Chapter 3
Land, Public Lands, Water & Natural Resources Plan

Land Resources

Located in south central Utah, Sevier County is approximately 135 miles south of Salt Lake City, the Capitol of Utah. Interstate 70 and U.S. Highway 89 intersect in Sevier County. Richfield City, the County Seat, is located approximately 30 miles east of Interstate 15. The County serves as a principal access corridor for east-west, and north-south highway traffic in the southwestern region of the U.S. The County's location is distinctly strategic to multiple national parks, historic monuments, scenic roadways and byways.

Sevier County is approximately 65 miles wide; 45 miles long and encompasses a landmass of 1,960 square miles. The County is serviced by and maintains some 765 road miles. It is a major transportation hub for traffic moving through, going to and coming from the western U.S. states of Arizona, Colorado, Idaho, Nevada and Utah.

The Utah Territory was organized in 1850. When the fourteenth Territorial Legislature met December 12, 1864, Sevier County was officially created. The first Probate Judge was elected on January 20, 1865 and the first County Court was organized later that year. Originally, the County covered an area of 1,976 square miles between the Pahvant Mountains on the West and a range of the Wasatch Plateau on the East. In 1902, the County Commission had the boundary line between Sevier and Piute counties surveyed. It's present southern boundary was thereby established at the mouth of Deer Creek and 15 chains south of the Koosharem Town Boundary.[1] Sevier County includes the most southern reaches of the Wasatch Plateau on the north, the Pahvant Range on the west, the northern portion of the Tushar Mountains on the south and the Parker Mountain range and Last Chance Desert on the east. Slicing through the center of the County on north-south orientations are Sevier Valley, Grass Valley, the Fish Lake high top Plateau, the Sevier Plateau and the Old Women Plateau. Sevier County contains a small portion of Capitol Reef National Park and a major portion of the Fishlake National Forest

[1]**Thru The Years,** Op. Cit., Pages 21 and 59.

Public Lands

Public lands administered by the Bureau of Land Management (BLM) are located on various sections throughout Sevier County, generally on the surrounding foothills and arid or desert areas. Sections, or partial sections of Utah State School and Institutional Trust Lands are interspersed throughout the County.

The land area of Sevier County is approximately 1,225,700 acres. Of this amount, approximately 25% of the lands, 262,374 acres are privately owned. This amount includes approximately 1,600 acres of sovereign reservation land owned by the Koosharem Indian Tribe; 691,756 acres are administered by the U.S. Forest Service (53%); 215,370 acres are administered by the Bureau of Land Management (BLM) (17.5%); 56,200 acres (4.5%) are administered by Utah State School and Institutional Trust Lands; and 2,820 acres are owned by the State of Utah, Division of Wildlife Resources (DWR).

Approximately 70% of the lands in Sevier County are owned and managed by administrative agencies of the federal government and 7% by the State of Utah. Municipal and County-administered lands account for approximately 6,500 acres, less than 1% of total land area within Sevier County.

Most of the lands administered by the U.S. Forest Service were reserved in 1903 through presidential proclamation and subsequently through public land orders or executive orders. BLM lands were originally public domain lands acquired early-on by the federal government through purchase or exchange.

In 1812, Congress established the General Land Office to administer the original 1.8 billion acres of public domain lands. Passage of the Taylor Grazing Act in 1934 established the U.S. Grazing Service that provided range management on public domain lands. In 1946, the U.S. Grazing Service and the General Land Office merged to become the Bureau of Land Management

Historically, public domain lands in Sevier County have been administered by the Bureau of Land Management and the U.S. Forest Service. Through various acts of Congress some public lands have transferred to private ownership through different sale authorities and land grants established to provide incentives to early settlers to obtain land for agricultural purposes and to encourage mineral exploration and mining.

Almost all large and small scale disposal of public lands is restricted through recent and on-going Congressional actions that have mandated public lands remaining in public ownership be managed for multiple uses.

Disposal of public lands now is contingent upon request, environmental assessment, proper land use planning and public input.

In 1894, about 7 million acres of land in Utah were designated by the federal government as trust lands to benefit Utah schools. Presently, an extensive appraisal process is underway that will lead to the exchange of “in-held” trust lands located within the boundaries of federally administered property. When this appraisal process is completed, Utah will turn in held lands over to the federal government in exchange for monetary compensation or equitable

exchanges of federal lands adjacent to trust acreage.

School Trust Lands are actively managed with the purpose of in-lieu selection or exchanges that will lead to development and provide economic support and public educational enhancements for Utah school children.[2]

Because of the substantial amount of public lands and diversity of uses, the management and planning of these land uses has a significant bearing on the use of private and state lands in Sevier County. Appropriate allocation, access, compatibility, and duration of both multiple and single-purpose uses are of on-going concern to public and private managers and users.

Sevier County Public Lands

Land use patterns throughout Sevier County feature agriculture, industrial, commercial and residential uses in valley areas. Adjacent foothill and mountain lands provide wildlife habitat, livestock grazing, and recreational uses. Generally, the valley lands are private, while most foothill and mountain areas are federally or state administered lands. As noted previously, approximately 77% of the land in Sevier County is publicly owned.

[2]See L. Dillon, A Matter of Trust, Utah School and Institutional Trust Lands Administration Circular, December IS, 1996. Also see ACETAL Annual Reports, 1995 and 1996.

Management and use of the federally-owned lands has a strong influence on the use of private and state lands. Close coordination between the land management agencies, municipal and Sevier County government officials is necessary to accomplish common goals and avoid conflicts in use. Generally, the federally-owned lands are in large, contiguous blocks that allow for efficient management and utilization.

After many discussions of contemporary features and issues related to public lands, the Sevier County, Federal and State Lands Committee[3] issued the mission statement, findings and recommendations which follow.

Sevier County Public Lands - Mission Statement

Our mission is to foster coordination and cooperation between those managing public lands, Sevier County leaders and, in appropriate instances, private landowners, to accomplish common goals, optimize resources, and balance multiple uses in Sevier County.

Findings

1. Until 1976, BLM goals were to provide land use plans for disposal of land. After the Federal Land Policy and Management Act of 1976 (FLPMA), the goals were changed

[3]Sevier County Planning Commission Committee oil Public Lands: Cecelia Bytheway, Planning Commissioner, Chair; Louis Brown, VerrDon Durfee, Ted Fitzgerald, Rod Lee, David Pace. Emery Polelonema, ReNonne Robbins, and Darin Sampson.

to retaining federal lands and to managing them for multiple use. The BLM still sells and exchanges land, but generally has a retention policy.

2. There are no lands currently being considered by any federal agency for wilderness designation in Sevier County.

3. Commercial grazing is important to the economy and the heritage of Sevier County. The Forest Service and BLM will continue to promote, permit and regulate grazing on public lands. However, the BLM and the Forest Service will continue to enforce agreements such that, when the grazing resource reaches the prescribed utilization level for a certain area, the animals will be relocated.

4. State Institutional and Trust Lands owns 22 1/2 acres of land near the Fremont Junction on the 1-70 Freeway off-ramp in the east part of Sevier County. They would like to sell this property for potential development, thus earning the most possible for the School Trust Fund. State and Institutional Trust Lands officials want the County to rezone this land for commercial development.

5. Sevier County citizens have indicated a strong desire to preserve agricultural lands and open spaces. Citizens also believe the County's future growth should be managed and regulated to keep the unique rural life-style and to protect prime statewide and locally important agricultural lands.

6. It is anticipated that the exchange of lands between government entities, also known as repositioning, can be accomplished so that future growth and development may occur on lands other than agricultural lands. The best possibility for exchanging lands will be between the BLM and the State Trust Lands. If this can be accomplished, State Trust Lands may then he offered for sale.

   Sevier County leaders may identify any federal land in the County for exchange with School Trust Lands. Some possible areas that Sevier County leaders may want to he exchanged are: Poverty Flat south of Monroe, some BLM land south of Glenwood, and some lands west of Aurora.

7. In some cases the Forest Service does transfer land to a municipality if it needs further lands to develop or is land-locked by Federal Lands. Some lands on the west side of Interstate 70 west of Richfield once were BLM lands, hut were recently transferred to the Forest Service because the Forest Service owns the lands that are adjacent to the west.

8. Currently, appraisers are working to place a value on selected parcels of School and Institutional Trust Lands interior to National Parks, Native American Reservations, and National Forests. When the appraisal process is completed, Utah will exchange these "inheld" lands with the federal government for other lands and payments. Federal (BLM) Lands are being identified throughout the state for potential acquisition and exchange for the "inheld" lands. Trust Lands Administrators remain

hopeful that the inholding exchanges can he completed.[4] The current dispersal of state lands within other public lands may influence another agency's land use designation(s) or management plan.

9. Federal courts have ruled that designated Federal Agencies have the legal authority to manage federal lands, provided they do so according to guidelines established by a series of federal regulations. According to strict legal interpretation, federal land management practices are not subject to a county's land use plan. More and more in recent years, Federal agency officials endeavor to work hand-in-hand with local interests and leaders in land use management and planning.

   Landowner and other interests play an integral role in Forest Service and BLM land ecosystems and planning. However, local citizens should not seek to dictate how federal lands are, or will be, managed. They can, however, have a major influence on public land management plans. A principal purpose of this General Plan is to document the intent by residents and landowners to have a major voice and influence on how public lands are managed in Sevier County.

10. Residents of Sevier County live in a high mountain desert area so water rights and availability are extremely important, As in other areas of Utah, surface waters travel through several different jurisdictions before being used. The State of Utah controls all water rights, including those under Forest Service or BLM jurisdiction.

    Forest Service officials have stated their interest in maintaining in-stream flows. In Sevier County there are no water rights dedicated to in-stream flow.

