WATER USE AND PRESERVATION ELEMENT

INTRODUCTION

Iron County, Utah, is required under Utah Code § 17-27a-403 to adopt a Water Use and Preservation Element as part of its General Plan. This element integrates water planning with land use decisions to guide sustainable development in unincorporated areas amid population growth and limited groundwater resources. While incorporated municipalities (Cedar City, Enoch, Parowan, Paragonah, Brian Head, and Kanarraville) manage their own efforts, this document promotes countywide coordination to address shared issues like aquifer overdraft in the Cedar/Beaver water basin.

The County does not provide water services. The Central Iron County Water Conservancy District (CICWCD), private wells, or municipal providers, each with independent water rights, supply these. Iron County relies on arid-region aquifers (Cedar Valley, Parowan Valley, and Escalante Valley) with minimal surface water from Coal Creek. Historical overdraft has caused subsidence and fissures in Cedar Valley, prompting recharge initiatives. This element draws from consultations with the Utah Division of Water Resources (DWR), Division of Drinking Water (DDW), Department of Agriculture and Food (DAF), and CICWCD, aligning with the General Plan's Land Use Element designating unincorporated lands for agriculture (primary), residential, commercial, industrial, recreation, and open space while prioritizing conservation.

KEY ROLES & RESPONSIBILITIES

Effective water management requires collaboration. While each entity operates within its own scope, their combined efforts ensure that water resources are managed wisely. The following four roles reflect key stakeholders discussed in this Water Element.

1. **The County** Protects sources, aligns zoning with availability, promotes conservation policies, and educates on best practices.

2. **Municipalities** absorb the majority of new growth within their established city and town boundaries. They are responsible for establishing visions, goals, objectives, policies, and land use regulations that govern their jurisdictional areas.

3. **Culinary water providers in unincorporated areas** provide essential water services to Iron County residents. Protecting the quality of existing water sources and ensuring reliable delivery to shareholders are top priorities.

4. **Central Iron County Water Conservancy District** serves approximately 90% of the county's population (including retail and wholesale supply), protects a large majority of Iron County's water future by managing resources efficiently, planning strategically, and representing local interests at the state level.

The Effect of Permitted Development or Development Patterns on Water Demand and Water Infrastructure

Permitted development patterns in unincorporated areas, dominated by agriculture and low-density residential/commercial, drive aquifer depletion. Urban growth is encouraged in Tiers I/II (near infrastructure) to minimize sprawl, while Tier IV (most county land) limits lots to 20+ acres for rural uses.

Aquifers, Safe Yields, and Groundwater Management Plans (GMPs)

Groundwater withdrawals exceed safe yields, leading to GMPs limiting use to sustainable levels (e.g., Cedar rights reduced to 21,000 AFY by 2035). Escalante and Parowan show higher stress ratios due to agriculture-heavy pumping, with depletions 50–91% above safe yield compared to Cedar's 33%. All have experienced 10–100 ft. water table drops over 80 years.

Valley	**Safe Yield (AF/yr)**	**Avg. Annual Withdrawal**	***GMP Approval Date**	**Implementation Date**
Cedar	21,000	43,000	Jan 2021	January 1, 2035
Parowan	22,000	27,000	Oct 2024	January 1, 2043
Escalante (Beryl)	34,000	85,000	Dec 2012	October 31, 2030
Avg. Annual Withdrawal based on 5 year avg. between 2019 & 2023 (M&I & Agriculture)				

Existing Demand

In 2024, reported municipal/industrial (M&I) use totaled ~11,940 AFY (culinary/domestic, commercial, institutional; excludes agriculture/private diversions). Non-public wells are exempt from reporting. An estimated 90% of domestic water use is metered via public systems. Therefore, it is estimated that total county M&I use totaled about 13,134 AFY. Residential use in Cedar Valley has dropped 18% since 1995, which ranks Iron County as the fourth lowest statewide (2019 DWR report).

The Table below summarizes estimated annual use (2024) across the County, separated by use.

Use	Residential (Domestic)	Commercial	Industrial	Institutional	Agricultural
% of Total	6%	0.79%	0.53%	0.71%	92%
Total Acre-Feet	9,572	1,254	852	1,128	146,929
Source: Based on DWR/CICWCD data estimates, excludes private diversions.					

Water Budget Overview

The Utah Division of Water Resources (DWR) provides clear guidelines for developing a water budget, which serves as a fundamental accounting tool to track and balance a region's water resources. At its core, the equation is straightforward: **Supply - Demand - Losses = Surplus (or Deficit)**. This framework helps identify whether water use is sustainable and directly influences land use planning by revealing how development patterns, such as residential density, agricultural conversion, or commercial expansion, impact availability. In Iron County, the water budget is particularly tied to

unincorporated areas, where the County's zoning tiers guide where and how growth occurs to avoid overburdening limited groundwater sources across the county. Cedar, Escalante and Parowan Valleys face acute stress from agriculture pumping, amplifying the need for valley-specific protections.

