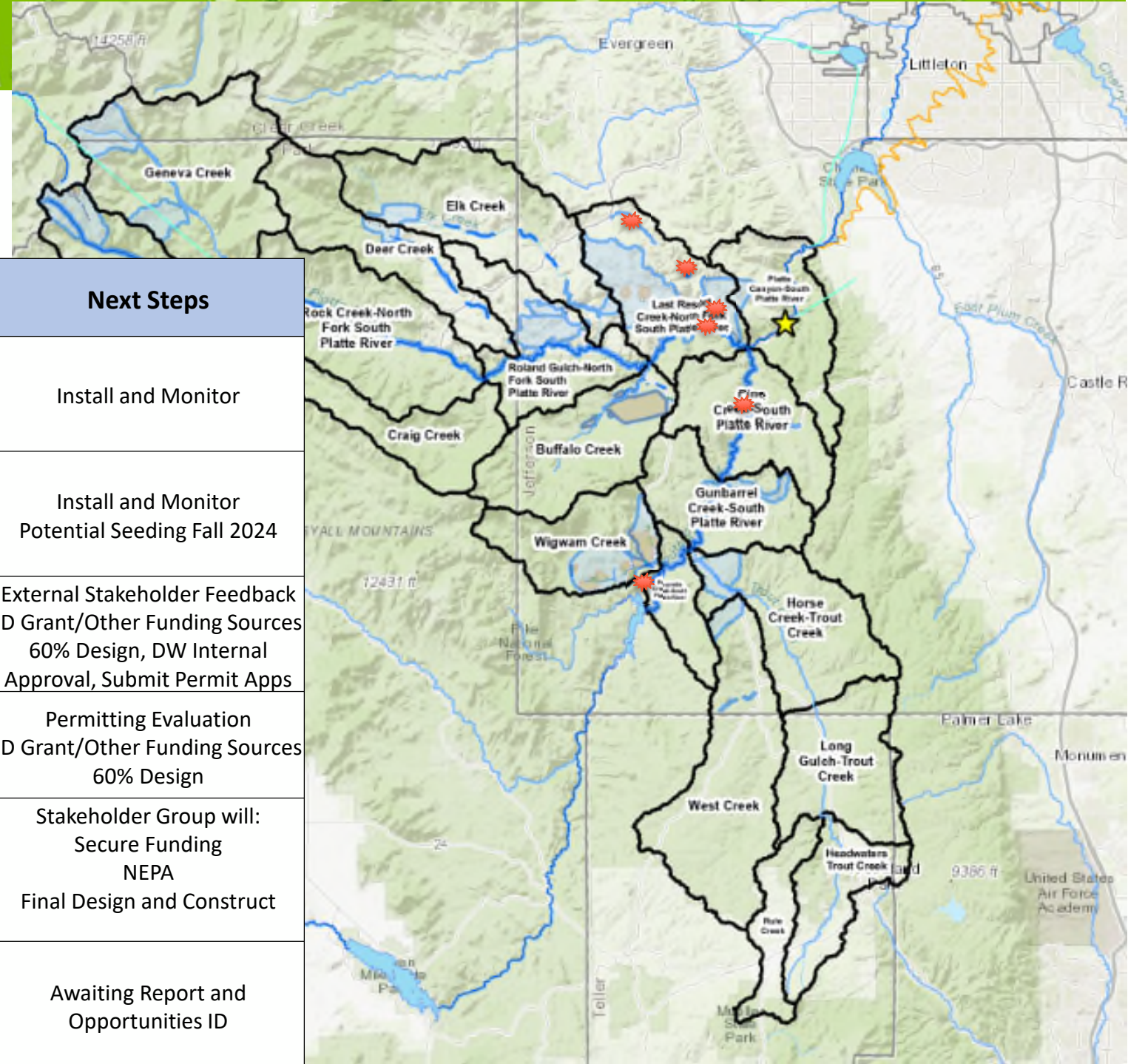
Project Goals

- **Sediment load reduction**
- Build resiliency for the future
- Partner to create multi-benefit projects
- Match DW dollars 1:1 (or more) with partner and/or grant dollars
- Maintain room for experimentation and learning



Projects!

