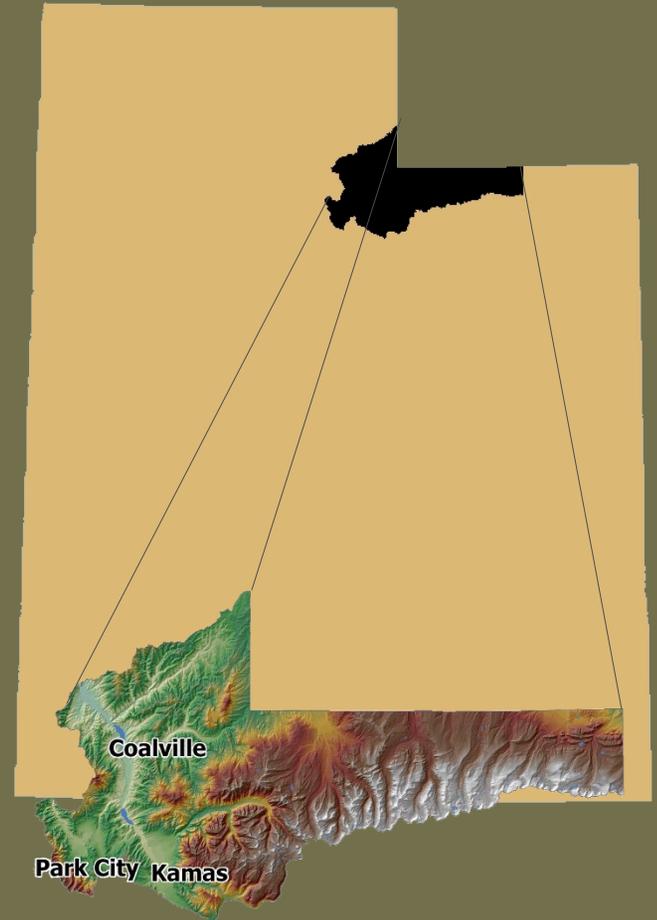


SUMMIT COUNTY RESOURCE ASSESSMENT

MAY 2013

Conserving Natural Resources For Our Future

KAMAS VALLEY & SUMMIT COUNTY CONSERVATION DISTRICTS



Acknowledgments

Kamas Valley Conservation District

Summit County Conservation District

with the:

Utah Association of Conservation Districts (UACD)
Utah Department of Agriculture and Food (UDAF)
Natural Resources Conservation Service (NRCS)

in partnership with the:

Utah Conservation Commission

Utah Conservation Districts Zones 1 - 7
Utah Association of Conservation Districts
Utah Department of Agriculture and Food
Utah Department of Environmental Quality
Utah Department of Natural Resources
Utah Division of Forestry, Fire and State Lands
Utah Grazing Board (Chair and Vice-Chair)
Utah School and Institutional Trust Lands Administration
Utah State University Cooperative Extension
Utah Weed Supervisor Association

Utah Partners for Conservation and Development (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
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

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Kamas Valley Conservation District Board

Wendell Stembridge, Chair
Alvin McNeil, Vice Chair
Chris Ure, Supervisor
Lloyd Marchant, Supervisor
Brenda Bushell, Treasurer
Melissa Atkinson, Clerk

Summit County Conservation District Board

Clare Richins, Chair
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Table of Contents

• Executive Summary	ii
<hr/> Why a Resource Assessment? · Natural Resource Priorities and Concerns · General Resource Observations	
• Introduction	I
<hr/> Conservation District Movement · Conservation Progress · Public Outreach	
• County Overview	2
<hr/> Background · Land Ownership	
• Natural Resource Priorities and Concerns	4
<hr/> Noxious & Invasive Weeds · Water Quality & Conservation · Wildlife & Aquatic Health · Range & Forest Health · Small Acreage Agriculture	
• General Resource Observations	14
<hr/> Soil · Water · Air & Climate · Plants · Animals · Humans: Social & Economic Considerations	
• References & Credits	26
<hr/> Map & GIS Data Sources · References	

Summit County Resource Assessment: Executive Summary



Farming in Summit County. Photo courtesy of Kent Pace.

Why a Resource Assessment?

The Kamas Valley and Summit County conservation districts have 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 Summit 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:

Kamas Valley CD
P.O. Box 744
Coalville, Utah 84017

Summit County CD
P.O. Box 882
Coalville, Utah 84017

Natural Resource Priorities and Concerns

The Kamas Valley and Summit County conservation districts have identified five natural resource priorities and concerns. These priorities receive special emphasis because of their immediate significance to Summit County.

1. **Noxious & Invasive Weeds:** Weeds of concern include thistle, dyers woad, and leafy spurge.
2. **Water Quality & Conservation:** Nutrients, stream bank erosion, urban runoff, and water conservation practices.
3. **Wildlife & Aquatic Habitat:** Aquatic habitat, wildlife habitat, predator control, and sage-grouse.
4. **Range & Forestland Health:** Range management and forest health issues.
5. **Small Acreage Agriculture:** Utah agriculture, farm conservation, prime and unique farmland, and loss of agricultural lands.

General Resource Observations

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

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.

Introduction

The Conservation District Movement

The Dust Bowl of the 1930s 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.

Conservation Progress

Since the organization of the Kamas Valley and Summit County Conservation Districts in 1942, great strides have been made toward increasing and sustaining natural resources in Summit County. The 2005 resource assessment listed the most critical resource concerns as 1) invasive and noxious weeds, 2) impacts of urban and suburban growth, 3) watershed health and water quality, and 4) soil erosion and condition. The 2013 resource assessment provides an opportunity to evaluate the progress made during the last several years and to set new goals to address the highest priority conservation needs in Summit County.

Public Outreach

In July 2010, the Summit County Conservation District conducted a survey to find out how the public views the county’s natural resources and what conservation issues were most pressing. Respondents indicated that invasive weeds and water quality are major concerns. Other top concerns included: wildlife and aquatic habitat, range and forest health, and small acreage agriculture.



Wind-devastated farmland during the Dust Bowl.



*Farmland in Summit County.
Photo courtesy of Coalville NRCS.*

Summit County Overview

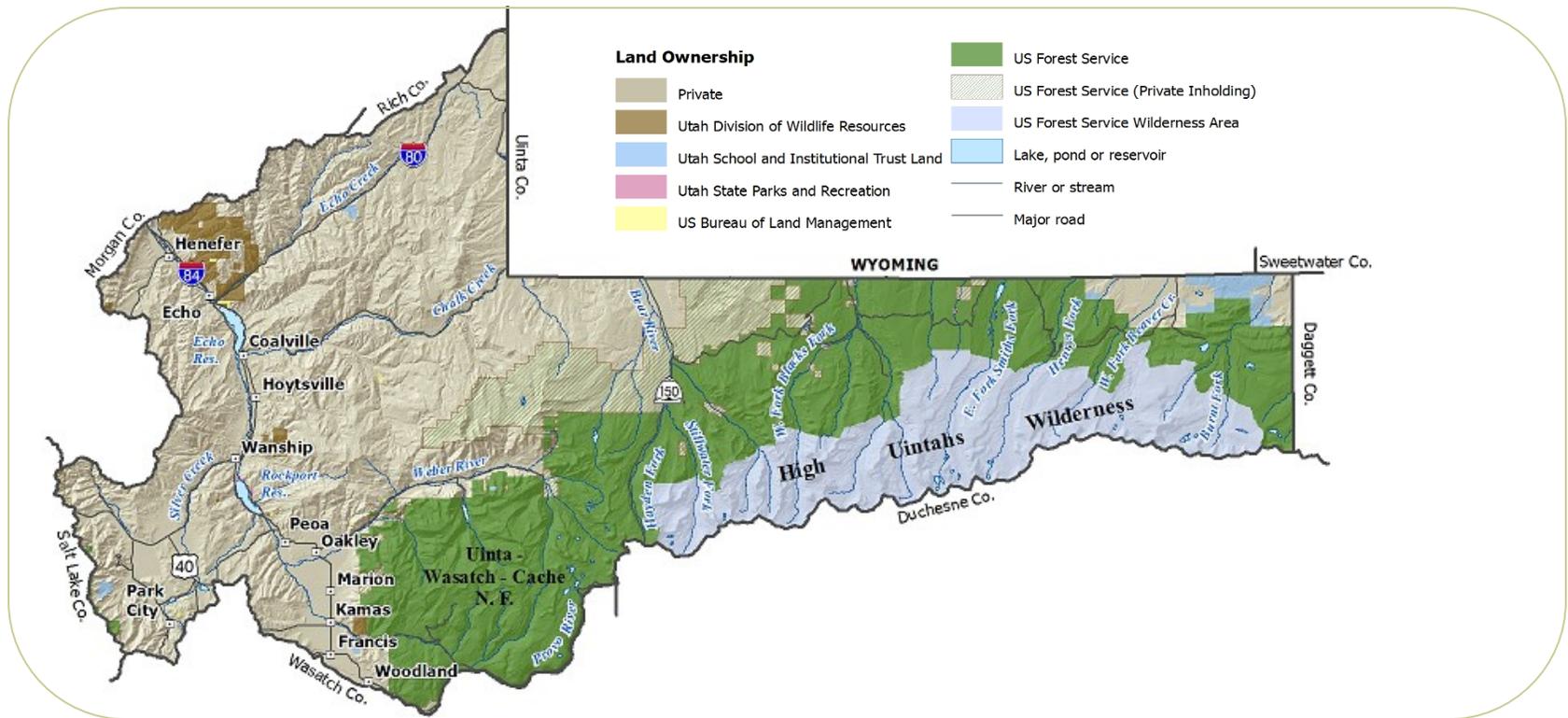
Background

Summit County is located in north-central Utah on the border of Wyoming, between the Great Basin and the Uintah Basin, and has a total land area of approximately 1,870 square miles. In 2010, the population of Summit County was 36,324. The median family income was \$84,752. At 85.5%, Summit county's racial makeup is primarily white.¹

Summit County includes 39 of the state's highest peaks. The first white men to visit the area were fur trappers and traders in the 1820s and 1830s. Until the arrival of the Mormons in 1847, the area provided hunting grounds for Northern Shoshone Indians. The Weber and Provo rivers, draining the western slope of the Uintas, provided the Indians with fish, among other benefits.

The first settlers in Summit County arrived at Parley's Park in 1850. During the 1860s, wagons hauled tons of coal from Coalville to the Salt Lake Valley settlements. In 1873, the Utah Eastern Railroad built a line from Echo Junction to Coalville to haul coal. This line eventually became part of the Union Pacific Railroad.

The discovery of silver, lead, and zinc in the Wasatch Mountains in the 1870s soon overshadowed the settlement and economic activities of the rest of the county. Park City, a mining town founded in 1872, continued to expand until the 1950s, at which time mining was no longer profitable. For several decades Park City was on the verge of becoming a ghost town, but the area's rugged terrain and deep snow led to its rebirth as a winter sports center.²



1 U.S. Census Bureau
2 Utah Association of Counties



SUMMIT COUNTY

Photo credits clockwise from top left: Main Street event by Park City Chamber/Bureau, cow at dusk by Chris Ure, snowboarding by Ben Lomu and David Gunnell, Historic McPolin Barn by Park City Chamber/Bureau, sunset by Brenda Bushell, and spring flow by Coalville NRCS.

