Duchesne County Comprehensive Water Resource Master Plan

Volume 1

Part 1, Water Management and Conservation Plan, and

Part 2, Capital Improvements Plan, and

Part 3, Potential Funding Alternatives

Prepared for:

Duchesne County Water Conservancy District

March 2001

Prepared by:

CH2MHILL

Executive Summary

Introduction

CH2M HILL has prepared this Comprehensive Water Resources Master Plan (CWRMP) under the authorization of the Duchesne County Water Conservancy District (DCWCD). The main objectives of this CWRMP are to:

- Prepare a water conservation plan based on U.S. Bureau of Reclamation (USBR) standards that provides the DCWCD with guidance on water management and conservation issues
- Develop a capital improvement list of projects that will provide short-term (5 years) and long-term (20 years) guidance to the DCWCD
- Collect and compile existing water resources data for both Municipal and Industrial (M&I) and agricultural purposes in Duchesne County

The data is presented in four volumes, as follows:

Volume 1

- Part 1 — Water Management and Conservation Plan
- Part 2 — Capital Improvements Plan
- Part 3 — Potential Funding Alternatives

Volume 2

- Part 4 — Water Rights
- Part 5 — Water Storage Facilities

Volume 3

- Part 6 —Data
- Part 7 —Tools

Volume 4

- Appendices

Volume 1, Part 1 — Water Management and Conservation Plan

The Water Management Conservation Plan (WMCP) includes discussion on the following:

- Discussion of the benefits of conservation and water management
- Historic settlement and growth of the County
- Historic agricultural and municipal water uses, and the development of local resources to the existing conditions
- The mission and organization of the DCWCD
- Demand patterns and available supplies
- Historically and currently implemented water management and conservation efforts
- Suggestions for improved water conservation and management
- Plan elements adopted by the DCWCD

Primary concerns identified by the Board of Directors of the DCWCD (Board) include the development of water storage, the lining and piping of canals, and water transfers. These problem areas impact all water users in Duchesne County (County), and reflect the major areas of concern of the County residents, as demonstrated by the projects identified in public meetings. With the water resource and financial limitations of the DCWCD, these focus areas are expected to provide the greatest short- and long-term benefits. The Board and staff have selected the projects that are most important to the County and have included them in their 5-year implementation plan, or Capital Improvements Plan (CIP). The projects of lesser importance have been included in the 20-year CIP.

Volume 1, Part 2 — Capital Improvement Plans

The CIP and associated tools will allow the DCWCD to regularly update results. The CIP includes a database with instructions, queries prepared for evaluation, and automated reports that will facilitate the DCWCD to make updates independently.

This part of the CWRMP contains the 5-year and 20-year CIPs as developed through a public involvement process. Two public meetings were held to solicit ideas, concerns, recommendations, and potential project ideas. The resulting information was consolidated, evaluated, and prioritized by the Board and staff to develop a list of over 120 projects. The projects were summarized, and a workshop was held to narrow the selection to the 18 projects included in the 5-year CIP. The remaining projects are included in the 20-year CIP.

The following projects are included in the 5-year CIP:

- Preserve existing wells
- Fire protection
- Small storage reservoirs on canals
- Culinary water storage tanks
- Additional USBR salinity projects
- Zoning of canal rights-of-way
- Combined Roosevelt and Ballard M&I System
- Reclassification of Class 6W and 2 lands
- Uintah River storage

- Pipe K2 Canal out of Browns Draw Reservoir
- Big Sand Wash Reservoir enlargement
- Lake Fork Pipeline/Big Sand Wash Feeder
- Hancock Cove wastewater treatment
- Cedarview and West Neola culinary system
- Reclaim unused Uintah Basin water
- Brown's Draw reservoir enlargement
- Expand Moon Lake
- Green River Exchange/Water Rights

The projects are not in order of priority; available funding and staff will determine priority.

Volume 1, Part 3 — Potential Funding Alternatives

The DCWCD will, on the behalf of project beneficiaries, seek grant funds and other external funding sources for project implementation. Most of the potential funding sources allocate money by grant, but a few allocate by low-interest loan. The following information has been provided for each potential funding source:

- Funding program purpose and goals
- Key restrictions controlling funding eligibility
- Funding limitations
- Key dates
- Contact information

The inclusion of funding sources within this document does not constitute a guarantee of either funding or eligibility.

Volume 2, Part 4 — Water Rights

DCWCD recognizes that the acquisition and development of water rights is a necessary component of water conservation and management. This part was prepared to provide information about the status, priority, and place of diversion necessary to facilitate project implementation and minimize additional expenditures.

The water rights data contained in this part is organized by:

- Location;
- Priority date;
- Number; and
- First owner.

The data in Part 4 has been obtained from the Utah Division of Water Rights (UDWR) and their ARC/INFO database, WRPOD.

Volume 2, Part 5 — Water Storage Facilities

Part 5 identifies existing water storage facilities within the County.

The water storage facility data contained in this part is organized by:

- Location;
- Completion date;
- Dam number;
- Owner; and
- Name.

The data in Part 4 has been obtained from the Utah Division of Water Rights (UDWR) and their ARC/INFO database, WRDAMS.

Volume 3, Part 6 — Data

Data collected for this study was limited to available resources. The following list provides a brief summary of available data:

- U.S. Geological Survey (USGS) Digital Quad Sheets for the entire County
- Geographic Information System (GIS) data including, in part:
  - Roads
  - Water Rights information
  - Streams and rivers
  - Land ownership by group (not individuals)
  - Population centers
  - Water-related land use
  - Shallow aquifers
  - Wildlife resource data including threatened and endangered species, deer habitat, elk habitat, etc.
  - Dams
  - Springs
  - Township, range, and section data
  - Watershed boundaries
  - Weather data
- Population projections
- Agricultural crop summaries
- Soil Conservation Service (SCS) soil survey

- Crop use for irrigated crops in the Uintah Basin
- Historical flows and diversions

Volume 3, Part 7 — Tools

Additionally, CH2M HILL has provided numerous tools to assist the DCWCD in evaluating and developing cost estimates for new projects added in the CIP. These tools include:

- A crop water demand and diversion requirement estimating spreadsheet
- A municipal water demand and waste water demand estimating spreadsheet
- A pressure pipe sizing and cost estimating spreadsheet
- Open channel pipe flow nomographs
- Cost estimating guidelines for water treatment plants, wells, wastewater treatment plants, reservoirs, etc.
- ArcView GIS, version 3.2

CH2M HILL has provided training to DCWCD staff in the use of these tools.

Volume 4 — Appendices

This part contains all appendices referred to in the text.

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Acronyms

ARDL	Agricultural Resource Development Loan
Board	Board of Directors of the Duchesne County Water Conservancy District
CDBG	Community Development and Block Grant
cfs	cubic feet per second
CIB	Community Impact Board; formally known as the Permanent Community Impact Fund Board
CIP	Capital Improvements Plan
CDF	Conservation and Development Fund
County	Duchesne County
CUP	Central Utah Project
CUPCA	Central Utah Project Completion Act
CUWCD	Central Utah Water Conservancy District
CWLF	Cities Water Loan Fund
CWRMP	Comprehensive Water Resources Master Plan
DCWCD	Duchesne County Water Conservancy District
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
EQIP	Environmental Quality Improvement Program
gpcd	gallons per capita per day
gpm	gallons per minute
GIS	Geographic Information System
IABAT	Inter-Agency Biological Assessment Team
M&I	Municipal and Industrial
NEPA	National Environmental Policy Act
NRCS	Natural Resources Conservation Service, formerly SCS
O&M	Operation and Maintenance
RCF	Revolving Construction Fund

SCADA	System Control and Data Acquisition
SCS	Soil Conservation Service, now NRCS
UBAG	Uintah Basin Association of Governments
UBRP	Uintah Basin Replacement Project
UDWR	Utah Division of Water Rights
UIP	Uintah Irrigation Project
URMCC	Utah Reclamation, Mitigation, and Conservation Commission
USBR	U.S. Bureau of Reclamation
USGS	U.S. Geological Survey
USU	Utah State University
WRP	Wetlands Reserve Program
WMCP	Water Management and Conservation Plan

1.0 Introduction

1.1 Purpose

This Water Management and Conservation Plan (WMCP) has been prepared as part of the Comprehensive Water Resources Master Plan (CWRMP) under contract with the Duchesne County Water Conservancy District (DCWCD), in accordance with guidelines prepared by the U.S. Bureau of Reclamation (USBR). The purpose of the CWRMP is to summarize the available resources; identify areas where improvements could be implemented; develop potential solutions; and prepare an appropriate plan of action. This WMCP (Volume 1, Part 1 of the CWRMP) was prepared to accomplish the first two items. Volume 1, Part 2 of the CWRMP identifies specific solutions and an implementation plan.

This WMCP specifically discusses:

- Water supplies in Duchesne County (County)
- Water uses in the County
- Historic and existing water management and conservation efforts
- Water management and conservation problems
- Potential project types to facilitate solutions
- Associated legal, institutional, and environmental issues
- Adopted plan elements

1.2 Benefits of Water Conservation and Management

Water conservation has been an important part of water resource management since the early settlement periods of the western United States. For years, water conservation efforts focused on the supply of water through the construction of dams and reservoirs. Early settlers recognized that without these reservoirs, settlement in many areas would be impossible.

With continued growth and development and limited new supplies of water, the focus of water resource management has shifted to include conservation measures for existing water supplies. As a result, water conservation and improved water management has for decades been a focus of research and implementation by many agencies. This focus is seen in the inclusion of legislative water conservation requirements such as the Central Utah Project Completion Act (CUPCA), the Reclamation Reform Act, and in most federal water development programs and projects.

Research and studies completed in the Uintah Basin since the late 1960s have all discussed the benefits of agricultural water conservation in Uintah and Duchesne Counties and the Green River drainage. These studies have led to the implementation of numerous water quality programs, discussed in Section 4 of this WMCP, and of water conservation projects. Benefits of agricultural water conservation measures include:

- Increased agricultural yields
- Reduced salt loading of the river system
- Reduced accumulation of salts in the soils
- Lowered water tables
- Reduced water shortages
- Potentially decreased labor costs
- Reduced fertilizer requirements
- Potentially reduced facility requirements (smaller reservoirs, canals, pipes)
- Numerous environmental benefits

Municipal and industrial (M&I) water conservation has also become a major topic of research and studies. Water shortages, droughts, and the rapid population growth in the western United States have encouraged, and in some cases mandated, drastic evaluations and measures to reduce water demands. Over the years, efforts to reduce water demands have led to more efficient household water fixtures, improved management techniques, and numerous educational programs. Benefits recognized from these domestic water conservation efforts include:

- Extended facility life before replacement and expansion is required
- Decreased volumes of wastewater to be treated
- Increased public awareness of the value of water
- Closer monitoring of water deliveries
- Enhanced public awareness of their responsibilities to conserve water

Water conservation does not solve all problems, but a WMCP can help address differences in the water supply and demand patterns, identify methods to alleviate potential shortages, and most importantly, provide direction and focus to water conservation efforts to extend the available water supply into the future.

1.3 History of Duchesne County

1.3.1 Settlement and Growth of the County

In 1861, the entire Duchesne River drainage area, including the Rock Creek, Lake Fork, and Uinta River subbasins, was set aside as a reservation for the Ute Indian Tribe. Between 1902 and 1905, the United States government redistributed the reservation by setting aside a portion to the Utes and declaring the remaining lands as surplus. The surplus lands were returned to the public domain in 1905, opened for settlement, and awarded to individuals in 160-acre tracts. These allotments were assigned rapidly, and most of the area was settled within a few years. With settlement came the development of agricultural lands along the rivers and creeks, and the construction of diversions, canals, and ditches for irrigation. Most of these irrigation facilities were constructed by hand and with horse-drawn Fresno shovels.

In 1914, the State of Utah organized the County from parts of Uintah and Wasatch Counties and designated the town of Duchesne as the County seat. Other communities in the County include Roosevelt, Tabiona, Hanna, Altamont, Neola, Bluebell, Arcadia, and Myton.

The new county saw development and growth increase significantly due to the sale of individual land allotments by Ute Indians to non-Indians, the sale of excess allotment lands by the Uintah and Ouray Indian Agency (1914 to 1922) to non-Indians, and the introduction and development of the oil and gas industry. The first commercial natural gas well was developed in 1925 in the Ashley Valley, and the first commercial oil well in the Uintah Basin and the State of Utah was drilled in 1948. Oil production peaked in the mid-1980s at approximately 18 million barrels per year. In 1997, there were 923 active oil wells in the County, with 68 new wells having been drilled in 1996 alone. Although wells continue to be developed, annual production has declined to about 9 million barrels per year, approximately half of the production of the mid-1980s.

1.3.2 Development of Water Resources

During the initial settlement of the Uintah Basin by non-Indians, water delivery systems were needed to bring land into agricultural production. Under the Act of June 21, 1906, the U.S. Congress approved and ordered the construction of the Uintah Irrigation Project (UIP) primarily for the benefit of the Ute Indian Tribe. The canals and distribution systems were designed to serve 77,095 acres. Capacity was later added to serve an additional 28,000 acres of land outside the project boundaries. This canal system consisted of 22 distinct canal systems serving lands from the Uinta River, Duchesne River, Lake Fork River, and Whiterocks River (*A Study of Economic Conditions on the Uintah Irrigation Project*, 1938).

At the same time the UIP was being constructed, newly-arrived non-Indian settlers were also constructing facilities to deliver water to their farms. Many of these facilities paralleled government facilities, although some were allowed to enter in and enlarge UIP facilities. By 1938, there were 30 independent canal companies within the boundaries of the original reservation, with the largest being the Dry Gulch Irrigation Company.

In 1928, the seven Colorado River States signed the Colorado River Compact in which they agreed to share the river water and determined allotments for each state. This provided a proportionate amount of water for Utah, but did not provide a mechanism for its utilization.

Because of inadequate supplies and storage in the Uintah Basin, the USBR initiated a reconnaissance study in 1931 to identify potential sites for a dam on the Lake Fork River. Moon Lake Reservoir was completed in 1937, and the Moon Lake Project was finished in subsequent years. This project also included the Yellowstone Feeder Canal, Duchesne Feeder Canal, Midview Reservoir, and associated facilities. The Moon Lake Water Users Association was organized to assume responsibility for the repayment of the project. This association consisted of the Dry Gulch Irrigation Company, T. N. Dodd Canal, Monarch Canal and Reservoir, Lake Fork Irrigation Company, Farmers Irrigation Company, Farnsworth Canal and Reservoir, Lake Fork Western Company, Uteland Ditch, and South Boneta Irrigation Company.

The Central Utah Project (CUP) was authorized by the Colorado River Storage Project Act of 1956, which allowed for the funding and initiation of the CUP and the construction of facilities to deliver and utilize this water. The CUP finally allowed the State to facilitate development of its Colorado River rights.

The Upalco and Uintah Units of the CUP were authorized in the Colorado River Basin Project Act of 1968. These projects have since been amended and updated through various

congressional acts to the present-day Section 203 Project. These projects were intended to deliver water to the Ute Indian Tribe and for others' irrigation uses, M&I purposes, recreation, and environmental mitigation and enhancements.

During the early 1990s, a need was identified to help develop, manage, and conserve the water resources in the County and to provide an interface with the Central Utah Water Conservancy District (CUWCD) and federal and State agencies while completing the CUP. The DCWCD was organized in December of 1997 in response to this need.

1.3.3 Historic and Projected Population Trends

Table 1-1 summarizes the historic and projected population of the County, based on data from the Governor's office and the Uintah Basin Association of Governments (UBAG) as published on the State of Utah's web page. Population in the County has been highly variable, as the area is subject to economic fluctuations. Growth in the Uintah Basin is and has been subject to several unpredictable conditions including growth in the oil industry, the development of improved technology for obtaining oil from the oil shale, continued growth of the high-tech industries, the continued influx of retirement communities, and the growing recreational industry.

The Utah State Governor's office has published population projections and trends for the individual areas in the County through the year 2020, and are shown in Table 1-2.

1.3.4 Historically Irrigated Acreage

Numerous historic data exist reporting the type and quantity of predominant agricultural crops throughout the Uintah Basin. Primary data sources used in this WMCP include the Natural Resource Conservation Service (NRCS) soil survey for Duchesne and Uintah Counties (December 1959) and the Water-Related Land Use Inventories, Utah, Uintah Study Unit (May 1994). Summaries of the historic cropping patterns are provided in Table 1-3.

TABLE 1-1
Duchesne County Historic and Projected Population

Year	Population	Growth (%)
1940	8,700	--
1950	8,100	-6.9%
1960	7,200	-12.5%
1970	7,400	2.8%
1980	12,700	71.6%
1990	12,600	-0.7%
1998	14,736	17%
2000	14,390	-2.6%
2005	14,998	4.2%
2010	16,307	8.7%
2020	18,894	15.7%

TABLE 1-2
Duchesne County Population Projections by Area

Area	1997	1998	1999	2000	2001	2002	2003	2010	2020
Altamont	190	192	192	193	194	195	198	219	254
Duchesne	1,436	1,447	1,453	1,459	1,466	1,476	1,495	1,653	1,916
Myton	515	519	521	523	526	529	536	593	687
Roosevelt	4,259	4,292	4,309	4,328	4,350	4,378	4,435	4,905	5,683
Tabiona	136	137	137	138	139	139	141	156	181
Other	7,624	7,683	7,715	7,749	7,788	7,838	7,891	8,781	10,174
Total	14,159	14,269	14,327	14,390	14,463	14,557	14,696	16,307	18,894

TABLE 1-3
Historically Irrigated Acreage

Crop	1939 Acres[1]	1949 Acres[1]	1954 Acres[1]	1992 Acres[2]
Alfalfa/Hays	25,719	33,845	33,668	46,959
Pasture	Unknown	Unknown	Unknown	48,919
Grain	10,129	11,716	6,234	6,583
Corn	2,132	2,452	2,575	2,550
Potatoes	177	145	178	7
Fruits and Vegetables	3,276	4,501	1,819	3

[1] NRCS Soil Survey, December 1959. It should be noted that this survey does not include any data on irrigated pastures within the Uintah Basin.

[2] Water-Related Land Use Inventories, Utah, Uintah Study Unit, UDWR, Department of Natural Resources, 1994.

1.4 Duchesne County Water Conservancy District

By definition, the boundaries of the DCWCD coincide with the boundaries of the County. This section summarizes the mission, organization, funding sources, and ongoing activities of the DCWCD.

1.4.1 Mission

The mission of the DCWCD is to:

- Acquire, develop, conserve and where necessary preserve water resources identified as necessary to accomplish the purposes of the DCWCD
- Construct, operate and maintain facilities associated with these water resources and such other facilities as are necessary to the functioning of the DCWCD
- Preserve, where necessary, stream and/or watershed ecosystems to maintain water quality standards and aquatic ecosystem balances
- Maintain responsible management of the DCWCD's physical facilities, financial, water and human resources

This mission is accomplished by the implementation of the DCWCD's policy, stating:

> *"It is the District's policy to develop and conserve water supplies for the benefit of its inhabitants through the most cost effective and environmentally prudent methods. The water supplies shall be developed for any and all beneficial uses consistent with the mission and statutory authority of the District. In furtherance of this policy, water rights shall be acquired by any lawful means and used for any lawful beneficial use, including without limitation, irrigation, municipal, industrial, hydropower generation and instream flows."*
> *(U.C. 17A-2-1401)*

This water conservation and management plan has been prepared to comply with these goals and the policy of the DCWCD.

1.4.2 Organization

The DCWCD is governed by a Board of Directors (Board) appointed by the County Commissioners, based upon designated areas of representation. Table 1-4 shows the current Board organization and the division each member represents.

TABLE 1-4
DCWCD Board Organization

Board Member	Area of Representation
Keith Mortensen, Chairman	Moon Lake Division
Art Taylor (Duchesne), Vice-Chairman	Combined Cities Division
Brad Hancock (Roosevelt)	Combined Cities Division
Kent Peatross	Duchesne/Strawberry Division
Max Warren	Uintah Division
Ed Bench	Duchesne/Strawberry Division
Lynn Burton	Moon Lake Division

Each Board member is appointed by the County Commissioners for a term of four years and is eligible for reappointment. In the case of a Board member not being able to finish his/her appointment, a replacement is selected by the County Commissioners.

Board members' responsibilities include attending monthly Board meetings to participate in the planning, discussions, and decision process of the DCWCD. Each Board member is provided copies of all documents on the agenda, and is allowed to provide their individual insights and recommendations. All decisions are based on a majority vote of the seven Board members. Additionally, some board members are assigned to the Executive Committee and are responsible for providing guidance to the DCWCD, assisting in negotiations, and providing direct supervision to the General Manager.

The General Manager and Secretary/Treasurer, Randy Crozier, is hired by the Board as a contract employee. Mr. Crozier is responsible for implementing the instructions and responding to requests of the Board and representing the DCWCD in meetings, negotiations, and day-to-day operations. He answers directly to the Chairman of the Board, and to the Board as a whole during meetings.

Adrienne Marett, Administrative Assistant, reports directly to the General Manager. She keeps track of all meeting minutes and supports the General Manager in his duties.

There are currently no other employees of the DCWCD.

1.4.3 Financial Resources

The DCWCD receives its base funding from taxes upon the annual land valuation within the County. The DCWCD receives a tax of up to 0.0004 percent of the assessed land value, the maximum allowed by the Colorado River Compact for water conservancy districts in the Upper Colorado River Basin states. Currently, there are no other sources of regular funds directly available to the DCWCD.

Other funding comes from grants and loans from federal, State, and local agencies. The DCWCD has been successful in obtaining funding from the USBR Salinity Control Program, Community Impact Board (CIB, formally known as the Permanent Community Impact Fund Board), Community Development and Block Grant (CDBG), and the CUWCD. It is expected that some of these agencies will continue to make funding available. These funds are typically available to the DCWCD on a competitive basis; this limits the ability of the DCWCD to rely on these revenue sources.

To help understand the operations and restrictions faced by the DCWCD at present, summaries of the 1999-2000 funding sources and budgeted expenditures are included in the following tables. Table 1-5 summarizes the various sources of funding for the DCWCD in Fiscal Year 1999-2000. Note that funding from the CIB, CUWCD, USBR, CDBG, and others is usually earmarked for specific projects. As previously mentioned, the only reliable funding source is tax revenues.

TABLE 1-5
DCWCD Funding for Fiscal Year 1999-2000

Funding Source	Amount
Tax Revenue	$233,000
Grant Revenues	$155,000
Grant Funds	$500,000
Safe Drinking Water Funds	$2,000

Table 1-6 summarizes the budgeted expenditures of the DCWCD for Fiscal Year 1999-2000. Administrative costs, including salary, benefits, rent, insurance, and utilities, consume most of the available tax revenue.

TABLE 1-6
DCWCD Budgeted Expenditures for Fiscal Year 1999–2000

Budgeted Expenditures	Amount
Administration	$161,500
Capital Expenditures	$605,000
Operations and Maintenance	$0
Project Development	$123,500

Projects must be funded externally, by grants or other sources, until the DCWCD can develop additional, regular revenue sources.

1.4.4 Ongoing Activities

The DCWCD is currently involved with the following ongoing projects:

- Replacement of diversion structures on the Duchesne and Strawberry Rivers, funded by the CUPCA environmental mitigation program through the Utah Reclamation, Mitigation, and Conservation Commission (RMCC)
- Salinity project for five pipelines, funded by USBR Salinity Control Program
- Green River Filings/Exchange, funded by CUWCD and CIB
- Comprehensive Water Resource Master Plan, funded by CIB, USBR, CDBG, and the DCWCD administrative budget
- Uintah Basin Replacement Project (UBRP) coordination, funded in part by CUWCD, the Department of the Interior, and the DCWCD administrative budget

With the exception of the Green River Filings/Exchange and the CWRMP, most projects currently being implemented by the DCWCD are in support of other water users and suppliers within the County.

2.0 Inventory of Water Resource Supplies and Use

2.1 Introduction

A primary objective of the DCWCD is to coordinate and support efforts by other agencies within the County to conserve water, improve water resource management, and develop new water resources. Although the DCWCD does not directly manage any water resources in the County, this section provides a summary of the surface water and groundwater resources available in the County, and how those resources are used. A clear understanding of existing water supplies and uses will allow the DCWCD to better define areas where it can provide water management assistance to other agencies.

A detailed listing of all currently effective water right filings is included in *Volume 2, Comprehensive Water Resources Master Plan, Part 4, Water Rights Filings*.

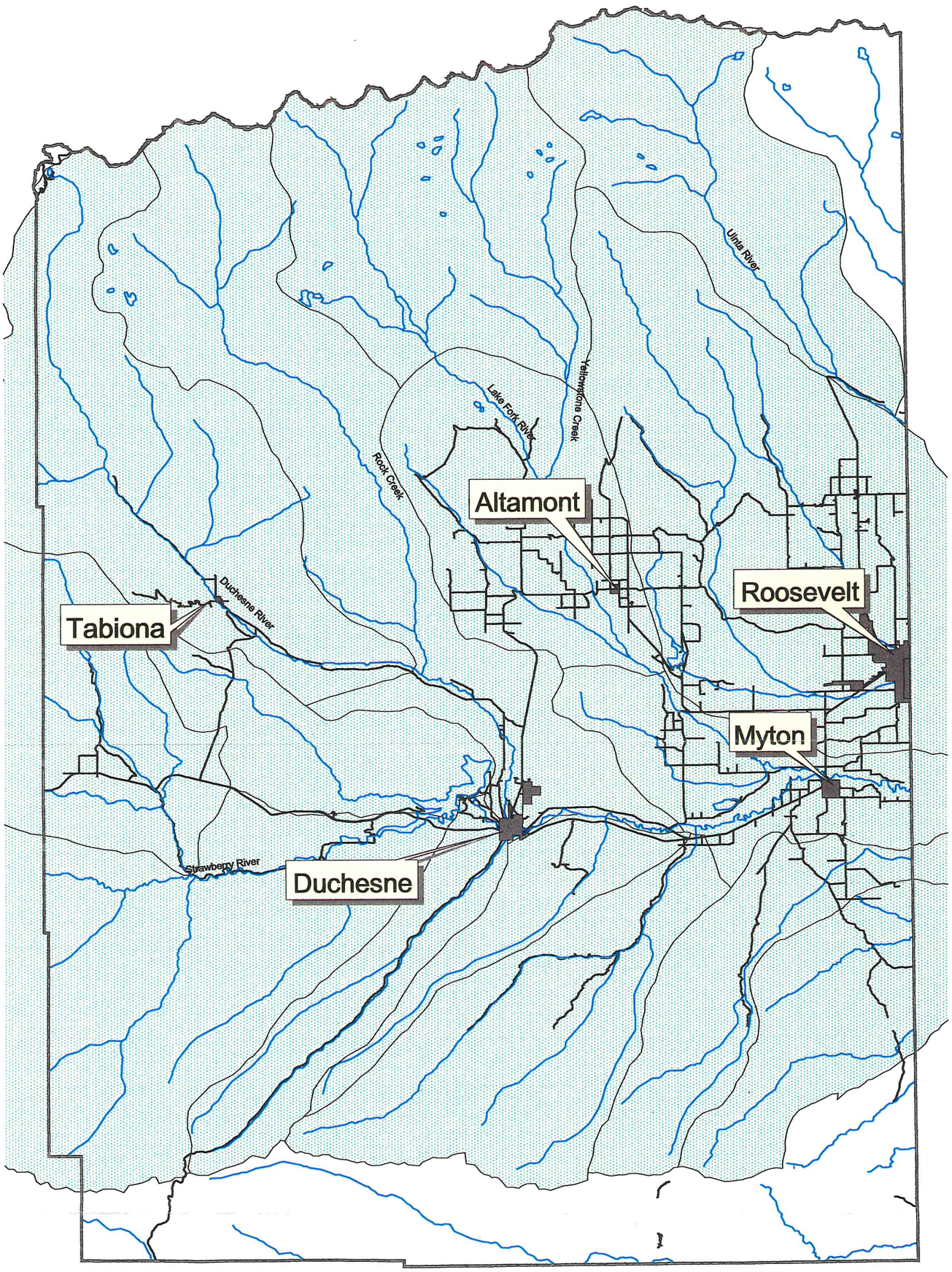
2.2 Water Supplies

There are two primary sources of water for use in the County: 1) surface water from the Duchesne River and its tributaries, and 2) groundwater from shallow aquifers. A summary of these two water supplies is provided below.