Project Summaries



Project Name	Primary Landowner	Project Status (Oct 2023)	Next Steps
Beaver Ranch Park and Reynolds Park Sediment Retention with LT-PBR	Jefferson County Open Space (JCOS)	Beaver Ranch Install: Nov 2023 Reynolds Install: Spring 2024	Install and Monitor
Lower North Fork Property Hillslope and Gully Sed Mgmt, Access Road Improvements	Denver Water	Install: Nov 2023	Install and Monitor Potential Seeding Fall 2024
Lower North Fork Bank Stabilization and Sediment Retention	Denver Water	30% Design Complete; Optimizing Design	External Stakeholder Feedback ID Grant/Other Funding Sources 60% Design, DW Internal Approval, Submit Permit Apps
South Platte at Pine Creek Floodplain Enhancement	Denver Water	Awaiting 30% Design with Optimization	Permitting Evaluation ID Grant/Other Funding Sources 60% Design
Gill Trail Improvements	USFS (3/4), DW (1/4)	Inventory and Assessment Complete Pilot Project Design Draft Submitted	Stakeholder Group will: Secure Funding NEPA Final Design and Construct
DW and JCOS LT-PBR Opportunities	Denver Water and JCOS	Field Investigations Complete	Awaiting Report and Opportunities ID

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LRC_5a and 6: Beaver Ranch and Reynolds Parks Sediment Retention

Issues:

- High bank erosion, incised channel, undercut banks, disconnect between vegetation and groundwater

Recommended Treatments:

- Three treatment areas with series of PALs, willow brush channel blockages, log jams based on reference reach

Partners: JeffCo Open Space: Implement and Monitor; Denver Water: Design, Permitting Support, and Construction Oversight

Contractors and Schedule:

- Design: Jacobs, August 2022
- Implementation: Beaver Ranch (2 segments): Nov 2023, Reynolds (1 segment): Spring 2024
- Monitoring: Post-construction 2023/24 +