Natural Resource Priorities and Concerns

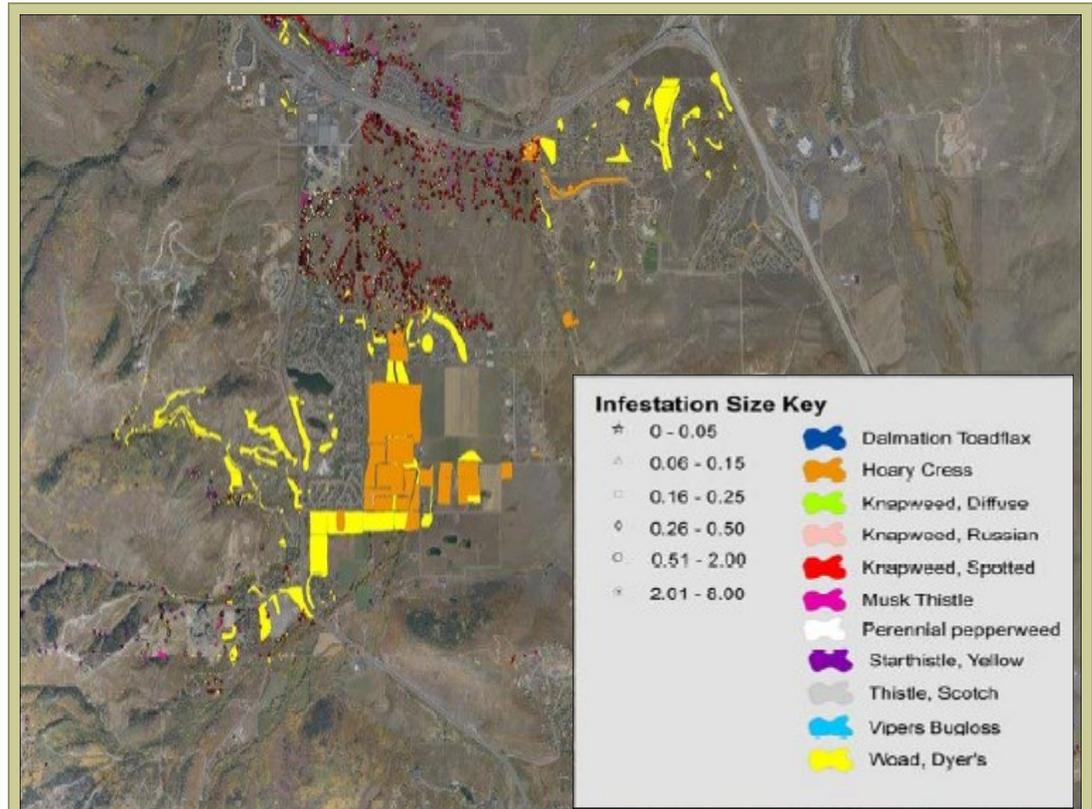
NOXIOUS & INVASIVE WEEDS

The invasion of noxious weeds has been likened to a raging biological wildfire that is out of control and spreading rapidly. With thousands of acres affected, noxious weeds are a major concern throughout Summit County.

If weed infestations spread without control or containment, large acreages of land used for farming, grazing, or recreation become completely useless. Noxious weeds have been known to reduce property values, reduce forage for livestock and wildlife, increase soil erosion, displace native plants species (which will reduce biodiversity), and reduce field production.

Many noxious weeds are toxic to animals. Leafy spurge is toxic to cattle and can cause death. Yellowstar thistle and Russian knapweed are toxic to horses. Houndstongue is poisonous to both horses and cattle. The seeds, stems and leaves of poison hemlock and black henbane are poisonous to people and animals. Musk, Scotch, and Canada thistle along streams, rivers, and lake shores can become so thick that they may affect those wanting to fish.

On rangelands, noxious weeds like leafy spurge and dyer's woad can displace native grasses and forbs, which reduces forage for livestock and big game animals. This in turn reduces the carrying capacity of rangelands, reduces ground cover, and increases the potential for soil erosion.³



Sample noxious and invasive weed mapping north of Park City. Mapping courtesy of the Summit County Weed Management Area. <http://www.utahweed.org/PDF/summitCWMA.pdf>



Leafy Spurge



Dyer's Woad



Musk Thistle



Poison Hemlock⁴

Prevention and Early Detection

Weeds are a problem for everyone. Federal, state, and local agencies and private landowners are responsible for the noxious weeds present on their lands. Prevention, early detection, control, and eradication of noxious weeds are the most practical means of weed management. Listed below are things that can be done to control the spread of noxious weeds.

- **Education.** Learn to identify the problem weeds of Wasatch County.
- **Buy only certified weed-free hay.**
- **Avoid planting noxious weeds as an ornamental or in landscaping,** such as Russian olive, tamarisk, or sulfur cinquefoil.
- **Be aware of hitchhikers.** Weed seeds attach themselves to clothing when hiking, hunting, fishing, or working. Pets and animals can also carry hitchhikers.
- **Bird feeders beware.** Some bird seed mixtures can be loaded with noxious and invasive weed seeds.
- **Know its origin.** Gravel, road fill, and topsoil can be contaminated with seeds.
- **Control.** Each weed is different, and the way to control one might not work for another. The County Weed Supervisor is a great source for information on weed control.³

Current Weed Control Efforts

Summit County Weed Department

The weed department focuses primarily on weed control efforts on county land. They track infestations and advise landowners on proper maintenance.

Summit County Weed Board

County weed boards are responsible for the formulation and implementation of county-wide coordinated noxious weed control programs designed to prevent and control noxious weeds.

Summit County Coordinated Weed Management Area (CWMA)

The Summit County CWMA is the main tool to obtain cooperation and coordination of the noxious weed program among land management agencies and private landowners. The CWMA has resulted in increased sharing of expertise, information, and resources and provides a process to improve the efficiency and effectiveness of the noxious weed program in Summit County.

Summit County Noxious Weeds List

Listed below are the major weeds that are problematic in Summit County.

Class A

- Garlic Mustard
- Yellow Toadflax
- Purple Loosestrife
- Medusahead
- Yellow Star Thistle
- Leafy Spurge
- Tamarisk
- Sulfur Cinquefoil
- St. Johnswort
- Diffuse Knapweed
- Viper's Bugloss
- Perennial Pepperweed
- Russian Knapweed
- Spotted Knapweed
- Canada Thistle
- Musk Thistle
- Scotch Thistle
- Dalmatian Toadflax
- Poison Hemlock
- Scentless Chamomile
- Mayweed Chamomile
- Corn Chamomile
- Common Burdock

Class B

- Dyer's Woad
- Houndstongue
- Oxeye Daisy
- Black Henbane

Class C

- Field Bindweed
- Quackgrass
- Bermuda Grass
- Johnson Grass

Class A weeds are relatively minor in extent and density but pose a well known threat to native plant communities and should be a top priority with eradication as the ultimate goal. Class B weeds are meant to be contained and controlled, with the goal of halting the spread. Class C weeds should be watched closely and contained when possible. The goal, however, is not to stop the spread but to disseminate education, research, and biological control for those that want management of the weed.

Natural Resource Priorities and Concerns

WATER QUALITY & CONSERVATION

The quality and conservation of water that originates and is stored in the county is important to the residents of Summit County as well as to the residents of the greater Wasatch Front. Summit County's diversity of landscapes, from high mountain forests to agricultural fields to rural communities to upscale resort communities, creates an equally diverse set of water quality concerns. Currently, several water bodies have been identified as not meeting their beneficial use designations.

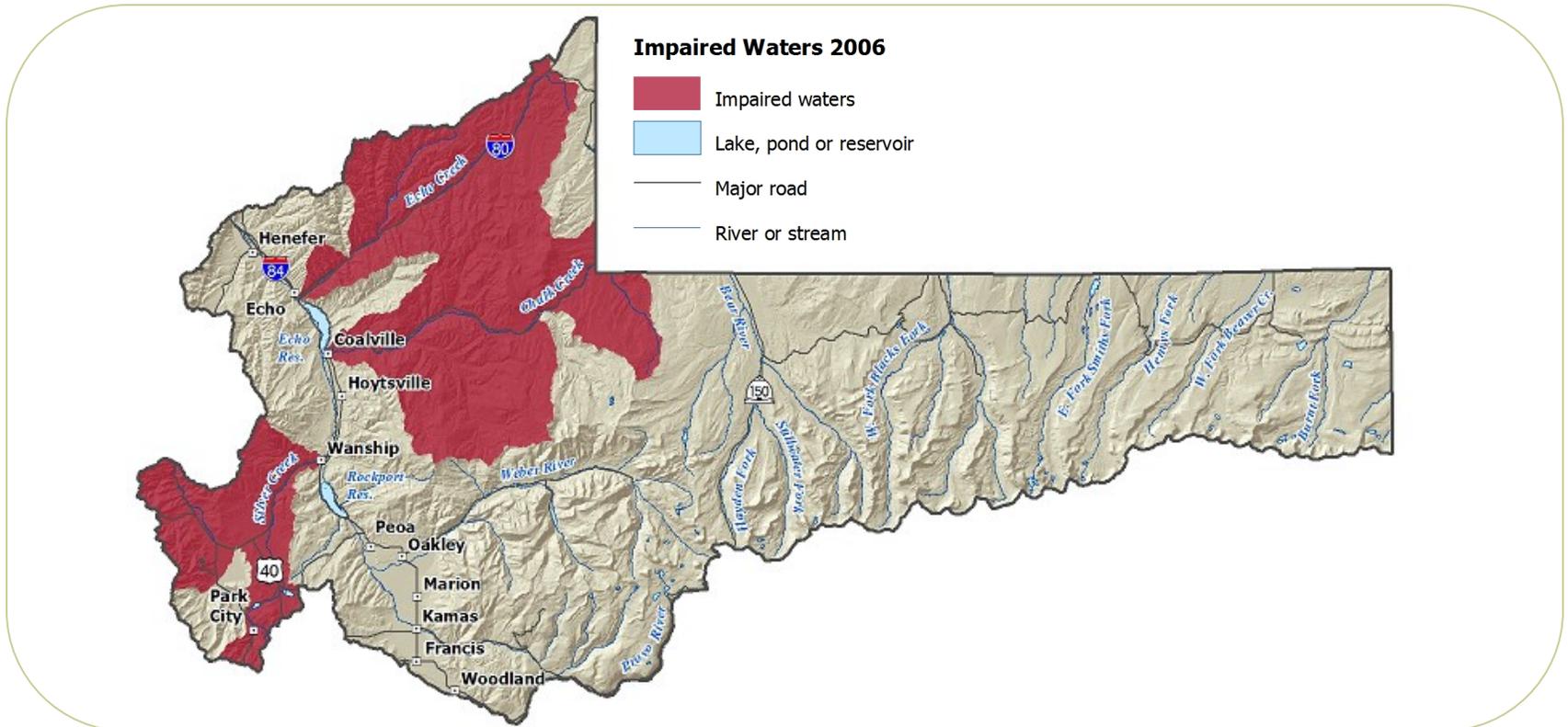
Waterbody	Beneficial Use	Impaired Beneficial Use	Pollutant of Concern
Echo Reservoir	1C, 2B, 3A, 4	3A	Total Phosphorus, Dissolved Oxygen
Echo Creek	1C, 2B, 3A, 4	3A	Sediments
Silver Creek	1C, 2B, 3A, 4	1C, 3A, 4	Zinc, Cadmium
Chalk Creek	1C, 2B, 3A, 4	3A	Total Phosphorus, Sediment, Habitat Loss
East Canyon Creek	1C, 2B, 3A, 4	3A	Total Phosphorus, Dissolved Oxygen

Beneficial Use Classifications: (1C) Domestic Water, (2A) Primary Contact e.g. Swimming, (2B) Secondary Contact e.g. boating and wading, (3A) Cold Water Fishery, (4) Agricultural Use, e.g. Irrigation and stock water

*Source: Utah Department of Environmental Quality Beneficial Uses and Water Quality Assessment Mapping tool (<http://wq.deq.utah.gov/>)

"Water is the most critical resource issue of our lifetime and our children's lifetime. The health of our waters is the principle measure of how we live on the land."

