

# RECLAMATION

*Managing Water in the West*

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**Windy Gap Firming Project**

**Land Use Technical Report**

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**U.S. Department of the Interior  
Bureau of Reclamation  
Great Plains Region**

**July 2008**

# **Land Use Technical Report**

## **Windy Gap Firming Project**

**prepared for:**

**U.S. Bureau of Reclamation  
Eastern Area Office  
Loveland, Colorado**

**prepared by:**

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# **WINDY GAP FIRING PROJECT LAND USE TECHNICAL REPORT**

## **1.0 INTRODUCTION**

The Bureau of Reclamation (Reclamation) has received a proposal from the Municipal Subdistrict, Northern Colorado Water Conservancy District, acting by and through the Windy Gap Firing Project Water Activity Enterprise (Subdistrict) to improve the firm yield from the existing Windy Gap Project water supply by constructing the Windy Gap Firing Project (WGFP). The proposal includes a connection of WGFP facilities to the Colorado-Big Thompson Project. For more information on the background and purpose of the WGFP, see the Windy Gap Firing Project Purpose and Need Report (ERO 2005a). This technical report was prepared to address the potential environmental effects on land use associated with the alternatives described below and will be used in the preparation of the EIS.

## **2.0 ALTERNATIVES**

The Windy Gap Firing Project Alternatives Report (ERO 2005b) identified four action alternatives in addition to the No Action alternative for evaluation in the EIS. All action alternatives include development of 90,000 AF of new storage in either a single reservoir on the East Slope or a combination of East and West Slope reservoirs. The Subdistrict's Proposed Action is the construction of a 90,000 AF Chimney Hollow Reservoir with repositioning. The alternatives are:

- Alternative 1 (No Action) – Continuation of existing operations and agreements between Reclamation and the Subdistrict for conveyance of Windy Gap water through the Colorado-Big Thompson facilities, including the enlargement of Ralph Price Reservoir by the City of Longmont
- Alternative 2 (Proposed Action) – Chimney Hollow Reservoir (90,000 AF) with repositioning
- Alternative 3 – Chimney Hollow Reservoir (70,000 AF) and Jasper East Reservoir (20,000 AF)
- Alternative 4 – Chimney Hollow Reservoir (70,000 AF) and Rockwell/Mueller Creek Reservoir (20,000 AF)
- Alternative 5 – Dry Creek Reservoir (60,000 AF) and Rockwell/Mueller Creek Reservoir (30,000 AF)

Repositioning, under the Proposed Action, involves the storage of Colorado-Big Thompson (C-BT) water in Chimney Hollow Reservoir. Windy Gap water pumped into Granby Reservoir would then be exchanged for C-BT water stored in Chimney Hollow. Windy Gap water stored in Chimney Hollow would be delivered and allocated to the WGFP Participants. This arrangement ensures temporary space in Granby Reservoir to

introduce and store Windy Gap water. Total allowable C-BT storage would not change and the existing C-BT water rights and diversions would not be expanded. To prevent the C-BT Project from expanding their diversions through repositioning, total modeled C-BT storage in Granby Reservoir and Chimney Hollow was limited to the capacity of Granby Reservoir, which is 539,758 AF. If this capacity limitation is reached, the model forces the C-BT Project to bypass water at Granby Reservoir. This water is then available for diversion at Windy Gap. Therefore, under repositioning, C-BT diversions would not be expanded with respect to their current water rights and capacity limitations.

In addition to the action alternatives, a No Action alternative was identified based on what is reasonably likely to occur if Reclamation does not approve the connection of the new WGFP facilities to C-BT facilities. Under this alternative, the existing contractual arrangements between Reclamation and the Subdistrict for storage and transport of Windy Gap water through the C-BT system would remain in place. All Project Participants in the near term would maximize delivery of Windy Gap water according to their demand, Windy Gap water rights, and C-BT facility capacity constraints including availability of storage space in Granby Reservoir, and the Adams Tunnel conveyance constraints. The City of Longmont would develop storage independently for firming Windy Gap water if the WGFP is not implemented. Most Participants indicate that in the long term, they would seek other storage options, individually or jointly, to firm Windy Gap water because of their need for reliable Windy Gap deliveries and the substantial investment in existing infrastructure.

Those Participants that do not have a currently defined storage option would take delivery of Windy Gap water whenever it is available within the capacity of their existing water systems and delivery points under the terms of the existing Carriage Contract with Reclamation and the Northern Colorado Water Conservancy District (NCWCD). Participants that would operate under this scenario include Broomfield, Central Weld County Water District, Erie, Evans, Fort Lupton, Greeley, Little Thompson Water District, Louisville, Loveland, Platte River Power Authority, and Superior. The City of Lafayette anticipates that it would withdraw from participating in the WGFP, dispose of existing Windy Gap units, and not pursue acquisition of future units if the Firming Project is not constructed.

Longmont indicates that it would develop storage facilities for Windy Gap water independently if Reclamation does not approve a connection of WGFP facilities to C-BT facilities. The City would evaluate the enlargement of the existing Ralph Price Reservoir (Button Rock Dam) located on North St. Vrain Creek or Union Reservoir located east of the City. The enlargement of Ralph Price by 13,000 AF would be the City's preferred option because Union Reservoir would not have sufficient capacity for Windy Gap water and conveyance and distribution would be more efficient from a higher elevation reservoir.

Middle Park Water Conservancy District (MPWCD), under No Action, would continue to use Windy Gap water to provide augmentation flows for other water diversions in a manner similar to current operations. MPWCD can store up to 3,000 AF of Windy Gap water in Granby Reservoir each year if Windy Gap water can be diverted and storage space is available.

Detailed descriptions of the components and operation of the alternatives is included in the Draft Windy Gap EIS Alternatives Descriptions report (Boyle Engineering 2005).

## **2.1. Study Area**

The primary study area for the land use evaluation included the specific locations where alternative project facilities would be located and changes in land use and landownership would occur. Local or countywide information also is discussed to provide additional context for the effects analysis.

