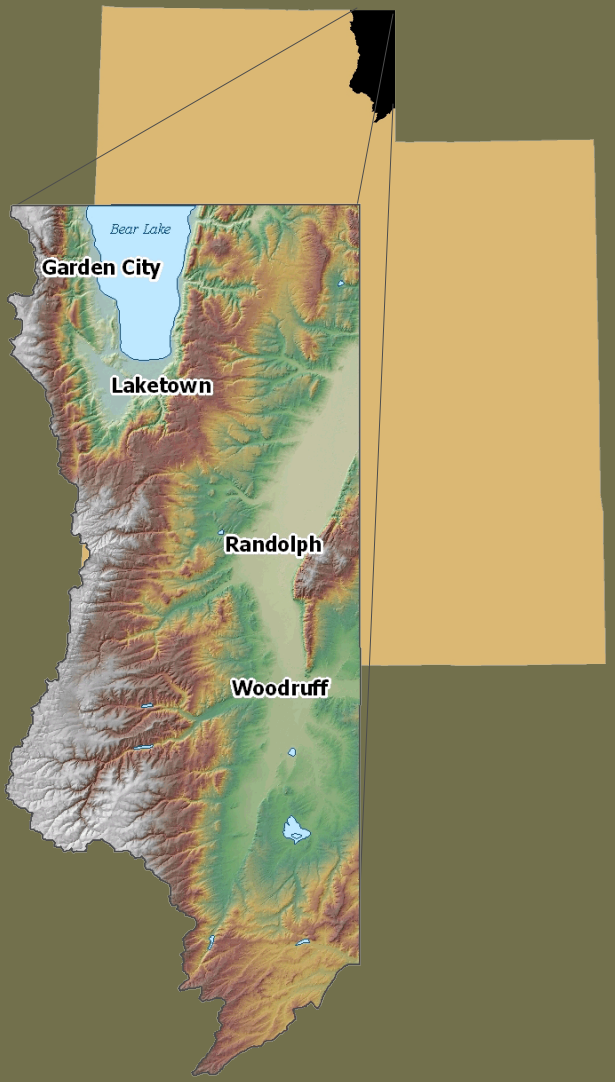
DRAFT, 9/07/10

Rich County Resource Assessment

Month 2010



Conserving Natural Resources For Our Future

Rich County Conservation District

UACD
Utah Association of Conservation Districts

UDAF
Utah Department of Agriculture and Food

USDA NRCS Natural Resources Conservation Service

Acknowledgements

Rich 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's 1 through 7
Utah Association of Conservation Districts
Utah Department of Agriculture and Food
Utah Department of Environmental Quality
Utah Department of Natural Resources
Utah Grazing Board
Utah School and Institutional Trust Lands Administration
Utah State University Cooperative Extension Service
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 State University College of Natural Resources
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

Governor's Office of Planning and Budget
Rich County Commission

Executive Summary

Farming, ranching, and recreation are important to the economy of Rich County. The county ranks in the top five Utah counties for beef cows.

Primary Focus: Resource Concerns

What is it? Where is it? This assessment strives to answer these questions pertaining to Rich County's natural resources, with a focus on identifying the most important natural resources and concerns and determining their location within the county. Local, state, or regional entities can use this information to evaluate the resource base and plan for future improvements.

What Resources are Assessed?

Basic resources are categorized as Soil, Water, Air, Plants, Animals and Humans (SWAPA + H). This assessment provides a general overview of each category, but puts greater emphasis on resources and concerns that the district has identified as priorities (above right).

Priority Resources and Concerns

The Rich County Conservation District has identified five natural resources and concerns as priorities:

- **Locally Important Farmland, pg. 3**
- **Noxious Weeds, pg. 5**
- **Irrigation Canals, pg. 7**
- **Grazing Land, pg. 9**
- **Sage Grouse Habitat, pg. 11**

The purpose of this assessment is to help ensure that conservation efforts in Rich County address the most important local resource needs. Further, a recent Coordinated Resource Management Plan (CRMP) for Rich County includes these same concerns as priorities.

Utah's Conservation Partnership

The principal responsibility for the resource assessment and this report is the Rich County Conservation District, with the Utah Association of Conservation Districts, Utah Department of Agriculture and Food, Utah Conservation Commission, and the Natural Resources Conservation Service. Member agencies of the Utah Partners for Conservation Development (UtahPCD) and others have contributed information and their expertise as reviewers of the respective resources.

We recognize that all who could have provided information may not have had the opportunity. New information and/or changes may be needed when updates or future editions of this report are published. Your comments are requested.

Rich County Conservation District
195 N. Main St./P.O. Box 97
Randolph, Utah 84604

Conservation districts provide the 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.

Table of Contents

List of Maps and Tables

Maps

Tables

Introduction

Background

Since the organization of the Rich County Conservation District in 1952, large strides have been made toward increasing and sustaining the natural resources in Rich County. An earlier assessment in 1970 showed the resource concerns at the time as 1) poor water management, 2) the need to improve water delivery systems and structures, and 3) the need to improve productivity of meadows.

The 2005 resource assessment listed the most critical resource concerns as 1) water quantity and quality, 2) grazing lands, 3) noxious weeds, and 4) wildlife habitat. The 2010 resource assessment provides an opportunity to evaluate the progress made during the last five years and to set new goals to address the highest priority conservation needs in Rich County.

Public Outreach

In 2005, the Rich County Conservation District developed a survey for local residents, government officials and conservation-oriented agencies to find out how they view the county's natural resources and what conservation issues were most pressing. The survey asked questions about high, medium, and low priorities in the following categories: air, agriculture, land use, pest management, soil, water, and wildlife. The surveys were available at conservation district meetings and were also sent out in a mailing by the Bear River RC&D from a listing of landowners, city and county officials, and conservation support groups.

In July 2010, the Rich County Conservation District conducted another survey requesting agricultural producers' input on high priority resource concerns. Respondents indicated that water quantity and quality are still major concerns as well as properly managing grazing land to maintain a sustainable agricultural industry. Other top concerns included: weeds, particularly perennial pepper weed and dyer's woad; irrigation canal improvements and maintenance; protecting sage-grouse habitat; and maintaining current levels of recreational opportunities in Rich County.

Outside Pressures

The use of BLM and U.S. Forest Service managed rangelands for livestock grazing has received much attention by outside environmental groups. There has been and is the potential for future appeals and related litigation of government agency land management plans.

Photos courtesy of Krista Payne

Rich County Canal

New Calf in Early Spring

County Overview

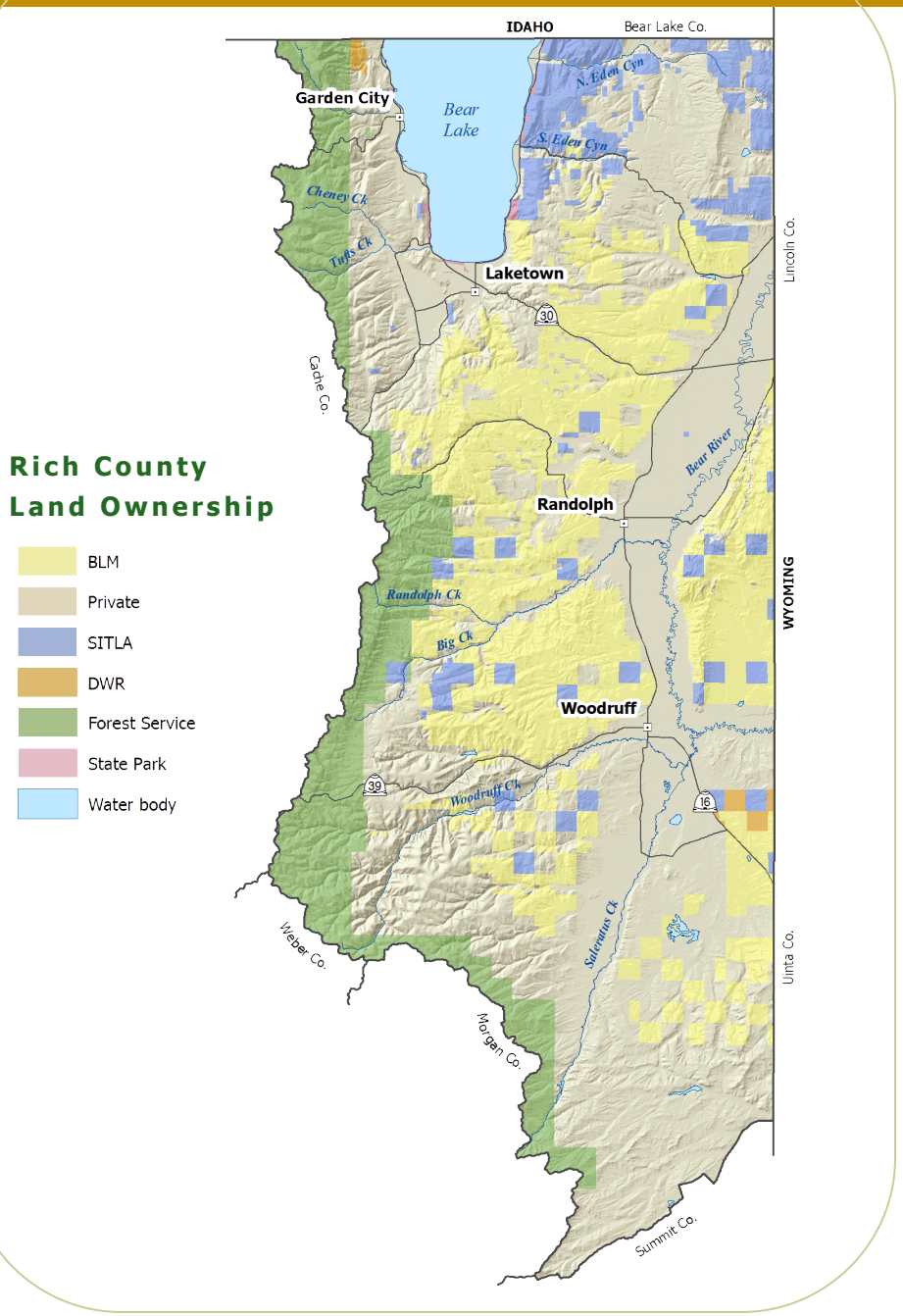
Rich County

Rich County, in the northeast corner of Utah, occupies a long, narrow area approximately 18 miles wide and 56 miles long, extending north of Echo Canyon. It is bordered on the east by Wyoming and on the north by Idaho with the southern half of Bear Lake extending into the county. Rich County takes its name from Mormon colonizer Charles C. Rich, who was called by Brigham Young to lead colonies and make settlements in the area. Even though much of Rich County is highland, it also has fertile lowlands that support productive farms and livestock, and three fourths of the county's land is used for agriculture, primarily grazing. [1]

All the communities within Rich County share two factors: they are rural and remote from the larger urban areas of Utah. In 2009, the entire population of Rich County was 2,329, one of the lowest county populations in the state. Median family income was $40,603, or 20% below the state average of $51,022. Rich County's racial makeup is primarily white: 97.3% of the total – ethnic population presence is significantly less than the state's average.

