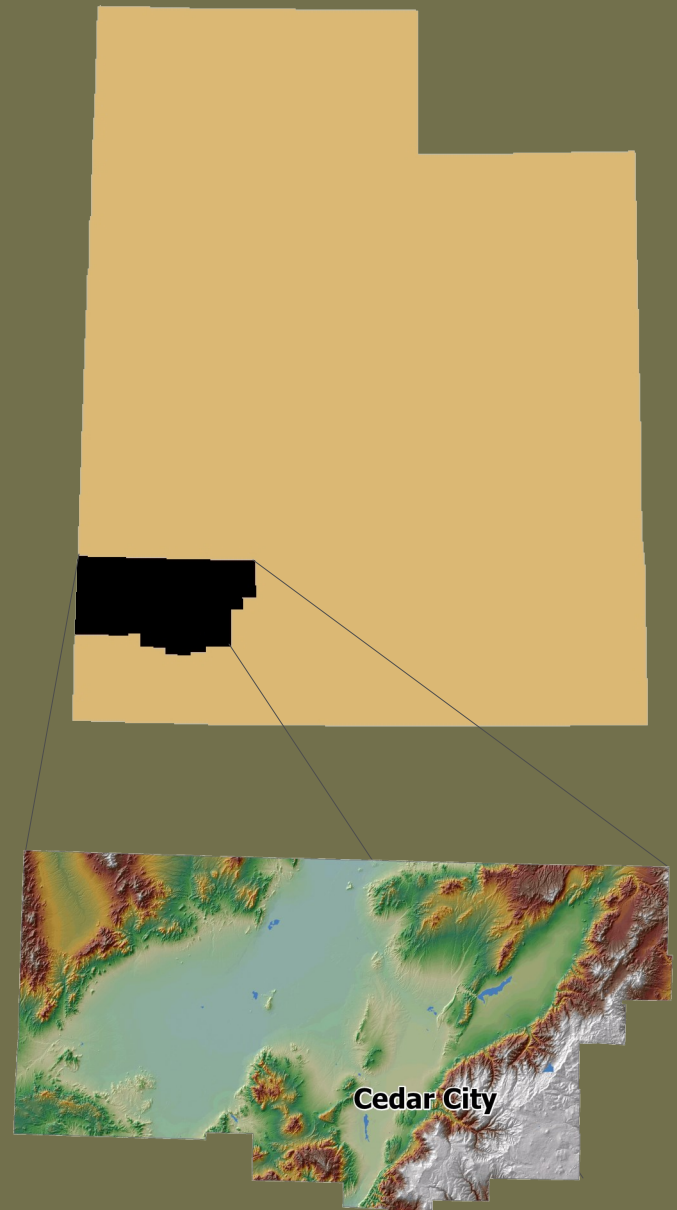


IRON COUNTY RESOURCE ASSESSMENT

JANUARY 2012

Conserving Natural Resources For Our Future

ENTERPRISE & IRON (E&I) CONSERVATION DISTRICT



Acknowledgments

Enterprise & Iron (E&I) County Conservation District

with the:

- Utah Association of Conservation Districts
- Utah Department of Agriculture and Food
- Natural Resources Conservation Service

In partnership with the:

Utah Conservation Commission

- Utah Conservation Districts Zone 5
- Utah Association of Conservation Districts
- Utah Department of Agriculture and Food
- Utah Department of Environmental Quality
- Utah Department of Natural Resources
- Utah School and Institutional Trust Lands Administration
- Utah State University Extension
- Utah Weed Supervisor Association

UtahPCD

State Agencies and Organizations:

- Utah Association of Conservation Districts
- Utah Department of Agriculture and Food
- Utah Department of Community and Culture
- Utah Department of Environmental Quality
- Utah Department of Natural Resources
- Utah Resource Conservation & Development Councils
- Utah School and Institutional Trust Lands Administration
- Utah State University Cooperative Extension Service
- Utah Energy Office

Federal Agencies:

U.S. Department of Interior

- Bureau of Land Management
- U.S. Fish and Wildlife Service
- Bureau of Reclamation

U.S. Department of Agriculture

- U.S. Forest Service
- Natural Resources Conservation Service
- Agriculture Research Service
- Farm Service Agency

Other

- State Historical Preservation Office
- Governor's Office of Planning and Budget
- Utah County Commission

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Many thanks to all those that have made comments and suggestions for this project.

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Executive Summary

Photo Courtesy of US Forest Service Website



Farming, ranching, and recreation are important to Iron County's economy.

Why a Resource Assessment?

The Enterprise & Iron (E&I) Conservation District has developed this resource assessment with the goal that conservation efforts in the county address the most important local resource needs. This report identifies natural and social resources present in Iron County and details specific areas of concern. Local, state, and regional entities can use this assessment to develop county resource management plans or to target conservation assistance needs.

We recognize that all who could have provided information may not have had the opportunity. This document is dynamic and will be updated as additional information is available.

Your comments are requested:

E&I Conservation District
P.O. Box 806
Panguitch, UT 84759
Phone: (435) 676-8189

Natural Resource Priorities and Concerns

The Iron County Conservation District has identified five natural resource priorities and concerns. These priorities receive special emphasis because of their immediate significance to Iron County.

1. **Water Conservation**
2. **Grazing and Public Lands**
3. **Noxious Weeds**
4. **Conservation Education**
5. **Forestry Lands**

General Resource Observations

Natural and social resources are categorized as soil, water, air, plants, animals, and humans (SWAPA + H). This assessment describes the general condition of these resources and highlights additional concerns in each category. As opportunities become available to address these issues, and as circumstances change, their emphasis should be elevated accordingly.

Soil: Soil survey information for agriculture and development

Water: Water quality/quantity, water development and storage

Air/Climate: Climate overview

Plants: Crops, rangeland, forestland

Animals: livestock, endangered and at-risk species

Humans: Population, economy, growth trends

Introduction

Conservation districts provide local leadership and education to connect private property owners with state and federal assistance to improve, protect, and sustain Utah's soil, water, and related natural resources.

The Conservation District Movement

The Dust Bowl of the 1930's brought the beginning of national programs for conserving soil and water resources in the United States. On April 27, 1935, Congress declared soil erosion "a national menace" and established the Soil Erosion Service. Since then, the agency has changed to the Natural Resources Conservation Service (NRCS). In May of 1936 farmers were allowed to set up their own districts to direct soil conservation practices. Today, Utah has 38 conservation districts.

Conservation Progress

Since the organization of the Enterprise & Iron (E&I) Conservation District on September 13, 1966, great strides have been made toward increasing and sustaining natural resources in Iron County. The 2005 resource assessment listed the most critical resource concerns as 1) adequate water supply for desired uses, 2) ground water quality and quantity, 3) storm water runoff and flooding, 4) soil loss and erosion on land and stream channels, and 5) loss of open space or agricultural lands.

Public Outreach

In July 2005, the E&I Conservation District conducted a survey to find out how the public views the county's natural resources and what conservation issues were most pressing. Respondents indicated that water quantity and quality are still major concerns, as well as controlling the amount of erosion, flooding, and loss of agricultural lands. Other top concerns included air quality, soil condition, urban growth, recreation opportunities, and noxious weeds.

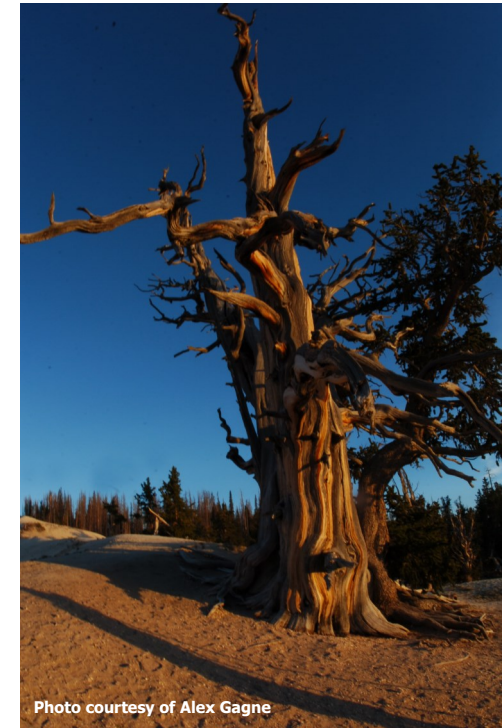


Photo courtesy of Alex Gagne

Iron County Overview

Background

Iron County is located in the southwestern portion of Utah and is comprised of approximately 2,110,720 acres. Seventy-seven percent of the county is public or urban lands. Most federal public land is administered by the United States Forest Service or the Bureau of Land Management. Much of the state land is administered by the School and Institutional Trust Lands Administration and the Utah Division of Wildlife Resources. Major land uses in the county include range, alfalfa and grass hay, corn and small grain crops, hog production facilities, forest production, and industrial and urban uses. Recreational uses are also common activities, both on private and public lands. Elevation and land cover are diverse within the county.

