Utah Division of Water

To Whom It May Concern: February 7, 2017

As I have been listening and seeking to understanding the ground water situation there are several observations and ideas that I would like to put forward, encapsulated into 3 ideas:

1 – Manage Ground Water via Sub Basins within the Cedar Valley
2 – Look to Increase the Sustainable Yield through Proper Range Management
3 – Meter Water Use, Crop Rotation – Goal to cut water use

1. ***The Division should look at managing the Cedar Valley through Sub-Basins. In Particular – The Rush Lake Area should be treated as a Sub-Basin, potentially with its own sustainable yield*** – I would propose that the Division of Water look at the Rush Lake area as a separate Sub-Basin within the Cedar Valley. The Rush Lake area has not seen a decline in its ground water table like other areas in the Cedar Valley, and in developing a ground water management plan this must be taken into consideration. There are several factors that influence this.
    - ***Bottom of Basin –*** Because Rush Lake sits at the bottom of the Cedar Valley Basin, all water flows downstream to Rush Lake.
    - ***Additional and Separate Recharge from Red Hills, JackRabbit and Steer Hollow*** Per the USGS Hydrology and Simulation of Ground Water Flow in Cedar Valley, Iron County, Utah report 2005-5170, the Rush Lake area is not only recharged from the Coal Creek drainage to its south, but also from the JackRabbit and Steer Hollow area to the north and from the Red Hills to the east. The study estimated the annual recharge coming from the Red Hills to be 600 af of water, and from JackRabbit and Steer Hollow area to the north to be 2900 af of recharge. The study hypothesized that water recharging from JackRabbit and Steer Hollow is flowing south to Rush Lake, and from Rush Lake out through Mud Springs Gap. This water from the North creates a recharge that benefits the Rush Lake area, but does not flow uphill to the rest of the Cedar Valley to the south. While Rush Lake does receive both surface and groundwater recharge from the south (Coal Creek, Braffits Creek), the separate recharge that comes from the north supports the idea that the Rush Lake area has a sub-basin with an additional and separate sustainable yield source from the remainder of the valley
    - ***No water transfers out of Rush Lake -*** If Rush Lake were considered a separate sub-basin that is in equilibrium, meaning that the water table is stable, I would propose that it would not make sense to allow water rights that are in the Rush Lake area to be transferred out of the Rush Lake area to portions of the valley that are experiencing a ground water decline, like the Quichapa or Enoch area. This would sortof be like how the north end and the south end of the valley are currently separated along hwy 56 with the division of water.

- ***Carefully review water transfers into the Rush Lake Area -*** Likewise, the division should carefully examine water transfers into the Rush Lake area to ensure that quantity impairment does not occur with the existing water and well rights in the Rush Lake area. Based upon the fact that the water table has been increasing in the Rush Lake area, I would hypothesize that the Rush Lake area is using water below its sustainable yield

2. *Increase the Sustainable Yield of the Basin – I hypothesize through proper range management of the pinon and juniper pine; the safe yield of the Cedar Valley ground water can be increased from 21,000 af to above 30,000 af*

I have attached several graphs from the Division of Water and the USGS Scientific Investigations Report 2005-5170. A link to the reports is included below.

https://www.waterrights.utah.gov/groundwater/ManagementReports/CedarValley/CedarValley.asp

Within the USGS ground water study, assumptions were made about the recharge rate from various locations surrounding the Cedar Valley. As I am in Rush Lake, we are ironically in an area where our ground water has increased. As I look at it, there are several reasons. First, we are located at the very bottom of the valley, 2nd the sewer plant recharges its water just south of us, and third, we also recharge from the JackRabbit and Steer Hollow areas to the north of Rush Lake, as well as the Red Hills to the east. I started considering the recharge rates, and realized that they are subjective. If you look to Table 3 on page 21 of the USGS Cedar Valley ground water study, it shows the AF of precipitation in various recharge portions of the valley, along with the estimated portion that recharges into the aquifer. The rates of recharge vary between 4.5% to 5.5%, with an average of 5% - meaning for every 100 af of rain, 5 af recharges into the aquifer.