For context, one acre-foot (AF) equals about 325,851 gallons, enough to supply a household of four for roughly a year. Below, we break down the current (2025) water budget using data from DWR, the Central Iron County Water Conservancy District (CICWCD), and recent assessments like the Pine Valley Water Supply (PVWS) Financial Business Plan and Water Needs Assessment (FBPWNA).

- **Supply**: The aquifer's safe yield, the maximum amount that can be withdrawn annually without long-term depletion.
- **Losses**: An estimated **10–15%** of supplied water (or ~2,800–4,200 AFY) is lost to inefficiencies, including leaks in aging pipes, evaporation from open canals, and unintended infiltration during transport. These "unaccounted-for" losses highlight opportunities for infrastructure upgrades, such as leak detection and canal lining.

Current Water Budget by Valley (Demand based on 5 year averages from 2019 to 2023)

- **Cedar Valley**:
  - **Supply**: ~21,000 AFY safe yield + ~5,000 AF recharge = **~26,000 AFY**.
  - **Demand**: ~43,000 AFY (~7,000 AFY M&I, ~36,000 AFY ag).
  - **Losses**: ~10–15% (~4,300–6,450 AFY) from leaks/evaporation.
  - **Net**: ~21,300 AFY overdraft; urban growth adds visibility.

- **Parowan Valley**:
  - **Supply**: ~22,000 AFY safe yield + minimal recharge (~1,000 AFY) = **~23,000 AF**.
  - **Demand**: ~27,000 AFY withdrawals (~2,000 AFY ; ~25,000 AF ag).
  - **Losses**: ~10–12% (~2,700–3,240 AFY).
  - **Net**: ~6,700 AFY overdraft; limited urban offset.
- **Escalante Valley (Beryl-Enterprise)**:
  - **Supply**: ~34,000 AFY safe yield + low recharge (~500 AF) = **~34,500 AFY**.
  - **Demand**: ~85,000 AFY depletion (~3,600 AFY M&I, ~81,400 AFY ag).
  - **Losses**: ~8–10% (~6,800–8,500 AFY).
  - **Net**: ~57,300 AFY overdraft; critical management area.

Countywide, this results in ~85,300 AFY annual overdraft causing issues like groundwater level declines (10–100 feet over the past 80 years), soil subsidence, and surface fissures in Cedar Valley. Without intervention, these trends threaten water quality and structural integrity.

How Land Use Patterns Influence the Water Budget

Iron County's General Plan uses four zoning tiers to manage growth and its water impacts ensuring development aligns with supply:

- **Tiers I II, & III (Urban/Higher-Density Areas)**: Focused near existing infrastructure like Cedar City (population ~42,200 in 2025, growing at ~3.3% annually), these areas encourage compact, efficient growth.

- **Tier IV (Rural/Low-Density)**: Covering most unincorporated land, limits lots to 20+ acres, reducing sprawl and outdoor water use (e.g., large lawns). They add only ~20% less demand than unchecked urban expansion, preserving aquifer recharge potential through open space.

Through its land use goals, policies and mapping, the County encourages Urban Growth with urban levels of density to occur where the development can be served by water and sewage treatment systems. Other areas remote from existing or anticipated infrastructure development are appropriately limited to more traditional rural uses and lower residential densities. These efforts have helped to reduce growth in areas far removed from standard infrastructure and helped to reduce the amount of residential development in remote areas of the County.

Future Water Demand and Projections

Looking ahead, baseline population projections from the Kem C. Gardner Policy Institute estimate Iron County's total population reaching ~77,300 by 2030 and ~91,300 by 2050, with ~20% (~15,500–18,300) in unincorporated areas.

The County has been adjusting Tier boundaries throughout 2024 & 2025 to support more sustainable land use, and will continue to adjust tier boundaries in 2026.

In 2024, the county's population is estimated at around 67,897 people, with roughly 13,579 (about 20%) of them living in unincorporated areas. That said, many of these homes rely on individual groundwater wells, which are considered non-public water systems. This setup makes it tricky to get a precise count of water usage, as owners of these private wells are not required to report their consumption to the Utah Division of Water Rights (DWR). Overall, while we can account for about 90%+ of the water use in the county, these figures should be viewed as estimates rather than exact totals.

Agricultural water usage is anticipated to decline over time as farms continue to adopt more efficient practices, or are potentially converted to residential development. Most of this agricultural to residential conversion is likely to occur near existing municipalities as they expand and extend their service areas.