-Luna Leopold



Nutrients: Streams and reservoirs can develop nutrient enrichment (eutrophication) when elevated levels of phosphorus or nitrogen are present.⁶ Typically, enrichment can be seen in excessive algal or macrophyte growth, which leads to swings in dissolved oxygen concentrations in streams and can lead to oxygen depletion (anoxic) conditions in reservoirs.⁷ Common sources of nutrients include wastewater effluent from sewage treatment plants or septic systems, storm water runoff, sediment from overland flow or stream bank erosion, fertilizers, agricultural irrigation return flows, animal waste, and natural sources, such as the phosphoric rock outcroppings in the East Canyon Creek area.⁹ Typically, phosphorus is the limiting nutrient and stimulates significant unwanted plant growth in the streams and reservoirs in Summit County.

Sediment: Sediments carried in the water column can transport nutrients, destroy critical fish habitat, alter stream channels, and eliminate storage capacity. Sources include overland soil erosion, storm water runoff from construction and resource extraction, floodplain encroachment, loss of riparian vegetation, and stream channel erosion from channel modifications and excessive grazing pressure.¹⁰

Metals: Metals adversely influence the aquatic environment through inhibiting macroinvertebrate populations and changing their behavior, growth, morphology, and physiology and seriously damaging the tissue and organs of fish. Typically, metals come from historic mining operations. Exposing mined rock to water leads to the leaching of metals as water passes over the newly exposed surfaces. Only one such stream occurs in Summit County; Silver Creek, which flows from the mountains of Park City, has been listed for excessive levels of zinc and cadmium due to Park City's long history of hard rock mining.⁸

Other: Bacterial pollution can come from several different sources, including animal waste and improperly treated wastewater. The county has periodic monitoring for bacterial pollution (Ecoli bacteria), but no major concerns have been identified. Toxic chemical pollution is a potential threat due to the major road and railroad transportation corridors that pass through the county and are often nearby water bodies. Echo Creek, Silver Creek, East Canyon Creek, and portions of the main stem of the Weber River are immediately adjacent to Interstate Highways 80 and 84, with many other tributaries adjacent to state roads. A spill event from a truck or rail car could quickly get into these water bodies and pollute any interconnected water bodies.⁶



Before Restoration After Restoration

East Canyon Creek Stream Restoration

Under the leadership of the East Canyon Creek Watershed Committee, East Canyon Creek has been the focus of several stream restoration projects. These projects have worked to address pollutants of concern identified in its TMDL, with the goal of the stream eventually being taken off the 303d list. Efforts have created an effective partnership between the conservation district, the watershed committee, local residents and interest groups, and interested landowners. For more information, see a success story documented, by the EPA, at: <http://water.epa.gov/polwaste/nps/success319/#progress>.

6 Weber River Watershed Restoration Action Plan (2003)
7 East Canyon Reservoir and East Canyon Creek TMDL
8 Silver Creek TMDL
9 East Canyon Watershed Committee Website
10 Chalk Creek Watershed CRMP

Natural Resource Priorities and Concerns

WILDLIFE & AQUATIC HABITAT

Aquatic Habitat

In the spring of 2005 the Swaner Nature Preserve began implementation of a stream restoration project on East Canyon Creek. The main goals were to stabilize eroding stream banks, restore riparian vegetation and improve fish habitat. Over 1100 feet of eroding stream banks have been stabilized using brush revetments. Riparian vegetation has been restored by planting various trees and shrubs along the creek. Approximately 760 trees and shrubs were planted in the project area along with 1800 willow cutting transplants. The roots from the vegetation help hold the soil in place, while providing habitat for wildlife that use the area. To improve fish habitat, a cross vane structure was constructed in the stream channel which improves habitat by creating a scour pool. Deep pools as well as riffles and runs are important features for many types of aquatic organisms, especially fish.¹¹



*East Canyon Creek restoration.
Photo courtesy of Lars Christensen.*

Mule Deer Habitat

Mule deer numbers are declining across the West, and recent deer hunts have been difficult for many Utah hunters. This issue has been — and continues to be — a top priority for Utah's wildlife managers. Over the past six years, the Division of Wildlife Resources (DWR) has invested tens of millions of dollars to implement a comprehensive deer-management plan and to help our struggling herds.



http://www.utahwildlifephotos.com/Largemammals/Mule-deer/3625563_g32bnN#!i=535769160&k=nqFLpGC

Photo courtesy of Utah Division of Wildlife Resources.

The DWR has launched a massive effort to restore mule deer habitat. It's the largest such initiative ever undertaken in Utah — and in the West. Over the past six years, the DWR and its many partners have improved mule deer habitat on more than 778,000 acres, at a cost of more than \$76 million. Habitat-improvement projects often take a few years to pay off, but over the long term, this effort will result in healthier deer populations statewide. The current Utah deer-management plan (effective 2008–2013) includes an objective to improve another 500,000 acres of habitat.

Starting in early December each year, the DWR monitors individual mule deer herds on a weekly basis. Biologists look at both the deer and their winter range, assessing the following factors: snow depth, area temperatures, availability of forage, body condition (fat measurements) and depredation issues. If the deer fall below certain pre-established thresholds in three or more of these categories, the DWR is prepared to begin a supplemental feeding program to help them through the season.¹²

¹¹ East Canyon Watershed Fact Sheet
¹² Division of Natural Resources

Predator Control

Predator control is vital to the establishment of sage-grouse and other threatened and endangered species. It is observed that the increase in predators, through their protection, has resulted in the decrease of the sensitive species that wildlife agencies are trying to protect. Proper management practices can be used to control predators and protect sensitive species.

Additional concerns exist regarding wildlife in Summit County. The following list shows a number of those concerns, as well as needs, that if addressed may help address fish and wildlife concerns.

Concerns:

- Predators reducing the numbers of desired wildlife species.
- Habitat management instead of predator control reducing acreage once available to grazing.
- Introduction of otters can create water use problems.
- Wolves and the potential negative impacts on citizens, livestock, and wildlife.
- Endangered species and sensitive species regulation impacting water and land use.
- Decline in pollinator numbers.

Needs:

- Improved management of predator numbers to restore historic populations of wildlife, especially where habitat is sufficient.
- Use livestock as a tool to improve habitat.
- Discouragement of otter introduction.
- Discouragement of wolf introduction.
- Collaboration and increased opportunities for local input on endangered and sensitive species-related regulation.
- Support and increase the number of pollinators through habitat enhancement and other measures.¹⁴

Greater Sage-Grouse (*Centerocercus urophasianus*)



The greater sage-grouse is an icon of western sagebrush ecosystems. It is a large, rounded-winged, spike-tailed, ground-dwelling bird, about two feet tall and weighing from two to seven pounds. Females are a mottled brown, black, and white. Males are larger and have a large white ruff around their neck and bright yellow air sacs on their chest.¹³ Sage-

brush is the predominant plant of quality habitat. A good understory of grasses and forbs, and associated meadow areas, are essential of optimum habitat. Male sage-grouse gather in traditional “strutting grounds” during March and April and put on a spectacular courtship performance—strutting with their tails erect and spread and air sacs inflated. The principle winter food item is sagebrush leaves. During summer, the fruiting heads of sagebrush, leaves, and flower heads of clovers, dandelions, grasses, and other plants are eaten.¹⁴

Greater sage-grouse conservation is urgent. Once seen in great numbers across sagebrush landscapes of the West, sage-grouse have declined in number over the past one hundred years due to the loss, degradation, and fragmentation of sagebrush habitats essential for their survival. Greater sage-grouse now occupy only about 56% of the habitat that was available to them before the arrival of settlers of European descent. Sagebrush ecosystems are home to a surprisingly abundant number of wildlife species that depend on this complex and often fragile ecosystem type. If sage-grouse populations are in trouble, it means other sagebrush-dependent species are, too.¹³

RANGE & FOREST HEALTH

Rangeland

The rangelands of Summit County are a very important part of the livestock management system for the state of Utah. The rangeland in this county serves as critical summer range for sheep and cattle all across northern Utah, as well as habitat for elk, deer, and moose. The biggest threat to rangeland in the county is non-native annual grass proliferation, which is degrading most rangeland sites. Species including bulbous bluegrass, annual ryegrass, medusahead, and cheat grass are increasing in canopy cover and decreasing the total forage production of most rangeland acres by 20-50% in some areas, according to rangeland health inventories conducted during 2011-2013. Other concerns on the rangelands of Summit County include cedar encroachment, overgrazing, and riparian stream bank erosion.

Not all areas in the county are under the same pressure from noxious plants. Annual grasses are of particular interest in the lower elevation areas around Henefer and Echo Canyon. In higher elevation sites, aspen and oak thickets are much healthier and remain in good condition and have proved to be valuable sources of livestock feed in late summer.¹⁵

Summit County is in the currently occupied range of the sage-grouse, a species of bird which has potential for listing as an endangered species. The greatest threats to the sage-grouse identified by the Morgan Summit Adaptive Resource Management Group (MSARM), include noxious weeds, fire, drought and weather, home and cabin development, and conversion of sagebrush habitats to non-sagebrush sites.¹⁶

All resource concerns can be remedied utilizing existing rangeland management techniques, including implementing improved rotational grazing systems, implementing brush management to reduce canopy cover of cedar, integrated pest management, and range planting in areas of heavy infestation of noxious plants.