Then I started to the think about the pinion and juniper, surrounding our valley. 150 years ago, the pinion and juniper was not as dense as it is today, primarily because of fire suppression. I hear of antidotal evidence about how springs that were once dry will start flowing again after fires. Then I started considering how much water a juniper tree consumes and I came across several articles. Some studies say a juniper consumes 20 gallons per day in the spring, growing to upto 30-40 gallons per day in the mid-summer. (http://juniper.oregonstate.edu/EC1417.pdf). If I read this study correctly, it shows an annual water draw of around 1 af per acre in a densely established stand, which in our arid climate basically means it is sucking up all the precipitation and only allowing about a 5% recharge rate into the aquifer, which parallels the USGS assumption.

So, the question is, if our valley worked with the BLM to properly manage the water shed, could the recharge rate increase modestly - from an average of 5% to 7.5%, which would in

turn increase our safe yield to above 30,000 af? As we talked with the BLM, they are already looking at "restoration" projects surrounding our valley (see enclosed maps).

There have been several studies conducted in Oregon that show that ground water tables can be increased with the proper management of pinon and juniper trees in the basin recharge zones. I believe it is extremely worth the effort for the state to consider means by which the sustainable yield can be increased. I have reached out to Professor Dean Winward with the SUU Agricultural Program who suggested the hypothesis could have validity and suggested Professor Randall Violett with SUU and Chad Reid with the Extension Office could be some additional leads in helping to flush out a study. Professor Winward and Chad Reid have both indicated they would be interested in assisting to flush out the idea. I have not heard back from Professor Violett. Because of the scale, it needs to have some funding to move the study along – but I believe given the valley's situation it is very much worth the effort. This will have an impact in other basins in Utah with recharge areas that are heavy in Pinion and Juniper. Below are related web links to studies done in Oregon.

http://www.opb.org/news/article/cutting-down-desert-junipers-save-precious-water/

https://www.oregon.gov/OWEB/MONITOR/docs/juniper/controllingjuniperandwater_deboodtfinal.pdf

http://www.bakercityherald.com/csp/mediapool/sites/BakerCityHerald/Outdoors/story.csp?cid=4121780&sid=874&fid=151

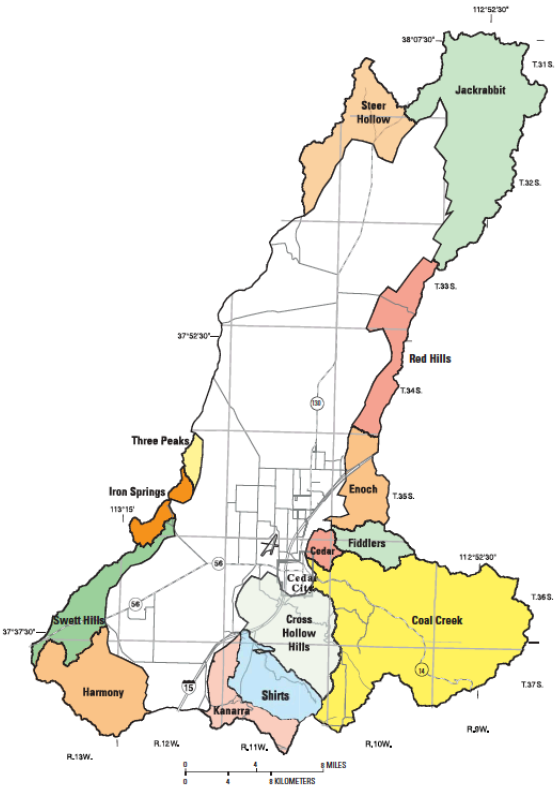
3. ***Metering of Water, Crop Rotations –*** Agricultural Ground Water users could begin metering their water use. Alfalfa is a high-water consumptive use, while wheat or barley is a less intensive use. As a farmer, if we could work with the State to develop a water metering system, we would be open to a crop rotation system whereby we metered our water use and through the crop rotation sought to decrease our overall water consumption by 80%.