Elevations in the county range from over 11,000 feet in the Markagunt Plateau on the east side of the county to 5,000 feet in the Escalante Desert. The county is surrounded by four mountain ranges, which drain into the Escalante Desert. Because of the various elevations in the county, precipitation, land cover, and land use vary. The higher elevations support subalpine meadows, conifer, and aspen forests. The average precipitation in these locations is 25 to 40 inches. Middle elevations support mixed forest communities, mountain shrub lands, and pinion/juniper forests, and the annual precipitation is from 15 to 25 inches. The lower elevations are semi-desert and salt desert rangelands, and they receive 8 to 15 inches of annual precipitation. Cropland and irrigated pastures are found in the lower elevations. In 2009, the total population in Iron County was 46,825 individuals. The median family income from 2006-2008 was \$46,104, with the unemployment rate averaging 7.9% in 2009.

In 2005, there was 40.3 square miles of developed land and 169.3 square miles of agricultural land in the county. There is an average of fourteen people per square mile in Iron County, compared to a state average of 34 people per square mile.¹

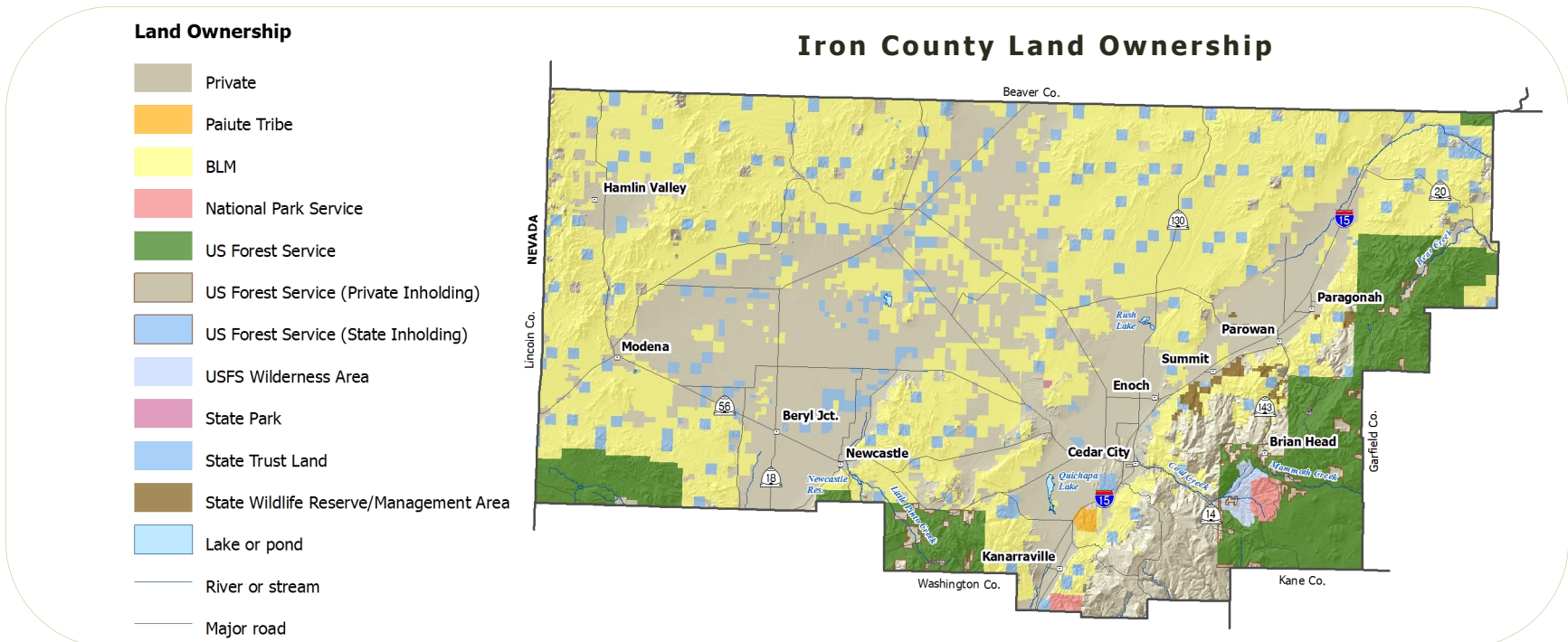




Photo credits clockwise from top left: Cedar City Livestock & Heritage Festival Website, Iron County Resource Management Plan, National Parks Service Website

Natural Resource Priorities and Concerns

WATER CONSERVATION

Water quality and quantity is a priority concern for Iron County. Because water supplies are limited, proper management and conservation of water resources is essential.

Challenges

Iron County, and in particular the Cedar Valley, has experienced growth in the past years, with this trend projected to continue over the next 50 years. The existing water supplies serving the Cedar Valley are currently being utilized beyond their sustainable capacity, as demonstrated by the declining levels of ground water in the local aquifer.²

The county is also in need of improved and additional storage facilities and methods for agriculture to cope with future growth within the county. Planning efforts are underway within the county and the local water conservancy district to create additional water storage and aquifer recharge from Coal Creek.¹

Needed Actions

There are many improvements and projects that can be developed that could enhance water quality and quantity and improve water conservation in Iron County.

Policy

- Improve government regulations to allow community needs and local considerations to more easily construct and maintain water storage facilities from Coal Creek and to make water storage and development a major priority.
- Support and participate in county long-range planning efforts, such as the Iron County Resource Management Plan, and encourage the U.S. Forest Service and Bureau of Land Management to manage federal lands under their jurisdiction, pursuant to the principles of “multiple-use” and “sustained yield”.
- Support Central Iron County Water Conservancy District’s planning process for greater storage and aquifer recharge.
- Enforce urban water conservation efforts, i.e. lawn irrigation at optimum times and lengths within the communities’ residential areas, businesses, parks/recreational areas, and the university.

Resource Management

- Construct water storage reservoirs/facilities from Coal Creek, which flows out of Cedar Canyon.
- Develop water injection sites for aquifer recharge within the valley.
- Develop additional canal structures to prevent flooding during the summer monsoon season.
- Develop more upland vegetation projects to treat bare ground and monocultures of pinion/juniper and sagebrush to slow water flows that recharge groundwater.
- Control excessive fertilizer application from farms and especially from homes that impact water quality.
- Utilize pivot irrigation system improvements/efficiencies that keep water flows closer to the plant and root zones and out of the wind.
- Practice water conservation efforts in regards to urban lawn/landscape areas within residential areas, city parks and recreational areas, businesses, and Southern Utah University.
- Improve water supplies for livestock and wildlife.