2.2.1 Surface Water

The Duchesne River drainage basin is the primary source of surface water in the County. This drainage basin encompasses approximately 240 square miles, and is part of the greater Uintah Basin which drains to the Green River. Figure 2-1 shows the approximate boundaries of the Duchesne River Drainage Basin.

Water in the Duchesne River and its tributaries originates from snowmelt in the Uinta Mountain Wilderness and summer rains across the Uintah Basin. Flow in streams sharply increases in early to mid-May, and sharply decreases in mid- to late July, coinciding with the spring snowmelt. By mid-August, flows generated by snowmelt diminish and the rivers return to their base-flow conditions. A representative annual hydrograph for the Uinta River at Neola illustrates a flow cycle representative of the streams in the Duchesne River drainage basin (see Figure 2-2). Table 2-1 shows the values represented in Figure 2-2.



Legend

- Duchesne River Drainage Basin
- County Boundary
- Streams and Lakes
- Roads

N

Not To Scale

SOURCE: UTAH DIVISION OF WATER RIGHTS AND AGRC

FIGURE 2-1
DUCHESNE RIVER DRAINAGE BASIN EFFECTING DUCHESNE COUNTY

DCWCD Comprehensive Water Resources Master Plan
Part 1, Water Conservation and Management Plan

NOTE: Attributes of Drainage Basin are based upon best available information.

CH2MHILL

p://155071/ComprehensiveMasterPlan/Reports/WaterConservation/WC1figs.apr

FIGURE 2-2
Typical Distribution of Annual Flow for the Uinta River, Utah (1979-1980)

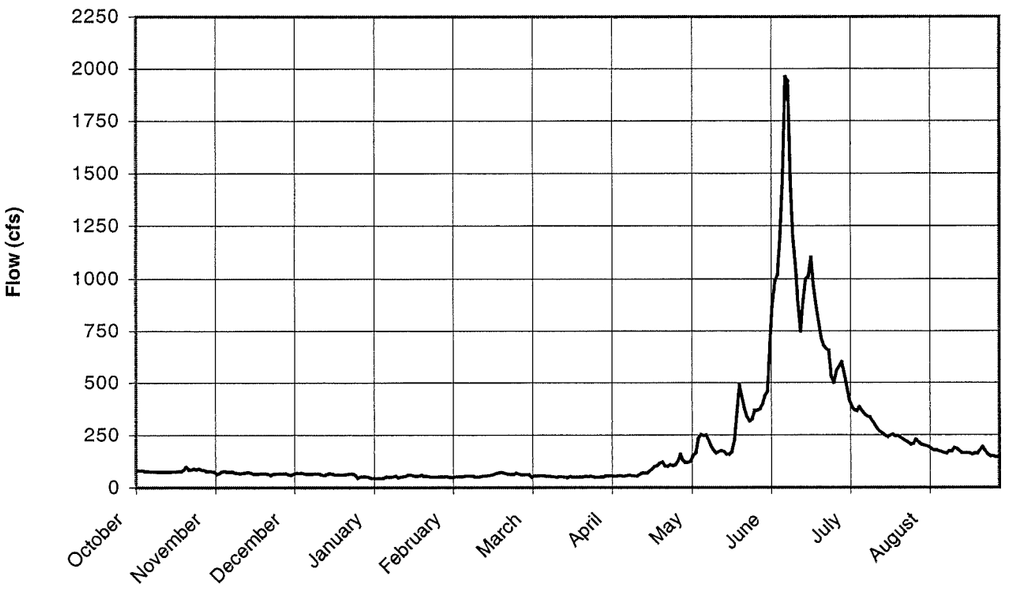


TABLE 2-1
Typical Distribution of Annual Flow for the Uinta River, Utah (1979-1980)

Date	Flow (cfs)	Date	Flow (cfs)	Date	Flow (cfs)	Date	Flow (cfs)
10/1/1979	82	11/11/1979	68	12/22/1979	63	2/1/1980	49
10/2/1979	80	11/12/1979	70	12/23/1979	65	2/2/1980	51
10/3/1979	80	11/13/1979	72	12/24/1979	65	2/3/1980	52
10/4/1979	78	11/14/1979	70	12/25/1979	58	2/4/1980	52
10/5/1979	78	11/15/1979	66	12/26/1979	46	2/5/1980	52
10/6/1979	76	11/16/1979	65	12/27/1979	50	2/6/1980	53
10/7/1979	76	11/17/1979	65	12/28/1979	52	2/7/1980	56
10/8/1979	76	11/18/1979	66	12/29/1979	52	2/8/1980	56
10/9/1979	74	11/19/1979	66	12/30/1979	50	2/9/1980	53
10/10/1979	74	11/20/1979	66	12/31/1979	46	2/10/1980	50
10/11/1979	74	11/21/1979	64	1/1/1980	45	2/11/1980	51
10/12/1979	74	11/22/1979	58	1/2/1980	44	2/12/1980	52
10/13/1979	74	11/23/1979	63	1/3/1980	44	2/13/1980	53
10/14/1979	74	11/24/1979	65	1/4/1980	44	2/14/1980	55
10/15/1979	76	11/25/1979	66	1/5/1980	45	2/15/1980	57
10/16/1979	76	11/26/1979	66	1/6/1980	50	2/16/1980	59
10/17/1979	78	11/27/1979	66	1/7/1980	50	2/17/1980	62
10/18/1979	78	11/28/1979	66	1/8/1980	50	2/18/1980	66
10/19/1979	84	11/29/1979	62	1/9/1980	52	2/19/1980	70
10/20/1979	98	11/30/1979	60	1/10/1980	54	2/20/1980	72
10/21/1979	86	12/1/1979	65	1/11/1980	48	2/21/1980	70
10/22/1979	86	12/2/1979	68	1/12/1980	50	2/22/1980	66
10/23/1979	88	12/3/1979	68	1/13/1980	52	2/23/1980	64
10/24/1979	86	12/4/1979	68	1/14/1980	55	2/24/1980	63
10/25/1979	88	12/5/1979	66	1/15/1980	60	2/25/1980	64
10/26/1979	84	12/6/1979	63	1/16/1980	58	2/26/1980	68
10/27/1979	82	12/7/1979	65	1/17/1980	56	2/27/1980	65
10/28/1979	78	12/8/1979	65	1/18/1980	54	2/28/1980	62
10/29/1979	78	12/9/1979	66	1/19/1980	56	2/29/1980	62
10/30/1979	76	12/10/1979	66	1/20/1980	58	3/1/1980	62
10/31/1979	72	12/11/1979	65	1/21/1980	54	3/2/1980	61
11/1/1979	63	12/12/1979	60	1/22/1980	54	3/3/1980	51
11/2/1979	68	12/13/1979	58	1/23/1980	52	3/4/1980	56
11/3/1979	74	12/14/1979	64	1/24/1980	51	3/5/1980	56
11/4/1979	78	12/15/1979	66	1/25/1980	51	3/6/1980	57
11/5/1979	74	12/16/1979	65	1/26/1980	51	3/7/1980	57
11/6/1979	74	12/17/1979	62	1/27/1980	52	3/8/1980	57
11/7/1979	74	12/18/1979	62	1/28/1980	52	3/9/1980	54
11/8/1979	70	12/19/1979	62	1/29/1980	52	3/10/1980	53
11/9/1979	68	12/20/1979	62	1/30/1980	52	3/11/1980	52
11/10/1979	66	12/21/1979	62	1/31/1980	49	3/12/1980	50

TABLE 2-1 (CONT'D)
Typical Distribution of Annual Flow for the Uinta River, Utah (1979-1980)

	Flow (cfs)	Date	Flow (cfs)	Date	Flow (cfs)	Date	Flow (cfs)
3/13/1980	49	4/25/1980	101	7/17/1980	265	8/29/1980	149
3/14/1980	52	4/26/1980	107	7/18/1980	257	8/30/1980	149
3/15/1980	51	4/27/1980	104	7/19/1980	249	8/31/1980	145
3/16/1980	49	4/28/1980	109	7/20/1980	241	9/1/1980	145
3/17/1980	47	4/29/1980	126	7/21/1980	249	9/2/1980	145
3/18/1980	52	4/30/1980	156	7/22/1980	253	9/3/1980	135
3/19/1980	50	5/1/1980	132	7/23/1980	245	9/4/1980	119
3/20/1980	50	5/2/1980	120	7/24/1980	245	9/5/1980	115
3/21/1980	51	5/3/1980	120	7/25/1980	237	9/6/1980	122
3/22/1980	51	5/4/1980	127	7/26/1980	229	9/7/1980	135
3/23/1980	51	5/5/1980	152	7/27/1980	221	9/8/1980	149
3/24/1980	53	5/6/1980	163	7/28/1980	213	9/9/1980	145
3/25/1980	52	5/7/1980	234	7/29/1980	205	9/10/1980	233
3/26/1980	53	5/8/1980	253	7/30/1980	209	9/11/1980	229
3/27/1980	50	5/9/1980	249	7/31/1980	229	9/12/1980	213
3/28/1980	49	5/10/1980	250	8/1/1980	217	9/13/1980	197
3/29/1980	49	5/11/1980	223	8/2/1980	205	9/14/1980	185
3/30/1980	51	5/12/1980	195	8/3/1980	201	9/15/1980	169
3/31/1980	50	5/13/1980	177	8/4/1980	197	9/16/1980	161
4/1/1980	56	5/14/1980	163	8/5/1980	193	9/17/1980	153
4/2/1980	55	5/15/1980	171	8/6/1980	185	9/18/1980	149
4/3/1980	55	5/16/1980	175	8/7/1980	177	9/19/1980	142
4/4/1980	54	5/17/1980	171	8/8/1980	177	9/20/1980	138
4/5/1980	53	5/18/1980	158	8/9/1980	173	9/21/1980	142
4/6/1980	57	5/19/1980	157	8/10/1980	169	9/22/1980	138
4/7/1980	56	6/29/1980	500	8/11/1980	165	9/23/1980	135
4/8/1980	53	6/30/1980	558	8/12/1980	161	9/24/1980	132
4/9/1980	57	7/1/1980	579	8/13/1980	173	9/25/1980	128
4/10/1980	59	7/2/1980	600	8/14/1980	173	9/26/1980	128
4/11/1980	57	7/3/1980	544	8/15/1980	189	9/27/1980	125
4/12/1980	56	7/4/1980	476	8/16/1980	185	9/28/1980	122
4/13/1980	54	7/5/1980	416	8/17/1980	173	9/29/1980	122
4/14/1980	61	7/6/1980	385	8/18/1980	165	9/30/1980	119
4/15/1980	68	7/7/1980	370	8/19/1980	165		
4/16/1980	69	7/8/1980	365	8/20/1980	165		
4/17/1980	70	7/9/1980	385	8/21/1980	161		
4/18/1980	79	7/10/1980	365	8/22/1980	157		
4/19/1980	89	7/11/1980	350	8/23/1980	161		
4/20/1980	99	7/12/1980	340	8/24/1980	161		
4/21/1980	105	7/13/1980	335	8/25/1980	177		
4/22/1980	115	7/14/1980	315	8/26/1980	193		
4/23/1980	121	7/15/1980	296	8/27/1980	173		
4/24/1980	103	7/16/1980	278	8/28/1980	157		

During the development of agricultural resources in the County, several reservoirs were constructed to store a portion of the natural spring flood flow for use during the latter part of the growing season. This has helped alleviate seasonal water shortages due to naturally fluctuating low river flows. The locations of most of the reservoirs, as reported by the Utah Division of Water Rights (UDWR), are shown in Figure 2-3. Unfortunately, most of the reservoirs are too small to provide significant relief from seasonal shortages and provide very little drought protection.

Table 2-2 summarizes the average annual surface water supply provided by each drainage subbasin as reported in the *State Water Plan* (1999). These figures exclude flows that are diverted to Uintah County and the Wasatch Front.

TABLE 2-2
Annual Water Summary

River	Average Annual Supply[5]
Uinta[1]	194,500 acre-feet
Lake Fork[2]	192,000 acre-feet
Strawberry[3]	103,700 acre-feet
Duchesne[4]	195,000 acre-feet

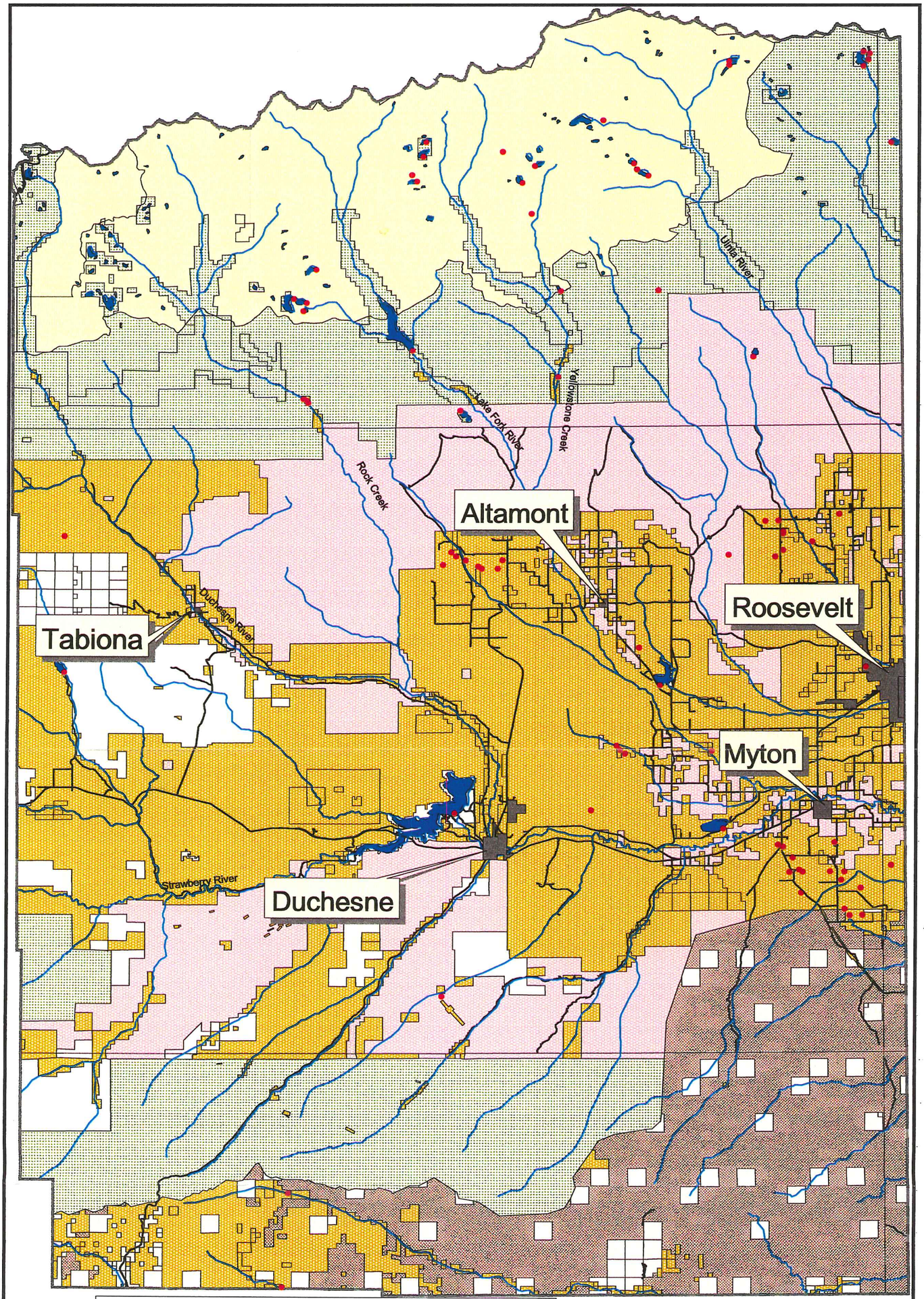
Notes:
1) Includes inflows to the Uinta and Whiterocks Rivers
2) Includes inflows to the Lake Fork and Yellowstone Rivers
3) Includes inflows to the Strawberry River below Strawberry Reservoir, and Current and Red Creeks
4) Excludes transbasin diversions out of the Duchesne River
5) Excludes transbasin diversion flows and diversions to Uintah County

Flows in each river basin are available to users with appropriate County water rights filings. It is important to note that a significant portion of the annual water supply is conveyed during the natural spring flood cycle, and cannot be utilized without storage reservoirs.

Figure 2-4, from the *State Water Plan*, shows the water balance of the Duchesne River System including parts of Uintah, Summit, Wasatch, and Daggett Counties. The relationship of the Duchesne River to the remainder of the Green River Drainage and the Uintah Basin is shown in Figure 2-5, also from the *State Water Plan*.

2.2.2 Groundwater

Soil materials within most of the County are derived from consolidated marine shales deposited during the tertiary and quaternary geologic periods. During the tertiary period, vast amounts of water filled the Uintah Basin forming what is commonly known as Lake Uintah. Over time, sediment materials were deposited and various geologic layers were created. Three major formations were developed from these materials during the tertiary period: the Green River (deepest), the Uinta, and the Duchesne River (shallowest). The combined tertiary formation tends to be very thick, often greater than 10,000 feet.



Legend

- Duchesne County Dams
- County Boundary
- Streams and Lakes
- Roads

County-ownership

- BLM
- FOREST SERVICE
- NATIVE AMERICAN RESERVATIONS
- PRIVATE
- STATE
- WATER
- WILDERNESS AREA

N

Not To Scale

FIGURE 2-3
DUCHESNE COUNTY DAMS

DCWCD Comprehensive Water Resources Master Plan
Part 1, Water Conservation and Management Plan

NOTE: Locations of dams and reservoirs are based upon best available information.
Some dams may not contain a reservoir.

SOURCE: UTAH DIVISION OF WATER RIGHTS AND AGRC

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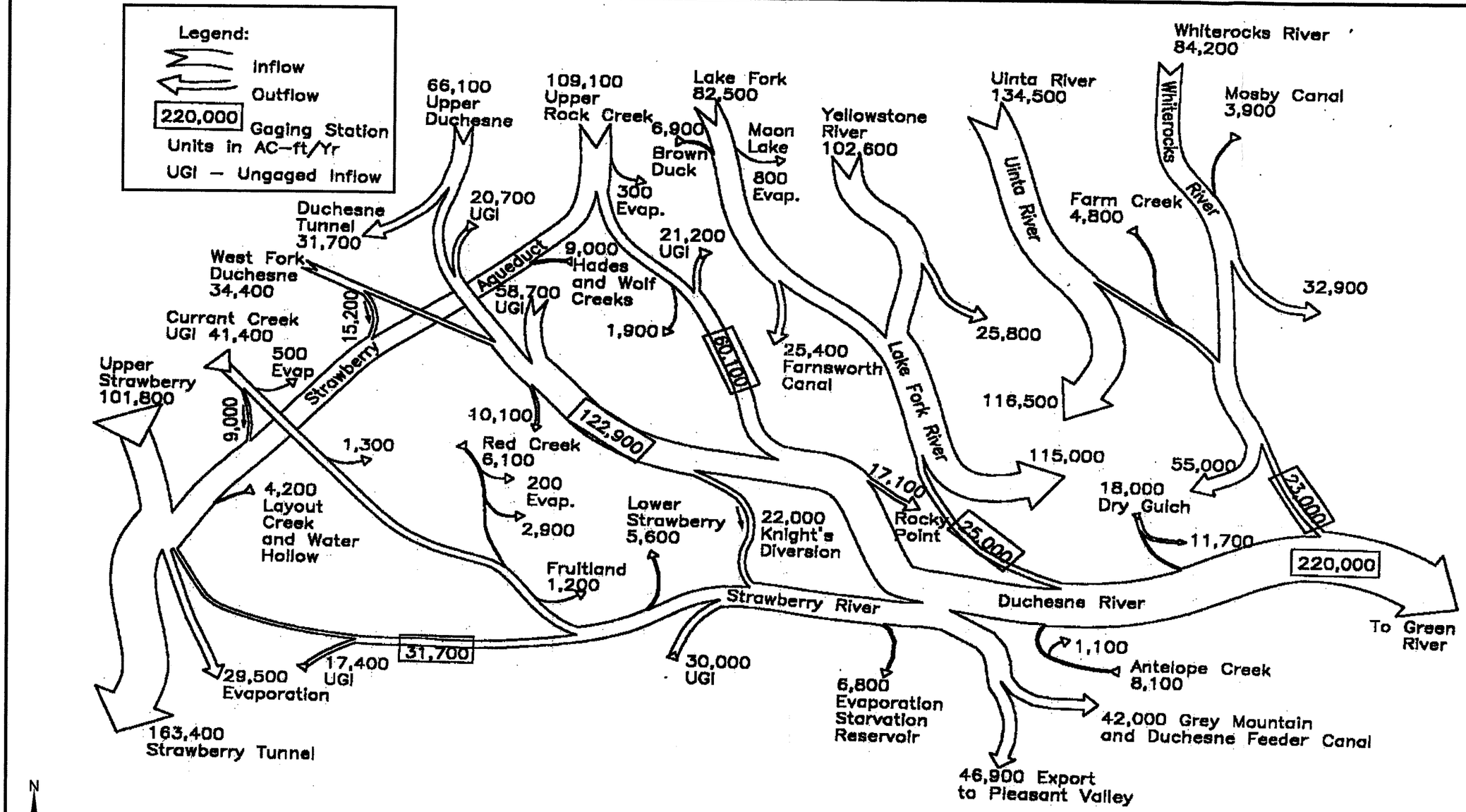


NOTE: Attributes of Water Balance are based upon best available information.

