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Chapter 1. Purpose and Need

1.1 Introduction

The proposed Windy Gap Firming Project (WGFP) would entail construction of a new water storage reservoir that would provide more reliable water deliveries to Front Range and West Slope communities and industry. Due to limitations and constraints with the existing system, the current Windy Gap facilities, which were completed in 1985, are unable to deliver the anticipated firm yield of water. Water deliveries from the West Slope are limited by storage capacity in Granby Reservoir and by the delivery capacity of the Adams Tunnel, which delivers water from Grand Lake to the East Slope. The Proposed Action would add water storage and related facilities to the existing Windy Gap operations to enable delivery of a firm annual yield of about 30,000 AF to Project Participants. The intent of the WGFP is to improve the yield of the Windy Gap Project and the existing Windy Gap water rights.



Existing Windy Gap Reservoir, Grand County, Colorado

The Municipal Subdistrict, Northern Colorado Water Conservancy District (Subdistrict), acting by and through the Windy Gap Firming Project Water Activity Enterprise, the project proponent, is proposing to improve the firm yield from the existing Windy Gap Project water supply. The Subdistrict's Proposed Action is the construction of Chimney Hollow Reservoir to store Windy Gap Project water. To improve yield, the Subdistrict also is requesting integration of the Colorado-Big Thompson Project (C-BT) and Windy Gap Project operations so that C-BT water can be stored in Chimney Hollow Reservoir. The Proposed Action would require new connections to C-BT East Slope facilities and continued use of C-BT storage and conveyance systems and other existing pipelines, canals, and diversions to deliver Windy Gap water to Project Participants.

The original Windy Gap Project was completed by the Subdistrict in 1985. Since that time, the Windy Gap Project has not been able to reliably deliver water supplies to Windy Gap Project unit holders (allottees). In addition, the Windy Gap Project does not currently provide annual carry-over water storage for the Middle Park Water Conservancy District (MPWCD) on the West Slope. Because of the deficiency in water deliveries and lack of storage, the Windy Gap Project allottees and MPWCD have not been able to fully rely on Windy Gap water for meeting a portion of their annual water demand. As a result, a group of the Windy Gap Project unit holders, working through the Subdistrict, have initiated the proposed WGFP, which would firm all or a portion of their individual Windy Gap units to meet a portion of existing and future municipal and industrial water requirements. The MPWCD is participating in the proposed WGFP to obtain storage to firm its Windy Gap water, and hence improve the reliability of its Windy Gap water supply for users in Grand and Summit counties, Colorado.

The purpose of the Windy Gap Firming Project is to deliver a firm annual yield of about 30,000 AF of water from the existing Windy Gap Project to meet a portion of the water deliveries anticipated from the original Windy Gap Project and to provide up to 3,000 AF of storage to firm water deliveries for the Middle Park Water Conservancy District. Firm water deliveries from the Windy Gap Project are needed to meet a portion of the existing and future demands of the Project Participants.

The Subdistrict is currently seeking approval from the Bureau of Reclamation (Reclamation) for additional physical connections to C-BT facilities in order to implement the proposed WGFP. The WGFP includes additional storage that could only be accomplished through one or more conveyance connections to the C-BT Project. Such connections would require approval from Reclamation. Because approval from Reclamation is a discretionary federal action and subject to compliance with the National Environmental Policy Act (NEPA), this Environmental Impact Statement (EIS) was prepared to evaluate the potential environmental consequences of the Proposed Action and other alternatives for firming the Windy Gap water supply. The U.S. Army Corps of Engineers (Corps), Western Area Power Administration (Western), and Grand County are cooperating agencies. The Corps has regulatory authority under the Clean Water Act for actions that require the placement of dredge or fill material in a water of the United States. Western is participating as a cooperating agency because it has jurisdiction over a transmission line that would be relocated under several of the alternatives. Western would need to acquire a new easement for the relocated line as well as construct, operate, and maintain the line. Western has responsibilities for marketing additional power that may be generated as a result of the WGFP. Grand County has information with respect to those areas of the project where it has jurisdiction or special expertise. All cooperating agencies have provided input and review of the EIS.

Chapter 1 provides a description of the purpose and need for the project, background material on the Windy Gap Project, a summary of the results of scoping and public involvement including issues of concern, and a discussion of the decision process. Chapter 2 describes the four action alternatives that were developed for detailed analysis in the EIS and a no action alternative. A summary of the impacts for each alternative is included in Chapter 2. Baseline information on natural resources, cultural resources, and socioeconomic resources in the project area and an analysis of the potential direct, indirect, and cumulative effects for each of the alternatives is provided in Chapter 3. Chapters 4 and 5 provide information on consultation and coordination, a list of preparers, and references.

1.2 Windy Gap Firming Project Participants

The original Windy Gap Project was developed, and is owned and operated, by the Municipal Subdistrict, Northern Colorado Water Conservancy District, which is a water conservancy district organized under the Colorado Water Conservancy Act. The WGFP is being developed, and would be owned and operated, by the Municipal Subdistrict, Northern Colorado Water Conservancy District, acting by and through the Windy Gap Firming Project Water Activity Enterprise, which is a water activity enterprise of the Municipal Subdistrict organized under Colorado Revised Statutes (CRS) §§ 37-45.1-101 et seq. For purposes of simplicity in this document, the Windy Gap Firming Project Water Activity Enterprise will be referred to as the “Subdistrict.” On those occasions when the Municipal Subdistrict, Northern Colorado Water Conservancy District (the owner of the Enterprise) is referenced, its full name will be used. All of the Windy Gap Project unit holders participating in the proposed WGFP and the MPWCD are referred to collectively as the Project Participants in this document.

Project Participants in the WGFP that own, lease, or that are in the process of acquiring units of Windy Gap Project water include municipalities, rural domestic water districts, and an industrial water user. Project Participants located on the East Slope of the Continental Divide are listed below and the service area for these entities is shown in Figure 1-1.

- City and County of Broomfield
- Central Weld County Water District (CWCWD)
- Town of Erie
- City of Evans
- City of Fort Lupton
- City of Greeley
- City of Lafayette
- Little Thompson Water District (LTWD)

- City of Longmont
- City of Louisville
- City of Loveland
- Platte River Power Authority (Platte River)
- Town of Superior

Not all owners of Windy Gap units are participating in the WGFP. The City of Boulder and the Town of Estes Park collectively own 40 Windy Gap units, but are not participating in the proposed WGFP because they have other sources of water supply and/or storage for Windy Gap Project water that currently meet their needs. Delivery of water to Windy Gap unit holders not participating in the WGFP will be similar to current operations, although the amount of deliveries may increase with time as demand grows. The amount of water delivered to these entities will not be expanded or diminished by the WGFP.

The MPWCD currently receives Windy Gap water, according to the terms outlined in the *1985 Supplement to the 1980 Agreement Concerning the Windy Gap Project and Azure Reservoir and Power Project*, which states:

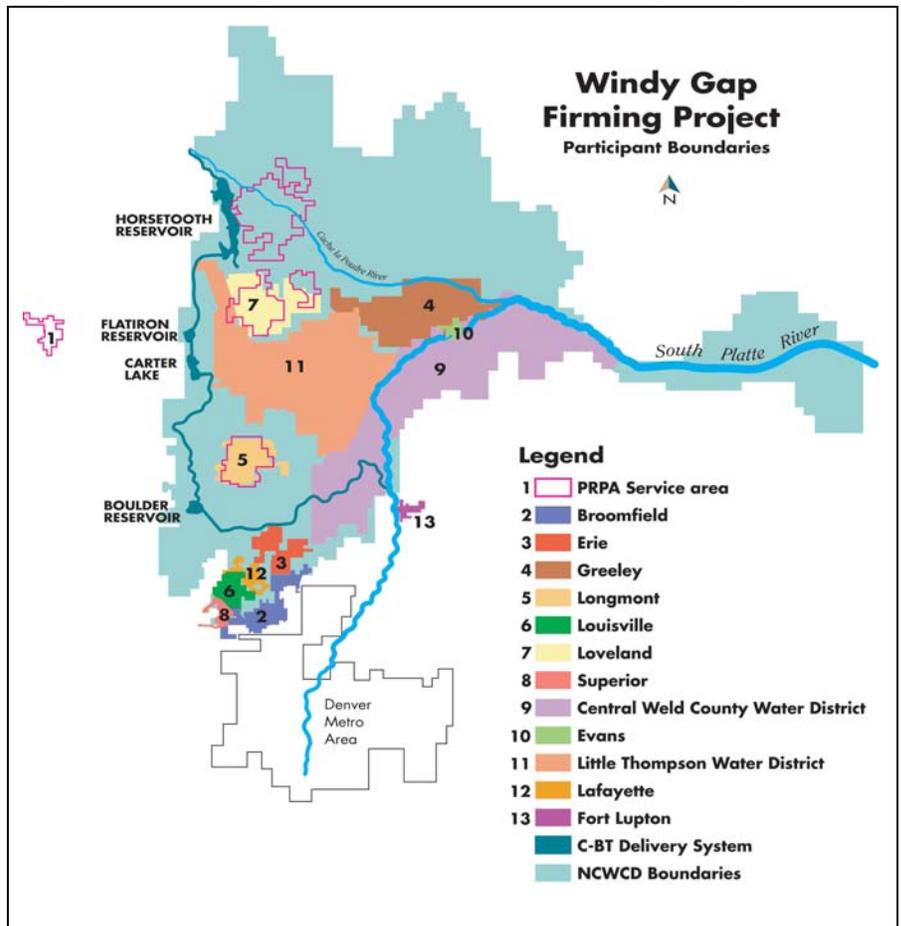
the Municipal Subdistrict, Northern Colorado Water Conservancy District will dedicate and set aside annually, but non-cumulatively, at no cost to Middle Park, 3,000 acre-feet (AF) of water in Granby Reservoir that is produced each year from Subdistrict water supplies and any water so stored in Granby Reservoir shall be the last of any Subdistrict water to be spilled from Granby Reservoir.

This water is for beneficial use without waste, either directly or by exchange or substitution, in the MPWCD. The direct beneficial uses do not include instream uses or industrial uses (unless the industrial use is within a municipality and through its municipal system). According to the 1985 Agreement, MPWCD’s Windy Gap water stored in Granby Reservoir cannot be carried over to the next year.

The MPWCD is a wholesale water supplier for about 67 water providers and users in Grand and Summit counties on the West Slope of the Continental Divide (Figure 1-2) that have contracts with MPWCD for portions of its 3,000 AF allotment of Windy Gap Project water. The water providers, also known as contractees, include towns, water districts, subdivisions, homeowner associations, and private individual homeowners, agricultural water suppliers, and ski areas. The largest contractees, which account for about two-thirds of the water served by MPWCD, include

- Grand County Water and Sanitation District
- Snake River Water District
- Summit County

Figure 1-1. Participant boundaries on the East Slope Project.



- Three Lakes Water and Sanitation District
- Town of Breckenridge
- Town of Fraser
- Town of Frisco
- Town of Granby
- Town of Kremmling
- Town of Silverthorne
- Winter Park Water and Sanitation District

1.3 Purpose and Need

1.3.1 Municipal Subdistrict

The purpose of the Windy Gap Firming Project is to deliver a firm annual yield of about 30,000 AF of water from the existing Windy Gap Project to meet a portion of the water deliveries anticipated from the original Windy Gap Project and to provide up to 3,000 AF of storage to firm water deliveries for the MPWCD. Firm water deliveries from the Windy Gap Project are needed to meet a portion of the existing and future demands of the Project Participants.

1.3.2 Western Area Power Administration

Western would be required to relocate approximately 3.8 miles of their Estes to Lyons 115-kV transmission line under alternatives that include Chimney Hollow Reservoir. The line would be moved to protect it from inundation by the reservoir. Western needs to ensure that the line is moved to a location that will allow Western to continue to adequately and efficiently operate and maintain it and to access it in emergencies.

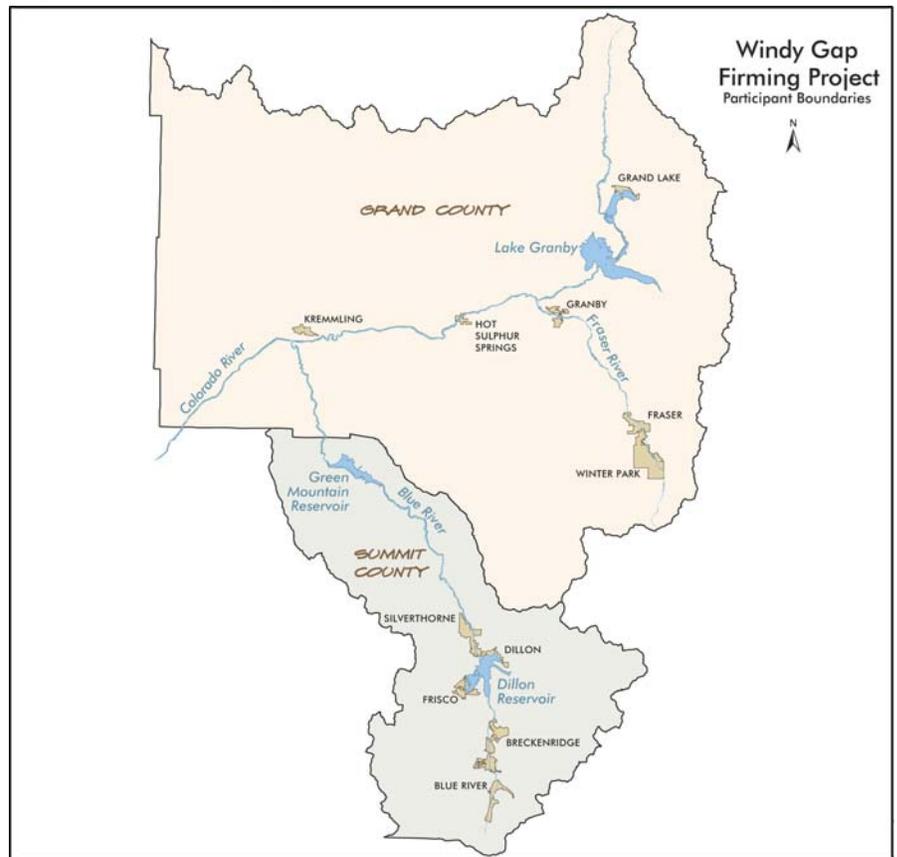
1.4 Background

1.4.1 Colorado-Big Thompson Project

The Colorado-Big Thompson (C-BT) Project was developed by Reclamation on behalf of the Northern Colorado Water Conservancy District between 1938 and 1957. The project was designed to provide water for agricultural, municipal, and industrial beneficial uses. The C-BT Project provides supplemental water to about 30 cities and towns and is used to help irrigate more than 600,000 acres of northeastern Colorado farmland. On average, about 220,000 AF of water is delivered to northeast Colorado.

Twelve reservoirs, 35 miles of tunnels, 95 miles of canals, and 700 miles of transmission lines comprise the complex C-BT collection, distribution, and power system. Willow Creek Reservoir, Shadow Mountain Reservoir, Grand Lake, and Granby Reservoir on the west of the Continental Divide collect and store C-BT water from the upper Colorado River basin (Figure 1-3). Water is pumped from Granby Reservoir into Shadow Mountain

Figure 1-2. West Slope service area for the MPWCD.



Reservoir where it flows by gravity into Grand Lake. From there, the 13.1-mile Adams Tunnel transports the water under the Continental Divide to the East Slope.

Once the water reaches the East Slope, it is used to generate electricity as it descends almost ½ mile through five power plants on its way to Colorado's Front Range. Carter Lake and Horsetooth Reservoir provide storage for C-BT Project water on the East Slope. C-BT water is delivered as needed via canals and pipelines to supplement native water supplies in the South Platte River basin. Additional discussion on current operation of the C-BT Project is found in Section 3.5.

1.4.2 Existing Windy Gap Project

During the 1960s, the cities of Boulder, Greeley, Longmont, Loveland, Fort Collins, and the Town of Estes Park determined that additional water supplies were needed to meet their projected municipal demands. The Municipal Subdistrict, Northern Colorado Water Conservancy District, consisting of the incorporated areas of the six entities, was formed in 1970 to develop the Windy Gap Project. Prior to project construction, the Platte River Power Authority acquired all of the City of Fort Collins' allotment contracts, as well as one-half of the City of Loveland's and one-half of the Town of Estes Park's contracts. Allotment contracts are the instruments used to allocate Windy Gap Project water. There are 480 units of Windy Gap water available. Each unit represents a yield of up to 100 AF. Windy Gap units, similar to C-BT units, can be bought and sold. The Windy Gap unit holders have changed since the original project was completed.

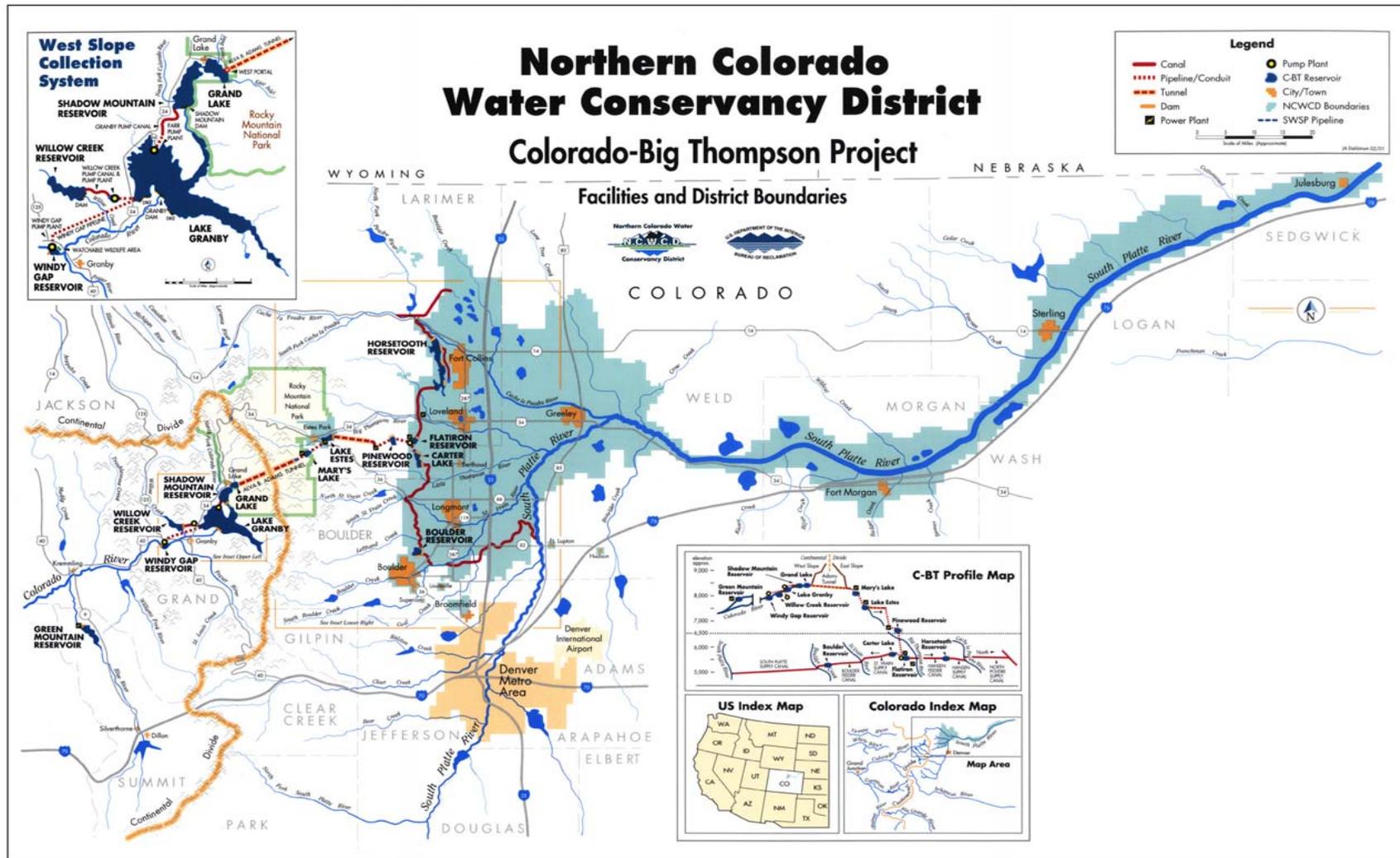
The Windy Gap Project consists of a diversion dam on the Colorado River, a 445-AF reservoir, a pumping plant, and a 6-mile pipeline to Granby Reservoir. Currently, Windy Gap Project water is stored and conveyed through C-BT Project facilities prior to delivery to Windy Gap Project allottees. Figure 1-3 shows existing Project facilities on the West Slope and the C-BT facilities used to deliver water to the East Slope. Because most of the MPWCD contractees on the West Slope use Windy Gap water to replace out-of-priority diversions, their Windy Gap water is released directly from Granby Reservoir to the Colorado River and no other delivery structures are required. Additional discussion on current operation of the Windy Gap Project is found in Section 2.2.1 and Section 3.5.

1.4.2.1 Windy Gap Project Environmental Impact Statement

In April 1981, Reclamation completed the Final EIS on the effects of using C-BT Project facilities for the "storage, carriage and delivery" of Windy Gap Project water. The 1981 Record of Decision (ROD) for the original Windy Gap Project EIS allowed Reclamation to negotiate a contract with the Subdistrict and the NCWCD for the storage, conveyance, and delivery of Windy Gap Project water using facilities of the C-BT Project.

The EIS for the original Windy Gap Project was completed in 1981. The project was constructed and has been in operation since 1985.

Figure 1-3. Colorado-Big-Thompson and existing Windy Gap Project features.



The original EIS determined that about 56,000 AF of water could be diverted annually from the Colorado River and that about 48,000 AF would be available for delivery to East Slope Windy Gap unit holders after subtracting 3,000 AF for MPWCD and allowances for various storage and conveyances losses. Windy Gap diversions are limited to a rate of 600 cfs and occur primarily during the months of April to July. Total Windy Gap diversions are measured at the Adams Tunnel and are limited to a maximum of 90,000 AF in any one year and a maximum of 650,000 AF during any consecutive 10-year period pursuant to the *Agreement Concerning the Windy Gap Project and Azure Reservoir and Power Project*, dated April 30, 1980 and the Windy Gap water rights.

1.4.2.2 Relationship of the Original Windy Gap EIS to Current Firming Project EIS

The WGFP EIS evaluates the potential effects of alternatives associated with firming the yield of the water diverted under the terms of the original Windy Gap Project EIS. The proposed Firming Project would not exceed the average annual diversion of 56,000 AF evaluated in the 1981 EIS and ROD or any other diversion-related limitations or water rights. Additional reservoir storage capacity is needed in the WGFP because of the limitations in the C-BT system to store Windy Gap water when it is available. The Firming Project EIS evaluates the direct, indirect, and cumulative effects of any new physical disturbances or changes in operation needed by the WGFP. As described below, the original EIS included a number of mitigation measures to offset impacts, several of which are ongoing.