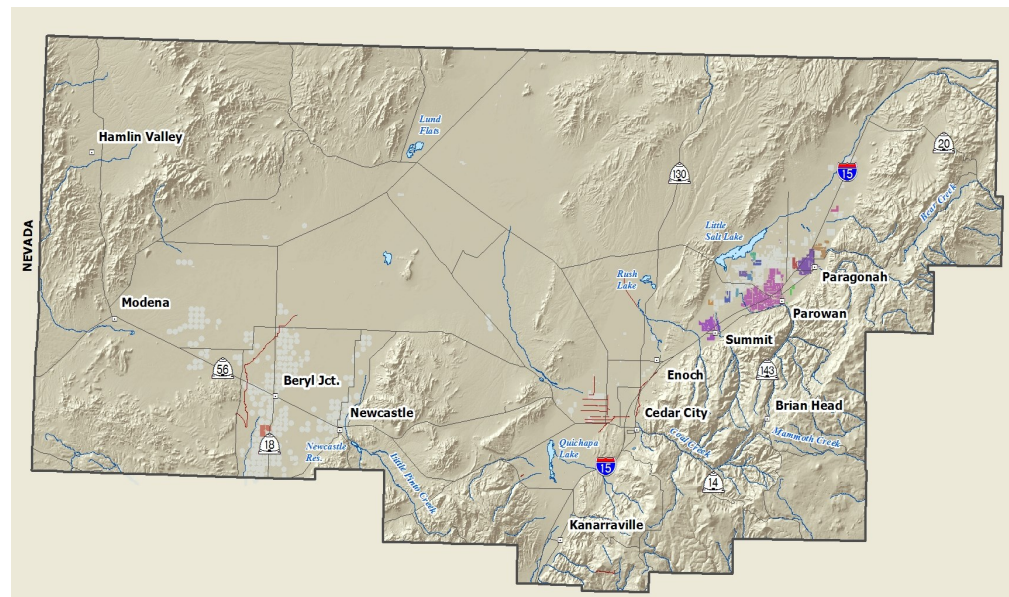
Outreach

- Promote urban water conservation education to home owners and businesses in the county.
- Continue to educate the youth about water conservation at annual Farm Field Days.
- Continue to develop improved irrigation practices/projects on agricultural lands.
- Promote forest health and sustainability on private forestland by providing education and cost-sharing with private forestland owners.
- Provide assistance for proper use and disposal of pesticide and herbicides.
- Educate landowners and homeowners on proper application rates of fertilizer products.

Irrigation Companies & Canals in Iron County

Irrigation Companies and Canals

BLM	Multiple Owners
Bradshay Farms	New Castle Reservoir Company
Carl & Marjorie Evans	Otto & Alice Kesler
Charles Lundgren Revocable Trust	Paragonah Canal Company
Darrell & Jean Ellingson	Parowan Reservoir Company
David Gordon Berg	Pleasant Hill Trust
David & Norma Burton	South & West Field Irrigation Company
Dennis & Marilee Stowell Living Trust	Staheli Farms
Diane Lister	Summit Culinary Water Users
Duke Hanafin Family Trust	Summit Irrigation Stock Company
Gina & Bernie Ratcliff	The Leon Robinson Farm
Halterman Farms	Town of Brian Head
Harden Family Trust	Walter Miller
James Bartlett	Unknown/Not Specified
James & Diana Peveler	Lake, pond or reservoir
King Morris	River or stream
Leo Pals	Ditch or canal
Little Creek Field & Canal Company	Major road



Natural Resource Priorities and Concerns

GRAZING & PUBLIC LANDS

Livestock grazing is an important economic factor in Iron County. Among the five counties in the southwest region of Utah, Iron County has the highest portion of land in private ownership, which attributes to about 36% of the county land total. The federal government holds about 58% of the land in the county. The Cedar City Bureau of Land Management (BLM) Field Office authorized livestock grazing on over 2.1 million acres of public lands. Iron County ranks fourth in the state in total sheep numbers, with about 30,000 head. The county also grazes about 10,000 beef cows. Private ranches traditionally possess permits to graze cattle and sheep on upland and high desert ranges. These permits are administered by the BLM, the U.S. Forest Service, Utah School & Institutional Trust Lands Administration, and/or private lands throughout the year, depending on the type of allotment. Many of the federal and private rangelands are under-managed by ranchers who are unable to make dramatic changes in grazing plans due to regulatory, financial, legal, and technical complications.

Challenges

Grazing on public lands is becoming more of a challenge for ranchers, due to increased pressures from federal land management agencies, special interest groups who want to eliminate public lands grazing, and competition from the over-population of wild horses on the county's western ranges.

Policy

- Increased regulations and reduction in AUMs on public lands is a threat to private ranches and farms.
- Wild horse populations are over-sustainable for appropriate management levels on both herd management areas within the county.
- The threat of appeals and related litigation of federal land agencies' management plans delay important best management practices and existing allotment seasons of use.

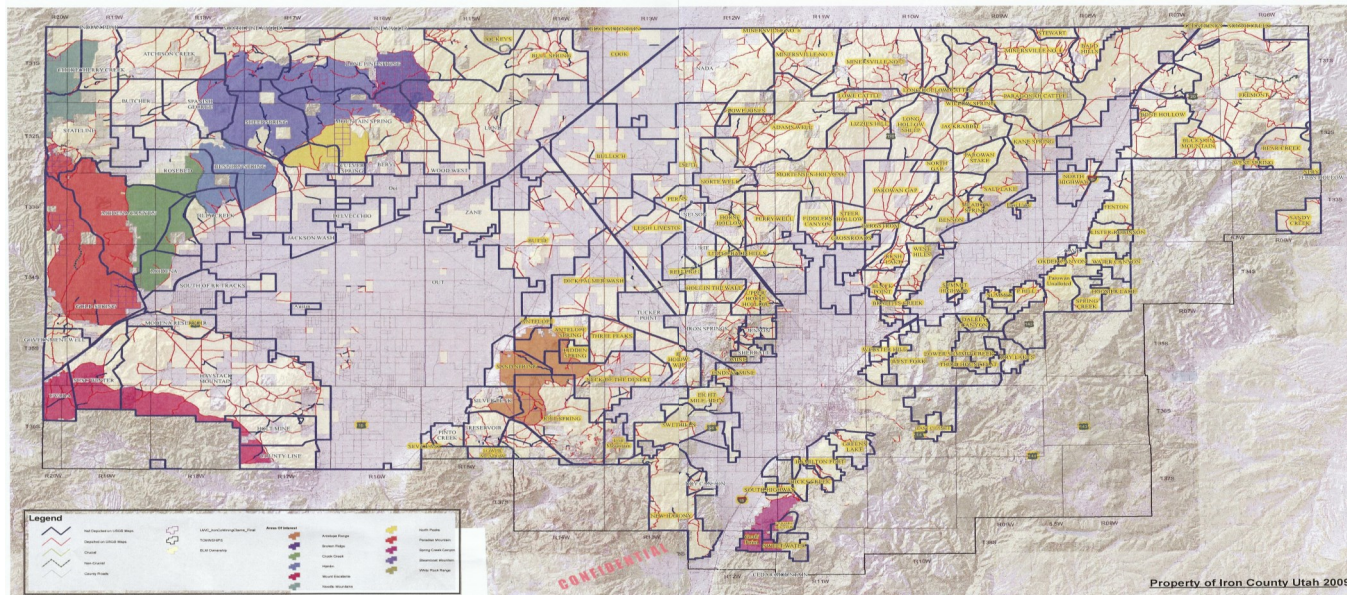
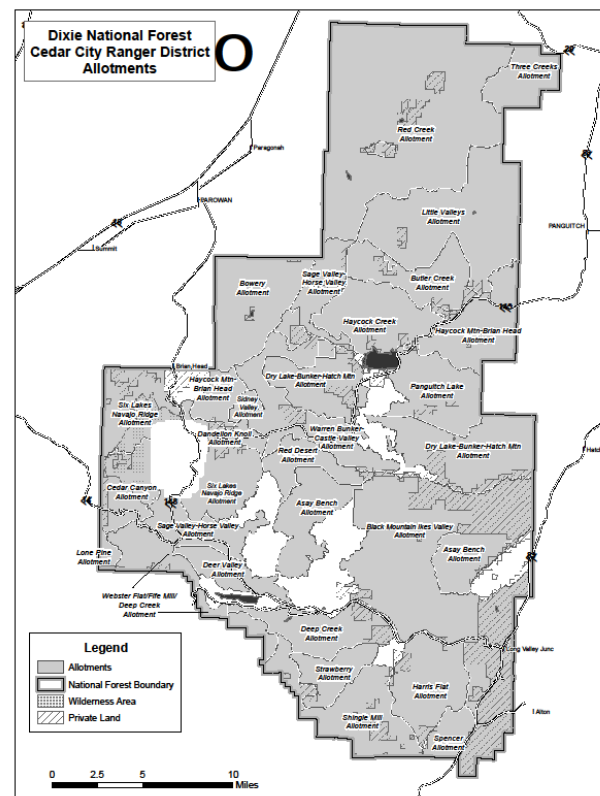
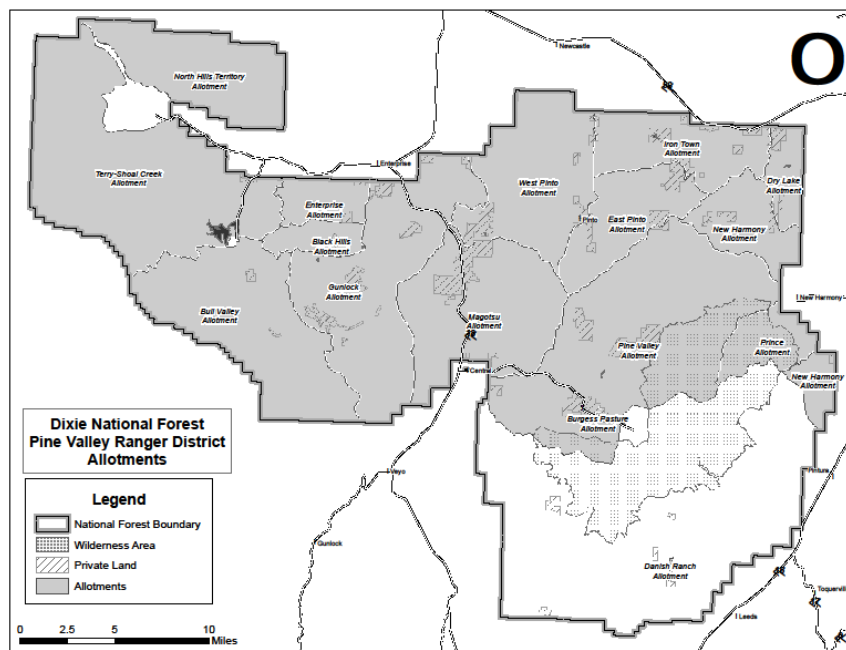
Resource Management