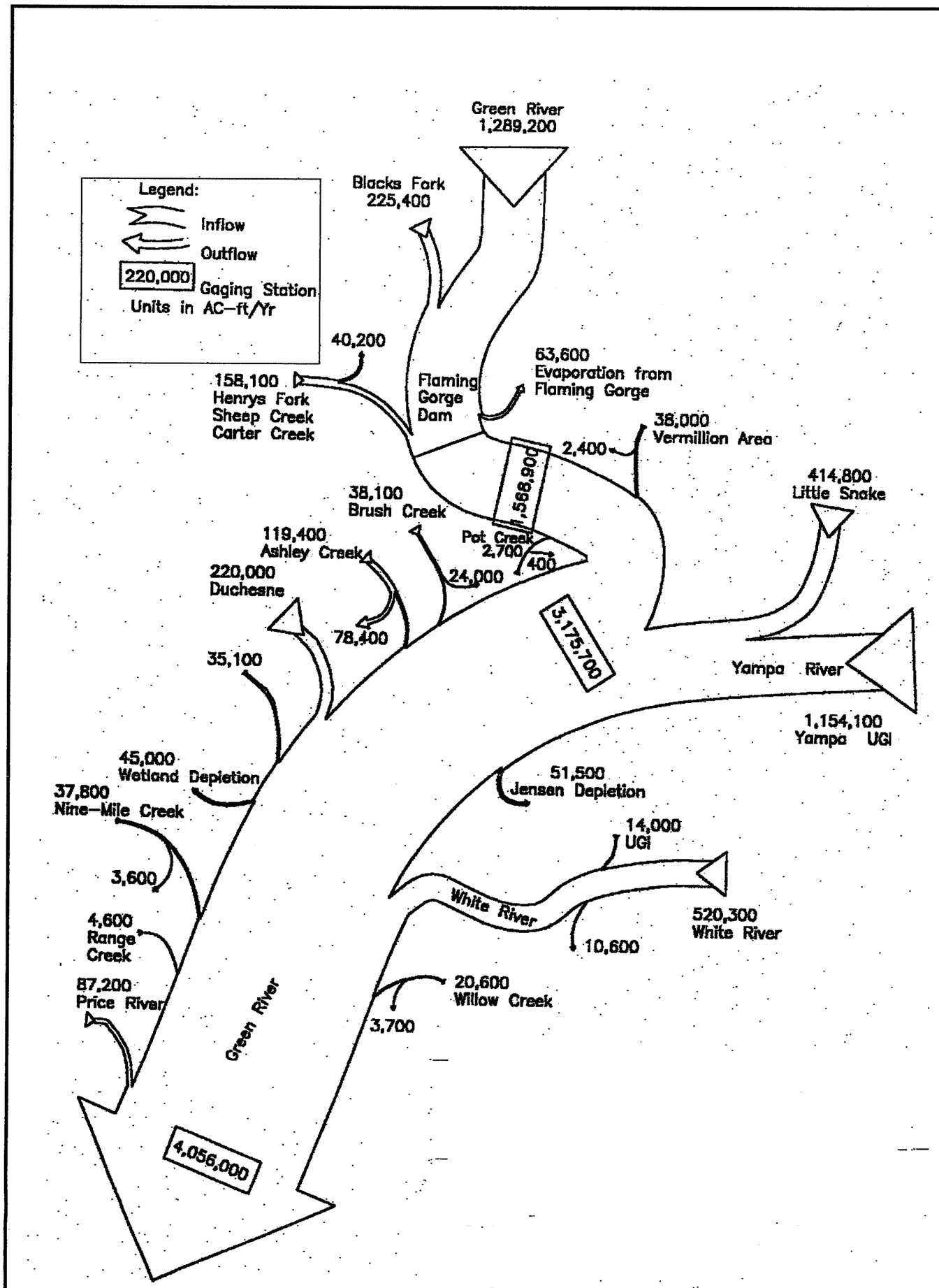
SOURCE: UTAH DIVISION OF WATER RESOURCES, STATE WATER PLAN, UINTAH BASIN

p://155071/ComprehensiveMasterPlan/Reports/WaterConservation/WCfigs.apr

FIGURE 2-4
DUCHESNE RIVER WATER BALANCE

DCWCD Comprehensive Water Resources Master Plan
Part 1, Water Conservation and Management Plan

CH2MHILL


Green River
1,289,200
Legend:
Inflow
Outflow
220,000
Gaging Station
Units in AC-ft/Yr
Blacks Fork
225,400
40,200
158,100
Henrys Fork
Sheep Creek
Carter Creek
Flaming
Gorge
Dam
63,600
Evaporation from
Flaming Gorge
38,000
Vermillion Area
2,400
1,568,900
414,800
Little Snake
38,100
Brush Creek
119,400
Ashley Creek
Pot Creek
2,700
400
24,000
220,000
Duchesne
78,400
3,175,700
35,100
Yampa River
1,154,100
Yampa UGI
45,000
Wetland Depletion
37,800
Nine-Mile Creek
51,500
Jensen Depletion
14,000
UGI
3,600
White River
520,300
White River
4,600
Range
Creek
10,600
87,200
Price River
20,600
Willow Creek
3,700
Green River
4,056,000
N
SOURCE: UTAH DIVISION OF RESOURCES,
WATER RIGHTS, UINTAH BASIN
Not To Scale
FIGURE 2-5
GREEN RIVER WATER
BALANCE
DCWCD Comprehensive Water Resources Master Plan
Part 1, Water Conservation and Management Plan
NOTE: Attributes of Green River Water Balance
are based upon best available information.
CH2MHILL
p://155071/ComprehensiveMasterPlan/Reports/WaterConservation/WCfigs.apr

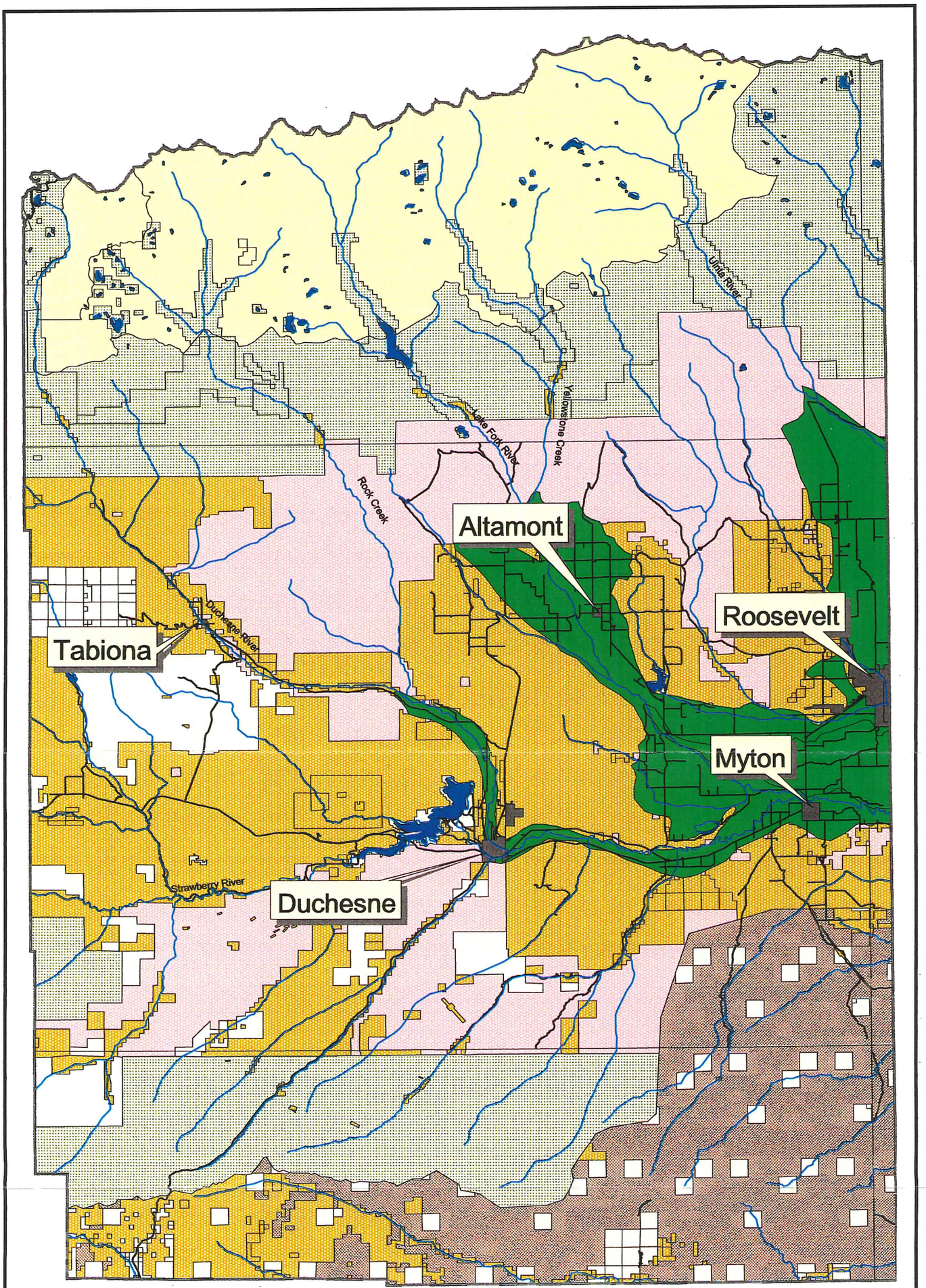
During periods of glacial action and subsequent alluvial action these formations have been highly eroded, creating the benches, upland mesas, broad valleys, and narrow alluvial fans fringing the valleys within the County. Additional variations have been created by glacial and alluvial outwash from the mountains, depositing areas of unconsolidated gravel, cobbles, and coarse sands commonly located along the ancient river channels.

In Utah, unconsolidated, valley-fill materials have traditionally been the best producers of groundwater. However, in the Uintah Basin, there are few unconsolidated aquifers due to the nature of the geologic formations. The most extensive unconsolidated aquifers are found in the Duchesne-Myton-Pleasant Valley areas and in the plains east of Neola. The remaining unconsolidated aquifers are found either in the bottoms of mountain canyons or stream valleys, or as discontinuous caps on terraces. Most of these deposits are less than 50 to 70 feet thick and are referred to as shallow aquifers (see Figure 2-6 for aquifer locations). Wells and springs located in the unconsolidated aquifers are typically found to yield unpredictable flows, ranging from less than 10 gallons per minute (gpm) to greater than 1,000 gpm (*State Water Plan*). Unfortunately, very few wells in the County yield more than 500 gpm.

Due to the few, inconsistent, and unconsolidated aquifers in the County the primary groundwater sources are restricted to the consolidated or bedrock aquifers. Confined, consolidated aquifer conditions exist in about 90 percent of the Uintah Basin, underlain by sedimentary rock. In these aquifers the potential yields are highly variable, being affected by folding and faulting which either fractures (enhance groundwater yields) or offsets (reduce groundwater yields) the aquifer. According to the *State Water Plan*, the best formations in which to find groundwater are the Browns Park, Duchesne River, Uinta, Currant Creek, and Morgan formations; Nugget/Navajo sandstone; and Weber quartzite.

Based on the geologic investigations of the formations within the Uintah Basin and a groundwater budget completed by the U.S. Geological Survey (USGS), it is estimated that the Uintah Basin, as a whole, has a total annual groundwater supply of about 630,000 acre-feet (*State Water Plan*). Of this supply, the State estimates that only approximately 21,000 acre-feet are accounted for by wells, while approximately 363,000 acre-feet are accounted for by seepage into streams and discharge from springs. Wetland vegetation is estimated to consume the remainder of the water through evapotranspiration. As the water budget shows, on a County-wide basis this resource is highly underdeveloped.

Although the USGS and the State have not addressed water quality in their groundwater studies, salinity is often a major hindrance to groundwater development in the County. High salinity concentrations in the consolidated aquifers, commonly in excess of 2,000 mg/L, render it unsuitable for domestic, industrial, or agricultural purposes. This problem limits the extent of potential groundwater development to the unconsolidated aquifers, areas near aquifer recharge, or consolidated formations that tend to have lower salinity concentrations. According to the UDWR, the unconsolidated outwash plains near Neola and river floodplains are the best areas in which to develop groundwater in the County. The coarse-grained alluvial and glacial outwash materials are most likely to provide good yields of fresh to slightly saline water. Of the consolidated formations discussed above, the Glen Canyon (Nugget) and Weber quartzite formations are the



Legend

- Shallow Groundwater
- County Boundary
- Streams and Lakes
- Roads

County-ownership

- BLM
- FOREST SERVICE
- NATIVE AMERICAN RESERVATIONS
- PRIVATE
- STATE
- WATER
- WILDERNESS AREA

N

Not To Scale

FIGURE 2-6
DUCHESNE COUNTY SHALLOW AQUIFERS

DCWCD Comprehensive Water Resources Master Plan
Part 1, Water Conservation and Management Plan

NOTE: Attributes of Shallow Aquifers are based upon best available information.

SOURCE: UTAH DIVISION OF WATER RIGHTS AND AGRC

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confined aquifer formations most likely to provide water of sufficient yields and quality for agricultural, municipal, and industrial use. The Browns Park, Currant Creek, Morgan, and Uinta Mountain formations may provide water of sufficient quality, although the yields may be insufficient for purposes other than domestic or stock watering.

2.3 Current Water Uses

2.3.1 Surface Water

Of the surface water supplies available for diversion within the County, approximately 543,760 acre-feet are presently developed. This includes diversions to the Wasatch Front (*State Water Plan*, Uintah Basin, Final Draft, August 1999, pp. 5-8). Surface water uses can be divided into the five categories shown in Table 2-3: exported water, agricultural water use, culinary water use, secondary water use, and instream flow requirements.

TABLE 2-3
Surface Water Uses

Water Use	Yearly Consumption
Exported Water	195,100 acre-feet
Agricultural Water Use	537,100 acre-feet
Culinary Water Use	500 acre-feet
Secondary Water Use	1,050 acre-feet
Instream Flow Requirements	204-216 cfs

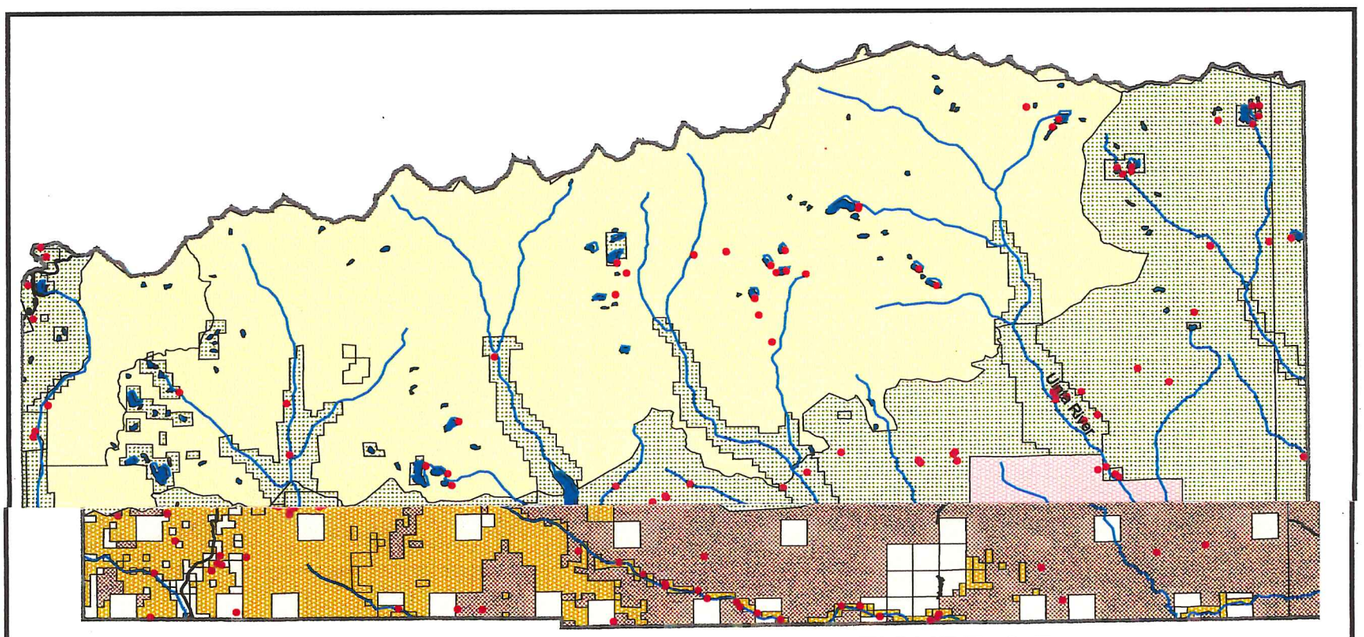
Source: Utah *State Water Plan*

2.3.1.1 Exported Water

The *State Water Plan* estimates that approximately 195,100 acre-feet of water are exported from the Duchesne River drainage basin to the Wasatch Front. This provides approximately 61,500 acre-feet of water to the Strawberry Valley Project and the remainder goes to the Provo River Project and CUP for M&I and agricultural purposes.

2.3.1.2 Agricultural Water Use

According to the *State Water Plan*, irrigated agriculture is the single-largest water use in the County, utilizing all but approximately 1,550 acre-feet of the developed surface water (excluding the 195,100 acre-feet exported to the Wasatch Front). The State has estimated that approximately 537,100 acre-feet of water, including rediversion of return flows, are diverted from the Duchesne River and its tributaries to serve approximately 143,040 acres of irrigated lands. It is also estimated that agricultural diversions deplete a total of 287,940 acre-feet of water from the river basin. The remainder returns to the river as return flows, or percolates and recharges the groundwater aquifer. Figure 2-7 shows the locations of all surface diversions rights, as reported by the UDWR.



Legend

Surface Points of Diversion

County Boundary

Streams and Lakes

Roads

County-ownership

- BLM
- FOREST SERVICE
- NATIVE AMERICAN RESERVATIONS
- PRIVATE
- STATE
- WATER
- WILDERNESS AREA

N

Not To Scale

FIGURE 2-7
DUCHESNE COUNTY SURFACE WATER DIVERSION RIGHTS

DCWCD Comprehensive Water Resources Master Plan
Part 1, Water Conservation and Management Plan

NOTE: Attributes of Surface Water Points of Diversion are based upon best available information.

SOURCE: UTAH DIVISION OF WATER RIGHTS AND AGRC

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p://155071/ComprehensiveMasterPlan/Reports/WaterConservation/WCfigs.apr

Numerous canals and canal companies, irrigation districts, and water users' associations use these surface diversions. In addition to these current surface water uses, the DCWCD has received a segregated right on 47,600 acre-feet (31,160 acre-feet depletion) of water commonly referred to as Green River Filings. The DCWCD is currently in the process of identifying lands to use this water as the first step towards demonstrating beneficial use. As the process continues an addendum to this plan will be prepared.

2.3.1.3 Culinary Water Use

Only about 500 acre-feet of surface water are used for culinary purposes within the County. The City of Duchesne has a water treatment plant owned and operated by the CUWCD, served by a pipeline from Starvation Reservoir. This is the only known surface water used for culinary purposes within the County. The DCWCD has filed on 3,200 acre-feet (2,300 acre-feet of depletion) for M&I use in the County as part of the Green River Filings. The DCWCD is currently identifying users for this water and will update this plan as efforts continue.

2.3.1.4 Secondary Water Use

Approximately 1,050 acre-feet of water are utilized annually in the County for secondary water use. Secondary water systems typically provide untreated water for irrigation of lawns and gardens. These water systems may be owned and operated by municipalities, irrigation districts, canal companies, water service districts, or others. Examples include Tabiona, and parts of Roosevelt historically served by irrigation ditches and canals.

2.3.1.5 Instream Flow Requirements

Another major surface water use in the County is the provision of instream flow to enhance or protect aquatic habitat. As part of the implementation of the CUPCA, requirements of the Federal Endangered Species Act, and other federal and State environmental programs, minimum flows in the Duchesne River are being identified at key points to preserve aquatic habitat. Minimum flows are required in some locations while decisions are still pending at other locations.

The Inter-Agency Biological Assessment Team (IABAT) makes recommendations and decisions for minimum flow requirements. Table 2-4 summarizes the instream flow requirements throughout the County, as either mandated or recommended by IABAT.

TABLE 2-4
Instream Flow Requirements

River	Location	Summer (cfs)	Winter (cfs)
Current Creek	Below Currant Creek Reservoir	24*	10*
Strawberry River	Wasatch County Line	26*	13
Rock Creek	Below Upper Stillwater Reservoir at the Reservation Boundary	29	23
Strawberry River	Starvation Dam to Confluence with Duchesne River	15	15
Duchesne River	At Knights-Shank Diversion	15	15
Duchesne River	Vat Diversion	12-24*	7*
Duchesne River	Lower Duchesne Below Confluence with Strawberry	Pending	Pending
Lake Fork	Between Moon Lake and Big Sand Wash Diversion	Pending	Pending

cfs = cubic feet per second
* Yearly recommendations by IABAT. These flows may increase or decrease depending on recommendations and water supply.

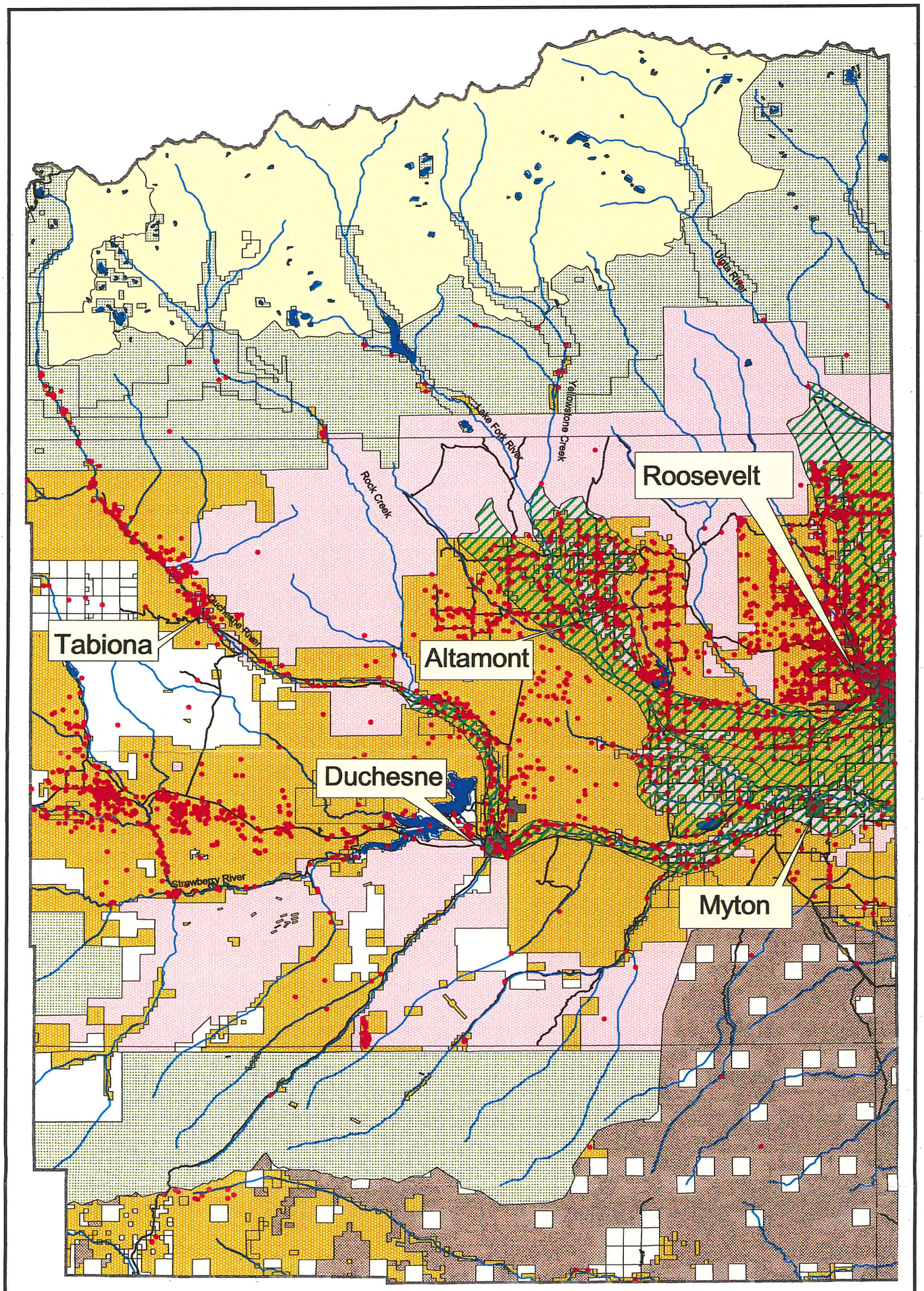
2.3.2 Groundwater

According to the *State Water Plan*, groundwater development within the County has historically been limited for four major reasons:

1. The development of surface water resources has been adequate for most needs;
2. The consolidated aquifers, generally, have hydraulic properties that preclude large-scale groundwater development;
3. The quality of the groundwater in some areas is unsuitable for domestic, municipal, industrial, and/or agricultural uses; and
4. The economics of drilling and pumping water from deep aquifers are prohibitive.

As a result, the primary development of groundwater, through both springs and wells, has been limited to primarily M&I and domestic purposes. The *State Water Plan* reports that cities, towns, and public community systems such as the Upper Country Water Improvement District, account for the majority of the groundwater water use within the County.

Figure 2-8 shows the location of groundwater diversion rights in the County, as reported by the UDWR. The UDWR estimates that approximately 2,950 acre-feet of groundwater per year are used within the County for public, commercial, institutional, and industrial uses.



Legend

Groundwater Diversion Points
County Boundary
Streams and Lakes
Roads
ADP Shallow Aquifer

County-ownership

BLM
FOREST SERVICE
NATIVE AMERICAN RESERVATIONS
PRIVATE
STATE
WATER
WILDERNESS AREA

N

Not To Scale

FIGURE 2-8
DUCHESNE COUNTY GROUNDWATER DIVERSION RIGHTS

DCWCD Comprehensive Water Resources Master Plan
Part 1, Water Conservation and Management Plan

NOTE: Attributes of Underground Point of Diversion are based upon best available information.

SOURCE: UTAH DIVISION OF WATER RIGHTS AND AGRC

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p://155071/ComprehensiveMasterPlan/Reports/WaterConservation/WCfigs.apr

At present, there are no estimates of agricultural groundwater uses for irrigation or stock watering within the County.

Table 2-5 lists the municipal and public water systems identified by the DCWCD in their Regional Water Management Plan. For a full discussion of drinking water facilities and suppliers, refer to Volume 4, Appendix A, which contains a copy of that Plan.

TABLE 2-5
Current Usage of Groundwater by DCWCD Culinary Water System

Irrigation Company	Present Water Rights (acre-feet)	Total Requirement Year 2002 (acre-feet)	Additional Requirement Year 2002 (acre-feet)	Current No. of Connections
Ballard Water Improvement District	0	513	513	310
Duchesne City	3919.7	324	None	532
Upper Country Water Improvement District	1473	587	None	602
East Duchesne Culinary Water Improvement District	277.6	281	3.4	220
Fruitland Water Special Service District	144.5	294.6	90.1	299
Johnson Water Improvement District	2648	941	None	568
Myton City	150	120	None	204
Neola Water and Sewer District	1788	137	None	188
Roosevelt City	7773	1815	None	1659
Town of Tabiona	500	64	None	110
Camp Timberlane	spring	spring	None	5
Camper World Lakeside Resort	0.074	0.074	None	23
Red Creek Ranches	181	181	None	14
Rock Creek Ranch	20.7	20.7	None	??
Valley Del Padre Homeowners Association	24	12?	None	14

3.0 Water Requirements and Demand Patterns

This section discusses, with respect to the water budget, how demands and supplies affect management and water conservation decisions. Understanding the existing and projected demand requirements and patterns in the County for both agricultural and M&I users is essential for:

- Planning for future requirements;
- Understanding areas where potential shortages may occur;
- Identifying areas where improvements can be made;
- Selecting specific projects that will provide the greatest water conservation benefit;
- Evaluating modifications that can improve water management.

3.1 Agricultural Water Requirements

Agricultural water requirements include the consumptive requirements of the crops and livestock, irrigation requirements, and diversion requirements. The difference between the amount of water actually provided and the requirements necessary for optimal crop production is the amount of surplus or shortage experienced. Clearly defining each requirement will help identify specific areas for water conservation and improvements to water delivery and management.

3.1.1 Consumptive Use Requirements

Consumptive use is defined as the amount of water consumed by plants and animals to sustain life. Plants draw this water from the soils, particularly from the first three to five feet down from the surface, known as the root zone. Consumptive use of a plant is a function of the type of plant, the availability of water, quality of the soil, temperatures, precipitation, humidity, wind, length of the daylight hours, presence of clouds and overcast skies, and the stage of plant growth (emergent, juvenile, or mature). Many variables of consumptive use are beyond human control, while others can be modified and enhanced. Specific information about controlling consumptive use is accessible through the local Utah State University (USU) extension agent.

Agricultural yields are directly related to consumptive use. As consumptive use increases to an optimal point, crop yields are maximized. The optimal condition occurs when the soil and water conditions are ideal (not too wet or dry). The USU Extension and Agricultural Research Station has prepared a guide to estimating optimal monthly consumptive use throughout Utah (Research Report 145). Table 3-1 summarizes the annual consumptive requirements, from Research Report 145, for a variety of crops and locations throughout the County. For further detailed information and monthly data, please refer to Volume 3, Part 10 of the CWRMP.

