

Ground Water Management Plan

Kent Jones, State Engineer

Cedar City High School Auditorium

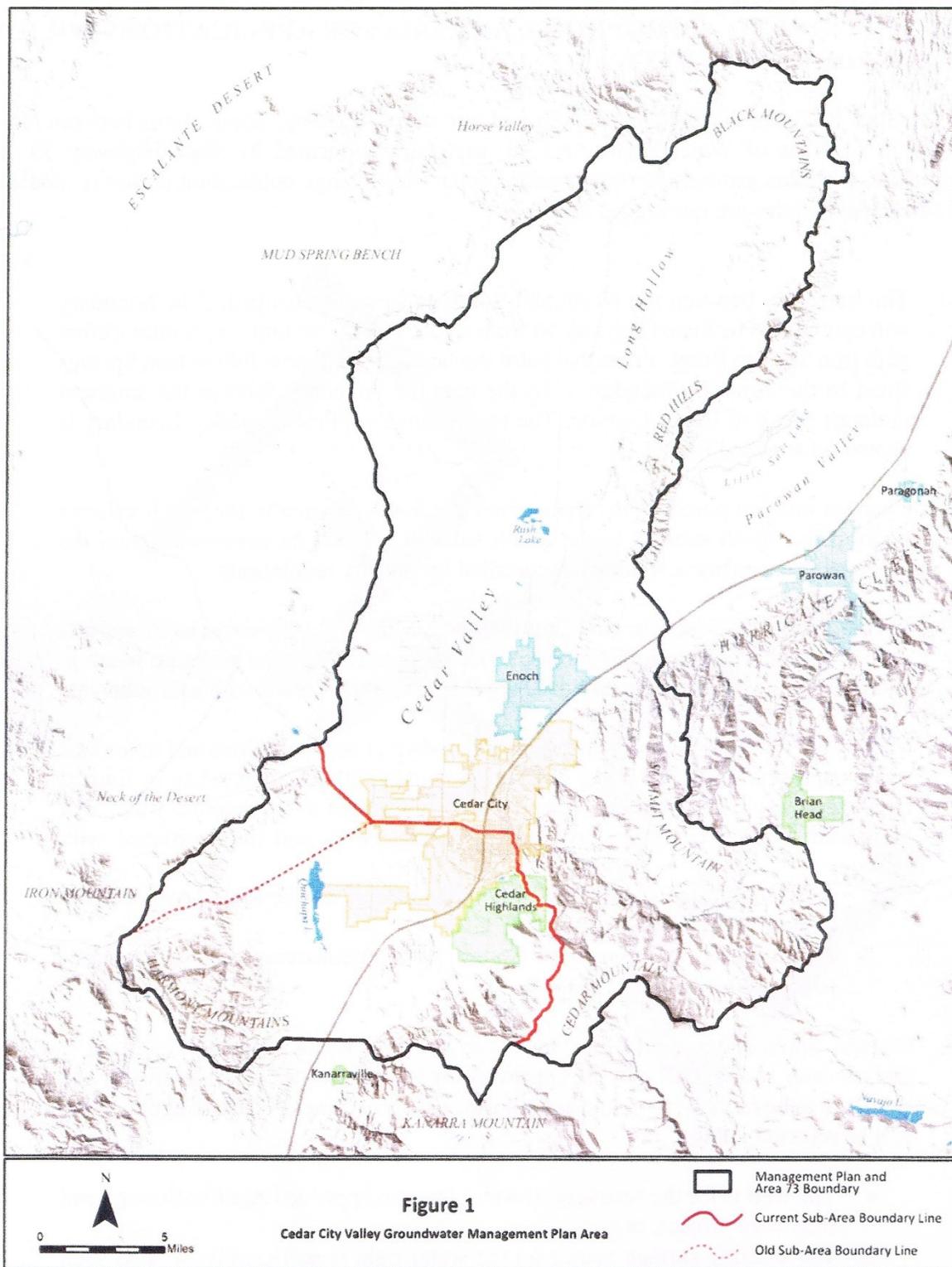
15 October 2019

DNR Handouts:

CEDAR CITY VALLEY APPLICATIONS TO APPROPRIATE AND CHANGE APPLICATIONS POLICY Adoption Date: XXX XX, XXXX

The State Engineer currently has a policy of not allowing change applications between North and South subareas of Water Right Area 73, generally delineated by State Highway 56. In conjunction with this groundwater management plan, this change application policy is modified and additional policies are introduced as follows:

1. The boundary between the North and South subareas is changed. The boundary will continue to be State Highway 56 from Cedar City to the highway's intersection with Iron Springs Road. From that point the boundary will now follow Iron Springs Road to the Area 73 boundary. To the east the boundary follows the southern drainage break of Cedar Canyon. The new change application policy boundary is shown on attached Figure 1.
2. Changes moving points of diversion from the South subarea to the North subarea or from the North subarea to the South subarea will not be approved unless the proposal is to replace a water right curtailed by priority regulation.
3. Recharged water, based on consumptive water rights, may be considered under a properly filed recovery application for recovery away from the recharge location and irrespective of the boundary dividing the basin into North and South subareas.
4. Cedar City Valley is closed generally to groundwater appropriations and to surface water appropriations. However, water may be available to appropriate in limited circumstances. The following categories of applications to appropriate water will be considered and evaluated on their individual merits and in accordance with statute:
 - a. Applications to appropriate water in Quichapa Lake or Rush Lake or water about to flow into either of these lakes.
 - b. Applications to appropriate water for non-consumptive uses or non-consumptive recharge projects.
5. Change applications proposing to move existing surface water rights to a groundwater source will only be approved for the quantity of water shown by the applicant to be reliably available at the surface source. Generally, these applications will be rejected unless:
 - a. The well is for the recovery of water from an approved Aquifer Storage and Recovery project; or
 - b. The existing surface source on the water right is sufficiently isolated such that there is a functional mechanism to abandon the historic point of diversion for the benefit of the local aquifer without expansion of existing rights.



**CEDAR CITY VALLEY
GROUNDWATER MANAGEMENT PLAN
Adoption Date: XXX XX, XXXX**

Introduction

The objectives of this groundwater management plan are to ensure groundwater withdrawals do not exceed safe yield, to safeguard the physical integrity of the aquifer, and to protect water quality in the groundwater basin of Cedar City Valley in Iron County. The intent of this plan is to provide specific management guidelines for this area pursuant to Section 73-5-15 of the Utah Code.

Studies indicate average annual groundwater withdrawals in Cedar City Valley exceed safe yield, making this groundwater basin a critical management area as defined in Section 73-5-15.1 of the Utah Code. The safe yield for the groundwater basin is estimated to be 21,000 acre-feet per year, while the current average depletion from the groundwater basin is estimated to be 28,000 acre-feet per year. If all groundwater rights that are approved or perfected were to be used the total depletion from the groundwater basin would be approximately 50,000 acre-feet per year. It is estimated that average actual depletion must be reduced by 7,000 acre-feet per year in order to balance recharge and depletion amounts in this groundwater basin.

Affected Area

This groundwater management plan applies to the groundwater basin within the surface drainage area of Cedar City Valley in Iron County. The groundwater management plan area is more particularly described as Water Right Area 73 and is shown in Figure 1.

Priority Regulation

In order to reduce actual depletion to balance recharge, water rights will be regulated according to priority and regardless of a water right's nature of use. Regulation will follow the schedule described in Table 1. A regulated water right will no longer be authorized to divert water beginning on the target date corresponding to the phase wherein the water right is to be regulated. A list of groundwater rights and corresponding priority dates and depletion estimates are posted on the Division of Water Rights website.