### **2.1.1. West Slope**

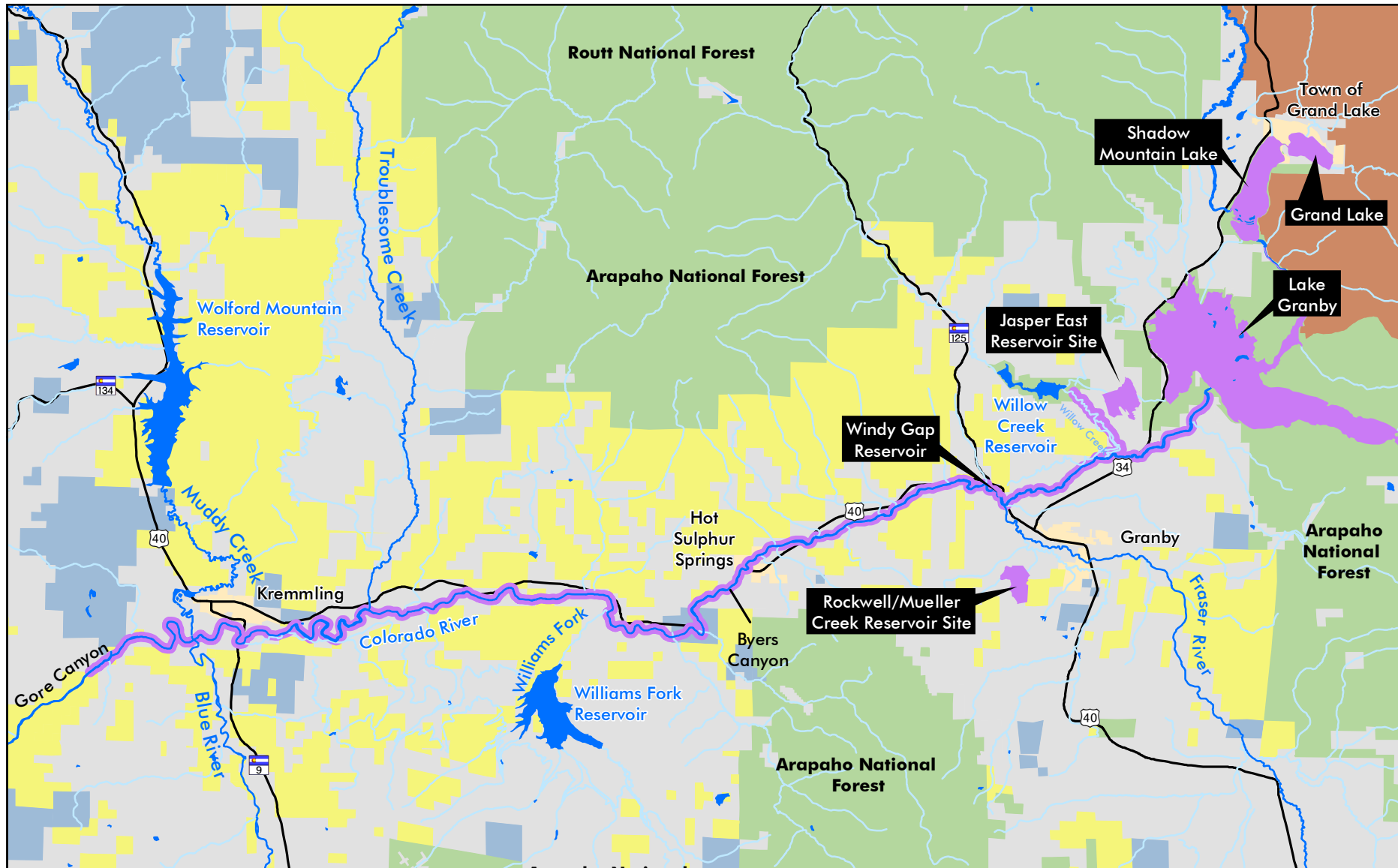
The West Slope study area includes Grand County and the lands near the potential Jasper East and Rockwell/Mueller Creek reservoir sites (Figure 1). The Jasper East Reservoir site is located in Sections 8, 9, 16, and 17, T2N, R76W (Figure 2). The average elevation at the Jasper East site is approximately 8,100 feet. The Rockwell /Mueller Creek Reservoir site is located in Sections 1 and 12 of T1N, R77W near the town of Granby (Figure 3). Average elevation at the Rockwell/Mueller Creek site is approximately 8,100 feet.

### **2.1.2. East Slope**

The East Slope study area includes portions of Boulder County where the existing Ralph Price Reservoir is located and Larimer County, where the Chimney Hollow and Dry Creek reservoir sites are located (Figure 4). Ralph Price Reservoir (Button Rock Dam) is located on North St. Vrain Creek west of the town of Lyons in Sections 17, 18, 19, and 20, T5N, R70W at an elevation of about 6,500 feet (Figure 5). The Chimney Hollow Reservoir site is in Section 33, T5N, R70W and Sections 4, 5, and 9 of T4N, R70W. Average elevation at the Chimney Hollow Reservoir site is about 5,700 feet. The Dry Creek Reservoir site is location in Sections 16, 20, 21, and 28 T5N, R70W. The average elevation of the proposed Dry Creek Reservoir is about 5,700 feet.

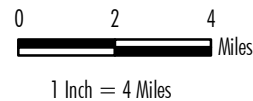
## **3.0 OBJECTIVES**

The purpose of this technical report is to characterize the affected environment and potential environmental effects regarding land use for the proposed Windy Gap Firing Project.



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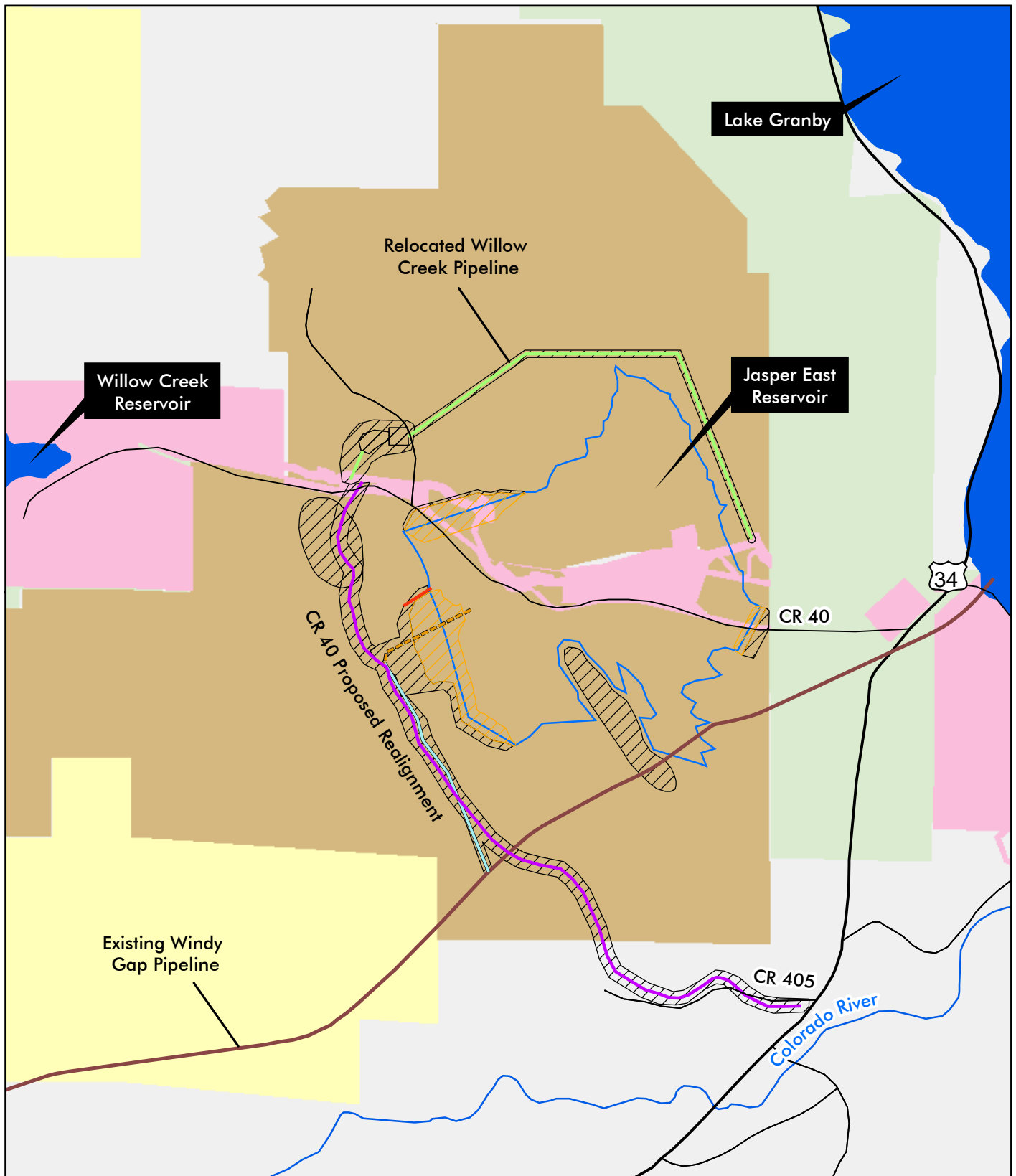
- USGS Gaging Station
  - NCWCD Gaging Station
  - Lake or Reservoir
  - Study Area Reservoir
  - City
  - Highway
  - Major Streams
  - Minor Streams
- Land Owner**
- Bureau of Land Management
  - Colorado State Lands
  - National Park Service
  - U.S. Forest Service
  - Private