Population projections estimate the potential growth of over 28,000 residents over the next 35 years. While it is true that most water use in the county is due to agricultural use, it cannot be said with certainty if the residential growth will replace currently irrigated agricultural land. Based on the 2022 Census of Agriculture, less than 14% of all farm acreage in Iron County is irrigated. The vast majority is used as pastureland (~75%).

Year	Estimated County Population	Estimated Unincorporated Population	Projected Demand Increase (M&I acre feet)
2025	70,028	14,006	
2030	77,312	15,462	+2,000
2040	85,248	17,050	+3,000
2050	91,299	18,260	+3,000
2060	98,098	19,620	+3,000
Kem C. Gardner Policy Institute baseline projections, updated 2025; CICWCD FBPWNA.			

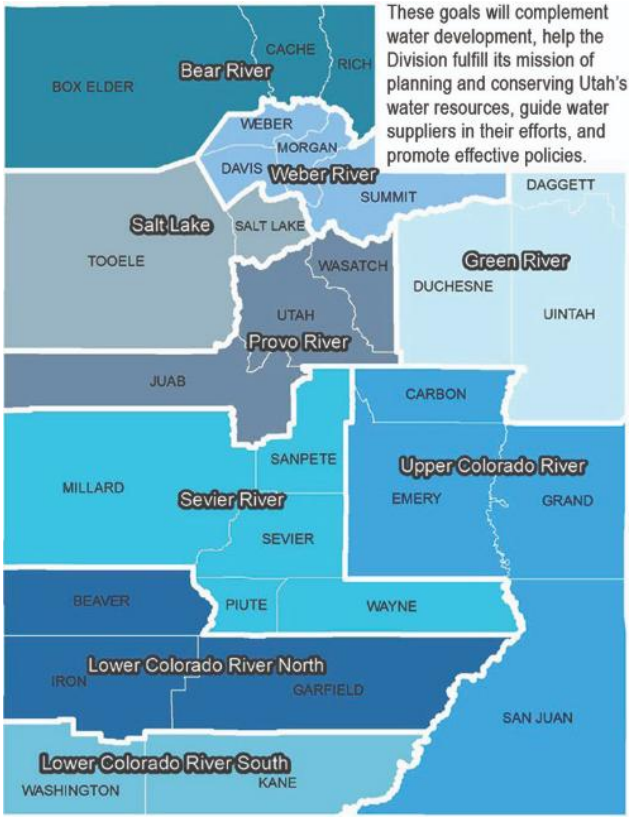
Infrastructure strains: Cedar Valley Aquifer is closed to new appropriations from DWR since 1966, with shortages projected at 5,000 AFY by 2030 without the Pine Valley Water Supply.

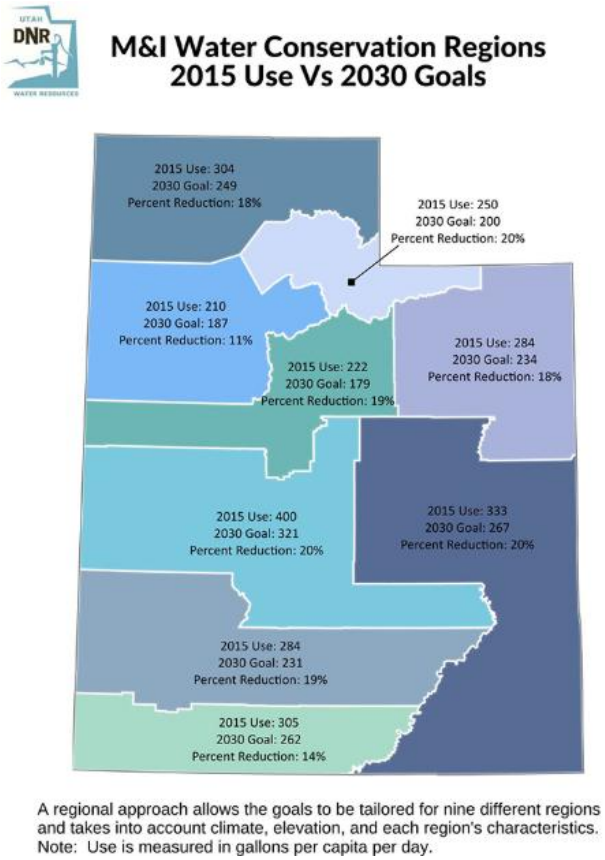
Projected Water Demand by Land Use in Cedar Valley					
Land Use Category	**2023 (Baseline)**	**2030**	**2040**	**2050**	**2060**
Municipal (M&I)	7,000	9,000	12,000	15,000	17,000
Agriculture	36,000	34,000	33,000	31,000	30,000
Total	**43,000**	**43,000**	**45,000**	**46,000**	**47,000**
assumes efficiency gains offset some ag decline. Similar trends projected for Parowan/Escalante					