Rich County has a total land area of 654,840 acres, or about 1,031 square miles.[1] About 11,600 acres are used as non-irrigated cropland, 48,400 acres as irrigated cropland, hayland, and pastureland, and 594,720 acres as rangeland and forest land. The irrigated cropland and pastureland are in Bear River Valley and Bear Lake Basin. The milder climate and higher precipitation of the Bear Lake Basin make it more favorable for the production of food crops than the rest of the county.

The average freeze free season is 55 days in the valleys, where most crops are grown. This short growing season limits the choice of crops grown to small grains, grass hay and alfalfa. There is a small raspberry industry along Bear Lake at Garden City. Elevation ranges from 5,924 feet at Bear Lake to 9,148 feet at Monte Cristo Peak.



1 www.richcounty.org

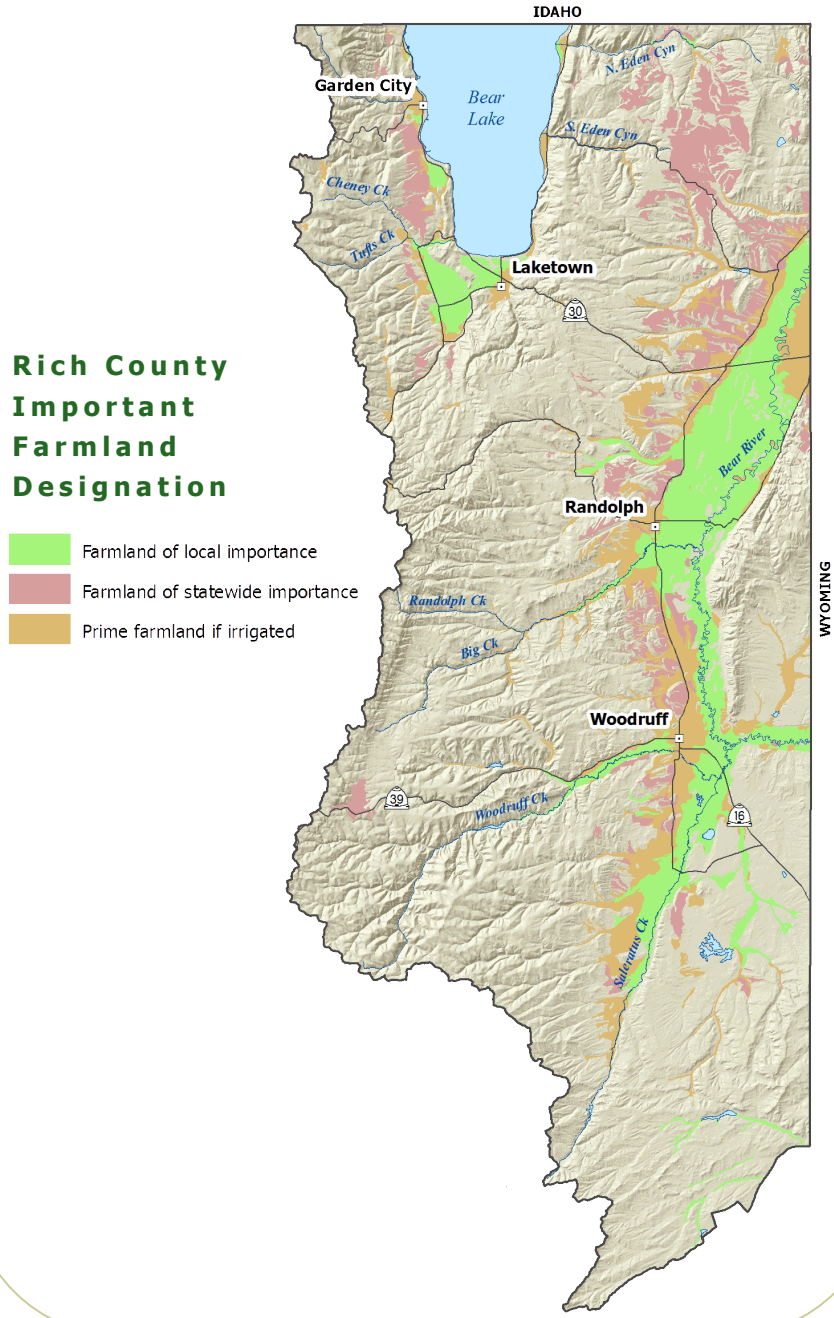
Priority Resources and Concerns

Locally Important Farmland

The Rich County Conservation District, Natural Resources Conservation Service, Farm Service Agency, and Utah State University Cooperative Extension Service have initiated the process to have important Rich County soils designated as "locally important farmland." This will improve the opportunity for applicants seeking federal assistance through federal Farm Bill programs. At this time there are two classifications being considered to designate locally important farmland:

- First, many irrigated pastures and hay land have a historically and/or seasonally high water table. Because of this, they do not qualify as Prime or Statewide Important. The committee has proposed that, because of local value, these lands be given a locally important designation as long as they are irrigated. It is estimated that 53,130 acres of farmland will fit this category.

- Second, the majority of potential Prime and Statewide Important soils do not have irrigation and therefore are not designated. These soils, however, are some of the most productive rangeland sites. The locally important soils committee has considered options for designating Prime and Statewide important soils that are not irrigated as locally important rangeland soils. Initial research shows that this has not been done elsewhere in the U.S. Additional research is needed before proceeding on classifying these soils as locally important.



Soils qualifying as Prime, Unique and Statewide Important meet the criteria given below. The map at the left shows their location in relationship to the proposed locally important farmland.

Prime Farmland

This is a national designation for land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor, and without intolerable soil erosion. There are potentially 45,570 acres of prime farmland in Rich County; however, these must be irrigated to qualify for this designation.

Unique Farmland

Unique farmland is land that is used for the production of specific high-value food and fiber crops. These lands must have specific characteristics, not general to the area or county, that make production of these crops possible. Examples include citrus, tree nuts, olives, berries, and vegetables that have unique soil and climatic requirements. While raspberries area a high value crop in production near Bear Lake, they can be grown elsewhere in the state, therefore the land around Bear Lake does not have Unique designation.

Farmland of Statewide Importance

Land identified by state agencies as important for agricultural use, but not of national significance can be designated as statewide important farmland. Rich County has approximately 35,256 acres of potentially statewide important farmland, but the actual is less due to a requirement for irrigation.

Priority Resources and Concerns

Noxious Weeds

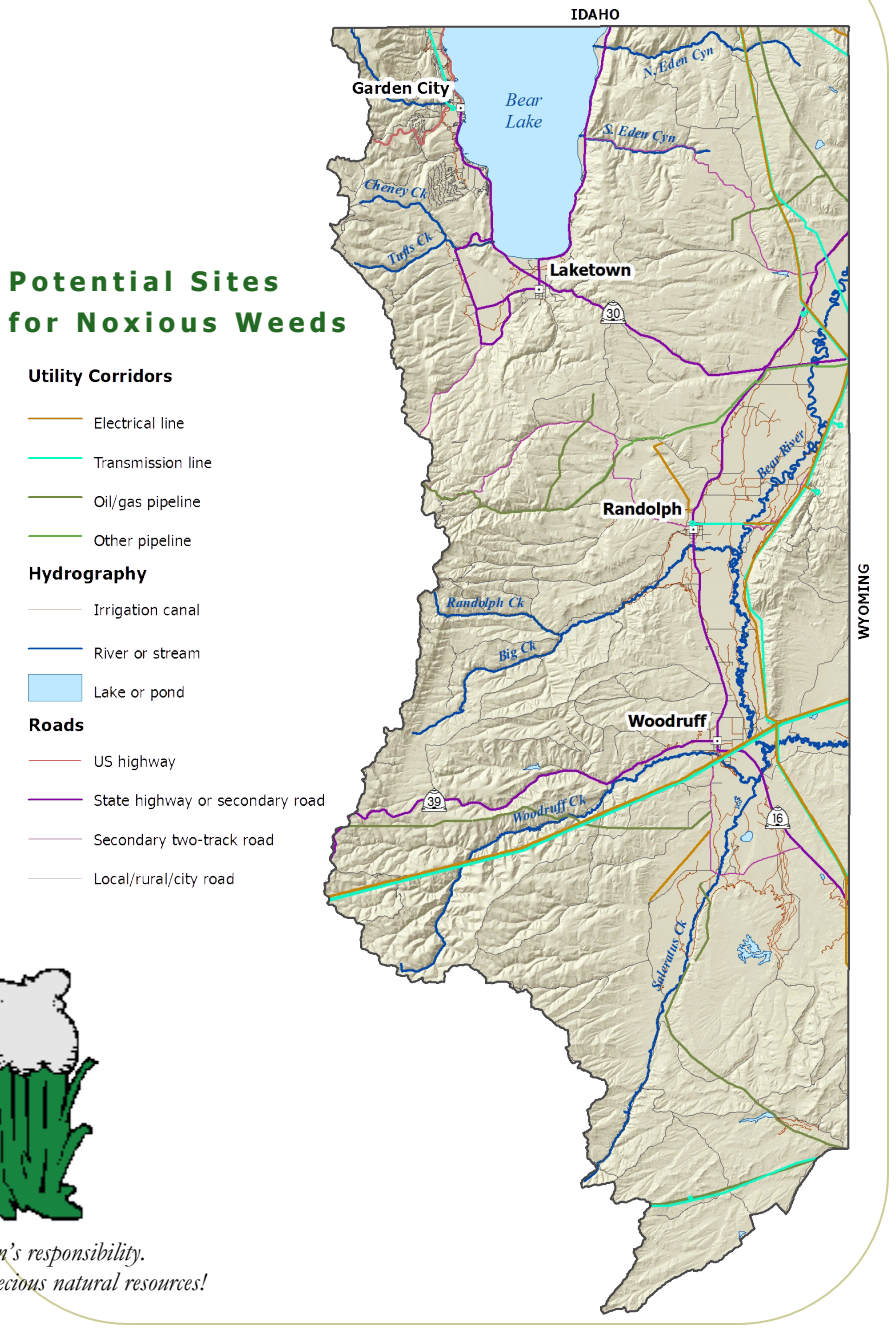
The most problematic weeds in Rich County are perennial pepperweed (tall whitetop), musk thistle and Canada thistle. Black henbane, leafy spurge, and dyers woad are of special concern, but have not reached significant populations and/or widespread distribution.

The Rich County Conservation District is especially concerned about the increasing impact of tall whitetop (*lepidium latifolium*). Locally it is referred to simply as whitetop. It is now found along many streams, canals, and other waterways. Wet meadow pastures and hayland are also being invaded.

Rich County is part of the Highlands Cooperative Weed Management Area (CWMA). In addition to Rich County, this CWMA includes Bear Lake, Caribou, and a portion of Bonneville Counties in Idaho, and Lincoln County, Wyoming. Rich County needs to maintain a working relationship with this CWMA.