- Assist producers/permittees with better grazing management on their farms and ranches. Encourage utilization of federal EQIP and state GIP and ARDL programs to develop best management practices on rangelands in a financially feasible way.
- Develop better livestock watering systems to improve grazing management methods, rangeland health, and carrying capacity.
- Encourage the BLM to better manage and control wild horse populations to sustainable levels, which in turn can improve rangeland health.
- Support planning and report efforts to mitigate more pinion juniper and sagebrush monocultures through Utah Partners for Conservation and Development (UPC&D) and through federal and state cost-share programs.
- Support rangeland/grazing management improvements that will benefit sensitive and listed species, such as the sage-grouse and Utah prairie dog.

Outreach

- Educate producers/permittees about existing cost-share opportunities for rangeland/grazing improvements.
- Be active with the Southern Region UPC&D group and project development.
- Support BLM wild horse gathering plans and projects and continue to support legislative efforts to resurrect the horse processing industry through lobbying efforts with elected officials.

US Forest Service and Bureau of Land Management Grazing Allotments in Iron County



Maps courtesy of the US Forest Service website and the Bureau of Land Management.
Map courtesy of Mike Worthen.

Natural Resource Priorities and Concerns

NOXIOUS WEEDS

Noxious and invasive weed infestations in Iron County tend to be concentrated near roads, highway corridors, railroad lines, fence lines, privately owned ranches, vacant/dormant lots, rangeland, pastures, and meadows. These areas are not always adequately maintained and are problematic sources of weed infestations.

Noxious and invasive weeds are one of the most serious problems that threaten healthy lands in Utah. Both noxious and invasive weeds are competitive non-native species that are introduced into environments where they readily adapt and reproduce prolifically. They negatively affect agricultural lands, forests, nature preserves, stream banks, private lands, and parks. If left unmanaged, weeds can quickly dominate a landscape, crowding out native plants, reducing forage for animals, and increasing the risk of wildfire.

Challenges

Massive financial cost and countless hours of manual labor are necessary to manage and prevent the spread of noxious and invasive weeds each year. If not maintained, these weeds can quickly dominate a landscape and reduce forage for animals and decrease soil health, as well as increase fire risk, resulting in destroyed ecosystems.

Policy and Resource Management

- Educate landowners about the negative impact and costs that noxious weeds can cause on their land. Encourage landowners to take more responsibility in controlling their noxious weed problems.
- Work with and support the Iron County Cooperative Weed Management Area (CWMA).
- Coordinate with the Iron County Weed Boards and county government officials regarding noxious weed problem areas and potential projects.
- Work with and coordinate noxious weed management projects and funding opportunities on U.S. Forest Service and Bureau of Land Management administered lands.
- Work with and coordinate noxious weed management projects and funding opportunities on state managed lands.
- Develop better cooperation with railroad companies in the county to maintain noxious weed programs.
- Coordinate better with the Utah Department of Transportation on highway right-of-ways with noxious weed program and priorities.

Outreach

- Develop educational resources for landowners, homeowners, and businesses about the importance of controlling noxious weeds.
- Develop better working relationships with state and federal government agencies regarding noxious and invasive weed management.



Hoary Cress



Perennial Pepperweed



Russian Knapweed



Scotch Thistle

Utah Noxious Weed List

The following weeds are official designated and published as noxious for the State of Utah, as per the authority vested in the Commissioner of Agriculture and Food under Section 4-17-3, Utah Noxious Weed Act:

- Bermudagrass* (*Cynodon dactylon*)
- Black henbane (*hyoscyamus niger*)
- Canada thistle (*Cirsium arvense*)
- Dalmation toadflax (*Linaria dalmatica*)
- Diffuse knapweed (*Centaurea diffusa*)
- Dyers woad (*Isatis tinctoria*)
- **Field bindweed (Wild morning-glory) (*Convolvulus arvensis*)**
- **Hoary cress (*Cardaria drabe*)**
- Houndstounge (*Cynoglossum officinale*)
- Johnsongrass (*Sorghum halepense*)
- Leafy spurge (*Euphorbia esula*)
- Medusahead (*Taeniatherum caput-medusae*)
- Musk thistle (*Carduus mutans*)
- Ox-eye daisy (*Chrysanthemum leucanthemum*)
- **Perennial Pepperweed**
- Poison hemlock (*Conium maculatum*)
- Purple loosestrife (*Lythrum salicaria*)
- Quackgrass (*Agropyron repens*)
- **Russian knapweed (*Centaurea repens*)**
- **Saltcedar (*Tamarix ramosissima*)**
- **Scotch thistle (*Onpordum acanthium*)**
- Spotted knapweed (*Centaurea squarrosa*)
- Squarrose knapweed (*Centaurea squarrosa*)
- St. Johnswort (*Hypericum perforatum*)
- Sulfur cinquefoil (*Potentilla recta*)
- Yellow starthistle (*Centaurea solstitialis*)
- Yellow toadflax (*Linaria vulgaris*)

State noxious weeds present in Iron County are listed in bold.

Natural Resource Priorities and Concerns

CONSERVATION EDUCATION

Iron County is one of the fastest growing counties in the state. It has been estimated that by 2020 the population of the county will reach over 68,000 residents, which will double the population from the year 2000. All three major age groups (school-age, working-age, and retirement-age) are projected to grow by more than 90 percent, with school-age children (0-17) expected to increase by 140 percent by 2020.¹

With these growth trends, the conservation district, along with its conservation partners such as the USU Extension and the Natural Resource Conservation Service (NRCS), sees natural resource conservation and agriculture education as an important component in maintaining a healthy and sustainable agriculture and natural resource base.

Challenges

Increased student enrollment and stagnant school budgets are a challenge when implementing outside extracurricular activities, such as Ag-In-The-Classroom and farm field days. Demanding an emphasis on students' time in required basic curricular in science, math, and English also make challenges for educators in deciding how much time outside the classroom can be afforded and how to incorporate these activities into core curriculum.

Educating the adult population about conservation and agriculture can also be a challenge. According to the demographics, most citizens are now two or even three generations away from the farm, making it more difficult to educate them about the importance of agriculture and maintaining it in the county.

Policy and Resource Management

- Develop natural resource and agriculture science curriculum in elementary schools that will compliment science, math, and social/community citizenship requirements.
- Maintain a healthy Future Farmers of America (FFA) program in high schools.
- Support outdoor classrooms, workshops, and natural resource/range camps sponsored by the district and conservation partners.
- Develop and support agricultural/natural resource scholarships within the district.
- Work with the USU Extension and NRCS in sponsoring education resources and workshops for landowners and producers.
- Develop educational resources for citizens within the district's communities regarding the importance of agriculture and natural resource conservation.