1.4.2.3 Mitigation Measures Included in the Original Windy Gap EIS

The 1981 Windy Gap Project EIS and ROD, as well as subsequent agreements, included a variety of mitigation measures to compensate and offset the effects associated with construction of the Windy Gap Project and water diversions. Operational mitigation measures are still in place and funding and compensatory mitigation measures have been paid. Mitigation measures are summarized below.

Minimum Streamflow. A Memorandum of Understanding between the Municipal Subdistrict, Northern Colorado Water Conservancy District, NCWCD, and Colorado Division of Wildlife (June 23, 1980) established the following minimum streamflows on a 24-mile reach of the Colorado River downstream of the Windy Gap Project to the mouth of the Blue River:

- From the Windy Gap Diversion Point to the mouth of the Williams Fork River: 90 cfs
- From the mouth of the Williams Fork River to the mouth of Troublesome Creek: 135 cfs
- From the mouth of Troublesome Creek to the mouth of the Blue River: 150 cfs
- If flows are less than those specified above, Windy Gap must curtail diversions except that the project cannot be required to bypass more than the natural inflow. Additionally, flushing flows of 450 cfs for at least 50 hours during the period of April 1 through June 30 are required at least once every three years.

Endangered Species. Endangered Species Act Section 7 consultation with the U.S. Fish and Wildlife Service concluded with a Biological Opinion (March 13, 1981) determination that Windy Gap depletions, with the conservation measures listed below is not likely to jeopardize the existence of the endangered squawfish or humpback chub. The Subdistrict agreed to payment of \$100,000 for a habitat manipulation project and \$450,000 for biological investigations on the Colorado River as conservation measures to compensate for the adverse effects of the Windy Gap Project. Specific conservation and recovery measures included:

- The establishment of backwater habitat areas along the mainstem of the Colorado River
- Support of a field research team for three years to evaluate habitat improvement techniques for endangered fish
- Bypass flow agreements with CDPW for trout habitat was also determined to benefit Colorado River endangered fish downstream of the project area

Azure Agreement. Western Slope objections to the Windy Gap project were resolved in the *Agreement Concerning the Windy Gap Project and the Azure Reservoir and Power Project* dated April 30, 1980, entered into by the Subdistrict with several West Slope entities who had been opposed to the project because of anticipated West Slope impacts.

Following negotiations between the Subdistrict and the Colorado River Water Conservation District (CRWCD), a settlement was reached and mitigation measures acceptable to the parties were identified. Other parties to this agreement included: the Northwest Colorado Council of Governments (NWCCOG), Grand County, MPWCD, Three Lakes Water and Sanitation District, the towns of Granby and Hot Sulphur Springs, Winter Park Water and Sanitation District, and 30 ranchers. The purpose of this agreement was to provide compensation to West Slope entities from the transbasin diversion of water and associated impacts. Principal agreements included:

Mitigation measures for the original Windy Gap Project included about \$11.5 million to develop West Slope water storage, fund diversion and water quality improvements, and support endangered species recovery. Nonmonetary measures included minimum streamflow commitments on the Colorado River and 3,000 AF of water for the MPWCD.

- A commitment by the Subdistrict to fund the construction of the Azure Reservoir and Power Plant, or if infeasible, fund an alternative project or a cash payment of \$10 million to the CRWCD
- Payment of \$25,000 to Grand County for salinity studies of the Colorado River
- Payment of \$150,000 to the Town of Hot Sulphur Springs for assistance in improving its water treatment facility and \$270,000 for improving its wastewater treatment facility
- Payment of \$500,000 to plan, construct, and design facilities needed for ranchers to maintain their diversion structures on the Colorado River
- An agreement by the Subdistrict to subordinate its Windy Gap decrees to all present and future in-basin irrigation, domestic and municipal uses, excluding industrial uses, on the Colorado and Fraser rivers and their tributaries above the Windy Gap Reservoir site
- An agreement by the Subdistrict to volumetric limits, which included a maximum single-year diversion of 90,000 AF/year and a maximum of 650,000 AF during any consecutive 10-year period. Per the 1985 *Supplement to the 1980 Azure Settlement Agreement*, these diversion limitations apply to deliveries through the Adams Tunnel, as opposed to diversions at Windy Gap Reservoir
- An agreement by the Subdistrict to bypass flows necessary to meet senior downstream water rights
- An agreement by the NCWCD to allow Grand County use of a rock and gravel quarry on their property
- An agreement by the Subdistrict to develop a Watchable Wildlife Area at Windy Gap Reservoir, including construction of three islands for waterfowl nesting

In return for these mitigation measures, West Slope interests agreed to drop objections to the Windy Gap conditional water right decrees and cooperate with all the necessary permitting requirements to allow construction of the project.

The 1985 *Supplement to the 1980 Azure Settlement Agreement* was later signed on March 29, 1985 by the Subdistrict, CRWCD, NWCCOG, Grand County commissioners, and the MPWCD. This agreement was implemented after the planned Azure reservoir was determined infeasible. The 1985 agreement included the following compensation to West Slope entities:

- Payment of \$10.2 million to fund construction of Wolford Mountain Reservoir on Muddy Creek north of Kremmling and release of obligations for funding of the Azure Project
- The Subdistrict agreed to set aside annually, but non-cumulatively, at no cost to the MPWCD, 3,000 AF of water in Granby Reservoir that is produced each year from Windy Gap supplies, for beneficial use without waste in the MPWCD for all beneficial uses, except instream uses and industrial uses
- Subordination of Windy Gap water rights to either Rock Creek or Wolford Mountain projects; Wolford Mountain Reservoir was built in 1996

1.5 Need for the Project

1.5.1 Current Windy Gap Project Operations

Windy Gap Project water is currently diverted from the Colorado River just downstream of the confluence of the Colorado and Fraser rivers at Windy Gap Reservoir (Figure 1-4). Once collected, it is pumped to Granby Reservoir for storage and conveyance through C-BT Project facilities and ultimate delivery to Windy Gap project allottees on the East Slope.

MPWCD's Windy Gap water is stored in Granby Reservoir and released as requested to replace stream diversions or ground water use by contract holders at various locations in Grand and Summit counties. MPWCD water users do not take direct delivery of Windy Gap water, but rather use it to augment other water diversions.

1.5.2 Windy Gap Project Delivery Shortage

In the original Windy Gap EIS, firm annual deliveries to the allottees of the Windy Gap Project were estimated to be about 48,000 AF, following conveyance and evaporation losses and allocations to the MPWCD.

Because each unit of Windy Gap water is entitled to 1/480th of the annual yield of the Windy Gap Project, a unit was expected to produce a yield of 100 AF per year. Actual Windy Gap yield between 1985 and 2004 averaged less than 10,000 AF per year, which is an average annual yield to the Project Participants of about 20 AF/unit, or about 20 percent of the anticipated deliveries (Boyle Engineering 2005a). As discussed in Section 3.5.1.4, Windy Gap pumping from 2005 to 2008 has increased the average annual yield to about 14,700 AF. Windy Gap diversions were less than allowable immediately following construction because demand was less than available supplies. Had Windy Gap unit holders used all available Windy Gap water, the average long-term yield (using hydrology from 1950 to 1996) would have been about 55 to 60 AF per unit (Boyle Engineering 2005a).

No Windy Gap water was diverted in 7 of the 23 years between 1985 and 2008 because of either a lack of available storage space in Granby Reservoir or Windy Gap water rights were not in priority during dry years. During this period, no Windy Gap pumping occurred in 1986, 1996 through 2000, and in 2002; only 300 AF were pumped in 2004. The lack of pumping, with the exception of 2002 and 2004, was due to a lack of available storage space in Granby Reservoir and/or limited demand for Windy Gap water. No Windy Gap water was diverted in 2002 because the Project's junior water right never came into priority and a dry year in 2004 also limited pumping. Because of the inability of the Windy Gap Project to provide reliable yields in both wet and dry years, the current firm yield is zero. Firm yield is generally defined as the amount of water that can be delivered on a reliable basis in all years and is typically determined by yield in dry years. For the Windy Gap Project, lack of available storage space in wet years also affects yield.

A similar evaluation of the firm annual water storage and yield available for use by the MPWCD indicates its firm yield is essentially zero. Although water may be available for diversion for MPWCD in the early spring, there are a number of years when storage in Granby Reservoir is not available to hold its supplies. Because MPWCD uses its Windy Gap water to augment or replace previous water diversions, releases from Granby Reservoir typically

Figure 1-4. Windy Gap Reservoir facilities.



do not occur until September or October. Consequently, Windy Gap water stored for the MPWCD during spring runoff in wet years is often spilled prior to its release for augmentation later in the year.

Windy Gap allottees and the MPWCD have not been able to rely on Windy Gap water for water deliveries in some dry or wet years. A summary of the reasons why the annual firm yield and deliveries from the Windy Gap Project have been substantially less than 48,000 AF are as follows:

- In dry years, the Windy Gap Project has not been able to divert water because more senior water rights upstream and downstream have a higher priority to divert water and “call out” the more junior Windy Gap Project water right. In addition, the Windy Gap Project is required to bypass water to maintain certain minimum streamflows downstream of the Windy Gap diversion dam. Thus, the Windy Gap Project cannot divert if streamflows immediately below the diversion dam on the Colorado River are less than 90 cfs, if flows at the Williams Fork confluence are less than 135 cfs, or if flows at the Troublesome Creek confluence are less than 150 cfs.
- Under the contract between the Subdistrict, NCWCD, and Reclamation, water conveyed and stored for the C-BT Project has priority over water conveyed and stored for the Windy Gap Project. In wet years when the C-BT system is full, there is no conveyance or storage capacity in the C-BT system for Windy Gap Project water. Windy Gap Project water stored in the C-BT system is sometimes spilled from the system to make room for C-BT Project water. Thus, Windy Gap Project water cannot be stored or carried over in some wet years.
- The Windy Gap Project was built to meet both current and future needs of the Project allottees. During the years immediately after construction, some of the allottees’ demands did not require the full use of their Windy Gap Project water, so not all available water was diverted. As demand increased, the need for Windy Gap Project water also increased.

While the inability to divert water in dry years was anticipated when the Windy Gap Project was constructed, the inability to divert and store during an extended set of wet years, such as the late 1990s, was not. Because of the deficiency in deliveries, Project Participants requested that the Subdistrict pursue measures through a joint project to firm Windy Gap water deliveries. Project Participants determined that a cooperative project was the most efficient means to firm Windy Gap water deliveries rather than each entity developing separate storage for its own share of Windy Gap water.

1.6 Overview of Water Supplies and Demand Projections for Project Participants

Project Participants are responsible for developing and acquiring safe and reliable water supplies to meet the needs of the users they serve. Acquiring adequate water supplies to meet anticipated future needs requires long-term planning because of the time needed to secure water supplies, satisfy permitting and regulatory requirements, and construct infrastructure.

Municipalities typically prepare a comprehensive plan to provide direction for growth and development within a community considering the anticipated types of land uses and population forecasts. Typically, these comprehensive land use plans undergo some form of public review and are formally adopted by a city council or other elected body. Public works and water utility departments respond to the comprehensive plan by seeking to secure reliable sources of water and the efficient use of this water to meet community needs. Industrial water users likewise develop operational plans and demand estimates to identify existing and anticipated water requirements.

Windy Gap water diversions are limited in wet years because of a lack of available storage and in dry years because water rights are not in priority.

Reclamation conducted an independent evaluation of the estimated current and future water requirements for each of the Project Participants to determine the need for the proposed project. The following discussion provides an overview of the existing water supplies, projected water demand, and the need for the proposed WGFP.

Additional information on the Project Participants water supply and projected demand is included in the *Windy Gap Firming Project Purpose and Need Report* (ERO and Harvey Economics 2005).

1.6.1 Sources of Water Supply

Each Project Participant has developed a unique portfolio of water supply sources to meet existing and anticipated water needs. A diversity of water supply sources is generally preferred to ensure reliable deliveries. Water supplies for East Slope Project Participants generally include multiple sources, such as direct flow diversion rights from the Big Thompson River, St. Vrain River, and Cache la Poudre River, ownership of shares of ditch water from various irrigation companies, storage rights in existing reservoirs, ground water, and transbasin water imported from the West Slope.

Transbasin water primarily includes ownership of units in the C-BT Project, which diverts water from the West Slope, stores it in several principal reservoirs including Granby Reservoir on the West Slope, and Carter Lake, Horsetooth Reservoir, and Boulder Reservoir on the East Slope, and then delivers the water through pipelines, canals, and discharges to streams for C-BT unit holders. Project Participants that own units of the Windy Gap Project likewise receive delivery of water, when it is available, through the C-BT delivery system. Windy Gap water can be used to extinction, thus allowing this water to be captured and reused multiple times.

As a conservancy district, MPWCD's role is to contract and allocate delivery of water from the Windy Gap Project to various water users in Grand and Summit counties. The source of Windy Gap supply for the MPWCD consists of diversions from the Colorado River at the Windy Gap pump station, which are then stored in Granby Reservoir. Windy Gap water primarily supplements other water supply sources for Grand and Summit County water users, although some small water users rely exclusively on Windy Gap water. MPWCD also allocates water from Wolford Mountain Reservoir located north of Kremmling, Colorado.

Firm yield, also referred to as the dry year yield, is an estimate of the amount of water that is available during a defined period or condition. The definition period often encompasses a 50-year historical record that includes several dry years. Firm yield planning typically does not include extreme drought events such as a 1 in 100 year drought because securing this amount of water and the associated cost is not feasible. Because water yield from the various water supply sources can fluctuate substantially from year to year, water providers require adequate storage to capture flows during wet years to meet their dry year water needs. Table 1-1 provides a compilation of the 2005 annual firm water supplies available for each Project Participant.

Table 1-1. Summary of Participant 2005 annual firm water supply (potable and nonpotable).

Participant	Annual Firm Yield (AF)	Participant	Annual Firm Yield (AF)
Broomfield	13,739	LTWD	5,510
CWCWD	2,786	Longmont	30,963
Erie	2,145	Louisville	5,063
Evans	9,298	Loveland	17,792
Fort Lupton	3,538	MPWCD	0
Greeley	43,850	Platte River	0
Lafayette	4,534	Superior	1,544
TOTAL			140,762

Firm annual water supply deliveries from streams, ditches, and reservoirs depend on each year's precipitation and any carryover reservoir storage. Annual deliveries of C-BT Project water also vary from year to year depending on available water supplies, the needs of shareholders, and the annual quota established by the NCWCD Board of Directors. The C-BT Project was established to provide a supplemental water supply to East Slope water users within the boundaries of the NCWCD. C-BT quotas are typically adjusted to deliver more water in dry years. This is the opposite situation from most water rights in Colorado because the C-BT Project was designed to

provide more supplemental water in dry years when native water supplies yield less water. Historically, the C-BT Project has delivered 1 AF per unit in dry years and as little as 0.5 AF per unit in wet years or in extremely dry years, such as the drought of 2002–2004 when the C-BT Project was limited by the actual supply of water that it could deliver. Based on analysis of hydrology and C-BT operations through historical drought periods from 1950 to present, it was determined that a firm yield of 0.6 AF per unit is a reasonable estimate of the amount of water the C-BT Project can deliver in all years. Although actual C-BT deliveries vary from year to year, for water supply planning purposes, 0.6 AF per unit was the assumed delivery to all Project Participants that own C-BT units.

Many of the Project Participants successively use, or are planning to successively use, Windy Gap supplies to minimize the acquisition of new supplies. Colorado water law allows for the reuse and successive use of transbasin imports such as Windy Gap water, and requires that East Slope importers should, to the maximum extent feasible, reuse and make successive use of foreign water to minimize the amount of water removed from Western Colorado.

Water reuse includes the subsequent use of imported water for the same purpose as the original use, such as the treatment of sewage to potable water standards for redistribution into the treated water system. Successive use refers to a subsequent use of imported water for a different purpose. For example, successive use may involve diversion from a wastewater treatment plant, and then conveyance to storage or distribution as nonpotable water for irrigation of parks, golf courses, and landscaping. Successive use allows a portion of outdoor water uses to be met without using raw water treated to drinking water standards (potable water). Participants also have the right to sell, lease, or exchange effluent-containing imported water after distribution through their water system and treatment. Several Participants, including Broomfield, Louisville, and Superior, have developed nonpotable irrigation systems, including conveyance and storage, to successively use their Windy Gap supplies. The Platte River Power Authority successively uses Windy Gap water to meet the cooling needs of the Rawhide Energy Station. None of the Project Participants reuse Windy Gap water for potable uses. Some Participants successively use Windy Gap water to meet augmentation or return flow obligations. Successive use of Windy Gap supplies for these purposes does not directly satisfy potable demands identified for a Participant, but it helps meet other legal or contractual needs of the Participant.

The Repayment Contract between the NCWCD and Reclamation specifies that C-BT Project water can only be used once by the allotment contract holder and all return flows after the first use are then used to supplement streamflows for diversions downstream. In some cases, a portion of South Platte River native water transferred from agricultural to municipal use can also be reused, depending on the conditions in the water rights decree. Firm yield values in Table 1-1 do not include reuse water. Although Windy Gap water is reusable, it does not currently provide a firm annual yield. Some Participants have other sources of water that can be reused, and these are discussed under the individual Participants water supply and demand in Section 1.7.

1.6.2 Water Demand

The 14 WGFP Participants include a variety of water providers and users including cities, towns, rural domestic water districts, a wholesale water supplier, and an electric utility. These water providers and users are located in the counties of Broomfield, Boulder, Larimer, Grand, Summit, and Weld. The water consuming groups served by these providers are comprised of residential, commercial, industrial, agri-business, agricultural, recreational, campus-based educational institutions, and power generation. The following sections provide information on population growth, historical water use, conservation efforts, and future water requirements of the Project Participants.

1.6.2.1 Population Growth

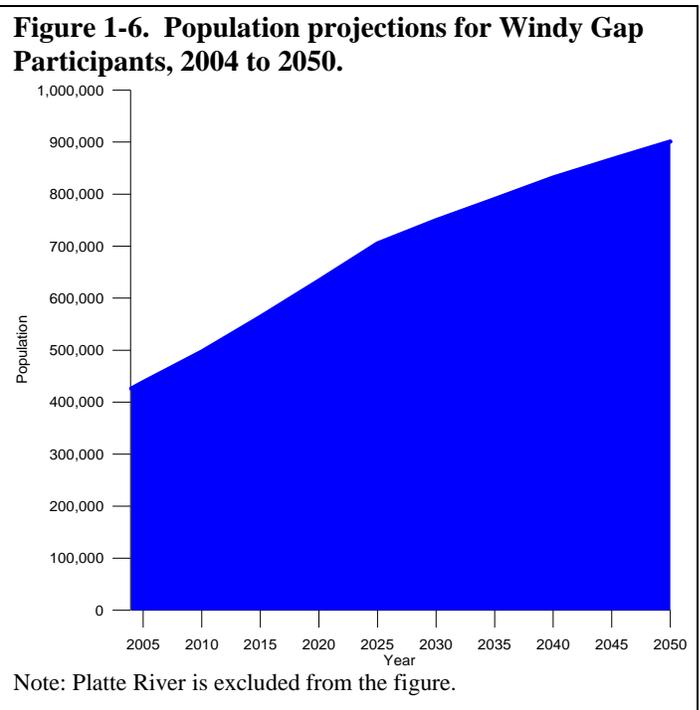
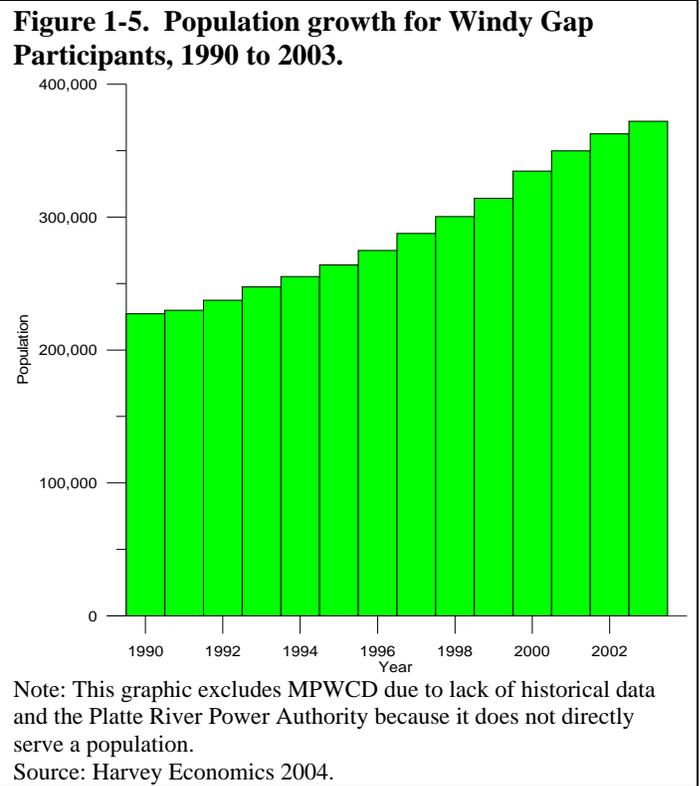
During the 1990s, Colorado's economy was in the top five nationally, driven by the technology sector, tourism, and economic diversification (Parker Colorado Economic Development Council 2003). From 1990 to 2000, the state added one million residents to its population. About 60 percent of this growth was attributable to in-

migration (Colorado Office of Economic Development 2004). A large part of the growth in the period between 1990 and 2002 occurred in the region where the Windy Gap Participants are located. Boulder County experienced a 23 percent increase in population; Larimer County’s population increased 41 percent, and Weld County’s population grew by 54 percent. Some of the growth in northern counties was due to relatively higher housing costs in adjacent areas, particularly Boulder and Denver.

The combined average annual population growth rate for Project Participants, excluding MPWCD and Platte River Power Authority, was 3.9 percent from 1990 through 2003. This rapid increase in population, from about 227,000 in 1990 to about 372,000 in 2003, is characteristic of the economic development that occurred in northern Colorado during this period (Figure 1-5).

The combined population for East Slope Project Participants (excluding Platte River) is projected to increase from about 426,000 in 2004 to about 750,000 by 2030 and 901,000 by 2050 (Figure 1-6). The projected population increase of the combined Participants indicates an increase of 324,000 persons, or 76 percent through 2030. This is equivalent to an average annual growth rate of about 2.2 percent per year during this period, which is comparable to the projected average annual growth rate of 2.1 percent by the Colorado State Demographer through 2030 for counties within which these Participants are located (DOLA 2004a).

