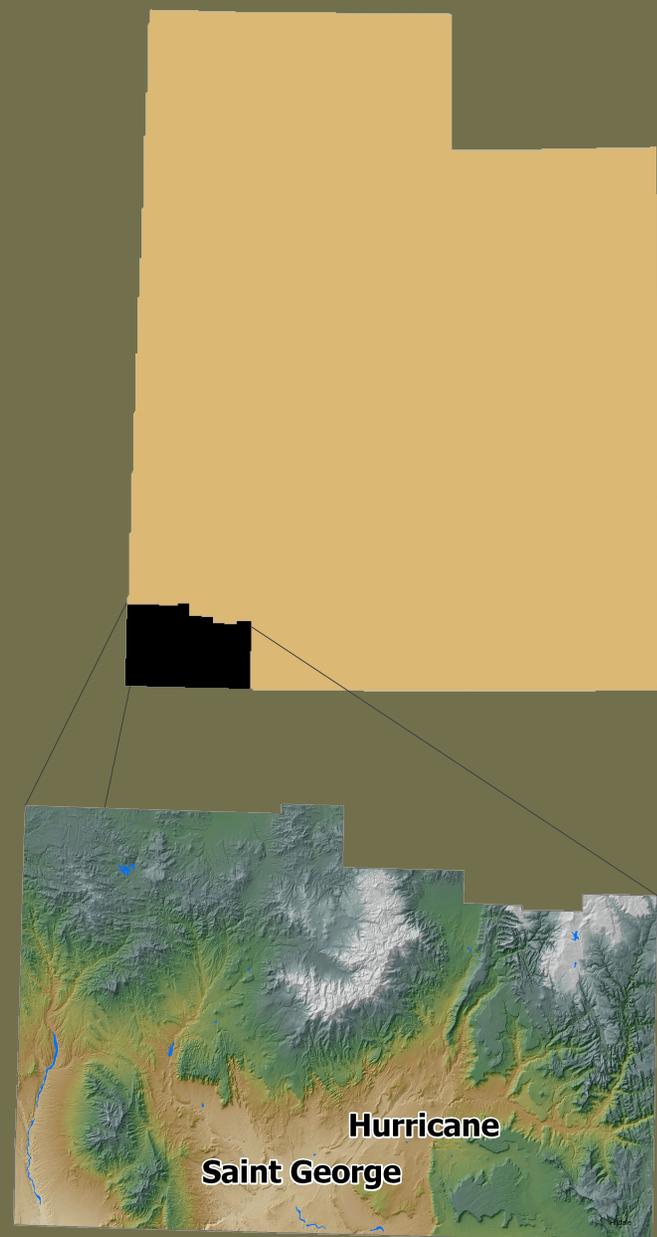


WASHINGTON COUNTY RESOURCE ASSESSMENT

OCTOBER 2012

Conserving Natural Resources For Our Future

DIXIE CONSERVATION DISTRICT



Acknowledgments

Dixie Conservation District

with the:

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

In partnership with the:

Utah Conservation Commission

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

UtahPCD

State Agencies and Organizations:

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

Federal Agencies:

U.S. Department of Interior

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

U.S. Department of Agriculture

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

Other

- State Historical Preservation Office
- Governor's Office of Planning and Budget
- 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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Washington County Resource Assessment: Executive Summary



Why a Resource Assessment?

The Dixie 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 Washington 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:

Dixie Conservation District
77 North Main Street
Veyo, UT 84782
(435) 574-3102

Natural Resource Priorities and Concerns

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

- 1. Watershed Level Health:** Developing partnerships with key stakeholders to improve watershed health.
- 2. Water Quantity/Quality:** Storage, delivery and use, improvement of water quality conditions, and problem sources.
- 3. Grazing:** improvement of rangeland, grazing management/season of use, noxious weeds, and red brome/cheatgrass.
- 4. Noxious Weeds/Invasive Species/Pests:** Coordinate with the county weed board and CWMA to mitigate noxious weeds and invasive species.
- 5. Urban Interface:** Urban development in dense pinion juniper stands and loss of locally important 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.

Soil: Erosion related to rangeland conditions and upland health.

Water: Water quality and quantity, water development, and conservation.

Air/Climate: As population increases, air pollution and inversions are a concern.

Plants: Grazing management and noxious weed concerns.

Animals: Threatened and endangered species

Humans: Urban/wildlife interface and loss of locally important farmlands.

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 has changed to the Natural Resources Conservation Service (NRCS). In May of 1936, farmers were allowed to set up their own districts to direct soil conservation practices. Today, Utah has 38 conservation districts.

Conservation Progress

Since the organization of the Dixie County Conservation District in 1959, great strides have been made toward increasing and sustaining natural resources in Washington County. The 2005 resource assessment listed the most critical resource concerns as 1) water quantity and quality, 2) grazing lands, 3) noxious weeds, and 4) wildlife habitat. The 2012 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 Washington County.

Public Outreach

A recent public survey was conducted by the Dixie Conservation District to find out what the public views as the most pressing conservation issues. Respondents indicated soil loss/erosion on land and stream banks were a major concern, as well as wildlife/range management issues and loss of open space/agricultural lands. Other concerns were urban/suburban growth, adequate water supply, ground water quality/quantity, and storm water run-off and flooding.

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.



Photo of Kolob Canyons by Mike Large.



Photo courtesy of NRCS

A great "roller" moves across the land during the Dust Bowl.