The county has a weed control program that employs one person. It is difficult for a single person to effectively treat the entire county because of the short time window in which treatment is effective. In 2010, the conservation district contributed funds from the state to the county for purchasing chemical for landowners to control tall whitetop on their property. Additional resources are needed to effectively control tall whitetop and other troublesome weeds in Rich County. Though weed control is often considered a county function, every citizen has a responsibility to control noxious weeds on their own property and hopefully will work adjacent right-of-ways as well.

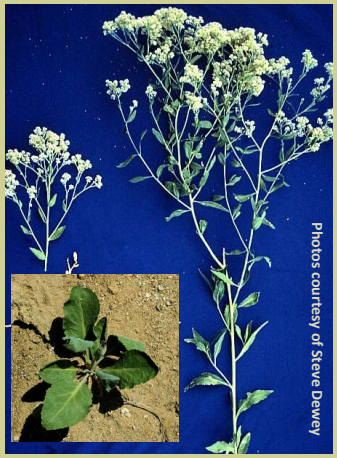
Eradicating noxious weeds is every citizen's responsibility.
Thank you for doing your part to protect our precious natural resources!



Perennial Pepperweed *(lepidium latifolium)*

Perennial Pepperweed grows one to three feet tall with bright green leaves. Flowers are white, in dense clusters near the top. Roots as deep as 9 feet make this weed difficult to control as it can store large amounts of resources and sprout stems following cutting, grazing, or herbicide treatments. Each mature plant can produce thousands of seeds per year, but it more commonly reproduces through laterally creeping roots. Roots and seeds float and can be transported long distances by water to establish new populations. Stands of Perennial Pepperweed can grow 50 stems per square yard, crowding out all other desirable vegetation.

Stand of Perennial Pepperweed along an irrigation ditch



The first year rosette and second year plant

Rich County Noxious Weed List

The following weeds are officially designated and published as noxious for the State of Utah, as per the authority vested in the Commissioner of Agriculture under Section 4-17-3, Utah Noxious Weed Act. Rich County's highest priority weeds are listed in bold:

- Bermudagrass (*cynodon dactylon*)
- **Canada thistle** (*cirsium arvense*)
- Diffuse knapweed (*centaurea diffusa*)
- **Dyers woad** (*isatis tinctoria L*)
- Field bindweed (Wild Morning Glory) (*convolvulus arvensis*)
- **Hoary cress** (*cardaria drabe*)
- Johnsongrass (*sorghum halepense*)
- **Leafy spurge** (*euphorbia esula*)
- Medusahead (*taeniatherum caput-medusae*)
- Musk thistle (*carduus mutans*)
- **Perennial pepperweed** (*lepidium latifolium*)
- Perennial sorghum (*sorghum halepense L & sorghum almum*)
- Purple loosestrife (*lythrum salicaria L*)
- Quackgrass (*agropyron repens*)
- Russian knapweed (*centaurea repens*)
- Scotch thistle (*onopordum acanthium*)
- Spotted knapweed (*centaurea maculosa*)
- Squarrose knapweed (*centaurea squarrosa*)
- Yellow starthistle (*centaurea solstitialis*)

Additional noxious weeds declared by Rich County :

- **Black Henbane** (*Hyoscyamus niger*)
- **Dalmatian Toadflax** (*Linaria dalmatica*)
- **Poison Hemlock** (*Conium maculatum*)

Priority Resources and Concerns

Irrigation Canals

Recent Utah legislation has brought increased attention to the risk/importance of canals and requires owners and/or operators to improve communication with cities, towns, and counties. Canals with diversions on the Bear River are part of the Upper Bear River Distribution System. Remotely sensed stream gauges measure diversions from the Bear River and efforts to automate headgates have begun. Generally all canals should maintain records documenting water use and when appropriate file required applications for non-use or change in use of water rights with the state engineer.

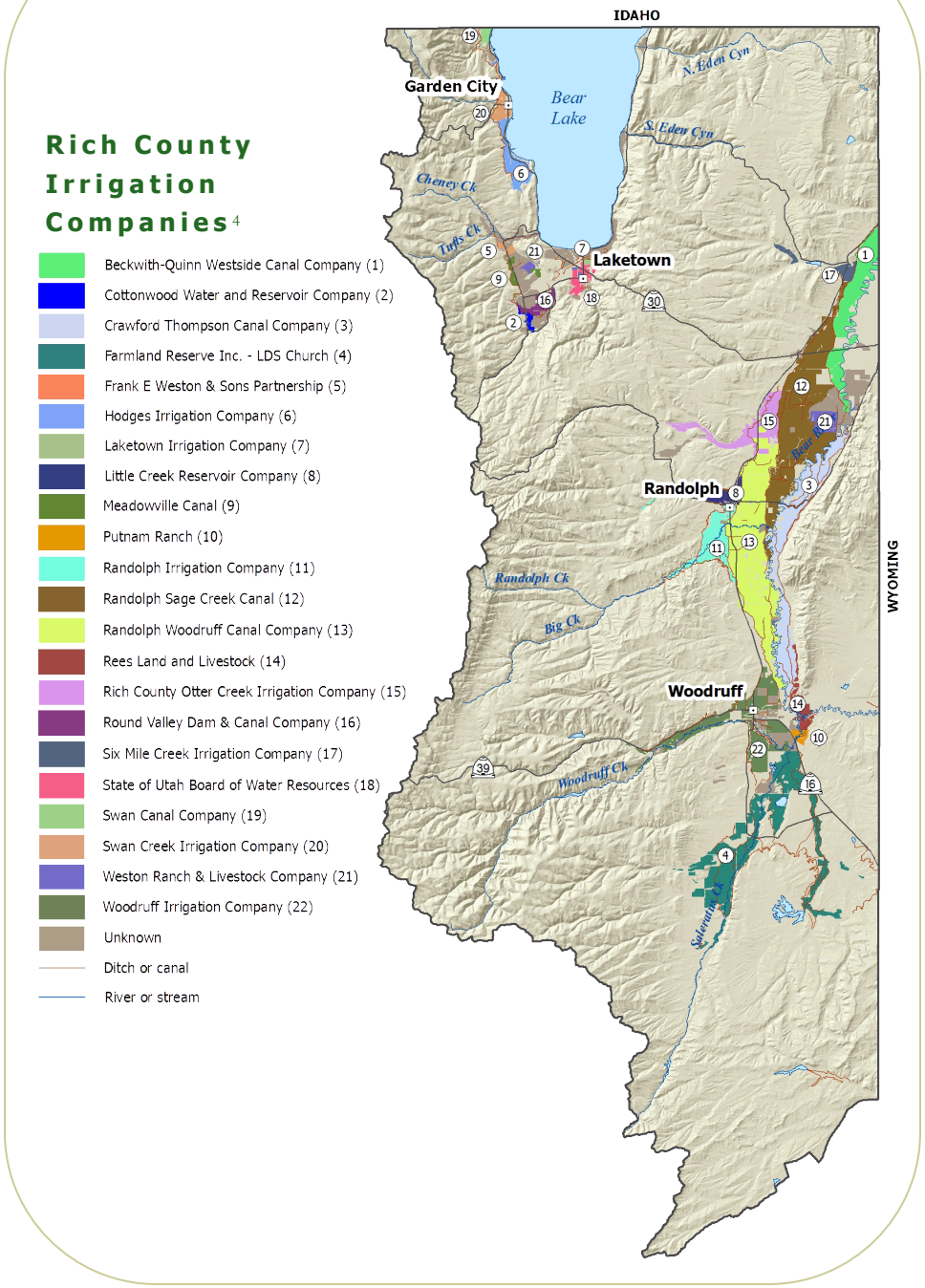
Rich County canals are generally considered in good condition with few potential hazards. Annual maintenance and repair is the responsibility of the respective company.

Potential Areas of Concern

Generally, existing and new development near or adjacent to canals is not a concern in the Bear River Valley. Record precipitation in spring 2010 increased flows to near or above design capacity. The Beckwith/Quinn Canal breached at approximately 300 CFS. Repairs were required, yet damage was limited to temporary interruption in the delivery of irrigation water and flooding of adjacent farm fields. There are a few isolated areas along the Randolph Woodruff Canal, Neville Canal, Beckwith/Quinn Canal, and the Sage Creek Irrigation Company with elevated banks and subbing concerns.[1]

In the Bear Lake Valley the Swan Creek Canal and the Hodges Canal have potential areas of concern related to development or potential development.[2] These areas should be identified by the respective land use authority. Development should not be allowed where conditions exist that would present the potential for hazard or, if allowed, site-specific assessments are needed and measures required to protect the public's safety and/or reduce the potential for property damage.

1 Ron Hoffman, Upper Bear River Water Commissioner
2 Rich County Commission



Rich County Irrigation Companies

Canal Company	Service Area Acres	Main Canal/ Ditches Miles	Parcels
1	4,356	12.13	179
2	205		32
3	5,148	28.77	259
4	8,215	40.89	466
5	141	1	25
6	1,288		92
7	113		6
8	978	4.89	81
9	294	4.28	37
10	258		23
11	2,368	4.75	177
12	9,044	29.60	345
13	8,898	26.18	378
14	925	1.82	76
15	2,427		173
16	606	5.14	38
17			
18	589	1.94	154
19	344		20
20	588		67
21	974	0.92	43
22	4,174	20.78	292
Unknown	9,977		991
Totals:	61,907	183.09	3,954

Prepared from GIS data and tabular records at the Utah Automated Geographic Reference Center and Utah Divisions of Water Resources and Water Rights. Data not available for all canals.[4]

The Upper Bear River Distribution System diversion records are available at **www.bearriverbasin.org** for canals, rivers, and Bear Lake. Measurements are real time from remotely sensed stream gages.

Other Issues & Opportunities

Canals and ditches have the potential to receive and transport nonpoint source pollution from agriculture fields, animal feeding operations, and storm water runoff from roads and municipal uses. Improvements in irrigation systems and water management including measurement, automation, and remote sensing will increase the efficiency of water delivery, especially helpful in drought years. Shareholder assessments should not only pay yearly operation and maintenance, but allow for future capital improvements.

Piping the Woodruff Irrigation Company and a section of the Randolph Woodruff Canal running through the city has been considered. The benefit did not justify the $1 million per mile cost.[1]

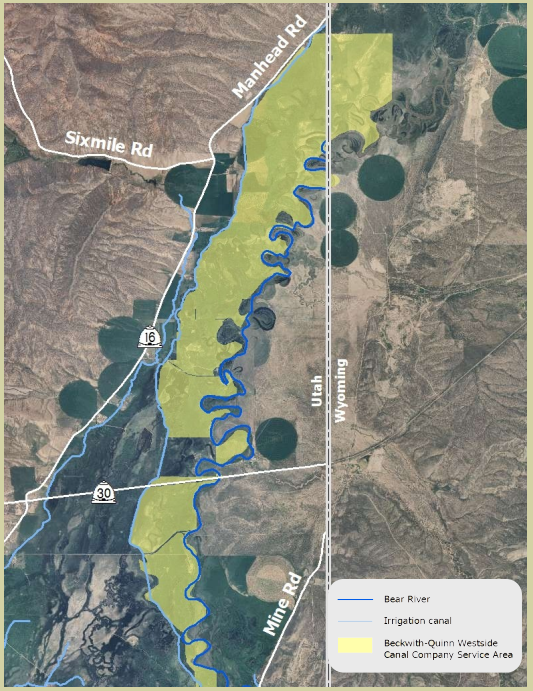
New EPA regulations are a future concern for irrigation companies and commercial applicators of pesticides. A state general permit will be required, under certain conditions, when pesticides are applied that could potentially enter canals or ditches that transport water beyond an operator's property.