*Cedar encroachment in rangeland.
Photo courtesy of Coalville NRCS.*



*Bulbous bluegrass encroachment in rangeland.
Photo Courtesy of Coalville NRCS.*

¹⁵ Thomas Hoskins, NRCS

¹⁶ Greater Sage-Grouse Management Plan

Forest Health

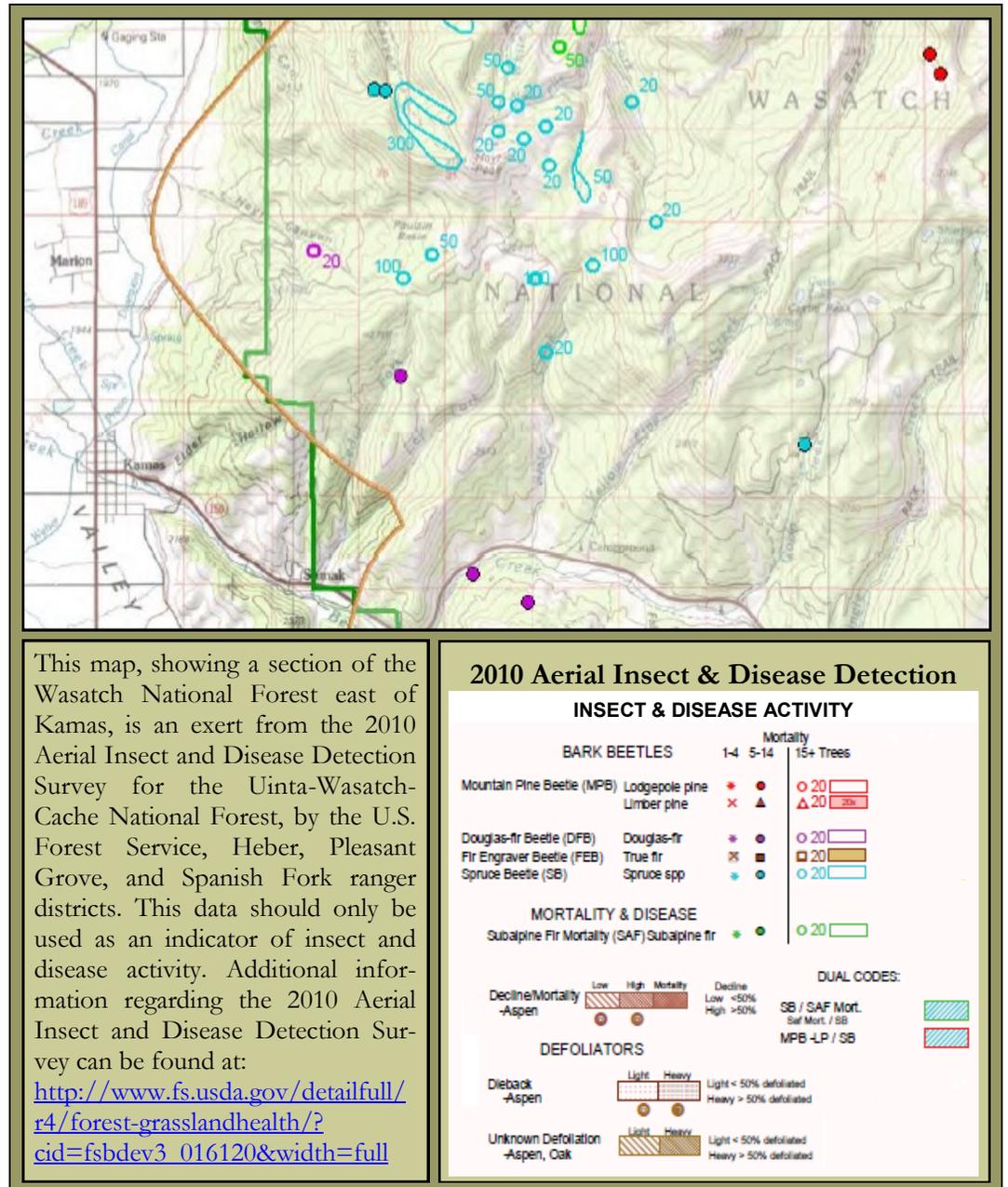
In 2010, the US Forest Service performed a forest health aerial detection survey within Summit County. The survey determined that the largest impact to mountain pine beetle tree mortality was the epidemic population of mountain pine beetle. Currently, mountain pine beetle populations seem to be subsiding to endemic populations. From 2005 through 2011, the mountain pine beetle devastated mature lodgepole pine stands located in the Bear River, Blacks Fork, Smiths Fork, Upper Provo, and Weber River watersheds. The majority of dead and dying lodgepole is found on Forest System Lands administered by the U.S. Forest Service. Additionally, much of the landscape is either protected as wilderness or designated roadless, preventing harvesting of dead trees with logging equipment.

The spruce beetle and its northern advancement are also a concern. Spruce beetle are host specific, only attacking mature Engelmann spruce trees, and are moving northward each year. Currently, the beetle's northern extent is in the Soapstone area. Spruce beetle populations are rapidly expanding. In some areas, entire drainages have been infested in the course of one year and nearly every mature spruce has been killed from the creek bottoms all the way up to higher elevations.

Given the abundance of dead, dying, and on-the-ground debris, fire has become an ever increasing concern. Fire is nature's way of cleaning landscapes and recycling resources. The different landscapes found within the county have become dependent upon fire to maintain the health and vigor of the many ecosystems. With the advent of fire suppression, many ecosystems have departed from pre-suppression conditions. As a result, when fires occur they are often more damaging and cause greater adverse impacts to soil, wildlife habitat, recreational resources, and watersheds.

For Technical Assistance regarding forest health concerns please contact:

PJ Abraham, Area Forester
Forestry, Fire & State Lands
2210 S. Hwy. 40 Ste. B
Heber City, UT 84032
(435) 671-3326



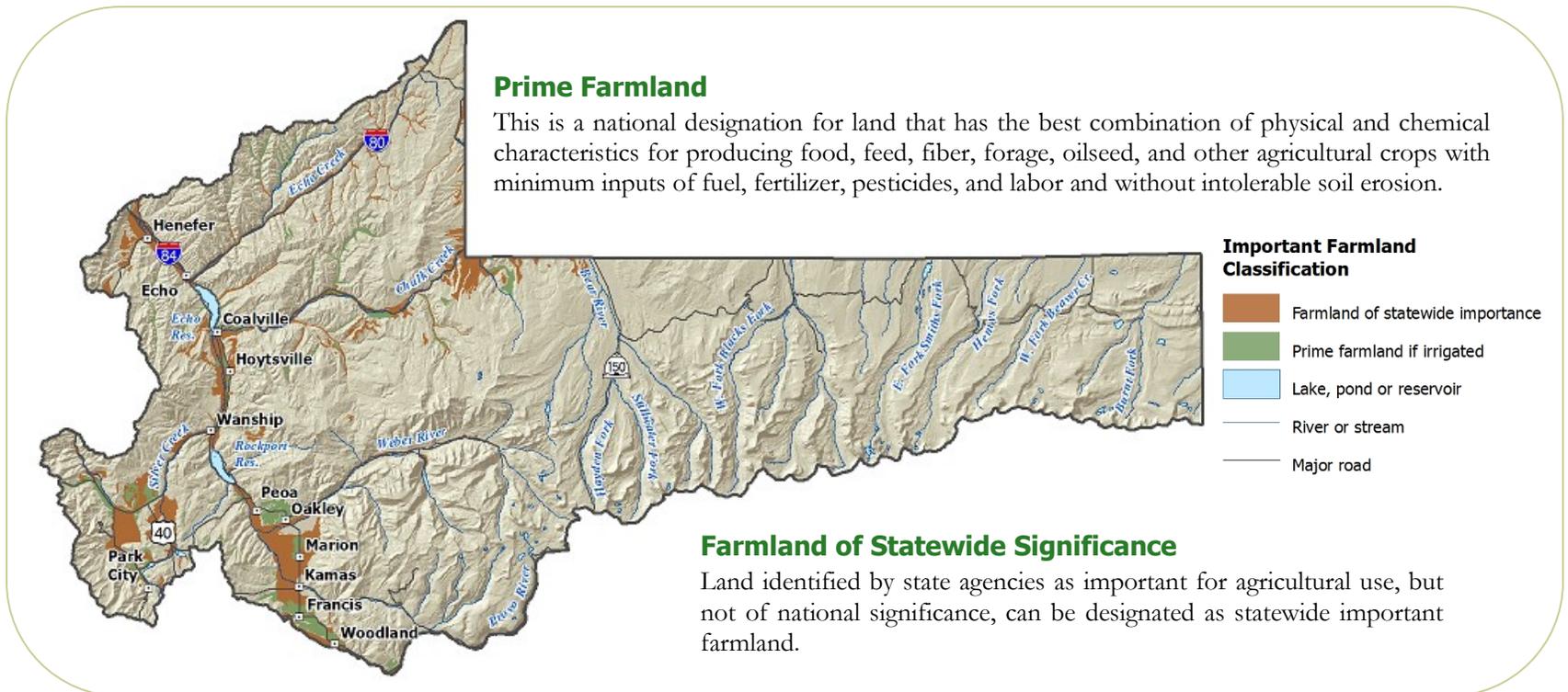
SMALL ACREAGE AGRICULTURE

What is Utah Agriculture?

Every farm or ranch is different, from ranchers on horseback surrounded by their animals to farmers in a large fields with their tractors. These types of farms still constitute the majority of agricultural products in Utah, but urban farms are also adding to our local food supply. These are small acreage operations, growing vegetables, fruit, eggs, honey, and sometimes meat, for the consumer market. Such farms are often found in cities or suburbs, rather than far away in rural areas. These farmers have found a niche market by using different marketing strategies, such as selling at farmer's markets or offering a subscription to a Community Supported Agriculture (CSA) program.

Why Conserve Our Farms?

Farms of all sizes provide a number of benefits that are critical to our quality of life. They produce food, fiber, nursery stock, and flowers. They clothe us, beautify our surroundings, and supply us with the energy we need everyday. All of these products can be imported from outside Utah, but the cost of transporting them and the concerns with the safety, nutrition and availability of imported products make having the local capacity to produce food very important and beneficial. We do not want to become dependent on foreign sources for such a basic critical need as food.¹⁸



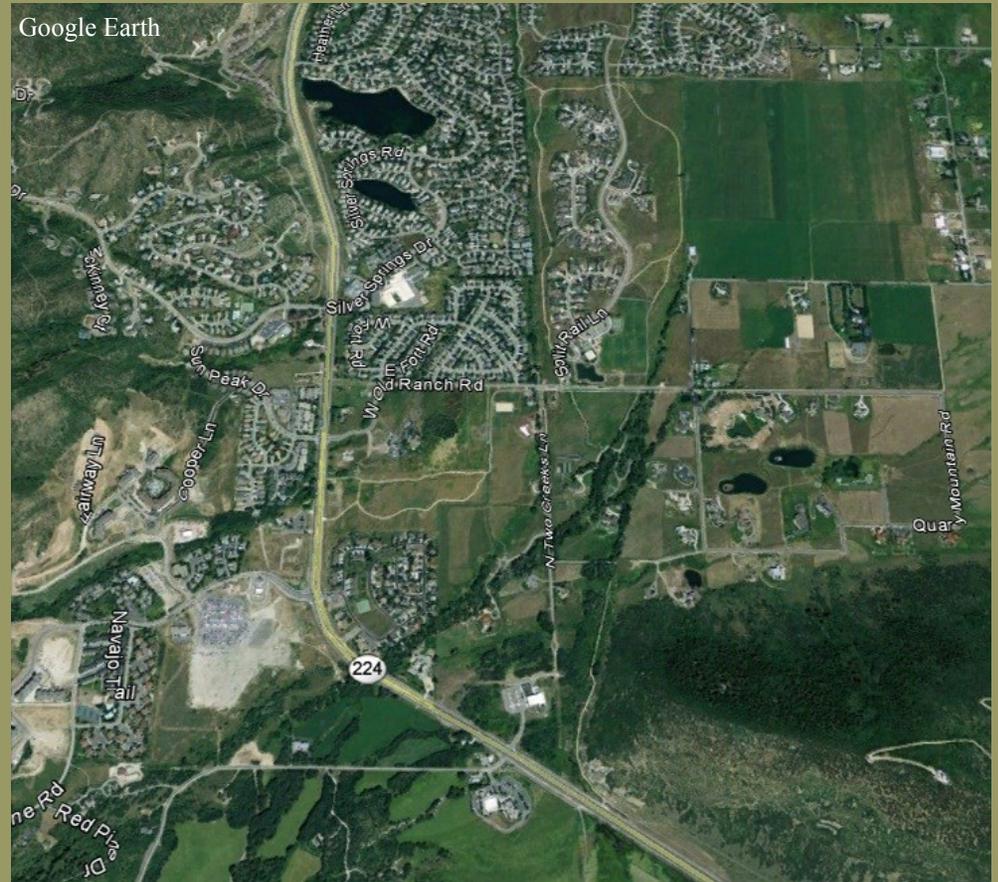
Loss of Agricultural Lands in Summit County

Contrasting aerial photos taken in Snyderville in 1993 and again in 2011 illustrate the intensity of urban development.