Population growth rate projections for Project Participants, excluding Platte River, are estimated at 1.6 percent from 2004 through 2050, which is less than the 2.2 percent from 2004 through 2030. This indicates a slowdown in growth rates as the Participants get larger and as some approach build-out. Half the Project Participants are predicted to reach residential population build-out before 2050, although commercial and industrial growth is predicted to continue for these communities beyond 2050. Figure 1-7 depicts 2003 and 2030 population projections for the Project Participants, excluding Platte River because it is a power utility. Although population growth rates fluctuate over time and have slowed due to economic conditions in 2009-2010, it is reasonable to anticipate that the population of the areas serviced by WGFP Participants will continue to grow in the future. The Colorado Demographic Office (2010) October 2009 population projections for the counties that the Participants are located,



projected average annual growth rates ranging from 1.0 percent to 3.3 percent between 2010 and 2030. These recently projected rates are similar to those projected for the Participants.

1.6.2.2 Historical Water Requirements

Past and future water requirements for the Project Participants are comprised of potable and nonpotable deliveries to end users and water losses from the point of raw water diversion to the individual water taps. MPWCD does not deliver potable water supply and Platte River only provides a small amount of potable water for use at the Rawhide Energy Station. All of the other Participants provide potable water deliveries to customers. Potable water deliveries are typically made to residential, commercial, and industrial customers as well as parks, golf courses, and other public uses, depending on the economic and demographic makeup of the water provider. The larger cities serve a diversified base of customers that include residential and various commercial and industrial uses such as food processors, high-tech firms and others, whereas the smaller communities primarily serve residential and agricultural customers.

Because it is a relatively new practice, nonpotable delivery systems do not have a long track record in northern Colorado; in 1990 only three Participants delivered nonpotable water. As of 2004, 10 of the 14 Project Participants delivered about 12,400 AF of nonpotable water to customers for outdoor irrigation. Nonpotable deliveries are typically conveyed through existing ditch systems that previously served agricultural lands. Parks, school grounds, golf courses, and open space are increasingly served by nonpotable water systems, if they are large enough or accessible, to avoid drinking water treatment costs and to take advantage of available water resources.

Total potable and nonpotable water requirements for Participants (excluding Platte River and MPWCD) are summarized in Table 1-2. For these Participants, combined total raw water requirements, including average losses of 13.7 percent, reached a maximum of about 104,400 AF in 2000 and decreased to less than 90,000 AF in 2003. The variations in total water requirements for Participants are indicative of the effects of drought, drought response measures imposed by Participants in order to ensure that essential water needs were met, and implementation of conservation measures.

In 2004, MPWCD contractees requested 2,680 AF of Windy Gap water. Historically, delivery of water to the MPWCD has ranged from 0 to 624 AF per year to augment water uses from other sources. A total of about 4,200 AF of water on average is delivered to the Rawhide Energy Station for the Platte River Power Authority. This includes about 3,300 AF on average of effluent from the City of Fort Collins for use in cooling and 950 AF taken directly from Horsetooth Reservoir and used for boiler make-up water and potable water needs.

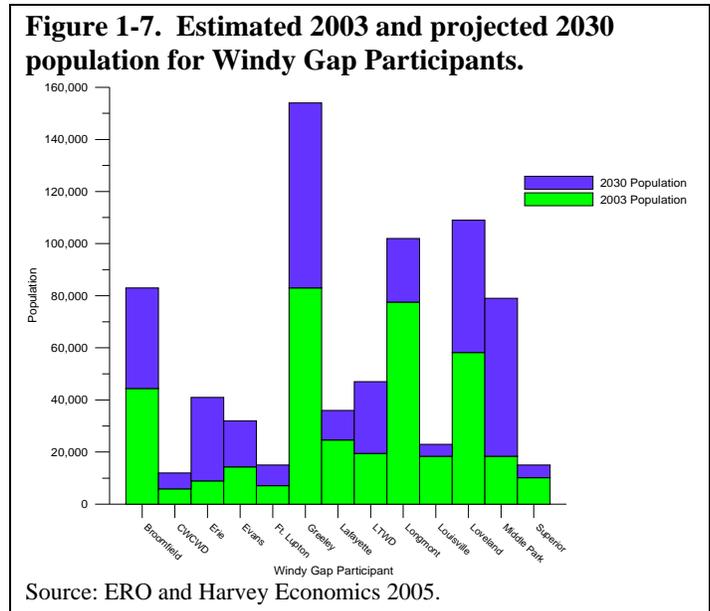


Table 1-2. Total water deliveries and raw water requirements for WGFP Participants, 1998 to 2003.

1998	65,473	10,440	75,913	88,539
1999	62,949	10,815	73,764	85,839
2000	76,902	12,252	89,154	103,804
2001	74,611	12,180	86,791	100,879
2002	71,431	13,856	85,287	98,839
2003	65,363	12,355	77,719	89,571

1.6.2.3 Water Conservation

The conservation of water through the efficient use of water supplies and demand management programs is standard operating practice among water providers and consumers in Colorado. Recent drought conditions and population growth in Colorado emphasized the need to continually evaluate methods to conserve water resources not only during droughts, but also during “normal” years.

Water use per capita for Windy Gap Participants dropped 26% between 1988 and the 1998 to 2003 average gallons per capita per day.

Water conservation includes both supply-side and demand-side management. Supply-side conservation includes a variety of measures to make the most of existing supplies, including detection and repair of leaks to reduce losses, metering of water use, and reuse. Demand-side conservation includes changes in landscaping and watering practices, use of water efficient indoor appliances, education programs, water rate structure incentives, and rebates.

Water conservation is an important strategy used by the Project Participants to improve the efficiency of water use and delivery to reduce overall demand. All Participants have an incentive to use water efficiently, which leads to reduced costs associated with the supply, treatment, and distribution of water. Common measures by Project Participants to reduce household water use include requirements and rebates for water efficient fixtures and appliances, regulations or incentives to reduce outdoor water use, including limits on the number of watering days and the times of the day, use of Xeriscaping™, and educational programs. All of the municipal Project Participants are 100 percent metered to encourage reduced water use. Most Project Participants use an increasing block or tiered rate structure to promote conservation. Other Project Participants have found that a uniform water rate in combination with other conservation measures effectively reduces water use. Industrial water users served by municipalities and water districts are likewise encouraged to implement measures to reduce demand. Platte River’s conservation effort includes use of effluent for all of its cooling needs and the reuse and recycling of water to extinction. A summary overview of conservation measures used by WGFP Participants is shown in Table 1-3.

Table 1-3. WGFP Participant water conservation practices.

Participant	Education	Rebates or Incentives	Water Efficient Fixture/Appliance Requirements	Universal Metering	Water Audits	Retrofitting Old Mains and Meters; Pipe Replacement	Landscape Ordinance/Guidelines	Outdoor Watering Restrictions	Xeriscape Planning on City/Town Lands	Water Reuse	Increasing Block Rates Pricing	Leak Detection	Rainfall/wind Sensors	Nonpotable Irrigation	Soil Amendments on New Lawns
Broomfield	E	P	X	X	P	X	X	X	X	E		X	I	X	X
CWCWD ¹	E		X	X		X				X	X	X			
Erie ¹	E	X	I	X	X	I	X	X	X	I	X	X	X	E	
Evans ¹	E	I	I	X	I	I	E	X	I		X	X	E	E	E
Fort Lupton ¹	E	I		X				E		I	X	E	I	X	
Greeley ¹	E	E	X	X	X	X	E	X	X	E	³	X	I	X	X
Lafayette ¹	E	I	I	X	E	X	X		X		X	X	E	X	X
Longmont ¹	E	X	X	X	X	E	X	X	X	X	X	E	X	X	I
Louisville	X	X	X	X	I/E	X	X		X	X	X	X	X	X	
Loveland	X	X	X	X	X	X	X	X	X	I		X	X	X	X
LTWD	X	X		X		X		X		X	X	X		I	
MPWCD ²	X	X	X	X			X	X			X	X			
Platte River			X		X	X				X		X			
Superior	X		X	X						X	X	X			

Note: X = Already implemented; I = Implementation in progress; E = Expanding the program; P = Proposed.

¹ State-approved water conservation plan.

² Not all of these programs are used by all of the water providers in MPWCD.

³ Greeley is currently examining a custom tiered rate structure.

Project Participants also have implemented various measures to improve the efficiency and delivery of water supplies. A number of the Project Participants have experienced rapid expansion of their systems in recent years; therefore, because the majority of their transmission and distribution systems are new, system losses are minimal. Supply-side measures used by Participants include leak detection, pipe replacement and lining, and monitoring. Technological improvements at water treatment and wastewater facilities also contribute to water savings.

Participants are involved in a number of programs to reduce water use and improve conservation measures. All WGFP Participants have conservation plans. Seven of the Participants—Erie, Greeley, Evans, Fort Lupton, Central Weld, Lafayette, and Longmont—have approved Colorado Water Conservation Board (CWCW) conservation plans since the passage of the Water Conservation Act of 2004 (Colorado House Bill 04-1365). Broomfield and Louisville anticipate completing their plans in 2012. Platte River is an industrial water user not covered by HB 04-1365, but reuses its water supply to extinction. The municipalities served by the MPWCD are not required to have a state-approved conservation plan, but most entities practice a variety of conservation measures. The remainder of the Participants have committed to having conservation plans in accordance with HB 04-1365 prior to taking delivery of Windy Gap water. As a component of the Water Conservation Act, Participants would update their conservation plans approximately every seven years and thus, water conservation measures will continue to be refined in the future. For those Participants with state-approved water conservation plans, projected conservation savings within the next 10 years range from about 6 to 17 percent.

In 2005, the cities and towns of Broomfield, Lafayette, Longmont, Louisville, and Superior signed the Denver Metropolitan Local Governments' Water Stewards Memorandum of Understanding, a commitment to water

conservation and stewardship. The Boulder-based Center for Resource Conservation offers a water conservation program that includes an irrigation audit program and suggestions for irrigation improvements. Erie, Lafayette, Greeley, Longmont, and Louisville participate in this program. In addition, the Water Efficiency Grant Program Act of 2005 (Colorado House Bill 1254) created a grant program to provide entities with financial assistance to implement water conservation measures and promote water conservation education and public outreach to assist with reductions in water use.

The NCWCD has long been a leader in agricultural water conservation; however, in recognition of the growing municipal water use within its boundaries, NCWCD has become much more active in urban water conservation (NCWCD 2004). With a special emphasis on potential savings from turf watering, NCWCD has established the Turf and Urban Landscape Water Management and Conservation Program. This program focuses on educating and training turf professionals, groundskeepers, and all persons responsible for turf care. NCWCD's program is grounded in horticulture research and scientific approaches to irrigation system design and practice. The educational component includes a host of fairs and other outreach efforts, while serving as a resource to homeowners.

One measure of the effectiveness of water conservation programs is an evaluation of customers' water use rates as expressed in gallons per capita per day (gpcd). Participant total water use, which includes residential, commercial, and industrial water uses, averaged 194 gpcd when summed for each of the individual participants or 188 gpcd when weighted by total population and water use from 1998 to 2003 (Table 1-4). The lower water use values when weighted by population reflect larger communities that serve more customers with multifamily dwellings compared with smaller rural communities that have lower densities and larger lots. Water use rates for individual WGFP Participants are illustrated in Figure 1-8. The effectiveness of conservation measures is indicated by comparison of Participant water use rates from 1988 (NCWCD 1991), which averaged 263 gpcd with the simple average of 194 gpcd for WGFP Participants for 1998 to 2003. This indicates a 26 percent decrease in water use rates since 1988.

Table 1-4. Potable water use in gpcd for WGFP Participants, 1998 to 2003.¹

Year	Simple Average of Individual Project Participants	Overall Average ²
1998	203	193
1999	194	180
2000	206	201
2001	203	191
2002	188	176
2003	172	N.A.
Average	194	188

¹ MPWCD and Platte River are excluded from these data. 2003 data for Greeley and Longmont was unavailable.

² GPCD based on total Participant population and water use.

Source: Information provided by Project Participants, 2004.

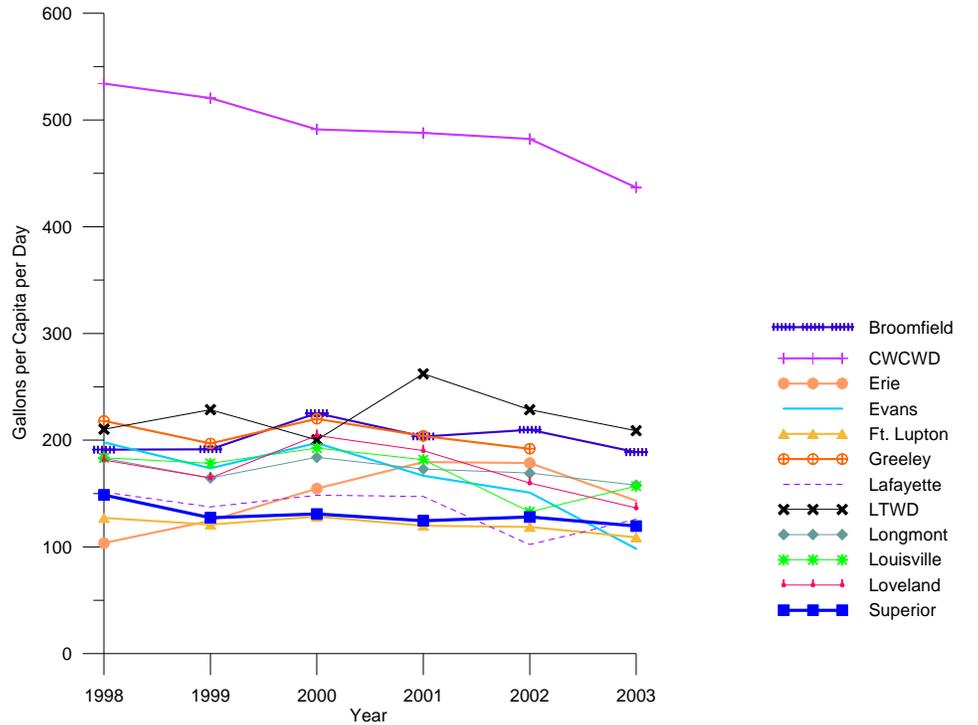
Overall, the Project Participants exhibit lower or comparable water use rates per capita compared with other Colorado water users, recognizing the geographic and service area differences. The Statewide Water Supply Initiative Report (CDM 2004) found that statewide gpcd ranged between 206 and 332; the South Platte River basin was the lowest in the state with 206 gpcd. The statewide average from this study was 210 gpcd (CDM 2004). Potable water use for the Denver Water service area averaged about 201 gallons per day for 1998 to 2003 (Denver Water 1998-2003). For the Upper Colorado River basin in year 1993, the U.S. Environmental Protection Agency reported an average water use of 242 gpcd (EPA 2003). This same EPA report includes the Platte River basin as part of the Missouri Region with a water use rate of 194 gpcd. Additionally, a report

prepared by Western Resource Advocates indicates that for 13 large cities in the Western U.S., water use rates averaged about 229 gpcd in 2001 (Western Resource Advocates 2003). A University of Utah study (Isaacson 2005) in the intermountain west found that average water use rates for nine cities with population and climatic conditions similar to the Participants had an average water use of 224 gpcd. These comparisons indicate that on average the Project Participants exhibit water use rates that are less than or equal to broad regional values.

To provide a comparable measure of water use with individual Participants, a regional water use average was calculated based on the Colorado statewide average of 210 gpcd and the nine representative communities from the University of Utah study of 224 gpcd. The average from these two sources provides a regional water use value of 217 gpcd. Individual water use for each of the Project Participants is below this average for all Participants except Central Weld County Water District (CWCWD) and the Little Thompson Water District (LTWD). Higher total water use rates for these two rural water districts are due to the characteristics of the customers that they currently serve.

The CWCWD provides water to various agricultural and dairy users, such as Aurora Dairy, as well as the Fort St. Vrain Power Generation Station. As a result, total water use averaged 492 gpcd from 1998 through 2003. Nonresidential water demands account for almost two-thirds of the total CWCWD water demands; thus, total water use is not directly comparable with other Participants or regional measures of water use. Residential water use rates for CWCWD typically average below 165 gpcd, which is similar to other Participants. CWCWD encourages conservation for all of its water users including the use of nontreated water whenever possible by dairies and other agricultural businesses.

Figure 1-8. Total water use rates for WGFP Participants, 1998 to 2003.



Notes:
 MPWCD and Platte River are excluded from these data.
 CWCWD is not directly comparable with other water providers because nonresidential demands, including agricultural and dairy users account for nearly two-thirds of total CWCWD demand. Residential water use for CWCWD is about 162 gpcd.
 The LTWD acquired the Arkins Water Association in 1999 and the Town of Mead in 2001 and 2002, which temporarily increased per capita use.

The LTWD water use averaged 224 gpcd for 1998 to 2003, as compared with the regional average of 217 gpcd. Residential gpcd for LTWD since 1998 is comparable with other Participants at about 174 gpcd on average. LTWD also serves dairies and other agricultural uses, which tend to increase its gpcd figures. In addition, LTWD acquired the Arkins Water Association and began serving the Town of Mead, which temporarily increased water use for several years. The LTWD conservation program includes encouragement of dual water systems for new developments.

Total water demand for East Slope Windy Gap Participants is projected to increase about 85,000 AF by 2030. West Slope water demand in Grand and Summit Counties is projected to increase about 17,000 AF by 2030.

In summary, water conservation is actively practiced among the Participants, and the current level of water conservation, which includes the low water usage during the 2002–2003 drought, is built into the water demand projections. Water use as measured by total gpcd has declined in the last 15 years and the demand projections assume that the recent lower levels will continue. Variations in total potable gpcd from year to year are heavily influenced by weather and drought-related restrictions.

The effectiveness of water conservation measures are best evaluated over the long term. It is possible that per capita water use will continue to decline in the future as recent conservation measures are fully implemented and the public becomes more educated in the efficient use of water. For some Project Participants, gpcd values could increase slightly in the future as communities reach residential build-out, but commercial growth continues. Drought restrictions, which clearly have an effect on water demand patterns, are not assumed to be in place in the future as more normal hydrologic conditions resume.

Participant current water use is reasonable compared with regional water use. Rural water districts that serve large agribusinesses have the highest water use and rates and the effect on per capita water use is magnified by a relatively small population base. This finding suggests that a reasonable level of efficient water use is being practiced by most Participants' customers.

To meet future water requirements will require continued improvements in water conservation in addition to the proposed WGFP. Projected future water requirements indicate that even with the WGFP, Participants will need additional conservation savings and/or additional water sources to meet future water needs.

1.6.3 Future Water Requirements

The 2005 estimated raw water requirements for Project Participants, excluding the MPWCD, is about 120,000 AF. Water requirements are projected to increase to about 205,000 AF by 2030 and to 251,000 AF by 2050. Water needs in Grand and Summit counties, which are partially served by the MPWCD, are projected to increase about 17,000 AF by 2030 to meet residential and commercial potable demand. Projected water demand for each of the WGFP Participants over the next 50 years is shown in Table 1-5.

Project Participants are continually updating water demand projections. Current water projections may vary slightly from the estimates in 2005, but the overall need to firm Windy Gap water supplies has not changed.

The combined average annual increase in water demand for the Project Participants is about 3 percent from 2004 through 2030 and about 2 percent from 2004 through 2050. Water demands increase at a somewhat higher annual rate than population because of commercial and industrial growth. Increasing nonpotable water use also drives total water requirements beyond population growth rates. Because Windy Gap water can be reused, Participants need Windy Gap water to help meet nonpotable irrigation and augmentation requirements and thus extend available water supplies. Total projected water requirements for individual Project Participants from 2004 through 2050 are shown in Figure 1-9.

Table 1-5. WGFP Participant total projected future raw water requirements.

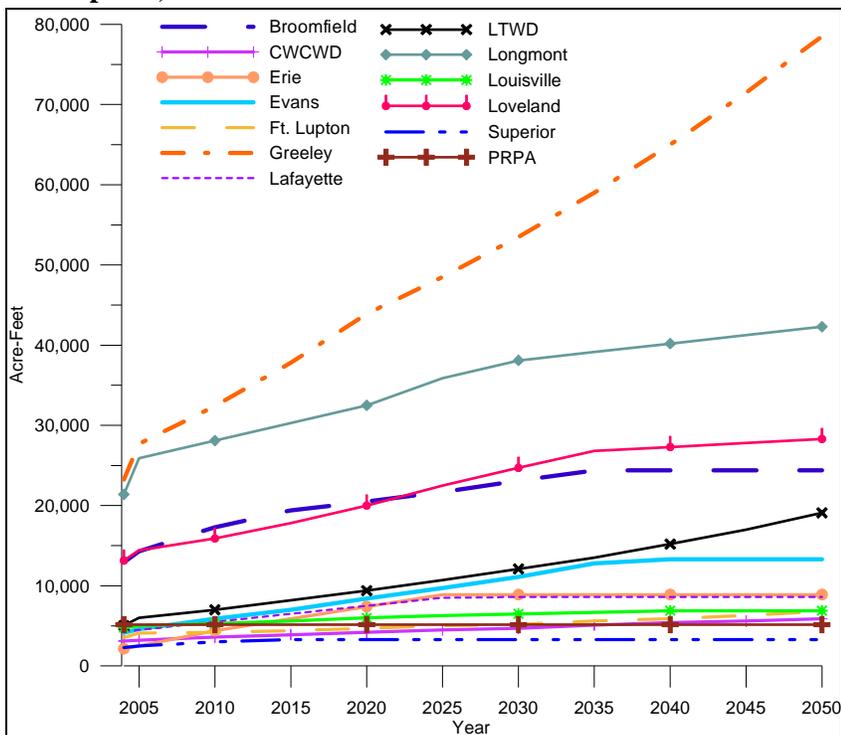
Participant	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
AF										
Broomfield	14,300	17,300	19,400	20,500	21,700	23,100	24,400	24,400	24,400	24,400
CWCWD	3,200	3,600	3,900	4,200	4,500	4,700	5,100	5,400	5,600	5,900
Erie	2,500	4,400	5,900	7,400	8,900	8,900	8,900	8,900	8,900	8,900
Evans	4,600	5,900	7,000	8,400	9,700	11,100	12,800	13,300	13,300	13,300
Fort Lupton	4,100	4,200	4,400	4,700	5,000	5,200	5,600	5,900	6,300	6,800
Greeley	27,700	32,400	37,800	43,900	48,500	53,500	59,000	65,000	71,500	78,500
Lafayette	4,500	5,500	6,500	7,500	8,500	8,600	8,600	8,600	8,600	8,600
LTWD	6,000	7,000	8,200	9,400	10,700	12,100	13,500	15,200	17,000	19,100
Longmont ¹	25,900	28,100	30,300	32,500	35,900	38,100	39,150	40,200	41,250	42,300
Louisville	5,000	5,300	5,600	6,000	6,300	6,500	6,700	6,900	6,900	6,900
Loveland	14,400	15,900	17,800	20,000	22,500	24,700	26,800	27,300	27,800	28,300
MPWCD ²	N.A.									
Platte River ³	5,150	5,150	5,150	5,150	5,150	5,150	5,150	5,150	5,150	5,150
Superior	2,500	3,000	3,300	3,300	3,300	3,300	3,300	3,300	3,300	3,300
Total	119,850	137,750	155,250	172,950	190,650	204,950	219,000	229,550	240,000	251,450

¹ Longmont projects a build-out demand of 42,300 AF in 2048.