The Woodruff Narrows Reservoir Company, which supplies storage for irrigation companies along the Bear River in Utah and Wyoming, is in the process of identifying flood-prone areas that could be affected if the dam failed. Further, a proof is being prepared for submission to the state engineer that will update the reservoir water right for each irrigation company.[3]

3 Larry Anderson, past director, Utah Division of Water Resources
4 Utah AGRC National Hydrologic Dataset (NHD), and 2000 updated TIGER/Line Census files

Outreach

In 2010, the conservation district mailed each canal company a brochure describing the requirements of H.B. 60 and H.B. 298 and two maps of their canal, as available, one on a topographic background and one on a digital orthophoto background. The district informed the canal companies of the purpose for the assessment, requested review of the information provided, and asked for additional information to help ensure the completeness and accuracy of the geographic data.



One of twenty-one individual maps prepared showing the location of canals, ditches, and service area from GIS data.[4]

Grazing Land

Ranching is the most common economic activity in Rich County. The economy has largely been depended on livestock since settlement. Sheep numbers have declined dramatically to only 8,900. The traditional method of cattle and sheep production in is for a private rancher to possess permits to graze animals on upland ranges administered by the Bureau of Land Management (BLM), the U.S. Forest Service, Utah School and Institutional Trust Lands Administration (SITLA), and/or private land during the summer months. Often livestock using these permitted allotments are under-managed by ranchers who are unable to make dramatic changes in grazing plans due to regulatory, financial, legal, and technical complications.

Public Land & Management

Livestock producers are facing pressure from federal agency land managers, other public land users and interests to restrict and in some cases eliminate grazing on public lands. The threat of appeals and related litigation of government agency land management plans delays implementation of these plans and has the potential to reduces the numbers of livestock allowed and/or the restrict the time livestock are permitted to graze an allotment.

The ranchers who possess the grazing permits on allotments found west of Randolph are considering a consolidation project to improve grazing management. The project's management plan uses cattle and sheep grazing to provide maintenance on a large landscape or watershed area. The cooperation of ranchers, land mangers, and other interests is critical to the health and sustainability of public and private rangelands in Rich County and the rural economy.

Water Quality

Unrestricted livestock access to stream banks impacts riparian corridors and is a source of sediment and manure. Changing livestock management will provide the greatest water quality improvement at the lowest cost. The use of rest-rotational grazing systems in the upland areas of the Upper Bear River Watershed will reduce nutrient loading and sedimentation improving stream and river turbidity, pH, and dissolved oxygen. Confined animal feeding operations require management to prevent nutrients from entering water courses.

Cattle grazing by Crawford mountain range near Randolph. Rich County livestock includes 41,000 head of cattle and 8,900 sheep.

Grazing riparian area, a resource concern addressed by improved management.

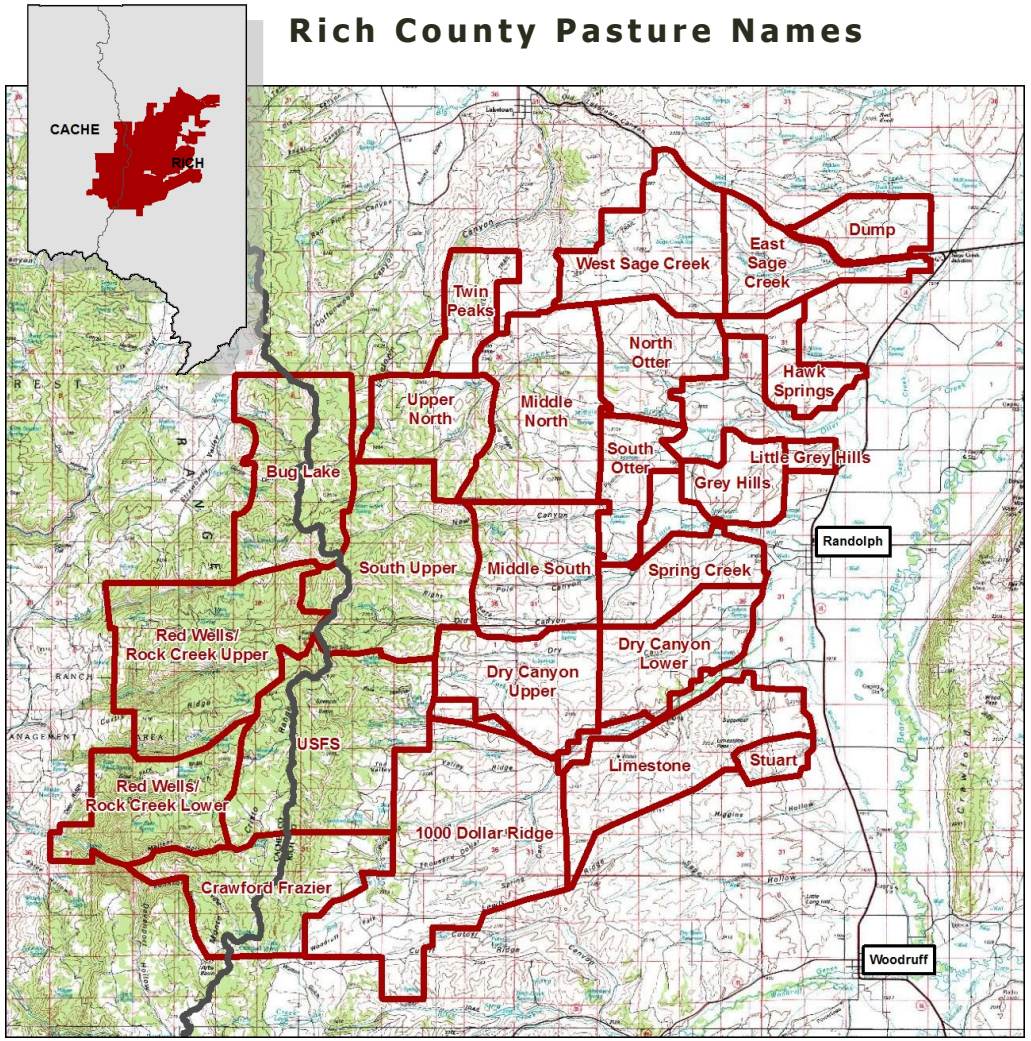
Other nonpoint source pollution concerns are eroding stream banks and restoration of some altered stream channels to their natural footprint. It is unknown how much impact winter feeding on lowland pastures has on water quality. There is need for additional study in this area.

Rich County Grazing Consolidation

The consolidated grazing project proposal is to make comprehensive changes in management on five BLM allotments (Big Creek, New Canyon, Sage Creek, Stuart, and Twin Peaks) and three Forest Service allotments (North Randolph, South Randolph and Rock Creek/Red Wells). A variety of range and habitat improvements are proposed. These include better water distribution, additional fencing, prescribed burns, and brush management. The change offering the greatest benefit is changing the time and timing of livestock grazing. Rather than season long grazing in some of the allotments, livestock would be combined into two herds. Each herd would be concentrated to graze smaller areas for shorter duration and then moved. Grazed pastures would then have opportunity to re-grow. Some pastures would be rested on a rotational basis. These changes will lead to improved wildlife habitat, improved water quality, improved plant diversity and improved livestock management.[1]

Changes in grazing management will be a critical step in long-term sustainability on both public and private ground. It is imperative to have collaborative working relationships amongst agencies and private producers.

1 Troy Forrest, Utah Grazing Improvement Program



Proposed new pastures for Rich County consolidated grazing plan. This demonstration project, expected to be approved by permittees, will be a model for how to improve rangeland condition through better management.

"This project can provide economic and ecological sustainability."
Bill Hopkin, Director, Utah Grazing Improvement Program, Utah Department of Agriculture and *Food*

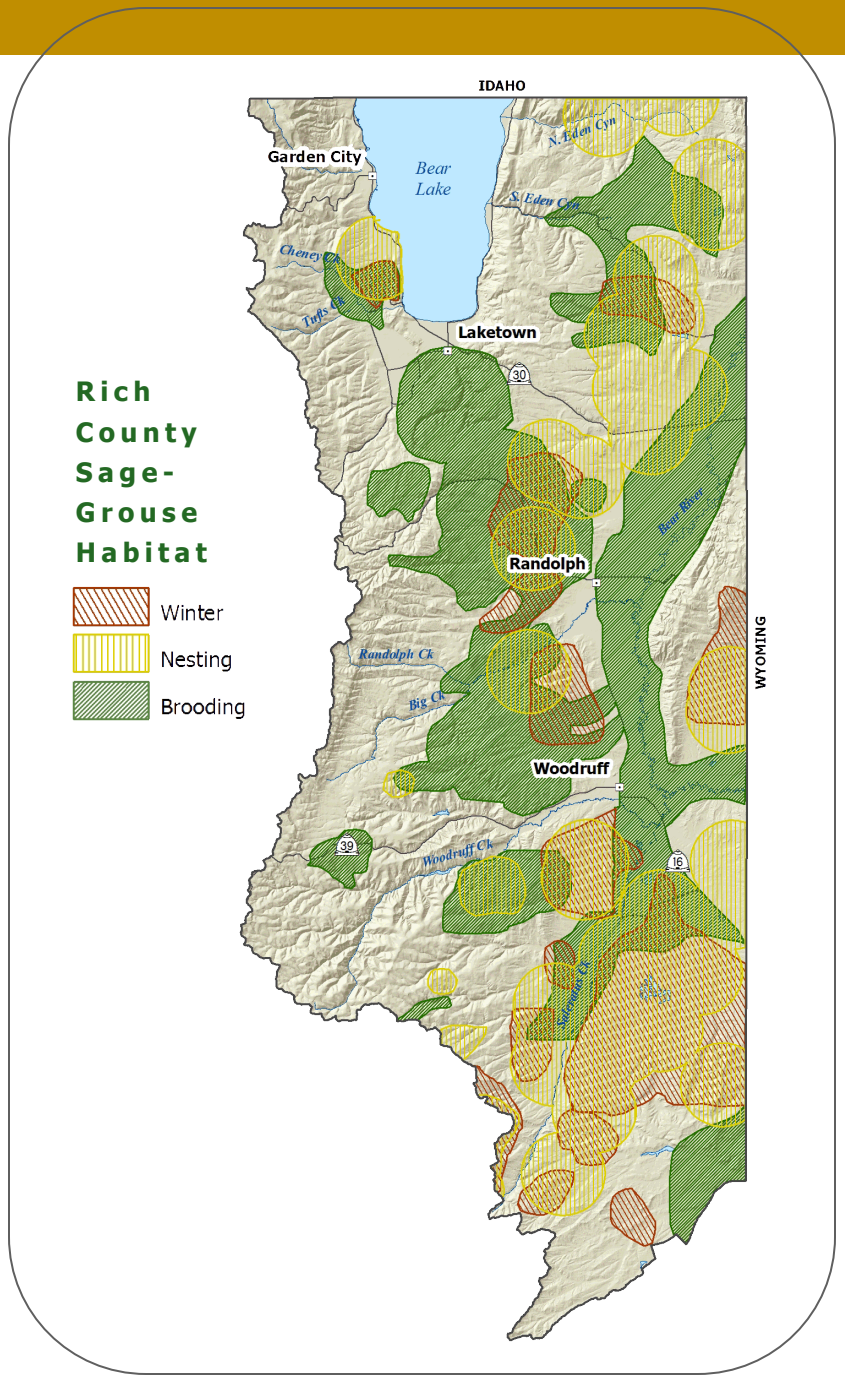
Priority Resources and Concerns

Sage-Grouse Habitat

In March 2010 the U.S. Fish and Wildlife Service announced, "The Greater Sage-grouse warrants the protection of the Endangered Species Act but that listing the species at this time is precluded by the need to address higher priority species first." The agency's announcement reaffirmed that states would continue to be responsible for managing the bird and that voluntary conservation agreements, federal financial and technical assistance and other partnership incentives are needed.