The regulated priority date for a given phase in Table 1 may be adjusted by the State Engineer to a later priority date based on the average annual artificial recharge or reductions in depletions that occur within the groundwater basin during the 10 years prior to the target date. Each year in the Cedar City Valley Pumpers annual distribution system report, the State Engineer will report on the status of the aquifer, the estimated annual depletion resulting from groundwater withdrawals, amount and disposition of artificial recharge, and any adjustments to the regulated priority date for a given phase. Recharged water under projects for which a recovery application has been approved and actively pursued will not be considered in adjusting the regulated priority date for a given phase.

Table 1 Priority Regulation Schedule

Phase	Target Date	Priority Dates Regulated Through	Acre-Feet Reduction in Estimated Depletion	Cumulative Acre-Feet Reduction in Depletion	Remaining Depletion (acre-feet)
1	January 1, 2035	December 31, 1957	5,434	5,434	45,530
2	January 1, 2050	December 31, 1954	7,330	12,764	38,200
3	January 1, 2060	December 31, 1951	8,814	21,578	29,386
4	January 1, 2070	December 31, 1935	6,761	28,339	22,625
5	January 1, 2080	July 25, 1934	1,518	29,857	21,107

Depletion Calculations

For purposes of this groundwater management plan, annual depletion from irrigation will be calculated using an annual crop survey prepared by the distribution system commissioner. The crop survey will tabulate the irrigated acreage for every crop type in the management plan boundary. It will include acreage supplied by groundwater and acreage supplied by both surface and groundwater sources. The crop survey will be published every year in the Cedar Valley Pumps annual distribution system report. For irrigated acreage supplied by both surface and groundwater sources, water users may be required to meter the amount of groundwater diverted to that acreage so that the groundwater depletion attributable to this acreage can be estimated.

Entities with municipal use will be required to report the following on an annual basis:

1. Amount of water diverted from all sources
2. Amount of water depleted from the municipal uses

Depletion due to municipal use will be the groundwater diversion minus any return flow resulting from the groundwater portion of wastewater effluent returning to the groundwater system and minus any return flow resulting from the groundwater portion of water used for lawn and garden irrigation and any other municipal purposes.

Depletion due to any other uses will be evaluated on an individual basis. Water users will be required to report diversions and depletions associated with these uses as directed by the State Engineer.

Artificial recharge due to recharge projects will be considered as an accretion of groundwater and will be a part of the depletion calculations. To be considered in the depletion calculations, the artificial recharge must be reported to the Division of Water Rights under a recharge permit approved by the State Engineer. The recharged water, if not diverted and left in its natural course, must not have previously recharged the groundwater aquifer.

Voluntary Arrangements

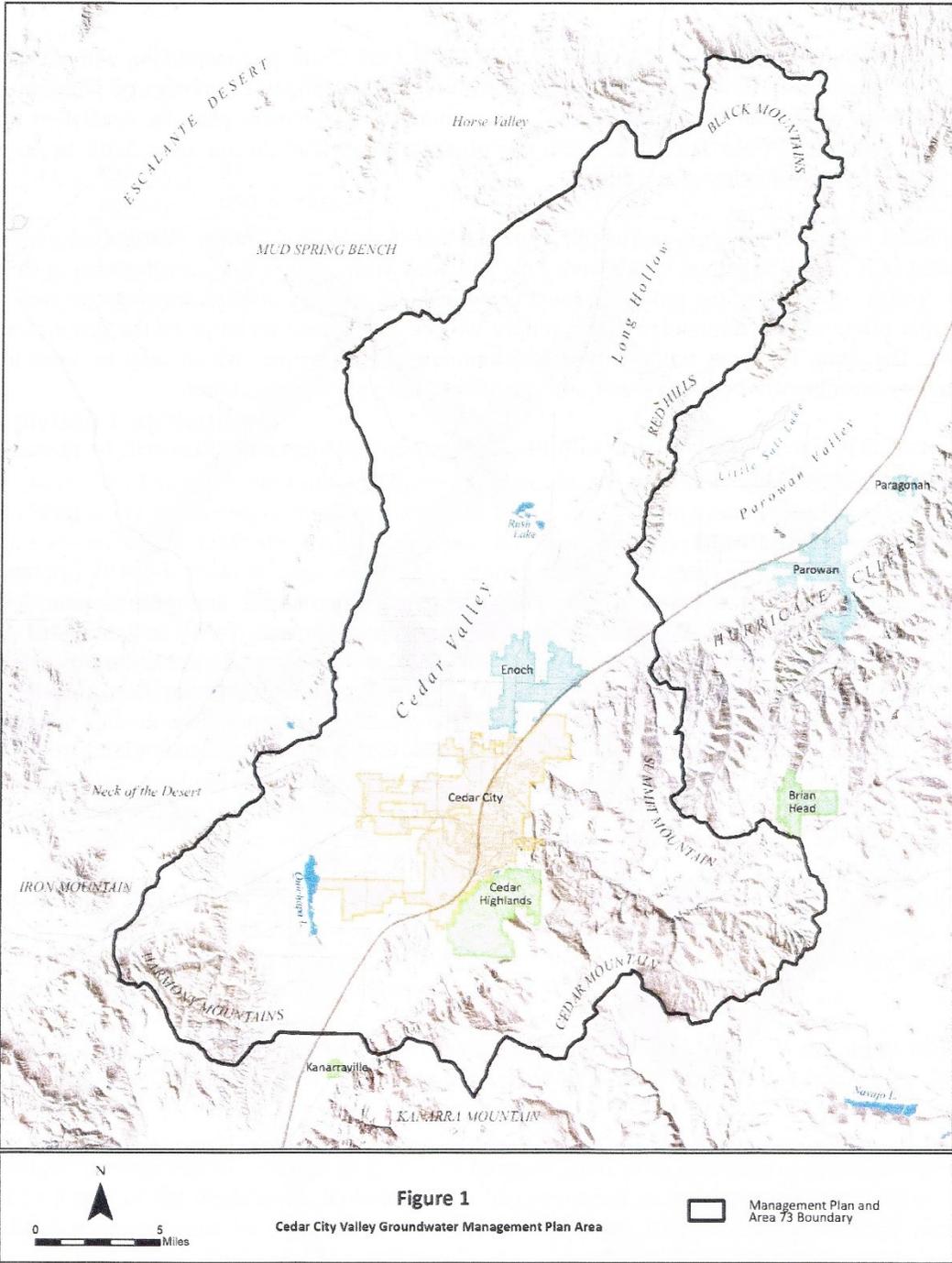
Pursuant to Subsection (4)(b) of Section 73-5-15 of the Utah Code, in consultation with the State Engineer, water users may agree to participate in a voluntary arrangement to manage withdrawals on a system other than by priority date. Any voluntary arrangement shall be consistent with existing statute and must not affect the rights of water users who do not agree with or do not participate in the voluntary arrangement.

The State Engineer has approved applications for the Central Iron County Water Conservancy District (CICWCD) to import water from Pine and Wah Wah Valleys to its service area in Cedar City Valley. Presuming the project is constructed and successfully imports water to this basin, a possible effect of this alternative water supply will be to increase recharge to the groundwater basin. The State Engineer will monitor development of this project which may be used in a voluntary arrangement between water users to offset future priority regulation.

Voluntary Arrangements associated with this Groundwater Management Plan will be posted on the State Engineer's website.