**Figure 1**  
**West Slope Land Ownership**

Prepared for: Windy Gap Farming Project  
 File: 2390 EIS\WestSlopeLandOwner.mxd (JP)  
 January 2008



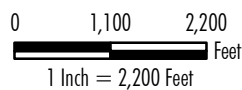


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**Land Owner**

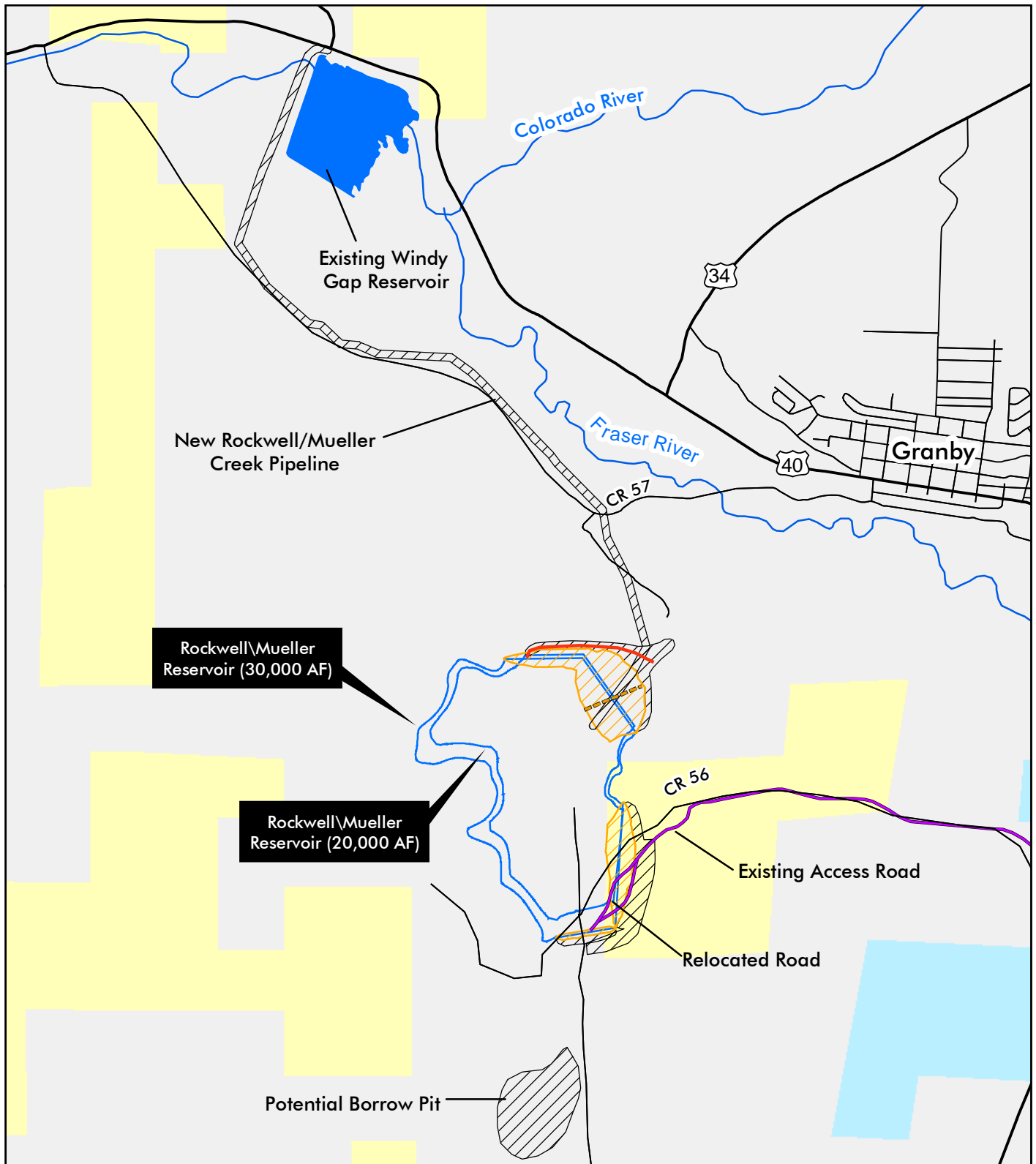
- Bureau of Land Management
- U.S. Forest Service
- Reclamation Lands
- Subdistrict
- Private
- New or Improved Access Road
- New Pipeline