Outreach

- Develop better working relationships with city and county planners.
- Continue to build important relationships with school administrators and teachers.
- Develop educational resources for homeowners, such as "Backyard Conservation" and urban conservation opportunities.
- Provide scholarships for youth majoring in natural resources and agriculture.



The E&I Conservation District hosts a local conservation tour every fall. The purpose of this tour is to showcase projects and improvements done on private and public lands during the previous year.

E&I CD Fall Conservation Tour

When: Wednesday, October 6, 2010

Meet at 10:00 am the NRCS Building in Cedar City (2390 West Highway 66)

Lunch will be provided in Enterprise by the E&I Conservation District

During lunch door prizes will be given to participants in Natural Resource Survey.

We will be touring the following:

- Quichipah Tamarisk Beetle Kill
- The new Holt Dairy
- Whitelaw Farm Conservation Projects
- Pederson Farm Hay Compressor Operation



Please RSVP by October 4, 2010 to Corry at (435) 692-6669



2012 Iron County Farm Field Day Stations and Participants

Pork Production: Allison Fiscus with Utah Pork Producers Association

Soils (Erosion): Jason Bradshaw with NRCS/E&I CD

Beekeeping: Mel Taylor with Utah Beekeepers Association

Beef Production: Leslie Yardley with Utah Beef Council

Sheep Production: Chad Gasser with Southern Utah University

Crops (Alfalfa): Dean Winward with Southern Utah University

4-H (Potatoes): Kathy Riggs with Iron County Extension Office

Water Quality: Candace Schaible with Iron County Extension Office

Horses: Doug Hansen with Farm Service Agency and Burke Degroff with 4-H

Natural Resource Priorities and Concerns

FORESTRY LANDS

Among the five counties in the southwest region of Utah, Iron County has the highest proportion of privately owned forest land. Iron County also ranks in the top three counties in the state with private forest ownership. Much of the forest land on Cedar Mountain consists of large aspen stands. Aspen is considered one of southern Utah's most iconic trees, and it dominates the landscape of Cedar Mountain. Currently, aspen stands are dying at an alarming rate on Cedar Mountain due to persistent drought conditions. In other areas of Iron County, aspen stands are being replaced by shade-tolerant conifers due to lack of disturbance, including the exclusion of low-intensity wildfire. The aspen eco-system is very important for landscape diversity, watershed health, and wildlife habitat.¹

Challenges

Several factors have contributed to the decline of forest health in Iron County, including the spruce beetle epidemic, fire exclusion, past logging practices, excessive numbers of elk, past grazing practices, and drought. Sustaining healthy forest lands and aspen stands is critical to the economy, the citizens, and the watersheds in Iron County.

Policy

- Less restrictive regulations and policies in logging beetle-killed spruce trees on Cedar Mountain.
- Better forest management policies regarding harvesting more conifers, which can allow for healthier forest stands and Aspen rejuvenation.

Resource Management

- Develop and administer active timber sales and thinning contracts as a tool to improve forest stand health and mitigate intense wildfire threats.
- Continue to plan and carry out prescribed burning efforts to sustain forest health.
- Control conifer encroachment in aspen stands to promote healthier aspen forests.
- Develop conservation plans and projects on private forest land to increase healthy stands of aspen and forest stands.

Outreach

- Target and educate private forest landowners about state forestry stewardship funding and USDA farm bill funding opportunities.
- Partner with the forest service on projects that benefit both federal and private lands.

Summary of Cedar Mountain Aspen Study

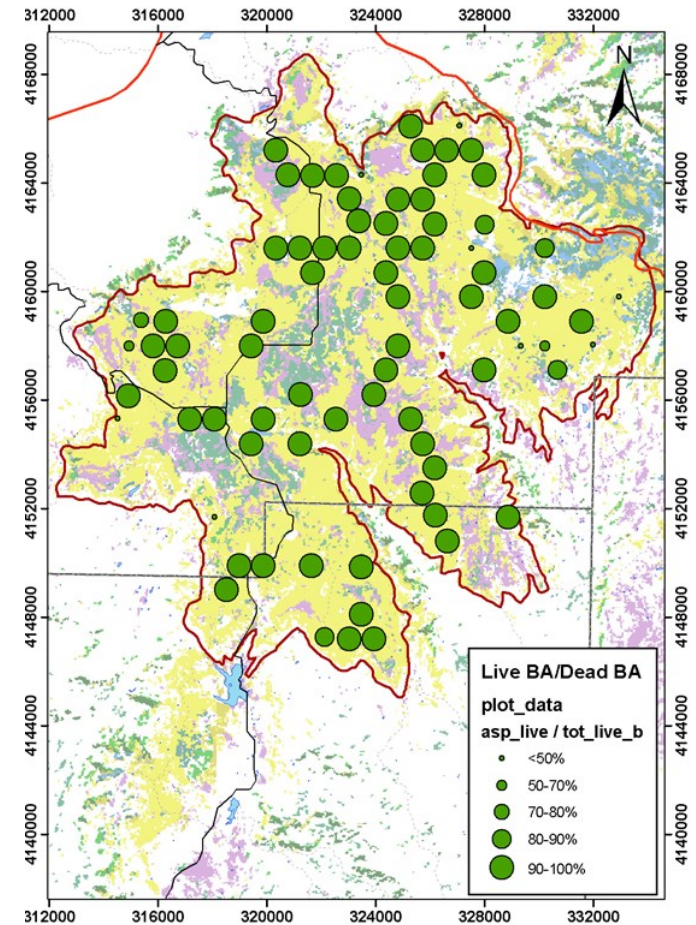
Paul C. Rogers, A. Joshua Leffler, and Ronald J. Ryel - Utah State University, Wildland Resources Department

In 2008, reports of rapid die-off of aspen on Iron County's Cedar Mountain led us to establish a network of sampling plots across the plateau to better understand their condition and prognosis for the future. We were particularly interested in aspen forests that exist primarily without other tree species, such as those found on Cedar Mountain. We sampled 83 aspen-dominated stands within a 275 km² landscape, using established forest health measurement protocols. Eighty-four percent of sample stands on Cedar Mountain exhibited pure aspen characteristics. The remaining forests were mixes of other species and aspen. The principle findings included: 1) a relatively uniform age of adults within the study area; 2) approximately 10% crown dieback on half of the plots sampled; 3) greater than 50% of trees had damage to the stems in roughly 50% of the study plots; 4) about 25% of the adult tree volume was dead; and 5) over half the plots had few sub-canopy individuals and/or limited regeneration. This last finding is the most important indicator of future sustainability, as stands without a healthy "next generation" are cause for great concern. How do we go about reinvigorating the lower- and mid-canopy trees in preparation for the inevitable mature tree die-off. We are fairly sure that land use history, particularly that involving domestic and wild browsers (sheep, cattle, deer, elk, etc.), are the prime cause for a lack of young "next generation" aspen trees. However, further research is necessary to test these hypotheses more fully.



The lack of small and medium sized trees in more than half of the aspen research plots on Cedar Mountain was a key finding of our work. These forests are at great risk of future stand die-off.

Rapid mortality of some aspen forests has already begun. While it is probably impossible to stop older trees from dying, better management of forest communities can ensure that healthy young trees will replace dying larger aspen.



This map shows the layout of aspen research plots on Cedar Mountain, Iron County, Utah. The size of the circles, Basal Area (BA), represents the percent volume of tree stems on each plot that are in aspen versus all other species. Most forest stands in the research area are pure, or nearly so, in aspen stems.