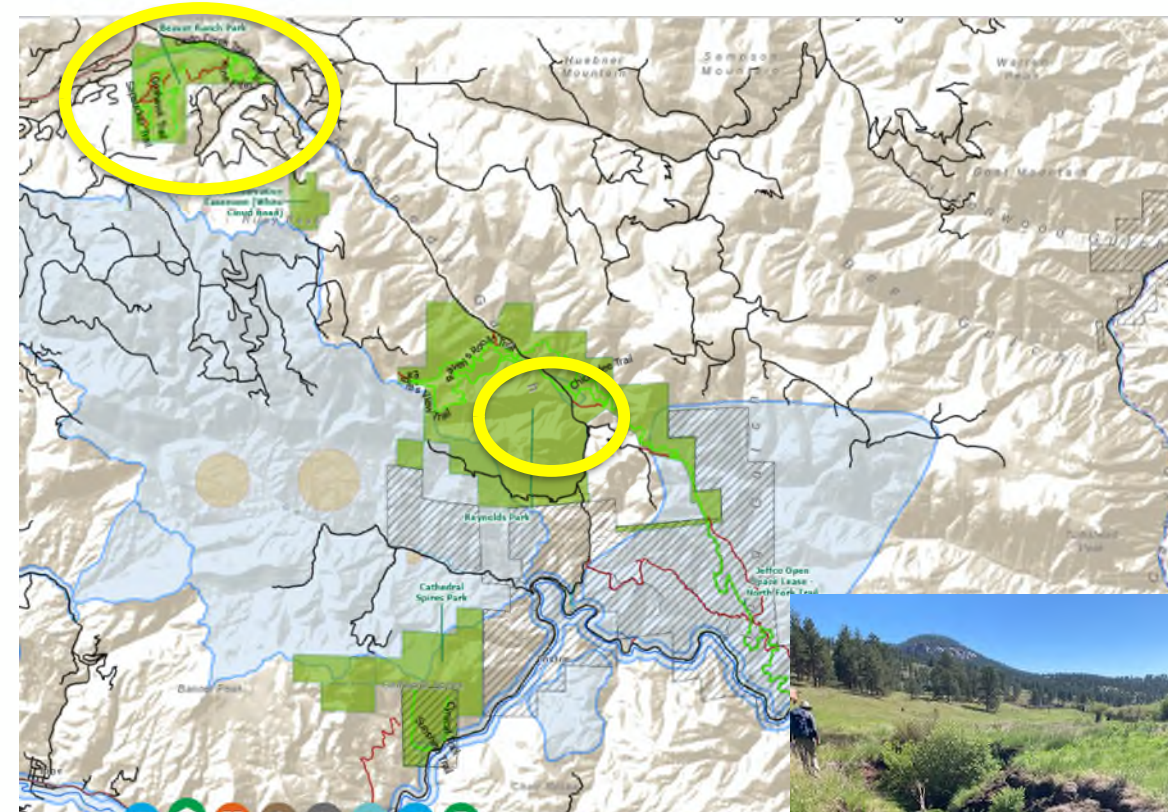


Table 3. Sediment Retention – Structure Types and Design Functions

Structure Type	Function	Design	Construction Description	Natural Reference	Detail (See Appendix C for full Details)
Post-assisted sediment traps	Primary Structure that functions to create backwater pools and promote sediment deposition.	Post-assisted sediment traps are channel spanning structures that are posts aligned perpendicular to flow and driven into the channel bed and bank. Brush materials are tightly woven between and around the post structures to make a seal that has very low permeability. These structures are intended to slow velocity, pond water and promote trapping of sediment behind them. It will be imperative to establish plantings with adequate root mass in conjunction with these structures so that lateral migration around the structures and associated bank erosion are minimal. It is equally imperative that these structures are frequently placed so that if one structure fails, there is another one downstream to trap sediments.	Post-assisted sediment traps are untreated pine posts that are placed perpendicular to flow across the entire channel and banks. These structures are constructed similar to Beaver Dam Analogs (BDAs). Live willow cuttings shall be interwoven between the posts. Branches and root clumps shall be packed between the woven willows to create a seal. The structure crest elevation is set at the bankfull elevation with a notch at the thalweg position that is 1/3 of the bankfull width and notched 1/3 lower than the bankfull elevation.	Not Applicable: Channel-spanning obstructions are not present within assessed reach.	<p>Post Assisted Sediment Capture Feature</p>
Willow Brush Channel Blockages	Secondary structures that function to slow water down and trap sediment materials in and around the brush structure.	Willow brush channel blockages are multi-branched live willow material buried or rooted into the channel, or along the bank to provide roughness and snags to promote deposition. Willow brush channel blockages may or may not be channel spanning structures. Willow brush clumps extend to at least half of the bankfull width of the channel and the average crest elevation at the bankfull depth. Willow brush channel blockages are intended to be permeable, and water can flow through the multi-branched structure.	Willow brush clumps are harvested from onsite materials. Willow clumps that are attached to the bank may be partially knocked into the channel to serve as a partial channel blockage mimicking natural channel processes. Willow clumps that are harvested and transplanted to a new location shall be partially buried into the channel bed and anchored to the new location with live willow stakes and/or wood posts woven through the clump.		<p>Live Willow Brush Channel Partial blockage Detail</p>
Log jams	Secondary structure that functions as large wood sediment traps.	Log jams are made of large wood pieces that are partially buried into the channel bed and protrude up from the channel bed to a crest elevation at or near the bankfull elevation. Large wood jams are permeable to flow and intended to trap sediments both upstream and downstream of the structure.	Large wood pieces (12 to 18 inches in diameter) and 5 to 8 feet long are keyed into the channel bed and bank. Large wood will be paired together with another log jam structure that is placed on the opposite bank and offset in the downstream direction.		<p>Log Jam Detail</p>

LRC_3: Lower North Fork Property Hillslope and Gully Management and Road Improvements

Issues:

- Partial 2012 Lower North Fork Fire burnscar
- Emergency access road to NF Trail cuts through gullies increasing erosion
- Hillslope and gully erosion where vegetation is low

