



Recent Advances in Fen Restoration

THE ROCKY MOUNTAIN FEN RESEARCH PROJECT

Brad Johnson – Johnson Environmental Consulting

RMFRP - Location



Background

- What's a fen?
- New approach to fen restoration
- Minimize wetland impacts through intensive ecological salvage and restoration
- Recreate a passively functioning fen hydrologic system including headwater springs and subterranean flow system
- Transplant the fen's "dermis" of peat and vegetation





The Hayden Ranch restoration site



The Hayden Ranch restoration site

Hayden Ranch





Derry Ranch HQ



Derry Ranch donor site

Site Preparation



Step 1 – Drain the pond and remove sediment



Step 2 – Water Management



Step 3 – Subsurface Preparation





Transplantation Procedure



Step 4 – Peat extraction and transportation



Step 4 – Peat extraction and transportation



Step 4 – Peat extraction and transportation



Step 4 – Reconstruction



Step 4 – Reconstruction

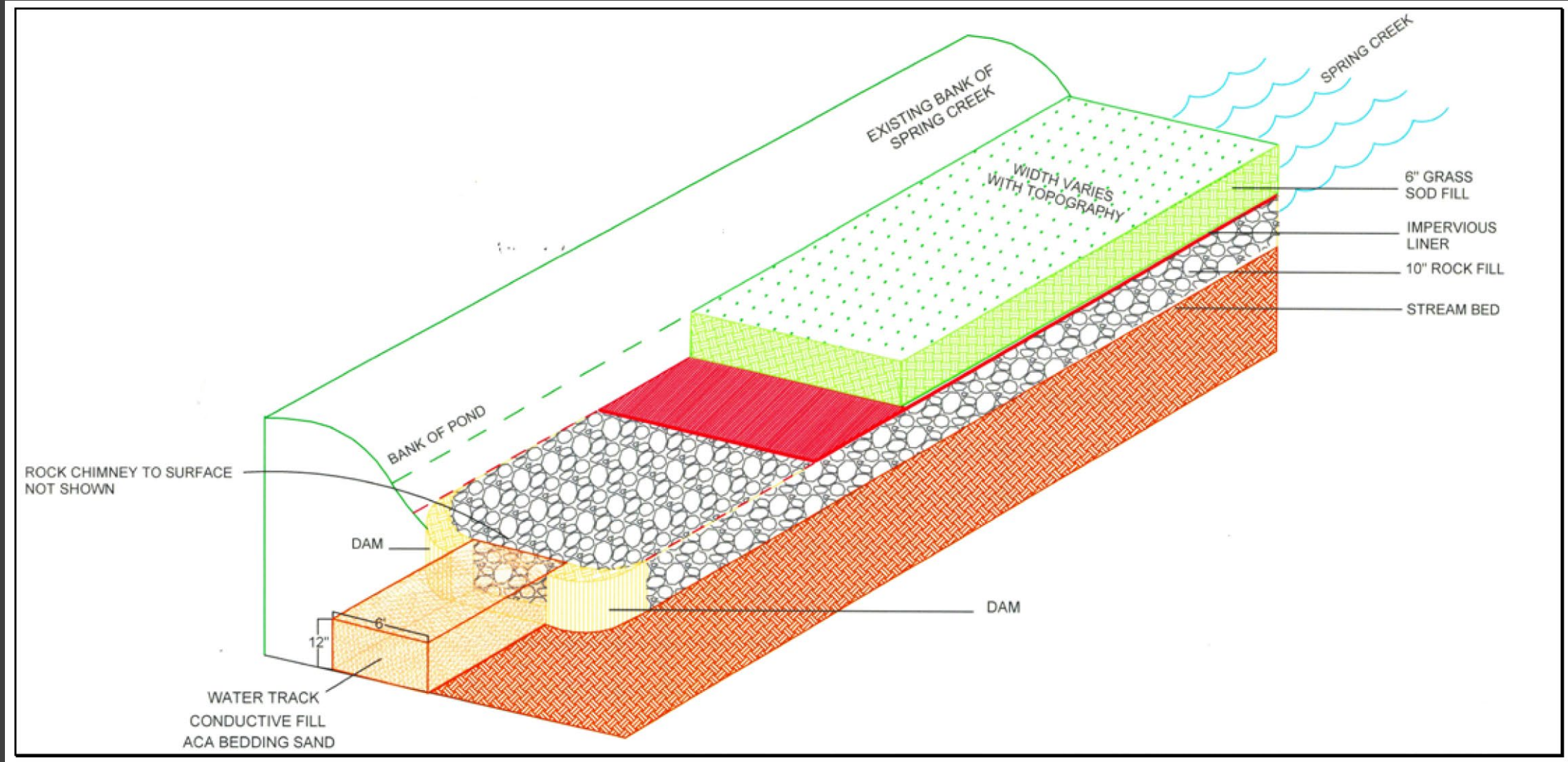
Dirt-hole filling



Step 4 – Reconstruction – water tracks



Step 4 – Reconstruction – Headwater spring



Step 4 – Reconstruction – Headwater spring



Results



Results

Community hub building



Photo by Ryan Fitzmaurice
sketch of the proposed hub building. The building is tentatively located between the ice rink and Truck Finn Park.

nature. concerns over the sustainability of the project once grant funds run out.

The commissioners did not approve any specific plans for the hub, but rather simply approved the continuation of planning for the facility, and its inclusion in the grant. Hix abstained, stating he did not see a reason for the vote due to the commissioners already having contributed to the Get Outdoors Leadville! initiative.

Dolores Hix both expressed

Fen building project takes 13 years, not 10,000

by Marcia Martinek
Herald Editor

"LCOSI to 'build' fens" was a headline in the July 29, 2003, issue of the *Herald Democrat*.

It described how the Lake County Open Space Initiative was planning to see if it could successfully build a fen, described by the Environmental Protection Agency as a peat-forming wetland that receives nutrients from sources other than precipitation.

Fens can take up to 10,000 years to form naturally.

It's now 13 years later, and the project involving transplanting fen material to the Hayden Ranch is essentially complete. Five to 10 years of monitoring lie ahead, but the transplanting of fen material has taken place.