The BLM is expected to coordinate with state fish and wildlife agencies and their technical committee in the development of a range-wide habitat map. The mapping project, not intended to replace individual state fish and wildlife agency core habitat maps, will identify priority habitat for sage-grouse within each of the western states.

Source: U.S. Fish and Wildlife Service News Release, March 5, 2010, Interior Expands Common-Sense Efforts to Conserve Sage Grouse Habitat in the West.



Rich County is home to one of the largest populations of sage-grouse in Utah. There are eight lek complexes in Rich County with a total of forty-six active and historic lek sites. The Utah Division of Wildlife Resources (UDWR) has been monitoring sage-grouse lek sites in Rich County since 1959. Historical data makes it appear that populations have been increasing, but this is due, in part, to increased intensity of monitoring through the years.

Private landowners and public land agency managers have been proactive in their response to concerns that the sage-grouse is petitioned for listing as an endangered species. The county has coordinated their efforts through the Rich County Coordinated Resource Management (CRM) Plan and the Rich County Sage-grouse Working Group. The goal is to help maintain and

improve Greater Sage-grouse (*Centrocercus urophasianus*) populations and their habitat while taking into consideration historical land uses and long term social economic issues.
Emphasis is to address the U.S. Fish and Wildlife Services' five listing factors:

1. Present or threatened destruction, modification, or curtailment of its habitat or range
2. Over-utilization for commercial, recreational, scientific, or educational purposes
3. Disease or predation
4. Authorities and inadequacy of existing regulatory mechanisms
5. Other natural or man-made factors affecting its continued existence

The intent of the CRM Plan is to maintain and, where possible, increase sage-grouse populations and improve habitat conditions by:

1. Implementing management strategies to conserve the sage-grouse and their habitats
2. Increasing communication with stakeholders and the state through outreach, information distribution, and education
3. Addressing and prioritizing threats to aid in prioritizing management solutions
4. Identifying and pursuing funding sources or supporting partners in obtaining funding for projects

Efforts to improve sage-grouse habitat and reduce predation and other factors must be a high priority because listing of sage-grouse would have far-reaching social, economic, and management impacts. These efforts should consider private landowners' management and financial objectives. Based on long-term data from Rich County, the Grazing Consolidation Project (*see pp 9 & 10 of this report*) is expected to have a significant positive effect on the habitat of sage-grouse and other wildlife species.

Greater Sage-Grouse

The Greater Sage-Grouse inhabits sagebrush plains, foothills, and mountain valleys. Sagebrush is the predominant plant of quality habitat. A good understory of grasses and forbs, and associated wet meadow areas, are essential for optimum habitat.

Greater Sage-Grouse are native to Utah and are listed as a sensitive species by the Utah Division of Wildlife Resources.

Sources: Utah Conservation Data Center source data from Biotics Database, 2005. Utah Division of Wildlife Resources, NatureServe, and the network of Natural Heritage Programs and Conservation Data Centers.

Basic Resources

Soil

As is typical of the soils in the Intermountain West, Rich County soils are comprised of such variety to make it difficult to generalize characteristics. Parent material is typically derived from sandstone and limestone formations. The Bear River Range and Crawford mountains are dissected by many streams and other small drainage ways. The lowlands along the Bear River, Bear Lake, and other waterways are often limited by poor drainage.[1]

Information on the soils in Rich County can be obtained from the Web Soil Survey: http://websoilsurvey.nrcs.usda.gov. The soil survey is a product of the National Cooperative Soil Survey, a joint effort of the USDA Natural Resource Conservation Service and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants.[2] The Web Soil Survey allows for a user to 1) define an area, 2) view the survey boundaries and soil types over laid 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 are evaluating soil suitability for dwellings with basements, landscaping, roads, and septic systems, measures for vegetative productivity, chemical and physical properties. Using this information agricultural producers, agencies, counties, and municipalities know 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.

Soil limitations identified in soil surveys include but are not limited to frequent flooding, ponding or standing water, shrink/swell properties, settling after saturated with water, high erosion properties, potential excavation difficulties, subsidence properties, and danger of sliding on slopes.

1 Rich County Cooperative Soil Survey
2 NRCS Web Soil Survey

Soil Survey near Garden City

Map Unit Legend

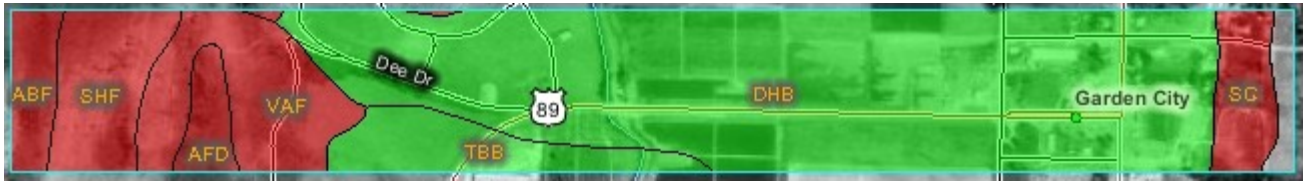
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
ABF	Agassiz-Richville complex, 10 to 60 percent slopes	5.3	3.5%
AFD	Ant Flat silt loam, dry, 10 to 25 percent slopes	3.8	2.5%
DHB	Despain variant gravelly loam, 1 to 3 percent slopes	93.5	62.2%
SC	Saleratus variant-Canburn variant complex	6.8	4.5%
SHF	Solak gravelly loam, 10 to 50 percent slopes	11.5	7.6%
TBB	Thatcher silt loam, warm, 3 to 6 percent slopes	10.7	7.1%
VAF	Vanni loam, 30 to 50 percent slopes	16.3	10.8%
W	Water	2.5	1.7%
Totals for Area of Interest:		150.3	100.0%

Web Soil Survey map showing selected area east and west of Garden City and table describing soil types.

Web Soil Survey

Three examples of Web Soil Survey interpretations showing suitability and limitations for the selected area: dwellings with basements, septic tank absorption fields, and available water holding capacity. Complete description for each category can be obtained at websoilsurvey.nrcs.usda.gov. Web Soil Survey (WSS) is a free online service that provides information on a large variety of soil concerns for any selected land area or parcel.

Soil Limitations for Dwellings with Basements



Dwellings are single-family houses of three stories or less. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet. The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, ...

Septic Tank Absorption Fields

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 60 inches is evaluated. The ratings are based on the soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health. Saturated hydraulic conductivity (Ksat), depth to a water table, ponding, depth to bedrock or a cemented pan, and flooding affect absorption of the effluent. . . . .

Available Water Capacity

Available water capacity (AWC) refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in centimeters of water per centimeter of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are content of organic matter, soil texture, bulk density, and soil structure, with corrections for salinity and rock fragments. Available water capacity is an important factor in the choice of plants . . . .

Basic Resources

Water

The Bear River and Bear Lake are the largest bodies of surface water in Rich County. They are fed by springs, storm runoff, and snowmelt from the surrounding mountains and foothills, and by ground water discharge. Bear Lake and numerous smaller reservoirs in the watershed provide for irrigation water, power generation, recreation, stock water, and flood control. Water for domestic use in towns is supplied mainly from springs and wells.

The Utah Division of Water Resources Bear River Basin Water Plan last published in 2004 can be obtained at www.water.utah.gov/planning/SWP/bear/bearRiver-1A.pdf. Water related land use including GIS information is located at www.water.utah.gov/planning/landuse/index.htm.