- Inlet - Outlet
- Spillway
- Dam
- Potential Disturbance Area



**Figure 2**  
**Jasper East**  
**Land Ownership**

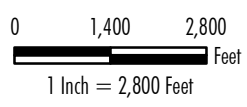
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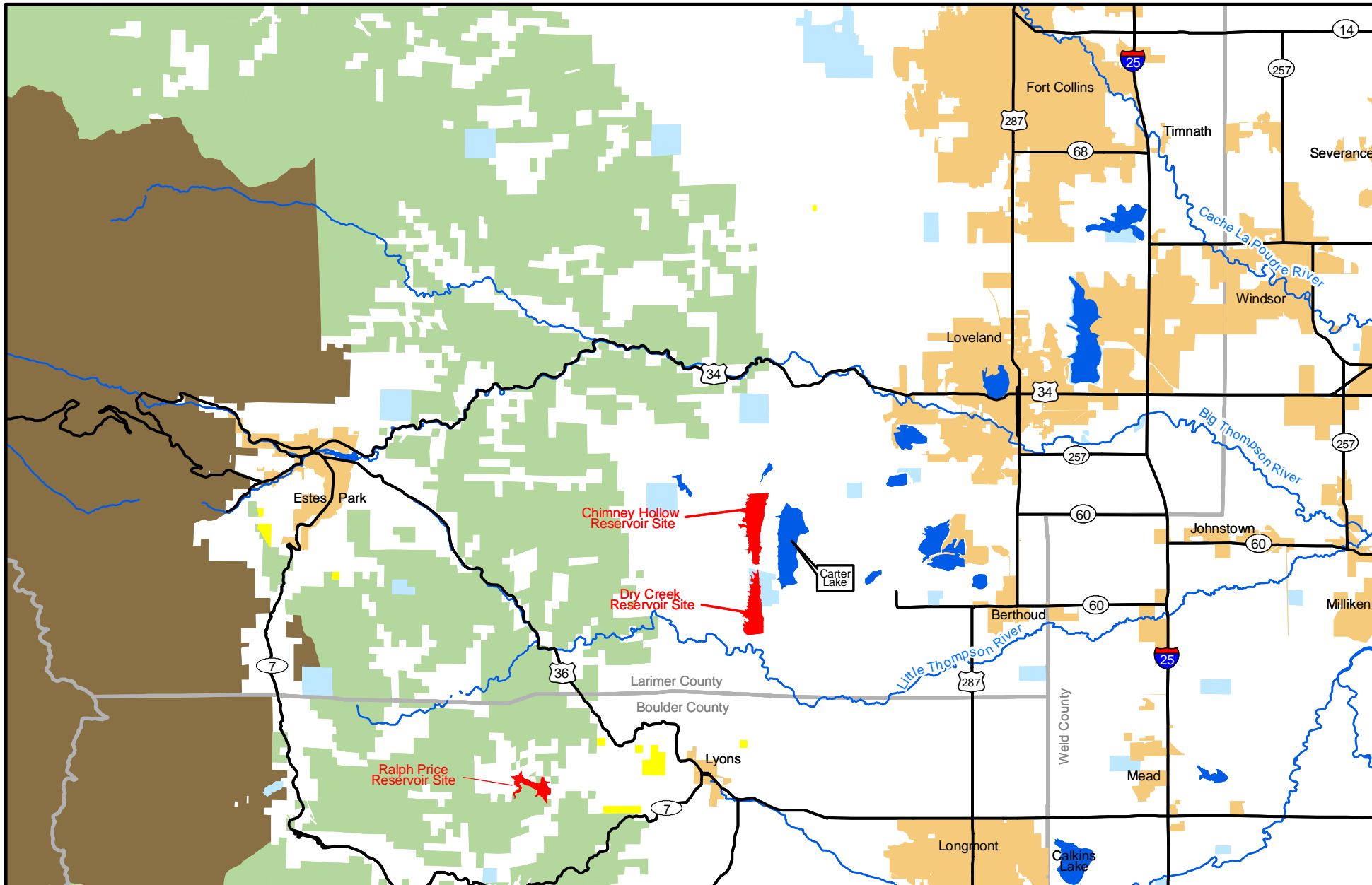
- New or Improved Access Road
- Inlet - Outlet
- Spillway
- Dam
- Potential Disturbance Area
- Reservoir

- Land Owner**
- Bureau of Land Management
  - State of Colorado
  - Private



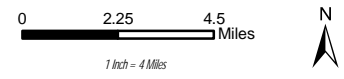
**Figure 3**  
**Rockwell/Mueller Creek**  
**Land Ownership**

Prepared for: Windy Gap Farming Project  
 File: Rockwell\_Land\_Ownership\_All.mxd  
 January 7, 2008



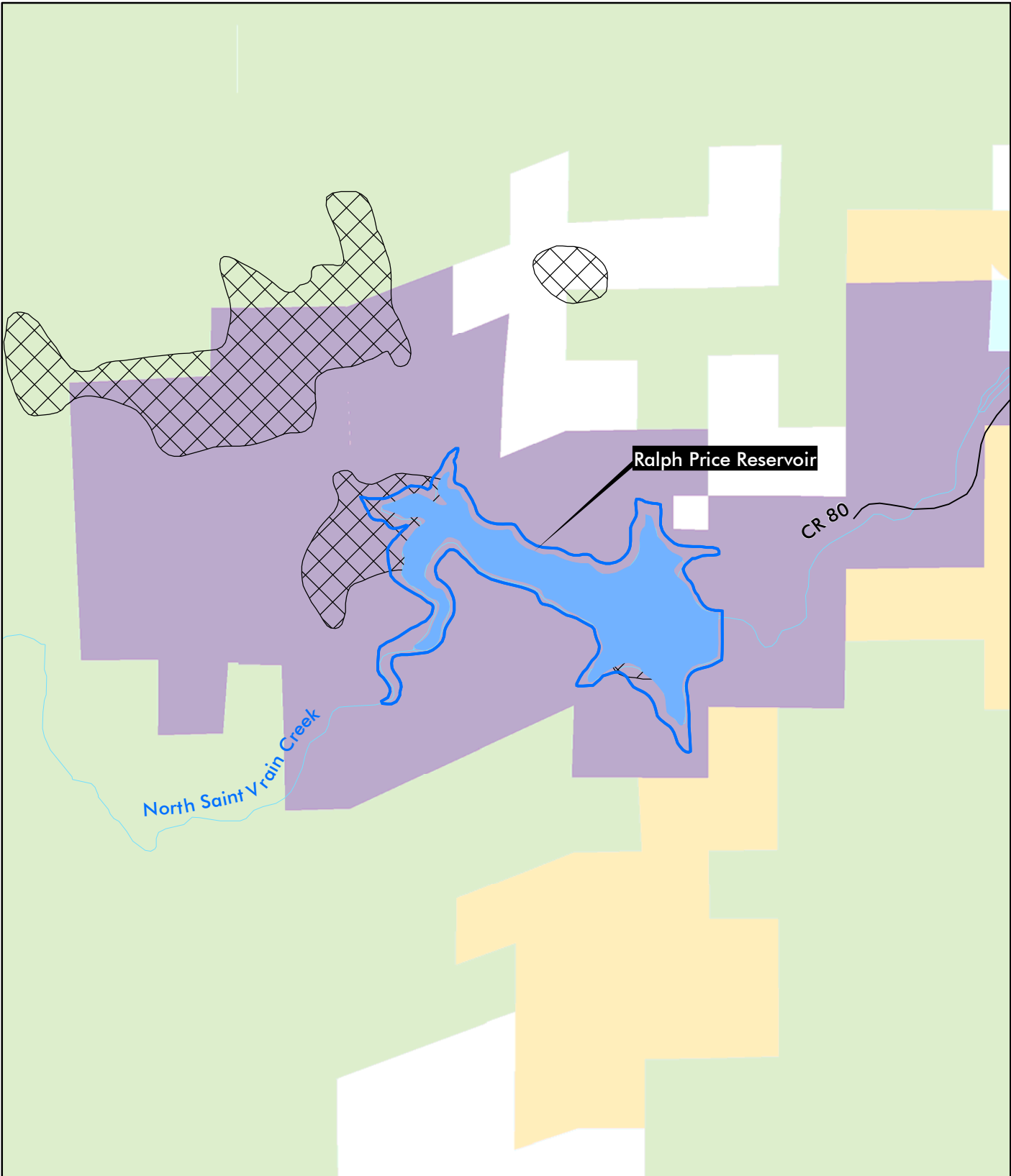
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- BLM
- State
- NPS
- USFS
- Private
- Existing Reservoir
- Potential Reservoir
- County Line
- County Highway
- U.S. Interstate
- U.S. Highway



**Figure 4**  
 East Slope Land Ownership

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 Date: December 2005



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Ralph Price Reservoir Enlargement

Potential Borrow Areas

**Land Owner**

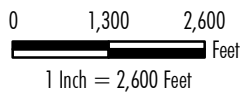
City of Longmont

Boulder County Open Space

State of Colorado

U.S. Forest Service

Private



**Figure 5**  
**Ralph Price Reservoir**  
**Land Ownership**

Prepared for: Windy Gap Firing Project  
 File: Ralph\_Price\_Reservoir\_Land\_Ownership.mxd  
 January 7, 2008

## **4.0 METHODS**

The best available information was used to describe the potentially affected land uses and to assess the impacts of the Firing Project alternatives. The data sources and impact assessment used for the analysis are described in the following sections.