² An incremental increase in water demand for Grand and Summit counties of 17,000 AF by 2030 above existing use is projected.

³ Platte River Power Authority needs 5,150 AF of reusable water to meet existing needs. Future water needs are expected to increase with the demand for additional power generation, but these amounts have not been determined.

Figure 1-9. Projected total water requirements for WGFP Participants, 2004 to 2050.



MPWCD is not included in this graphic.

Source: ERO and Harvey Economics 2005.

1.7 Participant Water Supply and Demands

This section summarizes the existing water supply, growth and population trend, water demand, and need for water for each of the Project Participants. Additional information is included in the *WGFP Purpose and Need Report* (ERO and Harvey Economics 2005). While Participant water supply and demand conditions may have changed slightly since the studies for the Draft EIS were completed, the water supplies and projected demands still provide a reasonable representation of the water needs for the 13 Participants. NEPA compliance is often a lengthy process so it is not practical to continually update all of the various studies and projections. Water supply planning and development is also a lengthy process and the intent of the WGFP is still to meet the long-term future needs of Participants.

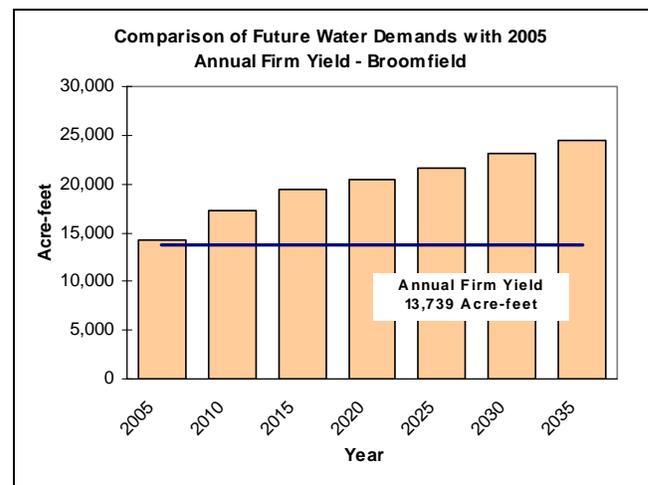
Participant WGFP firm yield values discussed in this section are based on firm yield goals. Actual firm yield estimates from hydrologic modeling of the Proposed Action are described in Section 3.5.2.9 and Section 3.5.3.7. Modeled firm yield deliveries to Participants would range from about 0 to 49 percent less than goals because of limitations in storage and available water. As discussed in Section 3.5.37, WGFP yields also would be reduced if reasonably foreseeable actions, such as the Moffat Collection System Project are implemented and flows available for WGFP diversion decrease.

1.7.1 City and County of Broomfield

The City and County of Broomfield is north of Denver and borders the intersection of Adams, Boulder, Jefferson, and Weld counties. Until the 1950s, only 100 people lived in the area. By 2004, Broomfield's population exceeded 46,000. In 2001, Broomfield citizens voted to establish the City and County of Broomfield.

Water Supply. Broomfield relies primarily on C-BT Project water and Denver Water for its potable water supply. The City owns 56 units of Windy Gap water, which is used when available or through the Windy Gap in-lieu program, which allows for borrowing C-BT water under certain conditions. Broomfield's nonpotable water supply includes flows from Clear Creek, Coal Creek, Walnut Creek, and Big Dry Creek and reuse of Windy Gap effluent when available. Broomfield also owns ditch and reservoir shares that are used outside the City and County boundaries for nonpotable uses including drought-tolerant sod production and biosolid disposal in Weld County. Broomfield recently completed a water reuse system that allows the capture of Windy Gap effluent to assist in meeting nonpotable irrigation needs.

Although the current firm yield of this reuse water is zero, it is projected to provide about 3,100 AF of reuse water if the WGFP is implemented. Broomfield's current firm water supply is 13,739 AF.



Growth and Population Trend. Broomfield experienced steady growth in population and employment from 1980 through 1990, but the pace of that growth accelerated from 1990 through 2004. Population almost doubled from 24,640 in 1990 to 46,400 in 2004—an average annual growth rate of almost 5 percent. Employment rose three-fold from 1990 to 2004, experiencing an average annual growth rate of 9 percent. Broomfield's employment growth has benefited from its location along a major highway between Denver and Boulder.

Current Water Demand. Broomfield's Water Department service area includes the entire county, plus the Jefferson County Airport and the Mile High Water District. Total potable water use for Broomfield peaked at about 10,100 AF in 2002, dropping in 2003 due to drought and related water use restrictions. Potable residential water deliveries nearly doubled between 1992 and 2003. Residential water use comprises an average of about 70 percent of total use. Commercial water use represents about one-fourth of total Broomfield water use; these water demands have been growing at a slightly slower pace than residential water use. Total water use per capita per

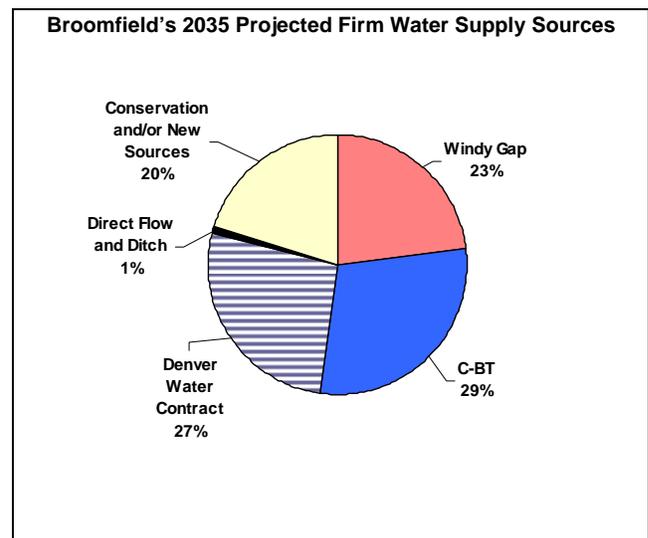
day varied within a fairly narrow range during the 1990s, averaging 188 gpcd. Residential water use averaged 132 gpcd from 1992 through 2003.

Conservation. Broomfield updated their 1996 Water Conservation Plan in 2009 (Broomfield 2009). To reduce potable water demands, Broomfield has invested several million dollars into a nonpotable water system that currently provides 2,400 AF of water annually to irrigate 1,105 acres of parks and golf courses. The reuse system is projected to expand over the next 30 years from covering 16 percent of total water demands today to supplying as much as 25 percent of the total water demand. Broomfield has a leak detection program to reduce distribution system losses and a plan to replace service meters at least every 12 years for functional optimization. A variety of public education measures and water audits are used to further conservation goals. Broomfield has set a conservation goal of a 3,560 AF (17.6 percent) reduction in water use by 2018. The 2009 conservation plan builds on existing conservation practices and implements new practices that include:

- Expansion of the existing water conservation public education program with additional information on their website and via school programs;
- Implementation of a water audit program for residential and commercial water users;
- Implementation of a rebate and incentives program for efficiency improvements to irrigation, appliances, and fixtures; and
- Expansion of the nonpotable irrigation system

Projected Water Demand. Broomfield's population is projected to peak at 83,300 residents in 2025 based on a 2.9 percent annual increase from 2004 through build-out in about 2035. This indicates an 80 percent increase in population in 20 years. Employment in Broomfield is expected to grow faster than population, doubling by 2025 and continuing to grow beyond that. Total firm water requirements are projected to increase from 14,300 AF in 2005 to 24,400 AF in 2035. About 86 percent of future demand is for potable needs and the remainder for nonpotable uses.

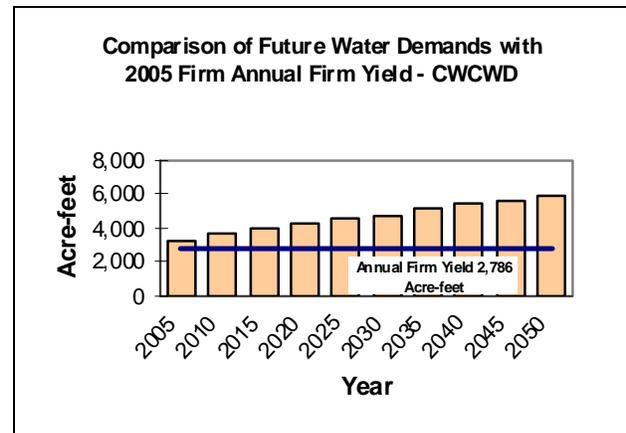
Water Need. Broomfield's existing water supplies are sufficient to meet current water needs during average years of precipitation. Currently, water demand may exceed available firm water supplies during dry years, depending on C-BT deliveries. Broomfield's projected 2035 water requirements exceed available firm supplies by about 10,700 AF. Firming Broomfield's Windy Gap water would provide a firm annual yield of about 5,600 AF to meet potable needs plus sufficient reusable effluent (3,100 AF) to meet the majority of anticipated nonpotable demands. A firm Windy Gap water supply would provide Broomfield about 23 percent of the City's 2035 water supply requirement, not counting the potential reuse of Windy Gap water.



1.7.2 Central Weld County Water District

Central Weld County Water District (CWCWD) was created in 1965 to serve a large rural portion of Weld County. The CWCWD's total service area is about 250 square miles generally located south of Greeley and spanning along the South Platte River to the area along I-25 south of Dacono.

Existing Water Supply. The CWCWD's water supply consists of two main water categories: water owned by CWCWD that is treated and delivered to rural customers; and water that is transferred to CWCWD, treated, and delivered to towns in the service area. The primary source of water owned by CWCWD is C-BT Project water, a small number of ditch shares in the Greeley-Loveland Irrigation Company, and 1 unit of Windy Gap water. The CWCWD does not have a firm source of supply for reuse because 99 percent of its water supply is from the C-BT Project, which is not reusable. Additionally, because CWCWD serves primarily rural customers with its Windy Gap water and CWCWD does not operate a wastewater facility, there are no plans for reuse of Windy Gap water. CWCWD's current firm water supply is 2,786 AF. In addition to the water owned by CWCWD, it receives, treats, and delivers C-BT water to eight small communities—Dacono, Kersey, Milliken, LaSalle, Gilcrest, Platteville, Left Hand, and Aristocrat. In 2005, CWCWD began providing water to the communities of Firestone and Frederick. The water supply and demand for Firestone and Frederick were not included in the evaluation because CWCWD's 1 unit of Windy Gap water is used to meet the needs of existing rural customers.



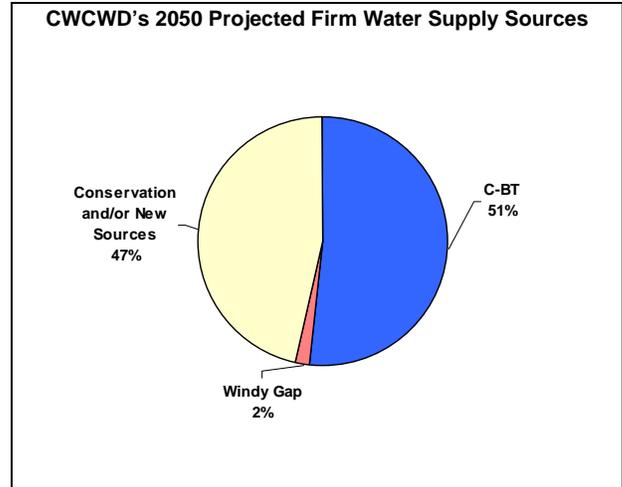
Growth and Population Trend. CWCWD service area population was estimated at about 5,200 in 2002 not including the communities that provide raw water to CWCWD for treatment. Between 1999 and 2002, the number of taps in the CWCWD service area grew at an average annual rate of 8.2 percent, or a total of about 27 percent.

Current Water Demand. CWCWD supplies water to rural customers within District boundaries. Nonresidential demands accounted for nearly two-thirds of total CWCWD demand in 2002. Nonresidential demand is mostly attributable to various agricultural and dairy users, with Aurora Dairy and Fort St. Vrain Power Generation representing the largest users. Total 2002 water demand was about 2,800 AF. Residential water use within the CWCWD service area was about 162 gpcd from 1999 to 2002. The CWCWD also treats water for the eight communities previously mentioned. Because the CWCWD is only responsible for providing treatment and not the raw water, these communities were not included in the demand evaluation. Total water use averaged almost 500 gpcd for the same period, but two-thirds of CWCWD water demand was for agricultural and industrial users.

Conservation. CWCWD implemented its current water conservation plan in 2005, emphasizing a diverse public education effort. CWCWD utilizes an advanced computer leak detection system, which monitors inflows and outflows every 2.5 minutes, facilitating rapid system repair. CWCWD encourages its dairies and other agricultural businesses to use nontreated water when possible. Dairies within CWCWD will typically have reused potable water three to four times once it reaches the dairy. CWCWD also requires low-flow fixtures in all new construction and promotes voluntary upgrades to low-flow fixtures and appliances for existing structures. Use of low-water use landscaping and efficient irrigation practices is encouraged. CWCWD promotes the development of future nonpotable water systems within the District. Updates to the conservation plan and approval by the CWCB would occur prior to delivery of WGFP water.

Projected Water Demand. The population in the CWCWD service area is expected to reach about 16,000 by 2050 based on the estimated growth in residential taps. To arrive at projected residential demand, historical residential use patterns were analyzed. Residential taps are expected to grow at an annual rate of about 4.6 percent until 2010, and then decline over time to about 1.2 percent by 2050. Projections of future nonresidential demands are based on the continuation of the historical average of 3.5 new taps per year. Total water requirements for the CWCWD are estimated to be 5,900 AF per year by 2050.

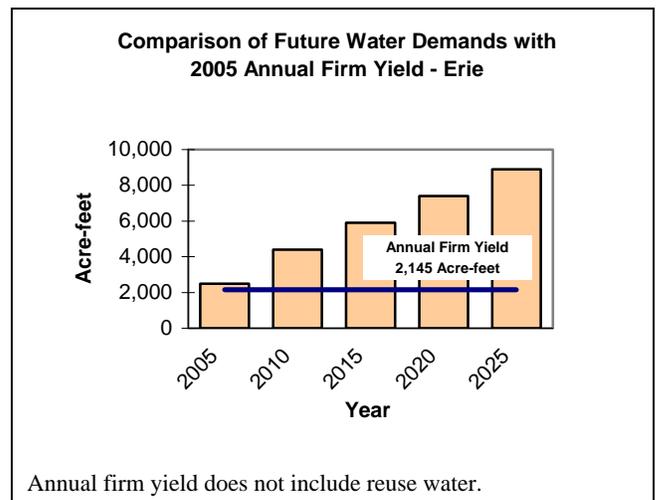
Water Need. CWCWD existing water supplies are sufficient to meet current water needs during average years of precipitation, but water demand could exceed available firm water supplies during dry years, depending on C-BT deliveries. Projected water demand exceeds the firm supply by about 1,900 AF in 2030, and by 2050 a shortage of about 3,100 AF is anticipated. Firming CWCWD’s single Windy Gap unit would provide about 100 AF of water, or less than 2 percent of its 2050 water supply. CWCWD is also a participant in the Northern Integrated Supply Project (NISP), which if constructed, would provide about 8,400 AF of firm yield (Corps 2008). A large portion of this yield would go to serving the communities of Firestone and Frederick, which are not included in the rural service area where Windy Gap water is used. If both the WGFP and NISP projects are constructed, the CWCWD is projected to experience a 1,770 AF shortage in 2060 water supplies (Harvey Economics 2011).



1.7.3 Town of Erie

The Town of Erie is in Boulder County, Colorado just north of the City of Lafayette. Prior to 1995, the Town of Erie was small and rural in nature, but considerable growth has occurred since then.

Water Supply. Erie’s water supply has grown over the last 10 years to keep pace with rapid population growth. Erie has purchased C-BT Project water since 1992 to the present, which currently provides more than 90 percent of Erie’s water supply. Other water sources include the ownership and planned acquisition of up to 20 units of Windy Gap water, reservoir storage rights, and various ditch shares. Erie does not currently have a firm supply of water for reuse. When available, effluent from Windy Gap water is used via an exchange to irrigate parks and open space. Erie estimates about 50 percent of its Windy Gap water could be reused if the WGFP is implemented. The current estimated firm annual water supply for the Town of Erie is 2,145 AF.



Growth and Population Trend. Erie’s population has grown from about 1,260 in 1990 to 6,300 in 2000; the population in 2004 was about 10,390. From 1990 to 2004, Erie’s population increased 729 percent with a 744 percent increase in the number of housing units.

Current Water Demand. Encompassing about 14 square miles, the Town of Erie and its water department serve most customers within its service area. No large industrial or other water users were served as of mid-2004. From 1997 through 2003, total water deliveries for the Town of Erie increased six fold. In 2002, residential water use comprised 76 percent of total water sales, and residential use has averaged 88 percent of total water sales from 1997 through 2004. In 2003 and 2004, commercial water sales accounted for more than 15 percent of total water

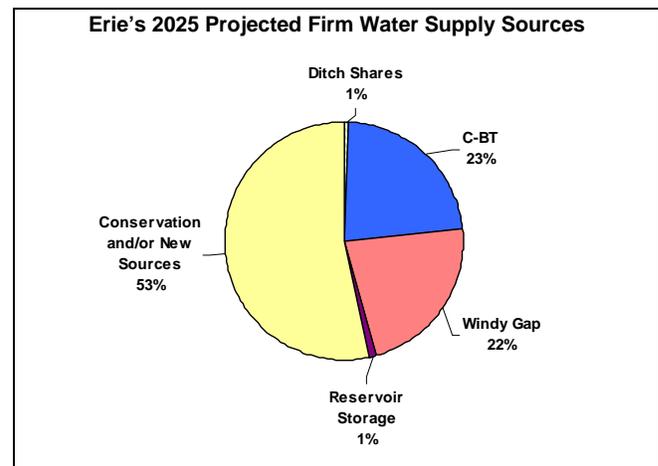
sales. The Town of Erie initiated nonpotable water use in 2001 and averaged about 80 AF of deliveries between 2001 and 2003. Total water requirements for the Town of Erie increased from 229 AF in 1995 to a high of 2,025 AF in 2002. From 2000 to 2003, total water use averaged 164 gpcd and residential water use averaged 129 gpcd.

Conservation. Erie developed and implemented their CWCB-approved water conservation plan in January 2008 (Erie 2008). This plan builds upon Erie's established conservation measures that include education, continuous leak detection, an irrigation audit program, an increasing block rate structure, and using reusable effluent for golf course and town landscape irrigation. The new plan expands the public education program, rebates for water-efficient washing machines, use of moisture sensors at parks, universal metering, and a water reuse program. The goals for Erie's conservation plan are:

- Saving 960 AF (17 percent) of water by 2014;
- Using 690 AF per year of reclaimed water by 2014;
- Reducing water use in town parks and landscaping by 15 percent by 2014;
- Implementing a monitoring system to effectively measure the success of the conservation programs on an annual basis; and
- Implementing a plan that is compatible with the community.

Projected Water Demand. The projected population forecast for Erie is based on an annual rate of growth of almost 13 percent through 2007, 6 percent through 2017, and 4 percent to build-out in 2025. Population at build-out is estimated at about 40,700 with about 14,600 housing units. Total Erie water requirements are expected to increase from about 2,500 AF in 2005 to 8,900 AF in 2025. This represents about a 260 percent increase over that period of time. About 96 percent of future water demand is needed for potable uses and the remainder for nonpotable irrigation.

Water Need. Existing water supplies are currently sufficient to meet Erie's water needs during average years of precipitation. Currently, water demand could exceed available firm water supplies during dry years, depending on C-BT deliveries. A firm water supply shortage of about 6,800 AF is estimated by build-out in 2025. Firming Erie's Windy Gap Project water supply would provide up to 2,000 AF of water, or about 22 percent of the Town's projected 2025 water supply need, not including the reuse of about 50 percent of the Windy Gap yield to meet irrigation demands. Erie is a participant in the NISP, which would deliver a firm yield of about 6,500 AF, if constructed (Corps 2008). If both projects are built, Erie would be close to meeting 2025 build-out water demand.



1.7.4 City of Evans

The City of Evans is in south-central Weld County just south of the City of Greeley. Evans is a highly diversified and stable community experiencing significant growth and development.

Existing Water Supply. The City of Evans currently relies on transbasin water from the C-BT Project and five local ditch companies for its potable water supply. Evans has completed a lease/purchase for 5 units of Windy Gap water. All of Evans' potable water is treated by the City of Greeley. Evans provides raw water to Greeley each year equal to Evans' projected water demand, plus an additional amount to account for losses incurred by Greeley. Evans' nonpotable water supply includes the Evans Town Ditch, which currently exceeds the City's nonpotable demand. The current firm annual water supply available to Evans is about 9,298 AF. In addition, Evans receives return flow credit from native water sources, which provide a variable supply of about 400 AF of

reuse water for meeting return flow obligations. Evans estimates up to 85 percent of its Windy Gap water could be reused if the WGFP is implemented.

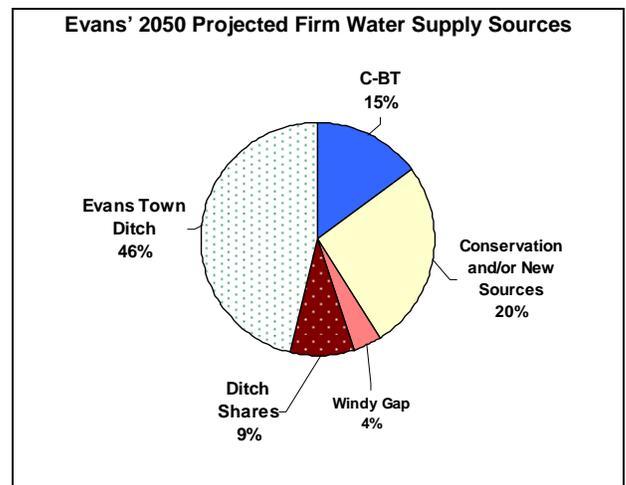
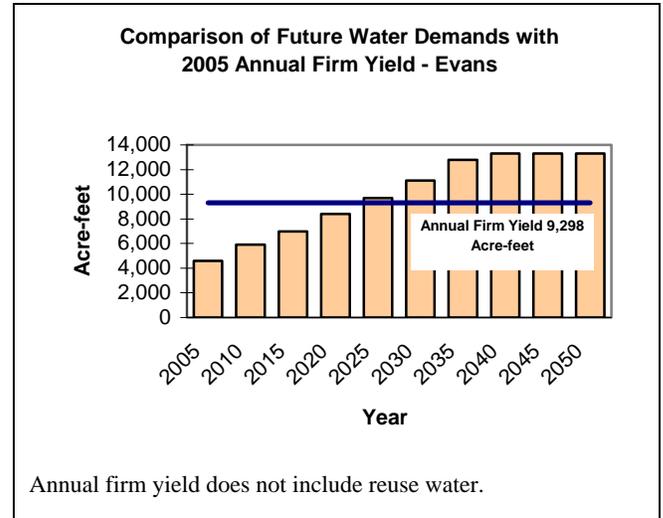
Growth and Population Trend. Between 2000 and 2002, the City of Evans ranked among the fastest growing cities in Colorado. Over this period, Evans grew at an average annual rate of 7 percent. Between 1990 and 2004, Evans' population grew from about 5,900 to 15,000.