The project involved taking fen material from the Hallenbeck/Derry Ranch, now owned by Aurora, and placing it in an area of the Hayden Ranch where peat soils were mined back in the 1940s.

The groundwater that was supporting the peat at the Hayden Ranch is still present, despite the removal of the peat. The peat at the Hallenbeck Ranch no longer has groundwater, as previous placer mining in the area has lowered the groundwater level.

Brad Johnson, of Johnson Environmental Consulting LLC, is overseeing the project, which he describes as disassembling and then reassembling the fen.

The fen materials are removed using a type of cutting device that takes the material in 18-inch blocks. This cutting device was discovered after a long search in a scrap yard in Canada by LCOSI director Mike Conlin.

When the material is removed, it resembles bales of hay, and a hay wagon is used to transport it from one site to another.

It is reassembled somewhat like a puzzle, with the space between the peat squares filled with soil, a process that is done by hand. Stones are also used between the squares to allow the flow of water.

The plan of action for the project describes this as a meandering water track filled with material exhibiting higher conductivity to induce the subsurface water flow and distribution characteristic of fens.

Water for the site has to be introduced from underneath rather than from the top, Johnson said.

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Photo by Marcia Martinek
Brad Johnson accompanies Cathy Patti of Colorado Mountain College as she videotapes the fen removal at the Hallenbeck/Derry Ranch. Some of the ranch buildings, which are rapidly deteriorating, are to the right.

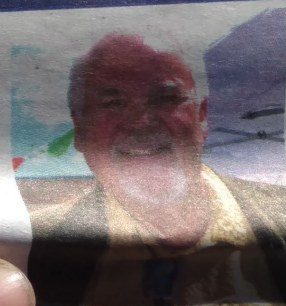
Bud Elliott County Commissioner

While I was mayor 3 buildings were built that would not have been completed without my leadership.

The building where the US Forest Service has offices is only there because the city, led by me, assisted in mitigating drainage on the property.

The ECO Bus Barn as originally planned by Eagle County was a very ugly building. The Leadville Planning Commission, in efforts led by me, insisted on Eagle County implementing design changes recommended by the CMC Historic Preservation Program.