### **4.1. Data Sources and Review**

Information on existing land use was gathered from local, state, and federal sources to characterize land ownership and land use patterns in the study area. This included a review of land ownership maps, land management plans, and information provided in county and community master plans. Land management policies and programs associated with regional government councils and planning commissions were included in this review.

This report highlights regional land use data (e.g., countywide data) and local land use data (e.g., land uses at alternative reservoir sites). Regional land use data provide a context for comparing the general area of impact to counties where potential project facilities would be located. Local land use data are used to provide a context for the local effects at specific project sites.

### **4.2. Impact Assessment**

Direct and indirect effects to land use were evaluated for the action and no action alternatives. The impact assessment focused on the probable changes to land use and land ownership that would result from implementation of the alternatives. Also discussed are impacts to transportation and primer farmland. The impact assessment identified local land use regulatory requirements. The cumulative effects assessment evaluated the potential land use impacts of the project alternatives in relation to other past, present, and reasonably foreseeable future activities within the study area.

## **5.0 AFFECTED ENVIRONMENT**

### **5.1. Land Ownership**

This section discusses regional (or countywide) land use data as well as local land use data at project sites, lands adjacent to project sites, and areas adjacent to the Colorado River.

#### **5.1.1. Regional Land Ownership**

State and federal lands comprise 72 percent of the land in Grand County, 52 percent of the land in Larimer County, and 36 percent of Boulder County (Table 1). Lands adjacent to the Colorado River corridor are private, or are publicly owned by either the U.S. Bureau of Land Management (BLM) or the Colorado Division of Wildlife (CDOW). In Grand County, private land is located along the U.S. 40 corridor, which parallels the Colorado River. Private land in Larimer County is primarily concentrated east of the foothills of the Front Range and public land is located in the western portion of the county. Regional land ownership in the East and West Slope study areas are presented in Figure 1 and Figure 4.

**Table 1. Land Ownership in Grand, Larimer, and Boulder Counties.**

County	State Land (%)	Federal Land (%)	County/Private Land (%)
Grand	5%	68%	27%
Larimer	5%	47%	48%
Boulder	1%	35%	64%

Source: Colorado Department of Agriculture 2005.

The City of Boulder and Boulder County are two of the largest landowners in Boulder County. The City owns about 43,000 acres of open space and mountain parks and Boulder County owns about 70,000 acres of open space. Larimer County owns about 30,000 acres of open space. In Table 1, these acreages fall under the “private land” category, which was used as the default category for non-state and non-federal land (Colorado Department of Agriculture 2005).

### **5.1.2. Local Land Ownership**

All lands at the Jasper East Reservoir site are owned by either the Northern Colorado Water Conservancy District (NCWCD) or Reclamation (Figure 2). The Rockwell/Mueller Creek Reservoir site is located on private and BLM lands (Figure 3).

The Ralph Price Reservoir project site is located primarily on land owned by the City of Longmont (Figure 5). Potential borrow pits are located on lands owned by the City of Longmont, private landowners, and Arapaho National Forest. Landowners at the Chimney Hollow Reservoir site include the Subdistrict, Larimer County Parks and Open Land, the Bureau of Reclamation (Reclamation), and private landowners (Figure 6). Primary landowners at the Dry Creek Reservoir site include the Colorado State Land Board and private landowners (Figure 7).

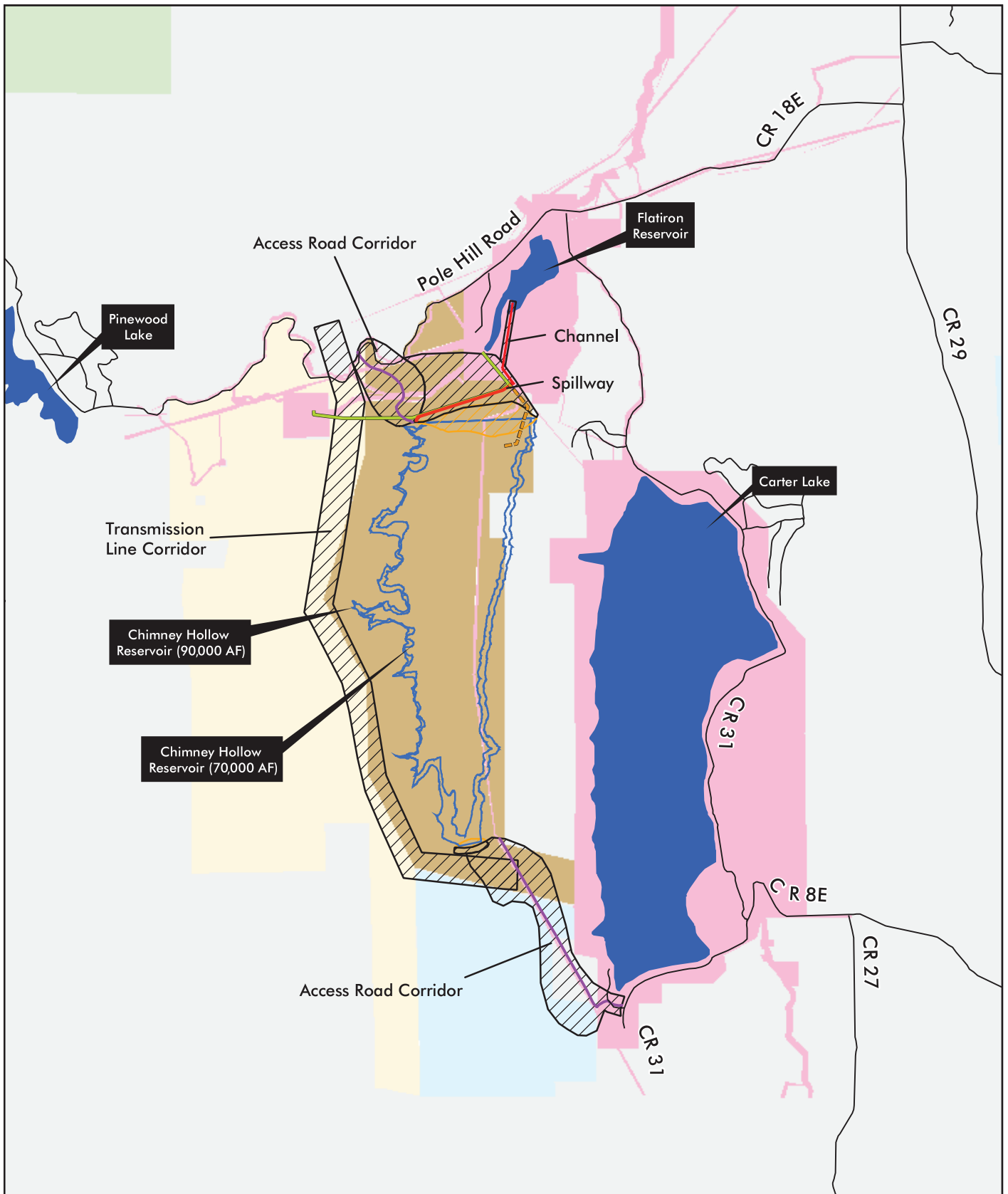
## **5.2. Land Use**

### **5.2.1. Regional Land Use**

Predominant land uses in portions of Grand, Larimer, and Boulder counties near potential project facilities are agriculture, recreation, low-density urban and residential, transportation, and utilities. Countywide trends for some land uses are discussed below to provide additional context for the effects analysis.