    On BLM lands, those who construct water improvements must file for the water rights and rights-of-way. The Forest Service does not allow such a filing, They own water rights on the Forest Service land. In Utah, water rights are not tied to the land, but belong to the entity, or person, owning the water rights.

11. The condition of the watershed is closely related to the vegetation on the land, which in turn directly impacts the quality of grazing, forestry and timber reserves. It is widely understood that proper watershed management helps to prevent flooding. As landowners and users become knowledgeable about vital hydrological influences, residents in Sevier County will closely monitor and work to improve the conditions of watershed lands.

12. In Sevier County, there are mining claims being filed, continued interest in mining claims, and on-going mineral production. The Forest Service and the BLM recognize mining and mineral activities as appropriate multiple uses on public lands.

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[4]State of Utah, School and Institutional Trust Lands Administration, Fiscal Year 1995 Annual Report

13. Recreation is another of the multiple use activities on public lands. Congress has allocated funding to the Forest Service to develop and support recreation. The USFS is very involved, both with money and resources, and has many developed recreational sites in Sevier County. The BLM does not have any developed sites in Sevier County.

    The intent of this General Plan is that recreational uses are managed to ensure there are minimal impacts on public lands.

    a. Fishlake Basin is a USFS managed and developed recreation area in Sevier County. Camping is permitted in designated areas only.

    b. The Paiute ATV Trail is a series of roads and trails, tied together and mapped, for the use of off-road and all-terrain vehicles. This trail system resulted from a cooperative effort among the Utah State Parks Service, County Commissions, the BLM, the Forest Service and many community groups. Sevier County wants to ensure this trail system remains intact well into the future.

14. Sevier County is major hub for electrical transmission systems and utility corridors. The Sigurd Substation is connected to a major 345,000-volt line from the generating plants in Carbon and Emery Counties to Southern Utah and Nevada. These electrical utility corridors extend from Sevier County north to Nephi, to the west desert, south to Page, Arizona, and to Cedar City. These corridors cross BLM, Forest Service and private lands.

    a. The Forest Service has identified utility corridors and designated these lands as such. USFS officials must complete a National Environmental Protection Act (NEPA)[5] analysis before giving permits for any utility additions on Forest Service land. The Forest Service also encourages buried utility lines for distribution. The visual aspect of above ground lines is also considered.

    b. The BLM is working to update agency land use plans that designate utility corridors on public land. Permission for building additional lines may be granted after the request is received and the appropriate NEPA analysis and other requirements are met. At this time the BLM is not limiting use of lands for utility corridors.

    c. Mountain Fuel Supply installed a natural gas transmission line north to south through Sevier County. For the most part the line follows Utah Department of Transportation rights-of-way along Highway 89.

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[5]United States Congress, The National Environmental Policy Act of 1969, as amended.

d. Repeater and translator sites for television, radio, cellular phones and other communications are located on mountaintops. It is Forest Service and BLM policy to co-locate any communications sites whenever possible. Those sites located on Forest Service or BLM land are regulated by these agencies.

15. Hunting and fishing are integral parts of the culture and lifestyle in Sevier County. At certain times of the year virtually all of the economy of Sevier County is focused on hunting, fishing and related seasonal activities.

Many businesses, including motels and restaurants provide equipment, licenses and services for hunting and fishing. Sevier County residents are committed to preserving and protecting the abundant wildlife resources and related activities in the County.

16 Wildlife habitat and management are important issues on public and private lands in Sevier County. Diverse populations of Wildlife, large areas of public lands, and high quality fishing lakes and streams are valuable to the economy, recreation, tourism and quality of life in Sevier County.

a. Wildlife habitat is defined in terms of spring, summer, fall and winter ranges. Critical areas where birds and animals congregate historically in Sevier County include, the Thompson basin, lower elevations of Monroe Mountain, the bench areas in Grass Valley, and Twist Canyon, 'S' Hill, Black Mountain and Triangle Mountain near Salina;

b. The Division of Wildlife Resources (DWR) owns 2,820 acres of land in Sevier County. These lands were purchased by the DWR and include upland game areas as well as big game ranges. By inter-jurisdictional agreement, the County Commission must approve any future purchases of land by the DWR;

c. The Division of Wildlife Resources manages the game in the State of Utah. The Forest Service and the BLM manage the habitat on federal lands. There is an overlap of administration on these lands and the only way to effectively manage wildlife and the habitat is through close coordination and cooperation.

d. The DWR makes recommendations to the Regional Advisory Coordinating Council (RACC), which also holds public meetings to gather recommendations from the public. The RACC then submits a recommendation to the Utah Wildlife Board, which makes final decisions.

e. Grazing is another important consideration in managing wildlife. The agencies must balance grazing versus the special interest of hunters and revenue from the permits for wildlife.

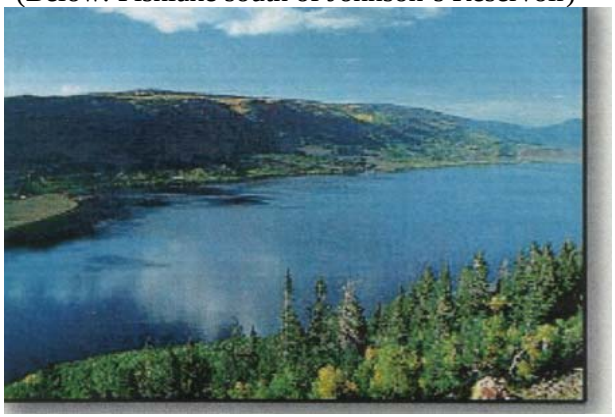
f. The Big Game Proclamation is a major tool for managing big game populations. Wildlife numbers need to be regulated to control and, in appropriate instances, reduce or eliminate depredation on agricultural lands.

g. The DWR issues recommendations for each species of upland game regarding season length and bag limits. The Wildlife Board, in turn, confirms, or modifies these recommendations and establishes hunting policies. Residents are concerned about decreasing populations of pheasants in Sevier County.

h. Sevier County is in the Pacific fly way for waterfowl. Migratory birds are under federal migratory regulation. Bag limits are commonly adjusted each year. Management is coordinated with the Federal Fish and Wildlife Service.

i. Sevier County contains numerous quality lake and stream fisheries, such as Fish Lake, Johnson's Reservoir, Koosharem Reservoir, Clear Creek, Sevier River, and numerous small ponds (i.e. Harve's Reservoir, Twin Ponds, and others) and steams. The U.S. Forest Service is actively developing fisheries on their lands and have purchased water rights to maintain year-around fishing. The Glenwood Fish Hatchery is operated by the DWR and located in Sevier County. Fishing is a growing recreational use on public lands. Fisheries in Sevier County are predominately managed by the DWR. The Forest Service and the BLM manage the habitat on federal lands and the DWR provides the fish.

(Below: Fishlake south of Johnson's Reservoir)



Recommendations:

1. Grazing:

a. Sevier County should support the current PRIA formula for determining Animal Unit Month costs (AUM's) [6] for grazing in public lands. The

[6] United States Forest Service, WO Amendment 2200-95-I, page 13. PRIA is the acronym for Public Range Lands Improvement Act of 1978.

formula is considered equitable and central to the profitable continuation of commercial grazing that undergirds the custom and culture of Sevier County;

b. Local agricultural boards, councils and permittees could be and should be consulted by the federal agencies to help with local input on grazing issues.[7]

2. Possibilities for exchanging lands are continually being explored by BLM and State Trust Lands officials. Sevier County officials should also be a part of this on-going process to identify lands for exchange. Some possibilities for repositioning are Poverty Flat south of Monroe, some BLM land south of Glenwood, and some land near Aurora. Perhaps in the future, Richfield City may need to expand on the Forest Service Land west, instead of expanding on the agricultural hand to the north and east.

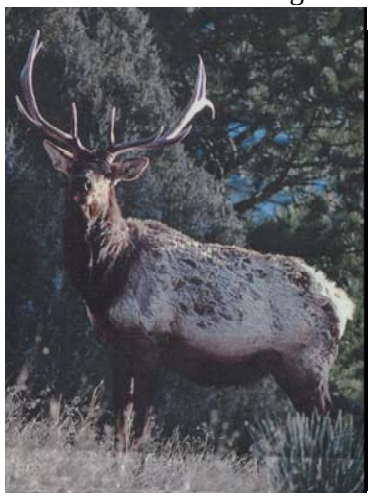
3. Vegetative management should be supported to protect the watershed in Sevier County. This committee supports chaining, burning, fencing, reseeding, grazing, etc. as being beneficial to the watershed. Selective and knowledgeable treatment of lands will improve watershed areas throughout Sevier County;

4. Sevier County officials should work to foster cooperation in the use of water rights for the benefit of communities, the County's economy, agricultural industries, hands and production.

5. Wildlife is a vital part of the lifestyle and culture of Sevier County.

a. This Committee supports the use of Habitat Stamp revenues and other revenue sources for wildlife habitat improvement projects in Sevier County.

b. Efforts to resolve conflicts between elk habitat and livestock grazing areas should continue in Sevier County. The Sevier County Sportsman Landowner Committee and the Monroe Mountain Demonstration Area Steering Committee are some of the groups working to resolve the conflicts. Their efforts should be supported and encouraged.



c. This Committee supports the potential of allowing release of commercially raised stock into fishing streams and lakes.

[7]Pace, David, Comments on Federal Register, page 4

There is potential for growth of commercial hatcheries in Sever County to provide fish for the fisheries on public land.