Alignment with Regional Goals

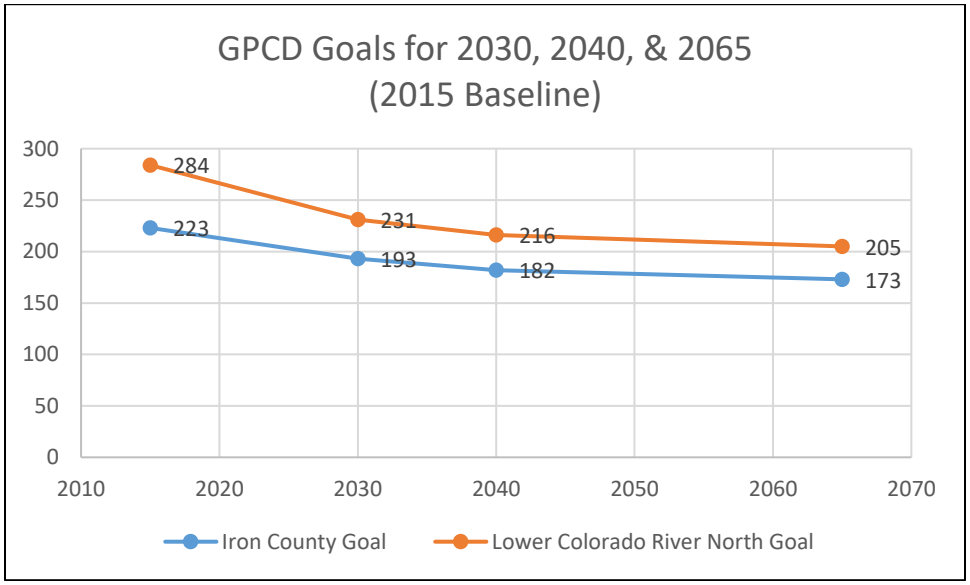
The Utah Division of Water Resources (DWR) established Regional Water Conservation Goals in 2019 for the state's nine municipal and industrial (M&I) areas, focusing on residential, commercial, institutional (e.g., schools and parks), and industrial water use while excluding agriculture, mining, and power generation (classified separately). Iron County falls within the Lower Colorado River North region, which targets a 19% reduction in gallons per capita per day (gpcd) by 2030 to enhance statewide efficiency amid drought and growth pressures.

This element directly supports these goals through integrated land use policies and partnerships, leveraging CICWCD's framework for M&I reductions. Countywide, actions such as tiered zoning, rebates, and ordinances, promote efficient development patterns and reductions in GPCD.





A regional approach allows the goals to be tailored for nine different regions and takes into account climate, elevation, and each region's characteristics.
Note: Use is measured in gallons per capita per day.



Methods of Reducing Water Demand and Per Capita Water Use for Existing Development

Residential water consumption in Cedar Valley has reduced by over 18% since 1995. Iron County was ranked the fourth county in the state for low water use according to the State's 2019 Regional Conservation Goals Report.

To demonstrate leadership in water conservation, Iron County has implemented landscaping renovations at key public facilities as models for the community. At the Parowan Courthouse, extensive turf removal was completed, with the area replanted using drought-tolerant species and equipped with efficient drip irrigation to minimize water needs. A similar project is now underway at the county office building in Cedar City, which will eliminate all turf and incorporate fully drought-tolerant landscaping on-site.

Another recharge project is currently under construction in Parowan. The project will recharge the water into the aquifer rather than flowing to the Little Salt Lake and evaporating, as well as improve flood conveyance and reservoir operations.

To address existing development in unincorporated areas, Iron County will implement conservation measures that have proven effective through CICWCD's implementation.

Replicate CICWCD successes ($2M grants since 2020):
Rebates: (utahwatersavers.com: turf/smart controllers/toilets; ~200 AF/yr indoor savings)
Audits: (15% leak reduction)
Education & Pricing: Tiered rates/DAF campaigns
Efficiency Practices: LEPA/LESA sprinklers (20% savings on 5,000+ acres)
Soil sensors (15% Ag reduction).

Aquifer Recharge Initiatives: CICWCD operates seven recharge facilities in Cedar Valley to capture excess winter flows and runoff from Coal Creek, countering overdraft by returning ~2,800 AF annually (2024 data) and building cumulative storage. To date, over 24,000 AF has been recharged since inception, with ongoing enhancements including automated valves, flow sensors, and improved diversions for precise quantification. Recharge facilities include Enoch Graben, Western Rock Pit, Airport Pits, Horse Alley, Quichapa Creek, Quichapa Lake, and Schmidt Pit.

A new reuse and recharge project (Phase 1 nearly complete as of Oct 2025) treats wastewater effluent and captures winter flows, projected to add ~1,500 AF/year of recharged water for secondary/irrigation use, reducing aquifer pumping. Future phases include storage reservoirs and well development in Escalante Basin (Basin 71) tied to broader supply diversification.

