Duchesne County Resource Assessment

January 2012

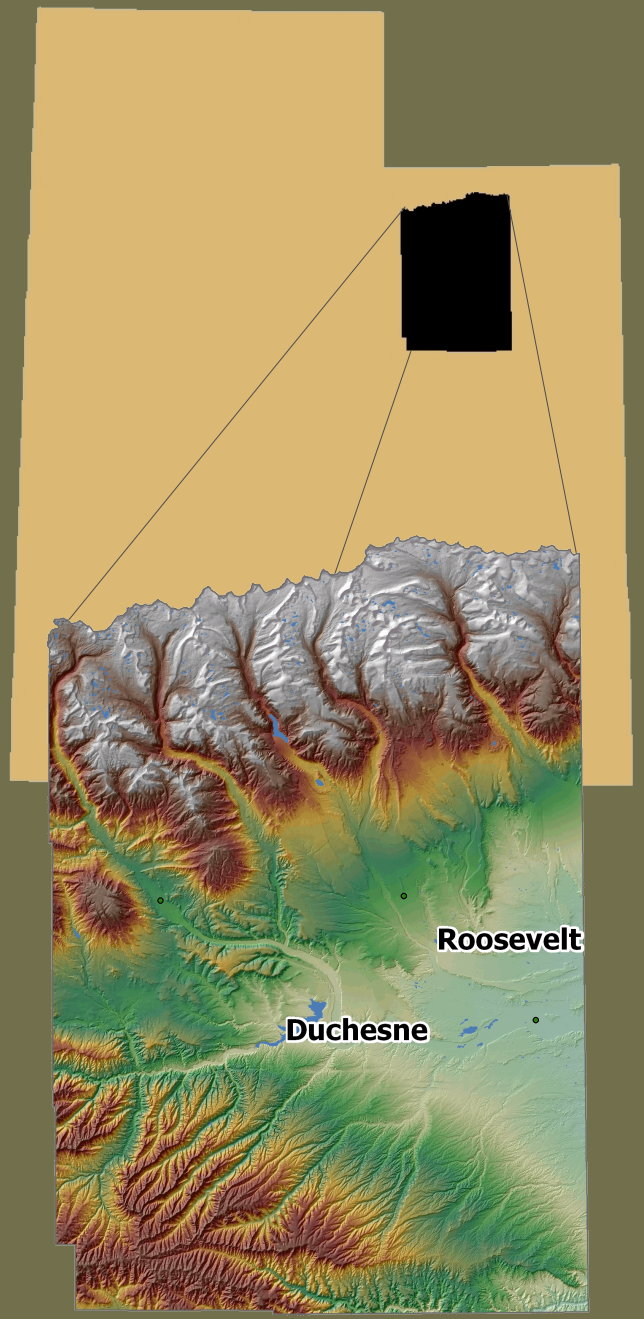
Conserving Natural Resources For Our Future

Duchesne County Conservation District

UACD
Utah Association of Conservation Districts

UDAF
Utah Department of Agriculture and Food

USDA NRCS Natural Resources Conservation Service



Acknowledgments

Duchesne 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 6
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
Uintah 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

Why a Resource Assessment?

The Duchesne County 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 Duchesne 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:

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Natural Resource Priorities and Concerns

The Duchesne County Conservation District has identified five natural resources concerns as priorities. These priorities receive special emphasis because of their immediate and long-term significance to Duchesne County.

1. **Water Quality and Quantity:** Irrigation system delivery, water storage, salinity, water rights
2. **Pasture and Rangeland:** Improve plant health, grazing management, soil erosion and nutrient loss control, encouragement to monitor to target needed improvements
3. **Noxious Weeds:** Weeds limit yields and out compete native species
4. **Energy:** Reduce energy needs by utilizing conservation measures, increasing renewable energy sources, increasing use of natural gas, and supporting the petroleum extraction industry in the county
5. **Air Quality:** Support measures that will decrease the county's nonattainment status declaration

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: Prime farmland, farmland of local importance, Duchesne County soils
Water: Water quantity and storage, quality, irrigation
Air/Climate: Air quality, climate, NRCS Snow Survey
Plants: Crops and pasture, rangeland, forestland, woodland
Animals: Livestock, endangered and at-risk species, aquatic life, game
Humans: population, economy, labor market, recreation

Introduction

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 was 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, which are divided into seven zones.

Conservation Progress

Since the organization of the Uintah Basin Conservation District in 1940, which included Duchesne and Uintah counties, great strides have been made towards increasing and sustaining natural resources. In 1990, the Uintah Basin Conservation District was split by county and formed the Duchesne County Conservation District. Board members serve on various other boards in efforts to address natural resources needs. Resource assessments have provided a framework for future direction in addressing those needs. This resource assessment continues to identify and address the resource concerns of Duchesne County.

Resource Assessment Outreach

In 2010, the Duchesne County District Board held a meeting to discuss and update the resource concerns for Duchesne County. Those attending included Duchesne Conservation District board members, the Utah Department of Agriculture, the Utah Division of Water Quality, USDA-Farm Service Agency, USDA-Natural Resources Conservation Service, local government officials, and others. The Duchesne Conservation District later held a public meeting with federal, state, and local agencies to determine areas and resources of concern in the county. These meetings allowed the identification of priority resource concerns for Duchesne County. The groups discussed the reasoning behind concerns and recommendations for addressing them.

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.

Great "rollers" moves across the land during the Dust Bowl.

Duchesne County Overview

Background

Duchesne County starts at the west gate of the Uintah Basin and extends into its heart. The county is bordered on the east and west by Uintah and Wasatch counties, respectively, on the north by Summit County, and on the south by Carbon County. The state's highest mountain, King's Peak at 13,528 feet above sea level, is located in the county's Uinta Mountains. Major streams running through the county include the Strawberry, Duchesne, Lake Fork, and Yellowstone rivers. The county consists of 3,238 square miles and averages 5.7 people per square mile.