Adaptive Management

To determine the effectiveness of the plan, depletion calculations and groundwater level measurements will be used. As groundwater depletions approach safe yield it is anticipated that groundwater levels will stabilize with time. The phased reductions in depletions over long intervals as specified in Table 1 provide an opportunity for groundwater levels to respond to changes in groundwater depletions. A reduction in the rate of groundwater level decline over time will be used as an indicator of approaching equilibrium of depletion versus safe yield. If during any phase of the plan it is determined by the State Engineer that safe yield has been reached, future reductions in depletion will not be implemented. This plan may also be amended at any time in the same manner through which it was adopted.



Analysis of Cedar Valley water presented to WAC

by Kelsey KEENER

IRON COUNTY TODAY

Jeremy Agüero, principal analyst with Applied Analysis, presented a Water Resource Economic and Fiscal Analysis to the Water Advisory Committee last month.

Agüero started with a summary of what his analysis found, explaining that research suggests groundwater levels have been eroding for the last 50 years, that Iron County's economic climate supports continued growth but that it will place additional demand on the water supply and the long-term water demand is expected to exceed capacity, which can produce economic and ecological consequences.

He then used a timeline of events related to water rights to explain and identify the issue the Central Iron County Water Conservancy District (CICWCD) is currently facing: water resource stability; an issue facing not just Iron County but areas nationwide. Agüero discussed the patterns of drought since 2015 and commented on the projected population growth of Iron County as complications to planning for water sustainability in the future.

He added that as a response to this issue the CICWCD was created in order to manage the demand for water and plan for the future. The CICWCD's three main objectives for trying to rectify the overuse of water in Cedar Valley are to import, recharge and conserve water.

"(CICWCD) is an entity that has the responsibility of making sure there is safe, sufficient and stable water resources for the entire region," Agüero said.

The Utah State Engineer determined that the safe water yield for the area is 21,000 Acre Feet per year, but current depletion levels are measured at 28,000 Acre Feet per year. The suggested solution to solve the overuse was to: reduce water rights starting with the most junior in 2030; reduce water rights every 10 years to reduce depletion by an average of 6,000 acre feet every decade; and do a final reduction in 2070 to bring non-regulated rights to 20,143 acre feet in the Cedar Valley Basin.

The CICWCD Groundwater Management Plan Committee responded to the State Engineer's plan with a more extended timeline: reduce water rights starting with the most junior in 2035; reduce water rights every 15 years; and complete a final

reduction in 2090.

Agüero discussed Iron County's current economic climate as a factor in determining a solution as well, saying Iron County is one of the fastest growing counties in Utah and reviewed unemployment rates, median earnings, poverty rates, educational attainment, personal income and gross domestic product - which generally point to a strong economy.

"I assure you conservation alone isn't going to solve this problem"

**» Jeremy Agüero
Applied Analysis**

He also reviewed Iron County's water demand and supply outlooks. Current depletion of water from well pumping, subsurface outflow, evapotranspiration and valley springs is divided mainly amongst irrigation for agriculture (75.9 percent) and municipal uses (18.8 percent).

"There's a lot of folks that would like us just to say 'let's just convert all this agriculture that we have in the state; that we don't really have a water problem, what we have is an agriculture problem,'" Agüero said. "That, to me, seems to ignore the importance of agriculture to an economy like this one and others throughout the western United States."

Assuming no conservation measures are put in place, municipal water depletion is expected to reach over 20,000 acre feet and agricultural depletion to reach 23,000 acre feet in 2080. Agüero provided several variations of conservation efforts between both sources of depletion to demonstrate that total water demand by 2080 could be anywhere from an expected 57,000 acre feet per year (no effort) to a projected 30,000 acre feet per year.

Agüero said there is an estimated of 50,000 acre feet of water rights owned, but only 21,000 acre feet of water are actually available.

"We have essentially developed more water rights, secured more water rights than actually exist in terms of the water that's there," he said. "... This is why importation of

water is such a critical, important part of this entire conversation, because I assure you conservation alone isn't going to solve this problem. It's got to be a combination of a number of strategies."

In addition to concerns of sustainable water sources, the Utah Geological Survey concluded that the long-term overuse of groundwater is the cause of land subsidence and earth fissures found in Cedar Valley.

"Each one of (the survey findings) essentially comes to the conclusion that drawing more water out of the ground is creating pressure on the ground, leading to environmental activities including everything from vegetation to fissures forming in the area and they are all problematic," Agüero said.

Agüero also discussed the potential importation projects from Pine Valley and Wah Wah Valley, which could theoretically be available in 2025 and 2040 respectively and potentially increase CICWCD supply to 47,275 acre feet (with the safe yield of 21,000 acre feet considered). However, that additional supply is expected to be insufficient without added conserva-

tion measures in both municipal and agricultural uses.

He also discussed projected impacts on the aquifer's running deficit (7000 acre feet per year), which is currently estimated at 415,500 acre feet of water since 1940, and implications on ground water levels. Agüero said with the least aggressive water strategy, the total estimated aquifer deficit will be 507,000 acre feet by 2025 (24,000 acre feet per year of average additional deficit); with the most aggressive strategy, the water deficit could be relieved by 2065.

Agüero reviewed the potential economic impacts by implementing new water infrastructure, an estimated 419.3 million dollar investment for importing water from Pine Valley and Wah Wah Valley, as well as by doing nothing to improve water infrastructure.

"We're talking about the stabilization of water, respecting the fact that there's some uncertainty relative to at least 7000 acre feet of water that's out there," he said. "We're talking about developing a plan to protect

see WATER » 8

WATER

» CONTINUED FROM PAGE 5

this economy, to protect those residents, to protect those businesses overall. We're also talking about the potential for growth... Development of those water resources in order to ensure the ability to meet the expectations for growth overall, means developing these two water infrastructure projects, or combined one water infrastructure project... It's another 41,000 residents, another 14,000 households, another 1.26 million dollars every year in personal income and another 2.3 million dollars in economic activity.

He also presented several fiscal considerations to the committee including the financing of the potential importation projects, debt service and operation and maintenance costs of the new infrastructure.

Notes:

(FCS)

Ken Jones State Engineer 15 Oct 2019

- Recording will be available on website
- Sum 2016 first public meeting
- USGS & UGS involved
- see 2016 laid out in formation
- Only use water comes into Basin.
- 3 years working with info.
- Area hydrologically connected
- Subsidence from valley. More in North
- More of Groundwater declines.
- Regulate based on priority. ^{ephm} ^{clayey} ^{basin}

Groundwater management plan.

- Cedar city valley effective area ^{Prairie} ^{Basin}

2035 First cut 5400 ac ft 1957

All water rights listed.

Some rights being cut are not being used.

Looking at displacement calculations: crop type

will have annual meeting.

Try to be transparent on web site.