Current Water Demand. The City of Evans is responsible for providing water to the residential, commercial, industrial and public users located within its service area. About 95 percent of Evans' customers are residential. Evans currently serves 14,860 residents within the city limits and provides water to 2,394 residents within the Arrowhead and Hill-N-Park subdivisions. Currently, no large water users are served by the City. Total water requirements to meet potable and nonpotable water needs since 2000 have ranged from about 3,700 to 4,600 AF per year. Over the period 1990-2002, total water use averaged 188 gpcd and residential water use averaged 157 gpcd.

Conservation. In May 2009, the City of Evans Water Conservation Plan was approved by the CWCB (Evans 2009). This plan builds on Evans' existing conservation measures and would reduce Evans' potable and nonpotable water use by about 492 AF per year (13 percent) by 2018. The City of Evans' conservation program emphasizes ongoing outdoor watering restrictions. In addition, Evans implemented an increasing block rate structure in 2001 that is billed monthly instead of quarterly. Evans has an active leak detection program and uses rain sensors on the irrigation systems at the City's parks. The plan requires additional rain or wind sensors for irrigation of open space properties and businesses. Evans intends to upgrade its public education effort regarding water conservation through such efforts as targeting high-water users, hiring staff to educate the public and monitor water use, establishing a Xeriscape program, and providing more sources of educational material via mailings and on the Internet. Evans will be expanding its use of nonpotable water for irrigation of rural property, city parks, schools, open space, and residential landscaping.

Projected Water Demand. The projected population forecast for Evans is based on an assumed annual rate of growth of 4 percent through 2010, 3 percent through 2020, and 2.5 percent thereafter. The City of Evans service area population is expected to peak at about 40,000 residents by 2037. Total raw water requirements to meet this anticipated population is about 13,300 AF per year.

Water Need. Evans' existing total firm water supply exceeds current demand during average years of precipitation; however, not all water supplies are currently available for meeting potable water needs. Water demand is expected to exceed available firm water supplies by about 2025, which would affect the ability of Evans to meet dry year water needs, depending on C-BT deliveries. However, the Evans Town Ditch, which is included in Evans' total water supply, currently can only be used for nonpotable uses because the water is only available downstream of Greeley's water treatment plant, which treats water for Evans. Thus, a shortage in firm potable water supplies may occur much sooner. Based on total water supply, without accounting for source of water, a firm water supply

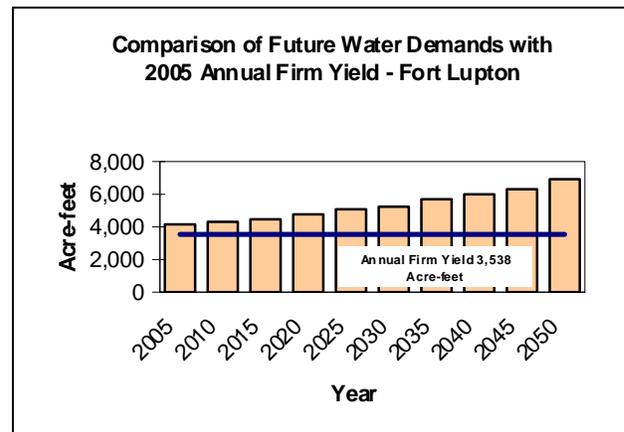


shortage of about 4,000 AF is anticipated by about 2040 when demand is expected to peak. Firming Evans' 5 Windy Gap units would provide the City with about 500 AF of water or about 4 percent of the City's projected 2050 water supply requirement, not including the reuse of about 85 percent of the Windy Gap yield to meet return flow obligations. Evans, as a participant in the NISP, would receive a firm yield of about 1,600 AF if the project is completed (Corps 2008). If both the WGFP and NISP projects are constructed, Evans is still expected to experience a shortage of about 2,000 AF in available potable water supplies to meet future needs.

1.7.5 City of Fort Lupton

The City of Fort Lupton is in south-central Weld County about 25 miles north of Denver. Nearby cities include Brighton, Platteville, Firestone, Frederick, and Dacono. Fort Lupton began as a trading fort in 1836; since that time, the community has expanded with its business, agriculture, and oil and gas-based economy.

Existing Water Supply. Historically, the City relied on ground water to meet its municipal water needs. With increasing growth and development along the Front Range, the quality of the ground water from Fort Lupton's wells in the South Platte River alluvium has gradually declined. For this reason, the City decided to acquire C-BT Project water in 1997 and blend this water with ground water to maintain acceptable water quality until 2005 when ground water was no longer used for drinking water. Fort Lupton recently purchased 3 units of Windy Gap Project water from Greeley. In addition, Fort Lupton owns shares in the Fulton Ditch, which provides water for irrigation. Fort Lupton does not currently have any sources of water available for reuse, but estimates that up to 80 percent of its Windy Gap water could be reused if the WGFP is implemented. Firm annual water supplies currently available to Fort Lupton total 3,538 AF.



Growth and Population Trend. The City of Fort Lupton's 2003 population is estimated at 7,071, and the City's service area is coincident with its city limits. From 1990 through 2003, population grew at an average annual rate of 2.5 percent. Total water taps increased by an average annual rate of 2.9 percent from 1997 through 2003. Annual growth rates have fluctuated since 1990, with the most significant growth occurring in 2000 and 2001.

Current Water Demand. Residential use has traditionally comprised the majority of potable water demands in the City of Fort Lupton, accounting for an average of 77 percent during the 1997 to 2003 period. A large portion of the remainder of Fort Lupton's water demand comes from nonpotable water needs. From 1997 through 2003, the Thermo power plant used an average of 1,625 AF of water annually, while other nonpotable users, including the City's parks and schools, outdoor irrigation and golf course, used 550 AF annually on average. Total water demand for Fort Lupton has ranged from about 3,000 to 4,000 AF per year between 1997 and 2003. Total potable water use has averaged 123 gpcd and residential water use has averaged 97 gpcd from 1997 to 2003.

Conservation. The City of Fort Lupton's 2007 Water Conservation Plan (Fort Lupton 2007), approved by the CWCB in 2007, sets long-term conservation goals for the three main water users—residential, city irrigation, and the Thermo power plant. The long-term goal for residential water usage is a 7 percent reduction in per capita residential water usage. The Thermo power plant revised its water usage in 2002 and reduced its water usage by 38 percent. The City and Thermo power plant are evaluating whether nonpotable water from the WTP can replace some of the well water used by the power plant. The City has established the long-term goal of 5 percent reduction in irrigation. A total water use savings of 222 AF is estimated by 2030 with implementation of conservation measures. The City will accomplish its goals through:

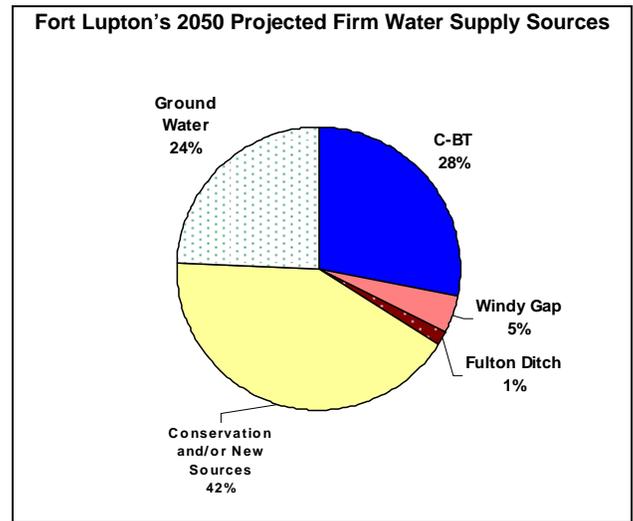
- Installing rainfall and wind sensors for City-irrigated properties and issuing rebates for residential and business use of rain and wind sensors to improve irrigation efficiency;

- Issuing rebates for low-flow fixtures;
- Expanding its water education programs;
- Changing its rate structure and implementing watering restrictions;
- Increasing WTP efficiency and/or developing a beneficial use for backwash;
- Detecting leaks and making repairs; and
- Improving billing meters to better account for water use.

Projected Water Demand. Based on an annual growth rate of 2.5 percent, the City of Fort Lupton is expected to reach nearly 24,000 by 2050. Residential, commercial, industrial, schools, city parks and irrigation water usage are all expected to track population growth. The City's current and future use for golf course irrigation is expected to remain steady from 2003 to 2050. Total raw water requirements of about 6,800 AF are projected by 2050, of which about 60 percent would meet potable water demand and 40 percent would meet nonpotable water needs, including the Thermo power plant.

Water Need. Existing water supplies are currently sufficient to meet Fort Lupton's water needs during average years of precipitation. Currently, water demand could exceed available firm water supplies during dry years, depending on C-BT deliveries. By 2030, Fort Lupton's firm water demand is projected to exceed supply by about 1,700 AF; by 2050

about 3,300 AF of additional water would be needed to meet Fort Lupton's water needs. Firming Fort Lupton's 3 units of Windy Gap water would provide Fort Lupton with about 300 AF of water, or about 5 percent of its projected 2050 water supply, not including reuse of up to 80 percent of Windy Gap water. Fort Lupton is a participant in the NISP, which would provide a firm yield of about 3,000 AF, if constructed (Corps 2008). If both the WGFP and NISP are constructed, Fort Lupton's 2050 firm water supply would be about 300 AF short of water needs.



1.7.6 City of Greeley

Greeley, the largest city in Weld County, is about 50 miles north of Denver. The City is in a semi-arid environment that receives about 12 inches of precipitation annually. Greeley was originally an agricultural-based community, but continues to diversify and support a variety of businesses and commercial industries.

Subsequent to the completion of the *WGFP Purpose and Need Report* (ERO and Harvey Economics 2005) prepared for this EIS, Greeley and Harvey Economics conducted additional evaluations and demand forecasting for the Halligan-Seaman Water Management Project. The Halligan-Seaman evaluation was based on more recent water consumption data and a different forecasting methodology, but the results were generally consistent with the *WGFP Purpose and Need Report*. The results of the additional evaluation, while varying slightly from those produced for the WGFP EIS, confirmed Greeley's need for participation in the WGFP and securing future water supplies. Pertinent differences between the two studies are noted in the following discussion.

Existing Water Supply. Greeley's water supply system is diverse and complex, and uses carryover storage from existing reservoirs, proactive water management, conservation, and system integration to increase the efficiency and yield of the City's water rights. Water supplies include the C-BT Project, direct flow rights from the Cache la Poudre River, irrigation ditch shares, and mountain reservoir storage. Although legally available, about one-third of ditch shares in the Greeley-Loveland System are currently in agricultural leases and not available for immediate potable or nonpotable use. Greeley owns 64 units of Windy Gap water. As described in Greeley's Water Master Plan, Greeley has been pursuing the potential sale/lease of 20 of its Windy Gap units as a way to

help fund storage for Greeley's remaining Windy Gap units. Greeley recently sold 3 Windy Gap units to Ft. Lupton, leased 5 units to Evans with an option to purchase, and has a lease/purchase agreement with the Little Thompson Water District for 12 units.

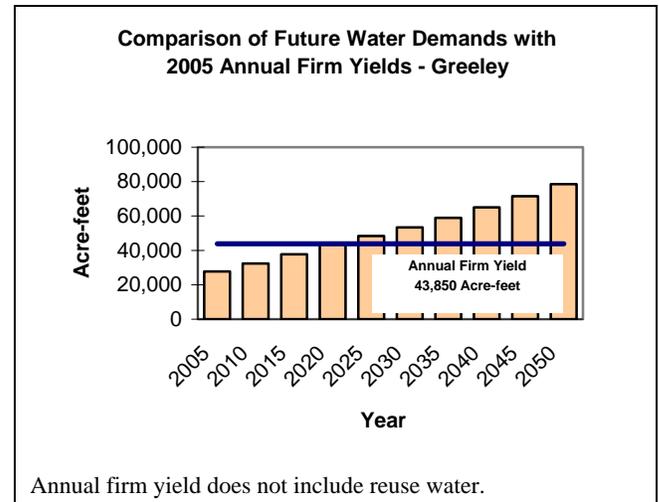
Greeley's current firm water supply is about 43,850 AF, which does not include any return flow obligations (RFOs) or wholly consumable supply, native, or Windy Gap water, needed to meet RFOs. However, the 43,850 AF does include about 2,350 AF of nonpotable water used for irrigation. Greeley estimates that it would be able to reuse about 80 percent of Windy Gap water if firmed, not as a potable supply because of the geographical and physical constraints, but as a supply to meet Greeley's RFOs.

Growth and Population Trend. The City of Greeley has grown from a rural community of 20,400 in 1950 to the second largest city in northern Colorado, with a population of 83,000 in 2003. Greeley's population doubled from 1960 to 1980. Population growth from 1970 to 1990 averaged about 2.2 percent per year, while population growth during the 1990s was about 2.5 percent per year.

Current Water Demand. Greeley delivers water to residential and commercial users within its service area in addition to deliveries and water treatment contracts with entities outside of its service area. Greeley provides wholesale water to the City of Evans, a Kodak plant, part of the Town of Windsor, part of the Town of Milliken, plus Garden City. These entities provide Greeley with raw water and associated water rights and Greeley treats and delivers potable water to the respective customers at master meters. The water demands associated with these customers are excluded from consideration in this analysis because Greeley is not responsible for providing any future water requirements. Greeley continues to provide water to other customers outside the City in the Greeley service area that have historically been served. This includes customers along Greeley's water transmission lines and certain agricultural customers. Greeley's water demands between 1993 and 2003 have ranged from about 19,000 to 25,000 AF. Total water use per capita, excluding wholesale accounts and those outside city limits, averaged 202 gpcd from 1993 to 2002. Single-family residential water use per capita, inside Greeley city limits, averaged 194 gpcd between 1993 and 2002. Greeley residential water use, which includes single- and multi-family residents use, was determined to be 146 gpcd for the period from 1997 to 2005 for the Seaman-Halligan Project (Harvey, pers. comm. 2007).

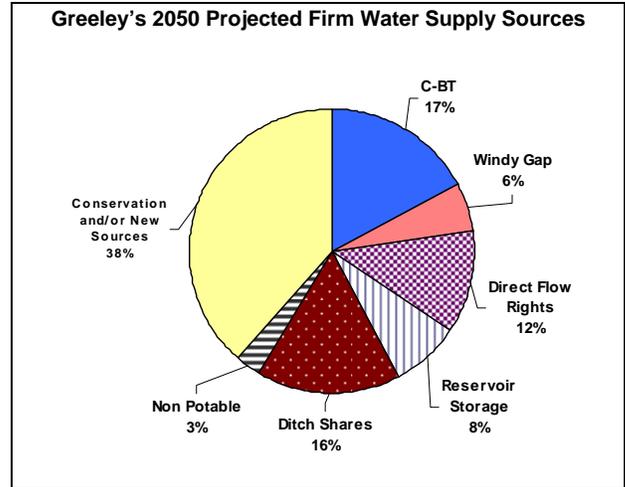
Conservation. As one of the largest communities among the WGFP participants, Greeley has an extensive and highly structured water conservation program. Since 1997, Greeley has employed a full-time conservation coordinator to manage water efficiency efforts. Conservation measures include rebates for fixtures and appliances, water audits, water-wise landscape ordinances, water rate structure and full metering, nonpotable irrigation, and other measures. The City's 2008 Water Conservation Plan (Greeley 2008), approved by the CWCB in April 2009, builds on the existing conservation program. The plan outlines how the City will meet the goal of a 3,000 AF (8.2 percent) water use reduction by 2030. The City plans to meet its conservation goals through the expansion of current conservation practices and implementing the practices listed below, as well as other measures described in the plan:

- Increasing the conservation budget by 25 percent over a five-year period;
- Implementing a water budget rate structure;
- Expanding the rebate program for water-efficient fixtures;
- Working with a new subdivision to participate in EPA's WaterSense program;
- Expanding and clarifying existing landscape code; and



- Retrofitting existing landscape to water-wise landscape when feasible.

Projected Water Demand. Greeley’s population forecast indicates an increase from 83,000 in 2003 to 126,300 in 2020, at the historical growth rate of 2.5 percent per year. By 2050, Greeley’s population is projected to be 228,800 based on a 2 percent growth rate between 2020 and 2050. A total raw water requirement of about 53,500 AF is estimated by 2030, and a need of 78,500 AF is estimated by 2050 to meet potable and nonpotable water demand. Water demand forecasts for the Seaman-Halligan Project indicate a greater near-term water demand in the next 5 to 20 years, but a similar long-term demand by 2050 compared to the evaluation conducted for the WGFP. The Halligan-Seaman water demand forecast was based on population projections and average recent gpcd values, while the WGFP demand forecast was based on projections of land use type. Similar results for both demand forecasting methods corroborate Greeley’s water need assessment.

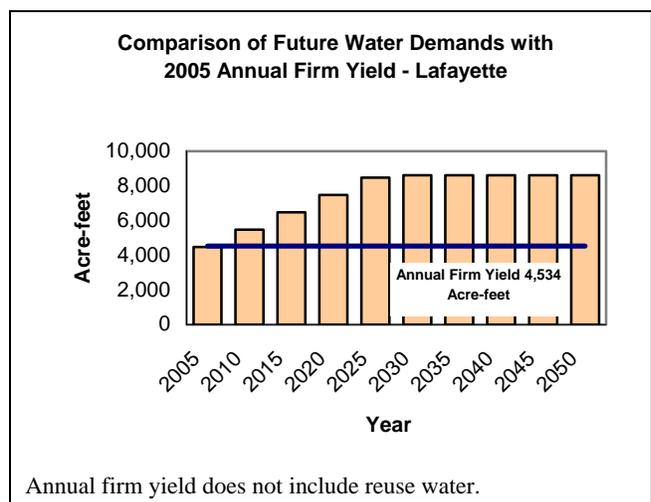


Water Need. Greeley’s existing water supplies are currently sufficient to meet water needs during average years of precipitation, as well as dry years. By about 2020, Greeley’s water demand is expected to exceed available firm water supplies. A water supply shortage of about 9,700 AF is anticipated by 2030, and a shortage of about 34,700 AF is anticipated by 2050. Firming 44 units of Greeley’s Windy Gap water could provide an annual yield of up to 4,400 AF. In the near term, the City needs the reusable effluent from Windy Gap water to meet return flow obligations and augmentation for existing operations and for added flexibility in managing its water portfolio. An annual Windy Gap water supply of 4,400 AF would provide Greeley about 6 percent of its projected 2050 water supply requirement. In addition, about 80 percent of Windy Gap water could be reused if firmed to meet Greeley’s return flow obligations and augmentation requirements.

1.7.7 City of Lafayette

The City of Lafayette is just east of the City of Boulder on the eastern edge of Boulder County. Bordering communities include the cities of Louisville and Broomfield, and the towns of Superior and Erie. Like many communities along the rapidly growing U.S. Highway 36 corridor, the City of Lafayette experienced significant growth in population over the last decade.

Existing Water Supply. The City of Lafayette’s raw water supply is based primarily on shared ownership in several ditch and reservoir companies with diversions from Boulder Creek and South Boulder Creek. Lafayette’s ownership in three reservoirs also provides storage capacity prior to water treatment and delivery. In addition, Lafayette recently joined the NCWCD and has acquired C-BT units. Lafayette has purchased 1 Windy Gap unit from Left Hand Water District and is in the process of acquiring an additional 7 units. The City is evaluating implementation of a reuse program for landscape irrigation and currently exchanges effluent for diversions from South Boulder Creek. Reuse of existing native water provides an average yield of about 200 AF. Lafayette plans to fully use all available effluent associated with Windy



Gap water if firmed, which, accounting for consumptive use and losses, typically is about 80 percent depending on season of use and the reclaimed water system. The estimated firm annual water supply for the City of Lafayette is currently 4,534 AF not counting reuse water.

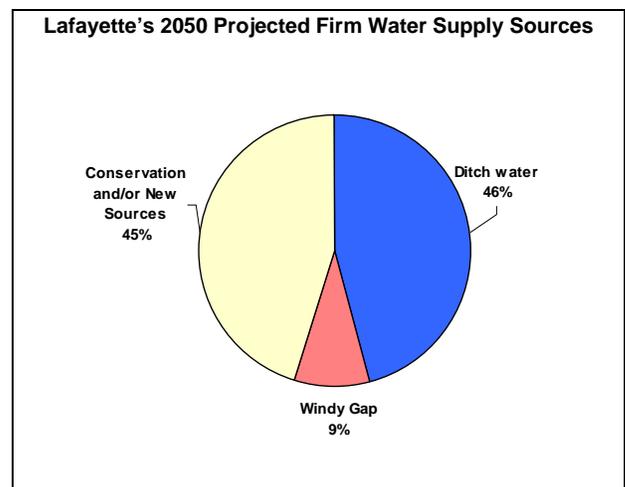
Growth and Population Trend. Lafayette's current service area population is estimated at about 25,500 persons. From 1979 to 2002, the City's population grew at an average annual rate of 4.6 percent. Annual growth rates for both population and the number of residential units have fluctuated. Significant growth, ranging from 8 to 10 percent per year, occurred during the early 1980s and mid-1990s, followed by periods of slower growth. In 1995, Lafayette imposed growth restrictions that limited the number of new residential dwelling permits.

Current Water Demand. The City of Lafayette is responsible for providing water to residential, commercial, industrial, and irrigation users within the City's boundaries. In addition, the City also provides water to the East Boulder County and Baseline Water Districts to serve certain rural residential customers. As of 2004, Lafayette did not serve any large water users. Current total water demands of 4,079 AF per year serve a population within the City of 24,637 people and an additional 359 residential taps outside the City's limits. Total water use has averaged 134 gpcd and residential water use has averaged 108 gpcd for 1993 to 2003.

Conservation. The City of Lafayette's new Water Conservation plan (Lafayette 2010) was approved by the CWCB. The goals of this plan are to reduce annual water consumption by about 596 AF per year through reductions in outdoor and indoor water use and to reduce system-wide water loss to 5 percent for a savings of about 233 AF per year by 2016. To reach this goal, the main focus of this plan is to reduce outdoor water use by adding a sixth and seventh tier onto the current aggressive increasing block rate structure to send a punitive financial signal to customers with unacceptable excessive use of water for landscaping. A smaller focus will be indoor use of water at City facilities through both retrofits to more efficient water fixtures and rebates to restaurants for reduced water consumption fixtures. Lafayette also will commence a multiyear program designed to perform acoustic leak surveys to further reduce system water losses.