The Climax building at CMC with meeting rooms, gym and climbing wall was built and paid for after the National Summit of Mining Communities demonstrated that there was not enough meeting space in the community. The Summit, chaired and led by me, brought in the community. The Summit, chaired for 2 years in a row,



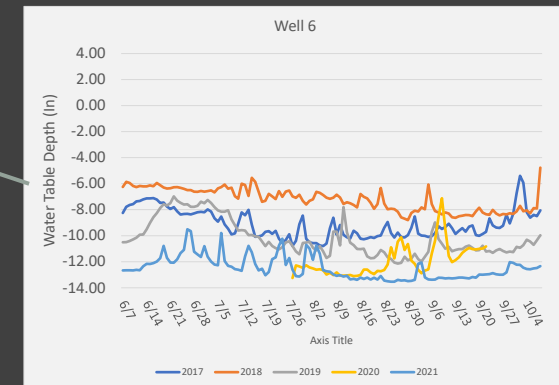
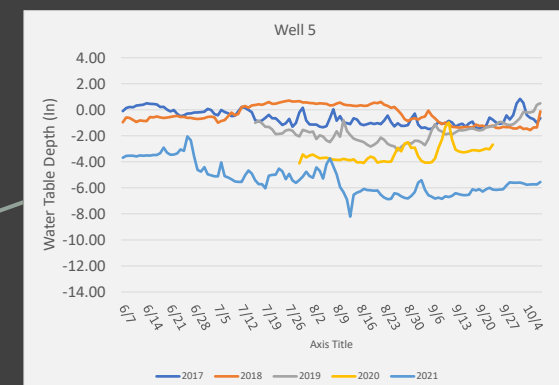
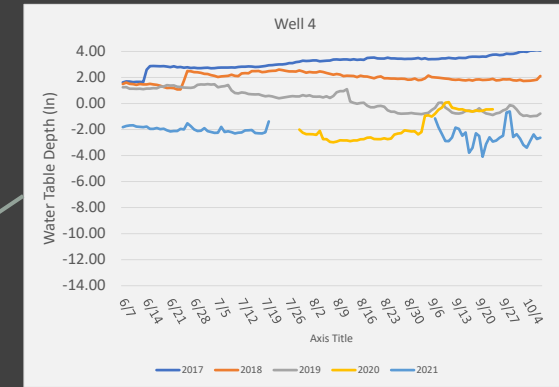
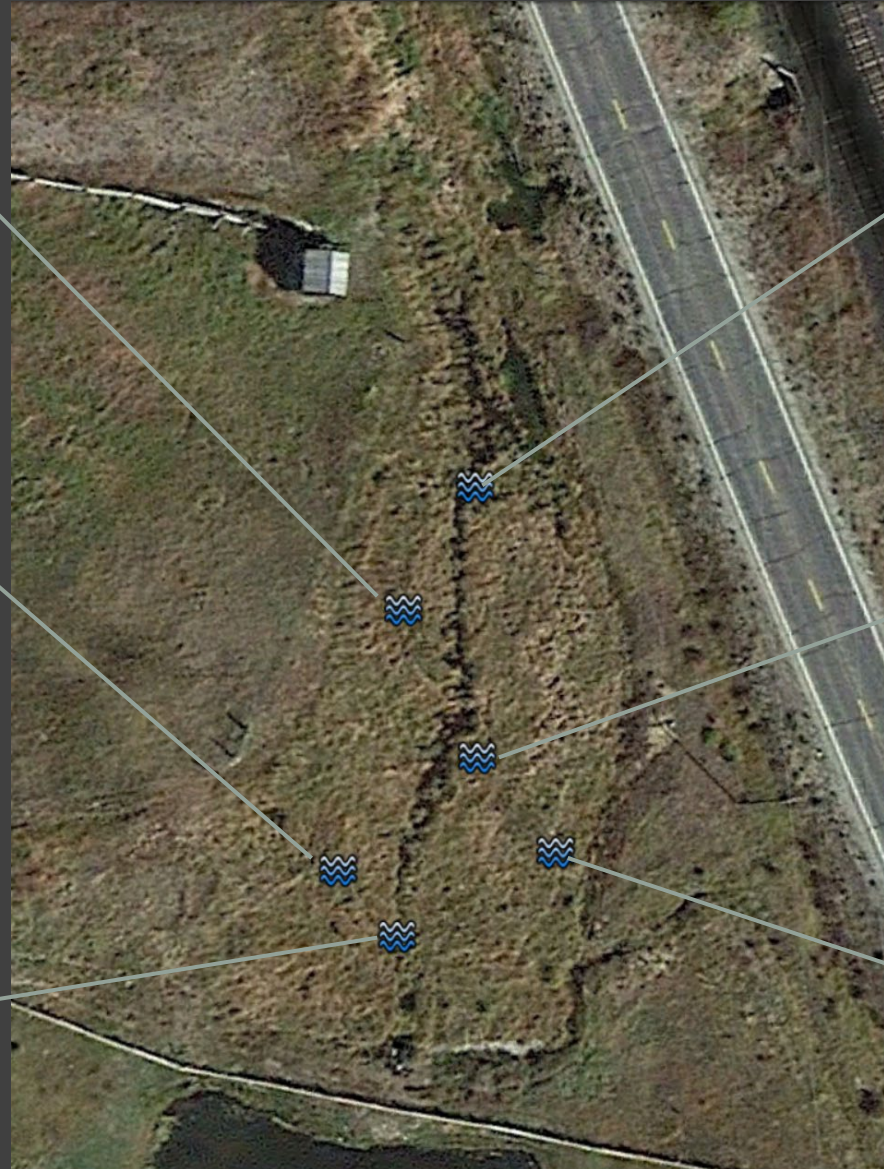
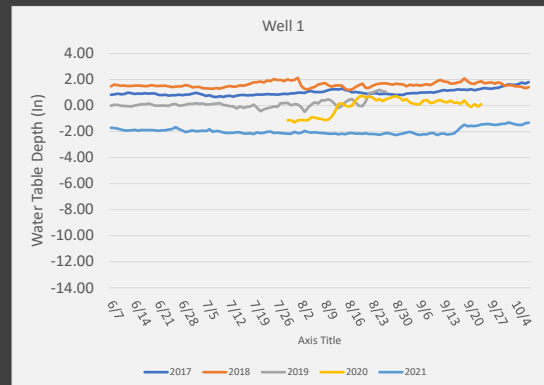
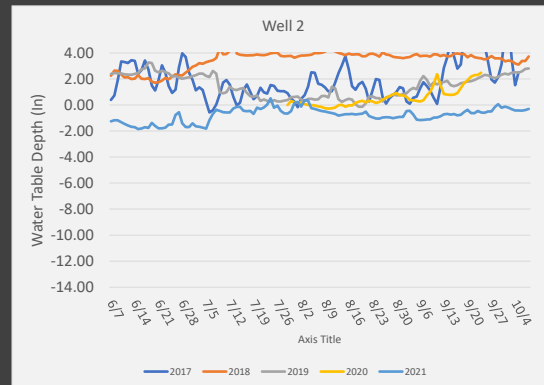
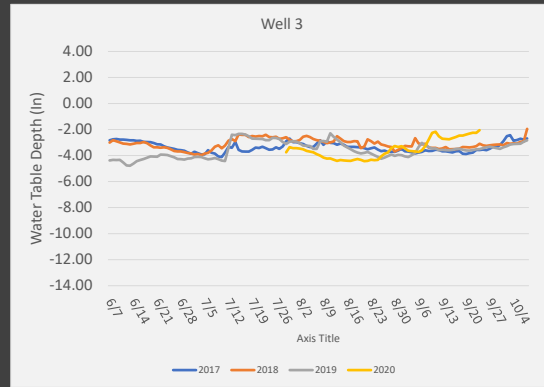
As-built – July first growing season (2017)