6. This Committee recommends at least a yearly meeting and report among the Sevier County Commissioners, the Forest Service, BLM, and DWR managers through a public meeting. This would help to continue and foster communication and coordination of all aspects of management of these public lands. We encourage and support any efforts for local input in the management of all public and state lands.

Public Lands Policies

1. **Multiple use activities on public lands in Sevier County** should continue and should include uses such as, agricultural grazing, fishing and hunting, mineral exploration and mining, recreation, wildlife habitat and timber sales;

2. This General Plan supports and encourages continued multiple-use of the public lands in Sevier County. Elected and appointed officials and private land owners **should encourage and support all efforts for local input in the management of all public lands.** Federal land agencies should seek input through the Sevier County Public Lands Committee on land use management decisions within the County;

   To accomplish this goal, the Sevier County Commission shall authorize the Planning Commission to establish a **Public Lands Advisory Committee comprised** of a member of the Planning Commission, representatives from the BLM, Forest Service, State Institutional and Trust Lands, and the Division of Wildlife Resources, along with private citizens;

   This Public Lands Advisory Committee shall receive at least yearly reports of activities from the Bureau of Land Management, US Forest Service, State Institutional and Trust Lands and the Division of Wildlife Resources. This Committee shall act as in an advisory capacity to the Planning Commission and the Sevier County Commission on matters dealing with public lands;

   The intent of this Advisory Committee would be to foster local communication and coordination in all aspects of the management of public lands within Sevier County.

2. **Commercial grazing is very important to the economy and heritage of Sevier County.** The BLM and USFS should continue to promote, permit and regulate grazing on public lands. However, removing livestock should not be the only option for managing public lands for utilization. Sevier County should support the current PR1A formula for determining Animal Unit Month (AUM's)[17] costs for grazing on public lands. **Local agricultural boards, councils and permittees should be consulted by federal land manages to provide local**

[17]See United States Forest Service, WO Amendment 220-95-I, page 13.

input on grazing issues.[18]

3. **Sevier County shall continue the road use agreements with the BLM, Forest Service and other agencies who own public and private lands so that rights-of-ways and access to public lands are maintained.** All present or expanded RS-2477 roads within Sevier County shall be recognized by applicable federal land management agencies;

5. Sevier County should support efforts to **improve the vegetative management and protect the watershed on public lands.** Activities such as chaining, burning, fencing, reseeding, grazing, and others are beneficial to the watershed;

6. **Wildlife habitat and management** are important issues on public and private lands in Sevier County. Accordingly, Sevier County land use policies should encourage:

a. The use of **Habitat Stamp revenues** and other revenue sources for wildlife habitat improvement projects;

b. Efforts to **resolve conflicts between elk habitat and livestock grazing.** The Sevier County Sportsman Landowner Committee and the Monroe Mountain Demonstration Areas Steering Committee are some of the groups working to resolve conflicts and should be commended for their efforts;

c. Promoting the **potential for growth of commercial hatcheries** in Sevier County to provide fish for the fisheries on public lands;

d. **Improving communications on any wildlife habitat decisions between government agencies and Regional Wildlife Advisory councils and County residents through a Sevier County Public Lands Advisory Committee;**

e. **Managing and enhancing wildlife populations and habitat** for continued and future contributions to economic and recreational opportunities;

f **Reasonable wildlife management** as long as this management does not create a single-use status adversely impacting or limiting other resources on public lands;

g. **Notification and discussion** of property acquisitions regarding the Division of Wildlife Resource.

7. Sevier County officials shall **look for opportunities to develop and reposition School and Institutional Trust** Lands in ways that will benefit the schools and facilitate local developments.

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[18]Pace, David, Comments on Federal Register, 1996, page 4.

Tribal Lands

Representatives of the Koosharem Tribe met with the Planning Commission's Public Lands Committee to provide input on Tribal Lands in Sevier County. The information indicated that Reservation lands are in three separate parcels:

- One parcel is located west of Joseph on the west side of 1-70 in south-western Sevier County. This land is occupied by 10 houses and four modular homes. The Tribe is considering commercial development such as a convenience store and gas station on this property which in total is approximately *520* acres;

- The second parcel is located west of Koosharem Reservoir. It includes a portion of the west shore of Koosharem Reservoir, the campsites located there, and lands west of Highway 22, totaling 215 acres. The Tribe has an agreement with the Elks Lodge of Richfield to construct and maintain their portion of the camping area along the Reservoir. A fee may be charged for its use;

- The third parcel is located near the northern boundary of Richfield City next to the canal and the Utah Power Service Center. The Tribe is in the process of building houses on this property of 3 acres. Unless otherwise requested by Tribal leaders, Tribal lands may be exempted from the provisions and policies adopted under this General Plan because they are considered sovereign.

Water Resources

Reviewing a base map of Sevier County illustrates the vital importance of water to all human activity. Almost all productive agricultural land and major population groupings in the County are located in close proximity to the Sevier River. Here, as elsewhere, people must and do live where they can readily obtain water for culinary and agricultural purposes. In the semi-arid ecology and unique geography of Sevier County, it seems the value of water has even greater importance.

In Sevier County, climatic conditions vary from semiarid at lower valley locations to humid on the adjacent mountains and plateaus. Normal annual precipitation ranges from 8 inches on the valley floor to about 30 inches on the surrounding mountain ranges. Summer precipitation normally falls from thunderstorms and winter precipitation falls principally in the form of snow.

The historic, contemporary and future development of Sevier County is directly related to the availability and sources of water.

The Sevier River attracted early settlers to the Valley and provided the water to sustain them, their animals and croplands. Contemporary agriculture and croplands are sustained by these same waters. Currently, most communities draw their culinary water from adjacent mountain lands and water shed areas in the County.

Technical challenges related to culinary water supplies, such as source protection, distribution systems, health, treatment and water quality speak to the importance and value of water. Present demands,

needs and desires associated with the relative conveniences of contemporary society, reaffirm the value of natural water resources, waste water drainage, disposal and regeneration systems.

Virtually without thought and almost effortlessly, Sevier County residents begin and end each day with water, the most vital of all life-sustaining minerals. That water exists naturally as an integral link in the human ecosystem is one of the miracles of mankind's existence. Those who are responsible for properly allocating, auditing, and accounting for water and for preserving source protection and watershed areas understand the delicate balance required to provide a sustainable supply of water. (See Map insert Sevier -Sigurd basin).

The future growth and development in Sevier Valley will depend, to a large extent, on the degree to which the County's vital water resources, in each of their multiple uses, are appropriately allocated, managed and protected.

The Central Sevier Valley

The central Sevier Valley forms a major portion of the upper Sevier river basin, which originates in parts of Kane, Iron, Garfield, Piute and Sevier counties and includes an area of approximately 2,400 square miles. The area is located in a transition zone between the High Colorado Plateau physiographic province to the east and the Basin and Range physiographic province to the west.

Separating the plateaus and mountains in the Sevier river basin are four major valleys: Panguitch, Circle, Grass and East Fork Valleys. The Sevier River flows through Panguitch and Circle Valleys into and through Piute Reservoir; the East Fork Sevier River flows through East Fork Valley and Otter Creek flows through Grass Valley, into and through Otter Creek Reservoir. The larger basin consists of the Sevier River and East Fork Sevier River drainage upstream from the confluence of the East Fork Sevier River with the Sevier River (See Map- Figure 1),[5]

Central Sevier Valley is located in the Utah section of the Colorado Plateau and is surrounded by the Sevier, Fishlake, Wasatch and Gunnison Mountains to the east and the Tushar and Valley mountains and Pahvant Range to the west. Altitudes range from 5,100 feet on the valley floor at the north end near Gunnison to about 12,000 feet in the Tushar Mountains.

The hydrologic systems in the Central Sevier Valley basin are characterized by complex interaction between surface and ground water. The ground water system in the basin receives most of its recharge from streams, canals, ditches and irrigated fields.

The central Sevier Valley covers approximately 300 square miles and is divided into five ground-water basins. These include:

- The Junction-Marysvale basin, the southernmost segment

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[5]Utah Department of Natural Resources; Brothers, William C. and Thiros, Susan A., Ground-Water Hydrology of the (Upper Sevier River Basin South-Central Utah. and Simulation of Ground-Water Flow in the Valley-Fill Aquifer in Panguitch Valley. Prepared by the United States Geological Survey in cooperation with the Utah Department of Natural Resources, Division of Water Rights; 1993, page 4.

of the central Sevier Valley, extends from Kingston in the south to the head of Marysvale Canyon to the North;