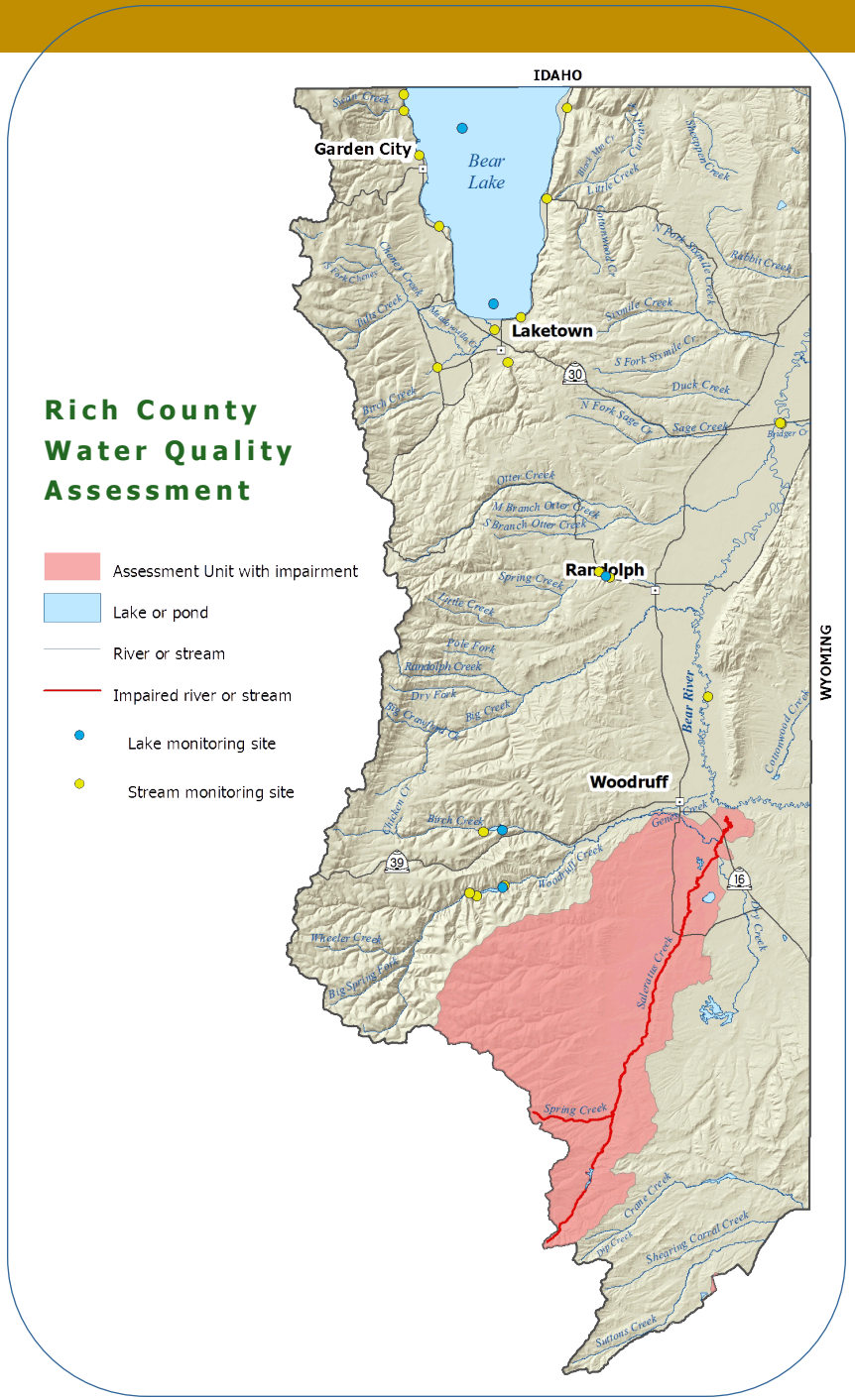
Irrigation Water

The rainfall in the county is not adequate to produce maximum crop yields; therefore, irrigation is used to supplement plant requirements. The Bear River and its tributaries are the main sources of water for irrigation. Twenty-eight irrigation companies service approximately 62,000 acres with four companies accounting for roughly 50 percent of the water diverted from the Bear River. Irrigation canals are a priority resource and additional information is included under Irrigation Canals section of this report.

Water Quantity and Storage

Seventeen lakes and reservoirs in the county contain approximately 727,718 acre-feet of water. Bear Lake makes up 97 percent of this total. Neponset, Woodruff Creek, and Birch Creek Reservoirs make up most of the remaining 3 percent. Bear Lake contributes little irrigation water to the county, but is a major recreation attraction.

Ground water recharge in the county is mainly from precipitation and excess irrigation water. In the Bear River Valley, the principal water-bearing deposits are the flood plain of the Bear River. The water supply for towns is derived mainly from springs. The present water supply is adequate to meet the current needs of most towns; however, additional water will be needed to stimulate economic growth and accommodate recreation needs in the future.



Real time information for the Upper Bear River Distribution System including flows and diversions on the Bear River and the water elevation for Bear Lake can be obtained at www.bearriverbasin.org.

Water Quality

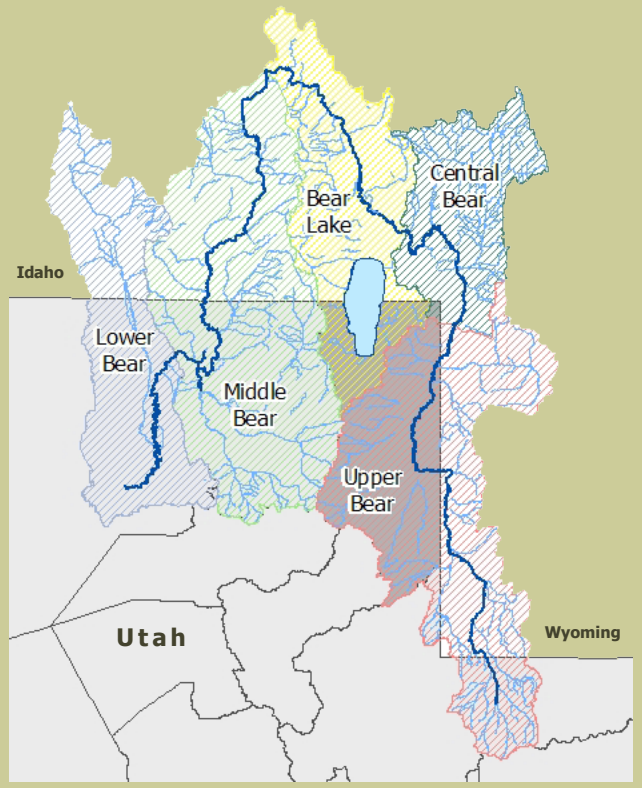
Rich County is within the Upper Bear River Watershed. The Utah Division of Water Quality (UDWQ) has classified the Bear River as impaired for not meeting State standards for dissolved oxygen. Further, sediment, nutrients, bacteria, and high water temperatures are concerns. Big Creek, southwest of Randolph is classified as impaired. Also, Otter Creek and Sage Creek are priorities for projects to improve water quality.

Improving grazing management on riparian areas is an important priority. Livestock and wildlife in direct contact with streams can contribute to streambank erosion as well as nutrient and bacteria loading. In addition, there are in various locations high background levels of phosphorous from naturally occurring geologic features which contribute to the eutrophication of downstream reservoirs. Winter feeding of livestock is common throughout the county. Some pastures are close to waterways and there is potential for spring runoff and irrigation return flows to transport animal waste and its associated bacteria and nutrients into the Bear River and its tributaries.

The UDWQ Upper Bear River Watershed Total Daily Maximum Load (TMDL) www.waterquality.utah.gov/TMDL/Upper_Bear_TMDL.pdf is the State guideline for water quality improvements. The Rich County Conservation District is the local sponsor for Clean Water Act Section 319, Nonpoint Source water quality projects addressing TMDL priorities. Project funding has and is currently available for protection and improvement of riparian areas and upland area best management practices to reduce sediment and nutrient loading into surface waters.

The UDWQ regularly conducts monitoring of surface waters to assess water quality. An Integrated Report www.waterquality.utah.gov/documents/2008_IR_BearRiver_63009.pdf is provided to EPA and the public to report assessment results and account for the State's progress in addressing TMDL requirements.

Bear River Sub-Watershed Boundaries



The Natural Resources Conservation Service (NRCS), administrative organization for Utah, emphasizes conservation planning based on watersheds. Rich County is located in the Upper Bear River and Bear Lake sub-watersheds of the Bear River Watershed.

Air and Climate

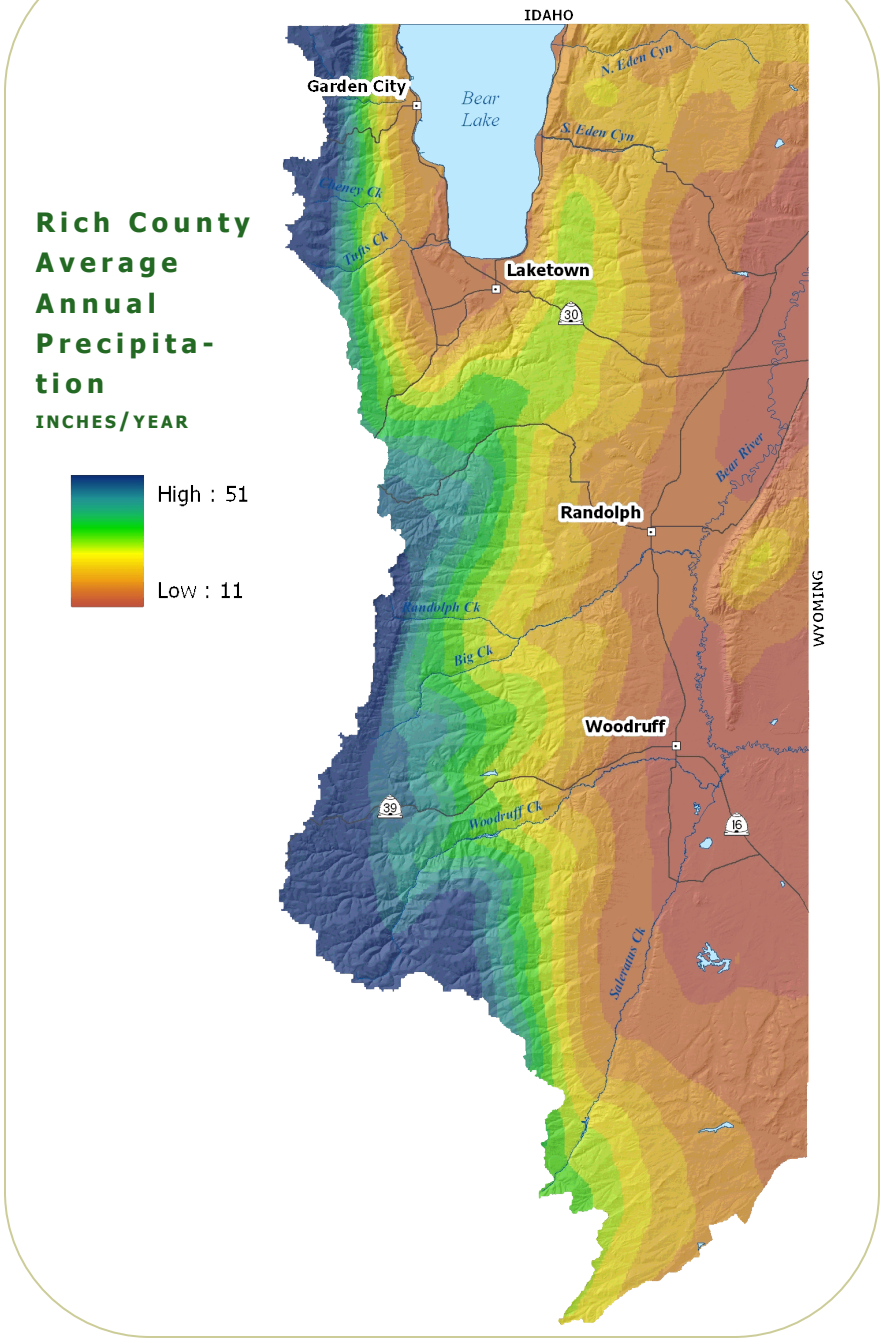
Generally the climatic conditions in Rich County would be regarded as severe, characterized by low humidity, generally low precipitation on the valley bottoms, and wide ranges in temperature. Abundant sunshine occurs during the growing season, but is restricted during winter when strong temperature inversions develop. Killing frosts are common early and late in the short growing season. The average annual rainfall is about nine inches, with an average annual temperature of 40 degrees F. The moderating effects of Bear Lake, makes the area around the lake slightly warmer than the southern end of the county. The elevation of the Bear River valley is about 6,400 ft.[1]

Most of the precipitation in winter falls as snow. The seasonal accumulation is quite variable, ranging from only 40 inches on the lower valley bottoms to nearly 200 inches at the higher elevations on the west side of the county. The normal annual precipitation ranges from a little less than 10 inches in the driest part of the county to nearly 50 inches at higher elevations.

Frost has been reported throughout the year in almost all parts of the county. The average length of the frost-free season is limited by the formation of intense temperature inversions during most of the year. The intense inversion also accounts for some extremely cold temperatures in winter. The coldest temperature has been recorded at 50 degrees below zero. Summertime temperatures can increase to near 100 degrees.