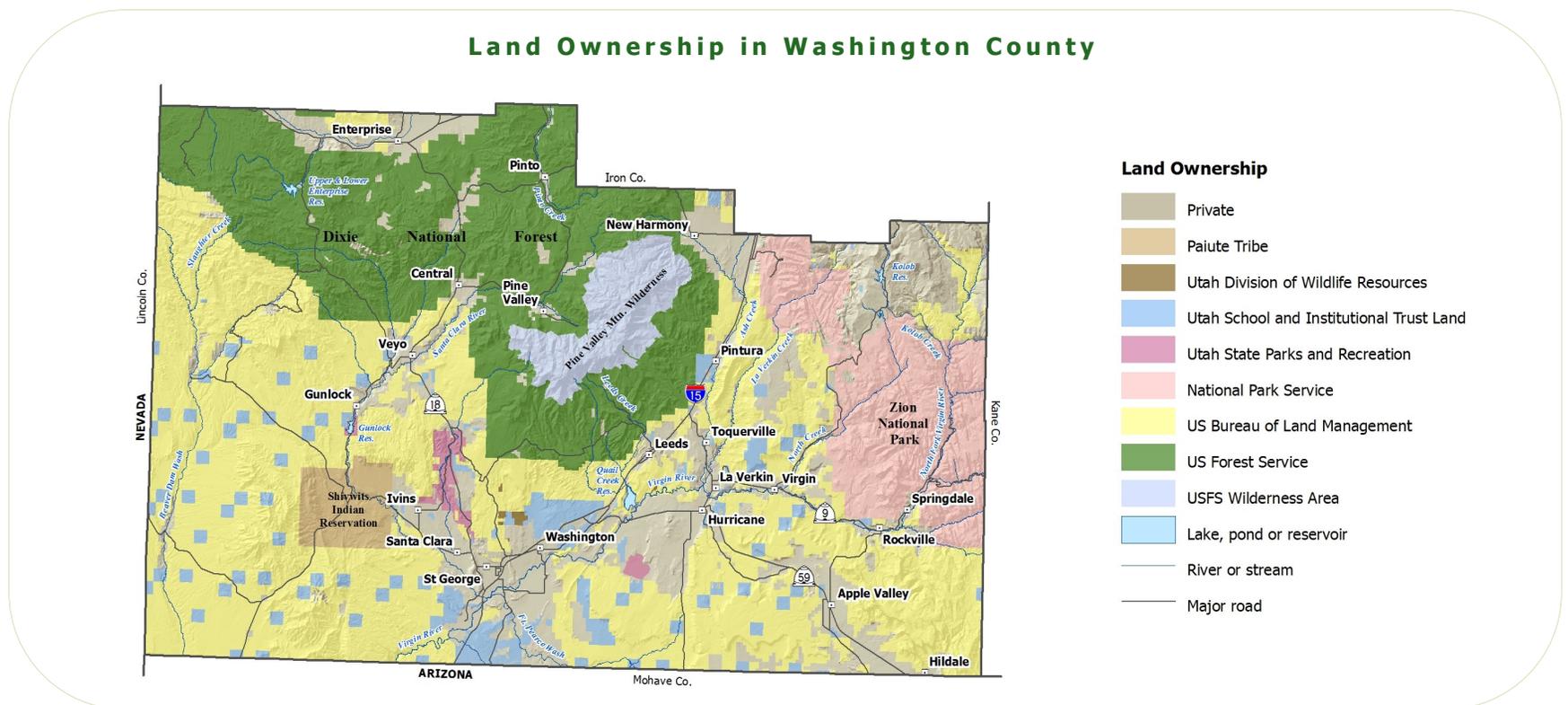
Washington County Overview

Background

Washington County is comprised of approximately 1,553,280 acres and is in the southwestern corner of Utah. The majority of the county is public land or urban land. Most federal public land is administered by the United States Forest Service (USFS), Bureau of Land Management (BLM), and National Parks Service (NPS). Much of the state land is administered by the School and Institutional Trust Lands Administration (SITLA) and Utah Division of Wildlife Resources (DWR).

Major land uses in the county include range, alfalfa and grass hay, corn and small grains crops, fruit and nut orchards, forest production, and industrial and urban areas. Recreational uses are also common on both private and public lands.

Elevation and land cover are diverse within the county. Elevations range from over 10,300 feet in the Pine Valley Mountains, found on the northern end of the county, down to 2,000 feet in the Beaver Dam Wash, which is located in the most southwest corner of the county. The county includes the following mountain ranges: Pine Valley Mountains, Beaver Dam Mountains, Bull Valley Mountains, Vermilion Cliffs, and Kolob Mountain. The valley areas in and around St. George are within the Mohave Desert zone and are very hot during summer months. Due to the variability of elevation, the county's precipitation, land cover, and land uses are also quite variable.¹



¹ NRCS Resource Assessment, August 2005.



WASHINGTON COUNTY

Photos: www.utahsdixie.com

Natural Resource Priorities and Concerns

WATERSHED LEVEL HEALTH

The majority of the watersheds in Washington County drain into the Virgin River. The Virgin River Watershed is the area of land that covers portions of southwest Utah, southeast Nevada, and northwest Arizona. The Virgin River eventually drains into Lake Mead just northeast of Las Vegas, Nevada. The Virgin River Watershed Management Plan, which the conservation district supports and is a partner with, covers the land areas in Iron, Kane, and Washington Counties that drain into the Virgin River. The watershed plan takes into account all activities that happen within these boundaries and all the people who live, work, and visit the area. Watershed planning is a dynamic process that includes many stakeholders and interests. The district supports a coordinated resource planning approach, which if done right can lead to win-win solutions in achieving watershed health and sustainable landscape viability.

Strategies

- Coordinate and work with conservation partners and local, state, and federal agencies in a coordinated resource management planning approach, using the Virgin River Watershed Management Plan and the district's resource assessment, to implement critical sub-watershed level conservation projects and improvements.
- Coordinate efforts with landowners and permittees using programs such as the state's Grazing Improvement Program (GIP), Utah Partners for Conservation and Development (UPC&D) funding opportunities, Utah Agriculture Resource Development Loan (ARDL) Program, USDA Farm Bill Programs, and other partner funding sources that become available for watershed restoration projects.
- As a local conservation district, remain an active partner of the Virgin River Watershed Advisory Group (VRWAG).

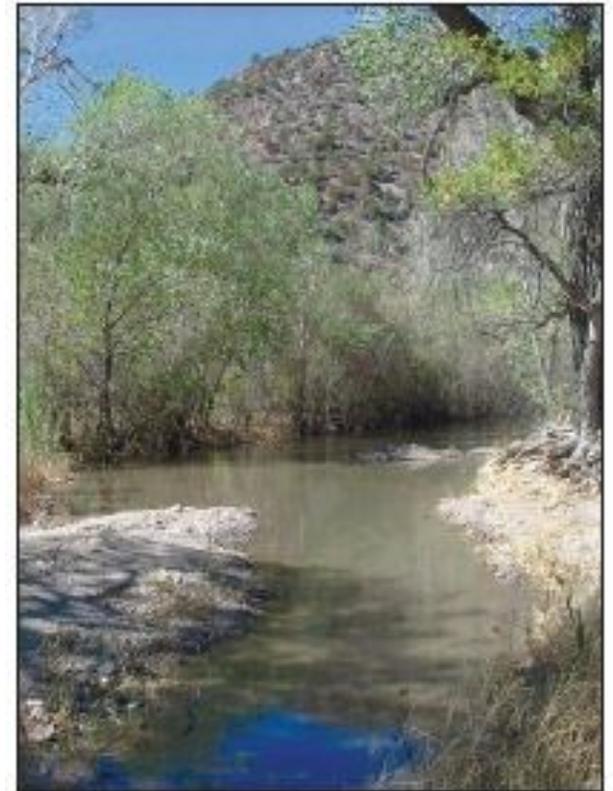
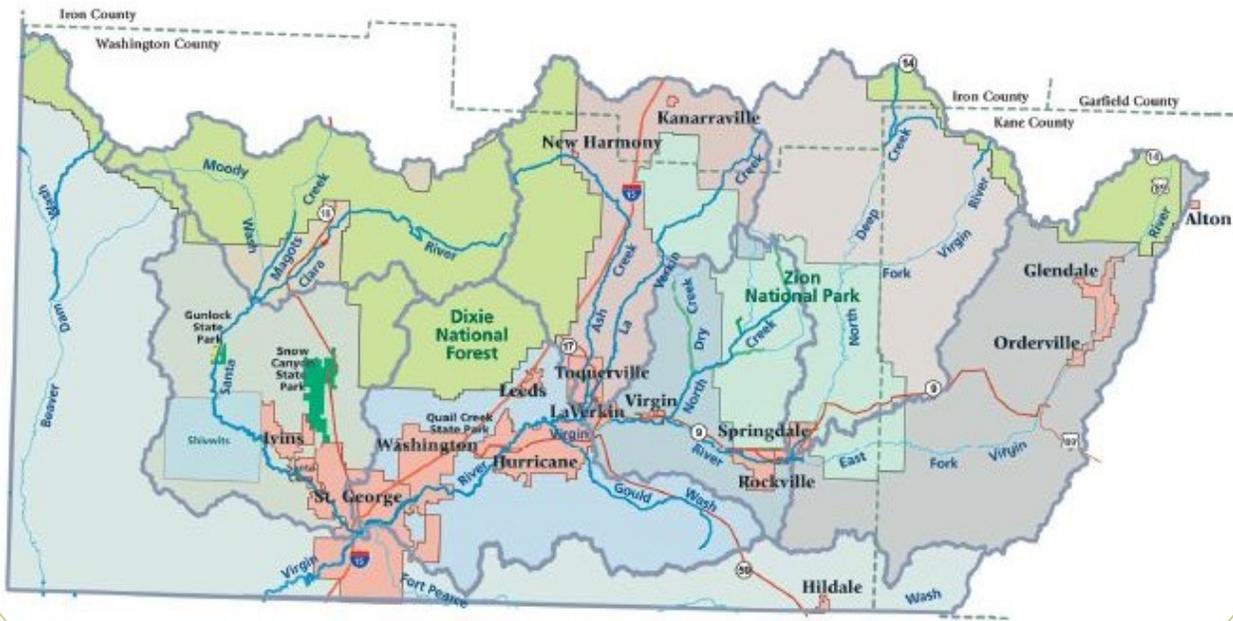
Actions/Tasks