General Resource Observations

SOIL

Mineral resources in the survey area consist of sand and gravel deposits and iron ore. The iron ore extraction in the area has lessened in recent years. Presently, only one open pit mine is functioning. Many vacated areas of iron ore mining are visible on the soil maps. Sand and gravel deposits are abundant along the Coal Creek area near Cedar City.¹

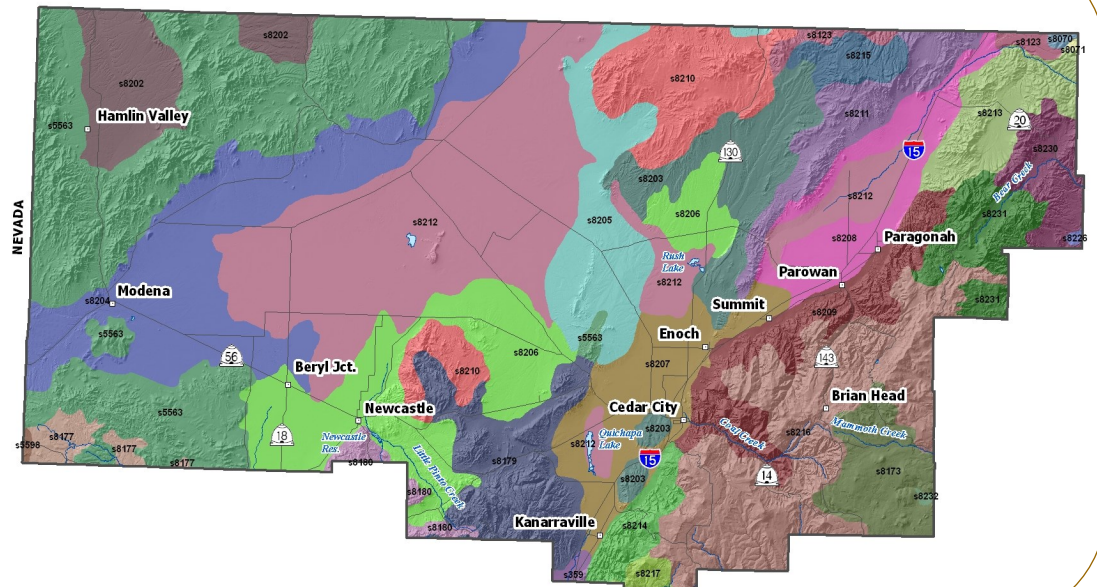
Information on the soils in Iron County can be obtained from the Web Soil Survey (WSS) located at <http://websoilsurvey.nrcs.usda.gov/>. The soil survey provides data and information produced by the National Cooperative Soil Survey, a nationwide partnership of federal, regional, state, and local agencies and private entities and institutions. The WSS allows a user to 1) define an area, 2) view the survey boundaries and soil types overlaid on a photo, 3) explore various interpretations, and 4) print maps and descriptive information.

The soil survey delineates and describes large areas of similar soils. Common uses for this information are evaluating soil suitability for dwellings with basements, landscaping, roads, and septic systems, measuring for vegetative productivity, chemical, and physical properties. Using this information, agricultural producers, agencies, counties, and municipalities become informed of the various soil suitabilities and are alerted to soil limitations. This basic resource information is critical when making land-use and management decisions.

When limitations are identified, on-site investigations should be conducted by a soil scientist or soil engineer.

General Soils in Iron County

s359	s8179	s8208	s8216
s5563	s8180	s8209	s8217
s5598	s8202	s8210	s8226
s8070	s8203	s8211	s8230
s8071	s8204	s8212	s8231
s8123	s8205	s8213	s8232
s8173	s8206	s8214	
s8177	s8207	s8215	



WATER

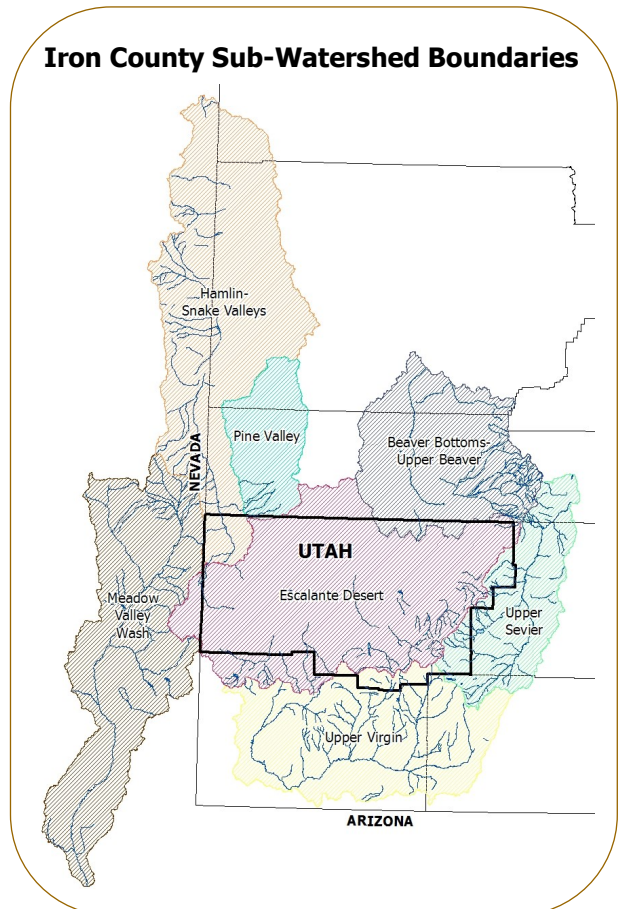
The total annual precipitation for Iron County is about eleven inches. Of this, five inches, or 45 percent, usually falls in April through September. The growing season for most crops, therefore, falls within this period. In two years out of ten, the rainfall in April through September is less than two inches. Thunderstorms occur on about two days of each year, and most occur in August. The average seasonal snowfall is about 45 inches. On the average, 39 days of the year see at least one inch of snow on the ground. The number of such days varies greatly from year to year.

The principal drainage ways for the eastern part of the survey area are Kanarra Creek, Spring Creek, Coal Creek, Shurtz Creek, Summit Creek, Little Creek, and Red Creek. These drainage ways flow westward into the Cedar and Parowan Valleys. In the northwestern part of Iron County, Bear Creek flows into Bear Valley. The two major drainage ways are Pinto Creek, which flows into the Newcastle area, and Shoal Creek, which flows into the Enterprise area. Three major reservoirs are in Iron County. They are the Newcastle, Enterprise, and Kolob Reservoirs. They are used as water storage areas for irrigation and stock water and for flood control and recreational activities.¹

Cedar/Beaver River Basin

According to the Utah Division of Water Resources, the Cedar/Beaver River Basin's snowpack was far above normal, at 158% of the average, as of April 2011. At individual sites, the snowpack ranged from 14% at Little Grassy SNOTEL (near Upper and Lower Enterprise Reservoirs, at 6,100 ft. elevation) to 251% of average at Harris Flat SNOTEL (east of Brian Head, at 7,780 ft. elevation). March 2011 precipitation was near average, bringing the area's seasonal accumulation (October 2010 to March 2011) to 181% of average. Sampled soil moisture in runoff producing areas was at 69% of saturation within the upper two feet of soil, compared to 46% in the year prior. Forecasted streamflows (from April to July) ranged from 120% to 172% of average.

As of April 2011, reservoir storage was at 89% of capacity. This was 23% higher than April 2010 at the same time. As of April 1, 2011, both Upper Enterprise (9,950 acre-feet) and Lower Enterprise (2,672 acre-feet). Reservoirs were full, Minersville Reservoir, also called Rocky Ford, (23,300 acre-feet) was 62% full. The Surface Water Supply Index (SWSI) was 3.05 (an 86 percentile), indicating far above average water supply conditions.²



¹ Soil Survey

² Utah Division of Water Resources

General Resource Observations

PLANTS
















Crops and Pasture

Irrigated crops and pasture lands make up only a small portion of Iron County, with 492,235 acres being irrigated. Main crops of irrigated land are alfalfa and other harvestable forage. About 71,900 acres are used for hay land/cropland, while only 3,100 acres are used for pasture land. The most prevalent crop rotation practiced is alfalfa for seven years, corn and/or small grains for two years, and then the land is replanted with alfalfa. Producers typically get two to three cuttings of alfalfa each year.