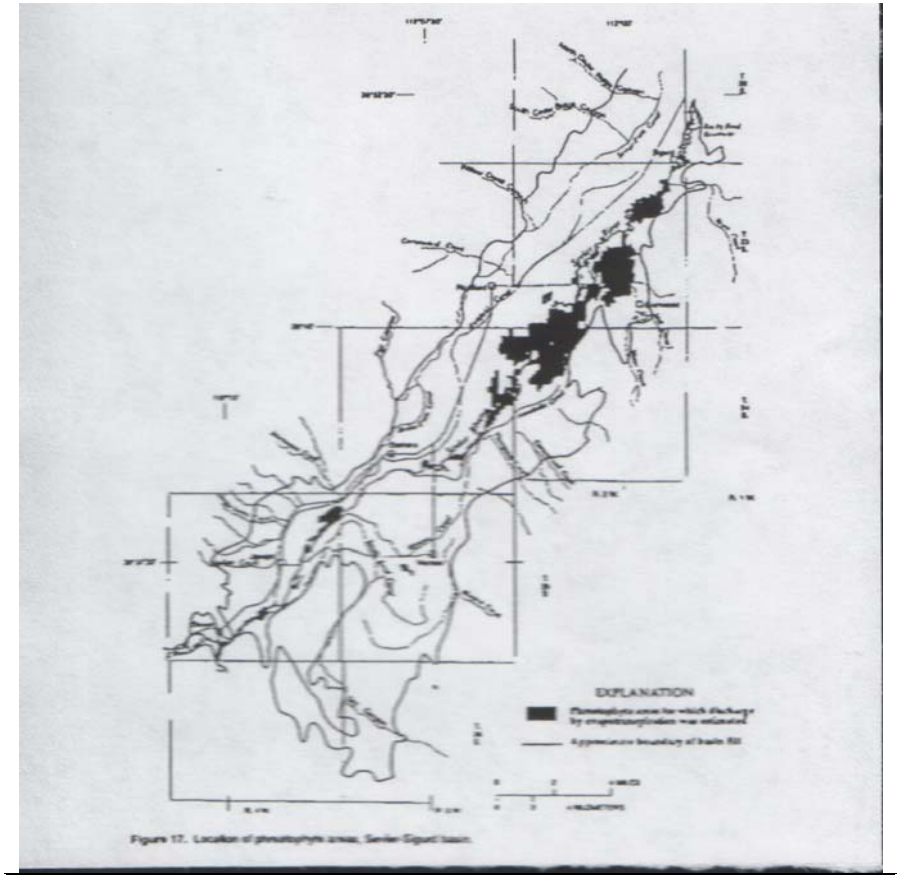
The Sevier-Sigurd basin extends from the mouth of Marysvale Canyon in the south to a geologic constriction in the valley at Rocky Ford Reservoir just north of Sigurd;

- The Aurora-Redmond basin extends from Rocky Ford Reservoir to the southern-most extension of the Redmond Hills anticline;

- The Redmond-Gunnison basin extends from the south end of the Redmond Hills to Gunnison where the basin branches to the north and northeast. The Sevier River flows through the main segment to the north. The northeast segment extends about 7 miles up the San Pitch River from Gunnison to Gunnison Reservoir;

- The northern-most basin in central Sevier Valley extends from Gunnison to Yuba Dam on the Sevier River and is known as the Gunnison-Sevier Bridge Reservoir basin.[6]

Of the five ground water basins, the Sevier-Sigurd basin is probably the most developed. Those who have studied the Sevier River know that it is probably the most intensively used stream in Utah. For this and other reasons, local and State water management agencies have indicated the need for a better understanding of the hydrologic system in the central Sevier Valley, primarily to make decisions on further ground and surface water development.



[6]Utah Department of Natural Resources; P.M. Lambert, J.L. Mason, and R.W. Puchta; Hydrology of the Sevier-Sigurd Ground-Water Basin and Other Ground-Water Basins. Central Sevier Valley, Utah. Prepared by the U.S. Geological Survey in cooperation with the Utah Department of Natural Resources, Division of Water Rights; 1995, pp. 5-6.

These factors, and others have combined to focus considerable study on the hydrology of Sevier County, studies which are on-going to determine water availability, quality and the level of growth that known water resources in the County may be able to sustain.

This General Plan contains recommendations pertaining to the current sources and uses of surface and ground waters which have or may possibly be developed for irrigation purposes, or which may, potentially, be converted for culinary purposes to sustain future growth of Sevier County's industries and population.

The Sevier-Sigurd Basin

Annual flow in the Sevier River through the Sevier-Sigurd basin sustains principal agricultural lands and a predominant portion of the population in Sevier County. This flow is dependent on the quantity of surface water released upstream from the Otter Creek and Piute Reservoirs, inflow from several tributary streams, diversions to canals, surface return flow from irrigation, and seepage to and withdrawals from the ground-water system.

Clear Creek is the largest tributary of the Sevier River in the Sevier-Sigurd basin. Other perennial, tributary streams in the Sevier-Sigurd basin include Brine Creek (also called Peterson Creek), Cedar Ridge, Cottonwood Creek, Monroe Creek, Willow Creek, and Water Creek. Only the flow from Brine Creek reaches the Sevier River on a regular basis.[7] These surface waters, including early spring and storm water runoff are controlled by retention basins and diverted for irrigation purposes.

Through complex estimating and measuring formulas, the total Inflow (acre-feet per year) in the Sevier-Sigurd basin is estimated to average about 280,450 acre feet. The total Outflow is 261,600-acre feet.[8] It may therefore he inferred that approximately 20-30,000 acre-feet per year are consumed for irrigation purposes or lost to evapotranspiration.

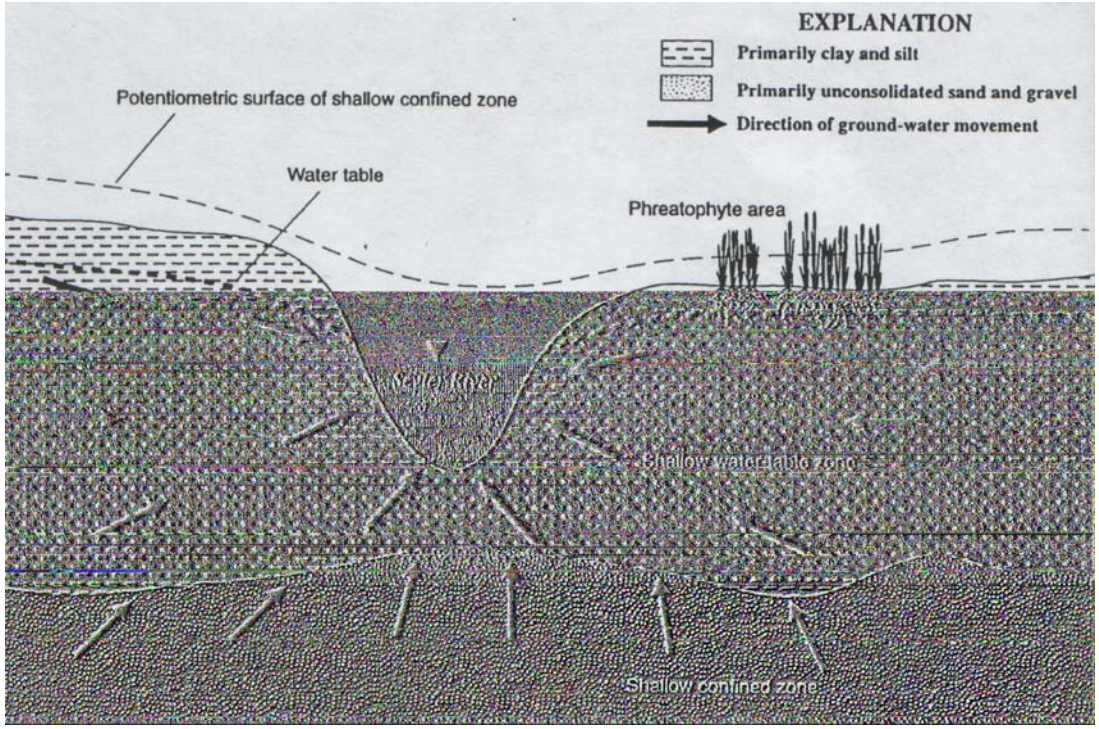
These and all other estimated figures are heavily influenced by the annual variations in precipitation levels upstream and in various Sevier County locations. In the area's natural geography, alluvial fans slope into the valley from both sides and in many areas overlap the flood plain. In many parts of the basin, the flood plain is adjacent to the mountains.

"Seepage from an extensive irrigation system is the primary source of recharge to the basin-fill aquifer in the Sevier-Sigurd basin…. To simulate the effects of conversion from flood to sprinkler irrigation, recharge rates simulating seepage from irrigated fields were reduced by 50 percent.

"After twenty years, this reduction resulted in water level declines of 1 to 8 feet in most of the basin, and a reduction in ground water

[7] lhid., page 7

[8] Ibid., page 23. Sec Tables 4,5,6,9 & 10. This inflow-outflow analysis for the basin "was made to determine the relative magnitude of recharge to ground water from consolidated rock cornpared with other recharge components. The cumulative error in the estimated inflow and total estimated outflow was estimated to he less than 15 percent.



Not to Scale

Ground-water movement in the shallow water-table zone, Sevier-Sigurd basin.

discharge to Sevier River 4,800 acre-ft/yr. Water level declines as much as 12 feet and a reduction in recharge to the Sevier River of 4,800 acre-ft/yr were the result of increasing well discharge near Richfield and Monroe by 25, 000 acre-ft/yr"[9]

[9] Ibid. Abstract, Page 1; and Conclusions, pages 104-107

This data is based on a model projecting future conditions with changes in water application methods and an increase in groundwater use. Multiple variable affect surface and subsurface water conditions in Sevier County. Technical and sophisticated models are required in accounting for the water that is, or may be available, for present and future requirements in the County.

Culinary Springs and Wells

Although there are multiple private culinary water systems, which mainly serve one household, most sources of culinary and municipal water systems are springs that originate in the mountains surrounding central Sevier Valley. (See Figure 2. Map and Spring Points of Diversion [POD's] in Sevier County).

Of the two hundred or so mapped natural springs in Sevier County, there are a number, which are vital as municipal and private culinary water sources.