Methods of Reducing Water Demand and Per Capita Water Use for Future Development

For future development, integrate water-efficient standards into county zoning and permitting, building on CICWCD's supply diversification (e.g., PVWS integration):

- **Smart Growth Policies**: Encourage water budgets in subdivision approvals, limiting density in water-scarce areas. Per Iron County Code § 17.20.050(B), new subdivisions relying on individual wells must demonstrate water rights at least 50 years old or fully developed wells to ensure senior, reliable supply amid aquifer overdraft. Promote low-impact development (e.g., permeable surfaces) to enhance recharge.
- **Zoning Codes**: Consider implementing CICWCD turf limits (50% of irrigated landscape area for single family residential, 40% for multi-family, 30% for commercial, industrial, institutional, no turf allowed in park strips or medians) county-wide.
- **Building Codes**: Support adoption of water-efficient fixture standards (e.g., 1.28 gpf toilets)
- **Wastewater Reuse**: CICWCD is collaborating with Cedar City, Enoch, and the County to treat effluent water from the Wastewater Treatment Facility to Type-1 water for secondary and agricultural irrigation. Using effluent water will reduce pumping from the aquifer.

Agriculture

Agriculture remains the dominant water user in Iron County, with the most severe overdrafts in Escalante and Parowan Valleys, where irrigation for pastures and crops outpaces recharge. To sustain this vital sector, spanning 475,348 farm acres (2022 Census; average 877 acres, with 64,987 irrigated), the County promotes efficiencies and protections that integrate with land use planning, prioritizing rural Tier IV zones to prevent urban encroachment and preserve aquifer integrity.

Data for this section was informed by consultations with state agencies (DWR, DAF) and CICWCD, drawing from public records to align with GMPs.

Water Rights Summary (aggregated from DWR Water Rights Database; focuses on major entities with delivery systems in county basins):

Company Name	Delivery System Description	Water Rights (AF)	Irrigation Season	5-Yr Avg. Use (2020–2025, AF)
Parowan Irrigation Co.	~10-mile main canal + branches from Parowan River	~15,000	Apr–Oct	~12,000
Enoch Irrigation Co.	~3-mile ditches serving lower valley farms	~8,000	Apr–Oct	~6,500
Summit Irrigation Co.	Short diversions from Shirts Creek for eastern ranches	~2,500	May–Sep	~2,000
Shirts Creek Irr. Co.	Ditch network (~4 miles) for pasture irrigation	~3,000	Apr–Oct	~2,400
Total (Identified Majors)	N/A	**~28,500**	N/A	**~22,900**

Efficiency strategies focus on proven upgrades:

- **Irrigation Modernization**: Expand Low Energy Precision Application (LEPA) and Low Pressure Stress Application (LESA) sprinklers, already saving 20% on 5,000+ acres per CICWCD data; target an additional 10,000 acres in Escalante/Parowan by 2035 via DAF grants. Canal lining reduces seepage losses by 15–25%, with pilots in Parowan Valley preventing ~1,000 AF annual waste.
- **Education/monitoring:** Co-host annual workshops (reaching 1,000+ users) and use CICWCD's AMI metering data for countywide gpcd tracking.
- **Technology and Monitoring**: Deploy soil moisture sensors and weather-based controllers on irrigated lands, aligning with regional goals for 15% farm use reduction; integrate with GMP flow metering (mandatory by 2030) to track compliance.
- **Canal and Delivery Protection**: Collaborate with municipalities to safeguard irrigation infrastructure from development, ensuring reliable delivery in shared watersheds.

Identified irrigation entities include Parowan Irrigation Company, Enoch Irrigation, and Cedar City Irrigation. Below is a summary of total irrigation (non-potable water) use:

Irrigation Water Use in Acre-Feet			
Year	Cedar City	Enoch	Parowan
2024	807.52	262.67	1329.3
2023	739.07	262.61	1068.1
2022	753.95	283.22	1151.5
2021	739.83	176.96	741.91

Preservation

To proactively preserve agricultural lands and mitigate conversion risks, Iron County can leverage House Bill 237 (Rollback Tax Amendments, effective May 7, 2025), which allocates 100% of greenbelt rollback taxes (previously capped at 20%), toward conservation. This provides a dedicated revenue stream (potentially $100,000+ annually from development conversions) for easements. Funds enable implementations under the Land Conservation Easement Act (Title 57, Chapter 18), explicitly prohibiting eminent domain and requiring balanced public-land purchases (e.g., swapping state/federal acres for private ag protection).