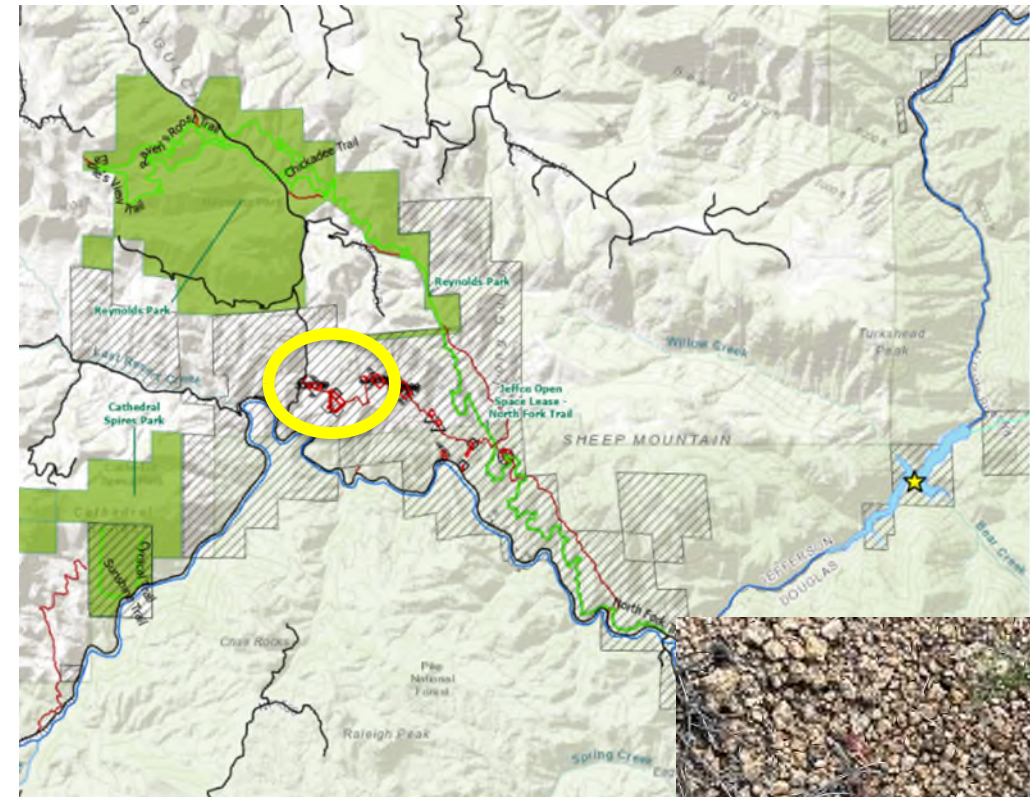
Recommended Treatments:

- Channel erosion control: log check dams, PALS, silt fencing
- Road erosion control: turnout sediment traps and road decommission and stabilize unused roads
- Monitor to quantify sediment transport rates and test efficacy of treatments

Partners: Potential: JCOS, CSFS, FPDs

Contractors and Schedule:

- Design: SWCA, July 2022
- Implementation (Subset): GEI, November 2023
- Monitoring/O&M: GEI, 2024



NFSP_1b: Lower North Fork Bank Stabilization and Sediment Retention

Issues:

- Bank erosion, narrow riparian corridor, road encroachment, post-fire sediment deposits