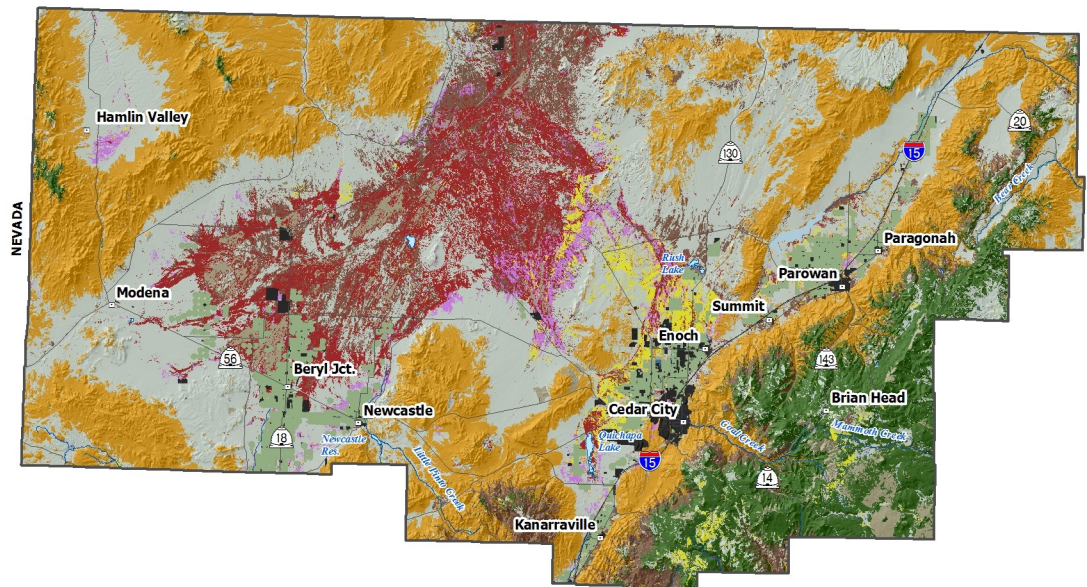
A large part of Iron County is used as rangeland for grazing cattle and sheep. The major irrigated cropland areas are in Cedar Valley, Parowan Valley, and the southern part of the Escalante Desert. The major crops grown are irrigated alfalfa hay, wheat, barley, potatoes, and corn, which is used for silage.¹

According to the 2010 Utah Agricultural Statistics, there were 213,000 tons of alfalfa and alfalfa mix hay produced on 41,500 acres of ground. That makes Iron County the second highest producer of hay in the state of Utah. There were also 500 acres of barley planted in 2009, with only 300 of those acres being harvested. The rest of the acreage presumably went to grazing feed for livestock. Those harvested 300 acres resulted in 33,000 bushels of barley.

Land Cover

	Sagebrush - 703,904 acres
	Pinyon-Juniper Woodland - 656,097 acres
	Forestland - 189,204 acres
	Other Shrublands - 165,995 acres
	Salt Desert Shrubland - 147,133 acres
	Agriculture - 85,301 acres
	Rock\Barren\Sand Dune - 57,312 acres
	Invasives - 39,904 acres
	Grassland - 35,099 acres
	Developed - 26,008 acres
	Open Water - 4,046 acres
	Riparian Area - 3,368 acres
	Lake, pond or reservoir
	River or stream
	Major road

Land Cover in Iron County



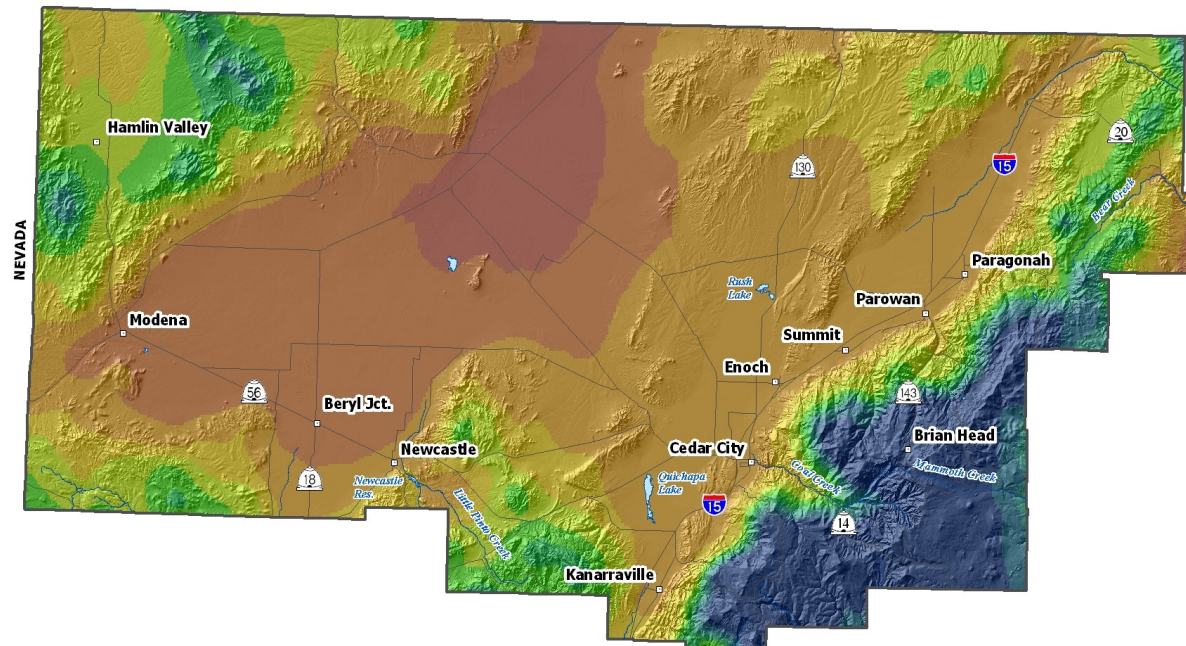
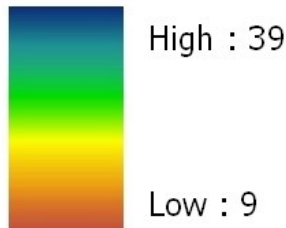
AIR AND CLIMATE

In winter, the average temperature in Iron County is 29°F, and the average daily minimum temperature is 17°F. The lowest temperature on record is -26°F. In summer, the average temperature is 74°F, and the average daily maximum temperature is 90°F. The highest recorded temperature is 105°F.

The total annual precipitation for Iron County is about eleven inches. Of this, five inches, or 45 percent, usually falls in April through September. The growing season for most crops, therefore, falls within this period. In two years out of ten, the rainfall in April through September is less than two inches. Thunderstorms occur on about two days of each year, and most occur in August. The average seasonal snowfall is about 45 inches. On the average, 39 days of the year see at least one inch of snow on the ground. The number of such days varies greatly from year to year.¹

Most of Iron County falls into the category of having a semi-desert climate. Semi-desert is defined as having an annual mean precipitation between eight and twelve inches. The growing season in this climate generally starts in early to mid-April and runs through the end of September. Vegetation consists of shrub-dominated landscapes with a small component of herbs and a lower component of succulents. Because this life zone occupies such a large portion of the state, most of Utah rangeland occurs here. Fifty-five percent of the developed land and 74 percent of irrigated agriculture occurs within this zone. Natural landscapes predominantly include pinyon-juniper, salt desert shrub, and big sagebrush shrublands. Smaller, but relatively unique vegetation types, consist of greasewood, mat saltbush, and creosote-white bursage communities. Invasive species are also a large component of this landscape, with the primary exotic species being cheatgrass (*Bromus tectorum*).²

**Iron County
Precipitation
INCHES/YEAR**



1 Soil Survey

2 2009 Rangeland Resources of Utah

General Resource Observations

ANIMALS

Livestock

According to the 2010 Utah Agricultural Statistics, there were 15,000 cattle and calves, with 10,000 of those cattle being beef cows, and 29,700 sheep and lambs in Iron County. Those numbers make Iron County the 4th highest producer of sheep and lambs in the state of Utah. According to the 2007 U.S. Census of Agriculture, there were 27 goat farms with a total of 457 goats, three bee farms with a total of 60 bee colonies, 1,590 horses and ponies, and 47 farms with a total of 809 miscellaneous poultry in Iron County. The sheep in the county produced 175,850 pounds of wool in 2007. The livestock sales for 2007 was \$28,300,000.¹

Sensitive Species

The Utah prairie dog is a federally threatened species that occurs only in southwestern Utah. A large proportion (65%) of the total population of Utah prairie dogs occurs in Iron County, and a high percentage (86%) of those (2,456/2,843 in 1997) occur on privately owned lands. Population growth in Iron County has averaged more than 6% over the last five years, and the population is expected to continue growing at least at the same pace and possibly as high as 10% (Colgan 1997). The increase in both residential and commercial development in Iron County has been the greatest in Cedar City but has also increased in and around other municipalities along the Interstate 15 corridor, including Kanarrville, Enoch, Summit, and Parowan. It is along this corridor where the majority of Utah prairie dogs in Iron County occur. Thus, conflicts between development of private lands and the federally protected Utah prairie dog have become increasingly common.²