Partnerships with the Department of Agriculture and Food (DAF) can establish program criteria, including priority for irrigated parcels (64,987 acres per 2022 Census) threatened by residential expansion. By directing HB 237 funds toward acquiring water rights, standalone or appurtenant to irrigated parcels, the County can prevent forfeiture during urbanization, preserving ~20,000 AF in agriculture allocations. Unobligated funds after 10 years transfer to the LeRay McAllister Working Farm and Ranch Fund (§ 4-46-301) for statewide grants, ensuring long-term viability. By leveraging HB237 funds to offer voluntary easements, the County could enhance sustainable agriculture use in overdrafted valleys, aligning with DWR's call for preservation plans and supporting GMP reductions without economic disruption.

Drinking Water

Iron County's 23 community water systems serve ~3,986 residents with a combined production and storage capacity of ~8,000 AF/year, relying heavily on groundwater amid aquifer stresses.

Countywide coordination with larger systems (e.g., Cedar City) emphasizes diversification to buffer shortages, projecting 5,000 AF deficits in Cedar Valley by 2030 without action. These systems exempt non-public wells from reporting, but ~90% of domestic use is captured through public metrics.

Diversification efforts include:

- **Pine Valley Water Supply (PVWS)**: Imports 10,000–15,000 AF annually from Pine Valley, reducing Cedar Aquifer reliance by 30–50% for unincorporated users.
- **Aquifer Recharge**: Captures ~5,000 AF of winter Coal Creek flows via seven Cedar facilities, adding buffer storage and countering overdrafts.

Modifications That Can Be Made to Local Government's Operations to Reduce and Eliminate Wasteful Water Practices

Adopt CICWCD protocols: Low-flow fixtures/recycled water in buildings/fleet (25-20% indoor savings per EPA WaterSense benchmarks); annual audits (10–15% loss reduction).

To ensure reliable supply and quality, the County will consider establishing the following programs and overlay zones:

Subdivision Water Capacity Pilot: To future-proof piped systems against growth while curbing wasteful practices, explore a voluntary pilot, verifying water rights and recommending 1.5x capacity for system extensions/hookups (e.g., upsizing mains based on projected peak demand). This avoids retrofits for future spikes (e.g., ADUs/guest houses, irrigation), operates at lower pressures to cut leaks/evaporation, enables precise metering for tiered rates that penalize overuse, and eliminates disruptive over-pumping during shortages. Participants could earn “Iron County WaterWise Certified” designation for marketing.

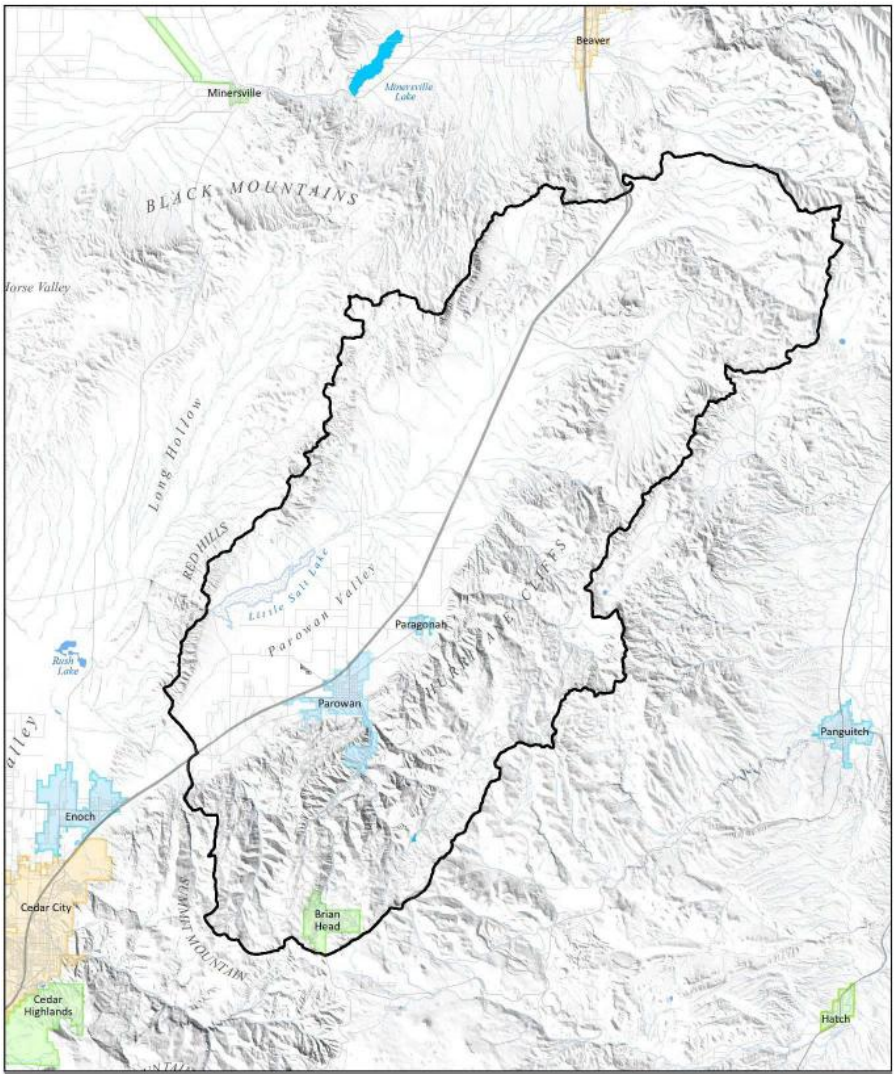
Zoning Overlays: Coordinate with CICWCD and DWR to identify natural recharge areas that would be ideal for an overlay zone and coordinate with Utah Geological Survey (UGS) to identify existing fissures (caused by long-term groundwater pumping that exceeds the rate of natural recharge) that could be mapped with a hazard overlay zone.