TABLE 3-1
Duchesne County Consumptive Use Requirements by Weather Station

Crops\Station	Consumptive Use (inches)						
	Altamont	Duchesne	Fort Duchesne	Hanna	Myton	Neola	Roosevelt
Alfalfa	27.83	28.17	28.46	22.64	28.16	27.51	31.34
Pasture	20.78	20.22	21.89	15.89	20.32	19.95	23.54
Other Hay	20.27	19.4	23.2	N/A	N/A	N/A	25.69
Corn	19.09	16.23	17.29	12.65	18.86	15.31	21.18
Spring Grain	18.77	17.61	19.43	15.65	18.53	19.4	20.9
Potatoes	15.31	N/A	N/A	12.63	N/A	15.35	N/A
Orchards	N/A	N/A	27.22	N/A	N/A	N/A	N/A
Turf	18.77	17.68	19.4	13.7	18.95	17.72	21.59
Gardens	13.46	12.42	13.66	10.59	14	12.76	16.12

Notes: Data from Utah Agricultural Experiment Station, USU, Research Report 145
N/A = Not applicable

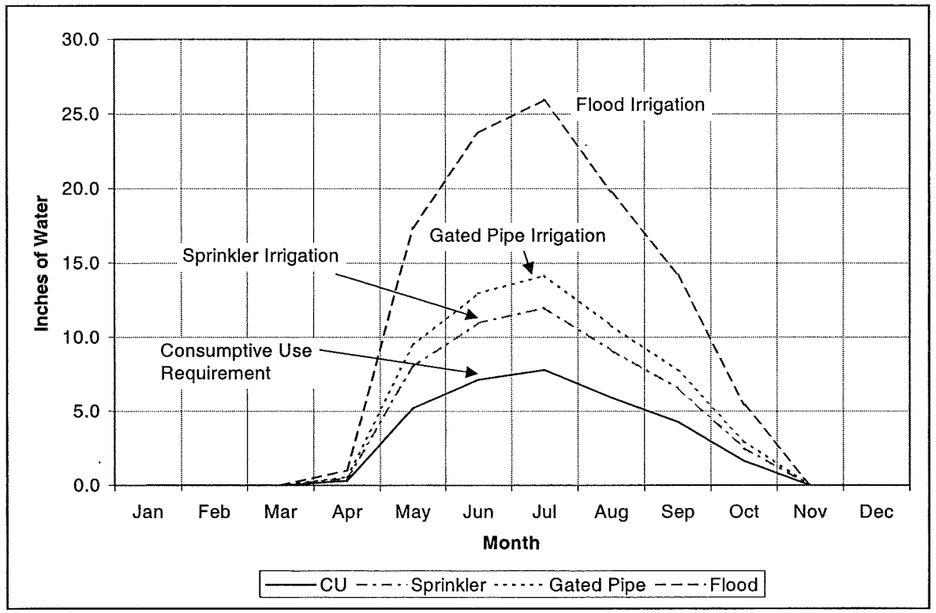
3.1.2 Irrigation Requirements

The irrigation requirement is defined as the amount of water that must be applied to meet a crop's consumptive use requirements and fill the soil reservoir known as the root zone. Practically, it is impossible to create these conditions in a production setting. As Figure 3-1 demonstrates, there are significant water losses associated with irrigation, including deep percolation and surface runoff. These losses are the difference between the water applied by an individual irrigation method and the consumptive requirements of the crop throughout the season. The figure also provides a comparison of each method of irrigation in terms of water required to meet the consumptive requirements of the crop. As illustrated, there are some inefficiencies; this is to be expected. However, significant improvements in efficiency can be realized through the use of properly designed and maintained sprinkler systems.

3.1.3 Diversion Requirements

The diversion requirements are defined as the amount of water that must be diverted into the canals to provide for each farmer's irrigation requirements. Under this definition, canal seepage losses, operation spills, evaporation within the canal, and other losses would be added to the irrigation requirements. Operation spills or wastes are often the result of water rights constraints (i.e., fixed diversion rate for the entire year), delivery schedules (i.e., fixed schedule with no flexibility), or lack of regulating facilities (i.e., no regulating reservoirs). As these variables demonstrate, the diversion requirements will vary extensively for every canal, even from year to year.

FIGURE 3-1
Irrigation Requirements for Alfalfa with Different Systems



3.2 Agricultural Demand Patterns

Having defined the elements of agricultural water requirements, it is important to realize that, typically, water users in the County have insufficient water to meet their requirements. These shortages tend to be the result of supply availability, capacity restrictions, excessive losses, and water rights. Although in many cases the full water requirement cannot be met for all crops, there are solutions for reducing these shortages. These can be realized primarily through modifications in the demand pattern. The demand pattern is defined as the timing and amount of water that must be delivered to minimize shortages. The following discusses various items affecting the demand pattern that may be modified to help reduce shortages.

3.2.1 Consumptive Use Patterns

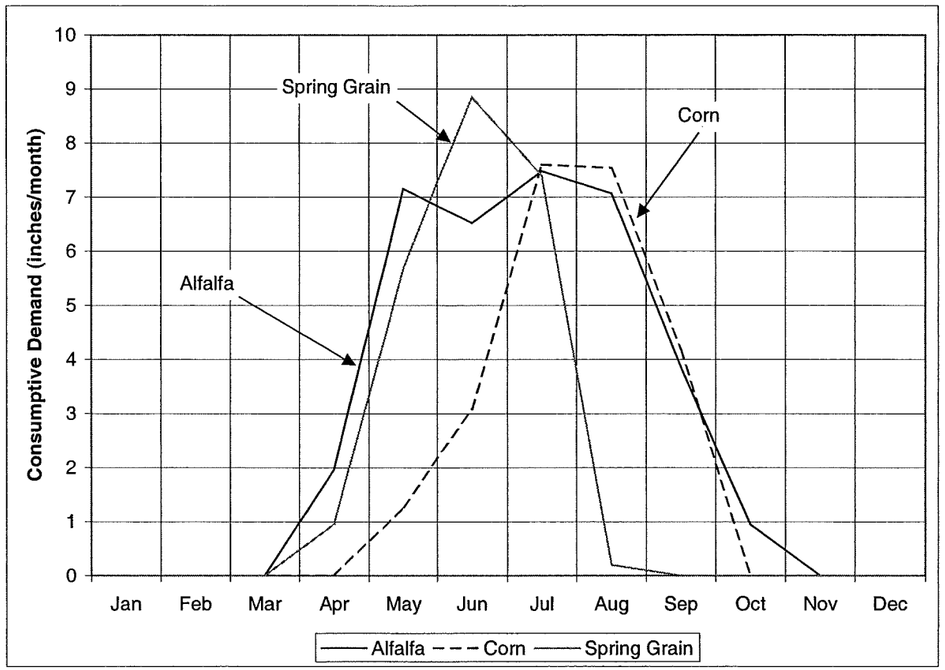
Changing crops can modify consumptive use requirements. As shown in Table 3-1 above, the annual water requirements of various crops vary tremendously. By capitalizing on these differences, farmers can modify the demand pattern to be more compatible with the supply patterns. Figure 3-2 demonstrates the differences in the demand pattern for three crops commonly grown in the County.

Unfortunately, it is difficult for farmers to realize economic benefits by modifying their crops to adjust their demand pattern. Most crops are planted either in a rotation or in

support of other efforts, such as the cattle industry. Modifying the crops to fit the supply pattern is often incompatible with other factors.

The composite crop pattern on an entire irrigation canal or canal system is even more difficult to modify. Canal companies, water users associations, and irrigation districts do not have the authority to dictate the crops that will be grown. As a result, though the composite crop patterns may vary from year to year and may even be predictable, irrigation companies and water users' associations have very little authority to mandate demand pattern adjustments.

FIGURE 3-2
Comparative Crop Consumptive Use Patterns



3.2.2 Application Methods

One of the most effective methods available to modify the demand pattern is to change the method of application. As shown in Figure 3-1, conversion from flood irrigation to sprinkler irrigation will reduce the peak demand by almost 50 percent and reduce the shortage at the peak by almost 65 percent.

Most farmers in the County are still using flood irrigation, at least on parts of their fields. Many recognize the value of converting to sprinkler irrigation, having seen or experienced the benefits, but lack the financial resources necessary for the capital expenditures.

3.2.3 Delivery Methods

Changing delivery methods is another effective technique for altering the demand pattern. As discussed above, losses from unlined earth canals include seepage losses, evaporation, consumptive use by brush and weeds growing along the canal banks, and spills. Piping open canals may eliminate these losses and reduce the peak demand requirements by up to 25 percent. This provides a reduction in the shortages experienced by water users, and in many cases, may decrease the size of facilities required to deliver the water.

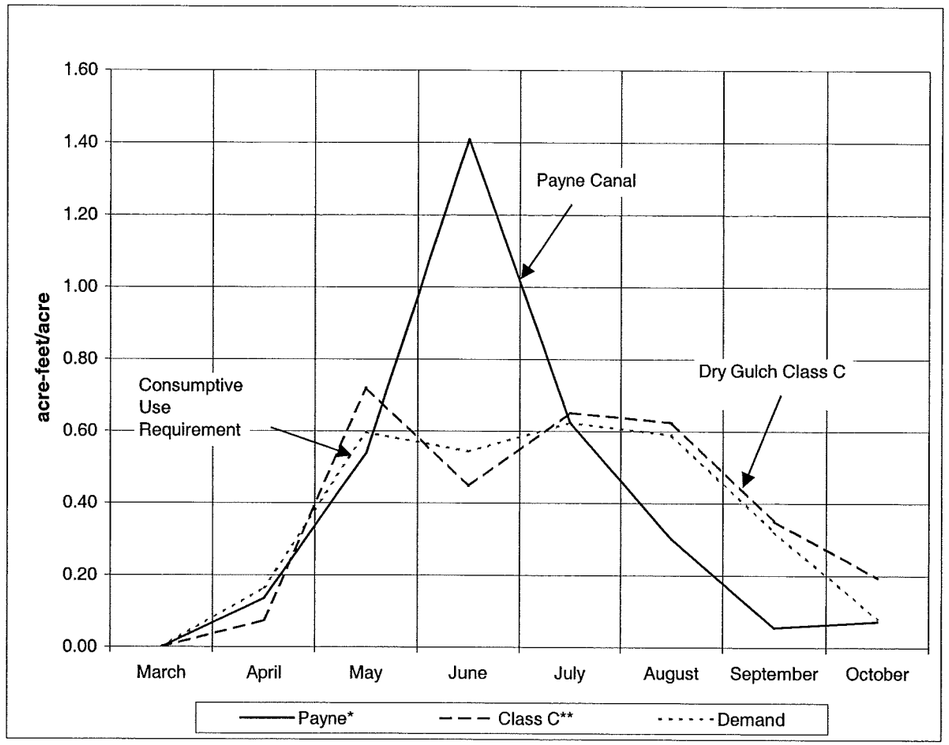
Typically, most canals in the County are unlined. Many canal companies and water users would like to pipe their canals but lack the necessary financial resources. As a result, most companies look to qualify for federal or State grant funds to help offset the costs.

3.2.4 Diversion Schedule and Policy

There are many methods of diverting water for irrigation; perhaps the most intuitive of these is the call or demand system. This system allows the water user to specify when he will start receiving his watering turn, how long the turn will last, and how large of stream (flow) he will receive. For areas of the County that lack regulating and storage reservoirs a fixed schedule would be another delivery option. Under a fixed schedule, a water user will receive water on a fixed schedule, for a fixed duration, of a fixed flow amount. By definition, a fixed schedule is purely supply-oriented and does not address the actual crop water demands.

To illustrate the differences in the systems, Figure 3-3 shows the diversion records for two canal systems in the County. The figure was generated from diversion data from the River Commissioner's reports for 1972. Data for the Dry Gulch Class C was modified to reflect the utilization of the current operating procedures, primarily a call system. The historical Payne Canal diversions show the effects of fixed-schedule water delivery. As the figure illustrates, the Payne Canal's delivery pattern closely follows the river hydrograph discussed in Section 2. It also shows the shortages that occur in the late season without a reservoir for storage, and the excessively high diversions during the early season. The high-peak diversions result from seepage losses in the canal and attempts by farmers to store as much water as possible in their soil before the snowmelt runoff subsides. The Dry Gulch Class C canal shows how the water users request their water based upon their crop water requirements, rather than by the river flows. As a result, their delivery requirements closely follow the consumptive use requirements. The Dry Gulch Class C Canal's delivery also demonstrates the benefits of a reservoir. In reality, that is the only reason they are able to use a call system, since it eliminates their dependency on flows in the river by allowing water storage to meet late-season requirements.

FIGURE 3-3
Call Delivery System versus Fixed-Schedule Delivery System at Diversion



3.2.5 Water Rights

One problem often not discussed in water demand modifications is associated with restrictions to water rights. In the Uintah Basin, many of the early water rights are for a fixed flow during the entire irrigation season. For example, Sandwash Water Users is allocated 6 cfs for the entire irrigation season. As a result, this canal is on a fixed irrigation schedule not by choice, but because their water rights mandate that form of operation. On the contrary, Dry Gulch Class C is allocated a right of 3.0 acre-feet per acre per year, which allows them to modify the flow rate based upon demand. By modifying their flow rates and the duration of their irrigation, the farmers are able to focus on the crop water demands and apply water when it is most beneficial, rather than when their turn is scheduled. Although both of these canals are served out of Big Sand Wash Reservoir, due to the difference in the water rights the canals are operated differently. By modifying the water rights and changing the restrictions, Sandwash Water Users could modify their operations to more efficiently utilize their water supply and minimize water losses to deep percolation, surface runoff, and operation wastes.

3.2.6 Agricultural Demand Pattern Summary

By understanding the agricultural demand pattern and the associated water requirements, water users can identify areas where the demand pattern may be modified to recognize major benefits.

Table 3-2 reflects the increases in yields that can be expected by implementing improved water management and various water conservation projects. Additional benefits may include a lower groundwater table, reduced salt accumulation in the crop root zone, and reduced leaching of salts and fertilizers into the rivers and streams.

TABLE 3-2
Hypothetical Effects of Irrigation Efficiencies on Alfalfa Yields

Example	Canal Losses (%)	Irrigation Efficiency (%)	Water Available to Crops (inches)	Expected Alfalfa Yields (% of maximum)	Comments
1	0	65	23.4	75	Piped ditch with sprinklers at Roosevelt
2	10	50	16.2	51.7	Ditch through clays and silts with land leveling and flood irrigation at Roosevelt
3	25	40	10.8	34.4	Ditch through sands and gravels with typical flood irrigation at Roosevelt

Notes: 1) Canal losses and irrigation efficiencies based upon typical results from studies completed by the NRCS, USU Extension, and USBR during the Colorado River Salinity Control Project and Colorado River Water Quality Improvement Plan
2) Water available assumes a diversion of 36 inches over the entire year
3) Expected yields assume a crop of alfalfa requiring 31-34 inches of consumptive water per year, based upon USU Agricultural Experiment Station, p. 310

3.3 Municipal and Industrial Water Requirements

M&I water requirements are directly related to the population of the community. Table 3-3, generated from data provided by the CUWCD, summarizes where most M&I water is utilized by a typical person on an average day. As the table shows, bathing and washing clothes, dishes, and food requires 70 to 115 gallons of water per person per day. This water is not consumed, but is used and disposed of either through wastewater treatment facilities or septic systems.

TABLE 3-3
Common Sources of Average Water Consumption

Use	Water Used (gpcd)
Bath or Shower	15-25
Washing Clothes	30
Washing Dishes	15-50
Cooking	10
Drinking	0.5
Flushing Toilet	4-7
Total	70-115

Note: Data From CUWCD, CUP Water Facts.
gpcd = gallons per capita per day

Table 3-4 illustrates the historic M&I water consumption in the County, as estimated by the Governor's office and UBAG. As the table illustrates, water use in the County is substantially less than the state average. This may be explained by: 1) not all of the culinary water in the County is monitored, i.e., most farmers have private wells where water quality will permit, and 2) where there are lawns, they are not irrigated as extensively as in more urban areas.

These estimates do, however, reflect that the water use per capita in the County is still somewhat excessive when compared to water-conscious communities like Tucson, Arizona, where average water demands are about 140 gpcd. Water use this low is usually accomplished through a combination of low water-demand landscaping, low-flush toilets, low-flow showers and sinks, rate schedules, and public education.

TABLE 3-4
Average M&I Water Consumption

Area	M&I Water Consumption (gpcd)					
	1991	1992	1993	1994	1995	Average
Duchesne County	215	383	235	195	151	235.8
Utah state	265	281	251	298	258	270.6

Note: Data based upon information provided by the Governor's office.

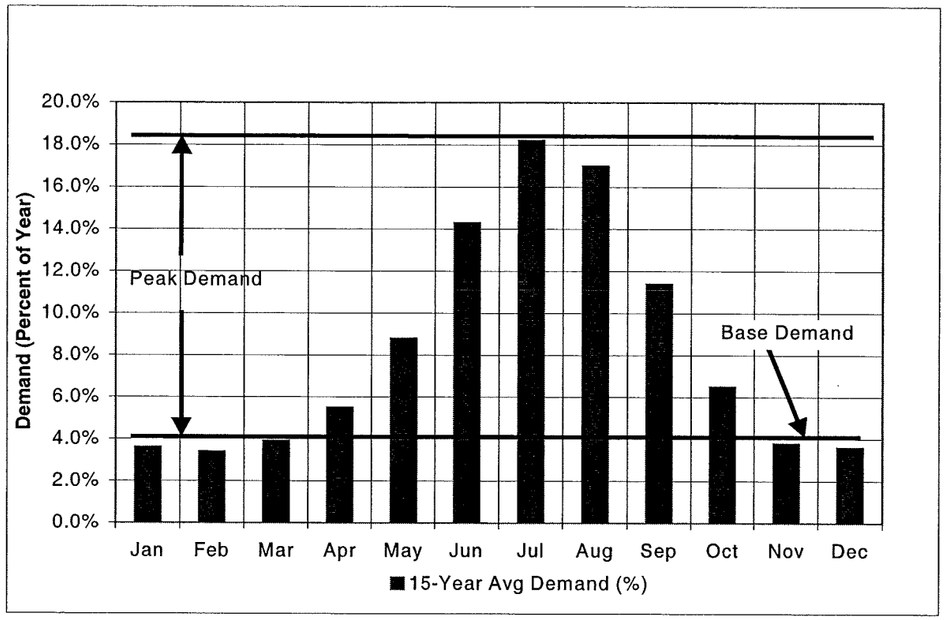
3.4 Municipal and Industrial Demand Patterns

M&I water demand patterns are very similar to agricultural water demand patterns, with the addition of a base demand. Water use rates inside the home are fairly consistent and tend to be independent of climate or weather conditions. Water use rates outside of the home, such as for irrigation of lawns and gardens, follow a pattern very similar to agricultural water demands. The resulting demand pattern reflects the periods when the M&I water system will be more stressed and flexibility is required.

A representative demand schedule is shown as Figure 3-4. The curve demonstrates that the greatest stresses on a system occur during the summer months. This commonly reflects outdoor use and requirements commonly associated with landscape irrigation and summer activities. The period of high use, associated with outdoor uses, is called the peak demand or the peaking period. Water uses associated with the common household demands are called the base load or base demand.

Throughout Utah, many education programs are focused on helping communities and residents understand the benefits of water conservation in our semi-arid environment. Water conservation programs focus on teaching irrigation scheduling, the benefits of Zero-landscaping (waterless landscaping) and Xeriscaping (low water-demand landscaping), and other water conservation techniques. In many communities, including Roosevelt and Duchesne, water conservation incentives, such as rate structures, are used. The focus of these programs is to lower the overall water demand by encouraging people to restrict excessive use of water both inside and outside of the home. This is accomplished most effectively through education. At a minimum, regular education programs should be implemented in the elementary and middle schools, recognizing that the greatest potential for water conservation begins in youth.

FIGURE 3-4
Typical M&I Demand Schedule



4.0 Existing Water Management Measures and Programs

Regular seasonal shortages, droughts, and government projects to reduce salinity in the Colorado River have prompted support from local residents to conserve water and to improve water resources management. For almost 30 years, various government programs with federal funding have been utilized to help offset the capital costs associated with these improvements. This section summarizes the projects and programs that have been either implemented in the past or are currently in operation.

4.1 Colorado River Salinity Control Program

The Colorado River Salinity Control Project, a program funded through the U.S. Department of Agriculture, focused on reducing salinity impacts on the Colorado River resulting from deep percolation and surface runoff from irrigated agriculture. The Uintah Basin was identified as one of the key tributary basins for the reduction of overall salinity in the Colorado River. This program assisted farmers in converting their irrigation methods from flood irrigation (common efficiencies of around 30 percent) to sprinklers (65 to 70 percent) or improved surface irrigation (50 to 55 percent) using land-leveling. Many farmers in the County participated to improve their water use and to reduce salinity problems resulting from over-irrigation and low irrigation efficiencies. As a benefit of this program, farmers experienced significant increases in crop yields. As a side effect, improved irrigation practices reduced return flows to the rivers, which now require tighter operation by the river commissioners. This program is no longer funded and was discontinued in the early 1990s.

4.2 Colorado River Water Quality Improvement Program

The Colorado River Water Quality Improvement Program, funded through the U.S. Department of Interior, focused on reducing river salinity generated by seepage losses from unlined canals and ditches. Through this program, numerous canals in the County were lined with clay or piped. This program has been discontinued and replaced by the USBR Salinity Control Program.

4.3 Central Utah Project

4.3.1 Uintah Basin Replacement Project

Under the CUP, the UBRP has been working to provide storage and additional facilities to improve water resources management and mitigate seasonal shortages in the Uintah Basin. Since the withdrawal of the Ute Indian Tribe from negotiations, alternatives are being investigated to implement UBRP.

The proposed reservoir expansions would provide substantial improvements in water management by:

- Allowing storage of high spring flows to help mitigate seasonal shortages, as discussed in Section 2;
- Providing carry-over storage to help alleviate drought impacts; and
- Facilitating the establishment of call systems, potentially replacing the existing fixed delivery schedule and natural flow systems as discussed in Section 3.

4.3.2 Section 207 Water Conservation Funds

The CUPCA has several requirements that involve water management and conservation. Section 207 mandates the implementation of water conservation throughout the CUP. Although the mandated amount of water conservation has been met, the CUWCD continues to provide water conservation funds to assist in implementing improved water management and conservation strategies, primarily through piping canals. There are environmental criteria associated with this program that must be met. Typically, those projects providing or guaranteeing instream flows as a result of the proposed project receive the highest prioritization by the review committee. In any case, water conservation by itself is insufficient to receive funding from this source.

4.3.3 Section 204 Environmental Mitigation Funds

Section 204 of the CUPCA requires that environmental mitigation be provided throughout the CUP. These funds can be used to make diversion structures more environmentally friendly and to improve the quality of the ecosystem along the rivers. As a benefit, the diversion structures could be improved to provide better river management, irrigation scheduling, and monitoring of diversions and river flows. Currently, DCWCD is in the process of replacing/building three structures on the Duchesne River, and one on Rock Creek; more will follow.

4.4 USBR Salinity Control Program

The USBR currently has a salinity control program that provides grant funds to assist in the construction and implementation of projects to provide salinity reduction. These funds are organized to provide both traditional and non-traditional solutions, but tend to focus on structural solutions. As part of this program, the DCWCD is currently working to replace five canals with pipelines. The improved transmission and distribution efficiencies and reduced seepage losses from this effort, as discussed in Section 3, result in the primary reduction of salt loading to the Colorado River. In most cases, salinity reduction is directly related to improved water management and water conservation.

4.5 NRCS Environmental Quality Protection Program

The NRCS has a program known as the Environmental Quality Improvement Program (EQIP). This program focuses on improving the quality of the environment by reducing erosion and salinity impacts, and where possible restoring the existing ecosystem to its pre-

agricultural conditions. These programs assist farmers in converting from flood irrigation to sprinklers and improve surface irrigation through land leveling. These measures will reduce sediment and nutrient loading to streams, creeks, and rivers; and assist in stream bank restoration. Some farmers in the County are currently using EQIP to improve water management.

4.6 Automation of Diversion Structures

Extensive efforts have been made to automate diversion structures on the Duchesne, Uinta, and Lake Fork Rivers, and the Big Sand Wash Reservoir. These efforts have focused on installing telemetry that allows the river commissioners to remotely monitor and regulate the diversions and flows in the river system. This has significantly improved the frequency and the simplicity of managing the river, and has improved the river commissioner's ability to meet diversion requirements and implement water rights. Additionally, it has allowed for water savings by reducing operation wastes and spills from canal systems.

4.7 Irrigation Scheduling

Irrigation scheduling allows the irrigators to specify when they will receive their water, how long they will receive it, and how much water they will receive, based upon available capacity. This conserves water by reducing over-irrigation, operation wastes, and spills.

Dry Gulch Classes C and D have converted their delivery systems to a call system. The water users are allocated a spring allotment with regular adjustments to natural flow and storage. Once they use their allocation, they are shut off.

4.8 Municipal and Industrial Rate Scheduling

The municipal systems in the County have a rate structure that penalizes use in excess of a base amount. For Roosevelt, the base amount is 8,000 gallons per month. After exceeding 8,000 gallons, the user is charged an additional fee based on a cost per 1,000 gallons above 8,000 gallons. The goal of this structure is to encourage residents and businesses to keep water usage below 8,000 gallons per month. Duchesne and many other private and public water systems have similar rate structures.

4.9 Secondary Systems

Areas in Roosevelt, Duchesne, Tabiona, and other communities are served by irrigation and canal companies. These systems reduce the peak demand on culinary systems, as discussed in Section 3, therefore reducing the requirements for storage tanks, water treatment, and associated expenses. The city of Roosevelt has two secondary systems that use surface irrigation water. One Roosevelt system was turned over to an individual water users association, whereas the other continues to deliver Dry Gulch K2 water to homes within the City boundaries.

4.10 Municipal Water Auditing

Every year the municipal systems are audited to compare the amount of water produced to the amount of water billed and delivered. The difference represents water that is lost to tank leakage, line leakage, and illegal or unmonitored connections. By identifying losses, operating agencies are able to take appropriate action to eliminate these losses.

4.11 Water Conservation Education

Many of the communities in the area are supporting ongoing water conservation education. These efforts are largely focused on reducing excessive domestic water use by converting to low-flow faucets and showers, low-volume toilets, and general practices to reduce daily water use. The teaching of focused irrigation scheduling principles and low water-use landscaping help reduce lawn and yard irrigation. The NRCS and USU Extensions are also supporting education efforts to help farmers schedule irrigation and reduce over-irrigation.

4.12 Wastewater Reuse

The city of Roosevelt has a five-lagoon wastewater treatment facility. Treated water is taken from the last cell and used to irrigate five center pivots, serving in excess of 600 acres. This significantly reduces the water diversions in this area by reusing treated wastewater.

4.13 Summary

As discussed above, the County has historically had a strong record of water conservation. Residents and agencies have taken full advantage of available funds to minimize seasonal shortages and drought impacts.

5.0 Problems, Opportunities, and Goals

5.1 Problems

Since the DCWCD does not own any conveyance or storage facilities, its primary role is as a facilitator to assist water users in implementing water conservation projects and resolving identified problems. Water users have identified over 120 specific projects at public meetings associated with the preparation of this WMCP. These projects, by their nature, define some of the biggest issues faced by the water users in the County.

5.1.1 Lack of Irrigation Storage Facilities

Most of the agricultural water users in the County do not have storage reservoirs to hold water for dry years or even late-season demands.

Symptom: The water diversions in the County typically exceed what is needed in the early season, and are less than what is needed in the late season, as discussed in Sections 2 and 3. The quantity of diverted flow tends to follow the quantity of natural stream flow. Common impacts are reduced yields, salt loading on rivers, and salt accumulations.

Symptom: During drought years many areas of the County, even those with reservoirs, experience late-season shortages or run completely out of water.

Symptom: The lack of storage capacity causes most of the irrigation districts and canal companies to use fixed-schedule rotation based on natural flows.