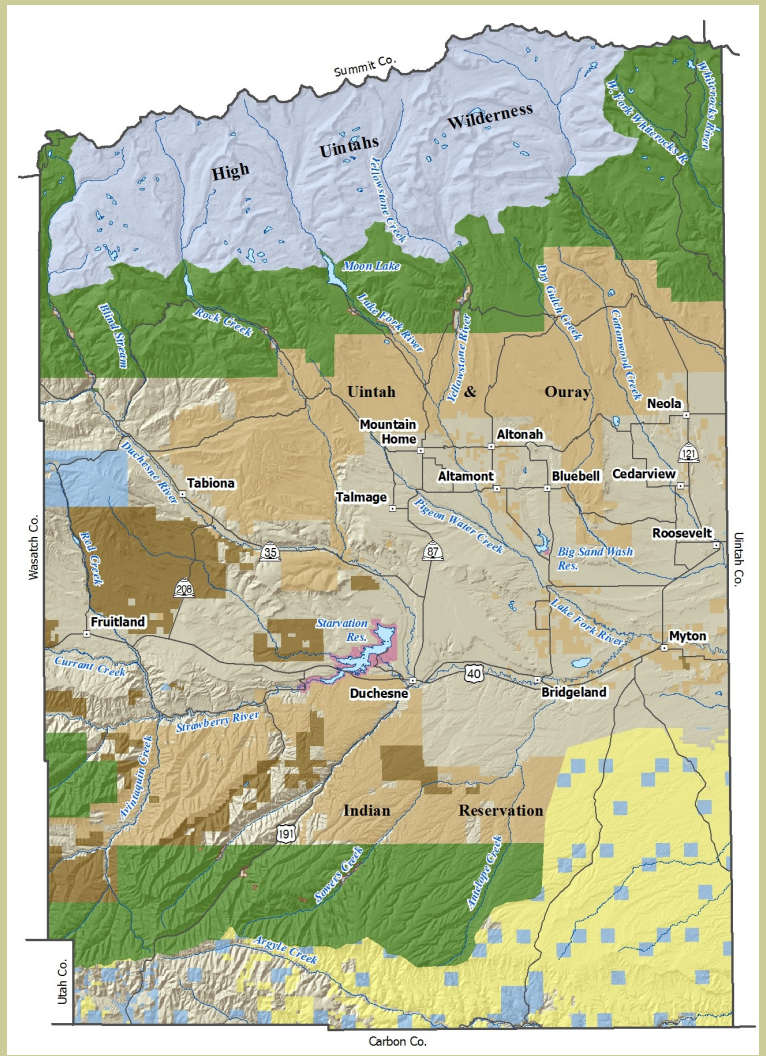
The average elevation of the county is 5,510 feet. The average rainfall is 9.73 inches, ranging from 7 inches in the Roosevelt area to 33 inches in the highest elevations of the Uintah Mountains. The average high temperature is 87˚F in July, while the average low temperature in is 8˚F in January.

The high elevation and the harsh weather make agriculture more challenging in the county than in other areas of the country. The livestock industry dominates the agricultural production in the county. The county's agricultural base is mainly made up of cattle, hay, and sheep. The base for 2010 includes 26,000 head of beef cows, 2,100 head of sheep, 40,000 acres of hay, and 4,700 acres of corn. The total value of crops and livestock products produced in 2010 was $46,047,000.

In 2010, the total population of the county was 18,607, with a population percent change of 29.5% from 2000 to 2010. Approximately 4.5% of the population is Native American, most being of the Ute Tribe. Another 6% of the population is of Hispanic decent.

The oil and gas industry remains a mainstay of Duchesne county's economy. Other important industries include government services, trade, transportation, and utilities. The growth of Ute tribal enterprises also gives a boost to the county's economy. The health of the economy is based largely on oil exploration and extraction. The oil and gas industry directly accounts for nearly one-fifth of all jobs within the county.

Duchesne County Land Ownership Map



From left to right, top to bottom: Duchesne River, Kings Peak, Upper Stillwater Dam, Moon Lake

Water Quality and Conservation

Water is considered the blood of the Uintah Basin. The majority of the Duchesne County water supply comes from the Uintah Mountains, with the Forest Service overseeing this federal land. This life sustaining resource is utilized by agriculture, residential, industrial, and recreational users. The top priority concern of the county is the maintenance and enhancement of the water storage and delivery systems within the county.

Challenges

Duchesne County water users face many challenges that impact how water is developed, controlled, and used. Some of these challenges include the following.

- Increased government regulations and the high cost of planning and constructing storage and delivery systems makes it difficult to construct and maintain additional facilities.
- Irrigation companies and water organizations oversee the use and delivery of water within the county. With all these entities, it makes it more complex to coordinate comprehensive water storage and delivery in the county.
- Salt entering the Colorado River drainage from poor irrigation methods and lack of understanding from area producers.
- Threats to the Uintah Basin water rights.

Stillwater Dam, 2011.
Photo courtesy of Jared Bruton.

Needed Actions

- Circumvent onerous federal regulation by changing focus of water storage sites to privately owned smaller storage areas.
- Circumvent onerous federal regulation by storing water off channel, away from “waters of the U.S.”.
- Increase coordination with the Ute Tribe in finding water storage sites on lands within the reservation.
- Increase coordination amongst the water management entities to ensure the best and most timely actions dealing with storage and delivery systems are achieved.

Needed Actions (cont.)

- Encourage participation in the Colorado River Basin Salinity Control Program, as well as other programs, to improve irrigation management and water conservation.
- Determine what can be done to keep water rights in the basin.
- Increase educational efforts in training water managers, producers, public representatives, and the public on water storage needs, water delivery systems, and water conservation efforts.

Additional Issues and Opportunities

Due to the lack of vegetation in this arid area, heavy storm waters can cause flash flooding and erosion, bringing tons of sediment and debris into the rivers and water areas. These events affect the watershed health and water quality. Some practices that may help to alleviate this problem include flood structures, dams, catch basins, gully plugs, and reseeding grass ways.

The county has a wide fluctuation of water availability from year to year. Some areas are still lacking water storage and use snowpack and stream runoff as a water supply. Often this creates a problem of too much water in the spring and not enough water in the summer. More water storage would be very beneficial to this areas. Continued work with the salinity control program and implementing improved irrigation systems and piping canals is important to water conservation and water quality. A dam in Uintah Canyon and other areas has been proposed and needs to be considered.

With the growing population of the county, culinary water is an increasing concern. A proposed pipe from the Duchesne Valley Water Treatment plant at Starvation Reservoir to the Roosevelt area would supply culinary water for that area. In addition, a secondary water supply pipeline is being installed from Sandwash Reservoir. The Duchesne Valley Water Treatment plant supplies 75 to 80% of the existing population of Duchesne County, as well as to some of Uintah County.

Coordination between all agencies and the checker-boarded land ownership continues to be a challenging aspect of any water project. There is a need for more communication and cooperation between all parties to meet the water concerns in Duchesne County.

Pasture, Nutrient Management, & Rangeland

Duchesne County's agriculture production is based mainly on the rearing of livestock and crops to support the livestock industry. As part of the livestock industry, the use of pastures and rangelands are an important tool used in the area. Pasture and rangeland health is key to long-term watershed health and profitability. 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. Proper nutrient management is key to water quality concerns for animal feeding operations that combine the use of pastures/rangelands and corals for confined feeding of animals.

Pasture and Nutrient Management

Challenges

- Most land used for pasture consists of soils that are not suitable for other crops. These include those areas that are too wet, dry, rocky, or shallow.
- Due to lack of grazing management, or inability to utilize grazing management, most pastures are not very productive and are over-used.
- Most pastures consist of native grasses or those grass species that can withstand continuous livestock use.
- Understanding of grazing management including irrigation, fertilizer, rotation, and noxious weed control, including the Russian olive.
- Improvements to inefficient irrigation systems.

Needed Actions

- Responsible and innovative grazing management.
- Noxious and invasive weed control.
- Irrigation improvements.
- Nutrient management is crucial to pastures and should include soil testing.