- Address objectives of the VRWAG, relating to the impaired waters on the state's 303d list within the watershed, to begin planning efforts related to project sites, funding sources, partnerships, etc.
- Improve coordination efforts with federal land management stakeholders and use local elected powers and duties to be the conservation link between the landowners and state/federal conservation programs.
 - o Promote state and federal conservation funding mechanisms to landowners and permittees.
- Support and encourage watershed/landscape scale management plans and project proposals that will enhance livestock grazing, wildlife habitat, water quality and quantity, and mitigate catastrophic wildfire threats from cheat-grass infestation and pinyon/juniper encroachment.

Outcomes

Outcomes related to watershed level health and planning include healthy watersheds and landscapes, increased water quality and quantity, sustainable allotments with more carrying capacity for livestock, improved wildlife habitat, and more effective control of noxious weeds. Healthier watersheds will lead to better plant diversity, with more water and better water, which is good for the citizens of Washington County and the people who visit from other areas.

Virgin River Watershed



Natural Resource Priorities and Concerns

WATER QUANTITY & QUALITY

There are two important factors that influence the health of a watershed: (1) water quality and (2) water quantity. Both of these factors are linked to activities that take place on the land. When it rains, more than just water flows into the streams and rivers within a watershed. Water that travels over the land picks up pollutants, such as debris, sediment, chemicals, and animal waste, and carries these pollutants to nearby water bodies. These pollutants, at certain levels, become dangerous to health and expensive for municipalities and water districts to clean for the many uses of the people and animals downstream in the watershed. ¹

In addition to water quality, land use activity can also impact water quantity. Increases in water use, or changes to the natural function of a water body, may decrease the amount of water that flows in a stream or river. In a hot and dry climate, such as Washington County, water quantity is naturally limited. Further impacts on water quantity can result in insufficient flows to support beneficial uses, such as irrigation and drinking water, and to sustain water-dependent wildlife.

There are a wide range of activities and practices that can be done to improve water quality and increase water quantity in the county. Some of these activities may include changing practices that have a negative impact on the watershed, such as over-watering lawns, prolonging the improvement of outdated irrigation systems and practices, over-watering crops and golf courses, and neglecting the maintenance of septic systems. Other activities that can improve water quality and quantity include modifying the way we do business, such as improving the management of livestock manure from animal feeding operations or the management of sediment from construction sites. Grazing management strategies in the uplands can also reduce erosion and sediment problems downstream.

The Virgin River Water Management Plan has identified various sources of water quality problems in the watershed. The report entitled *TMDL Water Quality Study of the Virgin River* has described the possible sources of pollutants causing water quality impairments. These include geology (sediment and salts), geothermal activity (dissolved solids), improper livestock management (lack of grazing and best management practices), irrigation (insufficient irrigation practices and systems), erosion (gullies, head/down cutting streams, steep slopes, and sparse vegetative cover), wastewater disposal (improper maintenance and dissolved solids and nutrients), exotic vegetation (reduced flow, salinity, and upland/rangeland wildfire issues), stream alteration (erosion and sedimentation), and urban runoff (sediment, nutrients, and chemicals). ²

Strategies

- Develop positive relationships with federal land management agencies to put conservation practices and projects on the ground that will enhance livestock grazing and wildlife habitat.
- Work with local governments and municipalities to develop information and education outreach campaigns that target urban water quality and quantity best management practices.
- Administer the new Environmental Stewardship Certificate Program, with Utah Department of Agriculture and Food (UDAF), for local livestock producers and farmers.
- Provide technical and financial assistance to farmers and ranchers improving their irrigation and animal feeding operations.

¹ Virgin River Watershed Management Plan, i-1.

² Virgin River Watershed Management Plan, iii-7.

Actions/Tasks

- Work with the Bureau of Land Management and U.S. Forest Service resource managers in developing projects and funding opportunities that will enhance water quality and quantity.
 - Develop Grazing Improvement Program (GIP) projects on public grazing allotments.
 - Encourage permittees to utilize state and federal cost-share and loan programs that will enhance water quality and quantity.
- Provide information and education programs to the urban public through extension, water conservancy districts, NRCS, and other partners.
 - Educate citizens through publications, water fairs, farm field days, workshops, and tours.
 - Provide outreach to irrigation companies, farmers, and ranchers with water conservation programs and practices.
- Provide district leadership and administration of the state’s new Environmental Stewardship Program for agricultural producers.
- Work with local agricultural producers to improve outdated and inefficient irrigation systems and practices. Provide technical assistance and on-farm planning to install conservation projects.

Outcomes

Outcomes related to water quality and quantity include improving the quality of water delivered to downstream users, keeping the cost down for water treatment, improving upland vegetation for livestock and wildlife, promoting a more educated public on the importance of water quality and quantity, and increasing water storage through conservation measures.

Water Quality Priority from the Conservation District

Farmers and secondary irrigation water users in cities and towns are concerned about the quality of the water from the Virgin River. The river water that is currently used for irrigation contains large amounts of sand, silt, and other suspended materials. The “dirty water” causes excess silting of fields and yards, silting of ditches and pipes, clogging of sprinkler systems, and increased time and expense to maintain the pipelines and equipment owned and operated by the Washington County Water Conservancy District. The increased sand and silt load carried in the irrigation water is a direct result of the current measures being taken to protect the endangered fish species in the Virgin River. The Water Conservancy District and the irrigation companies along the Virgin River are no longer allowed to operate and flush-out the system of settling ponds, which formerly removed much of the suspended material from the irrigation water. This problem needs to be addressed by developing a system and implementing actions that will remove as much of the suspended material as possible from the water before it is used for irrigation.

Table III-1.