Symptom: In most years, there are insufficient natural flows in the rivers during the late irrigation season to satisfy existing water rights.

5.1.2 Irrigation Delivery System Losses

Most of the canals and distribution systems in the County are composed of unlined, earthen canals. These canals suffer extensive water losses, reported by many of the local canal companies to be as high as 25 percent or more. These water losses are typically attributed to seepage into groundwater, evaporation, and consumptive use by vegetation growing in and around the canals.

Symptom: Water delivered to farms may be reduced by 25 percent, thus reducing the amount of water available to meet irrigation requirements. For example, a farmer with a 3.0 acre-feet per acre (36-inch) water right would only be able to deliver approximately 2.25 acre-feet per acre (27 inches). These losses would likely significantly reduce the crop yields, depending upon the time of season the shortages occur, types of soils, and the type of crop and its consumptive water requirements.

Symptom: It is usually necessary to divert excessive livestock flows during the winter due to seepage losses. The losses tend to increase groundwater levels, salt loads in the rivers, and salt accumulation in the soils.

Symptom: Seepage losses from the canal often cause a high water table in the region around the canal. This is often witnessed by accumulations of salt on the soil surface (called efflorescences) and the influx of wetland vegetation including Russian olive, salt cedar, cattails, reeds, and bulrush.

Symptom: Water losses from the delivery system often promote the growth of dense, lush vegetation around canals and ditches. This vegetation increases losses from the canals in the form of consumptive use, reduces the flow capacity of canals and ditches, and increases the costs of maintenance.

Symptom: Seepage losses also contribute to the leaching of salts from the soils back into the river systems. This source of salt loading is one of the motivating factors of many water conservation programs in the Colorado River Basin.

5.1.3 On-Farm Irrigation Losses

Most irrigation in the Uintah Basin is based upon inefficient flood irrigation systems that were constructed and established in the early 1900s. According to the NRCS, typical efficiencies for flood irrigation in the County are around 30 to 35 percent.

Symptom: Crop yields are reduced. Assuming earth-lined canals through sandy soils (approximately 75 percent efficient), a 3.0 acre-feet water right (36.0 inches), and typical flood irrigation in the County (35 percent efficient), only about 9.5 inches of water are available to the plants. The resulting water shortage may reduce crop yields from 30 to 70 percent, depending upon the crop.

Symptom: Deep percolation characteristics associated with flood irrigation often cause the groundwater table to rise. A higher water table may cause an accumulation of salt in the soil which, over time, can reduce or eliminate crop growth. Additional long-term symptoms include wet spots in fields that kill many agricultural crops and encourage the growth of Russian olive and marsh and wetland vegetation in fields.

Symptom: Excessive surface runoff from flood irrigation can cause erosion downstream of fields. This is seen in areas of the Uintah Basin where agricultural runoff has created washes.

Symptom: Excessive surface runoff from flood irrigation can cause extensive topsoil loss from the fields.

Symptom: Excessive surface runoff from flood irrigation, where sufficient drainage capability is not provided, can cause the creation of irrigation-induced wetlands. Although these can be seen as beneficial to the environment, they can cause farmers to lose valuable cropland and pastures and cause an increase in pests such as mosquitoes.

Symptom: Deep percolation in excess of leaching requirements also contributes to the increase of salts in the river systems downstream of the water use. This symptom is one of the motivating factors for many of the water conservation efforts in the Colorado River Basin.

5.1.4 Excessive Municipal and Industrial Uses

Excessive M&I water use is generally not related to water systems operation or maintenance. Typically, excessive M&I water use is the product of an environment where a sufficient water supply is taken for granted. The impacts of excessive M&I use are often not felt for years. However, if the capacity of a water supply system is exceeded and the capital and operating costs necessary to meet the demands rise, solutions may be met with public resistance.

Symptom: Excessive landscape irrigation results in water running in the gutters or streets. Similar symptoms would include deep percolation from watering yards and lawns every day, or multiple times a day.

Symptom: Diluted flows into the wastewater treatment plant due to high-flow flush toilets and sinks and showers may require wastewater conveyance and treatment system capacity upgrades. Additional water losses can also be attributed to inefficient dishwashing machines.

The DCWCD recently completed the Duchesne County Regional Water Management Plan (Volume 4, Appendix A). In this report they identified the water rights, supply, and storage needs of each drinking water supplier in the County. The plan addresses the current needs as well as the projected needs for the next 5 and 20 years. Table 3-2, discussed previously, shows these projected needs.

The basic needs of the County, where drinking water suppliers currently deliver water, include:

- Completion of wells and springs
- New storage tanks
- System rehabilitation and expansion

With increased water conservation, the capital requirements to improve these systems may be reduced or in some cases eliminated.

5.1.5 Leaks and Unmonitored Water Usage

On the municipal systems, there are water users that are currently not being monitored. These water users often consume a significant amount of water, and in some areas may cause extensive shortfalls in supply and excessive operating costs.

Symptom: Substantial differences in the amount of water delivered into the system and the amount of water measured as delivered. This can reflect system leaks, unmonitored uses, or unauthorized uses.

Symptom: Higher rate structures for measured users to compensate for lost revenue and additional operating costs.

5.1.6 No Existing Drinking Water Supply

There are several areas that have been developed without a drinking water supply, or any water supply at all. These areas include the Pinyon Forest Special Service District just east of Fruitland and some areas near Neola. In many cases, there have been no water rights

associated with the land. This requires residents living in these developments to bring their water excessive distances to provide for household needs.

Symptom: Trucking water from current water retailers is required. This usually results in hauling water long distances and increased costs.

Symptom: There is an insufficient financial base to develop water supplies, purchase water rights, and build water infrastructure without significant outside assistance.

5.2 Opportunities

Opportunities for the DCWCD to conserve water in the County are limited to a voluntary basis. Since the DCWCD owns neither the facilities nor the water rights, their role is to assist willing water users and agencies in identifying and implementing projects. In accordance with this role, the DCWCD held two public meetings on November 4, 1999 to identify projects that would benefit the County.

Over 120 projects related to water resources needs in the County were identified during the public meetings. A summary list of these projects is included in Volume 4, Appendix B. The sign-in rolls of the two meetings are included in Volume 4, Appendix C.

Those projects related to water conservation in the County can be summarized into the following main categories:

- Providing additional storage facilities to meet late-season shortages and provide drought mitigation
- Piping or lining canals to reduce seepage losses and improve operation efficiencies
- Increasing the telemetry and automation of canals and diversions to reduce spills and waste
- Converting irrigation delivery from scheduled systems to call systems, thus providing water only when it is needed
- Increasing the use of on-farm water conservation practices including sprinklers, gated pipe, and land-leveling
- Increasing the number of flow measurement structures to help quantify water losses and uses
- Automating and providing monitoring telemetry on spring collection boxes, wells, and storage tanks on potable water systems to reduce spills and shortages
- Converting areas to secondary systems to reduce groundwater pumping, treatment costs, and demands on the existing culinary systems
- Providing more auditing capacity to support further capital improvements on potable water systems, especially those suffering capacity restrictions and unmonitored water uses
- Adding water meters to currently non-metered culinary water uses

- Constructing storage tanks on culinary systems to better utilize existing supplies and reducing the need for new wells and treatment facilities.

5.3 Goals

Since the DCWCD does not own facilities, their role is as a facilitator to assist the water users in the County to implement water conservation projects and resolve the problems identified. In an effort to meet these challenges, DCWCD has identified the following water conservation goals:

- Assist County water users in identifying and prioritizing specific projects that will conserve water, increase agricultural yields, preserve ecosystems, extend M&I water resources, and reduce seasonal and drought shortages
- Assist in project implementation by helping water users obtain funding and technical support, and coordinating environmental compliance

6.0 Evaluation of Potential Water Management Measures

A primary objective of this WMCP is to present measures recommended for implementation by the DCWCD to improve water conservation and management in the County. The DCWCD is limited to a role of assisting willing water users and agencies in identifying, obtaining funding for, designing, and constructing water conservation and management measures. Therefore, any recommended measures must account for DCWCD's role in implementing the measures.

As previously discussed in this plan, there are many areas of water use and management that could be improved. In fact, as previously stated, the water users themselves have identified over 120 potential projects within the County that address existing water needs, many of them related to water conservation issues. Due to the extensive list of potential water conservation measures, this section provides a discussion of the different categories or types of measures that the DCWCD could coordinate for both agricultural and M&I water users.

This section also provides a summary of the legal, institutional, and environmental issues that must be addressed during the implementation of each measure. Although each project has unique issues, it is assumed that these issues will be identified and addressed at a later time. For detailed information about specific projects and their associated costs and priorities, please reference the 5-year and 20-year CIP in Part 2 of CWRMP.

6.1 Water Measurement and Accounting

A measure of the effectiveness of water conservation efforts is, to a great extent, directly related to the ability to measure and account for all water diverted, used, and lost. Ideally, water measurement could be provided at the diversions, at the head of each lateral, at the turnouts to each user, at the wasteways, and for each M&I user. Realistically, this is often cost-prohibitive.

Existing water measurement practices throughout the County vary from system to system. Some systems, especially those that are piped, have extensive measurement facilities; other systems may only measure flow at the diversion as required. Water system managers can benefit significantly by supporting improved water measurement and accounting by each irrigation company and potable water system. Some of the benefits include:

- Accurately identifying areas with substantial losses to prioritize further water conservation efforts and maintenance
- Obtaining the information needed for detailed water budgets that can assist in delivery scheduling and system operations

- Helping agricultural users reduce over-irrigation which contributes to salt accumulation, high water tables, salt loading of the river system, erosion, leaching of fertilizers out of the crop root zone, and souring of soils
- Assisting in auditing M&I systems to identify water losses and unmonitored or unauthorized users, and provide a basis of improved operations

In its current capacity, the DCWCD cannot institute additional water measurement and accounting practices. The primary role of the DCWCD is to provide assistance in obtaining funding for implementation of improved measurement, monitoring, and accounting practices in the County.

The following provides a summary of the legal, institutional, and environmental issues that pertain to implementation of water measurement and accounting measures:

Legal Issues:

No issues identified.

Institutional Issues:

Though State water law requires water measurement, some water users resist as they are concerned it will lead to a reduction in the water they receive. Education regarding the benefits of increased water measurement will help alleviate most concerns.

Increased water accounting and measurement can create an increased workload for office staff, ditch riders, and water masters. This workload and the associated costs should be considered in the planning of these measures and weighed against the benefits and appropriate methods selected.

Environmental Issues:

For most systems, no environmental issues are expected. The only exception would be measurement of flows in natural channels and waterways, or where wetland habitat may be impacted during the construction of new meters. Where structures are being placed in the rivers and natural waterways, permitting with the U.S. Army Corps of Engineers and the U.S. Department Fish and Wildlife, as well as with the appropriate state agencies, may be required.

6.2 Water Pricing Structures

The use of a carefully designed water pricing structure can be beneficial by providing the water users with economic incentives to conserve water. For example, a flat fee may not provide a water user with much of an incentive to conserve water, as the user pays the same fee no matter how much water is used. A variable rate structure, however, requires the user to pay for actual water usage. Therefore, if less water is used, a smaller fee is assessed.

The cities of Duchesne and Roosevelt already have pricing structures in place to encourage water conservation. The other culinary systems are either implementing structures, have them in place, or are considering them.

The irrigation companies in the County have their own pricing structures; most are based upon the number of shares held, acres served, and fixed fees. The bulk of these costs are based on operation and maintenance budgets for the irrigation companies and are not designed to encourage water conservation. The primary driver for water conservation on these systems is a limited supply of water.

The DCWCD has no authority to develop or implement the pricing structures for the agricultural or M&I water systems in the County. The DCWCD will, however, have the authority to establish a pricing structure on 47,600 acre-feet of Green River rights, once a method for delivering the water is identified. The cost of this water will be restricted by the demand on this water supply, and the ability of water users to pay for its use. At a minimum, the pricing structure will recuperate the cost of construction and operation and maintenance (O&M) of any DCWCD facilities that will be developed.

As a result, the primary role of the DCWCD is to support agencies in obtaining data to for developing an appropriate rate structure, coordinate successes and failures, seek funding for technical assistance, and provide project oversight where multiple agencies may be involved.

The following provides a summary of the legal, institutional, and environmental issues that pertain to the implementation of water pricing structures:

Legal Issues:

Depending upon the charter of the agency delivering the water, there may be legal restrictions governing the water pricing. If the water rights are owned by the individual users rather than by the agency delivering the water, water pricing is based upon O&M costs and the use of water pricing structures for water conservation no longer applies.

Institutional Issues:

Water pricing structures can be a very sensitive issue in some communities, and it often requires time and public education to prevent extensive dissatisfaction. The DCWCD should support this measure through education, and by providing information and technical support to willing and interested agencies.

Environmental Issues:

None identified.

6.3 Educational Programs

Many communities in the area are supporting ongoing water conservation education, focusing on increasing public awareness of the need for water conservation due in part to excessive domestic water use. Issues addressed by these programs include converting to low-flow faucets and showers, low-volume toilets, and suggesting general practices to reduce the amount of water used daily. Additional efforts have focused on reducing lawn and yard irrigation through the teaching of irrigation scheduling principles, and encouraging the planting of low-water-use plants.

The USU extension office and the NRCS have spent years educating farmers in the County about the benefits of improved water conservation. They have primarily focused on increasing irrigation efficiency, and reducing salinity impacts resulting from current irrigation practices.

Implementation of this measure would include the DCWCD becoming more involved in and supporting education efforts throughout the County. Efforts would include public announcements, school programs, and involvement with programs offered by USU, NRCS, and the UDWR. Other efforts may include sponsoring workshops or identifying demonstration projects in the area.

The following provides a summary of the legal, institutional, and environmental issues that pertain to the implementation of educational programs:

Legal Issues:

None identified.

Institutional Issues:

This can become a very time-consuming effort if attempted solely by the DCWCD. It is recommended that the DCWCD coordinate with and support State and federal agencies already providing these services.

Environmental Issues:

None identified.

6.4 Designation of a Water Conservation Coordinator

The purpose of a Water Conservation Coordinator is to coordinate the DCWCD's water conservation efforts in helping water users implement water conservation measures.

Within the DCWCD, the General Manager is the acting Water Conservation Coordinator. His primary responsibility in this role is the coordination of water conservation-related projects and efforts throughout the County, including interaction with the CUWCD, the UDWR, Bureau of Reclamation, NRCS, and the Bureau of Indian Affairs.

The following provides a summary of the legal, institutional, and environmental issues that pertain to designation of a Water Conservation Coordinator:

Legal Issues:

None identified.

Institutional Issues:

Care will be needed to insure that the duties of the Water Conservation Coordinator do not conflict with other responsibilities of the General Manager. Careful planning should be utilized to identify the effort required for water conservation tasks before making new assignments.

Environmental Issues:

None identified.

6.5 Water Shortage Contingency Plan

Most of the irrigation companies in the County do not have the benefit of significant reservoir storage. This puts them at risk during periods when an adequate supply of river water is not available. If a contingency plan is not in place, they may experience significant yield reductions due to the water shortage.

A water shortage contingency plan is helpful for dry periods when an adequate supply of water is not available. Such a plan encourages water users to identifying and prioritizing water uses that will maximize their economic benefits and minimize future shortages. A typical plan will also identify measures for plan implementation. Some examples of typical measures included in contingency plans include:

- Irrigation of fewer acres
- Prioritization of crop irrigation according to their cash value
- Planting crops with a water demand consistent with forecast water shortages

Due to the strong focus of these plans on the operation of individual water systems, the DCWCD cannot independently prepare water shortage contingency plans. A role of the DCWCD is limited to assisting agencies in obtaining funding for and helping them to develop appropriate plans.

The following provides a summary of the legal, institutional, and environmental issues that pertain to the preparation and implementation of water shortage contingency plans:

Legal Issues:

The plan should be prepared by the operating agencies in the County, with support and coordination by DCWCD.

Institutional Issues:

Since the DCWCD can only assist other agencies in preparing water shortage contingency plans, there are no real issues related with this alternative. The primary responsibility rests on the operating agencies.

Environmental Issues:

None identified.

6.6 On-Farm Conservation Financial Incentives

Financial incentives are an important part of implementing non-traditional measures for water conservation. By providing the end user with an opportunity to invest in water conservation measures, significant benefits may be realized by the user, the irrigation or M&I water supply system, and the environment. Unfortunately, the only financial incentive

that the DCWCD can provide is to assist farmers in seeking water conservation money and salinity control money from other agencies.

If funds are available, CUP Section 207 funds can be used as water conservation incentives. Additionally, the DCWCD may be able to work with State and federal agencies to establish a low-interest loan program to assist local farmers with implementing water conservation projects. This measure would require further investigation.

At present, the USBR and NRCS are seeking to make funds available for on-farm salinity control. The DCWCD continues to work with the County to negotiate with the USBR for these monies. The NRCS's EQIP can be used, under certain conditions, to provide financial incentives and facilitate better water management. The goal of EQIP financial incentives is to improve the environment, particularly water quality and in-stream flow volumes.

The following provides a summary of the legal, institutional, and environmental issues that pertain to implementation of on-farm conservation financial incentives:

Legal Issues:

There are no legal issues associated with federal incentives. The revolving loan concept will require further investigation.

Institutional Issues:

Since DCWCD has insufficient funding to provide financial incentives to farmers, the primary focus will be supporting efforts to generate funds from the Lower Colorado River Basin.

The establishment of a revolving low-interest loan program would be time-consuming to create, and would require substantial seed money that the DCWCD does not have. Meetings with the CUWCD and UDWR may be prudent to further investigate this matter.

Environmental Issues:

Depending upon the incentives generated and the sources of funding, there may be National Environmental Policy Act (NEPA) requirements associated with the implementation of an incentives program. Conservation measures typically dry up wetland areas arising from canal leaks or over-irrigation. Mitigation may be required to compensate for these losses.

6.7 Water Transfers

Water transfers consist of three basic types. First, water can be transferred from one water user or canal company to another water user or canal company for temporary periods, if for the same type of use. This can help offset shortages during drought, or to take water from low value crops to insure the success of high value crops. Typically, this involves individuals who buy the "right" to use the water for a short period of time. Due to the type of crops grown in the County, this type of transfer tends to lack the required economic incentives. Another form of this type of transfer is the sale of water from one piece of land to another, leaving the pre-sale lands dry. This type of water transfer may be the cause of "dry developments" in the County where there is no drinking water available.

Second, water can be transferred from one drainage basin to another. This currently occurs in the County on the Moon Lake System. Other similar systems that are currently being looked at include the Yellowstone Feeder and the Lake Fork Feeder. These two alternatives would transfer water to different sub-drainage basins to offset late season shortages and provide some drought mitigation. On a larger scale, this also includes trans-basin transfers, similar to the Strawberry and Provo River transfers.

Third, water transferred from one use to another use is becoming more common. These transfers include agricultural uses to municipal uses, and the development of lands where the water is converted from an irrigation right to a culinary drinking right for several lots. This often also includes the transfer of rights from surface to groundwater sources. As the communities develop and grow, there may be additional economic incentives for transferring water from agricultural users to municipal use.

Where feasible water transfers are identified, the DCWCD may choose to facilitate the projects in negotiations and coordination, assist in seeking funding and technical services, and provide project administration.

The following provides a summary of the legal, institutional, and environmental issues that pertain to implementation of water transfers:

Legal Issues:

Water transfers, either temporary or permanent, are subject to approval by the State Engineer's Office and thus must follow established water permitting and application procedures (i.e., for change of use, change of point of diversion). A key future water transfer and exchange is the Green River Filings.

Institutional Issues:

The DCWCD does not have water that they can transfer. The only water potentially available for exchange will be the Green River Filings. As a result, the DCWCD lacks sufficient authority to direct or encourage water transfers within the County.

Unless there are substantial financial incentives, most water users will not be interested in water transfers. The greatest potential transfer as development continues would be from irrigation to M&I uses. Potential impacts include exceeding the capacity of existing conveyance or storage facilities, or dewatering existing facilities.

Environmental Issues:

Potentially significant environmental issues may result from water transfers. Typically, as long as the water transfers stay on the same diversion, the environmental impacts on the rivers are usually small. However, if transfers change the points of diversion, potential impacts may become significant, especially for instream flows.

6.8 Land Management

Due to the arid nature of the County, the potential for dry land farming is minimal. Additionally, other forms of land management, such as fallowing or land retirement, do not have economic incentives sufficient to encourage participation. The only exception would be during severe droughts, when individual farmers may find it economically beneficial to leave lands out of production to maximize yields on other lands.

A role of the DCWCD is to educate water users in the County about the various alternatives in land management.

The following provides a summary of the legal, institutional, and environmental issues that pertain to implementation of land management:

Legal Issues:

The DCWCD has no authority to encourage or direct land management that would either temporarily or permanently remove water from fields. Additionally, this type of management may have significant water rights impacts.

Institutional Issues:

Retiring lands from production also has significant impacts on the communities and secondary beneficiaries of agriculture in the County. These beneficiaries may include fuel suppliers, equipment dealers, and local labor resources.

Environmental Issues:

Many environmental benefits and impacts may occur through land management changes. Depending on the destination of surface runoff and groundwater discharges, wetlands may be depleted or completely dried up. Additional impacts may include reducing wildlife habitat depending on how the lands are managed. Benefits may include increased river flows and improved wildlife habitat.

6.9 Improved Operating Procedures

The DCWCD has identified several key projects that will help improve operating procedures. These include automation of diversion structures, installation of major check structures and regulating reservoirs, and the conversion from a fixed rotation schedule to a call system. The simplest call system allows the farmer to choose when he will receive water, but provides a fixed duration and fixed flow (stream) of water subject to available capacity. This is the least flexible of the call systems, but is the easiest to implement.

The most flexible system allows farmers to specify the starting time of the irrigation, the duration, and the flow they receive. As a result, farmers can carefully manage the volumes of water applied to their fields, thus maximizing their irrigation efficiency.

The more flexible the call system, the greater the required capacity of the distribution system. In most cases, by converting from flood irrigation to sprinklers, the existing capacities of the main canals and laterals will be sufficient to provide flexibility in the

starting time and size of flow. The duration will often be a function of the level of automation and the labor requirements.

There are numerous variations on the call system, with the most common allowing the farmers to call for the water when they need it subject only to system capacity. Dry Gulch Class C converted to a call system out of Big Sand Wash Reservoir and have found this to be the most successful water conservation measure they have implemented.

A role of the DCWCD is to assist the canal companies and water users in obtaining funding to install automation, telemetry, and controls. DCWCD can also assist agencies in obtaining funding to install computer equipment and defining controlling constraints for a call system.

The following provides a summary of the legal, institutional, and environmental issues that pertain to implementation of improved operating procedures:

Legal Issues:

A review of the water rights, bylaws, and charters of each operating agency will be an important part of identifying any restrictions that may impact or alter operating procedures.

Institutional Issues:

Improving operating procedures can require more staff time, new training, and associated equipment costs.

Environmental Issues:

Reduced spills, surface runoff, and deep percolation may impact instream flows and wetlands. In most cases, these impacts are insignificant due to the inconsistency of operation spills.

6.10 Distribution Control

Distribution controls include the automation of structures, or at minimum, the installation of sensors on structures to allow agencies to track flow fluctuations and stabilize water flows and water levels in the distribution system. By providing telemetry and automation on main structures, canal companies and districts can reduce fluctuations in deliveries to water users, reduce spills, and improve accounting records.

A role of the DCWCD is to assist canal companies and cities in obtaining funding to improve their monitoring systems, install new sensors, and automate systems controls.

The following provides a summary of the legal, institutional, and environmental issues that pertain to implementation of improved distribution control:

Legal Issues:

None identified.

Institutional Issues:

Additional distribution controls will increase the staff workload and potentially increase the required level of communications and monitoring. On small systems, a cell phone may be all that is required.

Environmental Issues:

None identified.

6.11 System-wide Irrigation Scheduling

System-wide irrigation scheduling includes the determination of average daily or weekly diversions necessary to meet irrigation demands, where the delivery system is long and several sub-areas are served. This method of irrigation scheduling is most efficient for systems that include regulating reservoirs, and/or reservoirs at the head of the systems. Depending on the system's constraints, this type of scheduling system can be very data-intensive.

One approach to system-wide scheduling is to base water deliveries on water orders or calls from the farmers. Under this condition, the flows in the system match the orders. Another approach is to estimate water requirements based on soils, aggregated crops in sub-areas, and consumptive use requirements. This approach can quickly become very expensive and data-intensive.

Since the DCWCD does not operate systems, they cannot provide system-wide irrigation scheduling. A role of the DCWCD is to help implement system-wide irrigation scheduling by supporting willing system operators implement call systems and assisting farmers with on-farm scheduling. The DCWCD can also assist in the development of storage and regulating reservoirs to help facilitate system-wide scheduling.

The following provides a summary of the legal, institutional, and environmental issues that pertain to implementation of system-wide irrigation scheduling:

6.11.1 Legal Issues

The system must be able to deliver water even if there is an error in scheduling calculations.

6.11.2 Institutional Issues:

Staff must be trained based on the type of scheduling selected. Training should be included for the following areas: computer software, water accounting procedures, basic scheduling, water requirement calculations, and soils.

6.11.3 Environmental Issues:

None identified.

6.12 On-farm Irrigation Scheduling

The key to successful irrigation is to determine when water is needed and how much water should be applied. Most farmers have a good sense for the irrigation water needs, based on experience and the appearance of their crops. Typically, the biggest issue farmers face is obtaining the water when it is needed. As discussed previously, this often will require the flexibility of a call system. At present, some of the canal companies are implementing call systems and realizing excellent results.

Another problem farmers face is determining how long to turn water onto one place. This decision directly impacts the volume of water used for irrigation and whether water is conserved or lost. The amount of time water may be turned on is often decided by the irrigation schedule of the company, i.e., the farmer is often given a stream of water for 24 hours. Implementation of irrigation scheduling requires the farmer to provide input into the time and amount (volume) that he receives. Significant benefits can be realized by the farmer and supply system if an appropriate time and amount is requested.

A significant amount of information is necessary to practice irrigation scheduling. This includes information about crops, soils, climatic data, irrigation efficiency, and previous irrigation practices. Based upon this data, consumptive use of water by the crops can be calculated and compared to the soil's ability to store water between irrigation. The next irrigation can then be scheduled and monitored to minimize crop stress between irrigation, and reduce deep percolation and runoff.

The DCWCD could assist in providing this service in cooperation with USU and the NRCS to help farmers implement irrigation scheduling. A web page could be provided with estimated water requirements by crop, precipitation data, and so forth to assist farmers in determining their crop water usage. Much of the data is already being monitored and collected, and in some areas of the state is already being converted into crop water requirements. This will minimize or eliminate the costs associated with the on-farm irrigation scheduling and simplify farmer applications.

A second area of emphasis for scheduling includes residential irrigation. With the advent of automated sprinklers, many homeowners over-irrigate their lawns. Education of homeowners through public outreach programs could substantially decrease residential irrigation conservation in residential irrigation uses.