Projected Water Demand. Projected future growth rates of less than 2 percent indicate a build-out population estimate of about 36,000 in 2026. Future water demand projections are estimated at a rate consistent with population growth. Total raw water requirements by 2026 are estimated to be 8,600 AF, of which about 87 percent would meet potable water demand and the remainder would be used to meet nonpotable use requirements.

Water Need. Existing water supplies are currently sufficient to meet Lafayette's water needs during average years of precipitation; however, water demand could exceed available firm water supplies during dry years, depending on C-BT deliveries. By build-out in about 2026, Lafayette's water demand is expected to exceed firm water supply by about 4,100 AF. FIRMING 8 units of Lafayette's Windy Gap water would provide a firm annual yield of about 800 AF, of which about 80 percent could be reused for nonpotable irrigation requirements. A firm Windy Gap water supply would provide Lafayette about 9 percent of the City's projected 2030 water supply requirement, not counting the reuse potential. Lafayette is a participant in the NISP, which would provide about 1,800 AF of firm yield, if constructed (Corps 2008). If both the WGFP and NISP are constructed, the 2030 water supply for Lafayette would be about 2,300 AF below projected needs.



1.7.8 Little Thompson Water District

The Little Thompson Water District (LTWD) is a special governmental water district with customers in Larimer, Weld, and Boulder counties. The 300-square mile LTWD service area is generally bounded by the City of

Loveland on the north, Longs Peak Water District on the south, the City of Greeley, the South Platte River and the St. Vrain River on the east, and the foothills on the west. The LTWD provides treated water to homes and businesses within the District.

Water Supply. Currently, the LTWD relies almost entirely on C-BT water to meet its municipal and commercial water requirements. Ditch shares and direct flow rights do not provide any firm yield. The LTWD is acquiring 12 units of Windy Gap water from the City of Greeley through a lease/purchase agreement. LTWD does not currently have any sources of water that can be reused, but projects about 80 percent of Windy Gap water could be captured and reused if the project is firmed. The LTWD current firm water supply is 5,510 AF.

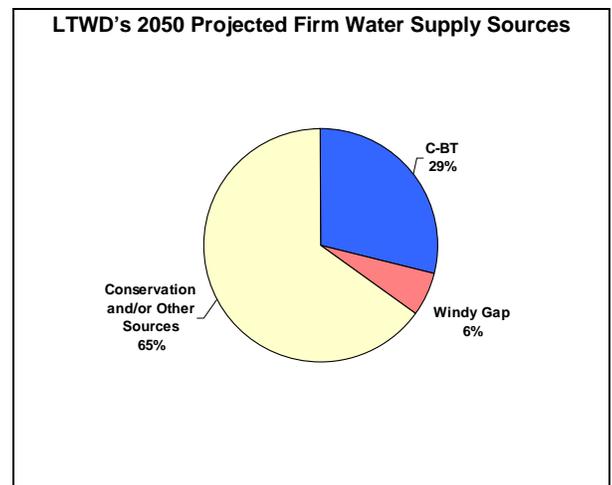
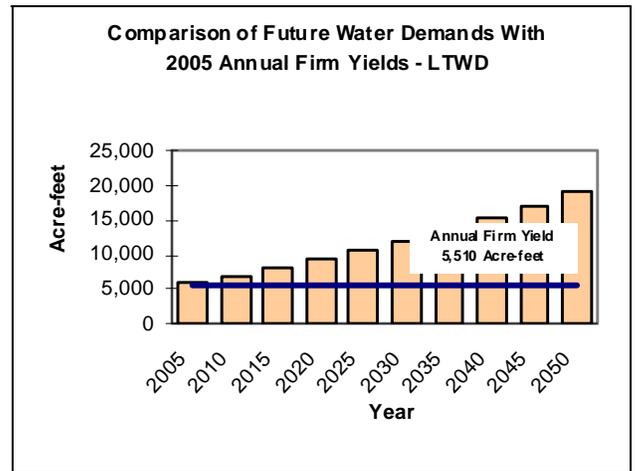
Growth and Population Trends. The population in the LTWD has almost doubled from about 10,800 in 1991 to 19,500 in 2003. During this time, the number of taps increased about 3.9 percent annually, excluding the LTWD expansion to become the primary service provider for the Arkins Water Association and the Town of Mead.

Current Water Demand. The LTWD provides treated water to nearly 20,000 persons in its service area. LTWD also provides treated water as a wholesale distributor to the North Carter Lake Water District, Long Peaks Water District, Town of Berthoud, and the City of Loveland. Because the LTWD is not responsible for providing the raw water for these customers, these deliveries were not included in the demand evaluation. The LTWD also serves an estimated eight to ten large agricultural and dairy water users. Total raw water requirements for the LTWD ranged from 4,000 to 5,000 AF per year between 2000 and 2003. Residential water use averaged 174 gpcd between 1998 and 2003. Total water use for the same period was 224 gpcd and is influenced by the presence of dairies and other agricultural users in the LTWD service area. In addition, LTWD acquired the Arkins Water Association and began serving the Town of Mead, which temporarily increased water use for several years.

Conservation. The LTWD is preparing a new water conservation plan for review by the CWCB. Currently the District employs several measures to encourage water conservation including rebates, conservation taps, an increasing block rate structure, distribution of conservation educational material, use of dual potable/nonpotable systems in several new developments, and a leak detection program. Additional conservation measures are being developed as part of the updated conservation plan.

Projected Water Demand. Projected population growth in the area served by the LTWD based on historical growth in the District and northern Front Range growth projections by the Colorado Demography Office indicate a population of about 76,500 by 2050. Between 2005 and 2050, the total number of taps is projected to increase by 26,700, or an average annual rate of 2.8 percent, driven by growth in the number of residential taps. Projected demands were calculated by multiplying per tap use by the total number of taps. Total raw water requirements for the LTWD are expected to reach about 12,000 AF by 2030 and 19,000 AF by 2050.

Water Need. Existing water supplies are currently sufficient to meet the LTWD’s water needs during average years of precipitation. Currently, water demand could exceed available



firm water supplies during dry years, depending on C-BT deliveries. Projected 2030 water requirements exceed available firm supplies by about 6,600 AF. By 2050, demand is estimated to exceed current firm water supplies by about 13,600 AF excluding the St. Vrain Lakes Development. Firming LTWD's Windy Gap water would provide a firm annual yield of about 1,200 AF for potable needs plus about 80 percent would be available as reusable effluent to meet a portion of nonpotable demands. A firm Windy Gap water supply would provide the LTWD about 6 percent of the District's projected 2050 water supply requirement.

1.7.9 City of Longmont

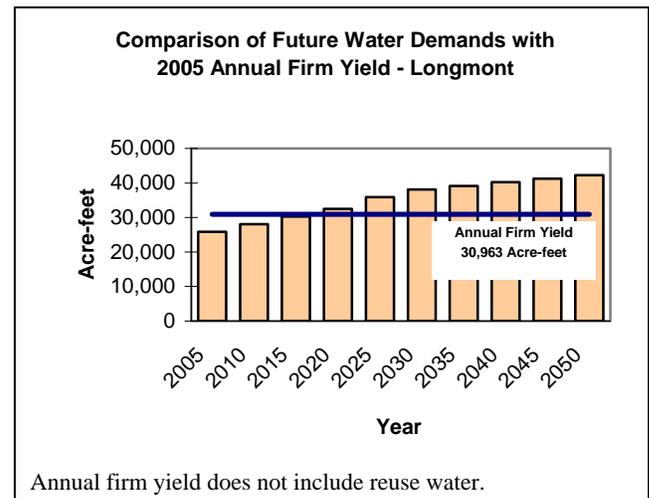
The City of Longmont is the second largest and fastest growing city in Boulder County. Longmont is about 16 miles northwest of the City of Boulder. The City was founded in 1871 and was named after the nearby Longs Peak. Similar to most urban areas along the Front Range, Longmont has experienced steady growth over the past 20 years.

Water Supply. Longmont's raw water sources come from the St. Vrain Creek basin and from the Colorado River basin. St. Vrain basin water facilities include Ralph Price Reservoir, the North Pipeline on North St. Vrain Creek, and the South Pipeline on South St. Vrain Creek. Other St. Vrain basin supplies include ownership in mutual and private ditch and reservoir companies that divert from St. Vrain Creek east of Lyons, Colorado. Colorado River basin supplies consist of the C-BT Project water and 80 units of Windy Gap Project water. Longmont's total current firm annual water supply is 30,963 AF. In addition, non-Windy Gap reusable effluent currently provides about 1,000 AF on average for nonpotable uses and the City estimates it would be able to reuse about 62 percent of Windy Gap water.

Growth and Population Trend. Longmont's population has grown from about 43,000 in 1980 to about 77,300 in 2002. Between 1990 and 2000, the increase was about 39 percent, for an average annual rate of 3.4 percent.

Current Water Demand. The City of Longmont supplies potable water inside its city limits, outside the city limits to a limited degree, and to nonpotable customers. In addition, Longmont treats water for the Town of Lyons, but this water is supplied by Lyons and is, therefore, not included in the historical demands or projections. Single family metered residential use accounts for about 80 percent of total metered residential water use inside the city, on average. Three large industrial water users—ConAgra, Amgen, and Royal Crest Dairy—represent about one-third of commercial and industrial water use. Their use has been relatively steady in recent years. In 2003, total Longmont water demand from all sources amounted to 20,900 AF. Longmont's water requirements have increased by 25 percent since 1990. Longmont's water use has averaged about 190 gpcd from 1994 to 2003, but excluding large commercial and industrial demands reduces total water use to about 175 gpcd.

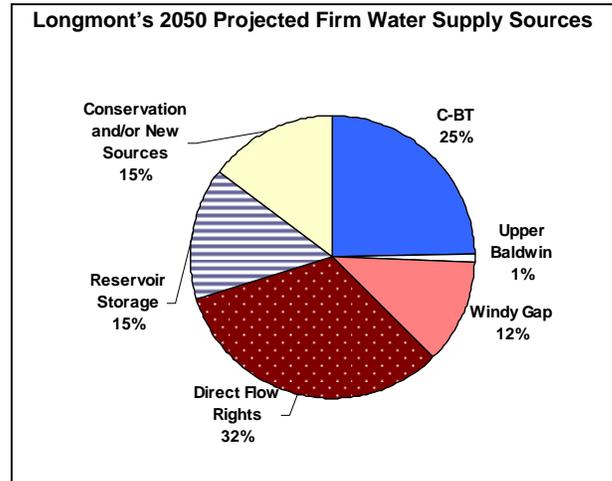
Conservation. The City of Longmont recently revised its Water Conservation Master Plan (Longmont 2008) and it was approved by the CWCB in November 2008. The City instituted an increasing block rate structure in 1989. Universal metering was completed in 2005 and the City is continually evaluating cost-of-service rates for all customers. Longmont's monthly utility bills show comparative usage and savings to encourage conservation. The City's public education program targets Xeriscape and water conservation techniques by customer type. Longmont has a retrofit program for City buildings and irrigation systems, regulatory measures for low-flow plumbing devices in new construction, and the prohibition of water waste. Reusable effluent is used for nonpotable demands. Conservation goals include reducing raw water demand by 1,600 AF (7.7 percent) by 2017



and by 3,500 AF (10 percent) by build-out. The 2008 conservation plan builds on existing conservation practices and implements new practices including:

- Expanding the existing water conservation public education program;
- Implementing a rebate program for soil amendments on commercial property, low-flow fixtures and residential appliances, and residential and commercial rainfall sensors; and
- Expanding the nonpotable irrigation system.

Projected Water Demand. Longmont’s population is projected to increase from 77,000 in 2002 to 104,000 by 2025. Raw water requirements to meet this projected demand indicate an increase from about 25,900 AF in 2005 to 38,100 by 2030, and 42,300 AF at build-out. Water demand would continue to increase even after population levels off to meet commercial and industrial needs. The increase in water use from 2005 to 2030 is about 47 percent, or an average annual rate of 1.6 percent. This compares to an average annual growth rate of 1.7 percent from 1990 through 2003 for Longmont treated water deliveries. This projection is in line with recent population projections in the City’s Comprehensive Plan and is less than recent historical growth rates. Commercial and industrial water use is expected to grow disproportionately as Longmont approaches build-out. Longmont’s nonpotable water demands are expected to increase almost 50 percent by 2030.

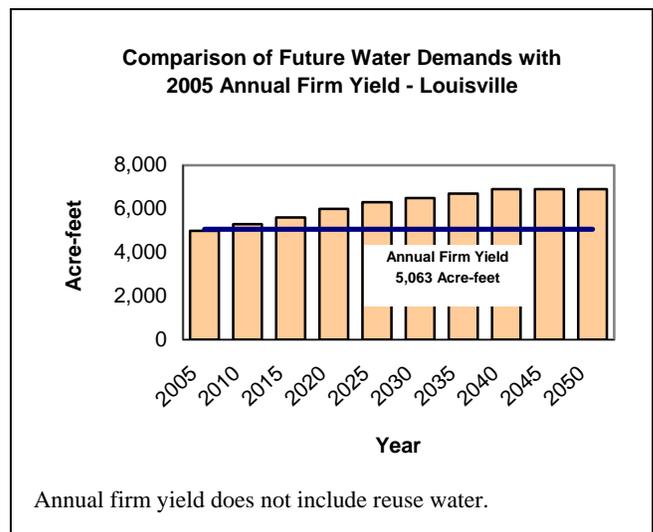


Water Need. Longmont’s water demand is expected to exceed available firm water supplies by about 2017, which would affect the ability of the City to meet dry year water needs depending on C-BT deliveries. A shortage in annual firm yield of about 7,000 AF is projected by 2030 and about 11,000 AF in 2050. Firming Longmont’s Windy Gap water supply would provide about 5,125 AF of water based on the City’s storage request and preliminary modeling, or about 12 percent of the City’s 2050 firm water supply. Firming Windy Gap water would provide reusable effluent of about 62 percent, which would contribute to meeting nonpotable water demand.

1.7.10 City of Louisville

The City of Louisville is in Boulder County about 6 miles east of the City of Boulder and 25 miles northwest of Denver. Louisville supports a residential community and associated commercial and industrial businesses. Louisville city limits cover an area of about 8.6 square miles including 1,700 acres of designated open space.

Existing Water Supply. The City of Louisville’s primary sources of water supply include direct flow rights from South Boulder Creek and C-BT Project water. Ownership of shares in the Marshall Division of the Farmers Reservoir and Irrigation Company also contributes to the firm water supply. Louisville owns 6 units of Windy Gap water and is lease/purchasing an additional 3 units from Greeley. Louisville’s current firm water supply is 5,063 AF. In addition, about 300 AF of water is currently available for



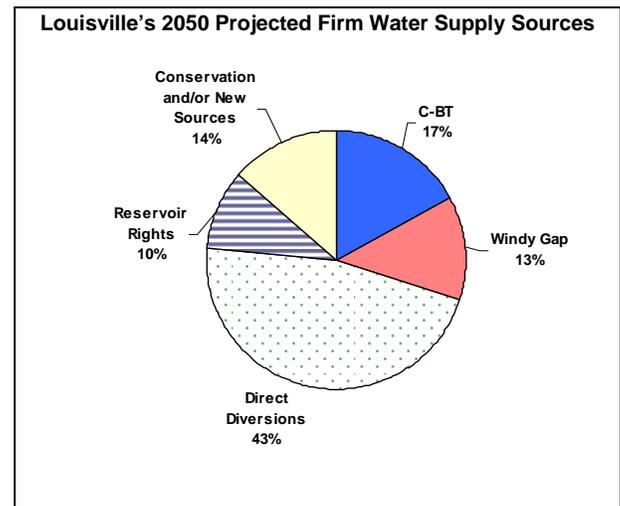
nonpotable reuse from native sources, and this could increase incrementally up to 900 AF in the future. Reuse water from the wastewater treatment plant is used for golf course and sports field irrigation. Louisville would reuse about 45 percent of its firm Windy Gap water for irrigation.

Growth and Population Trend. The City of Louisville's 2003 population was estimated at 18,387. From 1990 through 2003, population grew 49 percent, or at an average annual rate of 3.1 percent. The average annual growth rate for the total number of residential water taps was 0.2 percent from 1998 through 2003, and commercial water taps increased at an average annual rate of 7.1 percent in the same period. Population grew most significantly in the early and mid-1990s, while residential water taps have remained almost the same since 1998. Commercial growth has been considerable since 1998. The commercial sector is anticipated to generate the majority of future growth in water taps and usage in the City of Louisville.

Current Water Demand. The City of Louisville is responsible for providing water to residential, commercial, industrial, and irrigation users within the City's boundaries. The City also provides water to several residential customers just outside the city limits. Residential users have historically accounted for the majority of total deliveries at 66 percent; commercial users accounted for an average of 23 percent of total potable water use. Louisville's total water requirements have ranged from about 4,300 to 6,300 AF per year from 1998 to 2003. From 1998 through 2003, residential water use averaged 112 gpcd. Total water use per capita per day averaged 171 gallons.

Conservation. The City of Louisville is in the process of formally updating its 1996 CWCB-approved Water Conservation Plan and expects to have the revised plan completed in 2012. Current conservation measures include a leak-detection program, rebate incentives for appliances and irrigation practices, an increasing block rate price structure, water audits, and distribution of educational material, to name a few. In addition, the City's reuse system is used for nonpotable irrigation of City facilities including WWTP, parks, ball fields, and golf courses.

Projected Water Demand. The City of Louisville's is projected to reach a residential build-out population of 23,000 by 2025. A 1 percent growth rate in population and a 1.5 percent growth rate in commercial square footage were used to estimate future water demands. The City anticipates that commercial square footage would remain stable to 2007, and then increase at an annual growth rate of 1.5 percent. Based on the projected rate of growth, the City of Louisville would reach residential build-out by 2025 and commercial build-out by 2045. A total raw water requirement of about 6,900 AF per year is estimated for 2050. Total water requirements are anticipated to increase by 38 percent from 2003 through 2050, or at an average annual rate of 0.7 percent.



Water Need. Existing water supplies are currently sufficient to meet Louisville's water needs during average years of precipitation. Currently, water demand could exceed available firm water supplies during dry years, depending on C-BT deliveries. The City of Louisville is estimated to reach residential build-out by 2025 and commercial build-out by 2045. In 2050, a firm water supply shortage of about 1,800 AF is anticipated. Firming Louisville's 9 Windy Gap units would provide the City with up to 900 AF of water, or about 13 percent of the City's 2050 projected water supply need. Reuse of native water supplies up to 900 AF and capture and reuse of an estimated 45 percent of Windy Gap effluent also could contribute to meeting nonpotable demands. Although Louisville's future nonpotable water supply appears to be adequate to meet those needs, the City would need to develop additional water to meet potable water requirements.

1.7.11 City of Loveland

The City of Loveland is 50 miles north of Denver in southeastern Larimer County. Loveland has experienced rapid population growth between 1990 and 2003 within the 23.5 square miles of the city limits.

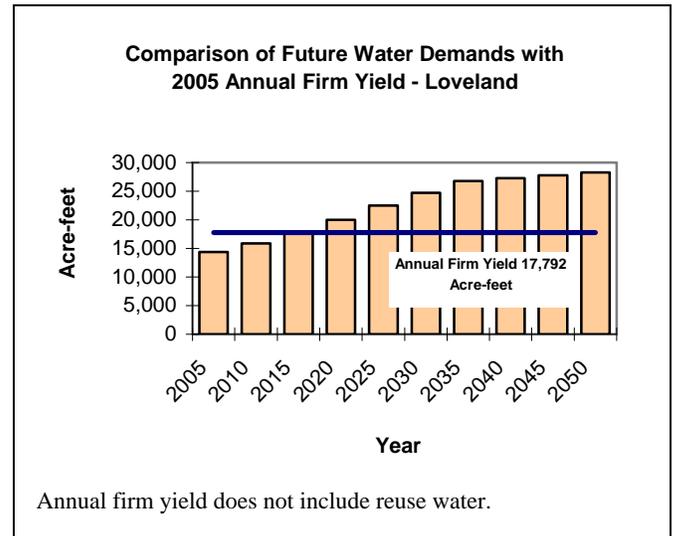
Existing Water Supply. The City of Loveland has two categories of water supply—transbasin supplies and transferred native ditch water rights. Transbasin supplies consist of C-BT and Windy Gap water. Transferred native ditch rights are diverted directly from the Big Thompson River to the water treatment facility for use in meeting potable water demand or stored in Green Ridge Glade Reservoir. A portion of the ditch shares not transferred for municipal use currently provides a nonpotable water source for meeting park and golf course irrigation needs. Loveland owns 40 units of Windy Gap water. Loveland’s current firm water supply is 17,792 AF including about 1,000 AF of nonpotable water. In addition, the City has limited capability for reuse of native water and is evaluating options for the potential reuse of a firm Windy Gap supply.

Growth and Population Trend. In 2003, the City of Loveland had a population inside its city limits of 58,170, but the Loveland Water Utility also serves over 5,000 additional customers within Loveland’s Growth Management Area (GMA). From 1990 through 2003, Loveland’s population grew by about 20,800, or more than a 50 percent increase.

Current Water Demand. The City of Loveland potable water demand includes residential and nonresidential water use inside and outside the City, ranch water picked up by water haulers, construction water delivered through fire hydrants, and wholesale water marketed to the Little Thompson Water District, Fort Collins-Loveland Water District, and the City of Greeley. Total potable water sales to Loveland service area end users increased by 3,250 AF between 1990 and 2002, or about 50 percent. About 80 percent of Loveland’s total water deliveries were dedicated to residential use over this time period. Commercial water use accounted for 15 percent of water use, while the remainder was accounted for by industrial, city, ranch water, construction water and wholesale water deliveries. Total water requirements, including potable and nonpotable demand and system losses, increased from 9,200 AF to 13,167 AF between 1990 and 2002. Residential gpcd has fluctuated within a narrow range from 1990 to 2003, with an average over that period of 117 gpcd. Total water use averaged 172 gpcd during the same period. Loveland serves industrial and commercial users outside its service area, which increases gpcd. Loveland also has sold wholesale water in the past, although this practice was greatly reduced in 2003.