Stream	Designated Uses and Protections					
	1C Drinking (needing treatment)	2B Boating or Wading	3A Cold Water Fish	3B Warm Water Fish	3C Non Game Fish	4 Irrigation or Stock Watering
Beaver Dam Wash from Motoqua to headwaters		X		X		X
Virgin River and its tributaries from state line to Quail Creek Diversion		X		X		X
Santa Clara from Virgin River to Gunlock Reservoir	X	X		X		X
Santa Clara from Gunlock Reservoir to headwaters		X	X			X
Leed’s Creek		X	X			X
Quail Creek from Quail Creek Reservoir to headwaters	X	X	X			X
Ash Creek and tributaries from Virgin River to Ash Creek Reservoir		X	X			X
Ash Creek from Ash Creek Reservoir to headwaters		X	X			X
Virgin River and tributaries from Quail Creek Diversion to headwaters except as listed below	X	X			X	X
North Fork Virgin River and tributaries	X	X	X			X
East Fork Virgin River from Glendale to headwaters		X	X			X
Kolob Creek from Virgin River to headwaters		X	X			X

From Utah Administrative Code R317-2, Standards of Quality for Waters of the State.

Natural Resource Priorities and Concerns

GRAZING & RANGELAND HEALTH

Livestock grazing on public lands is an important aspect of ranching in Washington County. Almost 80% of the land in Washington County is held and managed by the federal government. The St. George Bureau of Land Management (BLM) Field Office manages 99 grazing allotments on approximately 560,000 acres of BLM rangeland. The Pine Valley Ranger District in Washington County manages seventeen grazing allotments on the Dixie National Forest, which consists of approximately 17% of the land in Washington County. Some of the major concerns that threaten sustainable grazing in the county range from increased invasion of pinyon/juniper stands and noxious weed infestations to increased federal regulations and policies that make livestock grazing more difficult for rangers to manage on public lands.

Strategies

- Promote proven, science-based grazing management practices and strategies throughout the district's public and private lands, prioritizing larger landscape scale projects on BLM and Forest Service managed lands.
- Work with local Bureau of Land Management (BLM) range specialists and managers to change season of use grazing management practices to better mitigate red brome/cheat grass growth, which increases wild fire potential in Washington County.
- Assist landowners and permittees in implementing best management practices (BMPs) on private and public grazing lands that will improve carrying capacity and maintain or increase AUMs on public grazing allotments, making livestock production more economically feasible for local producers.

Actions/Tasks

- Improve coordination with BLM and Forest Service land management agencies to prioritize and develop planning, environmental assessments, and project plans for key landscapes needing grazing and rangeland improvements.
 - Promote conservation programs, such as GIP, ARDL, and EQIP, for these priority landscapes.
 - Develop positive relationships with local area managers and district rangers, and invite them to participate at local district meetings, zone meetings, and district sponsored events.
 - Disseminate information and provide education of programs to landowners.
- Coordinate efforts with Southern Region Grazing Improvement Program (GIP) board and southwest region GIP coordinator.
 - Utilize GIP coordinator in local conservation district meetings, zone functions, local tours and workshops.
- Represent landowners at regional Utah Partners for Conservation and Development (Utah PCD) functions and help landowners with prioritization of projects on Utah PCD database and ranking criteria.

Outcomes

- Improved rangeland at a landscape level, improved watershed health.
- Increased vegetative cover that will be beneficial to livestock and wildlife.
- More effective control of noxious weeds, especially red brome/cheat grass, which leads to catastrophic wildfire.
- Increased economic sustainability of Washington County's livestock industry through improved landscape health.



Photos: Bar 10 Ranch, Kelly Heaton

Natural Resource Priorities and Concerns

NOXIOUS WEEDS, INVASIVE SPECIES & PESTS

Noxious weeds are spreading at alarming rate across Utah and the west, and Washington County is no exception. Invasive plants such as white top, scotch thistle, yellow starthistle, silverleaf nightshade, spotted knapweed, sulfur cinquefoil, tamarisk/salt cedar, and Russian olive are among some of the biggest concerns and infestations in Washington County. A renewed effort in Washington County dealing with noxious weeds is underway. A new cooperative weed management area group has been developed, which opens up opportunities for invasive species grants. The conservation district has stepped up efforts with the county weed board and county commission to identify priority areas where resources need to be directed, and an increased education and information effort is in place to educate citizens and landowners of the negative effects noxious weeds can have on the landscape.

Strategies

- Increase funding opportunities for noxious weed projects and programs in Washington County.
- Devise important public outreach campaigns educating citizens and landowners about noxious weeds.
- Improve the county wide inventory of noxious weeds and note where priority areas need to be focused.
- Maintain an active county weed board and cooperative weed management area group.

Actions/Tasks

- Develop Utah State Noxious Weed Grant proposals through the Southern Utah/Northern Arizona Cooperative Weed Management Area and the Washington County Weed Board.
- Develop a comprehensive county weed inventory mapping project for the county, weed board, and local CWMA.
- Develop a county noxious weed and invasive species information and education program through the conservation district, weed board, and CWMA group.
 - o Sponsor noxious weed and invasive species workshops and tours for local landowners.
 - o Present noxious weed information to youth at annual farm field days at Staheli Farms.
 - o Develop county noxious weed materials and information to distribute through the media, radio, handouts, factsheets, etc.
 - o Support annual white top spray day in the New Harmony area, and develop other partner weed spray days in key priority areas.
- Attend and support county weed board meetings and CWMA committee meetings, and give input to weed grant proposals.

Outcomes

Outcomes related to noxious weeds and invasive species include increasing weed control, improving watershed health, decreasing wildfire danger, and improving forage quality and quantity for livestock and wildlife on private and public lands.



Hoary Cress



Scotch Thistle



Saltcedar



Yellow Starthistle

Utah Noxious Weed List

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

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

*Bermudagrass is not considered a noxious weed in Washington County.

Natural Resource Priorities and Concerns

URBAN INTERFACE

Washington County is experiencing rapid population growth. High population growth is a result of the county's proximity and accessibility to larger metropolitan areas in surrounding states and its favorable climate conditions. Encroachment from urban development is a concern. The agricultural areas around the communities of St. George, Santa Clara, Ivins, Hurricane, Washington City, La Verkin, Leeds, and New Harmony are at the greatest risk of development pressures. Many sustainable and locally important farmlands have already gave way to urban development. Land values for housing and business development are at all time high levels, making it hard for agricultural land values to compete and for local farmers and ranchers to stay in traditional agricultural lifestyles.

Several communities and subdivisions in the north central part of the county, which border BLM and Forest Service lands, are developing in dense stands of pinyon/juniper forests. This creates wildfire hazards and wildlife habitat issues for homeowners. This is a major safety issue for the county and municipalities, and important education regarding fire protection techniques is needed.

Strategies

- Promote importance of agriculture and open space as watershed and landscape filters to local municipalities and to the county.
- Educate and help municipalities understand and consider developing agriculture protection area ordinances to protect locally important farms and open space.
- Educate farmers and ranchers in the county about the Washington County Agriculture Protection Area Ordinance and how it could benefit their operations.
- Support urban farming opportunities, such as farmers' markets and agri-tourism ventures.
- Provide and encourage urban agriculture opportunities.
- Encourage local government, through planning and zoning, to make sustainable urban agriculture zones and priority areas.
- Educate homeowners, in partnership with state and federal agencies, about urban and wildfire safety and programs that can help create safer communities.