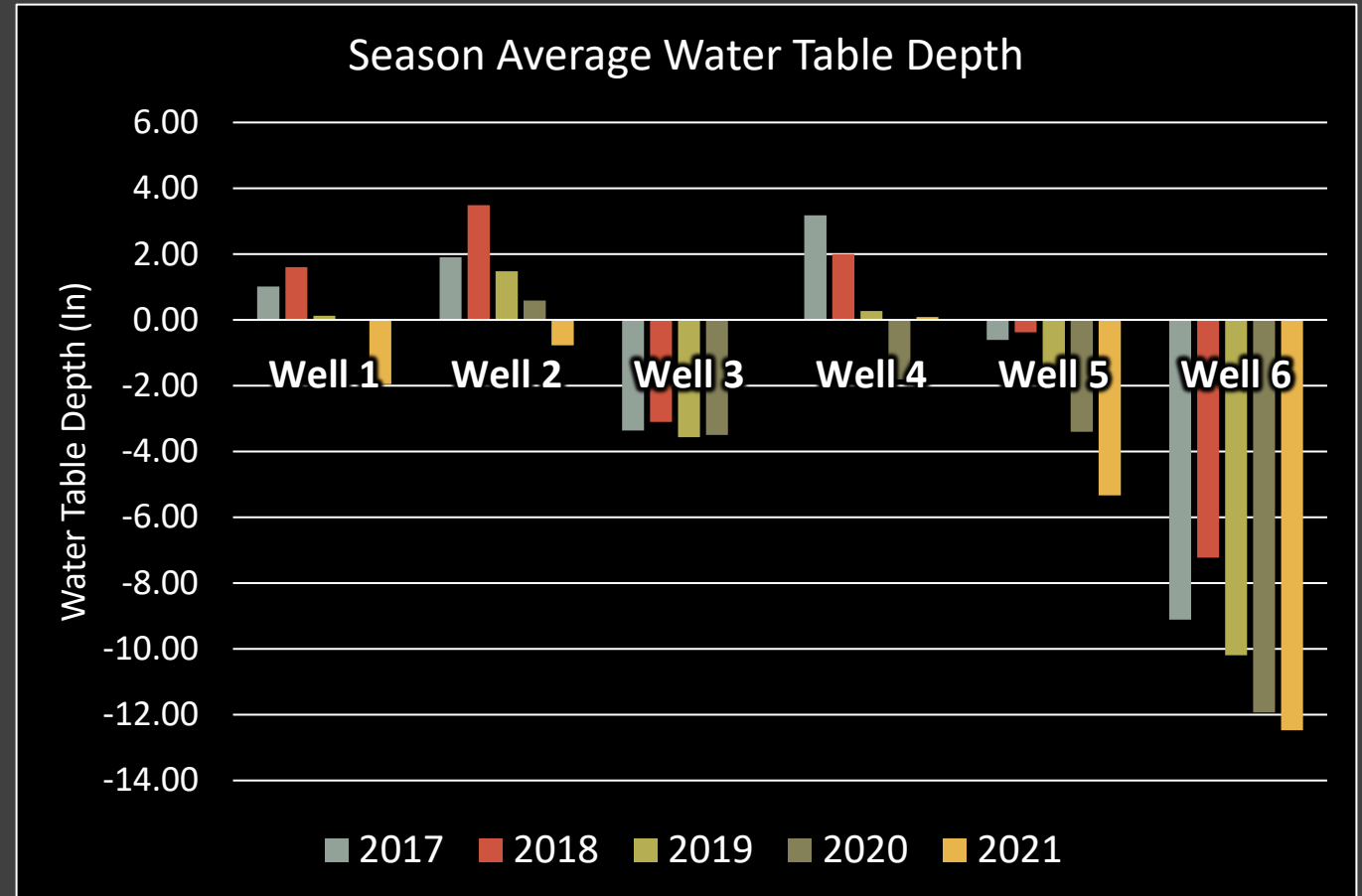
As-built – Last Season (2021)