Google Earth



Google Earth



The Utah Agriculture Sustainability Task Force was created to address popular interest in agricultural land preservation and sustainability. The task force is offering 29 recommendations that are expected to protect and enhance Utah agriculture. The recommendations generally call for the creation of new laws and policies at the federal, state, and local levels that remove obstacles for safe modern farming and ranching. The full report can be found at: www.ag.utah.gov/divisions/conservation/documents/TaskForceSummaryNov162011.pdf

General Resource Observations

SOIL

In the eastern part of the of the Uinta Mountains, parent material consists of reddish to grayish quartzite and quartz sandstone, with small areas of shale and siltstone. In the central to northern area, parent material is reddish to grayish sandstone, conglomerate, siltstone, and claystone. Parent material in the West Hills is light gray to gray igneous rock that is dominantly andesite. Parent material in the southwestern area is dominantly grayish limestone with layers of siltstone, sandstone, and quartzite and an area of granite around the Lone Peak area.¹⁹

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

The WSS delineates and describes large areas of similar soils. Common uses are evaluating soils suitability for dwellings with basements, landscaping, roads, and septic tanks, measuring for vegetative productivity and chemical and physical properties. Using this information, agricultural producers, agencies, counties, and municipalities can know the suitability of various soils and can be 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 Survey near Coalville



Map Unit Legend			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
115	Dastrup loam, 2 to 5 percent slopes	72.1	38.4%
116	Dastrup loam, 5 to 15 percent slopes	54.7	29.1%
129	Fewkes gravelly loam, 8 to 15 percent slopes	10.1	5.4%
148	Jana-Richsum-Rock outcrop complex, 30 to 70 percent slopes	12.7	6.8%
179	Wanship-Kovich loams, 0 to 3 percent slopes	38.2	20.3%
Totals for Area of Interest:		187.8	100.0%

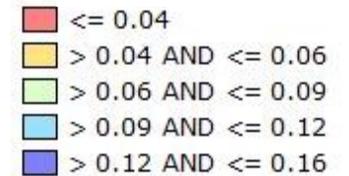
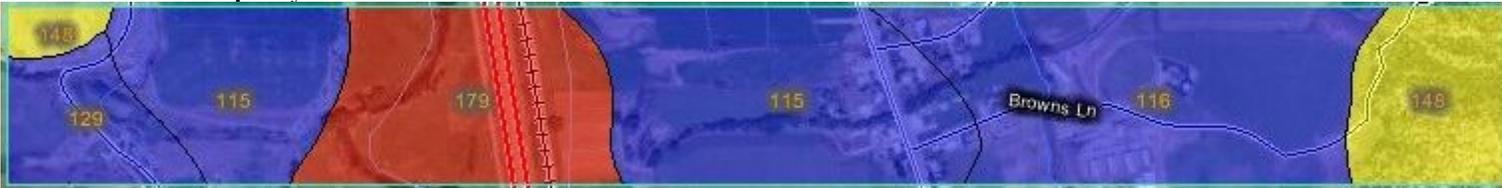
Above is a Web Soil Survey map showing a selected area of interest south of Coalville and the associated table of soil types.

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, erosion properties, potential excavation difficulties, subsidence properties, danger of sliding on slopes, and ecological site assessments.

Web Soil Survey

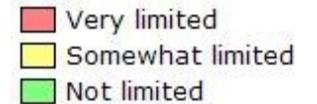
Three examples of Web Soil Survey (WSS) interpretations showing suitability and limitations for the selected area: available water capacity, soil limitations for dwellings with basements, and septic tank absorption fields. Additional soil criteria and the complete descriptions for each category below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

Available Water Capacity



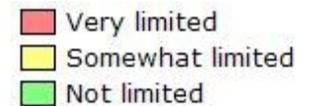
Available water capacity (AWC) refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The 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 or crops

Soil Limitations for Dwellings with Basements



Dwellings are single-family houses for 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



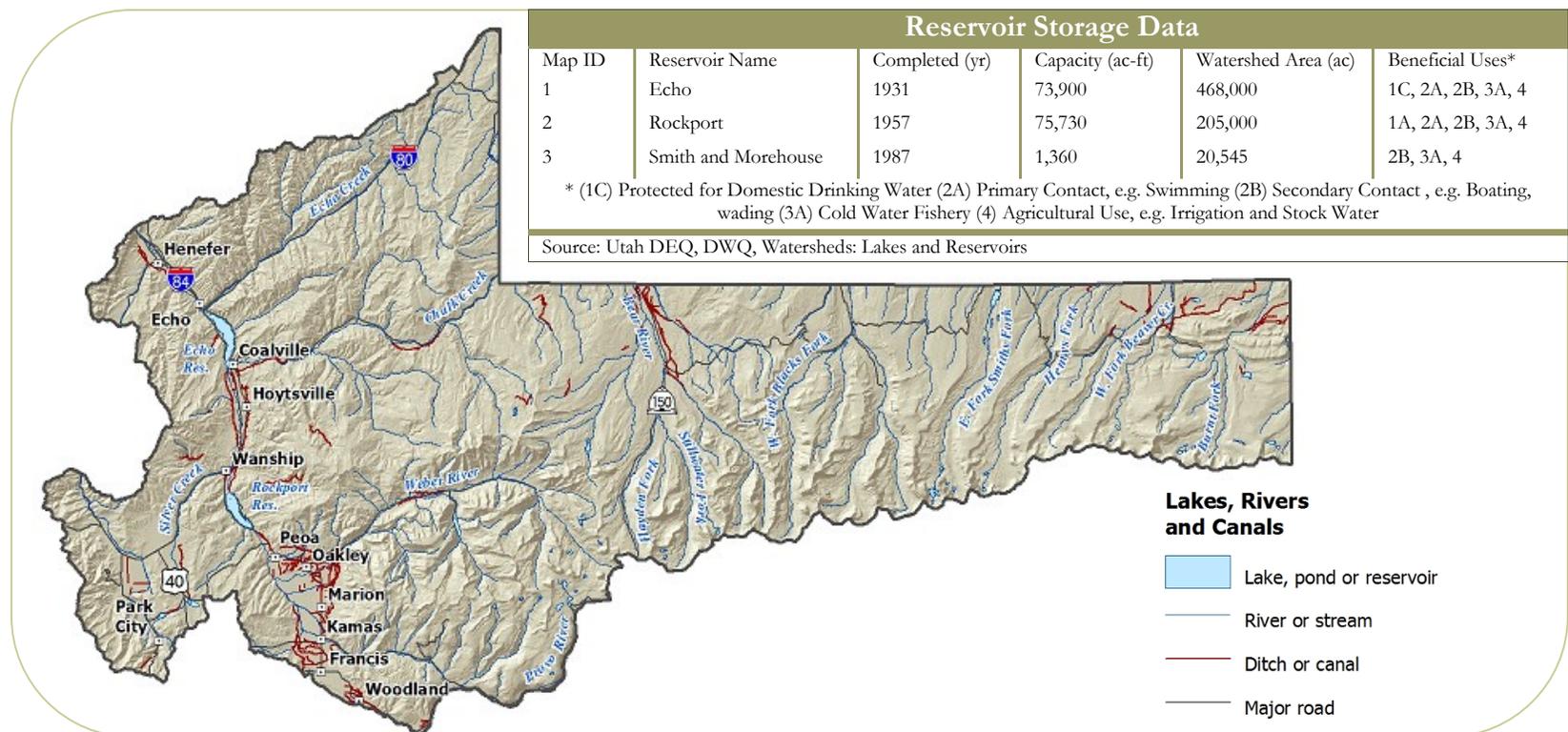
Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 60 inches is evaluated. The ratings are based on the soil properties that affect absorption of the 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

General Resource Observations

WATER

Summit County contains the headwater streams for seven large western watersheds. The high elevation and mountainous terrain makes the county a critical component to much of the water supply equation in these watersheds. The county receives 15-35 inches of precipitation per year, mainly in the form of snow, which supplies spring runoff to streams and reservoirs in the region. These reservoirs in turn provide storage and attenuate variations in water supplies. The Weber Basin Watershed is one of two major water supplies for the growing Wasatch Front, serving approximately 21% of Utah's population with drinking and irrigation water. Water is one of Summit County's most precious and contested resources and the system of reservoirs and streams are highly managed in order to meet the population's demands.

Rockport Reservoir, in cooperation with Echo Reservoir, provides drinking and irrigation water to Davis and Weber counties. Of this water, about 75% is used for irrigation and 25% is used for culinary water. Of the irrigation component, much of this water is for residential irrigation use. As these counties continue to grow and convert agricultural lands into residential neighborhoods, demand for this water will increase.⁶



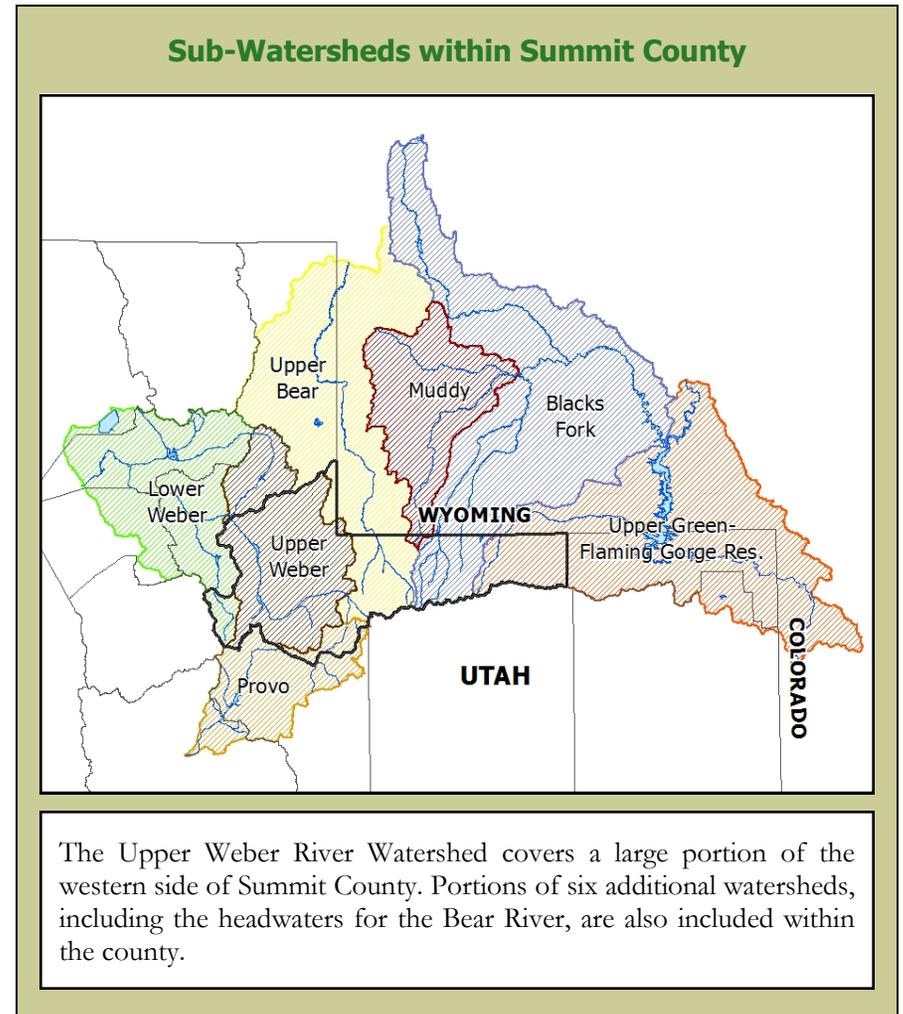
Storage and Delivery Systems

Rockport Reservoir is supplied by three main sources: the headwaters of the Weber River, Smith and Morehouse Creek, and Beaver Creek. Much of the watershed contributing to Rockport Reservoir is forested with agriculture, present mostly in the Kamas Valley. Rockport Reservoir has a Utah state park on the eastern shore and is a popular recreational destination for fishing, boating, and camping.