APPENDIX

Parowan Valley Groundwater Management Plan
Approved October 15, 2024

Safe Yield – 22,000-acre feet per year
Average well withdrawals between 2010 to 2019 – 35,000 acre-feet/year (depletion about 33,000)

Phase	Implementation Date	Priority Date (YYYY-MM-DD)	Estimated Depletion Remaining (acre-feet)
		No Regulation	33,000
1	January 1, 2043	1955-01-01	30,000
2	January 1, 2060	1954-01-01	29,000
3	January 1, 2070	1953-01-01	27,000
4	January 1, 2080	1951-12-05	22,000



Cedar Valley Groundwater Management Plan

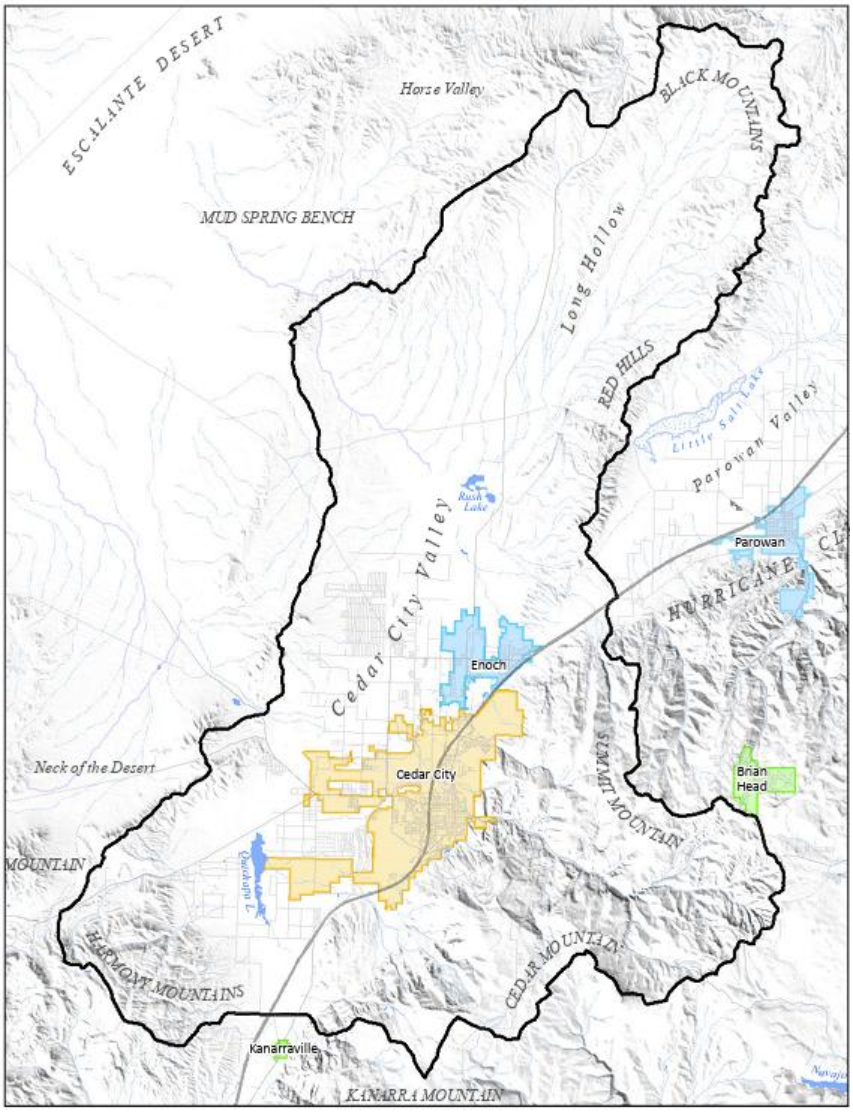
Approved January 11, 2021

Safe Yield – 21,000-Acre feet/year

Average well withdrawal – 28,000-acre-feet/year.