Rangeland Management

Challenges

- Weeds continue to be a concern for rangeland and watershed health.
- Pressures from the endangered species act and the potential listing of the sage grouse.
- Increase cost of energy impacting both transportation and production costs.
- Challenges from interest groups on public land grazing.
- Energy production impacts on desert range.
- Insects that include grass hoppers and crickets.

Needed Actions

- Responsible and innovative grazing management.
- Brush management.
- Wildlife management, including wild horses.
- Sage-grouse habitat needed to prevent listing as endangered species.
- Improved monitoring efforts to assist with management decisions.
- Workshops that promote and improve grazing education.
- Weed control and cooperation with all land agencies.

Photo courtesy of Troy Cooper, USU Extension

Noxious Weeds

Invasive noxious weeds have been described as a raging biological wildfire – out of control, spreading rapidly, and causing enormous economic losses. Weeds often reduce crop yields and can damage watersheds, increase soil erosion, negatively impact plant and animal communities, and adversely affect outdoor recreation.

Challenges

- Russian olive invasion into pasture land and range land.
- Neighboring lands can harbor weed stock, making prevention difficult in adjacent fields.
- A mix of land ownership including federal, state, tribal, and private makes weed control efforts hard to coordinate.
- Lack of effort put into controlling weeds while the problem is small leads to great effort and expense being required to control an exponentially larger infestation.
- Limited resources available to control weeds.
- Increased mobility of seeds due to human activity.

Musk Thistle

Needed Actions

- **Prevention.** Preserving and protecting lands not presently infested is the first line of defense against aggressive noxious weeds. Prevention requires awareness and action by land managers, as well as the general public, to recognize, report, and control new infestations before they have a chance to establish, expand, and spread.
- **Coordination.** Working with all land owners and managers to ensure a well funded and coordinated effort in prevention as well as an attack against already established weeds.

Needed Actions (cont.)

- **Quick Response Team.** A team of volunteers in the area need to be able to respond to controlling noxious weeds that haven't been established in an area. This team should have the ability to respond to these early invading weeds regardless of land ownership.

- **Education.** Continuing efforts to inform and educate the public, land managers, and property owners.

- **Identification.** Mapping where the weeds are and where they are spreading is essential in capturing the full extent of a weed and how best to control or eradicate it. This also helps in obtaining funding for the control of weeds.

- **Funding.** Due to the lack of funding coordination and personnel, a lot of areas go untreated.

- **Beneficial Plantings.** Many times when controlling invasive weeds the target weed is controlled but other noxious weeds grow back. Planting beneficial plants and seeds helps to stop this cycle.

Russian Olive

Duchesne County Noxious Weeds of Local Concern

- Perennial pepperweed (tall whitetop) (*Lepidium latifolium*)
- Johnson grass (*Sorghum halepense*)
- Russian olive (*Elaeagnus angustifolia*)
- Water hemlock (*Circuta maculate*)
- Yellow toadflax (*linaria vulgaris*)

Utah 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 and Food under Section 4-17-3, Utah Noxious Weed Act.

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

Energy

The boom-and-bust cycle of the Uintah Basin over the last 50 years has been based on the oil and gas extraction industries. These industries have proven critical to the economy of the Uintah Basin. Because of the importance of this industry in the basin, all aspects of the economy are impacted by these extraction industries. It is important for the county to ensure that the stability and soundness of the extraction industries are doing well. There are many challenges facing these industries that need to be identified and addressed for the basin.

Challenges

- **Permitting.** Permitting has been identified as one of the greatest concerns for the oil and gas extraction industry in the Uintah Basin. Sixty percent of the county is federally owned, and much of this land could be used for oil and gas extraction. Obtaining permits on federal land is becoming more and more difficult due to increasing environmental controls.

- **Distribution.** Distributing these commodities out of the basin has limited the growth of the oil and gas extraction industry. Although there have been improvements in gas distribution, it could still be a limiting factor for future growth. There are many other distribution challenges facing these industries, exclusive to the Uintah Basin, including the following.
  - No railroad service.
  - No oil pipeline.
  - For winter travel, high mountain passes are used by highway traffic.
  - Geographic isolation from refineries and population centers.

- **Environmental.** There are many natural resources that need to be preserved and protected within Duchesne County. However, the county needs to find the right balance between protection and economic development. The oil and gas industries have many environmental concerns. They are becoming overly cautious in investing in long-term infrastructure. Increasing environmental concerns may become the greatest limiting factor for expansion of oil and gas extraction.

- **Private Land Ownership.** Surface rights and mineral rights are usually separate, thus creating conflict between the owners of these rights. Many landowners feel violated, or at least not compensated, for the imposition of well drilling on their property.

Photo courtesy of Troy Cooper, USU Extension

Challenges (cont.)

- **Oil Shale.** Within the Uintah Basin there lies a massive amount of oil shale. This oil shale has the potential to provide an amazing amount of fuel for the world. Currently, the extraction of the energy from this resource has not proven economically viable. However, with recent technological breakthroughs, extraction may become feasible.

Needed Actions

- **Permitting.** Currently, many local politicians, including county commissioners, are doing all they can to encourage federal authorities to increase permitting on federal grounds and decrease regulatory burdens. We encourage the continuation of these efforts.

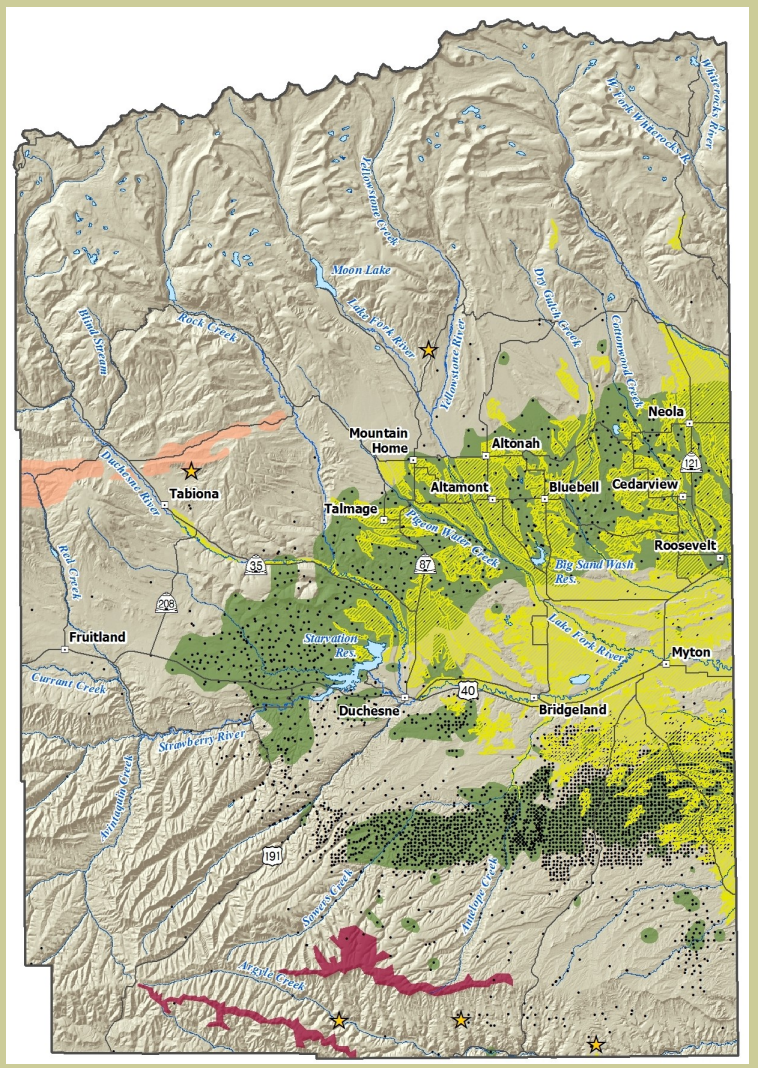
- **Distribution.**
  - Promote the development of infrastructure to more freely transport oil and gas raw materials from the Uintah Basin to refineries and population centers.
  - Encourage the development of local refineries.
  - Promote the use of natural gas vehicles within the basin.