Conservation. Loveland enacted a water conservation plan in 1996 and is preparing an updated conservation plan for submittal to the CWCB. Loveland balances the need for education about water conservation with the cost for additional staff and/or programs. The City promotes water conservation through a variety of educational measures. The City performs cost-of-service studies to determine rate structure, with higher rates for irrigation-only customers. Commercial water users pay a surcharge when annual water use exceeds an allotted quantity. The City has a leak-detection program and regularly replaces aging infrastructure to reduce system losses. The updated water conservation plan builds on existing conservation practices and implements new practices including:

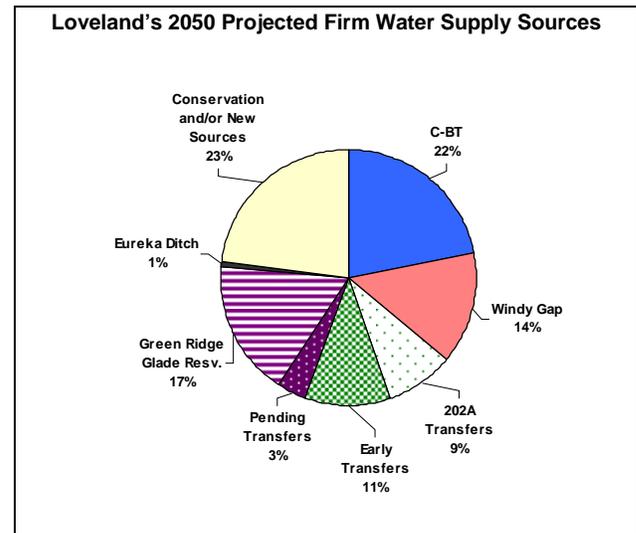
- Expanding the existing water conservation public education program including customer mailings, updated information on their website, and public school presentations;
- Providing free water audits for customers;



- Using nonpotable irrigation water wherever feasible;
- Using Loveland’s Site Development and Performance Standards and Guidelines to prescribe items such as water and energy conservation, soil conservation, and soil amendments; and
- Developing a plan that provides reusable effluent back to the Loveland WTP.

Projected Water Demand. Population forecasts for the City of Loveland estimate an annual growth rate between 1.7 and 2.7 percent. This rate of population change is well below the historical growth rate experienced from 1990 to 2003, but similar to Larimer County growth projections. The service area population is projected to reach about 127,000 by 2035. Employment growth projections range between 1.3 and 2.6 percent from 2005 to 2030. By 2050, water demand is estimated to be about 28,300 AF.

Water Need. Loveland’s existing water supplies are currently sufficient to meet water needs. Loveland’s water demand is expected to exceed available firm water supplies by about 2015, which may affect the ability of the City to meet dry year water needs depending on C-BT deliveries. A firm yield shortage of about 6,900 AF in 2030 and about 10,500 AF in 2050 is projected, if Loveland relies only on existing usable supplies. Firming the Windy Gap water supply would provide Loveland about 4,000 AF of water, or about 14 percent of the City’s projected 2050 water supply. To increase its firm yield, Loveland recently acquired 1,000 AF of additional storage in the WGFP from Platte River, and Platte River reduced its storage request by 1,000 AF. This transaction would not change overall WGFP storage requirements of 90,000 AF, but would slightly increase the firm yield to Loveland from the values in the DEIS. Reuse of Windy Gap water also would contribute to meeting nonpotable demands.



1.7.12 Middle Park Water Conservancy District

The Middle Park Water Conservancy District was formed in 1950 as a direct result of the development of the C-BT Project. The MPWCD serves as a representative of water interests in Grand and Summit counties and administers distribution of water from several projects to a variety of water users including municipal, private, and water and sanitation districts. MPWCD currently allocates water supplies from the Windy Gap Project and Wolford Mountain Reservoir.

Existing Water Supply. Agreements resulting from the construction of the original Windy Gap Project require that the Municipal Subdistrict, Northern Colorado Water Conservancy District, dedicate and set aside annually, but non-cumulatively, the first 3,000 AF of water in Granby Reservoir that is produced each water year from Subdistrict water supplies, for beneficial use without waste, either directly or by exchange or substitution, in MPWCD. Windy Gap water stored in Granby Reservoir for the MPWCD is the last to be spilled if the reservoir fills. If MPWCD’s Windy Gap water is not used in the year it was diverted, it cannot be carried over for the following year.

MPWCD also receives 3,000 AF of storage in Wolford Mountain Reservoir in an agreement with the CRWCD. MPWCD allocates Wolford Mountain water to 28 contractees in Summit and Grand County similar to Windy Gap water.

Growth and Population Trend. In 2000, the population of Grand County was 12,900 and Summit County had 25,700 residents. Population projections indicate a Grand County population of 28,800 and a Summit County

population of 50,400 by 2030 (DOLA 2004b). These figures do not include seasonal residents or visitors to either county, both of which have substantial recreation tourism in the summer and winter.

Current Water Demand. The MPWCD is a wholesale water supplier for 67 water providers and users in Grand and Summit counties. These water providers have contracts with MPWCD to use Windy Gap water, as requested and as available, on an annual basis. The water providers, also known as contractees, include towns, water districts, agricultural water users, and ski areas. The MPWCD contractees use MPWCD water for augmentation purposes in conjunction with other supplies. Some of the larger contract holders of MPWCD Windy Gap water rely on a variety of other primary sources of water to meet their total demand including surface water diversions, ditches, exchange agreements, and alluvial ground water. In addition, the MPWCD uses its water supply for exchanges, trades, and other agreements with other Colorado water providers. Currently, MPWCD's Windy Gap water is a supplemental supply to contract entities and only a portion of each individual entity's water supply. However, MPWCD water is the sole source of water for a number of small private augmentation water users, such as subdivisions and private landowners. Delivery of Windy Gap water to the MPWCD has historically ranged from 0 to 624 AF, although 2,680 AF was requested by contractees in 2004. Estimated water demand totaled 11,159 AF in 2000 for both Grand and Summit counties—3,132 AF in Grand County and 8,027 AF in Summit County.

Conservation. The MPWCD supplies water to a number of water providers in Grand and Summit counties. Each of the municipalities and water districts develop their own conservation programs. Conservation measures used by some of the water providers include metering, newsletters and distributing other educational information, increasing block rate pricing, mandatory watering restrictions as needed, leak-detection programs, landscaping restrictions, and other measures. None of the water providers in Grand and Summit counties currently deliver more than 2,000 AF of water and, therefore, are not required to have a CWCB-approved water conservation plan.

Projected Water Demand. The MPWCD does not prepare its own water demand projections. MPWCD's role is simply to respond to the needs of its contractees to the limit of its water supplies. Future water demand or allotment needs for MPWCD are based on previous studies and an examination of the overall future water resource requirements for Grand and Summit counties as an indication of contractees' demands.

By 2030, Summit County year-round population is projected to increase by 96 percent from 2000, and Grand County year-round population is expected to increase by 123 percent over that same 30-year period. Summit County employment is expected to increase by 138 percent, or 29,900 employees, between 2000 and 2030. Grand County employment is expected to increase by 144 percent, or 12,000 employees, during that same period (DOLA 2004c). Water used for snowmaking and livestock is not anticipated to change substantially in the future. Summit and Grand counties are likely to experience substantial increases in water demand between 2000 and 2030, primarily from residential and commercial growth. Total potable demand by 2030 is projected to increase by about 17,000 AF, including 13,500 AF for residential use and 3,750 AF for commercial use. The *Upper Colorado River Study* (Hydrosphere 2003a) projected total demand at build-out of about 32,000 AF.

Water Need. The MPWCD is anticipating needing additional reliable sources of water supply to meet both current demand and anticipated future demands. While actual use has varied from year to year, the projected future increase in residential and commercial demand of about 17,000 AF by 2030 indicates a substantial shortage. The Windy Gap Project would provide the MPWCD with up to 3,000 AF of storage to assist in meet existing and future demands. Colorado water law does not allow the MPWCD to reuse Windy Gap water because the water would be used within the basin of diversion. Currently almost 90 percent of the Windy Gap Project water is contracted for. Additional sources of water would be needed to meet the remainder of future demands.

1.7.13 Platte River Power Authority

Platte River Power Authority (Platte River) is a joint action governmental entity owned by the municipalities of Estes Park, Fort Collins, Longmont, and Loveland. Platte River was established in 1973 to meet the wholesale electric energy requirements of these municipalities. The Rawhide Energy Station (Rawhide) is owned and operated by Platte River and provides electric power.

Existing Water Supply. Platte River owns 160 units of Windy Gap water. Platte River's raw water supply is based on the availability of Windy Gap water and a Reuse Agreement with Fort Collins and the Water Supply and Storage Company (WSSC). Up to 4,200 AF of reusable effluent is delivered from the City of Fort Collins for use at Rawhide under the Reuse Agreement. In return, Platte River provides Fort Collins with an equivalent amount of Windy Gap water. Platte River direct flow rights, reservoir storage rights in Hamilton Reservoir, and a limited number of native ditch shares in Larimer County Canal No. 2 provide other minor sources of water. In addition, Platte River takes delivery of 950 AF of its Windy Gap water directly from Horsetooth Reservoir via an existing 10-inch pipeline when water is available. Platte River's water reuse program has two components: 1) the majority of the water used for cooling is effluent supplied by Fort Collins under the Reuse Agreement; 2) Platte River continues to recycle and reuse this cooling water to extinction. The current operation to meet Platte River's water supply needs is subject to the availability of Windy Gap water and these deliveries are not reliable.

Growth and Population Trend. Platte River is seeking a firm annual water supply of 5,150 AF from the 160 Windy Gap units that it currently owns to meet the current needs of the existing power facility. Platte River's water needs for the existing Rawhide Energy Station is for serving existing customers, thus the population growth in their service area is not a factor in their need for the WGFP. Energy load projections for Platte River indicate a continued increase for demand for electric power within Platte River's owner municipalities as these areas continue to grow. Future water demands would be based upon increased power requirements and related generating facility development to meet those electricity demands.

Current Water Demand. Platte River's current operational water demand averages about 4,520 AF per year. This includes 3,261 AF on average of effluent from the City of Fort Collins for use primarily for cooling, and 950 AF of relatively cleaner water taken directly from Horsetooth Reservoir and used for boiler make-up water and potable water. About 630 AF of water provides an operational reserve to meet fluctuations in water demand, or if not required, the water is leased. Platte River has an additional need for 309 AF to meet well and ditch augmentation requirements and a long-term lease obligation with Larimer County.

Conservation. Water conservation at Platte River's Rawhide plant is essentially 100 percent because all water is recycled and reused until extinction. Platte River employs a performance engineer to manage improvements in energy usage and heat rate, thereby reducing water use. Technological improvements to reduce water use are continually explored.

Projected Water Demand. Although Platte River may need additional water in the future associated with expansion of power generation capacity as demand for electricity increases, its participation in the WGFP is based on providing a firm reliable source of Windy Gap water to meet its current water requirements. Additional power generation is likely to be needed within the next 15 years. Platte River is currently evaluating options for meeting future new power generation needs. Water demands for Platte River's portion of new thermal power generation would be about the same proportion as that used for current coal-fired generation. A location for the future generation facility has not yet been determined. Platte River's Windy Gap Project units not included in the proposed WGFP may be used to help meet the water requirements of such new generation. However, power to meet future needs could come from a variety of sources, several of which may be less intensive than the current coal-fired plant. Water to meet any future energy needs is beyond the scope of the WGFP. Future water demands would be based on the timing of power generation needs.

Water Need. Platte River's participation in the WGFP is to meet the water needs for their current power generation facility, not to meet future water needs for expansion of power generating capacity. Platte River needs a firm annual supply of 5,150 AF of water to meet its obligations under the Reuse Agreement that supplies the current operational needs for the Rawhide Energy Station. The Reuse Agreement between Platte River, Fort Collins, and WSSC requires the availability of Windy Gap water. Platte River recently transferred 1,000 AF of its storage request in the WGFP to the City of Loveland. This transaction would not affect overall project storage requirements of 90,000 AF, but Platte River's firm yield from the WGFP would decrease slightly from the values in the DEIS.

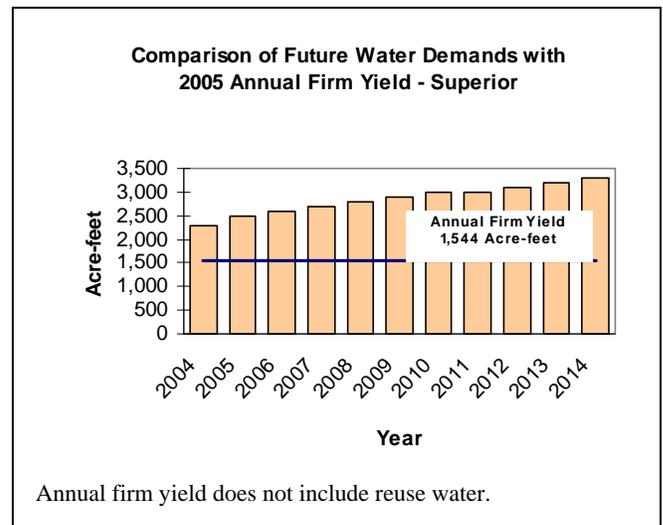
There are numerous scenarios, i.e., drought, under which there is no assurance that Platte River’s water supplies will be sufficient or available when needed. Without the firming of the Windy Gap units, the ongoing operation of the Rawhide Energy Station is vulnerable to curtailed operations during times when insufficient water is available.

1.7.14 Town of Superior

The Town of Superior is in southeast Boulder County and northern Jefferson County and is considered part of the greater Denver Metropolitan Area. The Town of Superior was founded in 1896 and remained small until the early 1990s when the Rock Creek Ranch residential development began construction. The Town has grown rapidly during the past decade, but residential growth has tapered off.

Water Supply. Currently, the Town of Superior relies primarily on C-BT water and local ditch water to meet its municipal and commercial water requirements. Windy Gap water, when available, is also used to meet potable water needs and is captured and reused for nonpotable irrigation. The Town of Superior currently owns 15 units of Windy Gap water, after the sale of 7 units to the Town of Erie. If Windy Gap water is firming, the City estimates that about 32 percent could be reused for irrigation. Superior’s current firm annual water supply is 1,544 AF.

Growth and Population Trend. As population growth commenced in the early 1990s, average annual growth became extraordinary, with an average population increase of 33 percent from 1990 through 2004. Since 2000, the average annual population growth has slowed in relative terms but still exceeds 5 percent on an annual basis. The growth in the number of water taps also slowed after 2000, but still grew more than 20 percent between 2000 and 2003. As of 2004, the Town of Superior’s population was estimated at 11,000.



Current Water Demand. Superior does not serve any other communities with water nor does it receive water from other communities. Superior’s total water deliveries more than tripled between 1995 and 2003, and average annual growth in water deliveries was 33.5 percent from 1995 through 2003. Total water requirements have increased from 1,127 AF in 1997 to 2,277 AF in 2003. From 1995 to 2003, Superior’s total water use averaged 135 gpcd.

Conservation. The Town of Superior will be preparing a conservation plan for approval by the CWCB prior to delivery of WGFP water. Currently, the Town has an increasing block rate structure and reuses water for irrigation. As a relatively new community, Superior’s land use plan has encouraged high-density housing and small lawns. Superior’s new water distribution system is highly efficient with minimal leaks and losses. All new homes are required to have low-flow toilets and low-water-use washers.

Projected Water Demand. The Town of Superior is projected to reach build-out in 2014, when the population of the town reaches 15,400. Compared with the 2004 population estimate of 11,000, the Town is expected to experience an average annual growth of 3.4 percent. Potable water deliveries are expected to increase by 211 AF from 2004 through 2014. Total potable water usage is projected to exceed 1,700 AF by 2014. The Town of Superior plans to maximize the use of nonpotable water for outdoor uses in the future. Total increases in nonpotable use call for a doubling from 2004 level of 700 AF to 1,400 AF at build-out. Total water requirements are projected to increase from 2,500 AF in 2005 to 3,300 AF in 2014.

Water Need. Superior's existing water supplies are sufficient to meet current water needs during average years of precipitation. Beginning in 2005, water demand could exceed available firm water supplies during dry years, depending on C-BT deliveries. A shortage in firm yield of about 1,800 AF is anticipated by build-out in 2014 if the WGFP is not completed. Firming Superior's Windy Gap water supply would provide up to 1,500 AF of water, or about 46 percent of the Town's projected 2014 water supply. Reuse of Windy Gap water also would contribute to meeting future nonpotable water demand.

1.8 Windy Gap Firing Project Participant Water Needs

1.8.1 Projected Shortages in Firm Yield

The evaluation of the water supplies and demands for each Project Participant indicates that projected water demand would exceed available firm yield in the near future. Project Participants have a firm water supply of about 141,000 AF and a demand of about 120,000 AF in 2005. By 2030, the cumulative water demand for all East Slope Project Participants is projected to reach about 205,000 AF, which would result in a shortage in firm yield of about 64,000 AF. Water demand for East Slope Participants is projected to increase to about 251,000 AF by 2050 and shortages in firm yield at that time would increase to more than 110,000 AF. An additional water demand of up to 17,000 AF by 2030 is projected for West Slope water users partially served by the MPWCD. The lack of a reliable firm water supply would affect the ability of all of these entities to meet anticipated water needs in dry years. The projected shortages in firm water supply over the 2005 to 2050 period are shown in Table 1-6.

Existing water supplies will meet the current water needs for most Project Participants during average years of precipitation, but supply shortages in dry years are expected to occur within the next 20 years for all of the Project Participants. For many East Slope Participants, a deficit in firm yield could occur soon, depending upon C-BT yields. Other Project Participants have a foreseeable future need for their Windy Gap water supply before 2025.

Project Participants have implemented a variety of effective conservation measures to reduce water demand. Additional improvements in water use efficiency and delivery systems are expected to continue in the future and are an important component in meeting future water supply requirements. While continued conservation is necessary, it would not eliminate the need for the proposed WGFP. Conservation measures may delay the timing for additional water deliveries, but would not change the ultimate need for additional water supplies. Projected future water requirements indicate that even with the WGFP, Participants will need additional conservation savings or for some Participants, additional sources of water to meet from about 10 to 65 percent of 2050 future water needs.

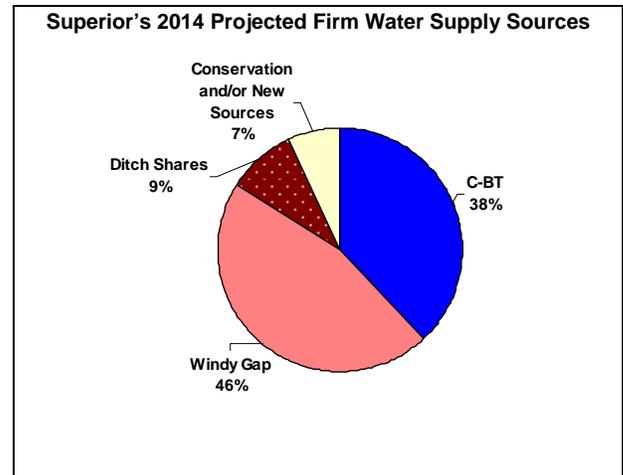


Table 1-6. Projected cumulative surplus or shortage (-) in firm annual yield for Windy Gap Participants.

Participant	Firm Supply	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	Year of Projected Shortage
AF												
Broomfield	13,739	-561	-3,561	-5,661	-6,761	-7,961	-9,361	-10,661	-10,661	-10,661	-10,661	2005
CWCWD	2,786	-414	-814	-1,114	-1,414	-1,714	-1,914	-2,314	-2,614	-2,814	-3,114	2005
Erie	2,145	-355	-2,255	-3,755	-5,255	-6,755	-6,755	-6,755	-6,755	-6,755	-6,755	2005
Evans	9,298	4,698	3,398	2,298	898	-402	-1,802	-3,502	-4,002	-4,002	-4,002	2025
Fort Lupton	3,538	-562	-662	-862	-1,162	-1,462	-1,662	-2,062	-2,362	-2,762	-3,262	2005
Greeley	43,850	16,150	11,450	6,050	-50	-4,650	-9,650	-15,150	-21,150	-27,650	-34,650	2020
Lafayette	4,534	34	-966	-1,966	-2,966	-3,966	-4,066	-4,066	-4,066	-4,066	-4,066	2006
LTWD	5,510	-490	-1,490	-2,690	-3,890	-5,190	-6,590	-7,990	-9,690	-11,490	-13,590	2005
Longmont	30,963	5,063	2,863	663	-1,537	-4,937	-7,137	-8,187	-9,237	-10,287	-11,337	2017
Louisville	5,063	63	-237	-537	-937	-1,237	-1,437	-1,637	-1,837	-1,837	-1,837	2006
Loveland	17,792	3,392	1,892	-8	-2,208	-4,708	-6,908	-9,008	-9,508	-10,008	-10,508	2015
MPWCD ¹	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Platte River	0	-5,150	-5,150	-5,150	-5,150	-5,150	-5,150	-5,150	-5,150	-5,150	-5,150	2005
Superior	1,544	-956	-1,456	-1,756	-1,756	-1,756	-1,756	-1,756	-1,756	-1,756	-1,756	2005
Cumulative Total ²	140,762	20,912	3,012	-14,488	-32,188	-49,888	-64,188	-78,238	-88,788	-99,238	-110,688	

¹ Grand and Summit Counties 2000 total water demand based on the UPCO Study (Hydrosphere 2003a) is about 11,000 AF. Sources other than Windy Gap are currently used to meet water demands. The MPWCD has an immediate need for Windy Gap water for use in augmentation of other withdrawals and diversions.

² The cumulative total includes the total firm supply of all participants and the collective surplus or shortage in firm annual yield. Participants individually meet any shortages.

1.8.2 Project Participant Firm Yield Goals

To meet a portion of identified current and future water demands, Project Participants are proposing to improve yields from the existing Windy Gap Project through the WGFP. The proposed WGFP is based on the existing water rights associated with the original Windy Gap Project and does not expand on those rights or the diversion amounts in the original 1981 Windy Gap Project EIS. The proposed WGFP does not necessarily meet all the future water requirements for each Participant, but rather seeks to improve the yield of each Participant's Windy Gap water delivery. Project Participants may seek additional water supplies through other projects, but the intent of the WGFP is only to improve the yield from an existing project and existing Windy Gap water rights.

The proposed WGFP would not firm all of the original 480 Windy Gap units (48,000 AF based on 100 AF/unit) because some Windy Gap owners are not participating in the project. In addition, some Firing Project Participants are not firming all of the units they own. Firing Project Participants own 440 Windy Gap units (Table 1-7). The remainder of the units are owned by the City of Boulder and the Town of Estes Park who are not participating in the WGFP.

Table 1-7. Project Participant Windy Gap units, storage request, and firm yield goals.

Participant	Windy Gap units	Storage request (AF)	Firm Yield Goal (AF)
Broomfield	56	25,200	5,600
CWCWD	1	330	100
Erie ¹	14	6,000	2,000
Evans ¹	0	1,750	500
Fort Lupton	3	1,050	300
Greeley	64	7,000	4,400
Lafayette ¹	1	1,800	800
LTWD ¹	0	4,850	1,200
Longmont ¹	80	12,000	5,125
Louisville ¹	6	2,700	900
Loveland	40	7,000	4,000
MPWCD ²	0	3,000	3,000
Platte River	160	12,000	5,150
Superior	15	4,500	1,500
TOTAL	440	90,180	34,575

¹ Acquiring additional Windy Gap units.