These include:

- Annabella Town – Red Butte Canyon Spring
- Aurora Town – Broadhead Spring, Denmark Wash Spring,
- White Bally Spring
- Austin Area - Norton Spring

- Burrville - Birch Spring
- Central Valley Area - North Spring, South Spring, Mecham Spring
- Elsinore Town - Martinson Spring, North and South Creek Springs
- Fish Lake Lodge - Fish Lake Spring
- Glenwood Town - Glenwood Springs
- Joseph Town - Cold Spring Group, Gooseberry Group Spring
- Koosharem Town - Brown Spring
- Monroe Town - Cold Spring, Big Springs Branch
- Redmond Town - Redmond Lake Springs
- Richfield City - Richfield City Spring
- Salina City - Tunnel Spring
- Sevier Area - Cove Spring
- Sigurd Town - Carter Spring, Willow Spring, North Spring
- Rock Spring
- Canyon Fuel Company Coal Mine - Upper Spring, Lower Spring

Drilling records indicate that approximately 666 wells were drilled in the Sevier-Sigurd basin prior to 1963, and approximately 375 were constructed from 1964 to 1988. Of the 1041 total wells, 271 are used for irrigation and public supply, 775 for stock and domestic uses, and 15 for industrial purposes. Volumes of water from wells are a large source of culinary water in Sevier County.

The annual discharge to wells in the Sevier area is estimated to be about 9,700 acre-ft/yr. During the 1990-1995 period, the average rate of development was approximately 22.27 acre-fl/yr. Data assembled and analyzed during this period led to the following conclusion: "At the current rate of development, 445.40 acre-feet of water will be developed in the next 20 years. This could potentially support an increase in the population of Sevier County from the current 15,430 residents to 16,847 residents."[10] In view of Sevier County's expanding population and current water rights policy, this conclusion will need to be revised.

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[10]Utah Department of Natural Resources, Division of Water Rights: *Technical Publication Number103* 1995; Pages 35-37, 104-107. Summary provided by State Engineer, Richfield City Office.

Sevier River Basin - 1997 Water Rights Policy

As noted previously, investigations into the water resources of the Sevier River Basin in central Utah are on-going. These investigations were prompted by findings documented in a series of Technical Publications prepared by the United States Geological Survey (USGS) in cooperation with the Utah Division of Water Rights.[11]

> "The main finding of these reports is that the ground water and the surface water of the basin are closely tied together; a measurable stress placed on one component causes a measurable effect on the other. Because the surface waters of the Sevier River Basin are considered to be fully appropriated during most years, it was determined that the continued granting of new ground-water applications would have a potential adverse effect on the system.
>
> "Prior to March 19, 1997, the Sevier River Basin was open only to the appropriation of small amounts of ground water for the domestic purposes of a rural home. This was defined as the in-house use of one family and an incidental use for watering a lawn/garden and a small amount of livestock; the total annual diversion not to exceed 2 acre-feet per year *(af/yr).* Since that date, an administrative hold has been in place and all new filings are being held to permit a review of this policy.

[11]Technical Publication #102 deals with Panguitch Valley and the valleys of the Upper Sevier River and was published in 1993. Technical Publication #103 covers the central part of the Sevier River Valley with emphasis on the Sevier-Sigurd area and was published in 1995. The last in the current series, Technical Publication #113 deals with Sanpete Valley and was released in 1995. Each of the studies is accompanied by a ground-water flow model of their respective alluvial aquifers. The Technical Publications are supported by previous research on the basin dating back to the late 1950's. (Sevier River Study Policy Options: Utah State Department of Natural Resources, Division of Water Rights, 1997).

On November 5, 1997, the State Division of Water Rights issued the following Water Rights Policy for the Sevier River Basin, Areas 61, 63, 65, 66, 68, 69:

> "On March 19 & 20, 1997, the State Engineer held four public meetings in the Sevier river Basin at which the current water rights policy was reviewed, along with the principal findings of the United States Geological Survey technical publications, and potential future management alternatives. The major issue discussed was the close hydrologic connection between the surface water and ground water. Water users were given until May 15, 1997, to submit comments. From those comments and our research findings we have formulated the following policy.
>
> "Under a Governor's Proclamation dated December 19, 1946, the surface waters of the Sevier River Basin were closed to all new appropriations. Since that time, all new development of surface water has been based on the acquisition and changing of existing valid surface water rights.
>
> "As of March 19, 1997, the Sevier River Basin was <u>closed</u> to all new appropriations of ground water except as set forth below. All new ground-water development will be based on the acquisition and changing of existing valid water rights from surface (including direct flow and reservoir storage) and underground sources.
>
> "To assist water users, the following criteria will guide the implementation of this policy:
>
> 1) The State Engineer will act upon Applications to Appropriate filed prior to March 19, 1997 in accordance with the policies, which were in effect at that time. Applications to Appropriate filed after that date which are not in accordance with this policy will be rejected;

2) The Sevier River Basin is closed to new appropriations, except:

a) that portion of the Sevier Desert (Area 68) located in Ranges 8 West and 9 West which remains open to small domestic well filings for the domestic purposes of one family, the irrigation of 0.1 acres of lawn and/or garden, and the watering of no more than 5 head of cattle or the equivalent; the annual withdrawal not to exceed I .0 acre-foot per year.

b) that portion of the Sevier Desert (Area 68) west of the line between Ranges 9 West and 10 West SLB&M, and the area around Sevier Lake (Area 69) will remain open to the appropriation of ground water on a case-by-case basis. The waters of Sevier Lake are still open to appropriation on a case-by-case basis.

c) that portion of the basin located in Pahvant Valley (Area 67) is covered by separate ground-water policy announced on March 2, 1994.

"In view of the above Water Rights Policy, those wanting to develop lands in Sevier County, particularly in the unincorporated areas, will be required to have, or to acquire, a water right. Those owning surface rights will be required to file a Change Application with the State Engineer. Those who do not own a surface right, or a ground-water right (well), will be required to purchase the water and file a Change Application.

"Changing surface water rights for underground water rights is not an easy task. Most canal companies in Sevier County have restrictions in their bylaws, which prevent change applications from a surface water right to an underground water right. Some canal companies may allow the Change Application if the underground right will be used in the company's service area."[12]

The above Water Rights Policy is consistent with this and related elements in the Sevier County General Plan, The Policy suggests that development should occur within or immediately adjacent to existing municipalities, or special services districts. The Policy is also consistent with the documented interest Sevier County residents have in preserving agricultural lands, open space, and in assuring orderly population growth.

"There are substantial water rights in the Sevier Valley drainage basin. The key questions relate to appropriation, beneficial use, ownership, availability and conversion (commonly, for culinary purposes). Whether the needed rights can be acquired and whether the requested change application will be approved by the State Engineer are also important considerations. The critical factor is likely to be the hydrologic impact on the Sevier River water system.[13]

Diversion Allowance In Acre Feet

The State Division of Water Rights has established a scale which shows the total amount of water required for domestic, animal, and

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[12]"Permanent Moratorium Issued on New Sevier Culinary Water Wells," Richfield Reaper, November 12, 1997, Page 1. See related articles on water and waste water in the Richfield Reaper, November 5, 1997, and September 17, 1997.

[13]Summary provided by the State Engineer, Richfield Office. To obtain a copy of the Water Rights Policy for the Sever River Basin, contact the State Engineer, Richfield Office, 130 North Main Street. Richfield, Utah 84701. Telephone (801) 896-4429.

poultry uses each year. A diversion allowance in acre feet of water required to meet annual needs is outlined in the following figure.[14]

Yearly Diversion Allowance in Acre Feet

Based upon the allowance of:

1 Family (domestic)	=400 gallons per day	= .45 ac.ft./year
1 Sheep, Goat, or Swine	= 5 gallons per day	= .00560 ac.ft./year
1 Chicken / Turkey	= 1 gallon per day	= .00084 ac.ft./year
1 Cow or Horse	= 25 gallons per day	= .0280 ac.ft./year

I Cubic Foot = 7.48052 U.S. Gallons
I Acre Foot = 325,851 U.S. Gallons

The Total Amount of Water Required for various numbers of animals or poultry is also available from the Division of Water Resources.

Water Quality and Mineral Content

The quality of surface and ground water continues to be of vital interest to water users throughout Sevier Valley. Because of highly variant ecological conditions and annual precipitation levels, concentrations of dissolved solids in the Sevier River change markedly as water moves downstream.

[14] For a family of four, total diversion is about 1.0 acre-feet per year. For Sevier County communities reporting to the Division of Drinking Water, the use was *375* gallons per capita per day.

As surface waters enter the Sevier Valley, the predominant ions are calcium, magnesium and bicarbonate. “Most of the water is diverted into the major canals and applied to irrigated fields throughout the basin. As the Sevier River flows northward the percent equivalence of sodium increases until at Sigurd it becomes nearly equal to that of magnesium.

“Similarly, sulfate and chloride increases, but bicarbonate remains the predominant anion. The increases in sodium, sulfate, and chloride may be due to tributary inflow, seepage from ground water and surface runoff from irrigated fields.” (Hahl and Mundorff also attributed these chemical increases to inflow from saline springs).”

“The predominant ions in water from Clear Creek are calcium, sodium, and bicarbonate; and from Brine Creek, sodium and chloride. Inflows to the Sevier River from areas with large springs have several prevalent ions that include calcium, magnesium, sodium, bicarbonate and sulfate.[15]

Surface water quality is directly related to the presence (or lack) of dissolved solids. Current data on total dissolved solids is being generated by the Division of Water Quality but is not presently available for Sevier County.

Several factors will continue to influence future changes in water use in Sevier County. One of the most significant of these is converting from irrigation to culinary uses, Allowing more pumping (or other

[15] Ibid., pages 36-39.

discharge) from groundwater sources would also impact water quality and water quantity. Increasing build out in any community in Sevier County is likely to impact the County's vital water budget.

Drains

Buried and surface drains are common throughout the central Sevier Valley. Ground water discharges from the relatively shallow water table zones in the valley to these seemingly omni-present drainage systems. Drains are prevalent in the north half of the Sevier-Sigurd basin and at the north end of the sub-basin near Joseph. Young and Carpenter (1965) estimated that about 10,000 acre-ft/yr of ground water is discharged to drains.