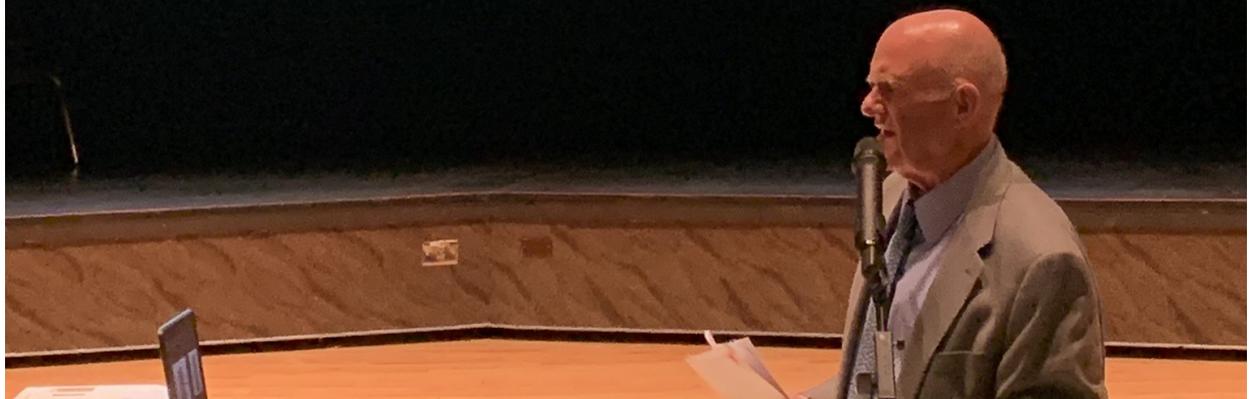
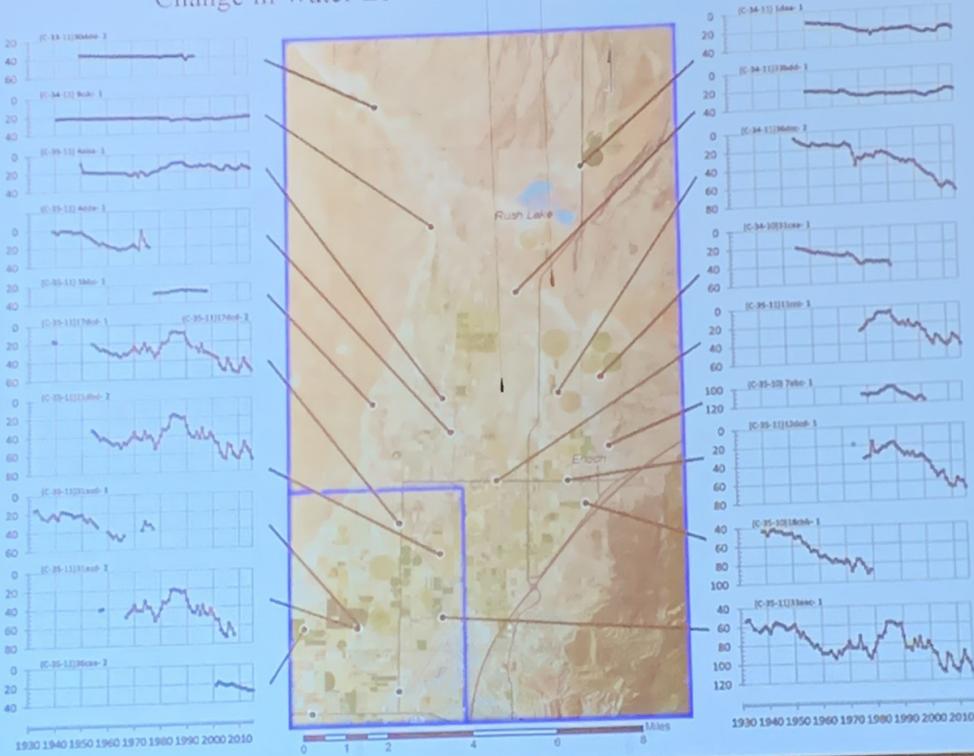
Need to get better handle surface wells

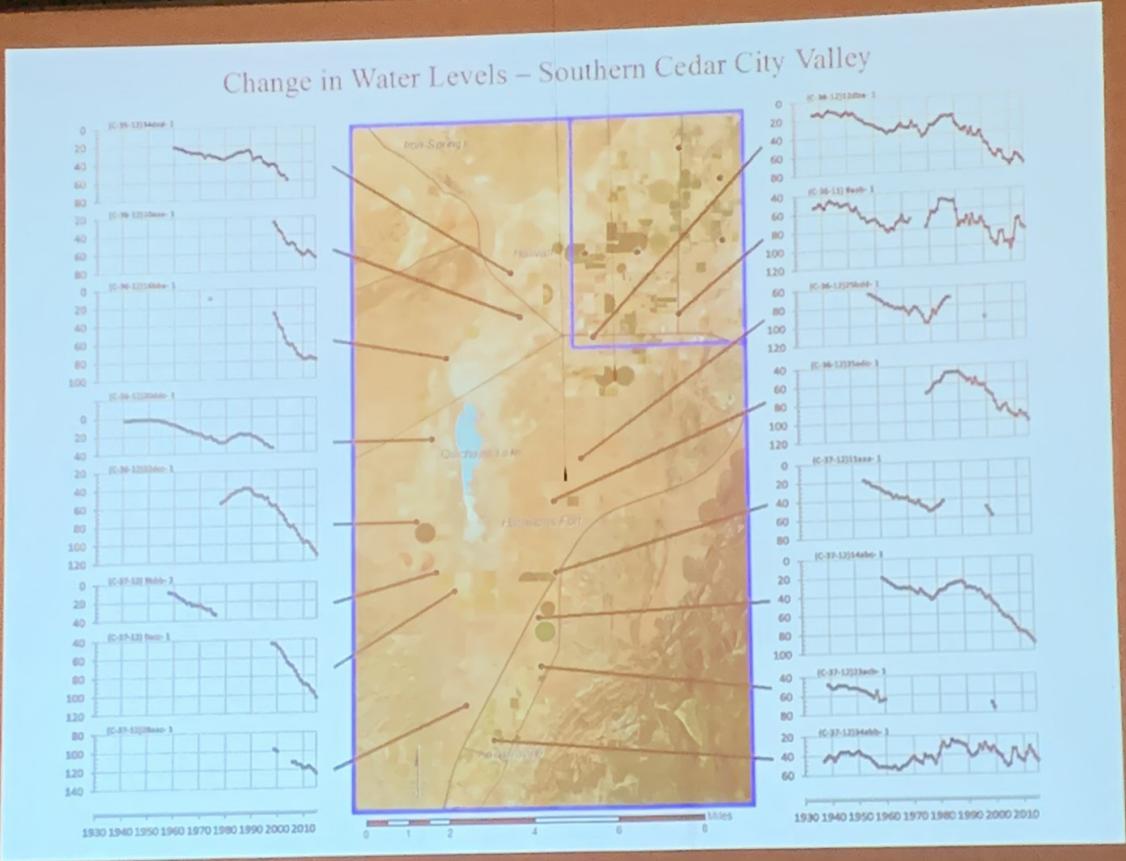
Will put numbers on wells.

Can allow voluntary arrangement

Escalate changed crop types to meet cut

Change in Water Levels – Northern Cedar City Valley



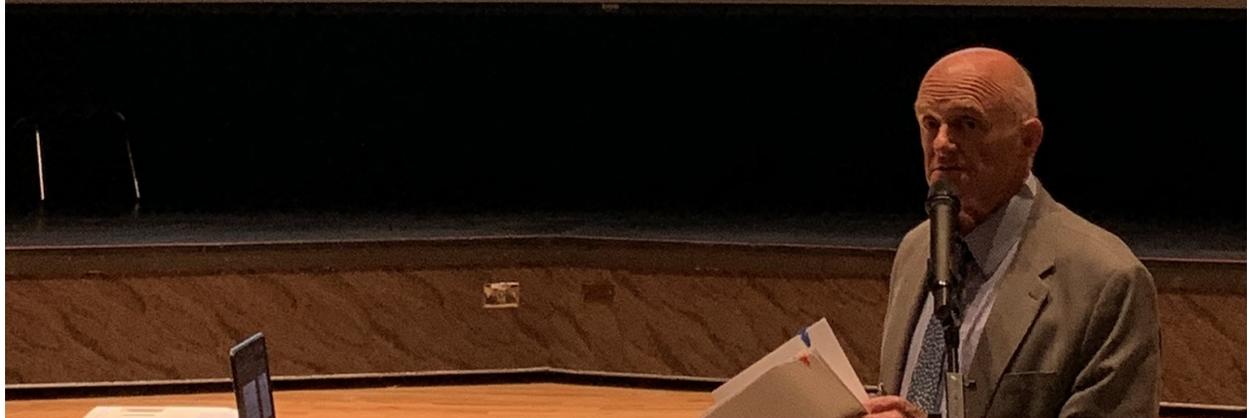


Introduction

Objectives

- Withdrawals do not exceed safe yield
- Safeguard the physical integrity of the aquifer
- Protect water quality in the groundwater