- **Environmental.**
  - Seek the appropriate balance between economic development, protection, and preservation of natural resource areas. In order to find this balance, there needs to be open communication between regulators and industry representatives.
  - Many of these environmental issues will be debated on a national or federal level. We encourage our local representatives to ensure that the Uintah Basin's concerns are identified and discussed.

- **Land Ownership Issues.**
  - Encourage open communication between well drillers and private land owners.
  - Ensure closed sites are reclaimed in a timely and appropriate manner, utilizing native and introduced seeds to ensure erosion control.

- **Oil Shale.** Promote the development of oil shale extraction technologies.

Duchesne County Energy Resources



Air Quality

During the winter of 2009-2010 in the Uinta Basin, limited air quality monitoring revealed periods of elevated daytime ozone concentrations exceeding the current U.S. Environmental Protection Agency (EPA) standards. Although the Uinta Basin 2009-2010 winter measurements were not made at regulatory stations, the results raised concerns regarding the winter ozone levels in the region. Of particular concern was the potential impact these ozone levels might have on the health of Uinta Basin residents. Concern was also expressed that a failure to meet EPA standards for ozone levels could result in a nonattainment designation for Uinta Basin's counties, a consequence that could severely impact the economy of eastern Utah and the state as a whole.

The results of the basin-wide winter ozone study showed elevated wintertime ozone concentrations throughout most of the Uinta Basin during wintertime temperature inversion events. Results also showed that the lower elevation monitoring locations, with the greatest number of nearby wells, tended to have the highest ozone concentrations and the greatest number of exceedances. Locations at higher elevations, approximately 5,500-6,000 ft above sea level, had relatively few exceedances, despite being near significant numbers of oil and gas wells.

Challenges

- There have been no air quality studies that meet EPA monitoring standards at this time. The 2009-2010 study identifies a problem, however, it takes three years of EPA monitoring to show exceedances of EPA standards prior to declaring an area as nonattainment. If a portion of the Uintah Basin is identified as being in nonattainment, then EPA is obligated to place measures to ensure attainment. These measures can, at times, be severe in nature and will negatively impact any potential economic growth for the area.
- Many of the roads found within the county have not been paved. The desert climate found in most of the county creates roads are usually dry and conducive to producing dust when driven upon. When a dirt road is overly utilized, the dust can be destructive to the local area.

Needed Actions

- Encourage accurate and concise air monitoring studies that meet EPA standards.
- Support all actions that will decrease the potential of being declared a nonattainment area.
- Urge the oil and gas extraction industry to support the air quality monitoring efforts and quickly respond to all air quality concerns.
- Identify dirt roads that need improvements for dust control.

Moon Lake

Soil

Soils in Duchesne County vary considerably, as do most of the soils in the Uintah Basin and the Intermountain West. Layers of mancos shale are prevalent in Duchesne County and contain large amounts of salts. Flood irrigating this land raises these salts to the surface, affecting yield and water quality when runoff leaves the land. Deep percolation drives the salts down further into the soil and thus into the water table. This salty water then seeps into the Green River, which is a tributary of the Colorado River where high salinity is a problem.

To help alleviate this problem, farmers are being encouraged to move from flood irrigation to sprinklers. These sprinklers are more efficient, giving just enough water to help counter the salt build-up on the surface of the land, as to not further contaminate the Colorado River.

The soil in Duchesne County is also very high alkaline.

Duchesne County is currently one of the few counties in the entire United States that is yet to have its Digitized Soil Survey completed. Therefore, some soil information is not readily available to the general public.

Soils used for agriculture production vary across the county, from most of the higher irrigated lands consisting mostly of shallow rocky soils used mostly for grass and pasture production to lower elevation lands adequate for small grains and hay land production. Irrigation is required for all croplands in Duchesne County. Dry farming in this area has been unsuccessfully tried in the past. Rangelands consist mostly of forest land used as summer range and dry desert used as winter range.

A field the first and second years after a salinity control project was installed.