Some ground water discharged to drains is diverted into canals for irrigation of crops and pasture with the remainder discharging into the Sevier River for use downstream.

Fine-grained deposits in which the drains are constructed yield ground water to drains slowly. Therefore, water levels are lowered only in the vicinity of the drain. The drain network is more important as a source of unused irrigation water from surface runoff and seepage from ground water than as a device for lowering ground water levels regionally.

Preserving rights of way, preventing contamination, interruption and maintaining the integrity of water inflow and outflow in the drain fields is of keen interest to landowners and developers within Sevier Valley

Extensive mapping and management of these drain fields is ongoing. Increasing awareness of the presence of these drainage systems will help to ensure that land uses are consistent with the vital ground water recharge and discharge areas throughout the County.[16]

Private Canal and Irrigation Companies

Canal and irrigation companies in Sevier County are afforded independent legal status by the Constitution of the State of Utah. As such, these companies have adjudicated irrigation water rights so long as they make 'beneficial use' of the waters described in their documented rights.[17]

In Sevier County the following canal and irrigation companies are operational in 1997 (as decreed in 1936):

Annabella Irrigation Canal Company
Aurora Irrigation Company

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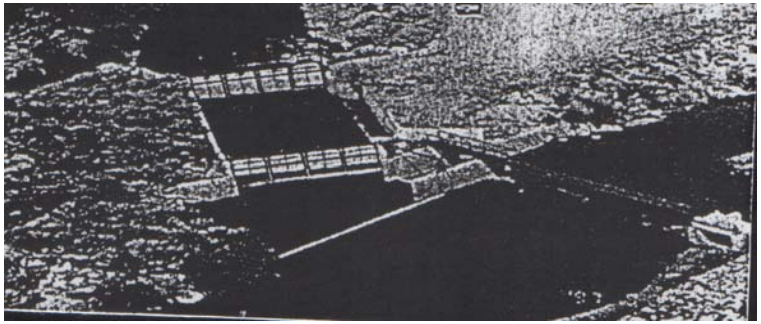
[16]From findings or the Water and Natural Resources Committee, Members of the Committee, Van Beutler and Ivan Cowley provided maps of the multiple drainage systems throughout Sevier Valley. They also provided a summary of required widths for rights of way for canals, ditches, municipal surface drainage systems, and subsurface drain fields. Maps of these drain systems are available in the Sevier County Building Inspection Department, the Central Utah Public Health Department and the State Water Engineer's Office in Richfield City.

[17] The information in this Chapter was provided by the Sevier County) Planning Commission: Water and Natural Resources Committee Members: Commissioner Kirk Forbush, Chair; Ronald Bosshardt, Van Beutler. Roger Foisy, Jay Harris, Ken May, Bill McClure, Tooter Ogden, Al Ricksecker, Tom Seegmiller. Mont Turner. Special acknowledgment is given to Bill McClure, Reporter. Richfield Reaper, and Al Ricksecker for considerable assistance with research and analysis related to water and natural resources in Sevier County.

Avery Irrigation Company
Bertleson Irrigation Canal Company
Brooklyn Canal Company
Burrville Irrigation Company
Cedar Ridge Irrigation Company
Clear Creek Irrigation Company
Cottonwood Reservoir & Irrigation Company
Cove River Irrigation Company
Dry Creek Irrigation Company
Elsinore Bench Irrigation Company
F.J. Heppler Ditch Company
Glenwood Irrigation Company
Gooseberry Creek Irrigation Company
Joseph Irrigation Canal Company
Joseph & Cove Highline Canal Company
King Meadow Ranches Irrigation Company
Koosharem Irrigation Company
Lost (Decreed as Loss) Creek Irrigation Company
Meridian Ditch Company
Monroe Irrigation Company
Monroe South Bend Canal Company
Otter Creek Reservoir Company
Piute Irrigation Company
Redmond Irrigation Company
Richfield Cottonwood Irrigation Company
Richfield Irrigation Company
Rocky Ford Canal Company
Rosebud Irrigation Company
Salina Creek Irrigation Company
Sevier Valley Canal Company
Skutumpte Reservoir & Irrigation Company Spring Hill Irrigation Company
Venice Pumping Company
Vermillion Extension Canal & Irrigation Company
Vermillion Irrigation Company
Wells Irrigation Company
West View irrigation Company
Willow Bend Irrigation Company

Canal Monitoring anti Control Systems

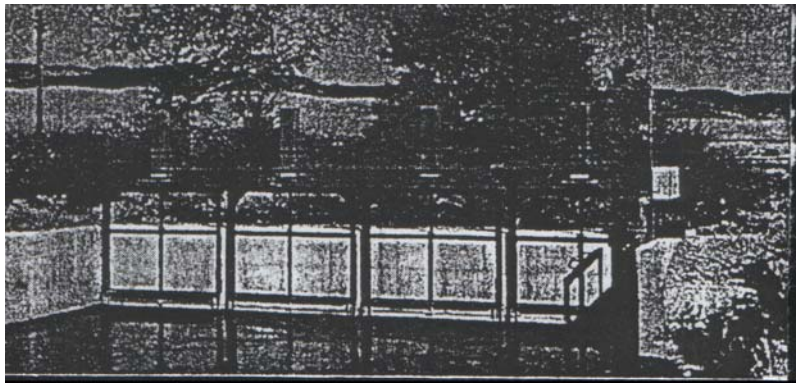
During 1996 and 1997, the canal companies in Sevier Valley, with assistance from the Bureau of Reclamation expanded their real-time monitoring and control system[18] by adding 14 new sites.



Photograph 1 – Sevier Valley/Puite diversion structure from the air. The upper set of gates is automated to regulate the flow into the canal.

[18]ReaI—time Technologies: An integration of computers, remote field units, and communication equipment to connect the water manager with his field sites, in order to implement enhanced management for the conservation and equitable distribution of water. The water monitoring system was manufactured by Campbell Scientific, Inc., Logan, Utah. Because electric power was not available at the site, The Bureau of Reclamation designed and installed a low—cost prototype DC system. The remote control enables the water manager to raise or lower the three gates on the Richfield diversion structure from his home 12 miles away.

Five of these sites - Monroe/South Bend, Joseph, Elsinore, Annabella and Vermillion - involve automated gate control at the



***Photograph* 2-** *Automated gates at the head of Sevier Valley/Piute Canal. The system is totally solar powered*

respective head works, All gate control systems are solar powered. The expanded real-time system provides improved irrigation management in Sevier Valley.

Because of the success of the Richfield Irrigation Company's real-time project, two additional canal companies in the Richfield area installed similar equipment during 1995. The Piute Reservoir and Irrigation Company installed five real-time flow-monitoring stations along its 65-mile-long canal. The Sevier Valley Canal Company automated its diversion structure using a system similar to the one on the Richfield Canal.

During 1997, the real-time system was expanded to include the remainder of the entire irrigation delivery system between Piute Dam and Vermillion Dam.[19] (See Photographs 1 and 2) (The Sevier Valley diversion also services the Piute and Joseph Canals).

Public Water Distribution Systems

Following is a complete list of public water distribution systems that are operational in Sevier County. The term *public*, as used by the Utah Division of Drinking Water, does not necessarily refer to ownership of a water system. It refers rather to the number of people who might use the drinking water facilities. Privately owned public waster systems are noted with an asterisk.

Annabella Town
Aurora Town
Austin Special Service District*
Big Rock Candy Mountain*
Bowery Haven Resort
Bowery Spring Campground
Brooklyn Tapline Company*
Burrville Culinary Water System*
Canyon Fuel Company*
Central Waterworks Company*

[19]Under the leadership of Ivan Cowley. President of the Otter Creek Reservoir Company, the Bureau of Reclamation expanded the real-time system to include a reservoir-level monitoring system on Piute Reservoir. five flow-monitoring stations along the Central Sevier River, including installation of an automated control stations on the Monroe/South Bend Canal.

Cove Special Service District*
Cove View Golf Course
Doctor Creek Campground
Elsinore Town
Fish Lake Lodge*
Fremont Indian State Park
Frying Pan Campground
Glenwood Town
Gooseberry Campground
Grass Valley Guest Ranch*
Ivie Creek State Highway (Rest Stop)
Joseph Town
Koosharem Town
Lake View Subdivision*
Lakeside Resort*
Monroe City
Monrovian Park Picnic Area
Oak Spring State Highway (Rest Stop)
Redmond Town
Richfield City
Salina City
Shadow Mountain Estates Subdivision*
Sigurd Town
South Monroe Water Company*
Saint Elizabeth Catholic Church*
Twin Creeks Campground
U.S. Gypsum (Sigurd) *
Venice Ward Church*
Venice Ward Cultural Hall*

* Denotes privately owned public water systems.

Hydrologic Budget of the Ground Water System

The hydrologic budget for the ground water system in the Sevier-Sigurd basin in summarized in the following figure. Estimates for total recharge and total discharge are identical because of the method used to estimate recharge from irrigated fields and consolidated rock.

Estimate for components of recharge and discharges other than discharge to wells were derived from available data fort 1957-86 and are assumed to represent long-term averages. Discharge from wells was estimated for 1988.[20]

Hydrologic Budget of Ground Water in Sevier County

Budget Component	Acre-feet per year
Recharge	
Inflow from consolidated rock and seepage from irrigation fields*	72,400
Seepage from the Sevier River	10,100
Seepage from other perennial and ephemeral streams (Sevier River)	19,200
Seepage from canals	8,900
Infiltration of precipitation	2,100
Total	**112,700**
Discharge	
Seepage to the Sevier River	47,400
Evapotranspiration	23,200
Springs	18,000
Pumped and flowing wells	12,100
Seepage to drains	10,000
Subsurface outflow	2,000
Total	**112,700**

[20]Utah Department of Natural Resources, Division of Water Rights; Technical Publication Number 103. 1995, Op. Cit. Page 37.