Actions/Tasks

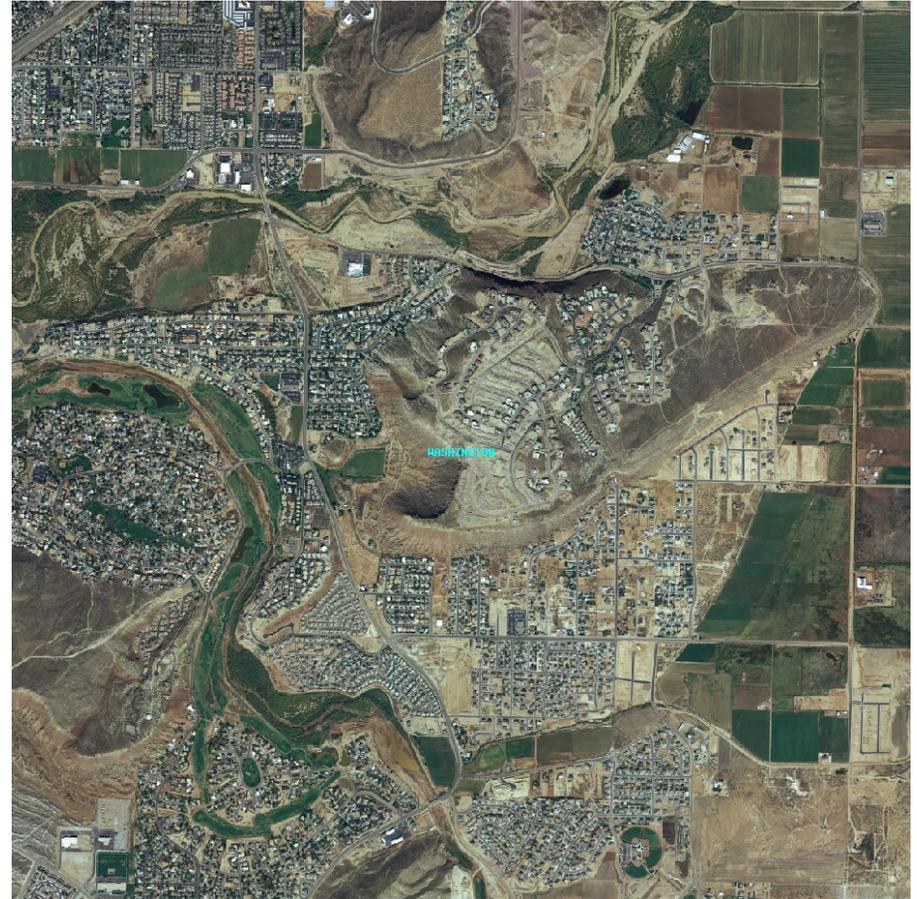
- Give information and provide education to individual communities in the county regarding Agriculture Protection Area ordinances (APA)s.
 - o Present APA information to city and town councils and planning and zoning commissions.
- Assist local farmers and producers with funding opportunities and mechanisms for urban agriculture development and projects.
- Encourage local government to create a new section of code to reduce greenbelt acreage rules.
- Continue to educate citizens, youth, municipalities, and local elected leaders about the importance of maintaining sustainable agriculture and open space.
- Educate landowners regarding small pasture improvement and viability.
- Provide homeowners in densely forested areas with urban interface and wildfire education, in partnership with the Division of Utah Forestry, Fire and State Lands, and BLM/FS.
 - o Educate homeowners of financial and technical assistance programs from the Utah PCD/Utah Interagency Coordination Guide.

Outcomes

Outcomes related to urban interface and loss of open space issues include an increase in community agriculture protection ordinances and zoning, increased support for urban agriculture opportunities (which include farmers' markets and agri-tourism ventures), increased awareness of the importance of agriculture and open space in the communities of Washington County, better prepared homeowners and communities with potential wildfire issues, and a less apathetic population towards sustainable agriculture.



1997 Aerial Photo of Washington Fields



2006 Aerial Photo of Washington Fields

General Resource Observations

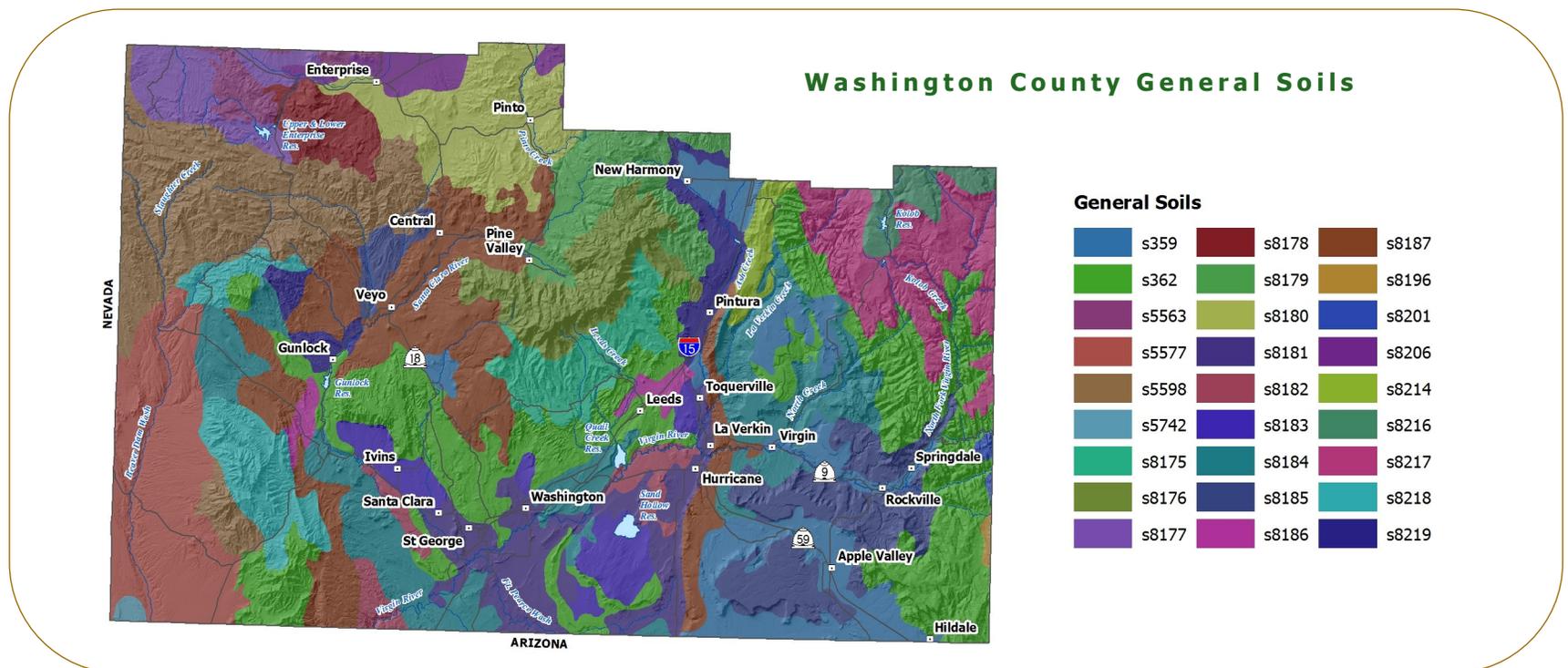
SOIL

Wind erosion on soil is a concern for much of the cropland in the Enterprise area as well as the non irrigated cropland of New Harmony and on Smiths Mesa. Winds are constant and strong in many of these location. High wind conditions, coupled with soils that are susceptible to wind erosion, makes this a constant concern for human safety as well as livestock health, crops, and the environmental stability of the area.