#### ***5.2.1.1. Agriculture***

In Grand County, agricultural land is found throughout the Colorado River corridor extending from Granby Reservoir to Kremmling. Many of these lands are irrigated for cultivation of hay and livestock grazing. Agricultural lands in Larimer and Boulder counties are located on private lands to the east of the Chimney Hollow, Dry Creek, and Ralph Price Reservoir sites.

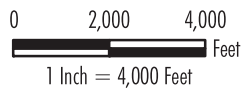


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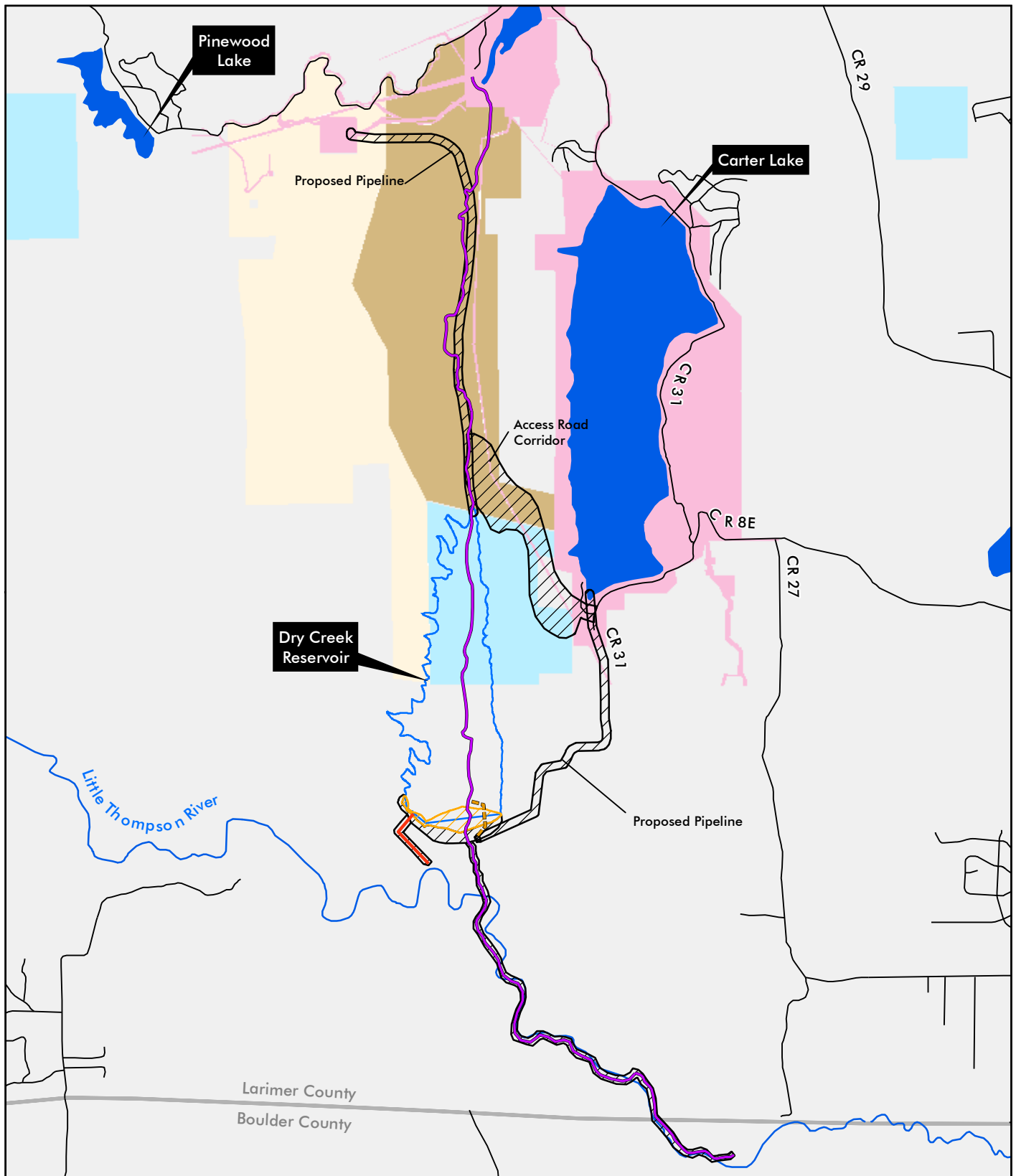
- State of Colorado
- U.S. Forest Service
- Reclamation Lands
- Subdistrict
- Larimer County Open Space
- Private

- New or Improved Road Access
- Inlet - Outlet
- Spillway/Channel
- Pipeline
- Potential Disturbance Area



**Figure 6**  
**Chimney Hollow**  
**Land Ownership**

Prepared for: Windy Gap Firing Project  
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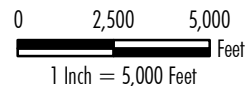


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**Land Owner**

- State of Colorado
- U.S. Forest Service
- Reclamation Lands
- Subdistrict
- Larimer County Open Space
- Private

- New or Improved Access Road
- Spillway
- Inlet - Outlet
- Potential Disturbance Area
- Dam



**Figure 7**  
**Dry Creek**  
**Land Ownership**

Prepared for: Windy Gap Farming Project  
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According to the 2002 Census of Agriculture, prepared by the USDA National Agricultural Statistics Service, about 18.5 percent of Grand County, 20 percent of Larimer County, and 22 percent of Boulder County are used for agricultural purposes. About 60 to 65 percent of the agricultural land in Larimer and Grand counties is used for livestock grazing, while 22 to 25 percent is used for cropland. The primary crop grown in Grand County is hay. Primary crops grown in Larimer and Boulder counties include corn, wheat, and barley (USDA 2002).

Between 1997 and 2002, the amount of farmland in Grand County decreased from 242,866 acres to 219,598 acres (10 percent) and the amount of farmland in Larimer County decreased from 534,783 acres to 521,599 acres (2 percent). In Boulder County, farmland decreased from 123,375 acres to 107,629 acres (13 percent) (USDA 2002).

#### ***5.2.1.2. Recreation and Open Space***

The abundance of public lands, rivers, and lakes within or adjacent to project sites and lands adjacent to the Colorado River provide a variety of summer and winter recreation opportunities. The Arapaho Roosevelt National Forest and Rocky Mountain National Park are popular destinations for hiking, camping, fishing, skiing, and sightseeing. In Grand County, the 36,000-acre Arapaho National Recreation Area (ANRA) is located within Arapaho Roosevelt National Forest. The ANRA includes Granby Reservoir, Grand Lake, Shadow Mountain Lake, and Willow Creek Reservoir, all of which provide boating and fishing. The Fraser and Colorado rivers also provide fishing and boating opportunities. Hunting is common in the fall on many public and private lands near the study area, and cross-country skiing, snowmobiling, and ice fishing are available throughout the winter in much of Grand County. The Winter Park Recreation Area and Sol Vista provide skiing and winter sport recreation.