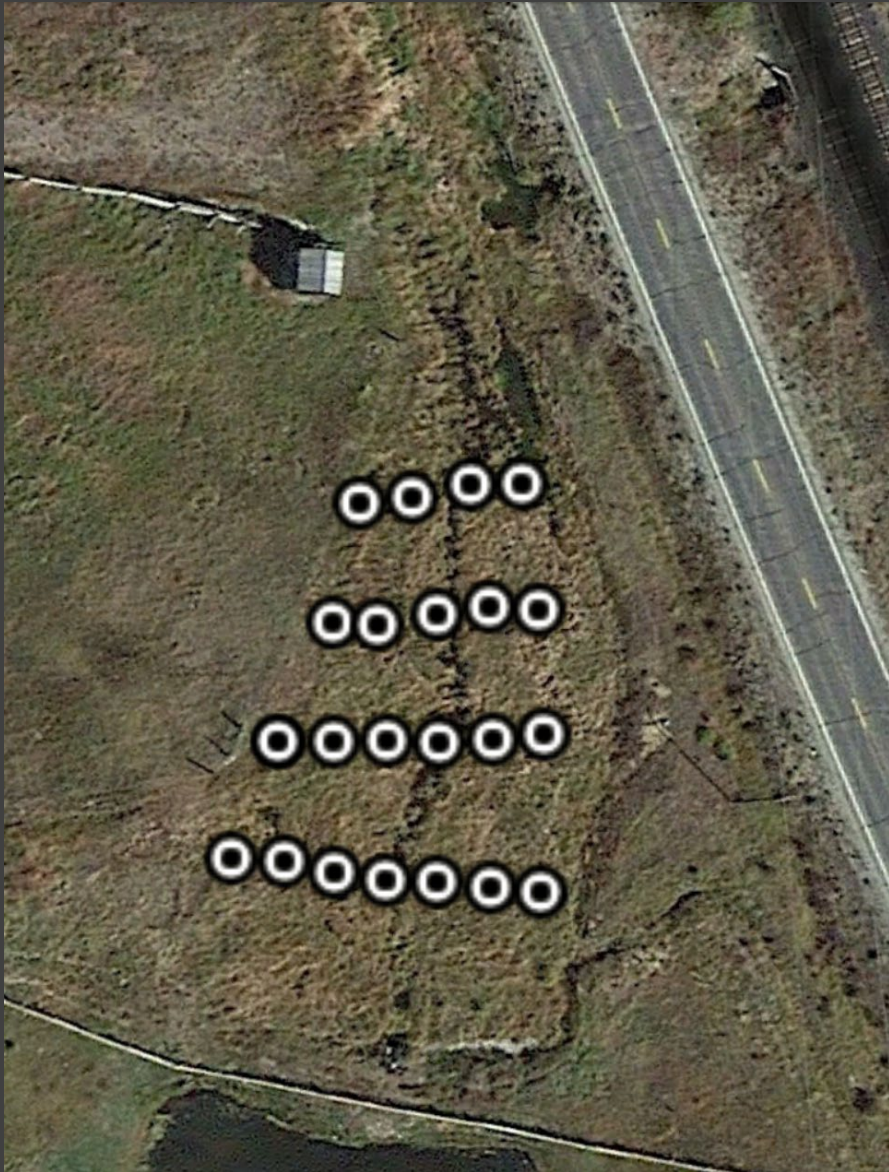
As-built – monitoring



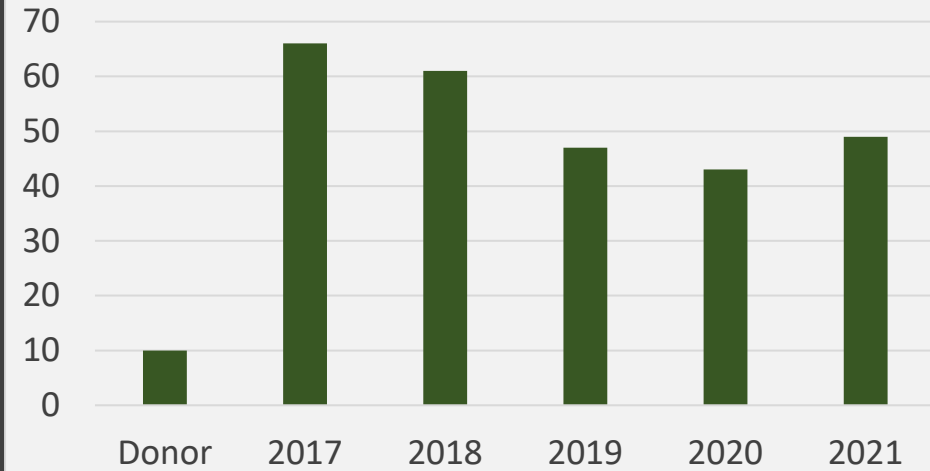
As-built – monitoring



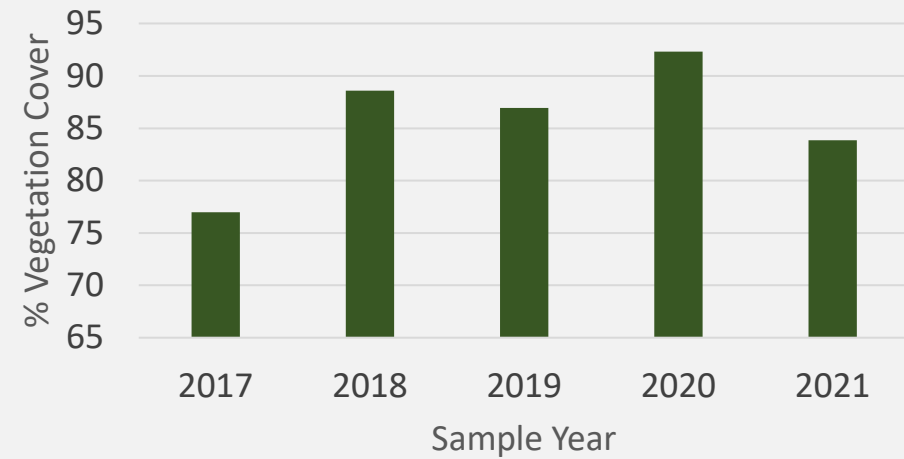
As-built – monitoring



Site Level Species Richness



Percent Vegetation Cover