In conjunction with Rockport Reservoir, Echo Reservoir also stores and supplies water to Weber and Davis counties. The reservoir is fed from the Middle Weber River as it exits Rockport Reservoir, Chalk Creek flowing out of the Uinta Mountains, and Silver Creek, which flows from the Park City area. Echo Reservoir is also a popular recreational venue for fishing, boating, swimming, ice fishing, and camping.

Smith and Morehouse Reservoir is located in the upper reaches of the Weber Drainage and is used primarily as a water storage facility. The reservoir is supplied by several small streams that drain small upstream high mountain lakes and beaver ponds and marshes. The reservoir provides several recreational opportunities including fishing, swimming, camping, hiking, and boating.

This complex storage system is connected through natural headwater streams that supply seasonal runoff, which is then transported through rivers that connect these water bodies. The Weber River is the primary drainage on the eastern side of the county and transports and supplies much of the lower valleys with irrigation water. The Upper, Middle, and Lower Weber Rivers are renowned trout fisheries and provide recreational, as well as economic, benefits to the county. Echo Creek and Chalk Creek flow from southern Wyoming and provide irrigation to agricultural producers in the lower valleys. Silver Creek and East Canyon Creek drain the area around Park City, supplying water to Echo and East Canyon reservoirs.²⁰



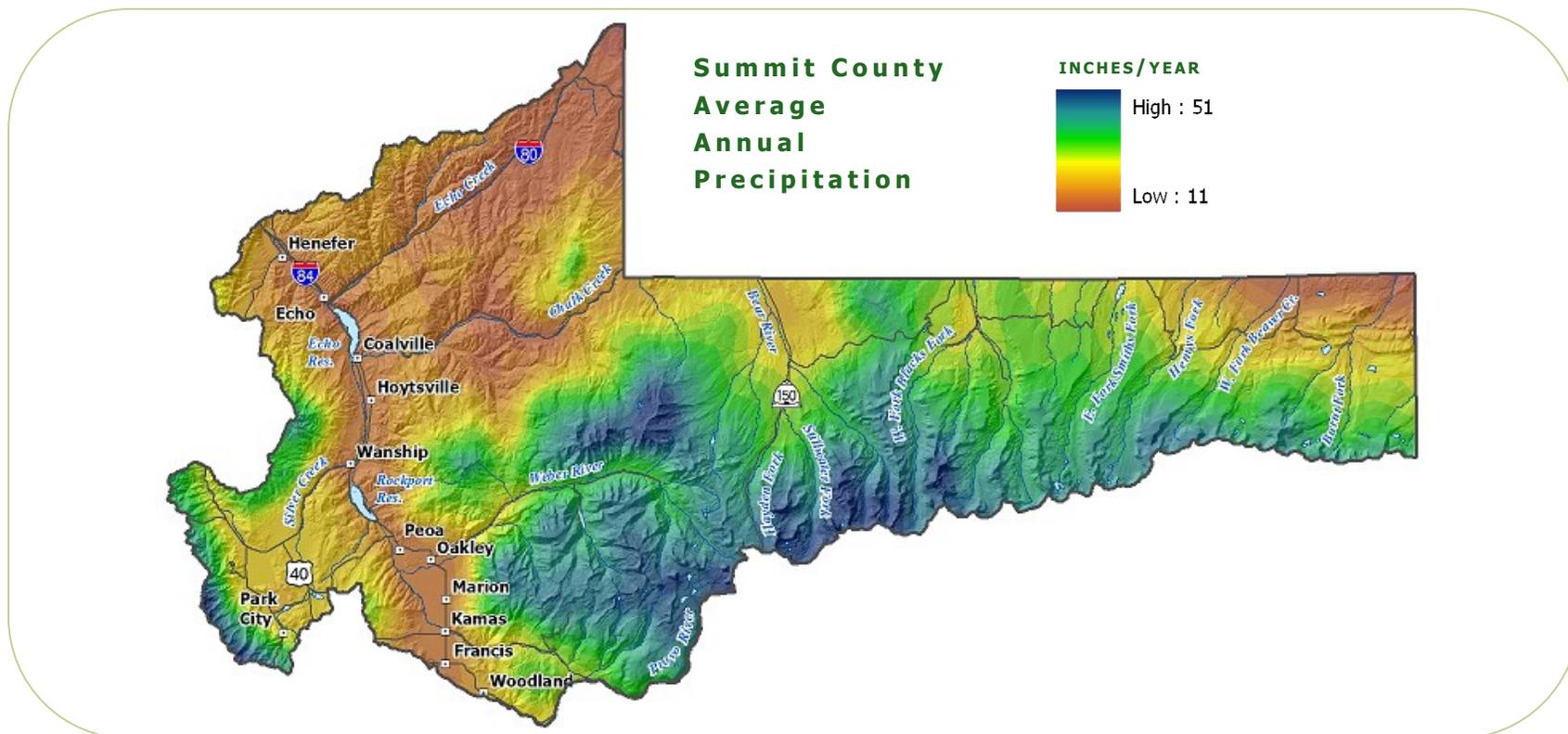
General Resource Observations

AIR & CLIMATE

Air Quality

Identified by the Clean Air Act, six common air pollutants are found across the United States that can create health hazards, harm the environment, or cause damage to property. These six common air pollutants include carbon monoxide, lead, nitrogen dioxide, particulate matter, ozone, and sulfur oxides.

Summit County is classified by the United States Environmental Protection Agency (EPA) as an attainment area for air quality. This means that the county's air meets the National Ambient Air Quality Standards (NAAQS) set forth by the EPA. Areas that do not meet the NAAQS are classified as nonattainment areas and are then required to develop and implement comprehensive state plans to reduce pollutant levels. The State of Utah currently has 24 air monitoring stations located across the Wasatch Front and southwestern Utah.²¹



The Summit County Health Department is actively monitoring PM_{2.5}. According to the EPA, particle pollution (also called particulate matter or PM) is the term for a mixture of solid particles and liquid droplets found in the air. Some particles, such as dust, dirt, soot, or smoke, are large or dark enough to be seen with the naked eye. Others are so small they can only be detected using an electron microscope.

A four-month study of PM_{2.5} was conducted by the Summit County Health Department for particulates in the Quinn's Junction and Snyderville Basin areas of the county. Sampling was continuous over the span of 105 days at both sites running, December 23, 2009 through April 12, 2010.

Results indicated generally low levels of PM_{2.5}, with the exception of two days. During those two days, levels of PM_{2.5} were elevated due to dust storm events. The 24-hour mean concentrations of PM_{2.5} were lower at the Quinn's Junction site (4.4 µg/m³) than at the Old Ranch Road site (5.5 µg/m³). The highest measured PM_{2.5} level was 44.9 µg/m³, recorded March 30, 2010 at the Old Ranch Road Site.²²

Climate

The climate in Summit County ranges from dry sub-humid to humid.

The dry sub-humid climate is in the dryer areas between Coalville and Evanston, Wyoming. The average annual precipitation is 14 to 16 inches. The mean annual air temperature is 40 to 45 °F, the frost-free period is 70 to 100 days, and the temperature regime is frigid.

The moist sub-humid climate is in the lower mountain areas. The average annual precipitation is 16 to 22 inches. The mean annual air temperature is 40 to 45 °F, the frost-free period is 60 to 90 days, and the temperature regime is frigid.

The humid climate is in the higher mountain areas. The average annual precipitation is 22 to 35 inches. The mean annual air temperature is 35 to 40 °F, the frost-free period is 20 to 60 days, and the temperature regime is cryic.

NRCS Snow Survey and SCAN Programs



The SNOTEL site at Smith and Morehouse in Summit County.

The Natural Resources Conservation Service (NRCS) Snow Survey Program generates water supply forecasts and provides near real-time climatic data from high elevation, snowfall driven environments in the western United States. Timing and amount of snowpack, along with temperature fluctuations throughout the spring and summer months, impact

the amount of water available for irrigation during the growing season. The NRCS Snow Survey provides valuable data that is used to help manage water resources in order to maximize available water.

In Summit County, NRCS operates thirteen SNOTEL (SNOWpack TE-Lemetry) sites monitoring snowpack conditions. Steel Creek Park (10,200 ft), Chalk Creek 1 (8,993 ft), Trial Lake (9,992 ft), and Smith and Morehouse (7,600 ft) are just a few of these sites. SNOTEL sites are highly important to the watersheds and water outlook in Wasatch County. Additional climatic data is available at: <http://www.ut.nrcs.usda.gov/snow/>.

The NRCS Soil Climate Analysis Network (SCAN) is a nationwide climate network that provides near 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. The stations are remotely located and collect hourly atmospheric and soils data from spatially representative soils and landscapes. Sites are located in agriculturally important areas that best represent current irrigated and non-irrigated practices. For access to data from other nearby sites, visit: <http://www.wcc.nrcs.usda.gov/scan/Utah/utah.html>.