² The MPWCD does not own Windy Gap units, but is requesting firming storage for its Windy Gap water. The estimated firm yield for the MPWCD and other Participants for each of the alternatives is discussed in Chapter 3.

Several Participants do not currently own Windy Gap units, but are leasing units or in the process of purchasing units. The Little Thompson Water District has a lease purchase agreement to acquire 12 units of Windy Gap water from the City of Greeley; likewise, the City of Evans has a lease purchase agreement to acquire 5 units from Greeley.

A 64,000 AF shortage in firm water supplies is projected for East Slope Participants by 2030. By 2050, the firm yield shortage would be more than 110,000 AF.

Louisville has a long-term lease of three units from Greeley. The City of Lafayette has acquired one Windy Gap unit and is in the process of acquiring an additional seven units. Erie recently acquired seven units from Superior and plans to acquire six units from other unit holders. In addition, since the completion of the DEIS, the City of Loveland has acquired an additional 1,000 AF of storage in the WGFP from Platte River. Platte River has reduced its storage request in the project by 1,000 AF. This change

does not affect overall WGFP water storage needs of 90,000 AF or water diversions, but would slightly increase Loveland’s yield and slightly decrease Platte River’s yield.

Because the Windy Gap Project water rights are junior to many water rights in the Colorado River basin, the WGFP would not be able to divert and store water every year. Thus, diversions during wet years would be stored for use during dry years. As more water is stored, the firm yield approaches 100 AF per unit.

While theoretically each unit of Windy Gap Project water would provide a yield of 100 AF, the actual firm yield depends on the amount of storage volume constructed and the actual project operation for each alternative. Project Participants have each requested storage in the Firming Project based on several factors, including their projected need, preliminary yield estimates, and the cost of storage. Storage requests for all Participants total 90,180 AF and the firm yield goal is 34,575 AF (Table 1-7).

This includes 31,575 AF for Windy Gap allottees and 3,000 AF for the MPWCD. The firm yield is developed by using the water supply from 440 units owned by the WGFP Participants in combination with the requested storage amounts. The storage request for some Participants may provide a firm yield of close to 100 AF per Windy Gap unit. For Participants with lower storage requests in relation to the number of Windy Gap units they own, the yield would be less.

About 90,000 AF of new storage is needed to meet Participants’ firm yield goals.

Firm yield for the WGFP also depends on future water development in the Colorado River basin and its effect on Windy Gap water rights; thus, actual firm yield may differ from firm yield goals. Chapter 3 and Sections 3.5.2.10 and 3.5.3.7 provide an analysis of the estimated firm yield associated with each of the alternatives described in Chapter 2 and the contribution of the WGFP in meeting projected Participant water needs.

1.8.3 Summary

Projected water demands indicate that the Project Participants individually and collectively will have a shortage in annual firm yield in the near future (Figure 1-10). The projected shortage in firm water supply supports the purpose and need of the proposed WGFP to firm about 30,000 AF of Windy Gap Project water for East Slope Project Participants and provide up to 3,000 AF firming storage of Windy Gap water for the MPWCD. The WGFP would provide about 10 percent of the cumulative water supply needs for the Participants in 2050 (Figure 1-11). Other new sources of water including conservation measures would be needed to meet projected shortfalls.

1.9 Public Involvement

1.9.1 Scoping

Scoping is the first phase of the public involvement process. It is designed to help determine the scope of issues and alternatives to be addressed in the EIS. The intent of the scoping process is to gather comments, concerns, and ideas from those who have an interest in or may be affected by the

Figure 1-10. Combined future total water raw water requirements and current annual firm yield for WGFP Participants.

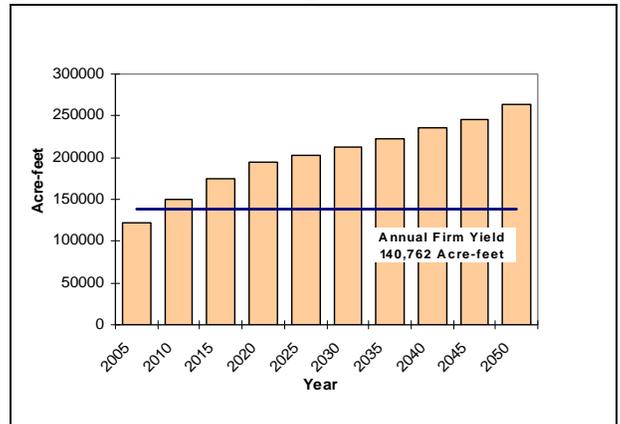
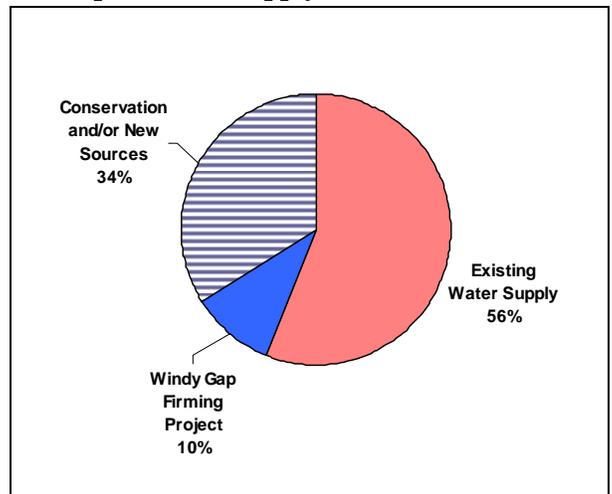


Figure 1-11. Summary of projected 2050 Participant water supply sources.



Proposed Action and identify issues the public and government agencies believe are most important. During scoping (from September to November 2003), Reclamation sought and received comments from the public, interested organizations, and agencies to help identify issues for evaluation in the EIS.

Several methods were used to inform the public and solicit comments, including public information meetings in July 2003, publication of a Notice of Intent in the Federal Register on September 8, 2003, and distribution of a scoping announcement prior to three public scoping meetings in Granby, Loveland, and Lyons, Colorado. An agency scoping meeting also was held to gather input from federal, state, and local government agencies. More information on the public involvement process is included in Chapter 4 *Consultation and Coordination*.

1.9.2 Key Issues Identified for Analysis in the EIS

Reclamation received about 160 written submissions during the scoping period on a broad range of potential issues. A detailed scoping report describing the public scoping process and the comments received was released on December 19, 2003 (ERO 2003a). A copy of the scoping report is located on Reclamation's website at <http://www.usbr.gov/gp/nepa/quarterly.cfm#ecao>, or is available by contacting the U.S. Bureau of Reclamation Eastern Colorado Area Office.

Based on comments received during scoping meetings and in consultation with cooperating agencies, Reclamation identified major issues for evaluation in the EIS as listed below. Because some of the alternatives presented during scoping have changed during the course of the NEPA investigation, comments related to previously considered reservoir sites are no longer applicable.

In addition to the primary issues listed below, the EIS briefly addresses other minor issues such as geology, paleontology, soils, air quality, noise, and visual quality.

1.9.2.1 Water Resources

- How would Firming Project diversions impact streamflow in the Colorado River and East Slope streams?
- Would there be any changes in the operation of existing reservoirs, including Granby Reservoir, Shadow Mountain, and Grand Lake (collectively referred to as the Three Lakes) on the West Slope and Carter Lake and Horsetooth Reservoir on the East Slope?
- What would be the impact to water quality in the Colorado River, the Three Lakes and East Slope streams and reservoirs, including any new reservoirs?
- Would there be any water quality impacts to the Fraser River?
- Would there be impacts to ground water recharge in Grand County?

1.9.2.2 Biological Resources

- What would be the effect to riparian and wetland vegetation at existing and new reservoir sites and along affected streams?
- Would there be an impact to threatened or endangered species including downstream Colorado River endangered fish?
- What would be the potential effect to native vegetation communities and sensitive plant species?
- How would changes in Colorado River flow and water quality affect aquatic life, including the potential for the spread of whirling disease on the West and East Slope?
- How would wildlife species and habitat be affected by construction of new reservoirs?

1.9.2.3 Recreation

- How would kayaking and rafting be affected by changes in Colorado River flow?
- Would storage changes in the Granby Reservoir and East Slope C-BT reservoirs affect water-based recreation?

- What recreational activities would occur at new reservoirs and who would be responsible for management?

1.9.2.4 Cultural Resources

- Would significant cultural resources be affected by new reservoirs or other facilities?

1.9.2.5 Land Use

- Would any private lands, residences, or commercial properties be affected by new reservoirs?
- Would there be any impact to county open space properties?
- How would land ownership change?
- How would land use near new reservoirs change?
- How would new facilities affect transportation, both during construction and over the long-term?

1.9.2.6 Socioeconomics

- What are the economic consequences of reservoir construction to local communities?
- How would property values be affected by new reservoirs?
- How would tourism on the West Slope be affected by potential changes in water-based recreation?
- How would the project be financed?

1.9.2.7 Other Issues

- Would the proposed Firming Project conflict with the purpose of the C-BT Project?
- What is the relationship between the proposed Firming Project and operation of the C-BT Project in conformance with Senate Document 80, which provides the operating conditions for the C-BT Project?
- Would the storage of C-BT water in a new Windy Gap reservoir require an amendment to the exiting Carriage Contract between the NCWCD and Reclamation?

1.9.3 Draft EIS Public Hearing and Comment Period

Completion of the Draft EIS was announced in the Federal Register (73 FR 50999) and made available to the public for a 60-day comment period from August 29, 2008 to October 28, 2008. A CD of the entire Draft EIS and a hard copy of the Executive Summary was sent to more than 650 individuals, entities, and agencies on Reclamation's mailing list. Hard copies also were made available, and the Draft EIS was posted on Reclamation's website. During the comment period, Reclamation held two open house/public hearings to provide an opportunity for the public to learn more about the alternative actions and formally comment on the Draft EIS. Notice of the public hearings was included with the distribution of the Draft EIS and publication in local and regional media outlets. Public hearings were held at the McKee Conference Center in Loveland on October 7, 2008 and at the Inn at Silver Creek in the Town of Granby on October 9, 2008.

Requests were made to extend the 60-day comment period and one was granted until December 29, 2008, providing a few days more than 120 in total. During that time, Reclamation received 1,150 letters, comment forms, and recorded oral and written statements made at two public hearings. Written and oral comments were received from 65 government agencies and officials, 18 organizations, 44 businesses, and 1,026 individuals. Of the comments received, 714 were individual written comments on standardized form letters.

Reclamation reviewed and considered all of the comments received on the Draft EIS. Responses to substantive public comments are included in Volume 2 – Appendix F of this FEIS. Additional detail on public scoping and the public hearings are included in Consultation and Coordination in Chapter 4. Reclamation's decision on the Proposed Action and other alternatives will be documented in a ROD following release of the Final EIS.

1.10 The Decision Process

A number of decisions, permits, and approvals are needed from federal, state, and local agencies to implement WGFP alternatives. Reclamation is responsible for NEPA compliance and other decisions associated with use and connection to C-BT facilities, any changes in C-BT operations, and use of Reclamation land. The Corps of Engineers, as a cooperating agency, is assisting with preparation and review of the EIS and has regulatory authority for any Section 404 dredge and fill permitting requirements under the Clean Water Act. The Western Area Power Administration, a federal power marketing agency in the U.S. Department of Energy, will make a decision on the relocation of a transmission line for the Chimney Hollow Reservoir alternative. Both the Corps and Western are using this EIS to meet NEPA compliance requirements for their federal actions associated with the WGFP.

1.10.1 Reclamation Decisions

As the lead agency, Reclamation is responsible for preparation of the EIS and ROD. In addition, Reclamation must make several decisions regarding potential actions associated with implementation of the Proposed Action or other alternatives. All of the action alternatives would involve a physical connection of WGFP conveyance facilities on the East Slope to C-BT facilities. Reclamation will need to decide whether to allow for this connection. The No Action Alternative does not require any authorization by Reclamation.

Because the Proposed Action includes the storage of C-BT water in a new Firming Project facility (a concept referred to as repositioning), Reclamation also will need to make a decision regarding accounting changes in the C-BT system to allow water storage and exchange between the two projects to occur. Implementation of repositioning may require modification or replacement of the existing conveyance and storage contract between Reclamation, the Subdistrict, and the NCWCD.

Reclamation action will be needed if Jasper East Reservoir is constructed because the reservoir would be partially located on Reclamation property and use of these lands would likely result in the sale or exchange of property with the Subdistrict. In addition, construction of Jasper East Reservoir would require relocation of the Willow Creek Pump Station and Canal. Reclamation will need to make a decision regarding the relocation of these C-BT facilities if Jasper East Reservoir is constructed.

1.10.2 Senate Document 80 and Section 14 Analyses

Prior to entering into a contract that would allow use of C-BT excess capacity, Reclamation must determine that the excess capacity contract is consistent with the provisions of Senate Document 80 (SD 80) and Reclamation's authority under Section 14 of the Reclamation Project Act of 1939 (43 U.S.C. § 389). This determination will be made available at a later time and is not part of this EIS. The following provides an overview of SD 80 and Section 14 and a description of the decisions that will be made.

The "Manner of Operation of Project Facilities and Auxiliary Features" ("Manner of Operation") is set forth on pages 2 through 5 of SD 80 and is incorporated into the Blue River Decrees, which decreed water rights for the C-BT Project. The Manner of Operation states that the C-BT Project, "... must be operated in such a manner as to most nearly effect the following primary purposes:

1. To preserve the vested and future rights in irrigation.
2. To preserve the fishing and recreational facilities and the scenic attractions of Grand Lake, the Colorado River, and the Rocky Mountain National Park.
3. To preserve the present surface elevations of the water in Grand Lake and to prevent a variation in these elevations greater than their normal fluctuation.
4. To so conserve and make use of these waters for irrigation, power, industrial development, and other purposes, as to create the greatest benefits.
5. To maintain conditions of river flow for the benefit of domestic and sanitary uses of this water."

To accomplish the above purposes, the Manner of Operation states that the project, "... should be operated by an unprejudiced agency in a fair and efficient manner, equitable to all parties having interests therein..." and in accordance with the 12 lettered stipulations identified in SD 80.

Section 14 of the Reclamation Project Act of 1939 ("Section 14") provides in part as follows:

"The Secretary is further authorized, for the purpose of orderly and economical construction or operation and maintenance of any project, to enter into such contracts for exchange or replacement of water, water rights, or electric energy, or for the adjustment of water rights, as in his judgment are necessary and in the interests of the United States and the project."

Reclamation will decide whether to allow the Subdistrict to connect Windy Gap facilities to the C-BT Project and whether to allow storage of C-BT water in a new Windy Gap reservoir.

Section 14 requires a finding that the exchanges contemplated under the proposed project are (1) for the purpose of orderly and economical operation and maintenance of the C-BT Project and (2) necessary and in the interests of the United States and the C-BT Project.

Reclamation expects to complete the NEPA process with a Record of Decision (ROD) no sooner than 30 days after the Final EIS is made available to the public. The ROD will document Reclamation's selection of an alternative for the WGFP and discuss the factors, including C-BT Project water rights, that were considered in making that decision. If the selected alternative includes issuing a water contract, Reclamation intends to determine whether the proposed contract complies with Senate Document 80, and other applicable authorities, prior to execution of the proposed contract.

1.10.3 Final EIS Preparation

The Final EIS includes updates, corrections, and minor changes as a result of comments received on the DEIS from the public and agencies. Volume 2 – Appendix F includes responses to substantive comments, some of which resulted in factual corrections, edits, or the addition of supplemental information in the FEIS. However, not all substantive comments warranted changes in the FEIS.

The FEIS also includes additional details on proposed mitigation measures and the anticipated effectiveness of those measures. Several of the mitigation measures require an adjustment in the operation of Alternative 2, the Proposed Action. This included modifications in repositioning to maintain higher water levels in Granby Reservoir than under the original plan and a curtailment of WGFP diversions under certain conditions when the stream temperature in the Colorado River exceeds the state standard. A description of modified repositioning is found in Section 3.5.4 and a description of curtailed diversions for temperature is discussed in Section 3.8.4.

This Final EIS was prepared in accordance with the NEPA of 1969 and amendments, Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500-15-8), and the Bureau of Reclamation NEPA Handbook.

1.10.4 Other Permits and Approvals

Implementation of any of the action alternatives requires compliance with applicable federal, state, and local regulatory agencies' laws, approvals, review, and permitting requirements. Permitting requirements may vary with alternative. The No Action Alternative also may be subject to various regulatory actions and permits. Principal federal, state, and local environmental compliance requirements associated with implementation of the Firming Project are listed in Table 1-8.

Grand County as a cooperating agency is providing input and review of the EIS. Grand County has regulatory authority under Colorado H.B. 1041, which allows counties to regulate activities designated as matters of state interest. Under Resolution No. 1978-5-4, Grand County regulates municipal and industrial water projects within Grand County. Grand County granted a 1041 permit for the construction of the original Windy Gap Reservoir and pipeline. Construction of a new reservoir in Grand County would be subject to additional 1041 review and permitting, and the County indicates an amendment to the original 1041 permit or a new permit would be

necessary for the Proposed Action. The Subdistrict disagrees with the County on the need for additional 1041 permitting for the Proposed Action, which does not require any new West Slope infrastructure. Reclamation takes no position on the need for a 1041 Permit for the Proposed Action. Resolution of this issue is not required for completion of the NEPA process or issuance of a ROD.

Table 1-8. Environmental compliance requirements.

Agency	Statute, Regulation, or Order	Purpose	Project Application
<i>Federal</i>			
BUREAU OF RECLAMATION	National Environmental Policy Act	Applies to federal actions that may significantly affect the quality of the environment	All action alternatives are subject to NEPA compliance because of connection to C-BT facilities owned by Reclamation
	National Historic Preservation Act, Section 106	Protection of historic and cultural resources in coordination with the State Historic Preservation Office	Surface disturbing activities, where cultural resources have been identified
	Easement	Required for use of Reclamation property	Construction of Jasper East reservoir and pipeline connections for Chimney Hollow or Dry Creek reservoirs are partially located on Reclamation property
	Executive Order 11990, Protection of Wetlands	Requires avoidance of adverse wetland impacts where practicable and mitigation if necessary	Disturbances to wetlands
	Executive Order 11988, Floodplain Management	Requires avoidance of adverse floodplain impacts where practicable and mitigation if necessary	Disturbances within stream floodplains
	Executive Order 12898, Environmental Justice	Requires consideration of disproportionate impacts to minority or low income populations	Socioeconomic effects to be evaluated for all alternatives
U.S. ARMY CORPS OF ENGINEERS	Clean Water Act – Section 404 Permit to discharge dredge and fill material	Authorizes placement of fill or dredge material in waters of the U.S. including wetlands	Surface disturbances associated with construction of dams, pipelines, or other infrastructure that affect wetlands or waters of the U.S.
U.S. FISH AND WILDLIFE SERVICE	Fish and Wildlife Coordination Act	Consideration of fish and wildlife conservation for water resource development projects	Development of mitigation measures for adverse effects to fish and wildlife
	Migratory Bird Treaty Act	Protects migratory birds	Surface disturbance that may harm or injure migratory birds and nesting
	Endangered Species Act	Protection of federally listed threatened or endangered species	Potential impacts to Colorado River endangered fish species or other federally listed species

Agency	Statute, Regulation, or Order	Purpose	Project Application
WESTERN AREA POWER ADMINISTRATION	DOE NEPA Implementing Procedures and applicable environmental and cultural resources protection statutes.	Applies to DOE actions that may significantly affect the quality of the environment.	Western would need to relocate transmission lines under alternatives with Chimney Hollow Reservoir
ENVIRONMENTAL PROTECTION AGENCY	EIS review and 404 review	Protection of wetland, air, water quality and other environmental resources	Review of potential environmental effects
<i>State of Colorado</i>			
DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT-WATER QUALITY CONTROL DIVISION	Section 401 water quality certification	Certifies that authorized Section 404 activities meet state water quality standards	Applicable for all disturbances that require Section 404 permitting
	National Pollution Discharge Elimination System Permit for Stormwater	Protection of water resources from discharges associated with construction activities	Applicable to all surface construction activities greater than one acre
	Construction Dewatering 402 Permit	Protects surface water from dewatering ground water during construction	Excavations for pipelines, dam construction or other activities that require dewatering
DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT-AIR POLLUTION CONTROL DIVISION	Air Pollution Emission Notice	Protection of air quality from construction activities including vehicle emissions and fugitive dust	Excavation, grading, and blasting for construction of dams, pipelines, roads, borrow areas, and other surface disturbances
	Open Burning Permit	Control open burning	Land clearing activities that result in burning trees or other materials
COLORADO DIVISION OF PARKS AND WILDLIFE	Review and comment on Proposed Action and mitigation measures	Protection of fish and wildlife resources	Changes in streamflows, inundation of streams, creation of lake habitat, impacts to terrestrial wildlife habitat from project development
COLORADO DIVISION OF PARKS AND WILDLIFE AND COLORADO WATER CONSERVATION BOARD	Colorado Revised Statute (CRS) 37-60-122.2.	Protection of fish and wildlife resources	Mitigation of projected impacts to fish and wildlife resources from implementation of the proposed project
OFFICE OF ARCHEOLOGY AND HISTORIC PRESERVATION, COLORADO STATE HISTORIC PRESERVATION OFFICER	Coordination of Section 106 compliance with Reclamation	Determination of eligibility of cultural resources for the National Register of Historic Places, significance of impacts, and appropriate mitigation measures	Surface disturbing activities, where cultural resources have been identified

Agency	Statute, Regulation, or Order	Purpose	Project Application
COLORADO DIVISION OF MINERALS AND GEOLOGY	Mining and reclamation permit	Mining and reclamation permits for borrow areas	Excavations needed for dam construction
<i>Local</i>			
LARIMER COUNTY	Location and extent review	Evaluation of public use, structures or utilities for conformance with master plan	Required for construction of Chimney Hollow or Dry Creek reservoirs
	1041 Matters of State Interest	Obtain 1041 permit and review	Required review and permit for construction of Chimney Hollow or Dry Creek reservoir and relocation of an electrical transmission line at Chimney Hollow Reservoir
	Special Use Review	Protect the health, safety, and welfare of Larimer County residents	Required for construction of Chimney Hollow or Dry Creek reservoirs
GRAND COUNTY	1041 – Matters of State Interest	Evaluation of impacts on county resources	Required for construction of new reservoirs and related facilities in Grand County
	Special Use Review	Protect the health, safety, and welfare of Grand County residents	Required for construction of new reservoirs and related facilities in Grand County
BOULDER COUNTY	1041 – Matters of State Interest	Evaluation of impacts on county resources	Required for expansion of Ralph Price Reservoir
	Location and Extent Review	Evaluation of proposed public or quasi-public facilities to ensure that the location and extent of the facilities are in conformance with the Boulder County Comprehensive Plan	Required for expansion of Ralph Price Reservoir
	Special Use Review	To determine the compatibility of the use with the site and surrounding land and uses and the adequacy of services	Required for expansion of Ralph Price Reservoir