Utah Code:73-5-15



Introduction (Cont)

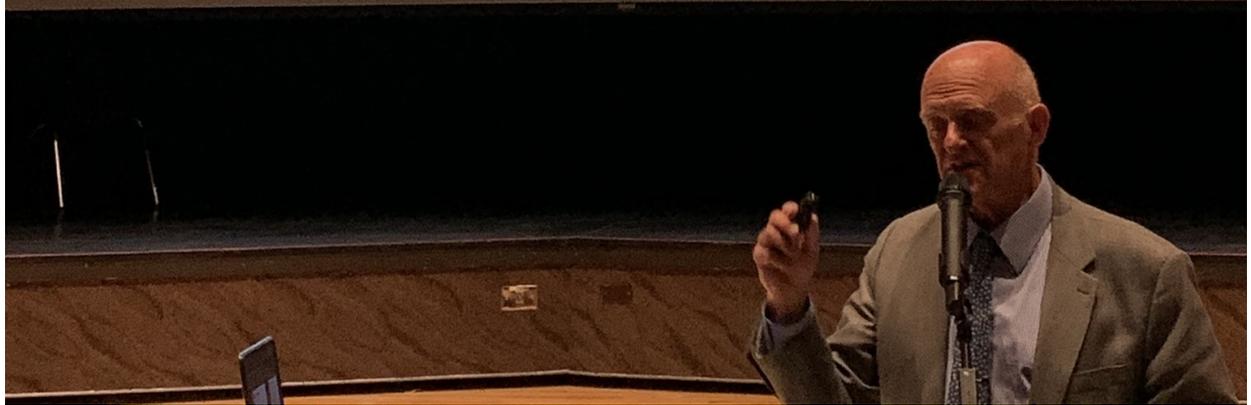
Critical Management Area

Average annual groundwater withdrawals in Cedar City Valley exceed safe yield

Safe Yield:	21,000 acft,
Current Average Depletion:	28,000 acft.
Approved and Perfected Water Rights:	50,000 acft.
Reduced Needed	7,000 acft

Priority Regulation

Phase	Target Date	Priority Dates Regulated Through	Acre-Feet Reduction in Estimated Depletion	Cumulative Acre-Feet Reduction in Depletion	Remaining Depletion (acre-feet)
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(146)

Take the problem in Escalante as in Cedar. Citizens Advisory Committee will be reported by Board. Must work with local people. Don't want to go door to door taking away water will be here soon & so someone else.

If I level out do not have to make the priority cuts. Plan can be amended at any time. Always appealable to District Court.

- comment county Approved in Cedar makes Escalante about problem.
- comment 28,000 ACFT. from water to make crops green.

Some things do not keep track of. 75% Agriculture 25% residential. Recovery from flooding during. James is person sued about Basin.

Channel through advisory committee. How was advisory board formed? CTCWCO appointed advisors. Voluntary. Only little water to Ranch lady & so not enough to cut pumping.

(147)

Watershed restoration production Springs coming because Brian Head fire - 80% peat pitatum ^{used by} natural vegetation. No well drillers involved in committee's looking water to lower stratus - Replaced 7 wells because deep wells take water to deeper stratus. Conservation & being careful big deal. Drillers data valid & needs to get to committee.

1 geologist at State Engineer's office. Note Regional Engineer res possible ^{this} area.

Policy

53 years since policy change in Cedar Valley. Created 56 Banded closed new appropriations. Some appropriation from art tributaries.

New Policy ① No trans for aens; WECCO Road.

② Replace water right see photos - Non-consumptive recharge can be appropriated. No recovery.

Priority Regulation

- List of Water Rights
- Annual Distribution Meetings
 - Status of the aquifer,
 - Estimated annual depletion
 - Amount of artificial recharge,
 - Any adjustments to the regulated priority



Voluntary Arrangements

Water users may agree to participate in a **voluntary** arrangement to manage withdrawals on a system other than by priority date

Voluntary Arrangements associated with this Groundwater Management Plan will be posted on the State Engineer's website.



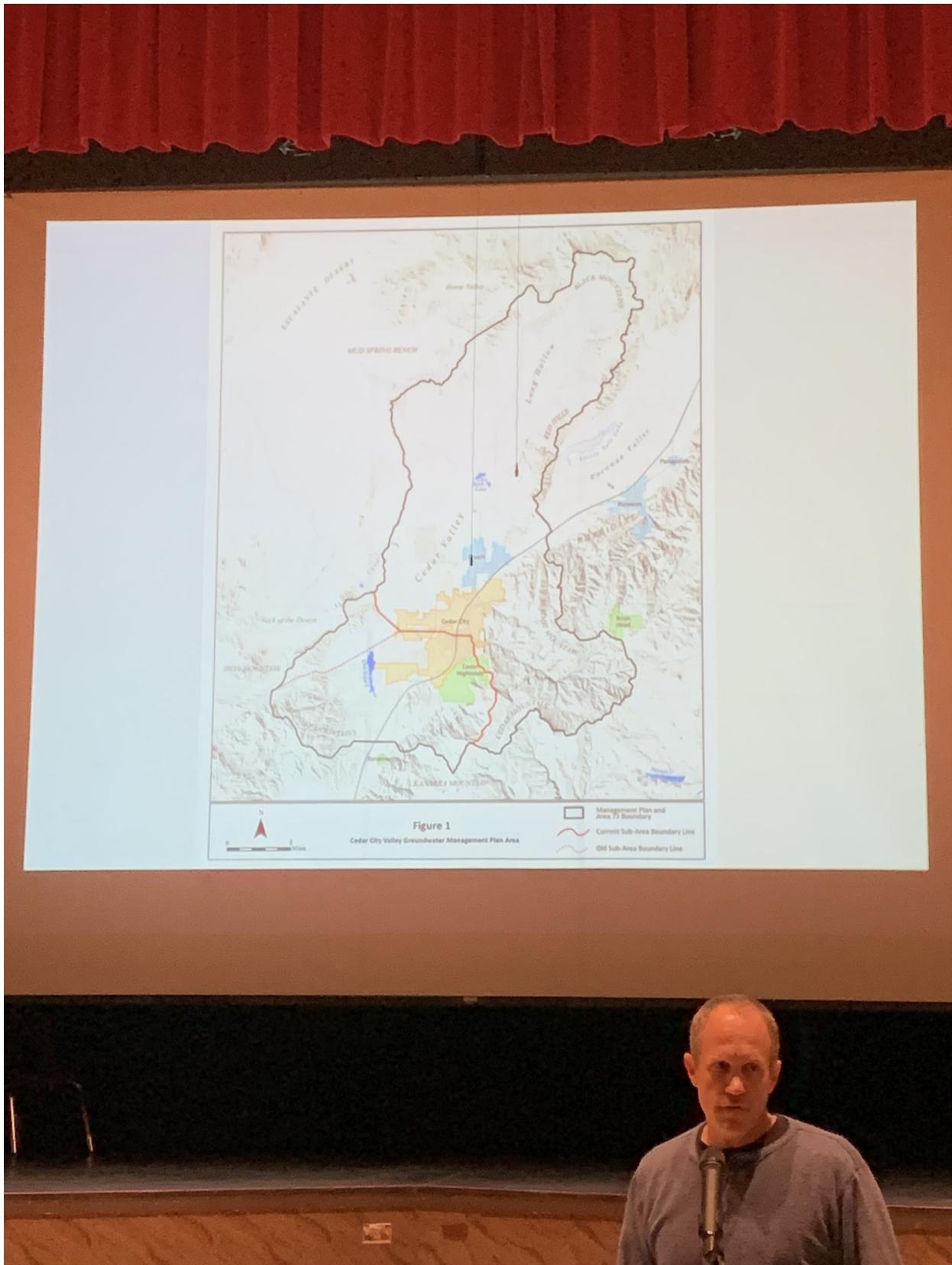
Adaptive Management

- Phased Reductions
- Monitor for reductions in the rate of groundwater level decline

If during any phase of the plan it is determined that safe yield has been reached, future reductions in depletion will not be implemented.