General Resource Observations

PLANTS

Crops and Pasture

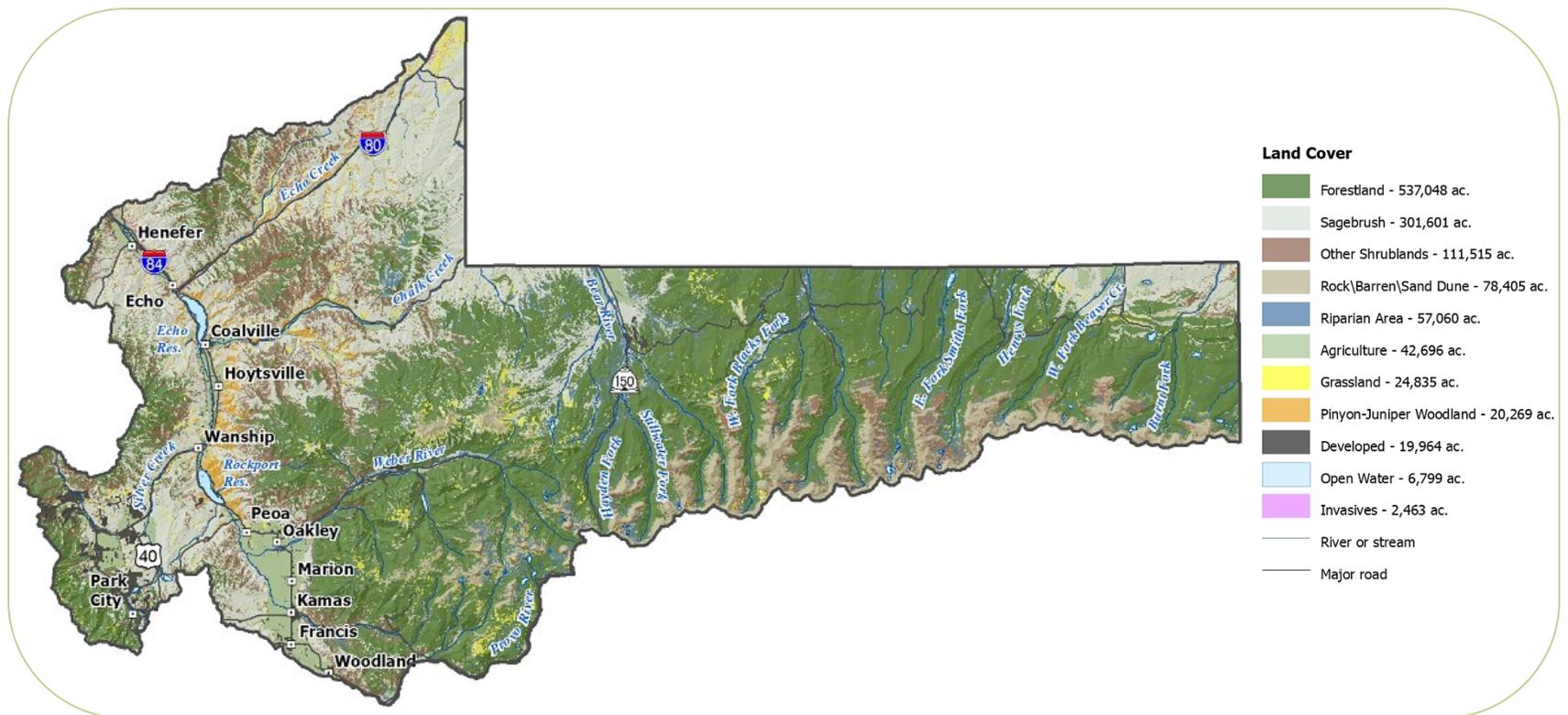
Approximately 415,000 acres of Summit County are considered to be farmland, of which approximately 24,000 acres are irrigated land and roughly 16,000 acres are harvested for hay and forage production. Over 1,500 acres are used for nurseries and greenhouses. A very small number of acres are used for corn and oats.²³

Forestland and Woodland

Tree species that are found above the cities include: Gambel oak, bigtooth maple, boxelder, cottonwood, mahogany, juniper, lodgepole,

ponderosa, Douglas-fir, aspen, white-fir, spruce (blue and Englemann), sub-alpine fir, and limber pine.

It is difficult to put a value on forested land. However, the only timber in the county that holds commercial value are conifers (Douglas-fir, spruce and, to some extent, white and sub-alpine firs). With the current spruce beetle attacks, the value of spruce is diminishing each year that the trees stand dead. Other than that, there's virtually no value in any of the other tree species at this point in time.²⁴



²³ National Agriculture Statistics Service.

²⁴ PJ Abraham, DFFSL

Rangeland

Rangeland and shrubland cover approximately 505,114 acres in Summit County, ranging from grassy meadow valleys to sagebrush and oak covered mountain slopes all the way to the sub alpine peaks of the Wasatch Mountains.²⁵ Summit County provides critical summer range to many livestock producers in Utah, as well as provide habitat for multiple species of wildlife, including mule deer, elk, moose, and sage-grouse. Due to historical overgrazing, invasive non-native annual grasses are a major concern for rangelands, as well as cause erosion and water quality issues related to livestock access to riparian areas. Several government agencies and local work groups are working together to address such problems. The Natural Resource Conservation Services (NRCS) and the Utah Department of Agriculture and Food Grazing Improvement Program (GIP) are working with the local conservation district to address conservation and natural resource issues at the county level, with range and livestock management being one of those concerns.

Grazing management is one of the most important factors in improving rangeland conditions. Rangeland plants, more specifically grasses and forbs, need to be given the opportunity to occasionally rest from grazing pressure and complete a life cycle to ensure their survivability and persistence. Rotational grazing has become a method of livestock management that provides plants the rest and recovery they need while still utilizing and maximizing forages for livestock production. While the initial implementation of a rotational grazing system is complex and somewhat costly, the long term benefits to livestock, wildlife, riparian areas, water quality, desired plant communities, and overall range health far exceed initial inputs. NRCS and GIP are government agencies designed to help offset the cost of implementing such systems and provide cost share programs for fencing, water development, weed/brush control, reseeding, and grazing management.²⁶

Community Forest

A tree inventory was performed for the municipal-owned trees of Francis, Kamas, Oakley, and Coalville. Francis, Oakley, and Coalville have each been recognized as a Tree City USA by the Arbor Day Foundation. The community forest of these four towns provide the following benefits annually: 526,449 gallons of storm water diverted; 100,542 pounds of CO₂ avoided; and 1,151,144 pounds of CO₂ stored. The community forest has a high percentage of green ash, as well as quaking aspen and other poplars. There has been success in adding bur oak, common hackberry, and Japanese lilac trees to the forest to help increase diversity. Numerous new tree planting sites are available. Communities are encouraged to take advantage of these sites to increase the benefits of cleaner air and cleaner water provided by the community forest.³⁴

²⁵ 2005 Summit County Resource Assessment

²⁶ Ashley Hansen, UDAF

³⁴ Jason Barto, ISA Certified Arborist



An irrigation center pivot with improvements funded by NRCS. Photo courtesy of Coalville NRCS.



Summit County rangeland with improvements funded by NRCS. Photo courtesy of Coalville NRCS.

General Resource Observations

ANIMALS

Agriculture

Most cattle operations in the county are cow-calf operations, where calves are marketed and sold in the fall. The total cows and calves inventory for Summit County decreased from 26,168 in 2002 to 24,894 in 2007. Over the same time frame, the total number of sheep increased from 24,834 to 32,215. With approximately 500 birds, poultry production in the county is minimal. Mink production in Summit County accounts for more than 16% of the state total. Approximately 87,500 pelts produced in 2007.²⁷

Aquatic Life

Because Echo and Rockport (Wanship) reservoirs are higher in elevation, they offer an abundant population of cold water sport fish. Both reservoirs contain numerous trout species, including rainbow trout, cutthroat trout, brown trout, and tiger trout. Other species of fish include channel catfish, black crappie, small mouth bass, large mouth bass, redbreast shiner, and carp. Rainbow trout can also be found in Smith and Morehouse Reservoir, east of Oakley.²⁰

Wildlife

Mule deer and Rocky Mountain elk inhabit the mountains of Summit County during the summer and spend winter in lower elevations throughout the county. Moose also call Summit County home. Several Wildlife Management Areas are located in the county and are managed by the Utah Division of Wildlife Resources, primarily for preserving wildlife habitat and providing sportsmen access for hunting and fishing. Black bear, mountain lion, bobcat, badger, mink, skunks, beaver, muskrat, raccoon, red fox, and coyote are found in Summit County, along with many other smaller mammal species.

Many bird species can be observed in Summit County, including raptors, waterfowl, wading birds, and migratory birds. Bald eagles can be observed during the winter. The large expanses of sage brush communities in several areas of the county provide habitat for the greater sage-grouse.²⁸



Photo courtesy of Chris Ure, Kamas Valley Conservation District.



Photo courtesy of Brenda Bushell.

²⁷ National Agriculture Statistics Service

²⁰ Utah DEQ: DWQ: Watersheds: Lakes and Reservoirs

²⁸ Doug Sakaguchi, Wildlife Biologist, DWR

Utah Sensitive Species

The purpose the Utah sensitive species list is to identify those species in the state that are the most vulnerable to population or habitat loss. This list provides land managers, wildlife managers and concerned citizens with a brief overview of the conservation status of listed species. The list is intended to stimulate management actions, e.g., development and implementation of a conservation strategy, for listed species. By developing and implementing timely and sufficient conservation measures for Sensitive Species, federal listing of these species under the Endangered Species Act may be precluded.²⁹

Threatened and Endangered Species

The purpose of the Endangered Species Act is to protect and recover imperiled species and the ecosystems upon which they depend. It is administered by the U.S. Fish and Wildlife Service and the Commerce Department's National Marine Fisheries Service (NMFS). Under the ESA, species may be listed as either endangered or threatened. "Endangered" means a species is in danger of extinction throughout all or a significant portion of its range. "Threatened" means a species is likely to become endangered within the foreseeable future. All species of plants and animals, except pest insects, are eligible for listing as endangered or threatened.³⁰

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

Common Name	Status
Greater Sage-grouse	C
Brown (Grizzly) Bear	T
Canada Lynx	Extirpated

Utah Division of Wildlife Resources, *County Lists of Utah's Federally Listed Threatened(T), Endangered(E), and Candidate© Species*. March 29, 2011.

http://dwrcdc.nr.utah.gov/ucdc/ViewReports/te_cnty.pdf



The Canada lynx is on the threatened species list.
<http://www.fws.gov>

Utah Sensitive Species

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

- Bald Eagle
- Bluehead Sucker
- Bobolink
- Bonneville Cutthroat Trout
- Brown (Grizzly) Bear
- Canada Lynx
- Colorado River Cutthroat Trout
- Columbia Spotted Frog
- Deseret Mountainsnail
- Ferruginous Hawk
- Grasshopper Sparrow
- Greater Sage-Grouse
- Lewis's Woodpecker
- Northern Goshawk
- Northern Leatherside Chub
- Short-Eared Owl
- Smooth Greensnake
- Three-Toed Woodpecker
- Western Pearlshell
- 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 at: dwrcdc.nr.utah.gov/ucdc/.