*Estimate was derived indirectly by computing the differences between estimated recharge from other components and the total estimated discharge from the ground-water system.

Because of semi-arid conditions, relatively low amount of annual rainfall in valley locations (approximately 8 inches) and the importance of natural precipitation, Sevier County spends several thousand dollars annually for cloud seeding operations.

Natural Resources

Sevier County is located in the transition zone between the Basin and Range Province and the Colorado Plateau physiographic Province. Eastern Sevier County extends into the High Plateaus of the Colorado Plateau.

A Computerized Resources Information Bank (CRIB) on the mineral resources in the County was completed in 1983 and contains 153 records of mineral occurrences in the County. This data shows that salt, sand and gravel, coal, gypsum and uranium are the County's most important minerals. Other mineral resources include aluminum, iron, gold, silver, clay, diatomaceous earth, flourite, molybdenum, lead, zinc, copper, strontium, manganese and gypsum. The locations of these occurrences are illustrated in the Sevier County Land Ownership and Minerals Map in this Chapter.[21]

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[21] Computerized Resources Information Bank (CRIB) data for Sevier County. Utah. *Utah Geological and Mineral Survey, Open File Report No. 40*; December 6, 1983, page 10.

Central Sevier Valley is a structural depression between fault zones, along which the beds of tertiary rocks are warped downward into the trough of the valley (See Sevier County Map in this Chapter for known fault areas in the County). A particularly interesting feature is the salt-bearing Redmond Hills, in which a rib of Jurassic rocks was thrust upward, bending the tertiary beds that were deposited against it and elevating terrace gravel.

At some point in history, that portion of the valley was likely flooded by an arm of Lake Bonneville. The Sevier River undoubtedly was much larger then and brought in sediments or eroded them out in the Redmond area as the regimen and base level of the stream changed.

Minerals

As noted above, principal minerals in Sevier County include clay. coal, gypsum, salt, sand and gravel and timber. Prior exploration for petroleum and natural gas reserves, including oil and oil shale deposits, although not significant at the present time, are also summarized in this chapter.

Clay

Extensive deposits of clay soils are found at multiple locations throughout Sevier County. In their purest form, these deposits can be utilized as fuller's earth for soap making. "Four pits have been opened in the Redmond Hills on bentonite deposits in the Dipping Vat Formations near salt deposits. The bentonite is quarried intermittently for local use as a lining for irrigation ditches and stock ponds or reservoirs to control leakage and to cover roofs and as a filler in soap. Its value derives from its property of swelling to 3 ½ times its volume after grinding and addition of water."[22]

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[22] **Land and Mineral Resources,** Op. Cit., Page 52.

Coal

Natural deposits of coal are important mineral sources in Sevier County. Canyon Fuel Company, L.L.C. is located approximately 30 miles northeast of Salina, Utah in Sevier County. The mine property consists of 17,418 acres and has over 90 million tons of recoverable reserves. The annual production in 1996 was 3,905,748 tons. At a four million tons per year rate, the estimated mine life is 23 years.

At the end of 1996, Canyon Fuel operated three coalmines in Utah - Skyline, Soldier Canyon, and SUFCO. In total, the mines employ approximately 675 operations personnel. The combined annual payroll is approximately $40 million. Over $9 million in royalties is paid annually to the State of Utah. Approximately $2 million is paid in property taxes, and $2.7 million is paid in direct Utah State income taxes. Sevier County property taxes paid by Canyon Fuel Company in 1995 were $681,794,

More than 80% of Canyon Fuel coal production is committed under short or long term contracts. Of the Company's contract coal sold in 1996, approximately 73% will he used in public utilities for power generation. The balance will he sold for industrial use, institutional and home heating.

Gypsum

Four companies including Diamond K Gypsum, Georgia Pacific, U.S. Gypsum Company and Western Clay conduct significant gypsum operations in Sevier County. Diamond K produces pharmaceutical and food grade gypsum, which is in high demand by numerous manufacturers throughout the U.S. and abroad. Georgia Pacific and U.S. Gypsum produce sheet rock for the construction industry. Western Clay hauls and crushes gypsum.

Salt

Early settlers found and quarried salt in the Redmond Hills (undoubtedly named for the distinct color of geologic formations) in northern Sevier County. Approximately 10,000 tons per year were mined in the early years of record. Most of the salt is removed in rough blocks as quarried for livestock. Smaller blocks are crushed for sheep. Analysis has shown that inherent minerals in the salt provide sufficient nutrition for livestock.

Crushed salt is used on roads and highways in the winter. Initially no attempt was made to refine the salt for human consumption. In recent years, the natural mineral content of the salt has become better identified and fine grain, natural salt is now packaged for human use.

Redmond Minerals Incorporated is the principal commercial producer of salt in Sevier County. The Company employs approximately 40 people. In 1996 the combined economic impact from these operations was approximately $15 million dollars. (See Sevier County Map in this Chapter for Mineral Occurrences)

Sand and Gravel

The Axtell or Sevier River Formation is a conglomeratic deposit, which most commonly occurs as a dissected alluvial fan rimming the western margin of the Sevier River Valley at the foot of the Valley Mountains.

Commercially significant deposits of sand and gravel occur at multiple locations throughout Sevier County, however, the most successful deposits occur in the Sevier River floodplain near Elsinore. Concentrations of gravel terraces occur adjacent to outcrops of Arapien Shale and the dipping Vat Formation. Deposits are composed mainly of gravel-sized detritus composed of limestone, sandstone, volcanics, quartzite, and chert. The covering top soils vary in thickness.

The exposed material consists of approximately 5 percent boulders and 75 percent gravel in 20 percent finer material. The deposits are poorly cemented by calcium carbonate, make excellent road gravel, and after separation, make excellent composition for cement and asphalt hatching plants

Timber

In the early settlement years, timbering was vital for structures and fuel for winter heating of homes and public structures in Sevier County. The most valuable type of wood was red pine which was found in several locations in the surrounding mountains. Aspen, Cedar (Western), Douglas Fir, Engleman Spruce, Juniper, Pinyon Pine, Ponderosa Pine, and Poplar continue to be commercially important wood resources to the County.[23]

[23]See Utah and Nevada Wood Industry Directory - 1997. The Directory is published by Utah State University Department of Forest Resources and Cooperative Extension in cooperation with the USDA Forest Service Region 4 State and Private Forestry. The Directory is available at the Utah Division of Fire, Forestry and State Lands Office in Richfield. Also see: Stewardship of Utah's Forests, a Report of the Utah Forest Practices Task Force to the Energy, Natural Resources, and Agriculture Interim Committee of the Utah Legislature; September 10, 1996; 23 Pages plus 5 Appendices.

Beginning in the early 1990's, timbering experienced a resurgence in Sevier County. Much of the current cutting is occurring on private lands. In Sevier County some native timber is being manufactured for use in log homes, log furniture, and wood pallets. Research is being conducted to determine the feasibility of replacing hardwood products with some of the alternative woods available in Sevier County.

Petroleum, Natural Gas and Oil Shale

The Green River Formation, which contains enormous resources of oil shale in the Uinta Basin, is exposed in the Sevier Valley and probably underlies considerable areas in both Sanpete and Sevier Valleys. No oil shale has been recognized and, according to U.S.G.S. studies, most of the general area is included in public oil shale lands in central Utah withdrawn from availability for production.[24]

Possibilities of finding commercial quantities of petroleum and natural gas in central Utah west of the Wasatch Plateau and the Wasatch Monocline are clouded by the complex geologic structures and by failure to find significant indications of gas or oil in the tests that have been drilled. Oil exploration sites confirm the complex substructure of the Central Utah geology:

[24]**Land and Mineral Resources of Sanpete County, Utah.** *Utah Geological and Mineralogical Survey;* August 1970, l3ulletin 85, pages 59-62, This Geological Bulletin contains the most current and only approved references to petroleum and natural gas explorations in central Utah, including the Sevier County area. No similar publication for Sevier County is available. However, the Utah Geological and Mineral Survey has compiled an Open-File Report (Number 40) which contains a computerized resources information data bank on mineral occurrences in Sevier County.

> "Two wells, one near Moroni (total depth 9,995 ft.) and one near Levan in Juab County (total depth 7,526 ft.) have been drilled deep enough to reveal significant characteristics of the subsurface formations. The test at Moroni was favorable in that it showed that the Cretaceous section found in the Wasatch Plateau, including the Ferron and Dakota, persisted this far west; there was a slight show of gas in the Ferron (lower formation of Sanpete Sandstone) The Levan test, spudded in the Jurassic European Shale, went through the nose of an anticline, overturned toward the east, which includes the Jurassic Navajo Sandstone… Another deep test… the Standard Oil of California Sigurd unit No. I drilled to a depth of 9,640 ft. in Sevier County, penetrated 9,000 ft. of European Shale before reaching the Navajo Sandstone. This is a probable thickening of the European owing to tectonic disturbance,"[25]

Until demand increases and market conditions change, both in the known oil fields of the United States and in the oil-rich middle east, there is likely to be little, if any, significant natural oil and gas exploration in the central Utah area.

Natural Stone Work

Diamond saw cutting, polishing and shaping of natural stone materials is presently occurring in Sevier County. Much of this work is by special order for statuaries, stone art, fountains, benches, and natural stone steps. Some of the present work is with stones that originate outside Sevier County. The abundant supply of natural and unique stones in the County, combined with expert craftsmanship and specialized stone working equipment suggest this could he a growing industry in the County.

