

# What is being done about land Subsidence in Cedar Valley?

Tuesday, April 1, 2014

These Fissures have existed for well over 50 years but have recently settled or increased due to limited recharge to specific areas of the basin. Subsidence will continue to occur if the aquifer is not brought back to equilibrium. The CICWCD is working on three large scale projects that perfectly align with the mitigating recommendations expressed by the Utah Geological Survey to prevent over drafting and restore the aquifer.

## What is being done about ground subsidence in Cedar Valley?

The first observance of the subsidence in Cedar Valley occurred in 2009 and since that time the Central Iron County Water Conservancy District (CICWCD) has been actively engaged in efforts to mitigate and reverse ground water depletion. The CICWCD was organized to insure water resources would be available for its citizens within its region 50 years into the future. We are charged to make sure our population has a reliable water source in Iron County for generations to come. The UGS Subsidence report that has been a work in progress the past five years has given recommendations to help the aquifer regain balance in Cedar Valley and the CICWCD has been in the planning stages of mitigating the issue since the occurrence. These include:

Import water from another basin

Increasing recharge to the Basin-Fill Aquifer

Dispersing high-discharge wells

Reducing groundwater withdrawals

### **Import water from another basin**

During the height of the initial findings of the fissures CICWCD was involved with the Lake Powell Pipeline to import water from the Colorado River. After several years of study the CICWCD concluded that a pipeline from Lake Powell to Cedar City was not feasible. Luckily, for our residents in 2006 the CICWCD had been looking elsewhere for water and discovered two basins with unappropriated water. The CICWCD filed for 27,000 ac/ft of water in Pine and Wah Wah Valleys located North West of Cedar City. The application is still pending with the State Engineer and is anticipated to be approved later this year when the compilation of a three year study partnered between the USGS, BLM, CICWCD, and Division of Water Rights is made available. The additional source of water into this basin is a top priority of the CICWCD and will carry the largest impact to the overall basin aquifer. All waters imported into the basin will reduce the withdrawal from our own aquifer and all excess water will recharge our aquifer either

by seeping into the ground due to over watering plants or as water that travels down the drain to the new waste water treatment plant and is treated it can be made available for reuse.

### **Increasing recharge to the Basin-Fill Aquifer**

Water managers within the Cedar Valley have long recognized the decline in water levels and have since been looking at ways to better recharge the basin-fill aquifer. Cedar City Engineer, Kit Wareham, has led the efforts for the past several years by directing 3,000 AC/FT of water/year from Coal Creek during the winter into the underground. The CICWCD is currently in the planning stages of implementing of a project which will include several de-sedimentation basins along Coal Creek to slow the flow, drop out the sediment and navigate the water into areas of high permeable soil to more efficiently recharge the aquifer. The CICWCD is partnering with the National Guard who has been willing to take this project on as part of their summer camp. The benefit of having the National Guard construct the basins is the limited cost associated during construction to the stakeholders and ultimately tax payers of Iron County. The CICWCD is still in the preliminary engineering and permitting stages of this project and anticipate breaking ground summer 2016.

### **Dispersing High-Discharge Wells**

The CICWCD has recently finished the Water Master Plan for the area which includes the priorities and projects of the District within basin. The first major project that the CICWCD is working toward is the development of a well field in the North end of the valley where water levels have actually risen during the past decade. The CICWCD anticipates connecting pipelines to Cedar and Enoch to distribute water from the north end of the valley to Cedar and Enoch City residents on the south end of Cedar Valley. Cedar City has high discharge wells on the west side of Quichapa Lake which has seen an average decline of over two feet per year in water levels since 1993. The transition of pulling water from the north end of the valley will alleviate the stress that is currently on the South end and allow the basin to neutralize.

### **Reducing Ground Water Withdrawals**

Every citizen in Iron County can alleviate the situation by conserving water. All who live in the valley and drink or use water are part of the problem and can be part of the solution. Water Conservation measures should be reviewed in every home to see where water savings can occur. Over 75% of the water used in this valley is by agricultural users which generally have a priority to water rights. In large, if the water users of the area do not come together to solve the problem at hand, the reduction of water withdrawal may come from the State Engineer through a Ground Water Management Plan similar to what is being done in the Beryl-Enterprise area.

### **Monitoring Subsidence**

Additional recommendations in the report include the monitoring of subsidence in our valley. In 2013, the CICWCD conducted its own survey of GPS monuments to set a benchmark to monitor subsidence in the future. They survey also showed that The CICWCD has also budgeted for the placement of new benchmarks within the highly critical zones of fissuring within the Enoch

Graben and areas west of Quichapa Lake. These monuments will help us understand the true movement of the fissures and ultimately help us determine what is precisely happening in these areas.

## **History of the Report**

In May 2009, Enoch City contacted the UGS of a fissure damaging streets and sidewalks in the Parkview subdivision in North Enoch.

In June 2009, the CICWCD Board approved a UGS proposal to conduct an investigation on subsidence in Cedar Valley and the UGS and CICWCD entered into a Memorandum of Understanding.

In 2012, the UGS presented their initial report to the CICWCD board which showed an overall decline of subsidence in the valley floor of 4-5 inches basin wide. The CICWCD did not accept the report based on survey methodologies for subsidence and asked UGS to resurvey.

During 2012-2014 the UGS contracted with a licensed surveyor, and a LiDAR and InSAR specialist to more accurately determine what the overall subsidence in the valley was.

In March 2014, the UGS reported their findings to the CICWCD Board which showed subsidence or fissuring within the Enoch Graben and along the south western margin of Cedar Valley. Aquifer levels have declined by 114' since pumping began in the 1930's. Overall subsidence to the valley as a whole was minimal, however, more fissures have developed and existing fissures have increased in size since 1997.

## **Summary**

The Utah Geological Survey states that ground subsidence is occurring in Cedar Valley due to the over mining the aquifer by as much and 9,000 AC/FT per year. Fissures have been pronounced north of Enoch City and west of Quichapa Lake. Some of these Fissures have existed for well over 50 years but have recently settled or increased in size due to soil compositions and limited recharge to specific areas of the basin. Subsidence will likely continue to occur if the aquifer is not brought back to equilibrium. The CICWCD is working on three large scale projects that perfectly align with the mitigating recommendations expressed by the Utah Geological Survey to prevent over drafting and restore the aquifer.

## **Notes**

UGS Report, Special Study 150: <http://geology.utah.gov/online/ss/ss-150.pdf>

UGS - Utah Geological Survey

Generally speaking a family of four uses one-acre foot of water per year.

An acre foot of water is about the size of a football field covered by one foot of water.

1 AC/FT = 325,851 gallons