HUMANS: Social & Economic Considerations

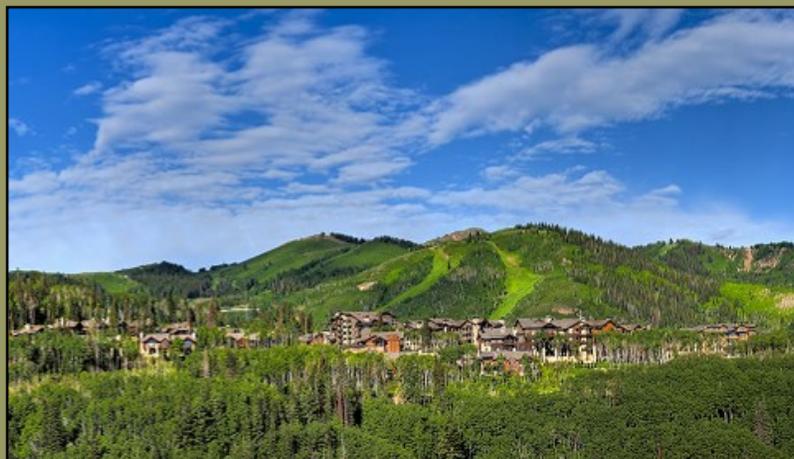
Population

From 1980 to 2011, Summit County's population increased at an average rate of 4.4 percent per year. The highest population increase rate was 9.5 percent in 1980. The total population of Summit County in 2011 was 37,208. In the county's population growth, natural increase, and net-migration are about equal.²⁷ As of 2010, populations of Summit County cities and towns were:

Coalville	1,363
Francis	1,077
Henefer	766
Kamas	1,811
Oakley	1,470
Park City	7,558

Demographics

In 2011, the county's racial makeup was 85.5 percent white, 11.8 percent Hispanic or Latino, 1.4 percent Asian, 0.7 percent black, 0.5 percent American Indian, and 0.1 percent Native Hawaiian or Pacific Islander. In the same year, persons under the age of 18 represented 27.5 percent, and persons 65 years and older represented 8.0 percent of the population. 6.4 percent of the county's population was below the poverty level, which is 5 percent lower than the state average of 11.4 percent, from 2007 to 2011. 93.3 percent of the population are high school graduates, while 49.8 percent of the county reports having a bachelors degree or higher.¹



Summer scenic view.
Photo courtesy of Park City Chamber/Bureau.

Area Name	Summit
Period Year	2011
Population	37,208
Births	476
Deaths	125
Natural Increase	351
Net Migration	361
Annual Change	712
Annual Rate of Change	1.9%



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

Economy

The top five nonfarm employers in the county are Deer Valley Resort, The Canyons, Park City School District, Park City Mountain Resort, and Park City. Leisure and hospitality jobs are the most prevalent in the county, followed by trade, transportation, and utilities, construction, and federal, state, and local government.³² Agriculture is significant in Summit County, accounting for a large portion of the labor force. According to the USDA 2007 Census of Agriculture, the mainstays of the agricultural community are sheep, beef cow, and mink production and hay for forage.²⁷

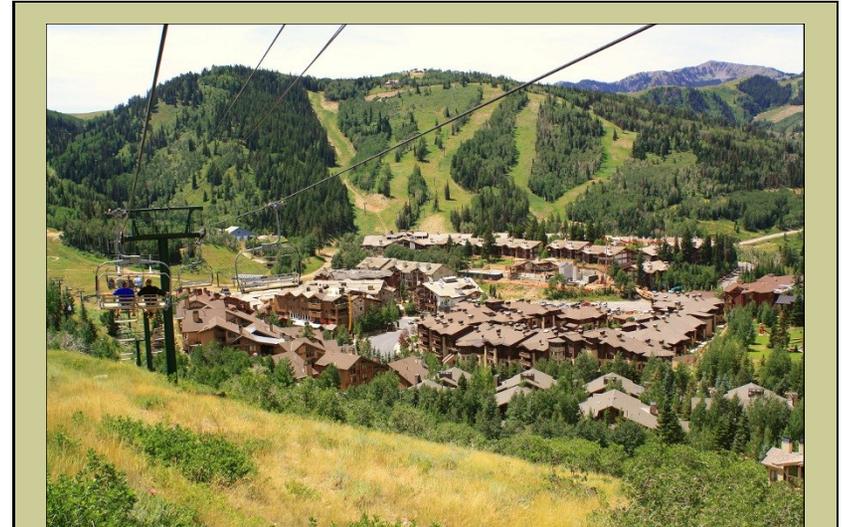
Recreation

Summit county has a rich heritage of outdoor recreation and trail use. The county's immense scenic beauty and mix of geography, public lands, and tourism has combined to provide the area with world-class recreational amenities and opportunities. By and large, recreation remains the most important aspect to a vital economy in the county.

Park City, Utah is always rated one of the top ski and snowboard destinations in the world. With three world-class resorts, Deer Valley Resort, Park City Mountain Resort, and the Canyons Resort, within a few miles of each other, you can spend a week skiing and never repeat the same run. In the summer months, there are miles of hiking and biking trails, fishing, and other water sports and golfing at five private and three public courses.

The alpine slide at Park City Mountain Resort has become quite famous. It allows normal people to experience a little of the spirit of the Olympic luge and bobsled, rocketing you down a fixed track of banked turns and exciting straightaways. The alpine slide is one of the longest slides in the world, with over 3,000 feet of track. You can choose from one of four lanes, offering varying numbers of curls, swirls, dips, and turns.

The Sundance Film Festival is the premier showcase for U.S. and international independent film, held each January in and around Park City, Utah. Presenting dramatic and documentary feature-length films from emerging and established artists, innovative short films, filmmaker forums and panels, live music performances ranging from solo acts to film composer events, cutting-edge media installations, and engaging community and student programs, the festival brings together the most original storytellers of our time.³³



Summer chairlift. Photo courtesy of Park City Chamber/Bureau.



Snowboarding. Photo courtesy of Ben Lomu and David Gunnell.

32 Utah Department of Workforce Services
27 USDA, National Agriculture Statistics Service
33 Utah.com

Appendices

Map and GIS Data Sources

Land Ownership/Overview: Land ownership status and areas of responsibility for the State of Utah. The Utah School and Institutional Trust Lands Administration (SITLA) and the Bureau of Land Management revise this data regularly to reflect changes in ownership. Available for download from the Utah Automated Geographic Reference Center at: [http://gis.utah.gov/sgid-vector-download/utah-sgid-vector-gis-data-layer-download-index?fc=LandOwnership](http://gis.utah.gov/sgid-vector-download/utah-<u>sgid-vector-gis-data-layer-download-index?fc=LandOwnership</u>)

Watersheds: A subset of the National Hydrography Dataset (NHD). The National Hydrography Dataset (NHD) is a comprehensive set of digital spatial data that contains information about naturally occurring and constructed bodies of water, paths through which water flows, and related entities. The NHD was developed by U.S. Geological Survey (USGS) in cooperation with U.S. Environmental Protection Agency, USDA Forest Service, and other Federal, State, and local partners. Available for download from the USGS National Map website at: <http://nationalmap.gov/index.html>

Hydrography: A subset of the National Hydrography Dataset (NHD). The National Hydrography Dataset (NHD) is a comprehensive set of digital spatial data that contains information about naturally occurring and constructed bodies of water, paths through which water flows, and related entities. The NHD was developed by U.S. Geological Survey (USGS) in cooperation with U.S. Environmental Protection Agency, USDA Forest Service, and other Federal, State, and local partners. Available for download from the Utah Automated Geographic Reference Center at: [http://gis.utah.gov/sgid-vector-download/utah-sgid-vector-gis-data-layer-download-index?fc=StreamsNHDHighRes](http://gis.utah.gov/sgid-vector-download/utah-<u>sgid-vector-gis-data-layer-download-index?fc=StreamsNHDHighRes</u>)

Important Farmland: Prime, Statewide and Uniquely Important Farmland derived from the following SSURGO soil surveys: UT613 –Summit Area, Utah, Parts of Summit, Salt Lake and Wasatch Counties and UT622 - Heber Valley Area, Utah - Parts of Wasatch and Utah Counties using Soil Data Viewer, a tool created by USDA Natural Resources Conservation Service as an extension to ArcMap that allows users to create soil-based thematic maps. SSURGO depicts information about the kinds and distribution of soils on the landscape. The soil map and data used in the SSURGO product were prepared by soil scientists as part of the National Cooperative Soil Survey. SSURGO Soil Surveys are available for download from the NRCS Soil Data Mart: <http://soildatamart.nrcs.usda.gov/>

Soils Detail Data: Detailed soil properties derived from the following SSURGO soil surveys: UT613 –Summit Area, Utah, Parts of Summit, Salt Lake and Wasatch Counties and UT622 - Heber Valley Area, Utah - Parts of Wasatch and Utah Counties using Soil Data Viewer, a tool created by USDA Natural Resources Conservation Service as an extension to ArcMap that allows users to create soil-based thematic maps. SSURGO depicts information about the kinds and

distribution of soils on the landscape. The soil map and data used in the SSURGO product were prepared by soil scientists as part of the National Cooperative Soil Survey. SSURGO Soil Surveys are available for download from the NRCS Soil Data Mart: <http://soildatamart.nrcs.usda.gov/>

General Soils: General soil properties derived from the STATSGO soil survey. STATSGO depicts information about soil features on or near the surface of the Earth. These data are collected as part of the National Cooperative Soil Survey. STATSGO is designed primarily for regional, multi-county, riverbasin, state, and multi-state regional planning, management, and monitoring. The STATSGO Soil Survey is available for download from the NRCS Soil Data Mart: <http://soildatamart.nrcs.usda.gov/USDGSM.aspx>

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

Precipitation: Produced by U.S. Department of Agriculture Natural Resources Conservation Service – National Cartography and Geospatial Center. This vector data set provides derived average annual precipitation according to a model using point precipitation and elevation data for the 30-year period of 1971 – 2000.

Assessment Units (Impaired Waters): Produced by Utah Division of Water Quality, January 2010. This dataset represents water quality assessment units for the State of Utah, and shows the 2006 assessment category for meeting State of Utah water quality standards. Available for download from the Utah Automated Geographic Reference Center at: [http://gis.utah.gov/sgid-vector-download/utah-sgid-vector-gis-data-layer-download-index?fc=DWQAssessmentUnits](http://gis.utah.gov/sgid-vector-download/utah-<u>sgid-vector-gis-data-layer-download-index?fc=DWQAssessmentUnits</u>)

Roads: This data set represents street centerline data for the State of Utah as compiled by the Utah Automated Geographic Reference Center from data contributed by local, county, state, federal and tribal governments. Available for download from the Utah Automated Geographic Reference Center at: [http://gis.utah.gov/sgid-vector-download/utah-sgid-vector-gis-data-layer-download-index?fc=Roads](http://gis.utah.gov/sgid-vector-download/utah-<u>sgid-vector-gis-data-layer-download-index?fc=Roads</u>)

County Boundaries: This data set represents county boundaries in Utah at 1:24,000 scale. Last updated July, 2012. Available for download from the Utah Automated Geographic Reference Center at: [http://gis.utah.gov/sgid-vector-download/utah-sgid-vector-gis-data-layer-download-index?fc=Counties](http://gis.utah.gov/sgid-vector-download/utah-<u>sgid-vector-gis-data-layer-download-index?fc=Counties</u>)

Map and GIS Data Sources continued...

Loss of Agricultural Lands in Summit County: Image compiled using the aerial photography time comparison feature to show historical imagery on Google Earth.

2010 Aerial Insect & Disease Detection Survey: This data set represents the 2010 aerial insect survey completed by the US forest service throughout Utah. http://www.fs.usda.gov/detailfull/r4/forest-grasslandhealth/?cid=fsbdev3_016120&width=full

References

1. U.S. Census Bureau. Retrieved from Summit County quick facts: <http://quickfacts.census.gov/qfd/states/49/49051.html>
2. Utah Association of Counties. Retrieved from Summit County History: <http://quickfacts.census.gov/qfd/states/49/49051.html>
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