Utah Climate and Water Report

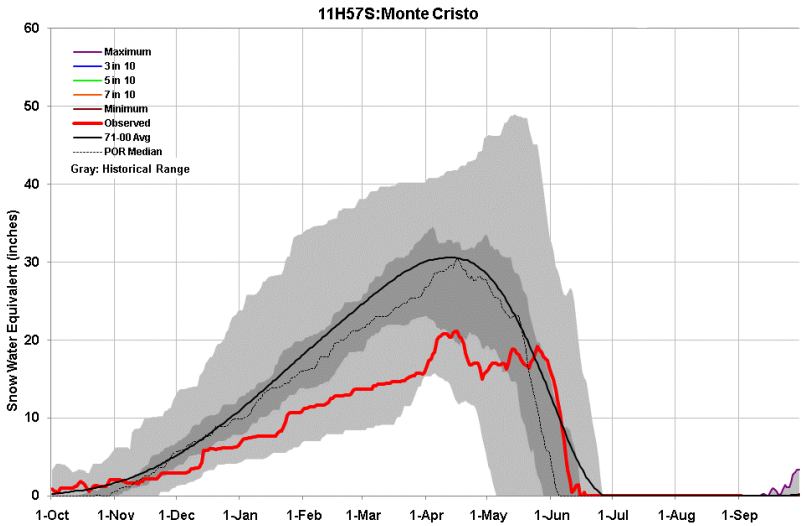
Data on precipitation, soil moisture, soil temperature, reservoir storage, and streamflow are analyzed and presented in the Utah Climate and Water Report, Sept. 2010 at www.ut.nrcs.usda.gov/snow/climate/. These data analyses can be used to increase irrigation efficiency and agricultural production. As with all data and analyses, there are limitations due to data quality, quantity, and spatial application.



1 www.richcounty.org

NRCS Snow Survey

The NRCS Snow Survey Program provides mountain snow pack data and stream flow forecasts for the western United States. Common applications of snow survey products include water supply management, flood control, climate modeling, recreation, and conservation planning. Timing and amount of snow pack, along with temperature fluctuations throughout the spring and summer months, impact the amount of water available for irrigation throughout the growing season. The Utah Snow Survey provides valuable data that is used to help manage water usage to maximize the water that is available. During dry years, it becomes very challenging to provide adequate water to landowners. As a result, it is common to have inadequate water resources available to sufficiently supply the land with irrigation needs for maximum crop growth.



The graph above takes historical average data to predict expected available water throughout the growing season. It also provides valuable data for determining range forage conditions. For more information contact the Natural Resources Conservation Service. Information about the Utah Snow Survey Program is at www.ut.nrcs.usda.gov/snow.

Soil Climate Analysis Network

Soil Climate Analysis Network (SCAN) stations are primarily located on low to mid-elevation, agriculturally important landscapes that maintain representative soils. Elevations range from 3,000 to 7,000 ft. The SCAN network provides real-time soil moisture and temperature data coupled with additional climate information for use in natural resource planning, drought assessment, water resource management, and resource inventory. SCAN stations are situated on non-irrigated, native soils, are remotely located, and collect hourly atmospheric and soils data that are available to the public online.

In Rich County the Buffalo Jump SCAN site is located near Woodruff.

Basic Resources

Plants

Crops and Pasture

Irrigated crops in the county are alfalfa, small grain, and raspberries. Most of the small grain and alfalfa is used locally for supplemental feed for livestock. Irrigated pastures consist of native, introduced and improved grasses. Low precipitation and a short growing season are the main factors limiting the production of non-irrigated crops in the county. Wheat is the principle non-irrigated crop. Steep sloping areas of non-irrigated cropland and moderately to severely eroded areas should be converted to permanent pasture or rangeland. Maintaining these marginal areas in grass provides better protection from erosion.

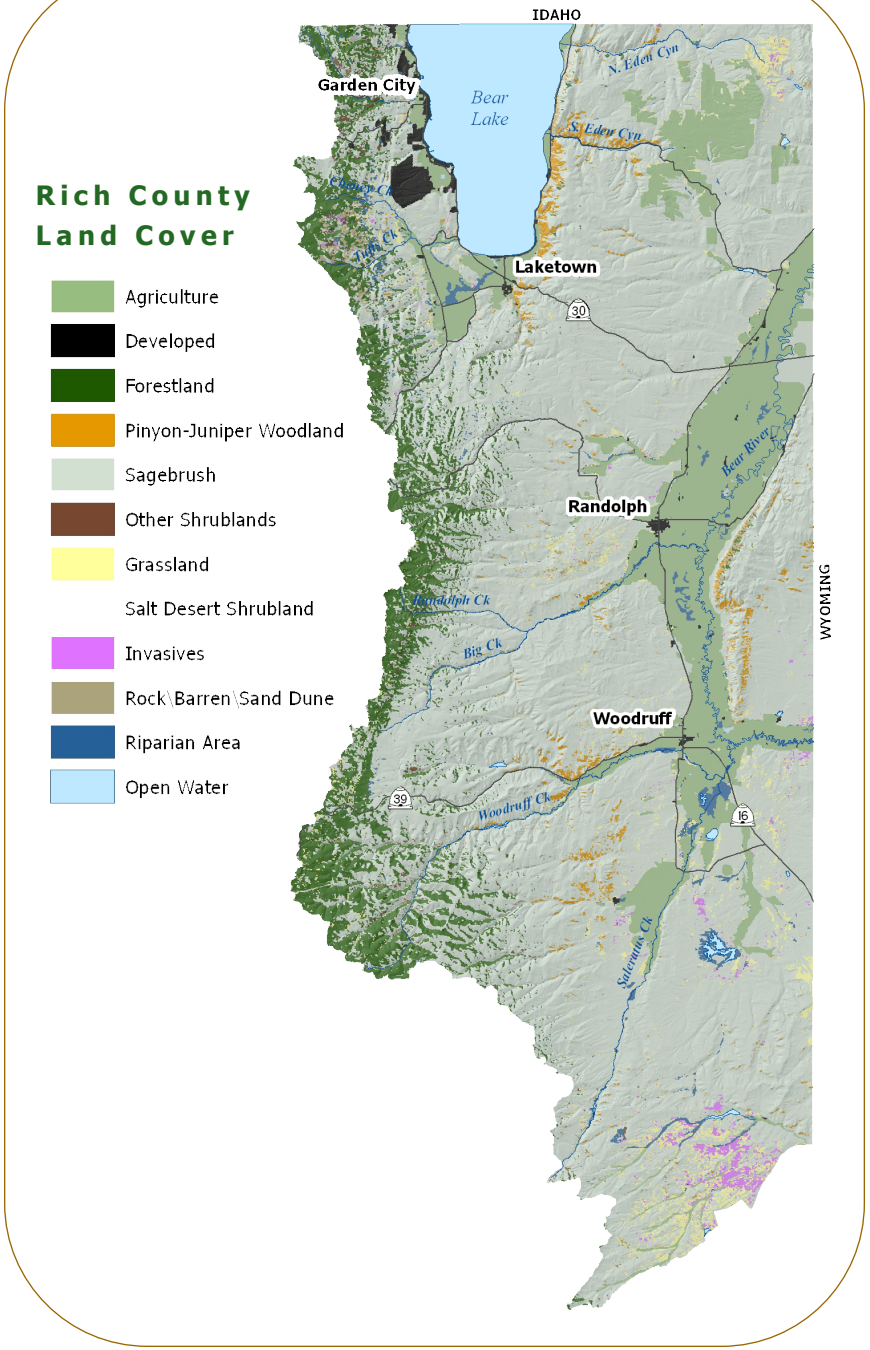
Rangeland

Rangeland is the most important agricultural resource in Rich County, at approximately 494,000 acres. Dominant vegetation includes perennial grasses, shrubs, and forbs; some areas support aspen, juniper, and coniferous trees.

Rangeland is used primarily as forage for cattle, sheep, and big game or upland game species. Generally, slopes are less than thirty percent, though some are much steeper. Livestock are wintered in hayland areas and are supplemented with hay harvested from the hayland. Brush management is needed on approximately 50 percent of the rangeland and 90 percent can be improved by proper management. Fires and excessive use have caused deterioration of some rangelands.

Woodland

About 15 percent, or approximately 100,000 acres is woodland. Soils in these areas are generally on steep slopes and at higher elevations. Soil properties have a strong influence on the adaptation and growth of trees and management. Soil texture and depth of the soil material limit water holding capacity and thus influence tree growth. Generally, trees grow fastest and tallest on the more productive soils. Understory vegetation consists of grasses, forbs, shrubs, and other plants. Some woodland areas , if well managed, produce enough understory vegetation to support grazing of livestock or wildlife, or both, without damage to the trees.



Forest Land

Forested land covers 70,000 acres or approximately 10 percent the county. These forests overlay some of the state's most valuable watershed, wildlife, and recreation areas. They are capable of providing multiple benefits as well as posing risks for nearby homes and communities if not properly managed. Threats and challenges include the degradation of watersheds and potentially irreversible changes in forest health that could result from poor management such as overgrazing, excessive timber harvest, and residential or recreation related development and surface mineral development.

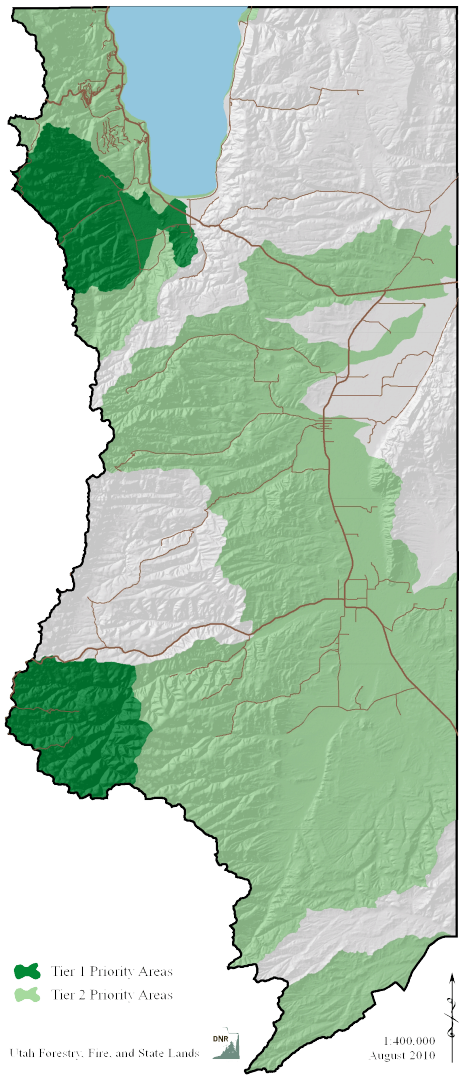
The expansion of residential or recreational homes on east facing slopes west of Garden City and Laketown increases the risk of fire at the urban forest interface and to homes and property improvements. Further new home owners responsible for large lots in residential subdivisions may not understand the need to control noxious weeds or the management needed to maintain and/or enhance desirable vegetation cover.