The following provides a summary of the legal, institutional, and environmental issues that pertain to implementation of system-wide irrigation scheduling:

Legal Issues:

None identified.

Institutional Issues:

Individual farmers will need extensive training in crop water requirements, soils, water balance concepts, leaching requirements, and data collection. Many data are already collected, but are not readily available. A web page should be developed in cooperation with the USU extension office or with USU to provide climatic data and consumptive use data from the most common crops and correction factors for less common crops.

Environmental Issues:

None identified.

6.13 Conjunctive Use

Conjunctive use is based on using both surface water and groundwater to meet water requirements. This has not historically been applicable to areas in the County, where the water supply is predominantly from surface supplies. Additional restrictions associated with groundwater quality, as discussed in Section 2, minimize the potential of conjunctive use to a small portion of the County.

Conjunctive use is at present only applicable to M&I users. The basic concept is to use surface water supplies to meet the base demand, and groundwater wells to meet the peak water requirements. This type of use reduces the cost of operations at water treatment facilities and helps optimize both surface and groundwater uses.

The DCWCD has no authority to regulate conjunctive use, but may assist in obtaining funding to help implement efforts to develop conjunctive use.

The following provides a summary of the legal, institutional, and environmental issues that pertain to implementation of conjunctive use systems:

Legal Issues:

Water rights for both groundwater and surface water are required.

Institutional Issues:

Implementation of conjunctive use will require the development of wells to provide drought contingency or backup resources. Some areas in the County could benefit from this measure; however, it would not be implemented in the entire County due to groundwater quality.

Environmental Issues:

None identified.

6.14 Construction of Regulating Reservoirs

Regulating reservoirs allow canal companies to store water, capture spills, and eliminate fluctuations in deliveries to water users. These functions are essential to provide a call system of irrigation on open channel canals. Irrigation companies using call systems usually have at least one regulating reservoir, and on long canals or large systems may have several.

On-farm regulating reservoirs also allow farmers, where call systems are not available, to receive the water and store it for use when it is needed. They can also be used to capture and hold storm water runoff in the system, and to capture and store water when farmers stop irrigating during major precipitation events.

It is important to note that several canal companies have told the DCWCD during public meetings that storage is needed. They feel that reservoirs will help improve regulation of flows in the canals, and reduce spill and wasteway flows.

In its present capacity, the DCWCD cannot build regulating reservoirs. A role of the DCWCD is to assist irrigation companies in obtaining funding, providing assistance during design and construction, assisting with NEPA compliance and permitting, and helping provide technical support during operations.

The following provides a summary of the legal, institutional, and environmental issues that pertain to construction of regulating reservoirs:

Legal Issues:

Construction of regulating reservoirs will require the purchase of land, rights-of-way, and easements. Additional water rights for storage reservoirs must be identified and coordinated.

Institutional Issues:

To benefit from the construction of regulating reservoirs, system operators need to change the way they run their systems.

Environmental Issues:

If funding is coming from the federal or State government, NEPA compliance will be required. This will usually require an environmental assessment or environmental impact statement, depending on the size and location of the reservoir. Potential resource impacts include wetlands, endangered and threatened species, and riparian and upland wildlife habitat.

6.15 Lining Canals and Reservoirs

Lining canals and reservoirs is the most common water conservation measure currently being implemented in the County. Lining or piping the canals provides immediate reduction of seepage losses, reduces evaporation when a canal is piped, and reduces or eliminates additional consumptive use by plants growing along a canal. This measure is the primary focus of many of current federal water conservation and salinity control programs. The DCWCD has five canals that are currently being piped as part of the USBR salinity control program, with additional projects expected in the future. Other projects are being implemented in the Talmage area.

Concrete cracks and vandalism have historically resulted in substantial water losses from culinary water reservoirs. The DCWCD can assist potable water suppliers in obtaining funding to line reservoirs that need repair with suitable EPA-approved impermeable materials, i.e., membrane liners.

A role of the DCWCD is to assist canal companies and water users in seeking funding, providing technical support during NEPA compliance, design, and construction, and providing assistance during operations.

The following provides a summary of the legal, institutional, and environmental issues that pertain to lining canals and reservoirs:

Legal Issues:

Current procedures that have been developed will need to be incorporated into future efforts.

Institutional Issues:

A sponsor canal company will need to recommend projects to the DCWCD for assistance in obtaining funding. This will require contracting for design and construction, as well as establishing the funding and repayment of the facilities.

Environmental Issues:

If funding is coming from the federal or state government, NEPA compliance will be required. This will usually require an environmental assessment or environmental impact statement, depending on the size and location of the reservoir. Potential source impacts include wetlands, threatened and endangered species, riparian and upland wildlife habitat.

6.16 Water Reuse Systems

Agricultural water reuse normally consists of capturing tail water and return flows before they reach their rivers or tributaries and pumping or delivering the water back to the fields. Water reuse systems are usually not feasible due to the low-value crops predominant in the County, and the cost associated with pumping.

There are, however, some successful applications of water reuse systems in the County. Where feasible, some farmers are collecting return flows from their fields and diverting them back to the canals. Instead of allowing excess to percolate or evaporate, reuse allows downstream users to benefit from the excess flow. Additionally, this happens naturally in areas where upslope canal losses are recaptured by parallel canals downslope.

The city of Roosevelt is also successfully implementing a water reuse system. Treated effluent from their wastewater treatment system is currently being used for irrigation of nearby fields. This has eliminated the need for discharge permits to stream or rivers and provided a water supply for the irrigation of approximately 600 acres.

The DCWCD can assist communities and water users in defining ways to reuse water, obtaining funding, selecting qualified technical support, and project administration. The DCWCD has no authority to initiate reuse projects without voluntary water users.

The following provides a summary of the legal, institutional, and environmental issues that pertain to the implementation of water reuse systems:

Legal Issues:

The water must be recaptured in a manner that it does not violate the water rights associated with the diversions.

Institutional Issues:

There are currently no pump-back systems in operation in the County. Individual farmers will need to request implementation of these systems. It is important to note that it is typically cheaper to install sprinkler systems than to install a pump-back system.

Environmental Issues:

Potential impacts will vary from site to site. Issues may include wetlands, endangered species, or fisheries. The impacts on these may be either beneficial or detrimental, depending on the site.

7.0 Adopted Plan Elements

The Board and staff of the DCWCD have reviewed this WCMP and have identified key areas on which to focus their efforts. One of the greatest issues faced by the residents of the County is a short water supply. With the rivers having a peaked runoff hydrograph, as shown previously in Figure 2-2, all water users on river systems without significant water storage are affected by seasonal shortages. Additionally, limited usable-quality groundwater and increased residential development are beginning to cause additional problems for culinary (potable) water supplies. As M&I demands continue to increase, the need for potable water also increases. Some County wells are suffering from decreased capacities and yields, or water-quality degradation.

Water conservation and management is the first step in providing water to meet current and future demands. Consequently, the Board has reviewed potential water conservation and management alternatives (Part 6) and has developed the plan of action. Adopted water conservation and management methods, and the implementation and monitoring plan, are discussed below.

7.1 Adopted Measures

Recognizing the limited staff and financial resources available to the DCWCD, the Board has chosen to focus primarily upon three primary water conservation and management measures, including:

1. Constructing regulating reservoirs
2. Lining canals
3. Developing water transfers and water rights

Each measure is discussed in order of priority to the DCWCD.

7.1.1 Construction of Regulating Reservoirs

As previously discussed, rivers in the County convey the majority of County water in a very short period of time. The DCWCD has discussed several options to more efficiently manage the water supply, and consider storage reservoirs to be the best alternative to regulate early-season peaks and reduce late-season shortages. Reflecting this emphasis, the Board and community identified six storage-related projects, now in the 5-year CIP. These projects include the construction of small regulating reservoirs on canals, the expansion of three reservoirs for increased storage, and the siting and construction of new reservoirs.

To accomplish this goal, the DCWCD will continue supporting the efforts of the CUWCD in completing the UBRP. The CUWCD is currently investigating the expansion of Big Sand Wash and constructing a pipeline from the Lake Fork River to capture early-season peak flows for late-season irrigation and M&I use.

The DCWCD will also continue to support the storage-development efforts of the irrigation districts and water users. Examples include the Dry Gulch Class C pond on the South

Lateral, the Moon Lake Expansion by the Moon Lake water users, and the expansion of Brown's Draw Reservoir.

7.1.2 Lining Canals

As previously discussed, seepage losses in canals can account for a large portion of lost, diverted water. As discussed in the 5-year CIP, the K2 canal out of Brown's Draw Reservoir loses a minimum of 22 percent of the diverted water to canal seepage. Piping that canal would provide a significant increase in water supply, not including additional benefits that would result from a pressurized irrigation system.

Additionally, the DCWCD encourages canal companies to seek funding from the USBR to pipe canals to reduce salinity impacts. Since the DCWCD does not own the canals or diversions, they can only assist owners in obtaining funding to implement these projects.

7.1.3 Water Transfers

The DCWCD does not currently own any water within the County. At present, they are restricted to transferring water into the Uintah Basin from other river systems. The DCWCD is attempting to develop water from the Green River for use within the County, and is considering other sources.

One benefit of water transfers would be the potential creation of a revenue stream, independent of taxes, for the DCWCD. These funds could allow the DCWCD to take a more proactive approach to County water conservation and management.

7.2 Implementation and Schedule

The water conservation approach is implemented in five phases. The first phase is to identify willing participants. This will be an entirely administrative effort; the amount of time necessary is unknown. The second phase would be to obtain funds for a feasibility study. This may be done by the owners or by the DCWCD, as appropriate. Potential funding sources are included in Part 3 of the CWRMP. The third phase would be the completion of individual feasibility studies to identify infrastructure requirements, expected costs, and expected benefits including water savings, salinity reductions, and environmental impacts and benefits. The fourth phase would include obtaining funding, and the fifth phase would include the final design and construction of each project.

The DCWCD has identified 18 projects considered high-priority, for implementation over the next 5 years. These projects include piping canals, reservoirs, new reservoirs, and water rights transfer and developments. Obviously, the implementation and selection of projects is limited by:

- Willing participants,
- Available staff time,
- Available funding,
- Completion of projects currently in process, and
- Board prioritization

1.0 Introduction

Needs and requirements for water resources can be difficult to identify and monitor when numerous agencies and water users are involved, and there is strong competition for those resources. Additionally, water users may be facing water shortages and are unaware of available solutions. The DCWCD has prepared this CIP in order to address these challenges, to identify the water resource needs of the County, provide an equal voice to all potential beneficiaries, and prioritize projects based upon importance.

In combination with the WMCP (Volume 1, Part 1), this CIP:

- Identifies water resource needs throughout the County;
- Defines the interests and desires of County residents;
- Provides master plan level-cost opinions;
- Directs focus onto major water resource problems in an active, rather than reactive, manner; and
- Generates project solutions based upon need, staff availability, and economic resources.

The remainder of this document (Sections 2 and 3) defines the procedures for updating the CIP and provides the definitions of each data field within the 5-year and 20-year CIPs. This document provides this information in both a 5-year (Section 4) and 20-year CIP (Section 5). The 5-year CIP consists of the projects identified by the Board through an evaluation and prioritization process; these projects are priorities for the County over the next five years. The 20-year CIP consists of projects considered necessary, feasible, and beneficial to the County, but are less important than the 5-year CIP projects. These will be completed within the next 20 years.

2.0 CIP Procedures

Although a CIP cannot forecast every future emergency, it can identify common, expected problems and address them in an active, rather than reactive, manner. Unfortunately, water related-issues are rapidly changing: projects are completed, new problems arise, regulations change, and the availability of economic resources fluctuates. Validity of the CIP in such a dynamic environment can only be maintained through regular review and updates. This section provides guidelines to assist in this process.

2.1 Project Identification

The first step in updating this CIP is to identify projects that might be added. There are numerous project sources, ranging from public interests to engineering evaluations. Recognizing the benefits of a wide range of experience and interests, the DCWCD solicited public input to provide project ideas. This process identifies projects by:

- Drawing on Board members' knowledge of their areas of representation
- Input from public meetings that are held in Roosevelt and Duchesne
- Staff experience and knowledge of the County
- Public agency recommendations from the cities, water districts, and state and federal agencies
- Previous projects identified in studies and reports

All projects and concerns are documented and included in the initial reviews.

2.2 Project Development

After the projects are identified, it is necessary for the DCWCD staff to start a CIP form for each project. Project descriptions and justifications are prepared, which include a definition of whether the project improves water conservation or management; project type must be determined; then classified by the requirements and beneficiaries. Further explanations of each data field are provided in Section 3 of this document.

Since a broad range of projects can be identified, it is necessary to group or classify them to ensure a uniform basis of comparison. As a result, the DCWCD has adopted two primary classifications, Code and Group, to assist in evaluating and prioritizing projects.

The code refers to the status or condition of the project. Typically, the code is taken from Table 1.

TABLE 2-1
Code Definitions

Code Abbreviation	Description
ADM	Administrative Projects
ON	Ongoing projects
NE	Needs engineering
NES	Needs engineering study
NEP	Needs engineering proposal
EX	Exempt (usually due to legal or political reasons)

The group refers to the beneficiary of the project. Typically, the group is selected from Table 2.

TABLE 2-2
Group Definitions

Group Type	Definition
Irrigation	Primarily irrigation water users
M&I	Primarily municipal and industrial water users
M&I and Irr.	Combined irrigation and M&I water users
Environmental	Environmental water users

2.3 Project Prioritization

Once the projects are classified, the DCWCD utilizes a two-step process for prioritizing projects for separation into the 5- and 20-year CIPs. In the preliminary prioritization, the Board members review all CIP projects and identify the five that are most important for each area, and another five that are important to the County as a whole. These preliminary projects are then sorted into the respective groups for final evaluation.

The final evaluation uses a paired-comparison process for each group of projects. This method, discussed more fully in Volume 3, Part 6, allows the Board members to compare the projects of importance to the County. The project that is considered most important receives a score of 1, while the project of lesser importance receives a score of 0. If the two projects are equal, then they both receive a score of 0.5. After comparing all pairs, the highest ranking projects (usually two or three) will be included in the 5-year CIP and receive a CIP Class of "A." All others are included in the 20-year CIP and receive a CIP Class classification of "B" or "C." B projects are considered important to the County, but usually do not need to be completed rapidly. Class C projects are considered beneficial to the

County, but currently lack support, funding, or priority. At this point, the 20-year CIP is complete.

2.4 Cost Opinions and Alternatives

The next step develops and updates cost opinions for the 5-year CIP projects. Information is collected from existing reports, maps, and project beneficiaries to develop cost opinions of engineering fees, construction costs, and total costs at a master planning level, typically ±30 percent. When engineering cost opinions are provided in previous reports, they are preferred. Otherwise, tools and estimating guidelines are provided in Volume 3, Part 6 of the CWRMP.

Additionally, this task generates a summary of alternative projects accomplishing the same benefit to be considered in later planning efforts.

2.5 Project Implementation

Upon completion of the above, the CIP is ready for submittal to the Board. The Board evaluates available resources, potential funding sources, and immediate needs to begin implementation of two or three projects from the 5-year CIP. Once the projects are selected, it is necessary to locate and obtain funding to complete the project; the project will then be implemented.

2.6 Completion/Removal of Projects

Projects are removed from the CIP list as they are completed. This prevents the CIP database from becoming stagnant and out-of-date. Additionally, the Board selects new projects from the 20-year CIP Class B projects, typically from the same group as the finished project, to keep the 5-year CIP complete.

2.7 Annual CIP Updates

The process of keeping the CIP up-to-date requires recognition of constantly changing needs and issues. Addressing these changes require, at a minimum, an annual review of the 5- and 20-year CIPs. It is recommended that the DCWCD utilize the public process in review at least every other year, while Board and staff review should occur annually.

3.0 CIP Definitions

This section provides definitions for the terms in the 5-year and 20-year CIP report forms. Additional definitions and procedures can be found in Volume 3, Part 6 of the CWRMP.

3.1 5-year CIP Definitions

Project Number: A reference number used in tracking project information. Automatically generated in the ID field when the project is added to the project lists.

Project Name: Provided when the project is created in the CIP database. Information is contained in the NAME field.

Source of Project: Defines where the project was identified; contained in the SOURCE field.

Project Description: Project description describes the project and its purpose(s); contained in the DESC field.

Project Justification: Project justification provides information on the benefits and need for the project, and is contained in the JUST field.

Alternative Solutions: Identifies alternatives where applicable; contained in the ALTERN field.

Status: Defines the requirements of the projects; contained in the CODE field. Status uses one of the following descriptors:

- **ADM (Administrative Projects):** Administrative projects requiring minimal outside support. May include generating specific information to clearly define projects or complete tasks that do not require engineering support, such as seeking to change zoning laws. These do not involve CIP costs.
- **NE (Needs Engineering):** Projects that will require engineering design.
- **NEP (Needs Engineering Proposal):** Projects that will require engineering services and will likely need a proposal process for selecting project engineers.
- **NES (Needs Engineering Study):** Projects that will require engineering studies to clearly define project information and generate detailed cost estimates.
- **ON (Ongoing):** Projects that have already been defined and are being implemented. No CIP costs are associated with these projects.

Group: Identifies the users that would benefit from the project. Information is contained in the GROUP field and uses one of the following descriptors:

- **Environmental:** Projects that are focused on benefiting the environment.
- **Irrigation:** Projects that are focused on benefiting the agricultural industry, primarily irrigated agriculture.

- **M&I:** Projects that are focused on benefiting municipal and industrial water users. Typically these are focused on the towns, cities, and major industries, including the oil industry.
- **Combined:** Projects that benefit both the Irrigation and M&I categories.

Type: Describes the project type. This information is contained in the TYPE field and uses one of the following descriptors:

- **Environmental:** Projects that are motivated by environmental purposes and seek to accomplish environmental goals.
- **Automation:** Projects that involve automation, telemetry, system control and data acquisition (SCADA) or similar approaches to improving operations, monitoring, and system control.
- **Canal Lining:** Projects that will either line or pipe canals.
- **Distribution/Transmission:** Projects that consist of either building or expanding distribution and transmission systems. Usually associated with M&I systems, although the Lake Fork Feeder Pipeline is a good example of a proposed new transmission line.
- **Diversion:** Projects that are either new, modifications, or replacements of diversion structures on the rivers.
- **On-Farm:** Projects that are built entirely on individual farms, usually involving single owners.
- **Operations:** Projects that are focused on improving and/or simplifying system operations.
- **Policy/Management:** Projects that are entirely focused on policy and management and are aimed at changing or modifying current procedures.
- **Reservoir:** Projects that would either build new or expand existing reservoirs.
- **H&S:** Health and safety projects that are directed at either public health or safety.
- **Flood Control:** Projects that control, mitigate, prevent, or regulate flooding.
- **Supply/Rights:** Projects that involve developing a water supply, usually associated with obtaining, developing, proving, or defining water rights. Other water supply projects are also included in this category.
- **Water/Wastewater:** Projects that are associated with water and wastewater service in either a municipal or rural environment. All projects related to the delivery of water and the treatment and removal of wastewater are included.

CIP Classification: Identifies the category or classification of the projects for completion as part of the CIP. Basic priorities are broken down into three classifications: "A" implies the highest priority (5-year CIP), "B" implies a moderate importance (Reserve CIP), while "C" implies the least importance (20-year CIP). Information is contained in the CIP CLASS field.

Source: Shows how the project was identified for the CIP evaluation. Sources include the Board and staff of the DCWCD, and public meetings held as part of the water conservation and management master plan, or by consultants. Information is contained in the SOURCE field.

Water Conservation/Management: Identifies whether a project provides water management or water conservation benefits. Information is contained in the WCM field.

Engineering Cost: Opinion for engineering fees to complete the phase of the project described in the project description. Information is contained in the ENGCOST field.

Construction Cost: Opinion for construction costs to complete the phase of the project described in the project description. Information is contained in the CONSCOST field.

Total Cost: Opinion for the expected total costs of the projects, usually the sum of the engineering costs and construction costs. Information is contained in the TOTCOST field.

3.2 20-year CIP Definitions

CIP Class: Identifies the category or classification of the projects for completion as part of the 20-year CIP. Basic priorities are broken down into three classifications: "A" implies the highest priority (5-year CIP), "B" implies a moderate importance (Reserve CIP), while "C" implies the least importance (20-year CIP). Information is contained in the CIP CLASS field.

Name: The name is provided when the project is created in the CIP database; information is contained in the NAME field.

ID: A reference number used in tracking project information. Number is automatically generated in the ID field when the project is added to the project lists.

Group: Identifies the users that would benefit from the project if implemented. Information is contained in the GROUP field and consists of one of the following descriptors:

- **Environmental:** These are projects that are focused on benefiting the environment.
- **Irrigation:** These are projects that are focused on benefiting the agricultural industry, primarily irrigated agriculture.
- **M&I:** These are projects that are focused on benefiting municipal and industrial water users. Typically these are focused on the towns, cities, and major industries, including oil.
- **Combined:** These are projects that benefit both the Irrigation and M&I categories.

Type: This field describes the project type. This information is contained in the TYPE field and consists of one of the following descriptors:

- **Environmental:** Projects that are motivated by environmental purposes and seek to accomplish environmental goals.
- **Automation:** Projects that involve automation, telemetry, SCADA or similar approaches to improving operations, monitoring, and system control.

- **Canal Lining:** Projects that will either line or pipe canals.
- **Distribution/Transmission:** Projects that consist of either building or expanding distribution and transmission systems. They are usually associated with M&I systems, although the Lake Fork Feeder Pipeline alternative is a good example of a proposed new transmission line.
- **Diversion:** Projects that are either new, modifications, or replacements of diversion structures on the rivers.
- **On-Farm:** Projects that are built entirely on individual farms, usually involving single owners.
- **Operations:** Projects that are focused on improving and/or simplifying system operations.
- **Policy/Management:** Projects that are entirely focused on policy and management and are aimed at changing or modifying current procedures.
- **Reservoir:** Projects that would either build new or expand existing reservoirs.
- **H&S:** Health and safety projects that are directed at either public health or safety.
- **Flood Control:** Projects that control, mitigate, prevent, or regulate flooding.
- **Supply/Rights:** Project that involve developing a water supply, usually associated with obtaining, developing, proving, or defining water rights. Other water supply projects are included in this category.
- **Water/Wastewater:** Projects that are associated with water and wastewater service in either a municipal or rural environment. All projects related to the delivery of water and the treatment and removal of wastewater are included in this category.

Source: Defines where the project was identified; information is contained in the SOURCE field.

Description: Project description describes the project and its purpose(s); information is contained in the DESC field.

Conservation/Management: Identifies whether a project provides water management or water conservation benefits; information is contained in the WCM field.

4.0 5-year CIP

Duchesne County Water Conservancy District

5-year Capital Improvement Project

Project Number: 2

Project Name: Green River Exchange

Source Of Project: Board Meeting

Project Description:

The DCWCD has filed on 47,600 acre-feet of water in the Green River to improve water quality, and provide additional water for M&I and irrigation shortages. The primary focus is the identification of beneficial water uses, methods of transporting water to where it can be used by either facilities or exchange, and demonstrating good faith and intent to develop these water rights. As of January 2000, Franson and Noble has submitted a draft study to help meet these goals. This project is looking at options including offstream winter storage, new land development, and increased storage in the Midview Reservoir.

Project Justification:

This water represents the potential irrigation of approximately 15,800 acres of new land in the County. Alternatives for using this water include drought mitigation if storage can be found or developed, transfers to drainage basins that need additional water, and M&I water supplies to offset groundwater requirements. The DCWCD has sought funds through grants to find ways to utilize these water rights. Costs included in this CIP only address the initial studies.

Alternative Solutions:

If these water rights are not developed, they will be lost. There is a limited time within which the DCWCD has to prove beneficial use of this water. The development of other water sources will be independent of these water rights.

Status: ON ***Group:*** Combined ***Type:*** Supply/Rights

CIP Classification: A ***Source:*** Board Meeting ***Water Conservation/Management?:*** Yes

Engineering Cost: $60,000

Construction Cost: $0

Total Cost: $60,000

Duchesne County Water Conservancy District

5-year Capital Improvement Project

Project Number: 5

Project Name: Roosevelt & Ballard M&I

Source Of Project: Board Meeting

Project Description:

Expand the Roosevelt M&I delivery systems to areas around Roosevelt and Ballard to ensure future water supplies. This project will consist of three phases. Phase I would prepare a feasibility study to look at the available water supply, necessary infrastructure, and a cost opinion. Only the cost for the feasibility study has been estimated in this CIP. Phase II would address permitting, funding, land acquisition, and addressing environmental issues. Phase III would include design and construction.

Project Justification:

Ballard currently purchases most of its water from the Ute Indian Tribe; a very limited water supply that has questionable water quality. By expanding the Roosevelt system, Ballard can receive a more stable water supply to meet the state water quality standards.

Alternative Solutions:

As an alternative, Ballard could seek to develop its own water supply and infrastructure.

Status: NE ***Group:*** M&I ***Type:*** Water/Wastewater

CIP Classification: A ***Source:*** Board Meeting ***Water Conservation/Management?:*** No

Engineering Cost: $20,000

Construction Cost: $0

Total Cost: $20,000

Duchesne County Water Conservancy District

5-year Capital Improvement Project

Project Number: 13

Project Name: Preserve Existing Wells

Source Of Project: Board Meeting

Project Description:

This project would prevent new wells from depleting groundwater and drying up existing wells. It would consist of developing and implementing a plan for wells and the drinking water source protection plans. The plan would consist of preparing groundwater reports on a basin-by-basin basis to address the following issues: (1) the sustainable yield of the aquifer in question; (2) demonstration, using a groundwater model, of the significant impacts that will result from exceeding the sustainable yield per state engineers rules, regulations, and precedence; and (3) presenting the "big picture" to the state engineer's office so it is not required for every well proposed in the future. The costs presented with this project are per subbasin and area of interest.

Project Justification:

Due to the limited groundwater resources in the County, some existing wells have been negatively impacted by the construction of new wells that draw water levels in the aquifer below historic levels. Impacts have included increased pumping costs, dry wells, and reduced water yields.

Alternative Solutions:

If efforts are not made to preserve the existing wells, it may become necessary to redrill, deepen, or relocate some of the wells to meet historical water deliveries.

Status: ADM ***Group:*** M&I ***Type:*** Supply/Rights

CIP Classification: A ***Source:*** Board Meeting ***Water Conservation/Management?:*** Yes

Engineering Cost: $25,000

Construction Cost: $0

Total Cost: $25,000

Duchesne County Water Conservancy District

5-year Capital Improvement Project

Project Number: 19

Project Name: Reclassification of 6W Lands & 2 Lands

Source Of Project: Board Meeting

Project Description:

Reclassify 6W lands that were too steep for flood irrigation but are good for sprinkler irrigation. Also reclassify Class 2 lands that may be wrongly classified based on sprinklers.