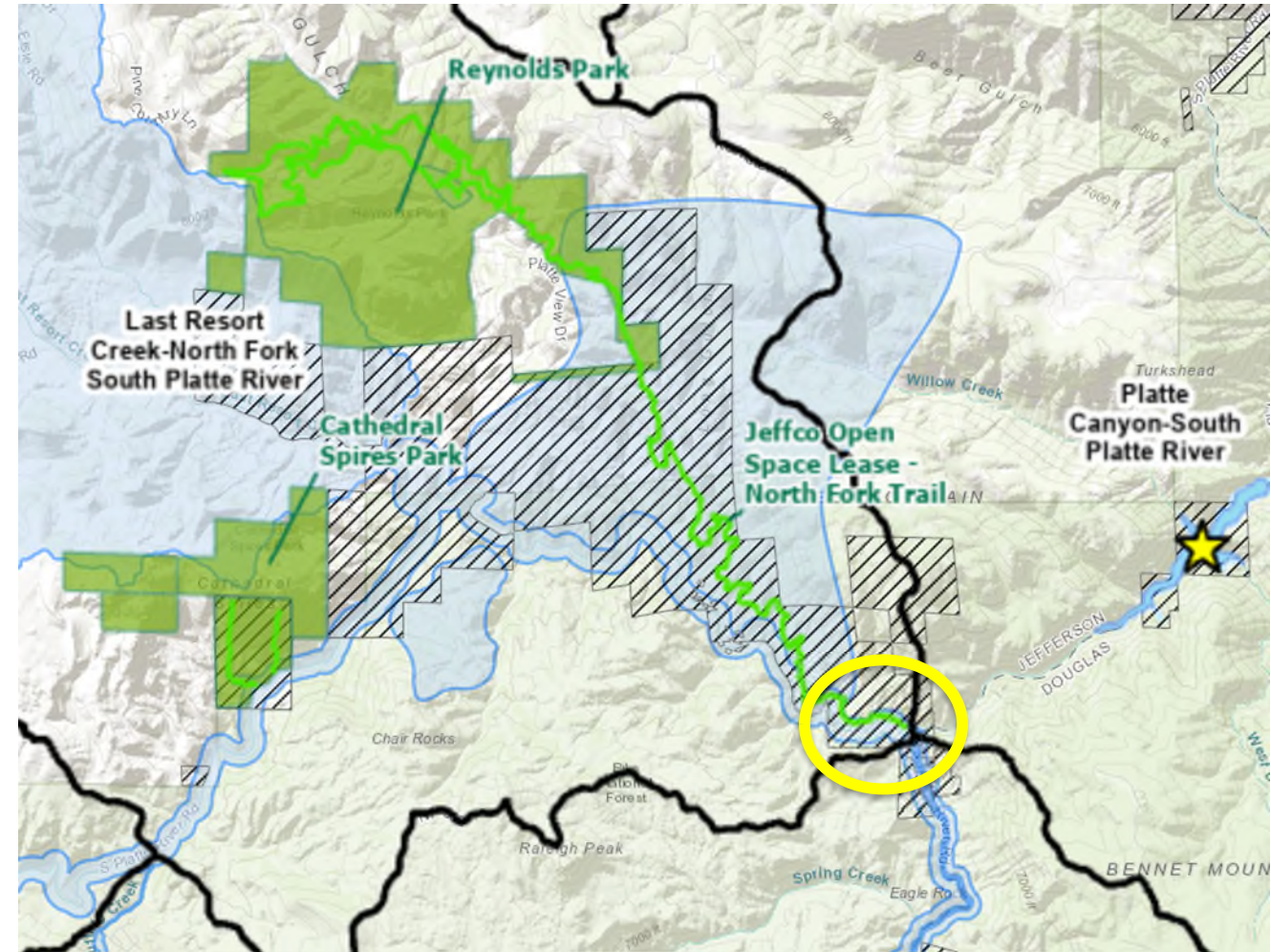
Recommended Treatments:

- Stabilize eroding banks
- Establish riparian vegetation
- Increase sediment storage capacity

Partners: TBD

Contractors and Schedule:

- Site Assessment/Feasibility/Conceptual Design Report: Matrix, 2022
- 30% Design: Matrix, 2023
- External Stakeholder Input: Matrix, Winter 23/24



SP_1g: Pine Creek Floodplain Enhancement

Issues: High bank erosion rates, erosion below root depths, post-fire sediment deposits. Bank erosion sediment contributions for this reach estimated at 800 tons/year.