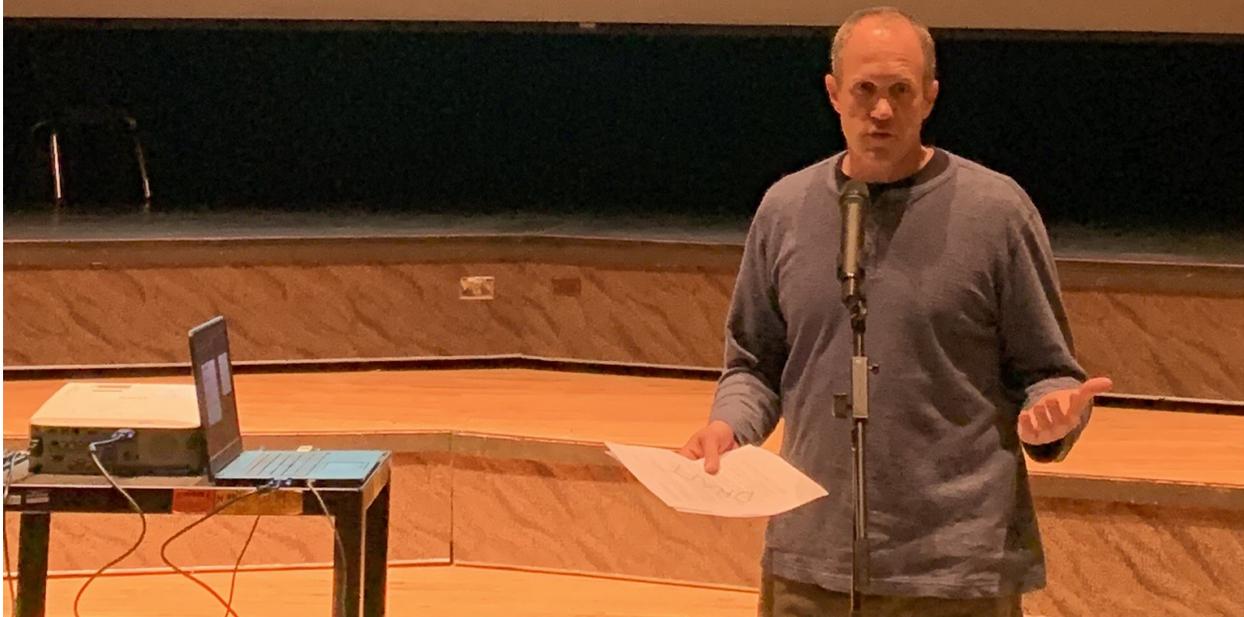
This plan may also be amended at any time in the same manner through which it was adopted.





Proposed Policies

- 1) Boundary line is modified
- 2) Replace a water right curtailed by priority regulation across boundary line
- 3) Recharge and Recovery across boundary line



Proposed Policies

4) Limited Appropriations:

- a. Applications to appropriate water in Quichapa Lake or Rush Lake or water about to flow into either of these lakes.
- b. Applications to appropriate water for non-consumptive uses or non-consumptive recharge projects.

Proposed Policies

5) Surface to Underground Changes:

- a. The well is for the recovery of water from an approved Aquifer Storage and Recovery project;
- b. The existing surface source on the water right is sufficiently isolated such that there is a functional mechanism to abandon the historic point of diversion for the benefit of the local aquifer without expansion of existing rights.

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Surface to underground change to generally be rejected. Did not make restrictive proposal, water from toilet goes north, suggested Cedar should pump back to Hamilton fort.

Have not been determined when new boundary line goes into effect. comments for 30 days. 60 day notice on groundwater plan.

Next 30 days critical - After notice 60 more days. Age dating. People to South & East would must regulate on safe yield.

Surface to underground change orders are coming regularly. Stream flow being measured for people using water. Conflict. USGS is putting in more measurement. State legislature is talking about measuring all water use.

(149)

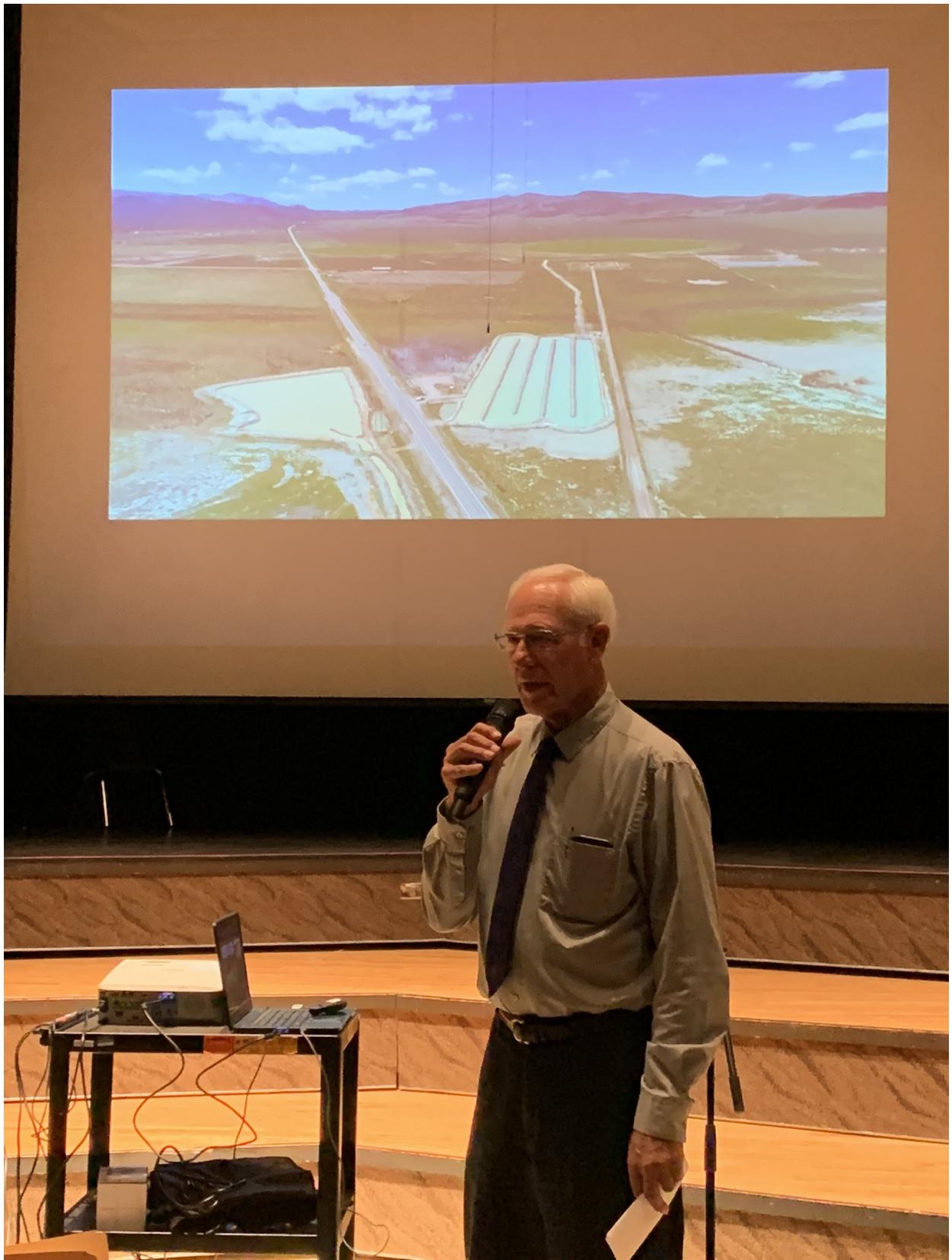
A lot of people in this room will not be here when put into effect.