Project Justification:

Many of the lands in the County were classified as 6W lands, which makes them ineligible for CUP water. They were classified this way based on drive-by classifications and slopes that were restrictive to flood irrigation. With the advent of sprinkler irrigation, many of these lands make excellent cropland, potentially some of the most productive lands in the county. This has already been done in the Uinta and Upalco Units of the CUWCD. Costs to complete the County are estimated at $25/acre.

Alternative Solutions:

There are no alternatives to this project.

Status: NE ***Group:*** Irrigation ***Type:*** Policy/Management

CIP Classification: A ***Source:*** Board Meeting ***Water Conservation/Management?:*** No

Engineering Cost: $0

Construction Cost: $0

Total Cost: $0

Duchesne County Water Conservancy District

5-year Capital Improvement Project

Project Number: 27

Project Name: Fire Protection

Source Of Project: Board Meeting

Project Description:

Identify specific fire control and suppression needs in the County as associated to water. One alternative that has been identified is the purchase of more fire-fighting equipment, more fire control staff, and requiring fire suppression equipment in houses built in the future. These requirements would be addressed as willing water companies, towns, cities, or agencies are identified and request assistance from the DCWCD.

Project Justification:

In the DCWCD's evaluation of the County's culinary water systems, several were identified as being unable to deliver sufficient fire flows. It has also become apparent that each system will need to identify specific system improvements and, potentially, further fire suppression facilities and equipment may need to be purchased.

Alternative Solutions:

Specific emphasis would be placed on storage facilities and capacity. Further study is required to develop a specific plan to identify these improvements and a plan for implementation.

Status: ADM ***Group:*** M&I ***Type:*** H&S

CIP Classification: A ***Source:*** Board Meeting ***Water Conservation/Management?:*** No

Engineering Cost: $0

Construction Cost: $0

Total Cost: $0

Duchesne County Water Conservancy District

5-year Capital Improvement Project

Project Number: 31

Project Name: Uinta River Storage (M&I & Irrigation)

Source Of Project: Board Meeting

Project Description:

Seek to develop and construct long-term storage on the Uinta River to meet late-season shortages, and provide stabilization of the flows and drought mitigation. This has been looked at by the CUP/UBRP, but has not been implemented due to political issues. An independent effort, including the feasibility study and NEPA documentation on the Upper Uinta site, would be beneficial.

Project Justification:

The Uinta River water users suffer from two primary problems. The Uinta River has a very narrow runoff hydrograph, as discussed in the water conservation plan. As a result, the water users suffer late-season shortages almost every year. Additionally, due to the lack of storage facilities, even minor droughts can cause serious shortages for water users. In some cases, various canals are not able to divert water for the entire irrigation season.

Alternative Solutions:

Although water conservation efforts can help reduce the impacts of late-season shortages, there is no real solution other than developing new storage facilities.

Status: NE ***Group:*** Combined ***Type:*** Reservoir

CIP Classification: A ***Source:*** Board Meeting ***Water Conservation/Management?:*** Yes

Engineering Cost: $1,500,000

Construction Cost: $0

Total Cost: $1,500,000

Duchesne County Water Conservancy District

5-year Capital Improvement Project

Project Number: 33

Project Name: Small Storage (in-line & off-line) on Canals

Source Of Project: Board Meeting

Project Description:

As an alternative to large storage reservoirs, small regulation reservoirs can be built along canals to reduce fluctuations in delivery and enable the conversion to a call system. Further study is required to identify specific locations and canal companies, irrigation districts, and water users' associations that would like to participate.

Project Justification:

Improvements in water delivery efficiencies, reductions in system losses, and ease of operation are all additional benefits of these smaller reservoirs. The size of these reservoirs may be an acre or less in surface area, depending upon the size of the canal.

Alternative Solutions:

The alternative to small storage and regulating reservoirs would be piping the canals and providing larger storage reservoirs similar to the Dry Gulch Class C pond.

Status: ADM ***Group:*** Irrigation ***Type:*** Reservoir

CIP Classification: A ***Source:*** Board Meeting ***Water Conservation/Management?:*** Yes

Engineering Cost: $0

Construction Cost: $0

Total Cost: $0

Duchesne County Water Conservancy District

5-year Capital Improvement Project

Project Number: 37

Project Name: Brown's Draw Reservoir Enlargement

Source Of Project: Board Meeting

Project Description:

Increase the size of Brown's Draw Reservoir by 1,000 acre-feet to improve system operations, control or minimize seasonal shortages, and provide drought mitigation.

Project Justification:

This project would increase the water storage capacity in Brown's Draw Reservoir, benefiting approximately 3,000 acres. This land already suffers from insufficient water and seasonal shortages.

Alternative Solutions:

Eliminating the water shortages will require storage, either through expanding Brown's Draw or building a new reservoir.

Status: NES/N ***Group:*** Irrigation ***Type:*** Reservoir

CIP Classification: A ***Source:*** Board Meeting ***Water Conservation/Management?:*** Yes

Engineering Cost: $156,000

Construction Cost: $1,198,000

Total Cost: $1,354,000

Duchesne County Water Conservancy District

5-year Capital Improvement Project

Project Number: 40

Project Name: Pipe K2 out of Brown's Draw

Source Of Project: Board Meeting

Project Description:

Pipe K2 out of Brown's Draw for water conservation and improved distribution efficiency. The length of pipe, acres served, and flows at various control points were provided by the water users. Elevations and associated data were assumed based on USGS quad sheets and estimated locations of control points.

Project Justification:

The K2 lands already suffer from seasonal water shortages and insufficient water supply. The estimated water loss in the canal alone is 14.1 cfs (21.6 percent), according to a water loss study completed by the irrigation company in July 2000. This would equate to approximately 2,800 acre-feet per year, assuming a 100 day irrigation season. Additionally, by piping this canal, these lands could convert to a pressurized irrigation system, potentially increasing their irrigation efficiencies from approximately 40 percent to about 65 percent. The combined water savings on this project, realized by converting to sprinklers and piping the canal, would be approximately 40 to 50 percent.

Alternative Solutions:

As an alternative, the system could be lined with non-pressurized pipe or geotechnical membranes to eliminate the seepage losses. This would not provide the alternative of pressurized irrigation systems.

Status: NE ***Group:*** Irrigation ***Type:*** Canal Lining

CIP Classification: A ***Source:*** Board Meeting ***Water Conservation/Management?:*** Yes

Engineering Cost: $976,000

Construction Cost: $11,709,000

Total Cost: $12,685,000

Duchesne County Water Conservancy District

5-year Capital Improvement Project

Project Number: 43

Project Name: Culinary Water Storage Tanks

Source Of Project: Board Meeting

Project Description:

The DCWCD would identify public water provider agencies in the County who have insufficient storage within their systems. The DCWCD would then assist willing agencies in obtaining necessary permits, funding, and engineering support to build the water storage tanks.

Project Justification:

During previous studies completed for the DCWCD, deficiencies in water storage were identified in several County water utilities. The additional storage is needed to provide sufficient water pressure, supplies during peak periods, fire flows, and to conserve water.

Alternative Solutions:

The construction of larger distribution laterals and systems would be able to help alleviate the need for new storage tanks in some systems.

Status: ADM ***Group:*** M&I ***Type:*** Water/Wastewater

CIP Classification: A ***Source:*** Board Meeting ***Water Conservation/Management?:*** Yes

Engineering Cost: $0

Construction Cost: $0

Total Cost: $0

Duchesne County Water Conservancy District

5-year Capital Improvement Project

Project Number: 53

Project Name: New USBR Salinity Projects

Source Of Project: Roosevelt Meetings

Project Description:

Identify more projects to obtain funding from the USBR salinity funds for salinity control and water conservation. This process will consist of two phases. Phase I will identify projects and willing participants, and is an administrative task and has neither engineering nor construction costs associated with it. Phase II would consist of preparing a feasibility study addressing infrastructure, potential environmental issues, salinity impacts, and costs. The feasibility study would be the basis of the application for funding. Phase III would include the design and construction of the new projects. Costs for Phase II and Phase III are dependent upon the projects identified, and are therefore not included in this CIP cost opinion.

Project Justification:

These projects provide reduced salt loading of the river systems, improving irrigation distribution efficiencies by piping canals. The USBR has increased available salinity funds and these funds may be available for more salinity reduction projects. Many canals in the County would benefit from piping, but are currently not specified. Canal companies such as the Farm Creek Canal Company will need to come forward and request assistance to submit funding requests. Following funding, engineering services will need to be acquired during design and construction.

Alternative Solutions:

Alternative funds may be available from the Utah Division of Water Resources based on low-interest loans.

Status: ADM ***Group:*** Combined ***Type:*** Canal Lining

CIP Classification: A ***Source:*** Roosevelt Meeting ***Water Conservation/Management?:*** Yes

Engineering Cost: $0

Construction Cost: $0

Total Cost: $0

Duchesne County Water Conservancy District

5-year Capital Improvement Project

Project Number: 68

Project Name: Reclaim Unused Uintah Basin Water transferred to Wasatch Front

Source Of Project: Roosevelt Meeting

Project Description:

As part of the construction of the CUP, the original plan was to divert water from Flaming Gorge into the Uintah Basin. This project is no longer being pursued due to cost-ineffectiveness. As an option to increase the available supplies to Duchesne County, the DCWCD can pursue reclaiming unused water diverted from the Basin by agreement with the United States Government. Specific water may include water allocated to the counties that withdrew from the CUP, or water that was allocated for southern Utah County and Juab County for agricultural purposes. This project would define a potentially cost-effective alternative to developing the water for the Wasatch Front. The starting basis for this project would be a feasibility study looking at the water supplies, storage, and potential uses of this water in the Basin. Economic and environmental evaluations would be a major part of this evaluation.

Project Justification:

When the CUP was planned, water was to be brought from Flaming Gorge Reservoir to Duchesne County via a pipeline and tunnel. However, over the years, the Flaming Gorge pipeline was dropped due to the extensive associated costs. Additionally, several counties in central Utah have dropped out of the CUP and additional facilities, such as the Spanish Fork-Nephi pipeline are not going to be built as originally planned. As an exchange, the water that was going to be diverted to the Wasatch Front could be left in the County and the reservoir storage used to offset seasonal shortages.

Alternative Solutions:

There are no real alternatives to restoring the wet water and storage capacity to the drainage basins.

Status: NES ***Group:*** Combined ***Type:*** Policy/Management

CIP Classification: A ***Source:*** Roosevelt Meeting ***Water Conservation/Management?:*** Yes

Engineering Cost: $45,000

Construction Cost: $0

Total Cost: $45,000

Duchesne County Water Conservancy District

5-year Capital Improvement Project

Project Number: 70

Project Name: Sand Wash Reservoir Enlargement

Source Of Project: Roosevelt Meeting

Project Description:

Enlarge Big Sand Wash Reservoir from 12,000 acre-feet to 24,000 acre-feet to reduce seasonal shortages, provide drought mitigation, and provide M&I water. This project is being considered part of the UBRP.

Project Justification:

This project is being considered as part of the CUP UBRP efforts. At present, the completion of this project will be subject to an updated EIS. Expanding Big Sand Wash Reservoir would increase the ability to store peak runoffs coming from the Lake Fork drainage. This water could then be used by the agricultural users in the area as well as Roosevelt City.

Alternative Solutions:

As an alternative to this project, the construction of additional reservoirs would be necessary. Based on other work already completed by the CUP, this alternative is not likely.

Status: NE ***Group:*** Irrigation ***Type:*** Reservoir

CIP Classification: A ***Source:*** Roosevelt Meeting ***Water Conservation/Management?:*** Yes

Engineering Cost: $1,897,000

Construction Cost: $13,088,000

Total Cost: $14,985,000

Duchesne County Water Conservancy District

5-year Capital Improvement Project

Project Number: 71

Project Name: Lake Fork Pipeline/Big Sand Wash - Feeder

Source Of Project: Roosevelt Meeting

Project Description:

This pipeline would divert water from the Lake Fork River into Sand Wash Reservoir, increase water supply to agriculture, mitigate late season shortages, provide drought mitigation, and provide a M&I surface water supply for Roosevelt City.

Project Justification:

This project is being looked at as part of the CUP UBRP efforts. The completion of this project is subject to the completion of an EIS.

Alternative Solutions:

Alternatives to accomplish the same goals have been evaluated as part of the CUP UBRP. These alternatives have been postponed due to political and environmental barriers.

Status: NE ***Group:*** Irrigation ***Type:*** Distribution/Transmission

CIP Classification: A ***Source:*** Roosevelt Meeting ***Water Conservation/Management?:*** Yes

Engineering Cost: $600,000

Construction Cost: $4,028,000

Total Cost: $4,628,000

Duchesne County Water Conservancy District

5-year Capital Improvement Project

Project Number: 81

Project Name: Hancock Cove Wastewater Treatment

Source Of Project: Roosevelt Meeting

Project Description:

Eliminate groundwater contamination problems from Hancock Cove septic systems by providing wastewater treatment facility. This would be done by installing sewer collection facilities with distribution to an aerated lagoon treatment system. This project will consist of three phases. Phase I would prepare a feasibility study that would look at the expected sewage flows, necessary infrastructure, and a cost opinion. Phase II would address permitting, funding, land acquisition, and environmental issues. Phase III would include design and construction. Only the cost for the feasibility study has been estimated in this CIP.

Project Justification:

Hancock Cove contains over 150 homes using septic tanks. Groundwater contamination is now becoming a major concern. Efforts are being made to develop a service district, and develop wastewater collection and treatment facilities.

Alternative Solutions:

As an alternative to the lagoon system, the wastewater collection facilities could be built to Roosevelt City.

Status: NE ***Group:*** M&I ***Type:*** Water/Wastewater

CIP Classification: A ***Source:*** Roosevelt Meeting ***Water Conservation/Management?:*** No

Engineering Cost: $25,000

Construction Cost: $0

Total Cost: $25,000

Duchesne County Water Conservancy District

5-year Capital Improvement Project

Project Number: 82

Project Name: Cedarview and West Neola Culinary System

Source Of Project: Roosevelt Meeting

Project Description:

Provide a culinary water system and supply for Cedarview and West Neola. This will require the identification of potential water sources, any collection and treatment necessary, and a distribution system. This project will consist of three phases. Phase I would prepare a feasibility study that would look at the available water supply, necessary infrastructure, and a cost opinion. Only the cost for Phase I has been estimated in this CIP. Phase II would address permitting, funding, land acquisition, and environmental issues. Phase III would include design and construction.

Project Justification:

These two areas are dry subdivisions. The need for water delivery for fire control and prevention, as well as drinking water, are well defined.

Alternative Solutions:

Rather than developing a new system, the Roosevelt system could be expanded to include Ballard, West Neola, Cedarview, and North Crescent. This would alleviate the problem without the development of a new system.

Status: NE ***Group:*** M&I ***Type:*** Water/Wastewater

CIP Classification: A ***Source:*** Roosevelt Meeting ***Water Conservation/Management?:*** No

Engineering Cost: $20,000

Construction Cost: $0

Total Cost: $20,000

Duchesne County Water Conservancy District

5-year Capital Improvement Project

Project Number: 117

Project Name: Zoning of canal rights-of-way

Source Of Project: Duchesne Meeting

Project Description:

Modify zoning to prevent development around canals and within maintenance rights-of-way.

Project Justification:

Many canals are facing problems of restricted or limited access due to unclear rights-of-way. In 1890 and again in 1891, the U.S. Congress passed two acts associated with canal rights-of-way across federal lands. These two acts specified that the canals would have a permanent right-of-way and easement of 50 feet. Many of these canals were developed as part of the early settlement of the county. Although the acts do not specify private lands, they do reflect that right-of-way was recognized in the early development periods, and that in order for these canals to be constructed, permanent right-of-way may have been granted by land owners. Implementation of this project would consist of a three-step process. First, the canal companies need to search their records and bylaws to identify if they have specified rights-of-way and easements on their canals. If not, they could reference the Acts of 1890 and 1891 and claim up to 50 feet. Second, they should file these records with the County recorder to have them registered as legal rights-of-way. Finally, the County should pass zoning laws to restrict the construction in canal rights-of-way. By doing this, many of the problems associated with canal maintenance can be resolved.

Alternative Solutions:

By not zoning these rights-of-way for non-development, the canal companies will continue to suffer infringements and the increased difficulties in maintaining facilities.

Status: ADM ***Group:*** Irrigation ***Type:*** Policy/Management

CIP Classification: A ***Source:*** Duchesne Meeting ***Water Conservation/Management?:*** No

Engineering Cost: $0

Construction Cost: $0

Total Cost: $0

Duchesne County Water Conservancy District

5-year Capital Improvement Project

Project Number: 137

Project Name: Expand Moon Lake

Source Of Project: UBRP/1999

Project Description:

Increase the storage in Moon Lake Reservoir from 35,400 acre-feet to 41,035 acre-feet.

Project Justification:

This will move water out of some of the mountain lakes and increase the storage potential for the Moon Lake Irrigation District. By providing the additional storage, the late-season shortages can be reduced.

Alternative Solutions:

Locate and construct new reservoirs in the County that can serve the same lands.

Status: NES/N ***Group:*** Irrigation ***Type:*** Reservoir

CIP Classification: A ***Source:*** UBRP/1999 ***Water Conservation/Management?:*** Yes

Engineering Cost: $228,000

Construction Cost: $1,139,000

Total Cost: $1,367,000

5.0 20-year CIP

Duchesne County Water Conservancy District

20-year Capital Improvement Project

CIP Class	Name	ID	Group	Type	Source	Description	Conservation/Mngt
B	Cedarview Dam and Reservoir	83	Combined	Reservoir	Roosevelt Meeting	Construct a small reservoir near Cedarview to provide irrigation, M&I, and secondary water.	Yes
B	River Heading Automation & Controls	22	Irrigation	Automation	Board Meeting	Identify diversion structures in the county that would benefit from automating the gates to alleviate diurnal fluctuations.	Yes
B	Class C township laterals	105	Irrigation	Canal Lining	Duchesne Meeting	Pipe the Class C laterals within the township to conserve water, improve distribution efficiency, and increase safety.	Yes
B	Class B Canal	92	Irrigation	Canal Lining	Duchesne Meeting	Pipe the Dry Gulch Class B Canal.	Yes
B	Roosevelt Ditch System	79	Irrigation	Canal Lining	Roosevelt Meeting	Pipe the Roosevelt ditch system for water conservation and safety.	Yes
B	Hancock Lateral	76	Irrigation	Canal Lining	Roosevelt Meeting	Pipe the Hancock Lateral to conserve water, improve distribution efficiency, and lower the water table in Hancock Cove.	Yes

Duchesne County Water Conservancy District

20-year Capital Improvement Project

CIP Class	Name	ID	Group	Type	Source	Description	Conservation/Mngt
B	County Zoning For Development	45	M&I	Policy/Management	Board Meeting	Improve county zoning to reduce impacts on the County and provide culinary water and fire protection flows to every resident. Lobby and work with the County Commissioners to implement an ordinance that will govern development and prevent more "dry" subdivisions from being developed in the County. This would include preventing the transfer of irrigation water off farm land and then developing the lands without a water source. This ordinance would help alleviate tension between developers and agricultural interests.	No
B	Tabiona Spring 2	114	M&I	Supply/Rights	Duchesne Meeting	Replace the Spring #2 collection system for Tabiona. The existing box is beginning to fail and is no longer as efficient as necessary.	No
B	New culinary systems	44	M&I	Water/Wastewater	Board Meeting	Assist various communities and water service districts in the County with the installation and replacement of culinary systems. This would address the needs of "dry" areas, areas currently on wells and septic tanks, and areas where well water is of low quality.	Yes

Duchesne County Water Conservancy District

20-year Capital Improvement Project

CIP Class	Name	ID	Group	Type	Source	Description	Conservation/Mngt
B	Provide adequate water for oil industry	34	M&I	Water/Wastewater	Board Meeting	Study and define the amount of water that will be needed in the future by the oil industry. It would ensure an adequate water supply to meet the expected oil industry demands.	Yes
B	Tabiona Storage Tank	113	M&I	Water/Wastewater	Duchesne Meeting	Provide an additional water storage tank for Tabiona.	Yes
B	Storage capacity for Johnson Water	57	M&I	Water/Wastewater	Roosevelt Meeting	Provide additional water storage for Johnson Water Service District.	Yes
C	Maximum Release vs. Flood Stages	122	Combined	Flood Control	Duchesne Meeting	Complete a study to define the maximum release from the reservoirs before flooding begins. This study would be similar to a flood insurance study to be done by the Federal Emergency Management Agency (FEMA). Additionally, the tunnel diversions and maximum releases in the Strawberry River and Duchesne River need to be coordinated with the CUWCD and PRWUA.	Yes

Duchesne County Water Conservancy District

20-year Capital Improvement Project

CIP Class	Name	ID	Group	Type	Source	Description	Conservation/Mngt
C	Ice Jamming Study and Mitigation on Strawberry River	121	Combined	Flood Control	Duchesne Meeting	Ice jams are a problem on the Strawberry River above Starvation Reservoir when the CUWCD is letting water out of Strawberry Reservoir. A study should be done to define possible guidelines for releases to prevent flooding.	No
C	Maintain Old Canals as Flood Control	120	Combined	Flood Control	Duchesne Meetings	When piping canals, leave old canals as flood control channels and structures. Maintenance would be provided by the owning agency.	No
C	Consider Including Moon Lake Exclusion (M&I & Irrigation) in DCWCD	30	Combined	Policy/Management	Board Meeting	Incorporate the area of land in Uintah County that was excluded from the Uintah Water Conservancy District to ensure the interests of these water users are being represented.	No
C	Zoning in Potential Flood Plains	118	Combined	Policy/Management	Duchesne Meeting	Provide zoning to prevent construction in potential flood zones to prevent catastrophic problems similar to the Weber/Davis area canal. Duchesne already has an effective flood insurance study in place. Additional zoning by the County would include mapping flood plains and restricting development further.	No

Duchesne County Water Conservancy District

20-year Capital Improvement Project

CIP Class	Name	ID	Group	Type	Source	Description	Conservation/Mngt
C	Coordinate projects with the DCWCD	61	Combined	Policy/Management	Roosevelt Meeting	Coordinate all water projects in the County with the DCWCD to ensure that similar projects cooperated, rather than competed, for the same funds and assistance.	Yes
C	North Crescent Reservoir	77	Combined	Reservoir	Roosevelt Meeting	Store water for M&I and late season irrigation use.	Yes
C	Storage Projects with Tribe	78	Combined	Reservoir	Roosevelt Meeting	Continue to pursue other storage projects with the Ute Tribe and trying to foster a joint effort.	Yes
C	Secondary Water Systems (M&I and cattle watering)	23	Combined	Water/Wastewater	Board Meeting	Identify locations in the county that could benefit from secondary water systems for cattle watering and irrigation. Additionally, generate associated costs for each system with potential alignments, sources, and other associated facilities. Further study will be required to identify the benefits of secondary water systems in the County.	Yes

Duchesne County Water Conservancy District

20-year Capital Improvement Project

CIP Class	Name	ID	Group	Type	Source	Description	Conservation/Mngt
C	Point & Non-Point Wastewater Treatment	35	Combined	Water/Wastewater	Board Meeting	Provide wastewater treatment for human and animal wastes to protect water quality and support wastewater reuse. Various types of treatment are available based upon flows and the level of treatment required.	Yes
C	Automation of canals at wasteways, spillways, and measurement structures	42	Irrigation	Automation	Board Meeting	Identify the canals that would benefit the most from automation of wasteways, spillways, and measurement structures, and develop a prioritization list. Additionally, it would be necessary to identify specific water user agencies that desire to participate in this type of project.	Yes
C	Measurement Structures	138	Irrigation	Automation	CH2M HILL	Add measurement structures along the canals at wasteways, spillways, and other strategic locations. By this, canal companies can monitor water usage and system losses. These structures, often very simple to construct, can improve operations tremendously and quantify losses.	Yes
C	Farm Creek Canal (piecemeal/replacement)	17	Irrigation	Canal Lining	Board Meeting	Pipe, line, or replace existing improvements of the Farm Creek Canal to conserve water and improve distribution efficiency.	Yes

Duchesne County Water Conservancy District

20-year Capital Improvement Project

CIP Class	Name	ID	Group	Type	Source	Description	Conservation/Mngt
C	Farnsworth Canals	9	Irrigation	Canal Lining	Board Meeting	Pipe the Farnsworth Canal to conserve water and reduce salt loading to the river system.	Yes
C	Rocky Point Canal (1.25 miles)	16	Irrigation	Canal Lining	Board Meeting	Pipe or line the first 1.25 miles of the Rocky Point Canal to conserve water and improve delivery efficiency. This canal delivers approximately 75 cfs through a 66-inch (estimated) pipeline.	Yes
C	T.N. Dodd Canal	39	Irrigation	Canal Lining	Board Meeting	Pipe the T.N. Dodd Canal to provide water conservation and improved distribution efficiency.	Yes
C	Bench, No.1, & Other Joint Operation Canals	41	Irrigation	Canal Lining	Board Meeting	Pipe joint-operation canals to conserve water and improve distribution efficiency.	Yes
C	Pioneer Canal (1 mile)	18	Irrigation	Canal Lining	Board Meeting	Pipe or line the first mile of the Pioneer Canal to conserve water and improve delivery efficiency.	Yes
C	Gray Mountain & Duchesne Feeder	32	Irrigation	Canal Lining	Board Meeting	Finish lining or piping the Gray Mountain and Duchesne Feeder Canals to provide improved distribution efficiency and water conservation.	Yes

Duchesne County Water Conservancy District

20-year Capital Improvement Project

CIP Class	Name	ID	Group	Type	Source	Description	Conservation/Mngt
C	Hicken Lateral	87	Irrigation	Canal Lining	Duchesne Meeting	Pipe the Hicken Lateral for water conservation and improved operations.	Yes
C	UBIR Canal system	88	Irrigation	Canal Lining	Duchesne Meeting	Pipe the rest of the UBIR transmission system to conserve water and improve operations.	Yes
C	Mt. Emmons #8 Lateral	91	Irrigation	Canal Lining	Duchesne Meeting	Pipe the rest of the Mt. Emmons #8 Lateral. The first two miles have already been mapped.	Yes
C	Pioneer Ditch	102	Irrigation	Canal Lining	Duchesne Meeting	Concrete line or pipe the lower portions of the Pioneer Canal and replace sections that are failing.	Yes
C	Pipe the South Boneta Canal	108	Irrigation	Canal Lining	Duchesne Meeting	Pipe the South Boneta Canal to conserve water and improve distribution efficiency.	Yes
C	Class C Canal	106	Irrigation	Canal Lining	Duchesne Meeting	Pipe the remaining Class C canal and laterals to conserve water and improve distribution efficiency.	Yes