In Larimer and Boulder counties, municipal and county-owned open space also provides recreation opportunities. Popular summer activities on many of these lands include hiking, mountain biking, and wildlife viewing. Recreation is discussed in detail in the Recreation Technical Report (ERO 2008).

#### ***5.2.1.3. Urban and Residential***

Urban and residential areas in Grand County are generally located along the Fraser and Colorado River valleys. Principal towns and communities along the Colorado River in Grand County near the potential West Slope reservoir sites include:

- Granby
- Grand Lake
- Hot Sulphur Springs
- Kremmling
- Parshall
- State Bridge

In Larimer County, the City of Loveland is located about 7 miles northeast of the Chimney Hollow and Dry Creek reservoir sites, and the Town of Berthoud is located about 6 miles east. Lyons is the closest urban area to Ralph Price Reservoir.

#### ***5.2.1.4. Transportation***

**Highways and County Roads.** Several state highways and numerous county roads are located near the West Slope alternative locations. Major U.S. highways in Grand

County include U.S. 34 and U.S. 40. U.S. 34 provides the primary linkage between Grand Lake and Granby, while U.S. 40 is the primary link between Granby and Kremmling (Figure 1). U.S. 40 and several county roads would serve as the primary access routes to the potential West Slope reservoirs.

Ralph Price Reservoir is accessed off U.S. 36 and County Road 80 (Figure 4). In Larimer County, major U.S. highways closest to potential reservoir sites include U.S. 34 and U.S. 287 (Figure 4). County roads would provide primary access to the Chimney Hollow and Dry Creek Reservoir sites. Average daily traffic and vehicle per day capacities for East and West Slope roads where information is available are listed in Table 2.

**Railroads.** The Union Pacific (formerly Denver-Rio Grande and Western Railroad) line runs along much of the Colorado River corridor in Grand County. Both passenger and freight trains use this route regularly for east/west traffic.

**Table 2. Average Daily Traffic and Vehicle Capacities for Roads Providing Direct Access to Potential Reservoir Sites.**

Primary Access Road	Average Daily Traffic *	Vehicle Per Day Capacity *
<i>Grand County</i>		
U.S. 40 (near County Road 56)	9,100	n/a
U.S. 40 (near County Road 57)	6,400	n/a
County Road 56	n/a	n/a
County Road 57	n/a	n/a
Highway 34	4,400	n/a
<i>Larimer County</i>		
County Road 18E	1,300	3,200
County Road 31	800	5,400
County Road 8E	1,200	5,400
County Road 29	1,800	5,800
<i>Boulder County</i>		
County Road 80	320	n/a

\* Average daily traffic and vehicle per day capacities are presented for those roads where data is available. Source: Grand County 2000; Larimer County 2000; CDOT 2004; Boulder County 2005.

#### **5.2.1.5. Utilities**

Power in Grand County (including the towns of Grand Lake, Granby, and Kremmling) is supplied by Mountain Parks Electric, Inc. In the Larimer County portion of the study area, Poudre Valley Rural Electric Association is the primary retail power provider.

## **5.2.2. Local Land Use**

### ***5.2.2.1. Ralph Price Reservoir (No Action Alternative Site)***

Ralph Price Reservoir is an existing reservoir located in unincorporated Boulder County on land owned by the City of Longmont. The City of Longmont manages the reservoir and surrounding land for resource preservation and water storage as part of the Button Rock Preserve. Two private residences are located on the north side of the reservoir. The City of Longmont's caretaker for the site has a home within the preserve. Angling opportunities are available at Ralph Price Reservoir and the surrounding lands offer opportunities for hiking and wildlife viewing. Access to the site is provided via Boulder County Road 80, although visitor parking is located about 2 miles from the reservoir.

### ***5.2.2.2. Chimney Hollow Reservoir Site***

The proposed Chimney Hollow Reservoir is located in a hogback valley west of Carter Lake and is currently undeveloped, open land. Historically the land was used for livestock grazing and as a private recreation area. Less than 4 percent of the proposed reservoir footprint includes two soil types (Harlan fine sandy loam, 3 to 9 percent slopes and Connerton-Barnum complex, 3 to 9 percent slopes) classified as farmland of local importance and farmland of statewide importance (NRCS 2005a). Areas having this soil complex with slopes less than 6 percent would qualify as prime farmland if irrigated with an adequate supply of water (SCS 1982). None of the affected lands are currently farmed or irrigated.

The Chimney Hollow area currently provides wildlife habitat and Larimer County has recently purchased lands adjacent to the reservoir site for open space recreation uses. No occupied homes are present at the site. Several homes are located on the hogback ridge east of the reservoir site. A 115-kV electric transmission line operated by the Western Area Power Administration (Western) runs the length of the site. An existing private dirt road and several spur roads extending from County Road 18E and County Road 31 provide access to the reservoir site. Flatiron Reservoir—a hydropower generation facility, Reclamation offices, and other C-BT facilities are located just north of the Chimney Hollow Reservoir site.

The 1998 Larimer County Open Lands Plan identified lands at Chimney Hollow as part of the Blue Mountain Project and a potential high priority open space. The goals of the Blue Mountain Project are to protect natural resources and open space (including ridgelines) and provide ecosystem connectivity between Blue Mountain Ranch and Carter Lake (Larimer County 1998). Lands at the ranch were recently protected from further development through a Larimer County conservation easement. Larimer County has purchased over 1,700 acres of land adjacent to Subdistrict lands that will become part of the planned Chimney Hollow Open Space area. Larimer County and the Subdistrict entered into an intergovernmental agreement that includes a recreational lease of about 1,600 acres of the Subdistrict property at no fee (Larimer County-Subdistrict 2004). The recreational lease is contingent on construction of Chimney Hollow Reservoir.

### ***5.2.2.3. Jasper East Reservoir Site***

Agriculture is the primary land use at the Jasper East Reservoir site. Approximately 313 acres are flood irrigated for cultivation of hay and cattle grazing; however, no prime farmland is present (SCS 1982). The Willow Creek Pump Station, forebay, and portions of the Willow Creek pump canal, which are features of the C-BT Project used to carry water from Willow Creek Reservoir to Granby Reservoir, are located at the site. The remainder of the site is undeveloped and provides wildlife habitat. No homes are present at Jasper East. County Road 40 provides access from Highway 34 to the reservoir site as well as to Willow Creek Reservoir, private land, and residences.

### ***5.2.2.4. Rockwell/Mueller Creek Reservoir Site***

The Rockwell/Mueller Creek Reservoir site includes meadows used as pastureland, a small stock pond, and four private residences. No prime farmland is present at the site (SCS 1982). Access to the site is via two unpaved county roads leading to the site from the north and east, respectively. The north route is accessible via U.S. 40 and County Road 57. The east route is County Road 56, accessible from U.S. 40. The undeveloped portions of this site provide wildlife habitat.

### ***5.2.2.5. Dry Creek Reservoir Site***

About 1 percent of Dry Creek Reservoir includes Harlan fine sandy loam, 3 to 9 percent slopes, which are classified as farmland of local importance (NRCS 2005b). Areas having this soil complex with slopes less than 6 percent would qualify as prime farmland if irrigated with an adequate supply of water (SCS 1982). None of this land is currently farmed or irrigated. The State Land Board currently has a mining lease with a party who is selling moss rock from the site (Routen 2006). State Land Board property at Dry Creek has historically been leased for grazing and is currently closed to public use.