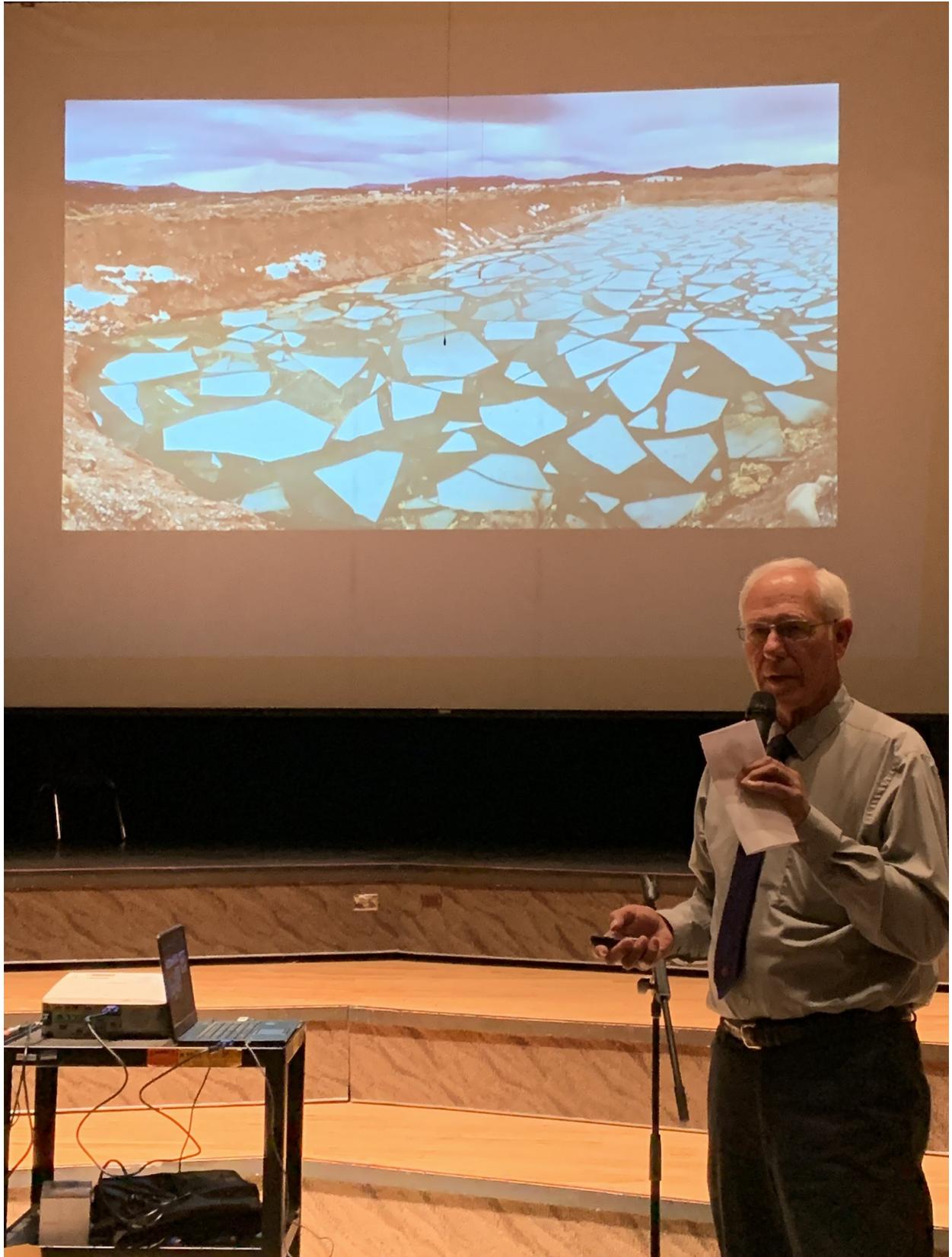
- Asked if involved SULL. No. USU is involved in study in valley. Are doing same things. Brent talked. Committee: Joe Milling, Paul Bittman took over, Paul Gorman, Paul Nelson, Paul Monroe, Raymond Proctor, Reed Erickson, Bob Robert, Spencer Jones, Brent Jones. Thanked Kent for working with committee.

Things done to be proactive -

- ① water into lazy river system - water into Onachupa into Cedar well
- ② water into gravel pits
- ③ Mtz Senator Vickers, state over appropriated water. Adopted irrigation systems \$200K to improve sprinklers. Photo pipes close to the ground.
- ④ 2006 applied for unappropriated water. Have 152 ac ft fine 116 with work