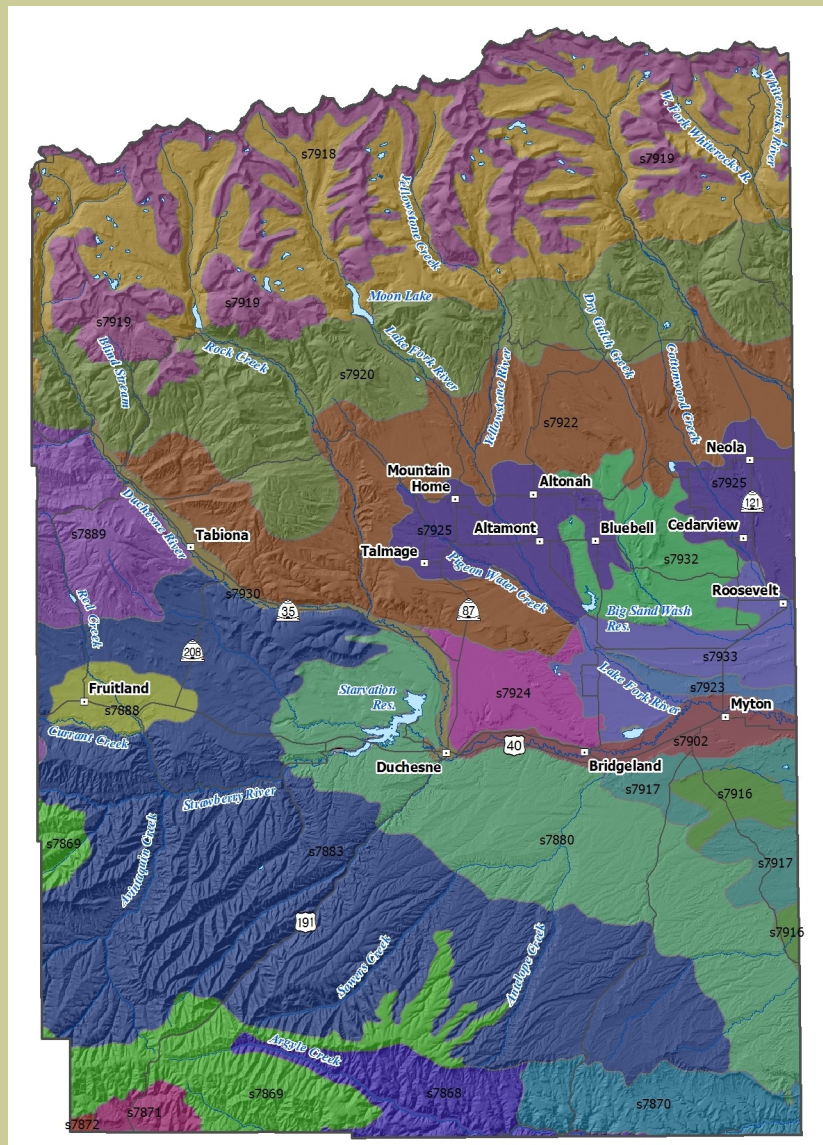
Erosion

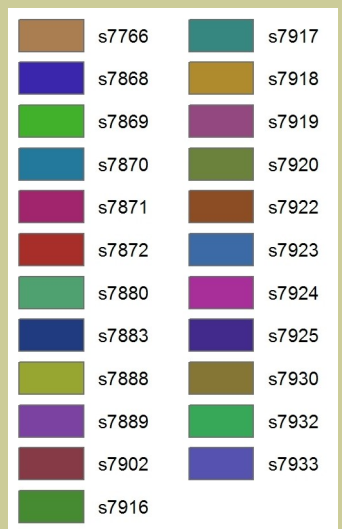
Due to the dry desert conditions in the Uintah Basin, wind erosion is common. Also, with the expansion of the energy fields, which include a large amount of vehicle traffic, the dirt roads' soil particles loosen and become more susceptible to wind and water erosion. With the improvements to irrigation systems, water erosion is mostly related to flash flooding caused by intense summer storms. With the lack of vegetation on desert lands, any large storm event causes erosion impacts.

Contaminants in Soil. Most soil contaminants are related to salinity and selenium in the soils. Other micro nutrients have been found in high enough levels to be a concern to water quality when leaching from the soils takes place.

Fertility. Most lower elevation soils are low in organic matter and fertility is generally low. Forest lands have adequate organic matter and fertility. Agricultural lands vary greatly in fertility, related to production goals and management of landowners.

Duchesne County General Soils Map





Water

The major rivers in the Duchesne County include the Duchesne River, Strawberry River, Lake Fork River, Rock Creek River, and Yellowstone River, as well as the many other smaller creeks that feed them. They are fed by springs, storm runoff, and snowmelt from the high Uinta Mountains and foothills and by ground water discharge. Lakes, reservoirs, and pipelines are used to provide irrigation and flood control as well as water for domestic use in towns and communities. Nearly all rivers and lakes are also used for recreation, with other uses being municipal and industrial.

Irrigation Water

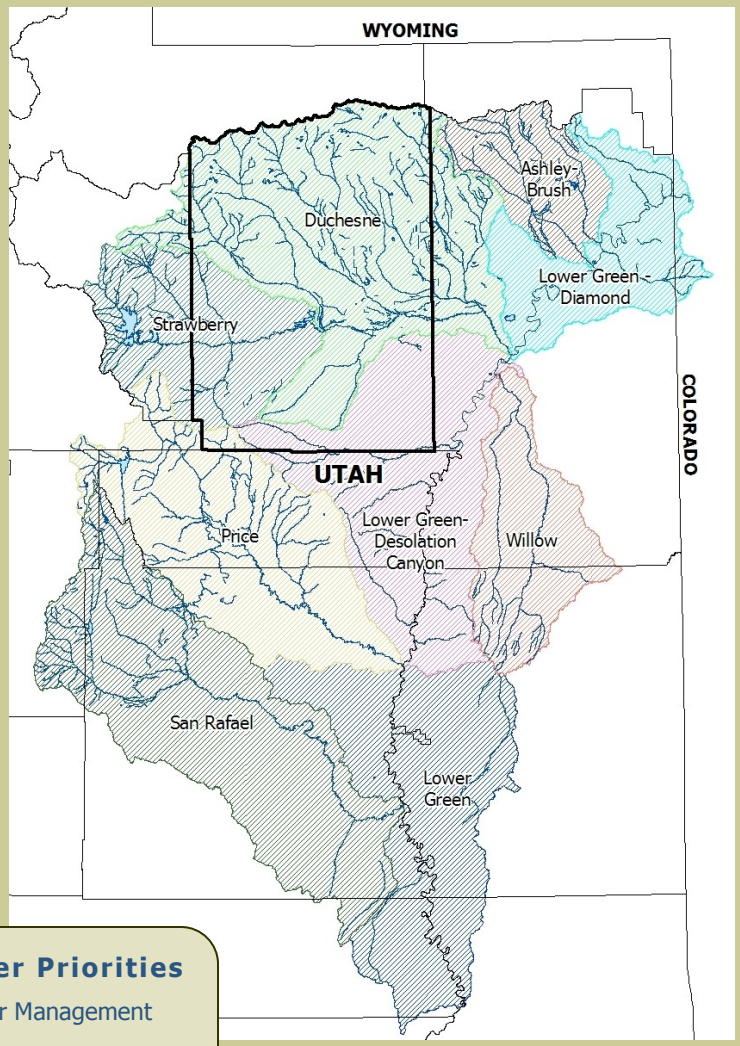
The water supply comes from precipitation, mostly in the higher elevations. Rainfall in the county is not adequate for crop production. Therefore, irrigation is used to supplement plant growth requirements. Irrigation companies service approximately 122,400 acres of agricultural land.

Water Quality

Duchesne County is located within the Colorado River Watershed. The Utah Division of Water Quality (UDWQ) has classified the Green and Duchesne Rivers, as well as some of their tributaries, as impaired for not meeting state standards. Soil erosion, inefficient irrigation systems, animal waste, and toxins from energy production and other industries contribute to a decrease in water quality.

The UDWQ regularly conducts monitoring of surface waters to assess water quality. An integrated report, which can be found at http://www.waterquality.utah.gov/documents/pdf, is provided to the EPA and to the public to report assessments results and account for the states progress in addressing TMDL requirements.