Rich County forests are in good condition. Mountain pine beetle and spruce beetle though present, are not now a significant threat. Generally the risk for catastrophic wildfire is low, yet accumulation of fallen timber, understory trees and brush would contribute to the intensity of a fire. Continued forest harvesting, thinning of understory trees, and/or fuels reduction are encouraged and will reduce the risks of epidemic populations of beetles.

A recent assessment by the Utah Division of Forestry, Fire and State Lands shows the location of areas that the most benefit can come from doing forest (tree) related projects. This includes urban and community forestry, tree planting, wind breaks, and projects in riparian areas. Rural forest landowners, ranchers and farmers have many opportunities to improve forest lands through the wise use of this resource, conservation plantings, and following best management practices.

State Forestry Assessment

The Utah Division of Forestry Fire and State Lands Statewide Forest Resource Assessment, completed in June 2010, provides analysis of forest conditions and trends, addresses current state and national resource management priorities, and identifies priority rural and urban forest landscape areas. The assessment is online at ffsl.utah.gov/stateassessment.php



State forestry assessment showing the highest priorities, based on watershed boundaries, for use of Utah Division of Forestry, Fire & State Lands program funds.

Basic Resources

ANIMALS

Agriculture: Cattle and Sheep

Livestock grazing is the most important agricultural enterprise in Rich County with approximately ninety percent of the total land area used for cattle and sheep.

The economy of Rich County has been largely dependent on livestock since settlement of the county. Large ungulate grazing (wild and domestic) can be either beneficial or detrimental to watershed health, especially riparian areas, depending on management. Contrary to popular opinion, 'stocking rate' is less important than managing the timing of grazing. Harvesting forage with domestic livestock on a rotational basis creates nutritional opportunity for wildlife.[1] Managed grazing encourages new plant growth and improves forage health over time.

At-Risk Species

The Utah Division of Wildlife Resources maintains information on Utah plants and animals classified as at-risk. The state's objective is to prevent at-risk species from being listed by the federal U.S. Fish and Wildlife Service as Threatened, Endangered, or Candidate Species under Endangered Species Act. In March 2010, the greater sage grouse was listed as a candidate species (see **Sage-Grouse Habitat section of this report**). A candidate species does not receive statutory protection, though it increases the urgency for state and federal agencies to give priority to and manage to improve habitat and mitigate impacts. Further, the yellow-billed cuckoo is listed as a Candidate Species. The black-footed ferret, previously classified as endangered, is no longer listed.

Aquatic Life

Important fish species are rainbow, brook, cutthroat, and brown trout. Bear Lake provides habitat for other species such as mackinaw, whitefish, and the Bonneville Cisco. Small reservoirs and privately owned ponds in the area support trout fisheries. Natural streams provide habitat for beaver, muskrat, and mink.

Upland Game

Utah statewide management plans for mule deer, elk, rocky mountain goat, moose, bighorn sheep and pronghorn are at wildlife.utah.gov/hunting/biggame/

1 Bill Hopkin, Utah Grazing Improvement Program

At-Risk Species

Included on Utah's State Listed Conservation Species Agreement with the U.S. Fish and Wildlife Service and Species of Concern in Rich County:

- **Greater Sage-Grouse***
- **Yellow-billed Cuckoo**
- **Black-footed Ferret**
- **Bear Lake sculpin**
- **Bear Lake springsnail**
- **Bear Lake whitefish**
- **Bobolink**
- **Bonneville cisco**
- **Bonneville cutthroat trout**
- **Burrowing owl**
- **California floater**
- **Ferruginous hawk**
- **Lewis's woodpecker**
- **Northern Goshawk**
- **Pygmy rabbit**
- **Western toad**
- **White-tailed prairie-dog**

This list was compiled using known species observations from the Utah Natural Heritage Program within the last 20 years. A comprehensive species list, which is updated quarterly, can be obtained from the Utah Division of Wildlife Resources website: dwrcdc.nr.utah.gov/ucdc/

*Greater Sage-Grouse status as Candidate species verified and confirmed from U.S. Fish & Wildlife Service News Release *Interior Expands Common-Sense Efforts to Conserve Sage Grouse Habitat in the West*, dated 3/5/10, available at www.fws.gov/news/NewsReleases/

Pygmy Rabbit

The pygmy rabbit, *Brachylagus idahoensis*, occurs in western (primarily northwestern) United States. It can be found in northern and western Utah, where it prefers areas with tall dense sagebrush and loose soils. Inactive periods are spend in underground burrows. As its name implies, the pygmy is the smallest of all rabbits in Utah and all of North America.[1]

Bonneville Cisco

The Bonneville Cisco, *Prosopium gemmifer*, is one of three whitefish species found only in Bear Lake. They generally inhabit cool, deep water. In January, the small sardine size fish move to shallow water, where they form large schools and spawn over the lakes' limited rocky areas. Bear Lake's eastern shoreline is a popular location for sport fishing, where great numbers are captured using dip nets.[1]

1 Utah Conservation Data Center source data from Biotics Database. 2005. Utah Division of Wildlife Resources, NatureServe, and the network of Natural Heritage Programs and Conservation Data Centers.

Data Sources

Primary and secondary habitat information is in the Utah Comprehensive Wildlife Conservation Strategy located at http://wildlife.utah.gov/cwcs/10-01-21_utah_cwcs_strategy.pdf

For general questions or comments regarding wildlife in Utah, contact the UDWR at: 801-538-4700 or DWRcomment@utah.gov or the Northern Region Office Habitat Manager – Scott Walker (801) 476-2776; scottwalker@utah.gov.

Humans: Social and Economic Considerations

Since 1990 Rich County's population has grown by about twenty-five percent. At 2,329 in 2009, this makes Rich County one of the least populated in the state. Economic activity in the area is geographically split. Agriculture/ranching dominates the southern two-thirds of the county, while tourism-related business dominates in the north– the Bear Lake area.[1]

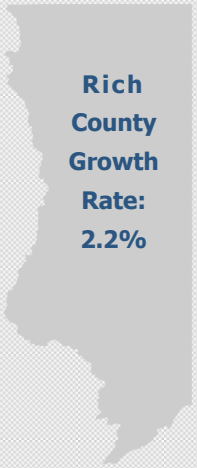
Labor Force

Rich County bases it's livelihood on agriculture (ranching), tourism, and government which, together, account for over half of nonfarm jobs. While the ranching activity is fairly stable year round, the tourism business is not. Off-season employment averages between 480 and 580 workers. During the summer peak season, employment counts run between 650 and 800. July has the most employees.[1]

One in five jobs in the county is in the hospitality industry. Government is a strong employer contributing one-third of total jobs. Although a relatively small part of the Utah economy, this corner of the state provides an important place for food production and recreation.[2]

Livestock grazing and the related feed crops are an important component of Rich County's economy.

Rich County Population Data



Area name	Rich
Period Year	2009
Population	2,329
Births	38
Deaths	16
Natural Increase	22
Net Migration	29
Annual Change	51
Annual Rate of Change	⇧ 2.2%

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

1 jobs.utah.gov/jsp/wi/utalmis/countyprofile.do 2 jobs.utah.gov/opencms/wi/regions/northern/rich/richfs.pdf

Recreation

Rich County provides a vide variety of recreational activities. Natural streams and lakes provide fishing and recreation for local residents and tourists; some streams and lakes provide year-round fishing. The greatest number of visitors are attracted to Bear Lake for water-related recreation and to enjoy its aesthetic value. In January, fishing for the Bonneville Cisco is a major event for fishermen. No other lake in the continental United States offers such an opportunity.

Rich County is noted for its hunting opportunities. Hunters return to the county year after year because of the abundance of sage grouse, ruffed grouse, blue grouse, and big game animals such as mule deer, elk, and moose. Opportunities for waterfowl hunting are also available.

There are several private and state recreational facilities on the shores of Bear Lake. The state parks provide beaches, overnight camping, and swimming. The private facilities provide lodging, water-oriented recreation, golfing, horseback riding, and other activities.

The last several years have shown an increase in the number of visitors to Rich County, especially in the Bear Lake area.

Sailing on Bear Lake

Virtual Utah
www.earth.gis.usu.edu/utah/

Virtual Utah offers aerial imagery (photography) for most of the state from 1993/97, 2003, 2004 and 2006. Using aerial images from multiple dates allows you to see how land use has changed over the years! Other geographic datasets include land cover, hillshade (shaded relief), elevation data, and other satellite images.

References and Credits

References

Soil Survey of Rich County Utah, 1982, created by the U.S. Dept. of Ag., Soil Conservation Service, Forest Service, Dept. of Interior and Bureau of Land Management in cooperation with the Utah Agricultural Experiment Station. A pdf of the report can be accessed at the NRCS website: http://soildatamart.nrcs.usda.gov/manuscripts/UT604/0/rich.pdf

State of Utah geographic databases from the Automated Geographical Reference Center (AGRC), a Utah State Division of Information Technology. Website: http://agrc.utah.gov/

Rich County Land Ownership data produced by Utah School and Institutional Trust Lands Administration and the U.S. Bureau of Land Management, April 2010

The 2003 noxious weed list was obtained from the State of Utah Department of Food and Agriculture (UDAF). For more information contact Steve Burningham, 801-538-7181 or visit their website at ag.utah.gov/plantind/noxious_weeds.htm

Soil Maps: Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey, accessed August 6, 2010, available online at websoilsurvey.nrcs.usda.gov/

GAP (what does this stand for?) Analysis [vegetation map]
This list needs to be reviewed and developed to accurately and briefly describe data sources that generally apply to the report and/or have not be cited in the document individual sections

Credits

Cherie Quincieu – Editor/Writer/Document Design, UACD
Thayne Mickelson – Program Coordinator, Utah Conservation Commission, UDAF
Gordon Younker – Technical Review/Partnership Coordination, UACD

Credits (continued)

Ann Johnson – GIS Specialist/Maps/Illustrations, UDAF
Patti Todd – GIS Specialist, Natural Resources Conservation Service

Individual Resource Contributors/Specialists

Locally Important Farm Land
Bracken Henderson – UACD
Jon Hardman, NRCS

Noxious Weeds
Bracken Henderson – UACD

Irrigation Canals
Gordon Younker – UACD
Lyle Shakespear – UACD
Bob Fotheringham – Former Utah Division of Water Rights Northern Area Engineer

Grazing Land
Taylor Payne – UACD
Bill Hopkin – Reviewer, Utah Department of Agriculture and Food

Sage Grouse Habitat
Todd Black – Utah State University Cooperative Extension Service

Soils
Gordon Younker – UACD
Patti Todd – Natural Resources Conservation Service

Water
Taylor Payne – UACD
Carl Adams – Reviewer, Utah Division of Water Quality

Air and Climate
Thayne Mickelson – UDAF

Plants
Mike Erickson – Utah Division of Forestry, Fire, and State Lands

Animals
Rory Reynolds – Utah Division of Wildlife Resources

Social and Economic Considerations
John Bennett – Utah Governor's Office of Planning and Budget
Evan Curtis – Utah Governors' Office of Planning and Budget