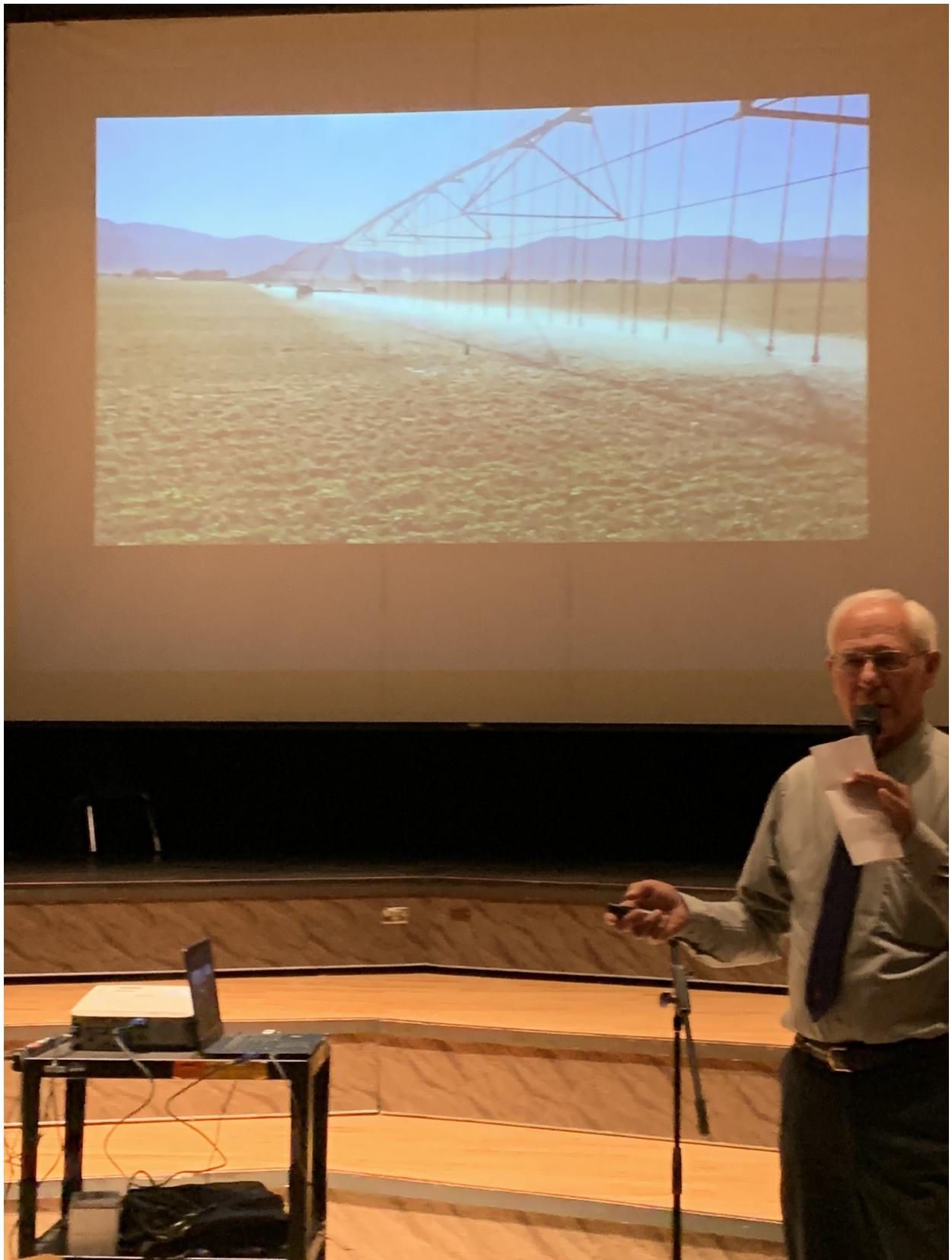




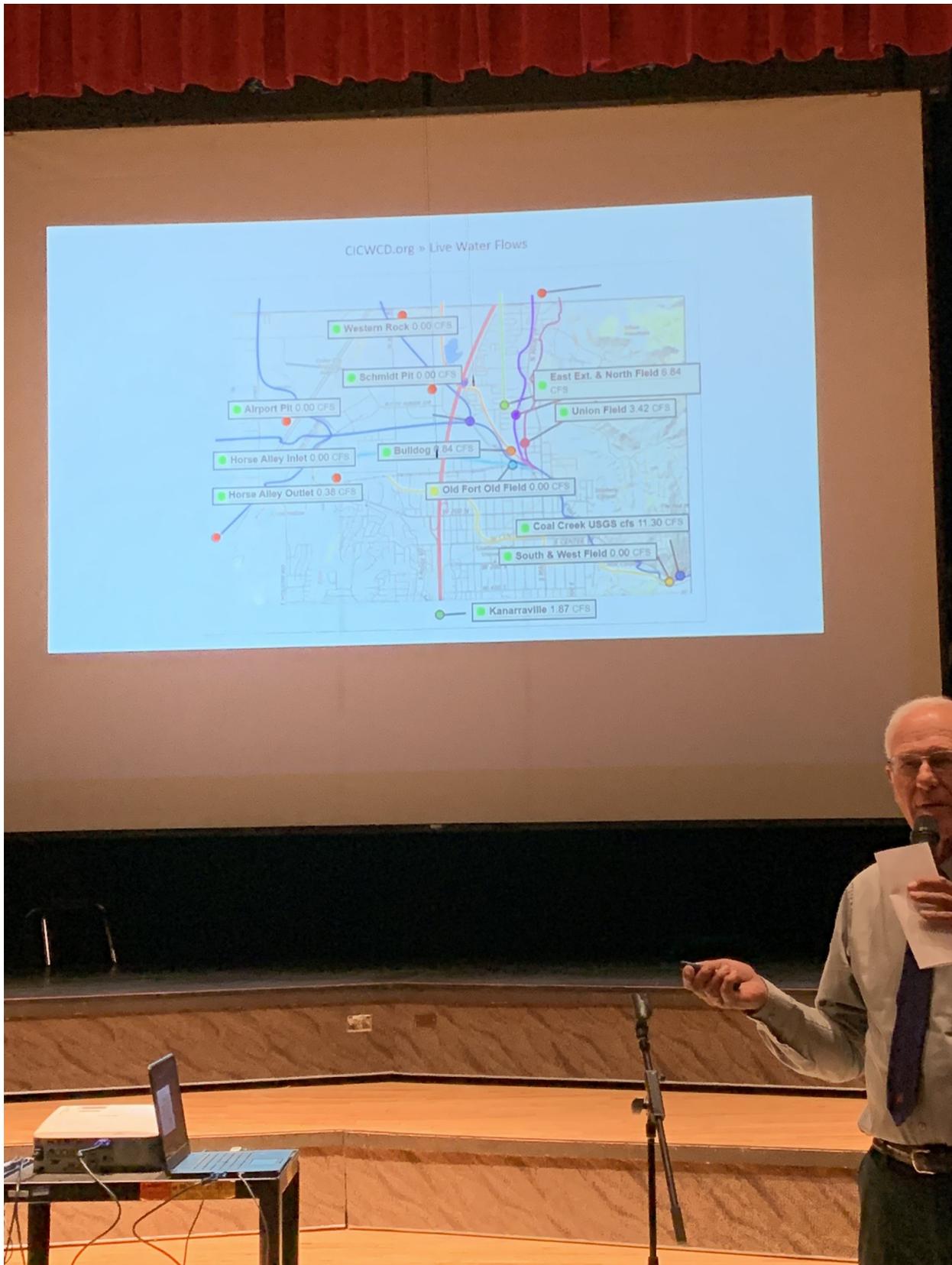










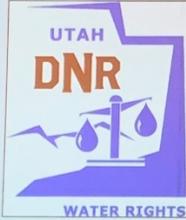


(150) Water deep but there.
 Working to get regularity approval
 State solar facility to pump water
 (5) where measured water
 in cedar valley funded Bent Sore.
 Saved 10K ac ft water this spring.
 Other plans to establish recharge
 - \$500 MM to pump the water.
 Will come from people using water
 Up from \$200 MM. Who knows?
 - Bill with Navajo Nation could help
 water into Basin. Cost comparison.
 Website: waterrights.utah.gov
 Pine Valley water can not go to hay
 must go to residential.
 Might have to change crop types,
 Colorado moratorium
 1934 is shut off line.
 Same ^{cover} talk about website
 Banner to be put on Home Page
 Part meeting links to recording
 & attendance.

(151) Grand Water Management Plan
 List of Grand water rights.
 Asked for notice of errors in database
 Annual Distribution meeting
 in February with Grand Water Pumping
 meeting 2nd Thurs @ Noon -
 in Water Rights office on Main Street
 Record open for 30 days -
 Can not hurt rights of others
 Grand water to groundwater transfers
 USGS State wide
 \$10-\$15/k for station.
 Across carbonate
 Paleotemp Hot Springs 10
 Beds dip to Permian
 left of water out of
 Tom Marsten USGS.
 Price of water is too cheap.
 - Must show using water using
 Plant grass. Use 14 Prove
 up \$1000 ac. ft. 5 city wells on 500

measurements from to regulation

Questions/Comments



Send written comments to:

Utah Division of Water Rights
 646 North Main St
 PO Box 506
 Cedar City UT 84721-0506
waterrights@utah.gov