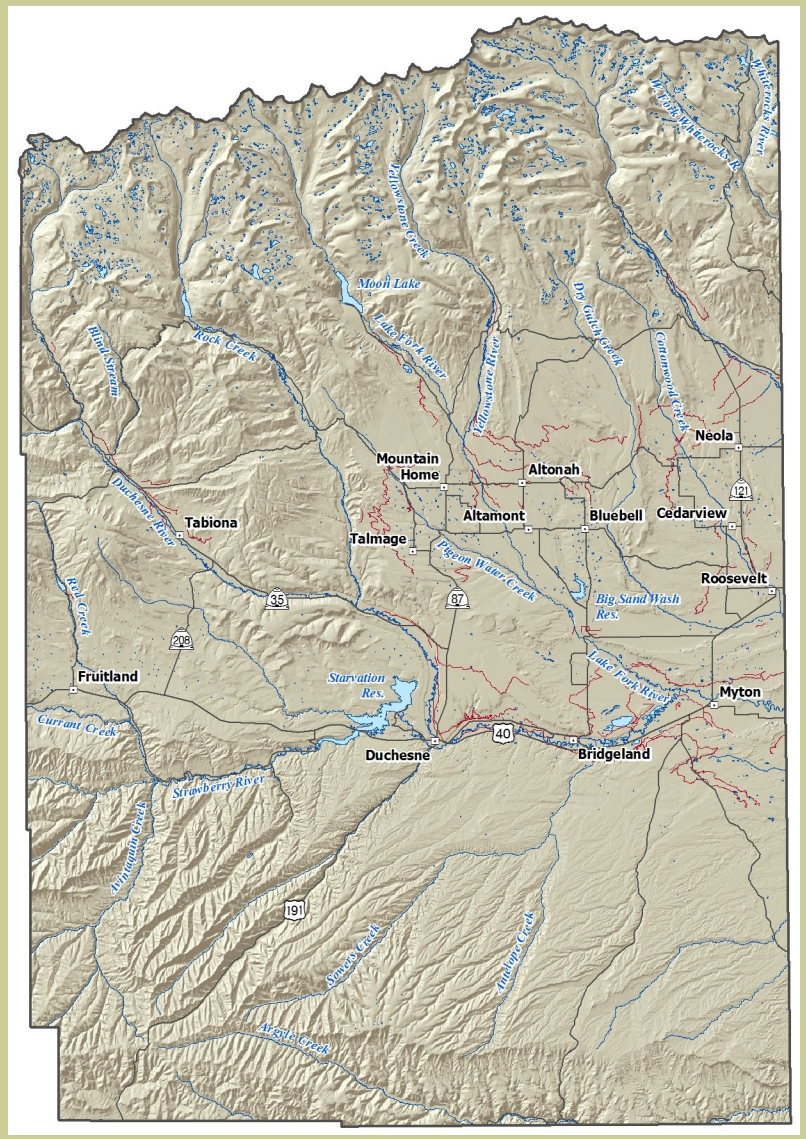
Duchesne County Watershed Map



Local Water Priorities

- Irrigation Water Management
- Irrigation Canals (see pg. 7)
- Impaired Waterways

Duchesne Hydrology



Lakes, Rivers and Canals

- Lake, pond or reservoir
- River or stream
- Ditch or canal
- Major road

Air and Climate

Air Quality

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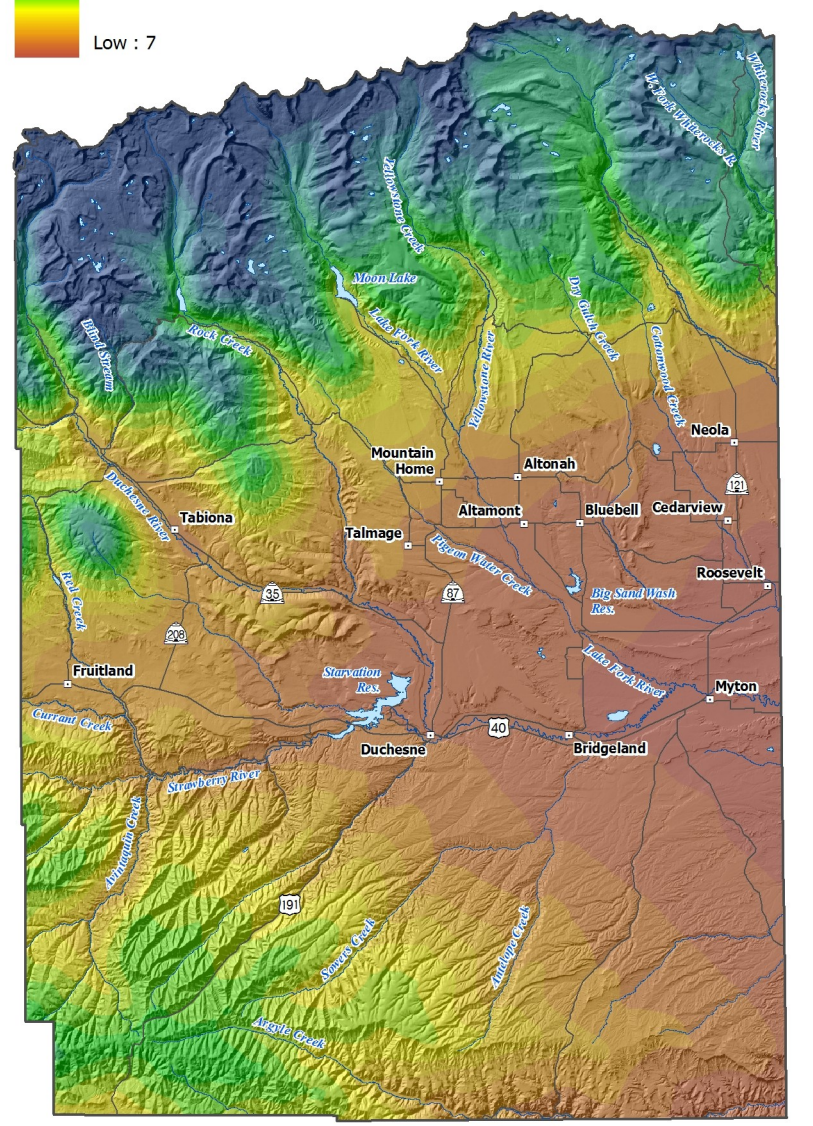
Climate

In Duchesne County, summers are mild to hot with an average high temperature of 87°F in July. Annual precipitation is about 9.73 inches. In the winter, Duchesne County tends to get a lot of snowfall and has an average low temperature of 8°F in January. Duchesne County usually has low humidity. Abundant sunshine occurs during the growing season but is restricted during winter when strong temperature inversions develop.

http://duchesne.utah.gov/about-duchesne-county/demographics.html

County Average Annual Precipitation



NRCS Snow Survey and SCAN Programs

The NRCS Snow Survey Program provides mountain snowpack 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. NRCS SNOTEL (SNOwpack TELemetry) sites monitor mountain snowpack and climate to forecast water supplies. Duchesne County has eight sites located within its boundaries: 1) Brown Duck, 2) Chepeta, 3) Five Points Lake, 4) Indian Canyon, 5) LakeFork #1, 6) LakeFork #3, 7) LakeFork Basin, and 8) Rock Creek.

Timing and amount of snowpack, 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 the irrigation needed for maximum crop growth.

The amount of moisture within the soil profile is an important factor in determining the amount of forage and water runoff that will occur during a given season. The NRCS Soil Climate Analysis Network (SCAN) sites monitor soil moisture and assess drought risk. Duchesne County has two sites located within its boundaries, Little Red Fox and Mountain Home. The SCAN sites provide valuable information relating to available soil moisture.