Soil erosion from water is also generally a great concern within many areas of the county. The Virgin River, Ash Creek, Santa Clara, and Shoal Creek near Enterprise have recently experienced severe stream bank and other water induced soil erosion problems. The winter of 2005 produced record precipitation events within the mountainous regions of the county. These events caused tremendous amounts of stream bank erosion, sheet/rill erosion, and deposition of sediments. Assessments were made of these events, and the damages total in the hundreds of millions of dollars, due to damages done to properties, structures, crops, roads, and infrastructures.¹

Through NRCS programs, many farmers and ranchers have applied conservation practices to reduce the effects of erosion by water. As a result, erosion rates on croplands and pasturelands fell 40 percent, from 1.6 to 0.9 tons/acre/year, from 1982 to 1997.²

The topography of the county ranges from nearly level bottom land to very steep mountains and nearly vertical cliffs. Elevation ranges from 2,500 to 8,200 feet.



¹ Soil Survey.

² Dixie Conservation District, 2007 Long Range Plan.

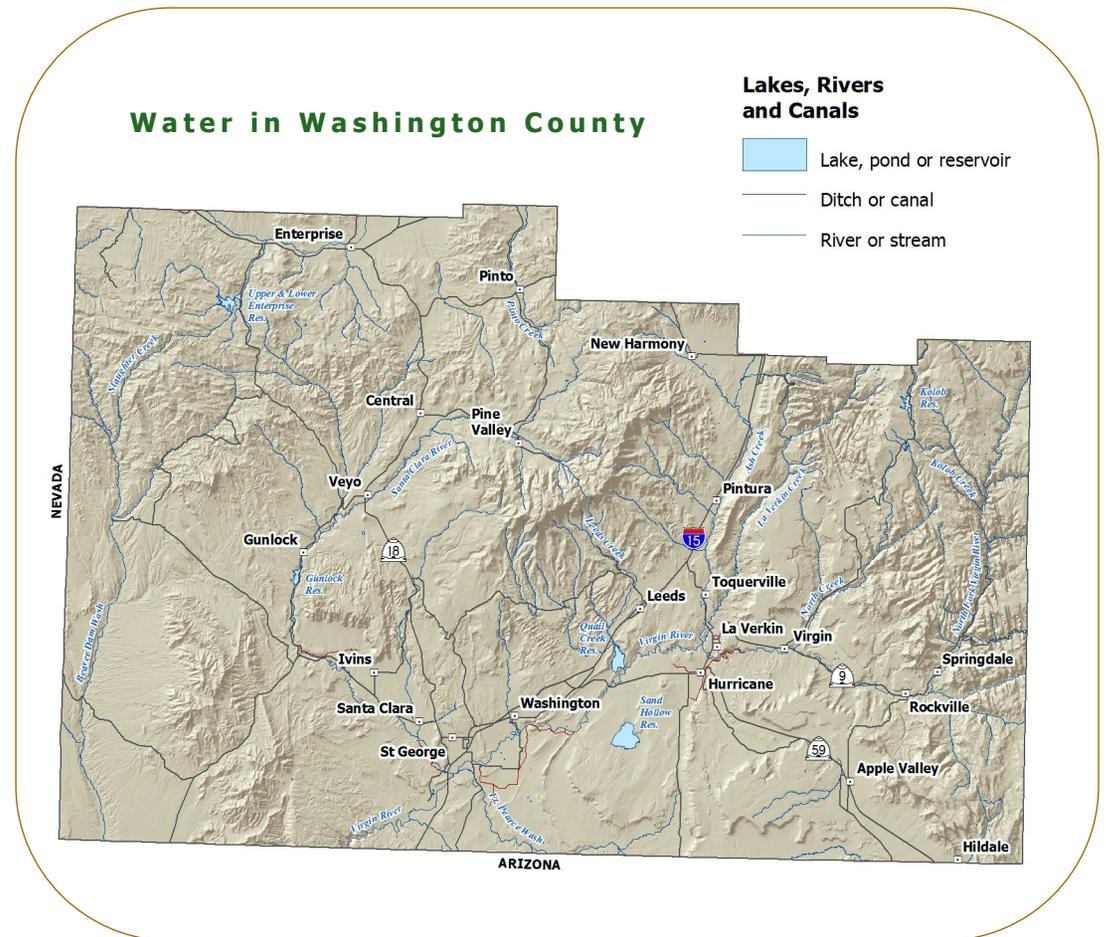
WATER

Washington County is drained by the Virgin River and its tributaries, Santa Clara Creek, Ash Creek, La Verkin Creek, North Creek, Coal Pits Wash, Goulds Wash, and Beaver Dam Wash. The nearly level to gently sloping flood plains and the alluvial fans along these streams are major areas used for irrigated farming.

The non-irrigated areas of Washington County are on Big Plain and Smith Mesa and in the New Harmony area.¹

Washington County's average precipitation is eight inches per year, compared to the state's average of thirteen. The county's low precipitation, desert climate, and susceptibility to prolonged drought renders the water supply limited and unpredictable. The population growth rate, and the 300 sunny days per year, presents a definite challenge to meeting the county's water needs. Water managers have felt the key to the future growth of the county lies in developing the necessary storage facilities to capture the water, wherever and however the water becomes available, as well as curbing the demand for water. In 1877, John Wesley Powell said, "In the whole region [the West], land as mere land is of no value. What is really valuable is the water privilege." Over the years, as the area has been settled and developed, that statement has proven true.²

Washington County has faced increasing demands for scarce water resources. Pioneers settled the area and established farming to survive. Today, agriculture is still an important part of the community, although dramatic recent residential growth is stressing developed water supplies. The county's water use averages 247-294 gallons per person per day (gpcd), compared to the national average of 101 gpcd. This is because of the long growing season and extremely hot and dry climate. Water conservation is now emphasized as an important part of the solution to meeting growing water needs with limited supplies.³



1 Soil Survey.

2 Washington County Water Conservancy District, *Washington County Water Management and Conservation Plan*, December 2010, 2.