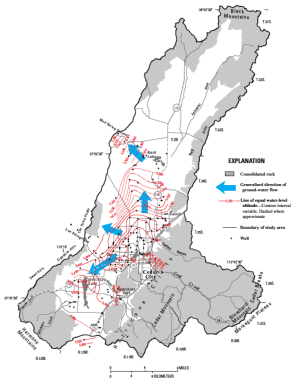
Again, the above 3 ideas are all rough thoughts and ideas that I believe play into the equation as a Ground Water management plan is implemented.

1 – Manage Ground Water via Sub Basins within the Cedar Valley
2 – Look to Increase the Sustainable Yield through Proper Range Management
3 – Meter Water Use, Crop Rotation

I would be very interested in working on or with any committee's looking at the Ground Water Management Plan.

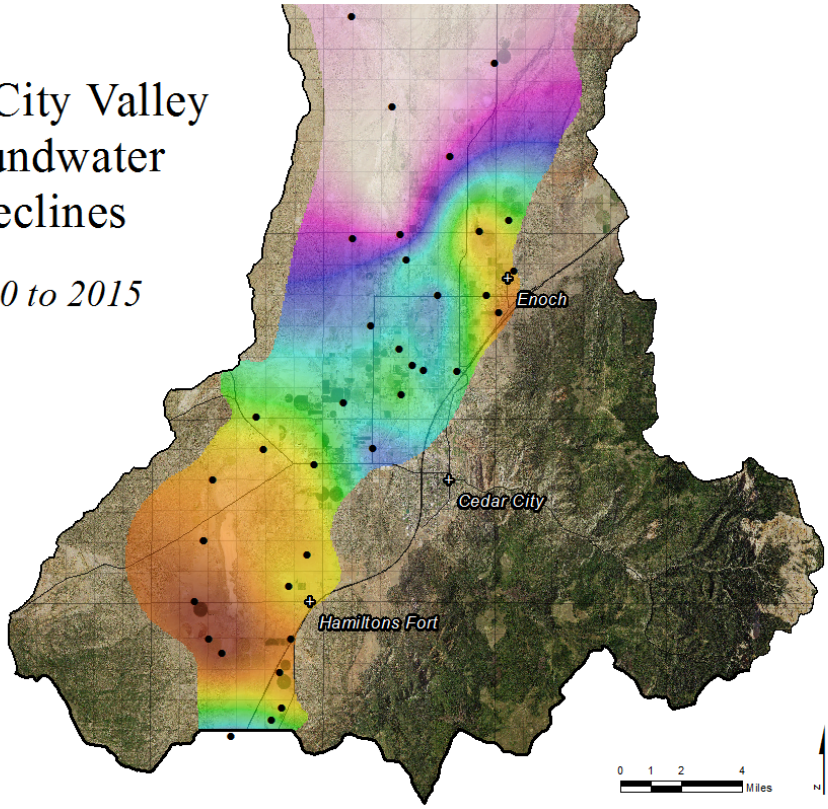
Sincerely,
Dave Curtis
Cedar Valley Ranch