For additional information contact the Natural Resources Conservation Service.

Information about the Utah Snow Survey Program is located at http://www.ut.nrcs.usda.gov/snow.

Indian Canyon SNOTEL Site

1. http://www.wcc.nrcs.usda.gov/nwcc/sntlsites
2. http://www.wcc.nrcs.usda.gov/scan/Utah/utah.html

Plants

Much of Duchesne County's land is primarily forest land. The inhabited portion of Duchesne County is devoted to agriculture. As previously mentioned, most of this agriculture is dedicated to livestock production. Due to this, hay production, pasture, and feed for livestock are the main crops grown in the county.

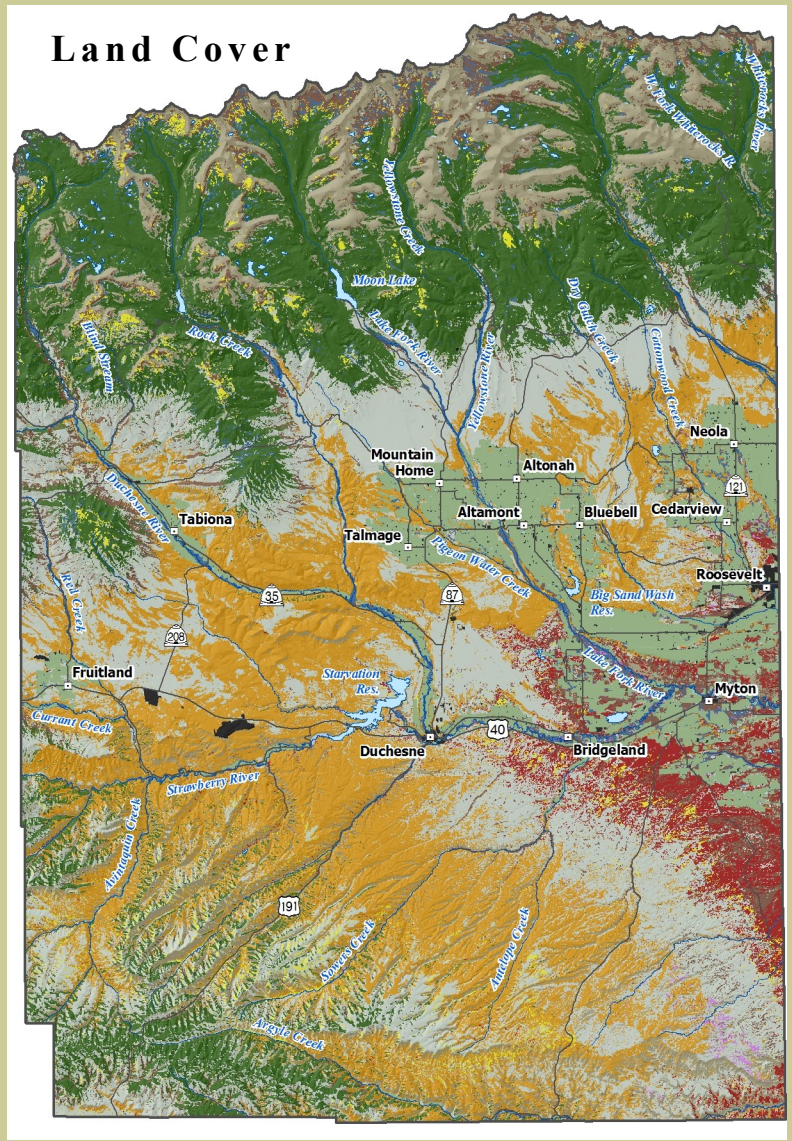
Rangeland

Today's rangeland in Utah provides feed for domestic livestock, forage and habitat for wildlife, outdoor recreation, and energy and mineral extraction. The various demands on this resource makes grazing on the public lands a delicate balance. Most of the grazing occurs in the summers in the forests, with some winter grazing on the desert lowlands. Federal and state rangelands have been an important source of livestock grazing, while the private lands provide feed for use in the winter season.
[Jim Brown]

Endangered Plant Species

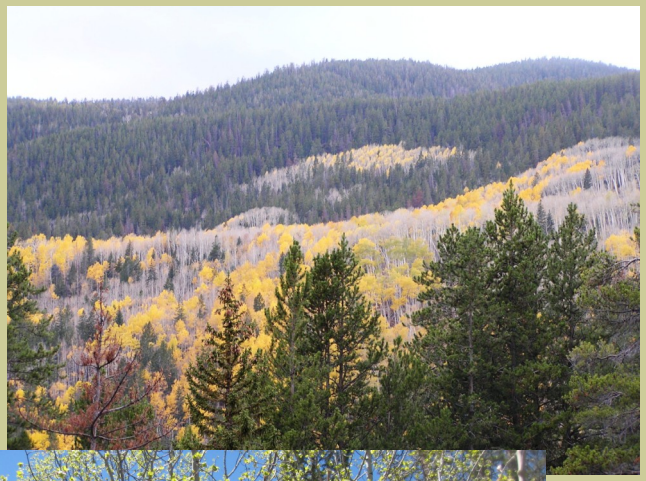
The following is a list of endangered plant species in Duchesne County. These plants do not impact agricultural production but can place limits on oil extraction and infrastructure enhancements.

- Barnaby Ridge-Cress
- Graham's Beardtounge
- Pariette Cactus
- Shrubby Reed-Mustard
- Uintah Basin Hookless Cactus
- Ute Ladies'-Tresses



Forestland

From an elevational gradient, the lowest species in the forested land of the basin consists mainly of pinyon pine and juniper. This forest type encompasses a majority of the landscape. Recently, there have been attacks on pinyon pine from the pinyon engraver beetle. With continued above normal precipitation, the pinyon pine is recovering from past drought and should be able to more effectively fight the attack of the pinyon beetle. There has also been frost damage, between Fruitland and Starvation Reservoir, on both juniper and pinyon pines.



Moving higher in elevation, Douglas-fir is another dominant species found on the landscape. Over the past several years, the Douglas-fir beetle has taken a devastating toll, creating very high mortality rates. Field observations are now showing a decrease in beetle populations and attack. This could likely be attributed to the increased precipitation amount the area has received over the past two years.

Other species which can be found at mid-elevations (8,000'-9,500') are white-fir, ponderosa pine, limber pine, and lodgepole pine. These species are not as pronounced but still serve as important habitat for wildlife and provide a diversity of tree species within the area.

The highest elevation species found in the area are Englemann spruce and subalpine fir. Currently, the spruce beetle is moving further north, and areas of spruce are experiencing high mortality rates.

Quaking aspen can be found from low elevation to high elevation. The health of aspen depends on stand age, disease, and recruitment of aspen and aspen suckers in the understory. Much of the aspen in the western U.S. is being overrun by the encroachment of an understory conifer. The decrease of aspen is associated with lack of natural disturbances, like wildfire.

Blue spruce is a species that can be found mainly in riparian areas or areas with moist rich soil types. [PJ Abraham]

Animals

Sensitive/Endangered 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. 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 is listed as endangered.