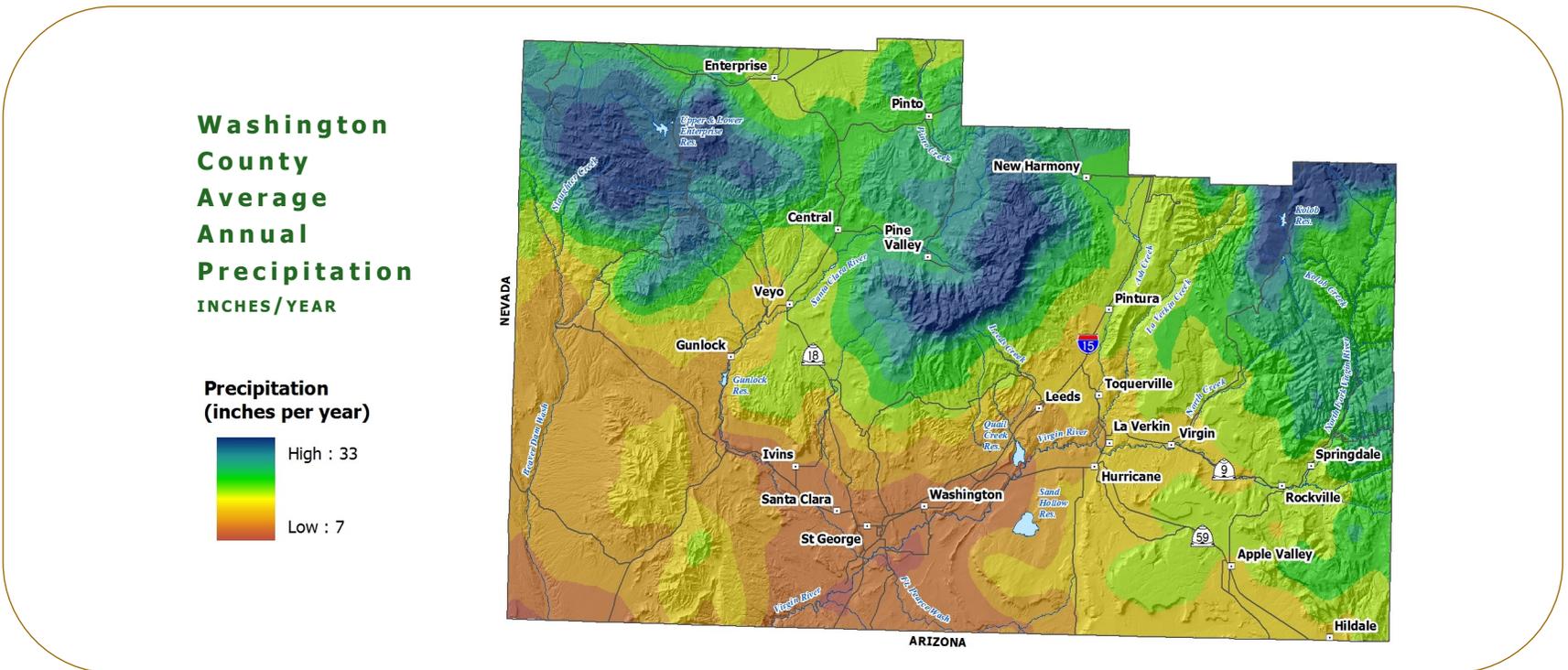
3 State of Utah Natural Resources, *Utah's Water Resources Planning for the Future*, May 2001, 23.

General Resource Observations

AIR AND CLIMATE

St. George is located within the northern extension of the Mojave Desert. The desert climate contributes to generally clear skies, relatively mild winters, and hot summers. Residents and visitors enjoy over 300 days of sunshine per year. The temperature in St. George varies from a low in January of 27.1°F to 102°F in July. The elevation in Washington County varies from 2,880 feet above sea level in St. George to over 10,000 feet in the peaks of the Pine Valley Mountains.¹

The higher elevations in Washington County support conifer and aspen forests. These areas receive 25 to 35 inches of precipitation annually. Middle elevations support mixed forest communities, mountain shrub lands, and pinyon/juniper forests. Precipitation in the mixed forest communities ranges from 15 to 25 inches. Lower elevations include semi-desert, hot desert, and salt desert rangelands and receive 7 to 15 inches of precipitation. It is in this lower elevation where irrigated croplands occur at some of the mid elevation areas on Smiths Mesa and in the New Harmony area. Irrigated lands utilize water from mountain stream runoff or from underground aquifers. The majority of land dependent upon aquifers for irrigation is found in the Enterprise area. St. George, and the cities surrounding St. George, are thriving and growing at an alarming rate. The farm land, and other available open space, is under tremendous pressure for development.²



1 St. George Area Chamber of Commerce.

2 Dixie Conservation District, 2007 Long Range Plan.

PLANTS

The major concern regarding plants is related to the invasion of unwanted and unproductive plant species on rangelands and fields. Pinyon/juniper encroachments, as well as invasion of cheatgrass, red brome, and other noxious weeds have decreased productivity of many rangelands and croplands. Some of these stands of cheatgrass and red brome have exasperated the wildfire danger and situation within the county. As of mid-July 2005, approximately 100,000 acres of rangeland were burned in Washington County. These fires reduced range productivity, and without proper vegetative practices, these lands will perpetuate additional stands of annual grasses and weeds, thus increasing the potential for future fires.¹

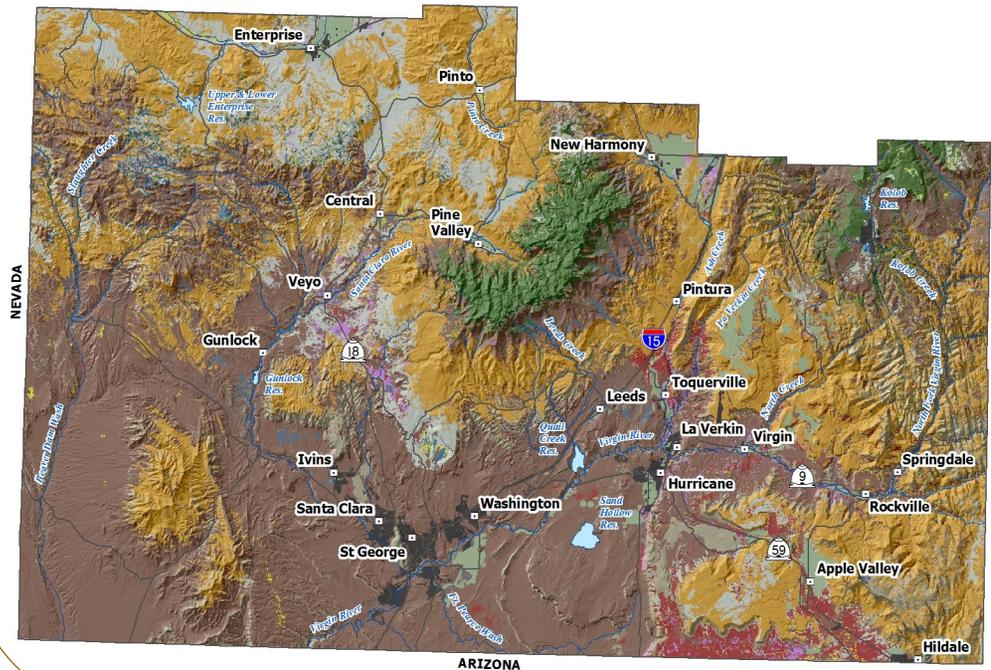
According to the 2010 Utah Agricultural Statistics, there were 21,000 tons of alfalfa and alfalfa mix hay produced on 4,500 acres in 2009.