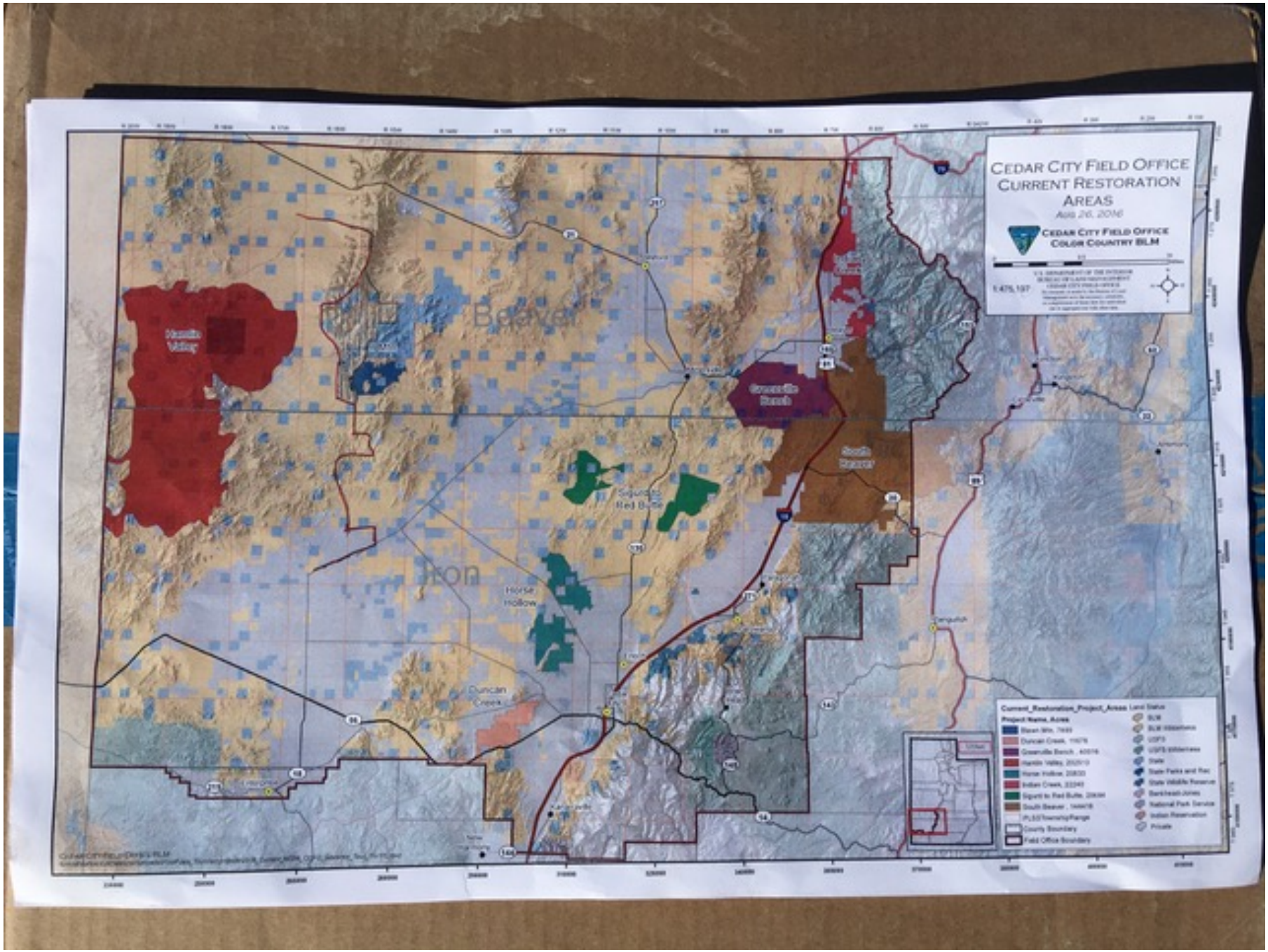


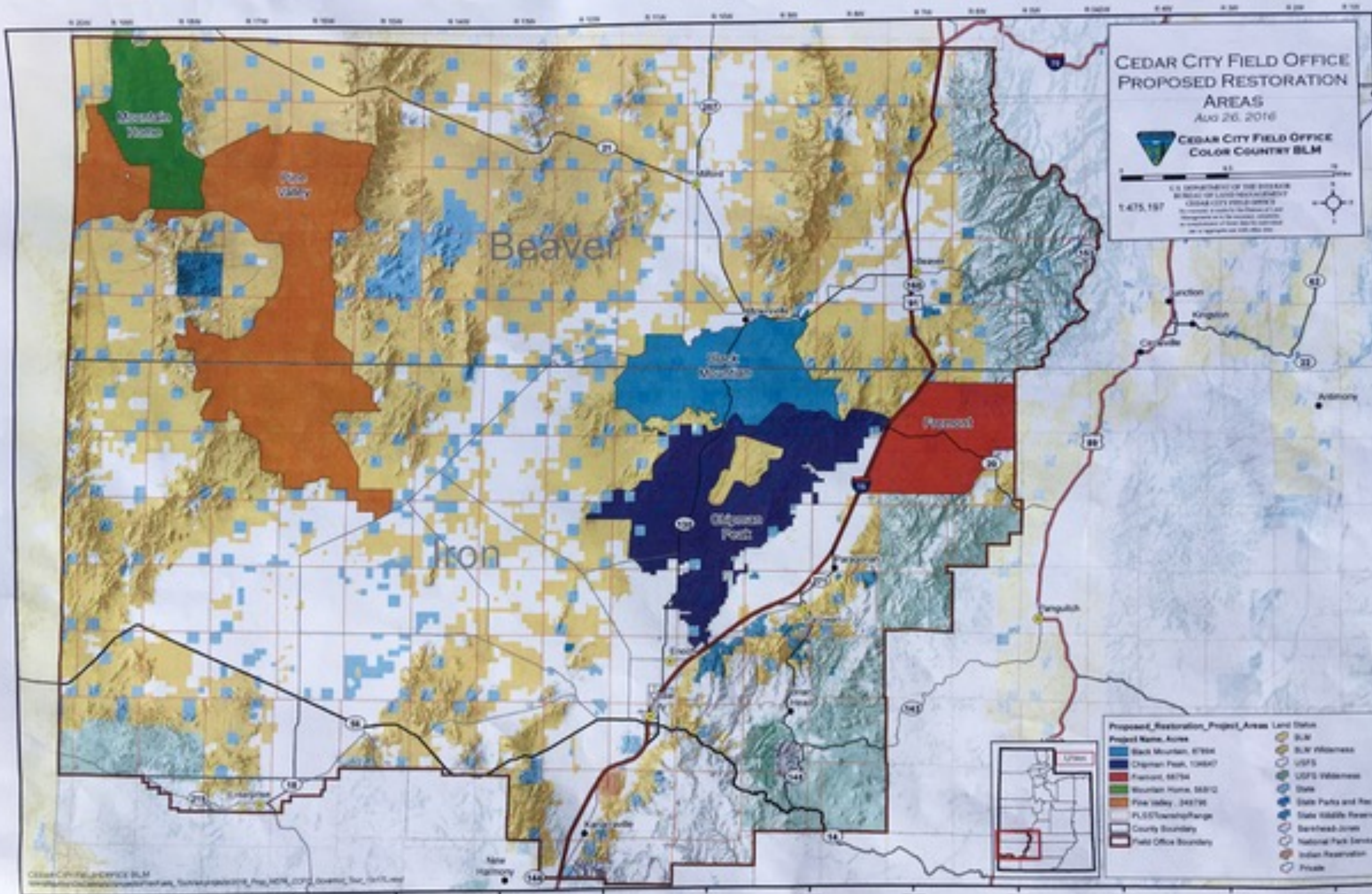


Cedar City Valley Groundwater Declines

1940 to 2015




CEDAR CITY FIELD OFFICE
CURRENT RESTORATION
AREAS
Aug 26, 2016
CEDAR CITY FIELD OFFICE
COLOR COUNTRY BLM
1:475,197
Beaver
Iron
Horse
Hollow
Duncan
Creek
Hamlin
Valley
Greenville
Bench
South
Beaver
Sigurd to
Red Butte
Current_Restoration_Project_Areas
Project Name, Acres
Land Status
BLM
State
State Parks and Rec
National Park Service
Indian Reservation
Private
County Boundary
Field Office Boundary


Cedar City Field Office
Proposed Restoration
Areas
Aug 26, 2016
Cedar City Field Office
Color Country BLM
1:475,197
Mountain Home
Pine Valley
Beaver
Black Mountain
Chipman Peak
Fremont
Iron
Milford
Minersville
Beaver
Junction
Kingston
Circleville
Antimony
Panguitch
Paragonah
Enterprise
Kanarraville
New Harmony
Proposed_Restoration_Project_Areas
Project Name, Acres
Black Mountain
Chipman Peak
Fremont
Mountain Home
Pine Valley
PLSSTownshipRange
County Boundary
Field Office Boundary
Land Status
BLM
BLM Wilderness
USFS
USFS Wilderness
State
State Parks and Rec
State Wildlife Reserve
Bankhead-Jones
National Park Service
Indian Reservation
Private