[25] Ibid., page 61

Sevier County leaders want all natural resources in the area developed or expanded to their full potential. Through the Sevier County Office of Economic Development, County officials have assisted and continue to assist current or prospective enterprises that want to expand or develop new operations in Sevier County.

Water and Natural Resources Committee

Under direction of the Sevier County Planning Commission, the Water and Natural Resources Committee held a series of meetings, obtained significant information, and conducted research into matters related to the committee's charge. The Committee's Mission Statement, findings and recommendations follow.

Mission Statement

Our mission is to identify the impact of growth on water, minerals, and natural resources in Sevier County; to recognize the limitations placed on land use in Sevier County by those finite resources; to gather facts, opinions, and concerns from County residents regarding important water, minerals, and natural resources, and to make policy recommendations pertaining to water and natural resources for the County's General Plan and Zoning Ordinance.

Committee Findings

1. The drain-tile systems in the nine Sevier County Drainage Districts pose significant effluent-water disposal problems to residential or commercial development in those areas.

Those drainage systems constitute ephemeral water courses to the Sevier River. State Water Quality Rules require any septic system to maintain a 100-foot lateral separation from such drains.

2. Some 18,234 total acres are devoted to the NINE Drainage Districts that have been created over many years and which drain into the Sevier River. Drainage Districts were formed in the Joseph Town area of southern Sevier County, central areas of the County and north to the Redmond Town area of northern Sevier County. The water drained by these systems is claimed by the Rocky Ford Canal Company.

3. Sevier County Drainage Districts (#1 and #4) are actively maintained, by means of' taxes levied against lands within the districts. Such maintenance entails the excavation of sections of the drain systems, as needed, to unplug or repair them. Any structure built over or within 30 feet of a drain line will encumber, or could preclude, its proper maintenance.

4. Inadequate culverts at public and private road-crossings of canals and tier-ditches impede stream-flows in those irrigation waterways and can contribute to flooding of nearby property. Frequently, such culverts are installed without the approval of the Canal Company's Governing Board.

5. Sevier County, in cooperation with the Utah Department of Environmental Quality and the Central Utah Public Health Department should encourage the development of properties which can he served by viable public drinking water systems and public wastewater treatment systems.[26] Utah DEQ discourages the further development of smaller drinking water and wastewater systems serving subdivisions, recreational projects, and other similar housing developments.

   This policy may place some limitations on the subdividing and development of smaller parcels of land, thereby encouraging such development to be in conjunction with existing utility systems. This approach seems to be in keeping with the overall objectives of the General Plan that haphazard development throughout Sevier County is not now desirable, from the standpoint of drinking water supply, wastewater disposal, access, solid waste removal, law enforcement, and many other related utilities and public services.

6. Combining or merging smaller services into existing utility facilities would be a significant improvement over inefficiently operated systems.

7. When new commercial and residential developments occur, storm water and wastewater runoff is a problem. If the water is channeled into existing irrigation canals it can cause problems. These new developments have the responsibility for water that runs off their property and for its proper disposal.

8. Local canal systems need to be protected. New structures and bridges can put a burden on them. Rights of way and proper widths on private canals need to be maintained and protected.

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[26]Viability is further described as system capacities; i.e. technical, operational, managerial and financial capacities.

9. Water discharged into septic tank systems poses significant challenges if land use density, soil conditions and ground water drainage systems are not carefully analyzed and evaluated. Empirical information needs to be obtained in each individual instance to determine how close these systems can be installed to each other, to existing drainage systems and to wells.

10. Ground water, ground water quality, surface and underground drainage systems need to be closely and routinely monitored. New developments should bear the principal responsibility and cost for obtaining empirical data pertaining to each proposed, or potential impact.

11. One-hundred-year flood plain maps need to be addressed and revised in appropriate instances. Flood plain detention basins and flash-flood channels need to be protected from development and need to be well-maintained;

12. Culinary water is of utmost concern. There needs to be an inventory of known public drinking water sources in Sevier County. Sources of water in each community need to be identified;

13. The Cox Decree states where all irrigation water rights from surface sources are allocated. Water usage information from each large canal and public water supplier is submitted to the State Engineer at the end of each year to assure compliance with individual water rights;

14. There is concern about how many wells can be drilled without affecting wells already in place. Residential wells, individually, may not have a significant effect on wells already in place or on the river. Large industrial or commercial usage, however, could have a significant effect.

15. When applying for a building permit, persons should identify their source of water and have an approved application to divert and use water for proposed purposes.

16. Natural resources and mineral production in Sevier County need to be promoted, protected and preserved. County officials encourage the identification of potential sources, appropriate development and use of natural resources in the County.

17. There is a general problem with unauthorized, negligent, disposal of debris, solid wastes and some potentially hazardous wastes in the unincorporated areas of Sevier County. It is the intent of County officials and enforcement personnel to investigate such disposal, to arrest and fine those responsible, and to enlist the assistance of County residents in preventing this problem in Sevier County.

Recommendations

1. The drain-tile systems in each of the nine Sevier County Drainage Districts are significant to the proper drainage of ground and surface waters throughout the County. Appropriate measures to carefully monitor new installations and structures shall be implemented to protect ground and surface waters in the County;

2. Inasmuch as ground and surface waters are used multiple times by multiple users in the Sevier River drainage system, monitoring and safeguarding the quality of these waters is a primary concern. These waters shall be protected and preserved;

3. The committee recommends policies be adopted which protect, record and properly maintain easements, rights-of-way and bridge and culvert crossings for canal and irrigation companies throughout Sevier County;

4. Drilling of individual and commercial wells poses significant issues for the growth and development of Sevier County. The committee recommends that appropriate access and source protection zones continue to be closely monitored by state, local and private entities and individuals responsible for maintaining water quality in the County;

5. It is recommended that Utah Division of Water Quality regulations governing the installation and operation of both individual and large wastewater disposal systems be adopted by Sevier County. These regulations require feasibility or engineering reports before construction permits can be issued by the District Engineer or the Central Utah Public Health Department;

6. Building permits shall not be issued in the unincorporated areas of Sevier County until the required clearance or feasibility study (if required) for a waste water discharge system is approved by the Utah Department of Water Quality; Subdivisions shall not be recorded until the required feasibility studies are approved in writing by either the Central Utah Public Health Department or the Utah Department of Environmental Quality;

7. It is recommended that Sevier County provide guidelines, which will enable residents in affected areas to work with appropriate agencies in reviewing and revising 100-year flood plain maps. The committee also recommends that flood plain detention basins and flash-flood channels be protected from development and be well-maintained;

8. Given that culinary water sources and quality must be assured, it is recommended that Sevier County cooperate with municipalities and private water companies to ensure that known and potential inventories of spring and well sources of culinary waters are identified and appropriately protected throughout the County;

9. Through applicable policy guidelines adopted in the Sevier County General Plan, empirical data shall be provided through feasibility studies (see Policy Number 5 below) specific to each development. Said data shall govern, and in appropriate instances may affect the issuance of some well sites throughout the County;

10. It is recommended that land use policies prevent the issuance of a building permit until the source of water is identified and the water right established.

12. The committee recommends that access roadways to natural resources in Sevier County be preserved, protected and, in appropriate instances, expanded in environmentally acceptable and economically viable ways;

13. In acknowledging the economic value to Sevier County of minerals, mineral production and mineral-related manufacturing, the committee recommends active promotion, extension and expansion of current activities and potential resources;

Water and Natural Resources Policies

1. Drain-tile systems in each of the **nine Sevier County Drainage Districts are significant** to the proper drainage of ground and surface waters throughout the County. Appropriate measures to **carefully monitor, regulate or relocate new installations and structures** shall be implemented to preserve and protect ground and surface waters in Sevier County;

2. An **approved source of culinary water** and an **approved waste water discharge system** shall be required for each dwelling and for all approved subdivisions in Sevier County;

3. **Special purpose or prescriptive easements and established rights-of-way for irrigation bridges,** canals and water ways shall be maintained and recorded throughout Sevier County. Generally, it is recommended that easements should be no greater than 30 feet and not encroach on private property;

4. Sevier County shall endeavor to cooperate with municipalities and private water companies to **ensure that known and potential inventories of spring and well sources of culinary waters are identified and appropriately** protected throughout the County;

5. Access **and source protection zones** for commercial**,** individual and public well water sources **shall be carefully monitored** by Utah State, County and private entities **to maintain water quality in Sevier County;**

6. A building permit shall not be issued by Sevier County until the **source of water is identified or the water right established;**

7. Utah Division of Water Quality regulations govern the installation and operation of all waste-water disposal systems in Sevier County. **No building permit shall be issued in the unincorporated areas of Sevier County until the required waste water permit for each development is approved** by the Central Utah Public Health Department and the District Water Engineer;

8. **Access to natural resources in** Sevier County shall be preserved and protected. Minerals, mining and mineral-related production and timbering shall be **actively extended and promoted** in Sevier County;

9. Sevier County officials intend to **adopt agreements and ordinances consistent with fire, interface, mitigation, and natural hazard codes that assist in protecting private and public property within the County from natural hazards and Wildland fires;**

10. Natural **surface water and waste water runoff** from irrigated lands flows into and through established ditches and drain fields. These corridors, easements, or rights-of-way, as the case may he, should be maintained, preserved, protected and recorded as performance criterion whenever **development is approved in the unincorporated areas of Sevier County.**

11. Sevier County shall continue to train and strengthen the operations of public health and safety personnel to prevent **the unauthorized, negligent disposal of debris, solid wastes and hazardous, or potentially hazardous wastes.** The intent of this policy is to **protect land resources, the visual environment, and ecology of surface and ground waters** in Sevier County.