Approved groundwater rights – 50,000 acre-feet/year

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



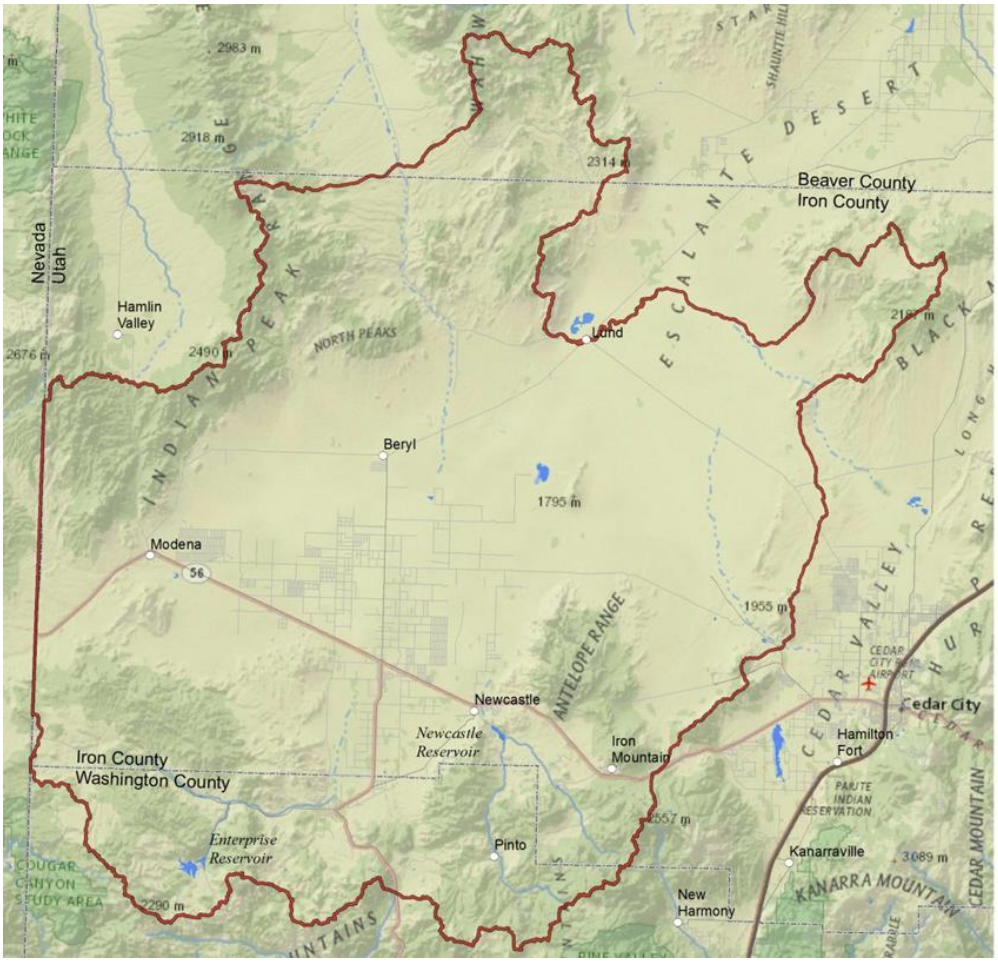
Beryl Enterprise Groundwater Management Plan
Approved December 21, 2012

Safe Yield – 34,000 acre-feet/year
Average depletion – 65,000-acre-feet/year

Table 1 - Groundwater Management Plan Regulation Schedule

Phase	Percent Reduction	Acre Feet Reduction*	Cumulative Percent Reduction	Cumulative Acre Feet Reduction*	Time Frame	Required Reduction Date
1	5 %	3,250 acft	5 %	3,250 acft		Oct. 31, 2030
	5 %	3,250 acft	10 %	6,500 acft	20 yr	Oct. 31, 2050
2	5 %	3,250 acft	15 %	9,750 acft	10 yr	Oct. 31, 2060
	5 %	3,250 acft	20 %	13,000 acft	10 yr	Oct. 31, 2070
	5 %	3,250 acft	25 %	16,250 acft	10 yr	Oct. 31, 2080
	5 %	3,250 acft	30 %	19,500 acft	10 yr	Oct. 31, 2090
	5 %	3,250 acft	35 %	22,750 acft	10 yr	Oct. 31, 2100
	5 %	3,250 acft	40 %	26,000 acft	10 yr	Oct. 31, 2110
	5 %	3,250 acft	45 %	29,250 acft	10 yr	Oct. 31, 2120
	3 %	1,750 acft	48 %	31,000 acft	10 yr	Oct. 31, 2130

* Reductions based on percent of total depletion of 65,000 acre-feet/year



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