¹ 2007 Census of Agriculture

² Habitat Conservation Plan for Utah Prairie Dogs in Iron County, Utah (Iron County Commission and Utah Division of Wildlife Resources, November 2006)

³ Utah Conservation Data Center

Greater Sage-Grouse

The greater sage-grouse (*Centrocercus urophasianus*) is also known as the sage-hen or the sage-chicken. These birds inhabit sagebrush plains, foothills, and mountain valleys. Sagebrush is the predominant plant of quality habitat. Where there is no sagebrush, there are no sage-grouse. A good understory of grasses and forbs, and associated wet meadow areas, are essential for optimum habitat. The principal winter food item is sagebrush leaves. During summer, the fruiting heads of sagebrush, leaves, and flower heads of clovers, dandelions, grasses, and other plants are taken. Insects are also taken during the summer. Sage-grouse are the only North American grouse that does not have a muscular grinding gizzard.



Sage-grouse were abundant in pioneer times, but sagebrush eradication and intensive use of lands by domestic livestock have reduced their numbers. Sage-grouse range is declining in Utah in both quantity and quality. Indiscriminate spraying of sagebrush, cropland conversion, and over-grazing of mountain meadows are the causes. The result has been an overall decline in sage-grouse populations. Sage-grouse range has declined 50 percent from historical times. Greater sage-grouse are native to Utah and are listed as a sensitive species by the Utah Division of Wildlife Resources.³

Utah Prairie-Dog

The Utah prairie-dog (*Cynomys parvidens*) is one of three prairie-dog species found in Utah, occurring in the southwestern part of the state. Interestingly, the species is not found anywhere else in the world, making it the only non-fish vertebrate endemic to (or found only in) Utah. The Utah prairie-dog is so rare that it has been Federally listed as a threatened species.



Similar to other prairie-dogs, Utah prairie-dogs form colonies and spend much of their time in underground burrows, often hibernating during the winter. The species breeds in the spring, and young can be seen above ground in late May or early June. The Utah prairie-dog's diet is composed of flowers, seeds, grasses, leaves, and even insects. Major threats to the species include habitat loss (through development and drought), poisoning, and the plague.³

HUMANS: Social and Economic Considerations

Iron County is well known for its Tony-winning Utah Shakespearean Festival, the Utah Summer Games, Southern Utah University, and a distinct manufacturing sector. Manufacturing plays a stronger-than-average role in this non-urban county. However, trade and services provide the most employment. Manufacturing plays a particularly important role in providing jobs in Iron County and maintains the same share of total employment as in the state as a whole. That's an unusual situation for a non-urban county. This dependence can work to the county's detriment since a downturn typically hits manufacturing hard. During the recent recession, Iron County had to deal with the double-whammy of a housing bubble collapse and the loss of its "bread and butter" manufacturing jobs.¹

Population

In the April 1, 2000 population estimate put together by the Governor's Office of Planning and Budget, the estimated population of Iron County was 33,779, with Cedar City having a population of 20,527. The same office put out a document on July 1, 2010, and the population of Iron County had grown to 46,163, with Cedar City having a population of 28,857. That's a change of 36.7% in only 10 years. The cities in Iron County have grown together considerably. Once, Enoch and Cedar City were two distinctly separate communities, and they have now grown together.

According to the 2010 Census Brief put out by the Governor's Office of Planning and Budget, Iron County had the fifth fastest growth rate in the state, with a rate of 36.7%. Enoch City ranked the third fastest growing city in the category of cities with a population between 5,000 and 9,000. There was a growth of 67.4% in the population between 2000 and 2010. Cedar City had 1.04% of the state of Utah's population in 2010.²

Economics

In December 2011, the unemployment rate in Iron County was 7.6%. Comparably, the unemployment rate in Utah was 6.0%, and the unemployment rate in the United States was 8.5%.

The growth boom that hit Iron County in 2009 has now slowed considerably. The construction industry went down 17% between September 2010 and September 2011.¹

In October of 2011, the total labor force in Iron County was 19,830 people and the unemployment rate was 7.6%, compared to the state's labor force of 1,338,703 people and the unemployment rate of 6.3%.

Iron County Population Data

Area name	Iron
Period Year	2009
Population	46,825
Births	916
Deaths	87
Natural Increase	687
Net Migration	-203
Annual Change	484
Annual Rate of Change	↑ 1.0%

Source: Utah Population Estimates Committee
<http://www.governor.state.ut.us/dea/UPEC.html>

¹ Department of Workforce Services

² 2010 Census Brief

REFERENCES

Executive Summary

Page ii: Picture courtesy of US Forest Service Website.

Available at: http://www.fs.usda.gov/detailfull/dixie/landmanagement/resourcemanagement/?cid=fswdev3_006661&width=full

Page 1: Picture courtesy of Alex Gagne on the National Parks Service website.

Available at: <http://www.nps.gov/cebr/photosmultimedia/RIT-Student-Photos-Gallery.htm>

County Overview

1. 2007 Enterprise and Iron (E&I) Long Range Plan

Photo Credits: Cedar City Livestock and Heritage Festival website: <http://www.cedarlivestockfest.com/>

Iron County Resource Management Plan available at: <http://www.ironcounty.net/departments/naturalresource/docs/NRPlan.pdf>

Cedar Breaks/National Parks Service website: <http://www.nps.gov/cebr/index.htm>

PRIORITY CONCERNS

Water Conservation

1. 2007 Enterprise and Iron (E&I) Long Range Plan

2. Central Iron County Water Conservancy District Capital Facilities Plan, March 2011

Iron County Irrigation Companies and Canals map courtesy of Anne Johnson, UDAF

Grazing and Public Lands

US Forest Service grazing allotment maps courtesy of US Forest Service website:

Bureau of Land Management grazing allotment maps courtesy of Mike Worthen, Iron County Natural Resource Planner

Noxious weeds

Noxious weed photos taken by Nathan Belliston, Uintah County Weed Department and available at the

Utah Weed Control Association website at: www.utahweed.org

Conservation Education

1. Iron County Resource Management Plan

Farm Field Day photos courtesy of Iron County USU Extension

Forestry Lands

1. Sarah Sampson, Forestry, Fire and State Lands Area Forester

Cedar Mountain Aspen Study

Paul C. Rogers, A. Joshua Leffler, Ronald J. Ryel; Utah State University Wildland Resources Department
(p.rogers@aggiemail.usu.edu)

GENERAL RESOURCE OBSERVATIONS

Soil

1. Soil Survey of Iron-Washington Area, Utah, Parts of Iron, Kane, and Washington Counties
General Soils map courtesy of Anne Johnson, UDAF

Water

1. Soil Survey of Iron-Washington Area, Utah, Parts of Iron, Kane, and Washington Counties
2. Utah Division of Water Resources
Iron County Sub-Watershed Boundaries map courtesy of Anne Johnson, UDAF

Plants

1. Soil Survey of Iron-Washington Area, Utah, Parts of Iron, Kane, and Washington Counties
Iron County Land Cover map courtesy of Anne Johnson, UDAF

Air and Climate

1. Soil Survey of Iron-Washington Area, Utah, Parts of Iron, Kane, and Washington Counties
2. 2009 Rangeland Resources of Utah
Iron County Average Annual Precipitation map courtesy of Anne Johnson, UDAF

Animals

1. 2007 Census of Agriculture
2. Habitat Conservation Plan for Utah Prairie Dogs in Iron County, Utah
(Iron County Commission and Utah Division of Wildlife Resources, November 2006)
3. Utah Conservation Data Center
All pictures and information about Greater Sage-Grouse and Utah Prairie-Dog courtesy of Utah Conservation Data Center

Humans

1. Utah Department of Workforce Services
2. 2010 Census Brief from the Governor's Office of Planning and Budget
Iron County Population Data courtesy of Utah Population Estimates Committee.
Information available at: <http://www.governor.state.ut.us/dea/UPEC.html>