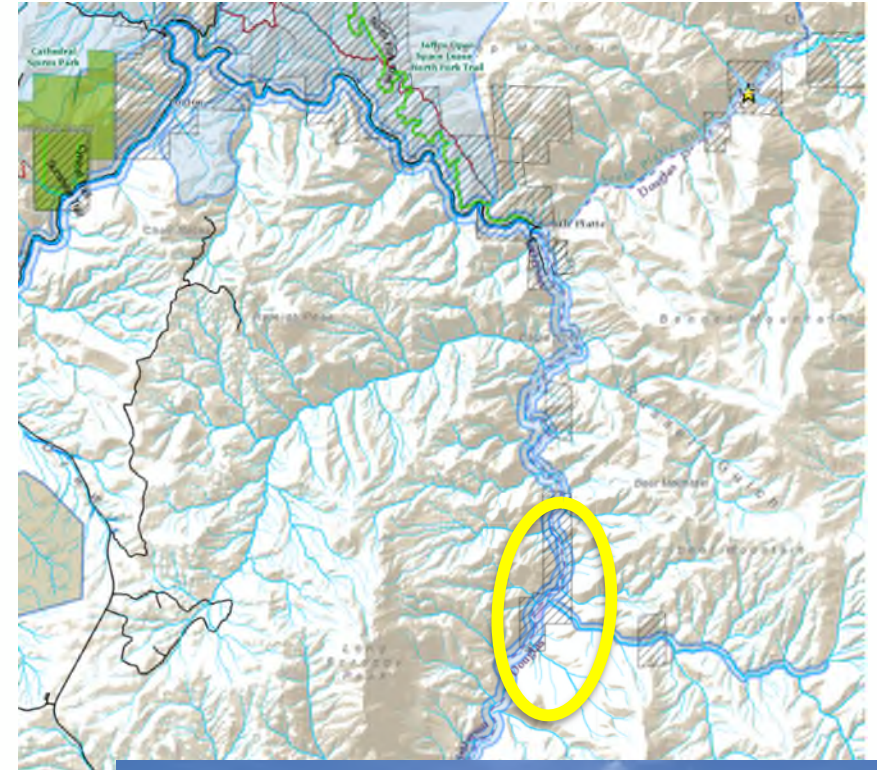
Recommended Treatments:

- In-Channel Sediment Storage: In-line sediment basin + LT-PBR
- Create Local Upland Disposal Capacity
- Pine Creek Sediment Basin

Partners: Douglas County, USFS, CPW, TU, potential for many others; interest from corporate donor organization

Contractors and Schedule:

- Feasibility/Alternatives: 2022 – Jacobs
- 30% Design and Sediment Retention Optimization: Jacobs –November 2023
- Permitting: Jacobs – 2023 Wetland Delineation Survey



Gill Trail

Issues:

- Heavy trail use; many social trails

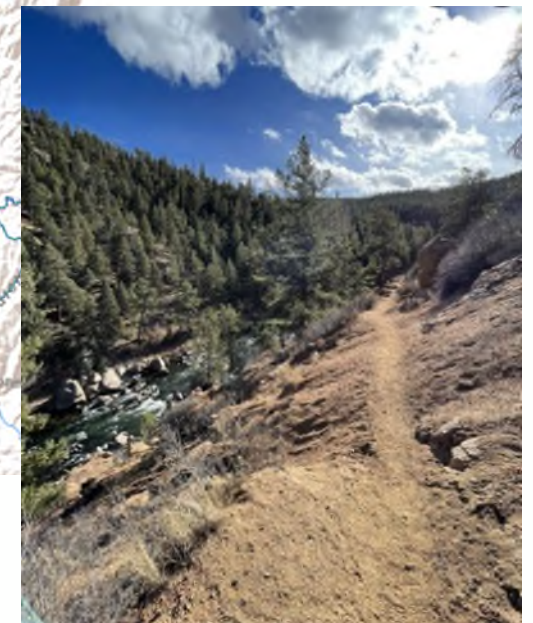
Recommended Treatments:

- Waiting for inventory, assessment, and recommendations
- Close and rehab trails, create sustainable fishing access points, educational signage

Partners: DW Rec, TU (original funder), USFS, RMFI, Backcountry Hunters and Anglers

Contractors and Schedule:

- Assessment/recommendations: ERO, Spring 2023
- Implementation: TBD



THANK YOU!

QUESTIONS?

Alison Witheridge

Watershed Scientist, Denver Water
Alison.Witheridge@denverwater.org