Duchesne County Water Conservancy District

20-year Capital Improvement Project

CIP Class	Name	ID	Group	Type	Source	Description	Conservation/Mngt
C	Farm Creek and Jasper Pike Canals	125	Irrigation	Canal Lining	Duchesne Meeting	Pipe the Jasper Pike and Farm Creek Canals into one system. These are parallel systems serving Indian and non-Indian lands. Substantial water conservation and efficiency would be gained.	Yes
C	Bench Canal Rehabilitation	135	Irrigation	Canal Lining	UBRP/1997	Pipe or Line the Bench Canal for water conservation and improved distribution efficiency.	Yes
C	Yellowstone Feeder	11	Irrigation	Distribution/Transmission	Board Meeting	Build a pipeline from the Lake Fork River to Yellowstone River, thus stabilizing river flows, reducing late season shortages, and providing drought mitigation.	Yes
C	Jones Diversion	100	Irrigation	Diversion	Duchesne Meeting	Reconstruct and automate the Jones Diversion.	Yes
C	Wright (Rock Creek) Diversion	101	Irrigation	Diversion	Duchesne Meeting	Reconstruct and automate the Wright Diversion on Rock Creek.	Yes
C	Broadhead Diversion	99	Irrigation	Diversion	Duchesne Meeting	Reconstruct and automate the Broadhead Diversion.	Yes

Duchesne County Water Conservancy District

20-year Capital Improvement Project

CIP Class	Name	ID	Group	Type	Source	Description	Conservation/Mngt
C	Dry Gulch Class B Heading	90	Irrigation	Diversion	Duchesne Meeting	Provide automation and remote control of the Dry Gulch Class B heading to conserve water and improve operations.	Yes
C	Peterson Diversion	98	Irrigation	Diversion	Duchesne Meeting	Reconstruct and automate the Peterson Diversion.	Yes
C	Wagstaff Diversion	97	Irrigation	Diversion	Duchesne Meeting	Reconstruct and automate the Wagstaff Diversion.	Yes
C	Purdy Diversion	146	Irrigation	Diversion	UBRP/1993	Replace the existing diversion dam.	Yes
C	South Boneta Diversion	145	Irrigation	Diversion	UBRP/1993	Build a permanent diversion to keep equipment out of the river and improve water use and efficiency.	Yes
C	Red Cap Diversion	148	Irrigation	Diversion	UBRP/1993	Replace the existing diversion dam.	Yes
C	"C" Diversion	144	Irrigation	Diversion	UBRP/1993	Replace the existing diversion dam.	Yes
C	Uteland Diversion	147	Irrigation	Diversion	UBRP/1993	Build a permanent diversion to keep equipment out of the river and improve water use and efficiency.	Yes

Duchesne County Water Conservancy District

20-year Capital Improvement Project

CIP Class	Name	ID	Group	Type	Source	Description	Conservation/Mngt
C	Hamilton/Knudsen Diversion	149	Irrigation	Diversion	UBRP/1993	Build a permanent diversion to keep equipment out of the river and improve water use and efficiency.	Yes
C	Crystal Ranch	150	Irrigation	Diversion	UBRP/1993	Build a permanent diversion to keep equipment out of the river and improve water use and efficiency.	Yes
C	Dry Gulch #1 Diversion	143	Irrigation	Diversion	UBRP/1993	Build a permanent diversion to keep equipment out of the river and improve water use and efficiency.	Yes
C	Yellowstone Feeder/Payne	151	Irrigation	Diversion	UBRP/1993	Replace the existing diversion dam.	Yes
C	Boneta Diversion	142	Irrigation	Diversion	UBRP/1993	Build a permanent diversion to keep equipment out of the river and improve water use and efficiency.	Yes
C	Rowley Diversion	140	Irrigation	Diversion	UBRP/1993	Build a permanent diversion to keep equipment out of the river and improve water use and efficiency.	Yes
C	Farnsworth Diversion	139	Irrigation	Diversion	UBRP/1993	Replace the existing diversion dam.	Yes

Duchesne County Water Conservancy District

20-year Capital Improvement Project

CIP Class	Name	ID	Group	Type	Source	Description	Conservation/Mngt
C	US Lake Fork Diversion	141	Irrigation	Diversion	UBRP/1993	Replace the existing diversion dam.	Yes
C	Uintah Diversion Dam	127	Irrigation	Diversion	UBRP/1997	Replace the existing Uintah Diversion Dam.	Yes
C	Uintah Independent Diversion Dam	133	Irrigation	Diversion	UBRP/1997	Combine the Larsen, Coltharp Canals, and Uintah Independent Diversions and canals.	Yes
C	Cedarview diversion Dam (Modify)	126	Irrigation	Diversion	UBRP/1997	Modify and reconstruct the Cedarview Diversion Dam.	Yes
C	Uintah No. 1 Diversion Dam	128	Irrigation	Diversion	UBRP/1997	Replace the existing Uintah No. 1 Diversion Dam.	Yes
C	U.S. Deep Creek Diversion Dam	129	Irrigation	Diversion	UBRP/1997	Replace the existing diversion dam.	Yes
C	Bench Diversion Dam	130	Irrigation	Diversion	UBRP/1997	Replace the existing diversion dam.	Yes
C	Whiterocks-Ouray Valley Diversion Dam	131	Irrigation	Diversion	UBRP/1997	Replace the existing diversion dam.	Yes

Duchesne County Water Conservancy District

20-year Capital Improvement Project

CIP Class	Name	ID	Group	Type	Source	Description	Conservation/Mngt
C	Uinta East Channel - West Channel Bifurcation Structure	132	Irrigation	Diversion	UBRP/1997	Replace the existing structure.	Yes
C	Ouray Park Feeder Pipeline Diversion Dam	134	Irrigation	Diversion	UBRP/1997	Construct a new diversion dam to combine the Moffat and Ouray Park Diversion Dams.	Yes
C	Distribution & On-Farm Systems	20	Irrigation	On-Farm	Board Meeting	Continue on-farm system and distribution system improvements since this is the area of greatest potential water conservation benefits.	Yes
C	Establish call systems	62	Irrigation	Operations	Roosevelt Meeting	Provide facility upgrades to allow irrigation deliveries to be based on a call system. Based on experiences of the Dry Gulch Canal Company, this will result in substantial savings.	Yes
C	Adjudication of the Duchesne River Basin	10	Irrigation	Policy/Management	Board Meeting	An adjudication of the Duchesne River Basin and all of its tributaries will map and quantify the historical and current beneficial uses versus existing water rights. The courts will then adjudicate actual water rights and priorities based upon compliance with state law, priorities, and actual beneficial use not to exceed the individual water-righted quantities.	Yes

Duchesne County Water Conservancy District

20-year Capital Improvement Project

CIP Class	Name	ID	Group	Type	Source	Description	Conservation/Mngt
C	Offsite Reservoir on Dry Gulch	51	Irrigation	Reservoir	Roosevelt Meeting	Provide off-site storage on Dry Gulch to regulate operations and provide late season water.	Yes
C	System Automation	69	M&I	Automation	Roosevelt Meeting	Automate more of the municipal systems, possibly adding sensors on the springs to better manage the culinary systems.	Yes
C	FEMA FIS for Duchesne, Myton, and other communities	119	M&I	Flood Control	Duchesne Meeting	Seek funding to complete a flood insurance study by the Federal Emergency Management Agency. An effective study already exists for Duchesne. This should be reviewed and updated if necessary to incorporate improvements in the storm drainage systems, the construction of reservoirs upstream, and the changes in operations.	No
C	Cottonwood Creek Flood Control	67	M&I	Flood Control	Roosevelt Meeting	Develop flood control facilities on Cottonwood Creek, and possibly a small reservoir to attenuate or reduce peak flows.	No
C	Rate Systems (Rural vs. M&I)	49	M&I	Policy/Management	Board Meeting	Evaluate the different rate structures and benefits applicable to rural water users versus municipal water users for each system.	Yes

Duchesne County Water Conservancy District

20-year Capital Improvement Project

CIP Class	Name	ID	Group	Type	Source	Description	Conservation/Mngt
C	Development Impact Fees	86	M&I	Policy/Management	Roosevelt Meeting	Evaluate the benefit of impact fees for new hookups and developments for systems in the County that are willing to participate.	Yes
C	Roosevelt reservoirs sites	74	M&I	Reservoir	Roosevelt Meeting	Build new reservoirs near Roosevelt to generate economic resources resulting from recreational uses.	No
C	Identify/Protect Good Quality Springs/ Headwater Source Protection	47	M&I	Supply/Rights	Board Meeting	Identify springs that produce culinary-quality water for future purchase/development, and prepare and implement a drinking water source protection plan. All public drinking water sources are required to have a drinking water source protection plan as of January 1, 2001.	Yes
C	Pinion Forest Service District Water Supply and Distribution	8	M&I	Supply/Rights	Board Meeting	Provide sufficient supply, transmission, and distribution for current and future water needs. Efforts would include obtaining funding for water supply and development of a master plan, and obtaining water rights. Further efforts would include developing the water supply and building transmission and distribution facilities.	No

Duchesne County Water Conservancy District

20-year Capital Improvement Project

CIP Class	Name	ID	Group	Type	Source	Description	Conservation/Mngt
C	Upper Country Water Conservancy District's Spring #3	59	M&I	Supply/Rights	Roosevelt Meeting	Assist the Upper Country Water Service District develop their third spring (#3).	
C	Water treatment facilities	36	M&I	Water/Wastewater	Board Meeting	Evaluate future surface water treatment facilities for the municipalities in the basin.	Yes
C	North Crescent area culinary water system	25	M&I	Water/Wastewater	Board Meeting	Provide culinary water system and improvements to the North Crescent Area.	No
C	Upper Country M&I	6	M&I	Water/Wastewater	Board Meeting	Provide sufficient supply, storage, transmission, and distribution for future water needs for the Upper Country Water Service District.	Yes
C	Hanna & Tabiona M&I	7	M&I	Water/Wastewater	Board Meeting	Provide sufficient supply, storage, transmission, and distribution for future water needs of Hanna and Tabiona.	Yes
C	Hancock Cove Culinary System	26	M&I	Water/Wastewater	Board Meeting	Provide culinary water system to the Hancock Cove area.	No
C	Arcadia Pipeline and Storage	111	M&I	Water/Wastewater	Duchesne Meeting	Pipe East Duchesne water to Arcadia and provide an additional storage tank.	Yes

Duchesne County Water Conservancy District

20-year Capital Improvement Project

CIP Class	Name	ID	Group	Type	Source	Description	Conservation/Mngt
C	Blue Bench Storage Tank	110	M&I	Water/Wastewater	Duchesne Meeting	Construct additional storage for East Duchesne Water on Blue Bench to mitigate capacity restrictions.	Yes
C	East Duchesne Culinary System Expansion	89	M&I	Water/Wastewater	Duchesne Meeting	Expand the East Duchesne culinary system north to serve up to the confluence of Rock Creek.	
C	East Duchesne Storage Tank	107	M&I	Water/Wastewater	Duchesne Meeting	Construct an additional storage tank for the East Duchesne Culinary Service District.	Yes
C	Upper Country Water Service District water supply	56	M&I	Water/Wastewater	Roosevelt Meeting	Provide increased capacity and storage for Upper Country Water Service District.	Yes

1.0 Introduction

As mentioned in the WMCP, Volume 1, Part 3, DCWCD is experiencing severe financial restrictions due to the limited County tax base. Potential project beneficiaries, including irrigation districts, individual farmers, and the local communities, suffer similar financial complications. The DCWCD, therefore, is seeking grant funds and other external funding sources to implement water resources projects.

Numerous potential funding sources are discussed in this part of the CWRMP to identify potential funding sources. Emphasis has been placed upon grant funds; however, low-interest loans have also been identified.

For each potential funding source discussed, the following key information has been included:

- Funding program purpose and goals
- Key restrictions controlling funding eligibility
- Funding limitations
- Key dates
- Contact information including name, agency, and phone number(s)

Inclusion of funding sources within this document is not a guarantee of either funding or eligibility. The DCWCD will still be required to comply with all funding agency requirements.

2.0 Potential Funding Sources

2.1 U.S. Bureau of Reclamation Salinity Program

Purpose and Goals: This program is funded by the water users in the Lower Colorado River Basin seeking to reduce the salinity levels in the Colorado River through the salinity forum. Continuing efforts have focused for several years on the Uintah Basin, Price River Basin, and Grand Valley in Colorado due to the extremely high agricultural salinity contributions. As a result, the U.S. Bureau of Reclamation (USBR) has been allocated $143 million to implement further projects.

Eligibility: Any water user agency owning or sponsoring a project.

Funding Restrictions: Typically, some sort of cost sharing is preferred, either in cash or equity, to ensure the owners will maintain the projects. Most selected projects require a cost-effectiveness of $25 to $30 per ton of salt reduction. Over the last four years, the cutoff points for project funding have been, respectively, $25, $35, $32, and $27. Since projects are competitively evaluated based on the greatest salinity reduction per dollar invested, the lower the cost per ton of salt the greater the likelihood of selection. Preferred projects tend to emphasize structural rather than non-structural alternatives.

Key Dates: New projects will be solicited in February or March of 2001 with proposals due approximately May 2001.

Key Contact: Lee Baxter
USBR, Provo Field Office
(801) 379-1174

2.2 Central Utah Project Completion Act Section 203, Uintah Basin Replacement Project

Purpose and Goals: The Uintah Basin Replacement Project (UBRP) was initiated as part of the Colorado River Storage Project Act of April 11, 1956 and updated by the Reclamation Projects Authorization and Adjustment Act of 1992 (Section 203) to increase efficiency, enhance beneficial uses and achieve greater water conservation in the Uintah Basin.

Eligibility: Projects have been restricted to the Uinta and Upalco Units. These efforts are already under evaluation and are subject to the completion of the NEPA process. New projects are not being accepted outside of this process.

Funding Restrictions: An appropriation of $30,538,000 was provided by U.S. Congress. This money is only available to projects in the NEPA process. A local cost share is required.

Key Dates: Unidentified

Key Contact: Contact the manager of the DCWCD at (435) 722-4977, as he is involved in this project.

2.3 Central Utah Project Completion Act Section 207, Water Conservation Funds

Purpose and Goals: This program has two primary purposes:

- Identify, evaluate, and implement water conservation measures that maximize the efficient use of existing water supplies, and aid CUWCD in meeting the District-wide water conservation goal of approximately 48,389 acre-feet of water per year by 2013
- Allocate $50 million in authorized federal monies (maximum 65 percent federal cost share/ minimum 35 percent local cost share) to fund the implementation of conservation measures

Eligibility: Selection for funding is contingent upon prioritization and approval. The process includes:

- Submittal of an application
- Completion of CUWCD/applicant consultation
- Submittal of feasibility study
- Completion of National Environmental Policy Act (NEPA) compliance/review
- Inclusion in active inventory
- Prioritization
- Selection for funding
- Implementation and assessment

There are no guarantees that funding will be provided.

Funding Restrictions: This funding program may cover up to 65 percent of the project costs, or $1250 per acre/foot of water conservation, whichever is lesser. Funding for this program is provided by annual allocations from the U.S. Congress, up to amounts provided by legislation. These funds are currently fully allocated to projects on the "active inventory," and may not be available for new projects. As a result, any application, irrespective to the water conservation value, may not receive funding. Future funding is expected, but not guaranteed.

Key Dates: Unidentified

Key Contact: Heath Clark
CUWCD
(801) 226-7100

2.4 Natural Resource Conservation Service (NRCS) Environmental Quality Incentives Program

Purpose and Goals: The Environmental Quality Incentives Program (EQIP) is designed to assist farmers facing serious threats from soil, water, and related natural resources. Within the County, priority areas have been defined as those areas there are significant concerns with natural resources. Contracts are offered that provide financial incentive and technical

and educational assistance for conservation practices to improve and maintain the health of natural resources. Salinity projects have been earmarked as priorities in the Uintah Basin.

Eligibility: Participation is limited to persons engaged in livestock or agricultural production, and enrolled lands must be privately-owned cropland, rangeland, forestland, or other farm or ranch lands.

Funding Restrictions: Cooperators are limited to 75 percent of project costs, not to exceed $10,000 in a given fiscal year or $50,000 per life of the contract. Up to 35 percent of funding is available for outside of priority areas, but 50 percent is earmarked for livestock-related conservation.

Key Dates: Applications are accepted throughout the year and are ranked and selected during designated periods.

Key Contact: Karl Kler, Program Manger
National Resource Conservation Service (NRCS)
(801) 524-4565

2.5 National Resources Conservation Service Wetlands Reserve Program

Purpose and Goals: The Wetlands Reserve Program (WRP) is a voluntary program to restore and protect wetlands on private property. It is an opportunity for landowners to receive financial incentives to enhance wetlands in exchange for retiring marginal agricultural lands (wet pasture, portions of fields suffering from shallow groundwater, etc.). Landowners may choose from permanent conservation easements, 30-year easements, or restoration cost-share agreements.

Eligibility: Landowners must have owned the land for more than one year unless it was inherited. The land must be restorable and suitable for wildlife benefits. These benefits include:

- Farmed wetlands
- Prior converted croplands
- Farmed wetland pastures
- Rangeland, pasture, or production forestland where the hydrology has been significantly degraded and can be restored
- Riparian areas which link to protected wetlands
- Lands adjacent to protected wetlands that contribute significantly to wetland functions and values
- Previously restored wetlands

Funding Restrictions: Provides landowners with 75 to 100 percent cost-sharing for permanent easements, 50 to 75 percent cost-sharing for 30-year easements, and 50 to 75 percent for restoration cost-share agreements.

Key Dates: Program has been extended through 2002

Key Contact: Bob Sennett, Program Manager
U.S. Department of Agriculture
(801) 524-4566

2.6 National Resource Conservation Service Small Watershed Program (PL-566)

Purpose and Goals: This small watershed program provides both technical and financial (project implementation) assistance to help urban and rural communities protect, improve, and develop water and land resources in watersheds up to 250,000 acres. Projects may address:

- Flood prevention, including wetland and floodplain easements
- Agricultural water management including conservation, development, use and disposal
- Public recreation including water resource improvement and basic facilities
- Groundwater recharge
- Water quality improvements
- Conservation and proper use of land including watershed protection

Eligibility: Projects are undertaken at the request of local sponsors. Coordination with appropriate county, State, and tribal agencies is necessary.

Funding Restrictions: Sponsors and other beneficiaries are expected to provide a cost-share dependent on the type of project. They are also responsible for operations and maintenance.

Key Dates: Unidentified

Key Contact: Karl Kler, State Planning Coordinator
NRCS
(801) 524-4565

2.7 U.S. Environmental Protection Agency Non-Point Source Implementation Grants, Section 319 (319 Program)

Purpose and Goals: This program provides formula grants to states to implement non-point source projects and programs in accordance with Section 319 of the Clean Water Act. In Utah, this U. S. Environmental Protection Agency (EPA) program is administered by the Utah Department of Environmental Quality.

Eligibility: Requires the "lead agency" in the state to sponsor the program.

Funding Restrictions: Requires the State and local organizations to provide 40 percent of the total project costs.

Key Dates: Unidentified

Key Contact: Roy Gunnell
Department of Environmental Quality
(801) 538-6146

2.8 U.S. Environmental Protection Agency Wetlands Protection Development Grants, Section 104(b)(3)

Purpose and Goals: This program provides financial assistance to states, federally recognized Indian tribes, and local governments to support wetlands development, or augmentation and enhancement of existing programs. In some states, communities have used this funding to offset the cost of wastewater treatment facilities by discharging to wetlands or creating natural treatment systems. In Utah, this program is administered by the Governor's Office of Planning and Budget.

Eligibility: Project grants are used to fund individual projects.

Funding Restrictions: States or tribes must provide a 25 percent match of the total project cost.

Key Dates: Unidentified

Key Contact: Nancy Keate
Utah Governor's Office of Planning and Budget
(801) 538-1548

2.9 Partners for Fish and Wildlife

Purpose and Goals: This program is a cost-share program for farmers and ranchers interested in increasing production while improving wildlife habitat. This program provides funding for 10 to 30 years, for both uplands and wetlands. Projects can include fencing, water development, re-establishment of riparian habitat, removal of exotic species (Russian olive, salt cedar, etc.), installation of water control structures, and other measures. Funding may be available to install new diversion structures that help provide fish bypass and stream rehabilitation similar to the structures being built on the Duchesne River by the CUPCA environmental mitigation funds.

Eligibility: Non-federal ownership required

Funding Restrictions: Not specified, but usually seeks a 50-percent cost share

Key Dates: Not specified

Key Contact: Karl Flemming
U.S. Fish and Wildlife Service
(435) 723-5887, ext. 22

2.10 Permanent Community Impact Fund Board

Purpose and Goals: The Federal Mineral Lease Act of 1920 requires those participating in the development and production of non-metalliferous minerals on federal lands to pay a royalty to this fund. Fossil fuel production is the primary source of funds in Utah. The Permanent Community Impact Fund Board (CIB, PCIFB) goal is to mitigate local impacts associated with mineral production.

Eligibility: Eligible applicants include:

- Counties
- Cities
- Towns
- School districts
- Special service districts
- Special improvement districts
- Housing authorities
- Water conservancy districts
- Water and sewer improvement districts
- Building authorities
- County service areas
- Public post secondary institutions

Additionally, the applicant must demonstrate that it is or may be socially or economically impacted, directly or indirectly, by mineral resource development on federal lands. Funding is limited to planning, construction, and the maintenance, and provision of public facilities. "Public services" has been interpreted to mean public infrastructure traditionally provided by government entities.

Funding Restrictions: Funding is limited to planning, construction, maintenance, and provision of public facilities. Maximum funding allowed will be $2,500,000.

Key Dates: Unidentified

Key Contact: Mr. Shirl D. Clarke
Dept. of Community and Economic Development,
Div. Of Community Development
(801) 538-8726/8722

2.11 Community Development Block Grant

Purpose and Goals: The purpose of this small cities program is to "assist in developing viable urban communities by providing decent housing, a suitable living environment, and expanding economic opportunities, principally for persons of low and moderate income."

The primary goals of the Community Development Block Grant (CDBG) are to:

- Improve public facilities
- Expand economic opportunities

- Develop and use land resourcefully
- Provide decent housing through use of all available programs, either direct or indirect
- Provide needed public services
- Leverage CDBG funds with other available public and private resources
- Simplify CDBG applications and management requirements while addressing congressional program intent and existing federal law
- Decrease juvenile crime, teen pregnancy, drug and alcohol abuse and family violence.

Most projects affecting the small cities fall within the goals established.

Eligibility: Grants are available to cities and towns with populations less than 50,000 and counties with populations less than 200,000. Applicants must attend an annually-offered "How to Apply" workshops to be eligible.

Funding Restrictions: In 1999-2000, the CDBG allocation for the Uintah Basin Association of Governments was $414,177.

Key Dates: Pre-applications are due in December

Key Contact: xxxxxx

2.12 Utah Division of Water Rights Loans

Purpose and Goals: This program established a revolving fund to give technical and financial assistance to water users, with a goal of achieving the highest-possible beneficial use of water resources within the State. Funding is provided to construct and implement projects that conserve, protect, or more efficiently use present water supplies; develop new water; or provide flood control. Applications are available over the Internet, and must be filled out as completely as possible and sent to the applicant's UDWR Board member (Larry S. Ross). Once an application is received, a project manager is assigned and will contact the applicant to initiate the process.

Eligibility: Projects are funded based upon the following prioritization system:

1. Project involves public health problems, safety problems, or emergencies
2. Municipal water projects that are required to meet an existing or impending need
3. Agricultural water projects that provide a significant economic benefit for the local area
4. Projects which will receive a large portion of their funding from other sources
5. Projects not included in 1 – 4, but have been authorized by the Board

The UDWR Board will not fund projects that are associated with regularly occurring operations and maintenance, projects sponsored by developers, or domestic water systems where less than 20 percent of the residents live in the project area year-round.

Funding Restrictions: Repayment terms and conditions depend upon the recommendations of staff and the type of fund used. Several funds, with different constraints are available including:

- Revolving Construction Fund (RCF)
- Cities Water Loan Fund (CWLF)
- Conservation and Development Fund (CDF)

For further information, refer to the Utah Division of Water Resources.

Key Dates: Applications must be received no less than three days prior to the UDWR Board Meeting.

Key Contact: Larry S. Ross
1036 W. Gates Drive
Roosevelt, UT 84066
435-738-2436 ext. 132 (office)
435-722-0611 (home)

2.13 Utah Agricultural Resource Development Loan

Purpose and Goals: The Utah Agricultural Resource Development Loan (ARDL) program is a $27-million revolving fund that provides 3 percent loans for projects with conservation benefits. The goal of this state program is to help landowners conserve soil and water, increase yields, maintain and improve water quality, conserve and improve wildlife habitat, prevent flooding, develop on-farm energy projects, and mitigate damages caused by natural disasters.

Eligibility: Project must meet purpose and goals

Funding Restrictions: A one-time 4-percent administrative fee will be charged

Key Dates: Unidentified

Key Contact: Koy Page
Utah Department of Agriculture and Food
(801) 538-7176

Bibliography

Franson-Noble and Associates. 1999. *Duchesne County Regional Water Management Plan.*

Houser, Lance Eric. 1998. *A Geographical Information System Approach to Evaluating the Effects of Alternate Agricultural Management on Salt Loading of River Systems.*

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Utah Natural Resources – Water Resources. 1994. *Water-Related Land Use Inventories, Uinta Study Unit.*

Water Conservation Plan Evaluation Form

Plan Submitted by: Duchesne Co. WCD

Reviewed by: H Brown **Date:** 5-1-01

Scoring: Rate each of the following items on a scale from 1-10. (1 to 4=inadequate, 5 to 7=adequate, 8 to 10=excellent)

Characteristics of an Adequate Plan	Score	Comments
I. Description of System		
A. Describes the service area and water system	10	
B. Details pertinent demographics (population, connections, land use, etc.)	10	
C. Explains unique characteristics or pertinent history of system	10	
II. Water Supply Inventory		
A. Identifies and quantifies the water supply sources of its system	10	
B. Describes constraints of the system (water rights, system capacity)	10	
III. Present Water Use and Future Water Needs		
A. Quantifies the present water use in the system	10	
B. Identifies abuses, overuses, and losses in the system	10	
C. Estimates future water needs based on population growth projections	10	
IV. Water Problems, Conservation Measures, and Goals		
A. Identifies and prioritizes present and future water problems	10	
B. Describes current water conservation measures	10	
C. Identifies other water conservation measures	10	
D. Quantifies the costs and effectiveness of all conservation measures	10	
E. Sets water conservation goals that can be quantified	10	
V. Implementing and Updating the Water Conservation Plan		
A. Recommends measures to reach water conservation goals	10	
B. Recommendations are consistent with present and future needs	10	
C. Identifies the resources required to monitor progress and accomplishment of goals	10	
D. Sets deadlines for implementation of measures and accomplishment of goals	10	
E. Details a procedure for updating the water conservation plan	10	
AVERAGE SCORE	10	EXCELLENT - THE BEST I'VE SEEN.