Game

Utah statewide management plans for mule deer, elk, mountain goat, moose, bighorn sheep, and pronghorn can be found at http://wildlife.utah.gov/hunting/biggame/. Various other upland game species including rabbits (cottontail, blacktail, jack, etc), turkeys, and grouse occur through the county. Waterfowl species also frequently use the lakes, rivers, and uplands in Duchesne County.

Human/Wildlife Interactions

Wildlife can conflict with private lands and/or livestock. Private lands, in some locations, are seeing and increase in use from pronghorn, deer, and elk. Predation from coyote, bears, mountain lions, and wolves can be localized concerns.

Aquatic Species

Various species of trout are numerous in most mountain lakes and streams. Lower elevation lakes also include trout, large mouth bass, small mouth bass, bluegill, and channel catfish, as well as many other non-game species.

Duchesne County's Federally Listed Threatened (T), Endangered (E), and Candidate (C) Species

Common Name	Status
Western Yellow-Billed Cuckoo (bird)	C
Black-Footed Ferret (animal)	E
Bonytail (fish)	E
Canada Lynx (animal)	T
Colorado Pikeminnow (fish)	E
Razorback Sucker (fish)	E
Greater Sage-Grouse (animal)	C
Humpback Chub (fish)	E
Mexican Spotted Owl (animal)	T

Cite the Source

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 Duchesne County:

- **Greater Sage-Grouse***
- **Humpback Chub**
- **Black-footed Ferret**
- **Bonytail**
- **Colorado Pikeminnow**
- **Razorback Sucker**
- **Yellow-billed Cuckoo**
- **Brown (Grizzly) Bear**
- **Canada Lynx**
- **Mexican Spotted Owl**
- **Ute ladies'-tresses**
- **Shrubby Reed-mustard**
- **Clay Reed-mustard**
- **Pariette Cactus**
- **Uinta Basin Hookless Cactus**
- **White River Beardtongue**

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 at http://dwrcdc.nr.utah.gov/ucdc/.

*The greater sage-grouse's status as a candidate species is 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 http://www.fws.gov/news/NewsReleases/.

Greater Sage-Grouse

The greater sage-grouse *(Centrocercus urophasianus),* often called a "sage chicken" in Utah, is the largest grouse species in North America. Adult males can reach weights exceeding seven pounds, twice the weight of the females, and have a wing span of 2.5 feet. Both the male and female sage-grouse are brownish-gray with marks of drab gray and white and have a very distinguishable black belly patch. The male can be distinguished from the female by its white breast and neck feathers, while the female is more plainly colored from head to toe. Both sexes have long pointed tails and are noticeable in flight and in display by the males. Sage-grouse are a relatively long-lived upland game bird species, and once they reach adulthood they can often live five or more years.

In March 2010, the U.S. Fish and Wildlife Service announced that "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. BLM has coordinated 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, identifies priority habitat for sage grouse within each of the western states.

Research has found a variety of reasons for the decline in greater sage-grouse populations. Some of theses reasons include predation, weeds, and human disturbances.

Local Animal Priorities

- Grazing Management (see pg. 7)
- Other sensitive species (see pg. 22)

Sage-Grouse

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

Greater sage-grouse are native to Utah and are listed as a candidate 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.

HUMANS: Social and Economic Considerations

Population

In 2010, the total population of Duchesne County was 18,607, with a positive population percent change of 29.5% from 2000 to 2010. The majority of the population is Caucasian, but approximately 4.5% of the population is Native American, most being of the Ute Tribe, and 6% of the population is of Hispanic decent.

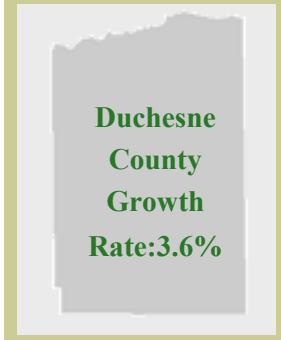
Labor Force

In 2011, Duchesne County's labor force was estimated to be around 9,780, with a 4.4% unemployment rate. The unemployment rate is falling, and is lower than both the state and national averages.

Economy

The oil and gas industry remains a mainstay of Duchesne County's economy. Other important industries include government services, trade, transportation, and utilities. The growth of Ute tribal enterprises also gives a boost to the county's economy. The health of the economy is based largely on oil exploration and extraction. The average monthly income in Duchesne County is $3,477.

Duchesne County Population Data



Area name	Duchesne
Period Year	2009
Population	17,368
Births	426
Deaths	110
Natural Increase	316
Net Migration	287
Annual Change	603
Annual Rate of Change	3.6%

Source: Utah Population Estimates Committee
http://jobs.utah.gov/jsp/wi/utalmis/countyprofile.do

Local Human Priorities

- Oil & Gas Development
- Recreational Use of County Resources

Education

Duchesne County has great education opportunities for such a small community. The Uintah Basin Applied Technology College offers over 20 programs for both adults and high school students. These programs range from construction to the medical field to computer technology. The Utah State University Uintah Basin Extension has over 50 degrees, licenses, certificates, and endorsements available, ranging from education and business to science.

Recreation

Duchesne County offers a variety of recreational activities. Starvation State Park and Reservoir, as well as the many other bodies of water in the county, offer activities such as swimming, boating, and year-round fishing. Duchesne County is also home to parts of the Uintah-Wasatch-Cache and Ashley National Forests. On the southern boarder of Duchesne County is Nine Mile Canyon, which is full of history and adventure.

Above: Starvation Reservoir and Freedom Bridge
Right: Red Rock, Hanna, UT

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.

Appendices

References

Soil Survey of Duchesne County, Utah. 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 at http://soildatamart.nrcs.usda.gov.

State of Utah Geographic Databases. From the Automated Geographical Reference Center (AGRC), a Utah State Division of Information Technology at http://agrc.utah.gov/.

Duchesne County Land Ownership. Data from the Utah School and Institutional Trust Lands Administration and the U.S. Bureau of Land Management, April 2010.

2003 Noxious Weed List. 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 http://ag.utah.gov/plantind/noxious_weeds.htm.

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

Landcover/Vegetation Map. Data from the USGS National Gap Analysis Program. 2004. Provisional Digital Land Cover Map for the Southwestern United States. Version 1.0. RS/GIS Laboratory, College of Natural Resources, Utah State University. Published 9/15/2004. Multi-season satellite imagery from 1999-2001 was used in conjunction with digital elevation model derived datasets to model natural and semi-natural vegetation.

Precipitation Map. Data from the U.S. Department of Agriculture, Natural Resources Conservation Service – National Cartography & Geospatial Center. Vector dataset provides derived average annual precipitation according to a model using point precipitation and elevation data for the 30-year period of 1971 – 2000.

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Evan Curtis – Utah Governors' Office of Planning and Budget
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Acknowledgments

Duchesne 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 (Chair and Vice-Chair)
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 College of Natural Resources
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
Duchesne County Commission
Chevron
Newfield Energy Production
Duchesne Water Conservancy District

List of Maps & Tables