Acknowledgements

Aurora Water

Denver Water

Pueblo Board of Water Works

Colorado Water Conservation Board

Colorado Springs Utilities

**Upper Gunnison Water Conservancy
District**

Colorado Mountain College

Mike Conlin – Conlin Associates

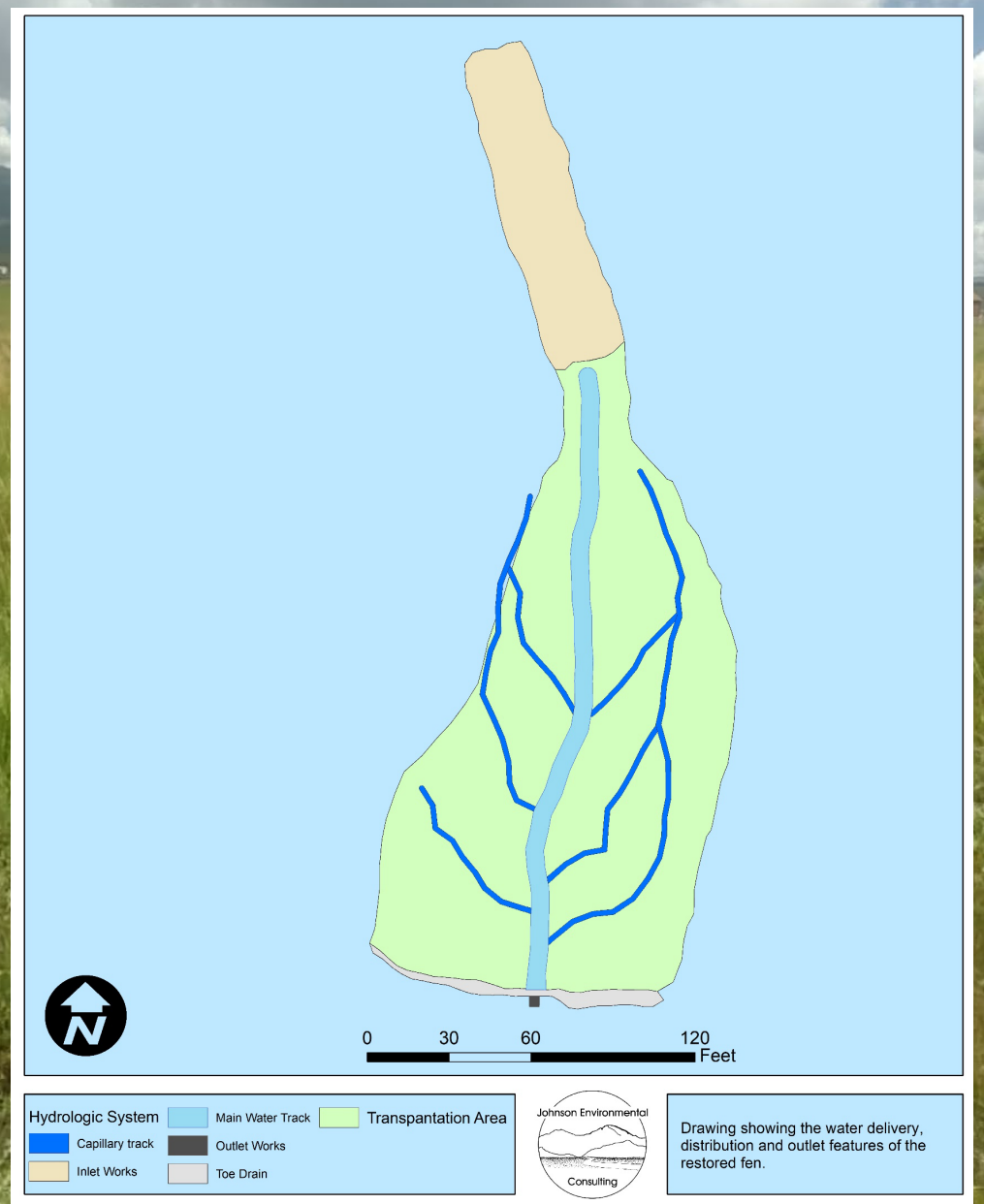
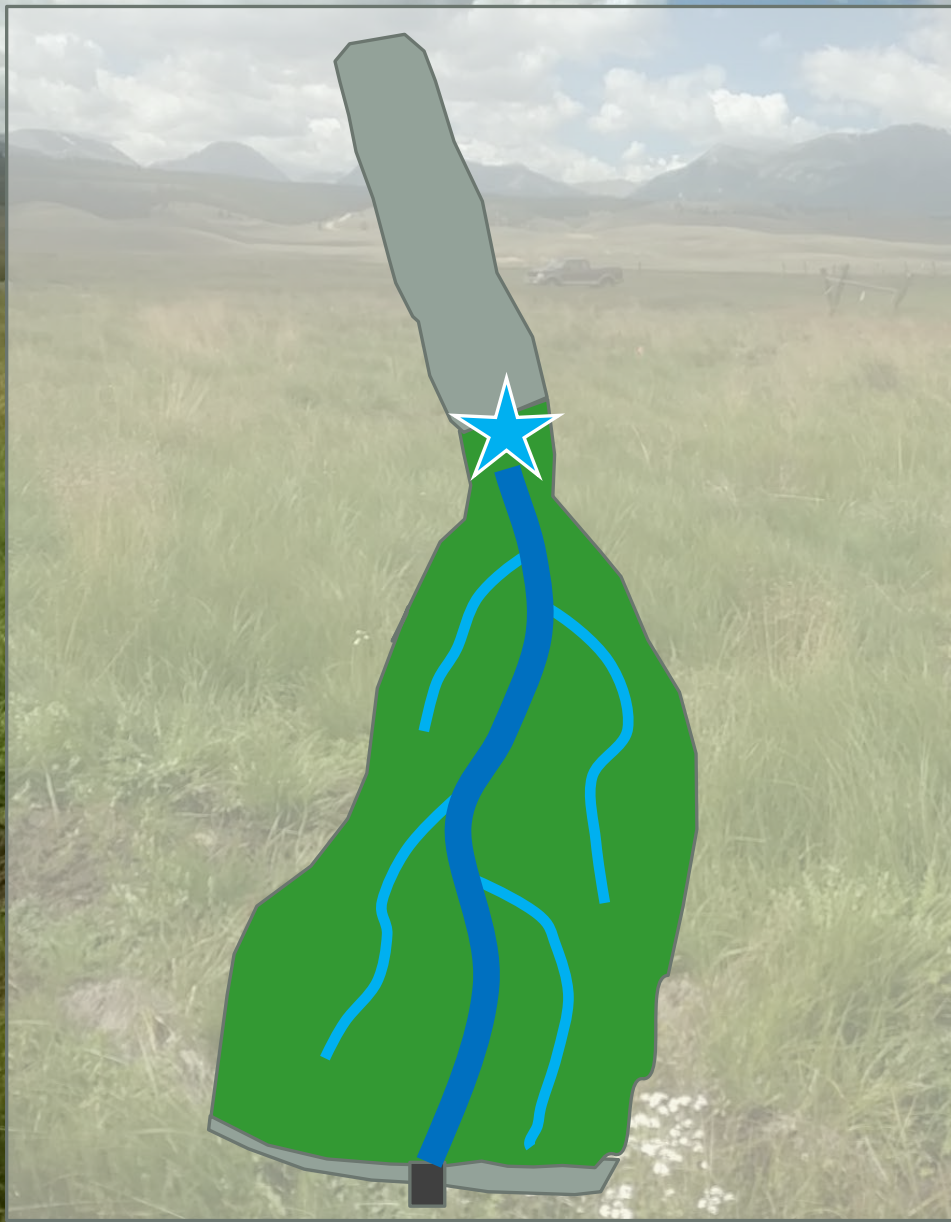
**Cathy Patti – Formerly Colorado Mtn.
College**

HC and Dominic Patti

**Interagency Study team – US Army
Corps of Engineers, US EPA, US FWS**

Step 4 – Reconstruction Outlet





Fen Design