State Forestry Assessment

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

Washington County Land Use/Land Cover

Land Cover



¹ Dixie Conservation District, 2007 Long Range Plan.

General Resource Observations

ANIMALS

Livestock

According to the 2010 Utah Agricultural Statistics, there were 17,000 cattle and calves, with 8,000 of those cattle being beef cows, and 600 sheep and lambs in Washington County. According to the 2007 U.S. Census of Agriculture, there were 31 goat farms, with a total of 136 goats, 22 bee farms, with a total of 706 bee colonies, 2,041 horses and ponies, and 71 farms, with a total of 1,065 miscellaneous poultry, in Washington County. The sheep in the county produced 4,855 pounds of wool in 2007. The average of livestock sales for 2007 was \$6,000,000.¹

Washington County has the highest occurrence of sensitive species (candidates for federal listing, federally listed threatened species, federally listed endangered species, state of Utah Conservation Agreement Species, and State of Utah Species of Concern) in the state of Utah.²

Desert Tortoise

Three groups of desert tortoise, *Gopherus agassizii*, exist: 1) the California type, which is found in California and southern Nevada; 2) the Sonoran type, which inhabits areas south of the Grand Canyon; and 3) the Beaver Dam Slope type, which occurs in extreme southwestern Utah. Utah's Beaver Dam Slope population of desert tortoise is listed as threatened by the U.S. Fish and Wildlife Service.

Within its range, the desert tortoise can be found near water in deserts, semi-arid grasslands, canyon bottoms, and rocky hillsides. Desert tortoises often construct burrows in compacted sandy or gravelly soil. Females nest under a large shrub or at the mouth of a burrow and lay one to three clutches of two to fourteen eggs from May to July; eggs hatch in late summer or fall. Burrows, which may contain many tortoises at once, are used for hibernation during cold winter months.

The typical diet of the desert tortoise consists of perennial grasses, cacti, shrubs, and other plant material.³



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 Washington County:

- Arizona Toad
- Burrowing Owl
- Desert Iguana
- Ferruginous Hawk
- Greater Sage-Grouse*
- Kit Fox
- Long-Billed Curlew
- Northern Goshawk
- Short-Eared Owl
- Southwest Willow Flycatcher
- Speckled Rattlesnake
- Utah Prairie Dog
- Virgin Chub
- Western Toad
- Yellow-Billed Cuckoo

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/.

*Greater sage-grouse 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: www.fws.gov/news/NewsReleases/.

¹ 2007 Census of Agriculture.
² 2009 Rangeland Resources of Utah.
³ Utah Conservation Data Center.

HUMANS: Social & Economic Considerations

Population

The 2008 population of Washington County was estimated to be approximately 137,500. This is an increase of over 47,000 people since 2000. In 2007, this area, particularly St. George, Utah, was named by the United States Census Bureau as the fastest growing metro area in the nation, with a 6-year growth rate of 40 percent. The St. George Chamber of Commerce has estimated that the population will grow to 607,334 by 2050, given current trends. This current and projected growth will have significant impact on the natural landscape through urbanization and the recreational impacts of the population. Since water is a significant limiting factor, it should logically reduce future growth. However, to date, it seems that limited water availability has not hindered population growth.¹

In 2008, Washington County was ranked in the top of the most populated counties in Utah, with Washington City being ranked in the top five fastest growing communities.¹

Washington County was the second fastest growing county in Utah for the second decade in a row. Washington County, with a 52.9% increase over the decade, grew at more than double the state rate. St. George City alone has 2.64% of the population of the state of Utah.²

Labor Market

In 2007, the unemployment rate was at the tolerable level of 3.0 percent. By 2010, however, the rate more than tripled, rising to 10.1 percent. There was a 4.6 percentage-point increase from 4.9 percent in 2008 to 9.5 percent in 2009. However, the unemployment rate had decreased to 8.0 percent as of November 2011.³

Recreation

Washington County, commonly referred to as Dixie, has a large variety of recreational opportunities. The following state parks are located in Washington County:

- Gunlock State Park
- Quail Creek State Park
- Sand Hollow State Park
- Snow Canyon State Park

Zion National Park is also located in Washington County. It is a major vacation destination for biking, hiking, gold panning, and other recreational activities. Zion was given its national park designation in 1919, making it Utah's oldest national park. The park is known for its incredible canyons, including The Narrows, which attract canyoneers from around the world. Hiking possibilities are endless. With nearly three million visitors per year, Zion is Utah's most heavily used park.⁴

Washington County Population Data

Area name	Washington
Period Year	2009
Population	145,466
Births	2,599
Deaths	892
Natural Increase	1,707
Net Migration	-951
Annual Change	756
Annual Rate of Change	↑ 0.5%

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

¹ 2009 Rangeland Resources of Utah.

² 2010 Census Brief.

³ www.utah.com/zion.

⁴ Utah Department of Workforce Services.

REFERENCES

Executive Summary

Page ii: A Man Irrigating in Washington County, Utah

Available at: <http://www.ilovehistory.utah.gov/topics/water/irrigation.html>

Page 1: Photo of Zion National Park by Mike Large

Available at: <http://www.nps.gov/zion/photosmultimedia/Landscapes-of-Zion-Gallery.htm>

County Overview

Page 2: ¹ County Description from NRCS Resource Assessment, August 2005

Washington County Land Ownership Map Courtesy of Anne Johnson, UDAF

Page 3: Photos Courtesy of: www.utahsdixie.com

PRIORITY CONCERNS

Watershed Level Health

Page 5: Virgin River Watershed Map and Picture Courtesy of Virgin River Watershed Management Plan

Water Quality/Quantity

Page 6: ¹ Virgin River Watershed Management Plan, page I-1

² Virgin River Watershed Management Plan, page III-7

Page 7: Designated Uses and Protections Table Courtesy of Virgin River Watershed Management Plan

Grazing/Rangeland Health

Page 9: Photos Courtesy of Bar 10 Ranch, Kelly Heaton

Noxious Weeds/Invasive Species/Pests

Page 11: Noxious Weed Photos Taken by Nathan Belliston, Uintah County Weed Department and

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

Urban Interface

Page 13: Photos from Virtual Utah

Available at: earth.gis.usu.edu/utah/

GENERAL RESOURCE OBSERVATIONS

Soil

- ¹ Soil Survey of Washington County Area, NRCS
- ² Dixie Conservation District 2007 Long Range Plan

Water

- ¹ Soil Survey of Washington County Area, NRCS
- ² Washington County Water Conservancy District, *Washington County Water Management and Conservation Plan*, December 2010, 2
- ³ State of Utah Natural Resources, *Utah's Water Resources Planning for the Future*, May 2001, 23

Plants

- ¹ Dixie CD 2007 Long Range Plan

Air and Climate

- ¹ St. George Area Chamber of Commerce
- ² Dixie CD 2007 Long Range Plan

Animals

- ¹ 2007 Census of Agriculture
- ² 2009 Rangeland Resources of Utah
- ³ Information on Desert Tortoise from the Utah Conservation Data Center at: dwrcdc.nr.utah.gov/ucdc/

Humans

- ¹ 2009 Rangeland Resources of Utah
- ² 2010 Census Brief
- ³ www.utah.com/zion
- ⁴ Utah Department of Workforce Services