The Dry Creek area is mostly undeveloped and provides habitat for a variety of wildlife species. Several private dirt roads traverse the area and provide access to homes. Like Chimney Hollow, Larimer County has identified the Dry Creek site as part of the Blue Mountain Project and as high priority open space (Larimer County 1998). Included on the site are three private residences, one of which includes a small llama operation. This business specializes in breeding, showing, and packing llamas, and in 2005 had about 13 animals. Access to the site is via U.S. 36, unpaved County Road 71, and other private roads northwest of Lyons. An unimproved road extends through the property.

## **5.3. Land Use Planning and Management**

County land use controls for Grand County include the Grand County Master Plan, Grand County Zoning Regulations, and Grand County 1041 Regulations. The Larimer County Comprehensive Plan and Larimer County Zoning Code regulate land use activities in Larimer County. The City of Longmont Municipal Code regulates land use activities on City-owned lands, including Ralph Price Reservoir.

Federal land use planning and management on U.S. Forest Service (Forest Service) and BLM property is guided by Resource Management Plans. A brief discussion of relevant components of these planning documents is provided below.

### 5.3.1. Grand County

The 1997 Grand County Master Plan (Grand County 1997) provides policies and strategies to identify future growth and development in Grand County, maintain community services and amenities, and preserve agricultural land uses and open space. The Grand County Master Plan identifies areas where development can best be accommodated based on environmental, infrastructure, and other factors. Most of the growth areas are adjacent to or associated with existing communities or subdivisions. A primary criterion for establishing growth areas in Grand County is to “Preserve Forestry & Open District by protecting agricultural lands, open space and sensitive environmental areas.” No growth areas are identified along the Colorado River downstream of Granby Reservoir. The Grand Lake Upper Growth Area is located along the Colorado River upstream of Grand Lake. The Three Lakes Design Review Area encompasses the Colorado River upstream of Grand Lake and lands bordering Grand Lake, Shadow Mountain Reservoir, and Granby Reservoir.

All of the lands along the Colorado River corridor and near potential reservoir sites in Grand County are zoned as *Forestry/Open* lands. Water storage projects in Grand County are subject to a Special Use Review (Grand County 2004a, 2004b). Uses permitted by special review are those that due to their unusual and unique features could be injurious to the health, safety, or welfare of inhabitants of Grand County. These uses are permitted in designated zoning districts only after receiving favorable approval of the Board of County Commissioners. Grand County has 1041 *Regulations for “Areas and Activities Designated for Matters of State Interest* (per State 1041 regulations - C.R.S. 24-65.1-101) for “Municipal and Industrial Water Projects” to ensure that they are developed in a manner that emphasizes the most efficient use of water, prevents the pollution of aquifer recharge areas, and that does not pollute rivers, streams, lakes, reservoirs, ponds and aquifer recharge areas within the source development area (Grand County 1978). These regulations require and establish procedures for county permits prior to the development of a municipal or industrial water project. Grand County granted a 1041 Permit for construction of Windy Gap Reservoir and the County indicates that an amendment to that permit would be needed for any of the action alternatives. The Municipal Subdistrict disagrees with the need for amending the 1041 Permit for the Proposed Action because no new construction or facilities in Grand County would be required to implement the project.

The Northwest Council of Governments (NWCOG) is the designated regional water quality management agency with responsibility for water quality planning in Eagle, Grand, Jackson, Pitkin, and Summit counties (NWCOG 2002). In compliance with Section 208 of the Clean Water Act, NWCOG has completed a water quality management plan for the region. The Watershed Service Program also reviews development applications to determine consistency and compliance with the 208 Plan. The purpose of Section 208 of the Clean Water Act is to require plans for coordinated regional approaches to water quality management. NWCOG functions will include review of regional permits that may be required for the WGFP to determine potential conflicts with the Upper Colorado River Water Management Plan.

### **5.3.2. Larimer County**

The Larimer County Master Plan (Larimer County 1997) provides general guidance on a variety of topics related to community and infrastructure development in unincorporated portions of Larimer County. The Larimer County Land Use Code includes a Location and Extent Review process to “determine if a public use, structure or utility proposed for location in unincorporated Larimer County conforms with the adapted master plan” (Larimer County 2004a). Potential reservoirs located in Larimer County are located on lands zoned primarily as Open Lands (low density rural residential 1/10 acres) and Estate-1 Lands. Both zoning districts require that water storage projects go through the Location and Extent Review Process prior to Larimer County approval.

### **5.3.3. Boulder County**

The Boulder County Comprehensive Plan (Boulder County 2007a) outlines policies to protect environmental resources. Ralph Price Reservoir is surrounded by lands designated in the Boulder County Comprehensive Plan as a *Municipal Watershed* and zoned *Forestry*. Recreation and water storage are permitted uses, all of which are subject to special use review, location and extent review, and 1041 Review of Areas and Activities of State Interest (Boulder County 2007b).

### **5.3.4. U.S. Forest Service**

Managed by the Forest Service, the ANRA includes Granby Reservoir, Shadow Mountain Reservoir, Grand Lake, and Willow Creek Reservoir. These lands are managed according to the *Arapaho and Roosevelt National Forests and Pawnee Grassland Land 1997 Revision of the Land and Resource Management Plan* (Forest Service 1997). Included within this plan are specific management and planning guidelines relevant to geographic management units (“Geographic Areas”) just outside of the study area. These management units include the Indian Peaks Wilderness and the Arapaho National Recreation Area Geographic Areas.

### **5.3.5. U.S. Bureau of Land Management**

Lands managed by the BLM are present in several locations along the Colorado River corridor and near the Rockwell/Mueller Creek Reservoir site (Figure 1). All of these lands are within the Kremmling Management Area, and are managed according to the Kremmling Resource Management Plan (BLM 1982). Many of the BLM lands are concentrated in an area known as the Upper Colorado River Special Recreation Management Area (Upper Colorado SRMA), which runs from Gore Canyon on the Colorado River downstream to State Bridge. BLM land use priorities in this area include recreation (boating and angling) and scenic areas (BLM 1982). BLM is currently in the process of updating their Resource Management Plan.

BLM lands between Kremmling and Granby Reservoir include lands adjacent to or near the Colorado River. Lands adjacent to the Colorado River are prioritized for livestock, soil protection, wilderness, and scenic areas. Lands prioritized for livestock uses include BLM lands committed to production of livestock forage and grazing. Lands prioritized for soil protection are lands where reducing soil loss is a priority, while

wilderness areas are lands recommended as suitable for wilderness designation (BLM 1982).

## **6.0 ENVIRONMENTAL CONSEQUENCES**

### **6.1. Land Use Effects Common to All Alternatives**

All alternatives include the diversion of water from the Colorado River at the existing Windy Gap Reservoir west of the Town of Granby. No new structural features are needed for this diversion. The Municipal Subdistrict, Northern Colorado Water Conservancy District would continue to operate the Windy Gap diversion and reservoir on the property that it owns. Diversions would affect Colorado River streamflows downstream of the Windy Gap diversion as well as releases from Granby Reservoir upstream from the diversion site. Spills from Granby Reservoir would occur less frequently because new reservoirs would provide additional storage, which reduces the potential for spills. Projected changes in Colorado River streamflows or Granby Reservoir water levels would not directly affect existing land ownership or land uses. No new facilities would be constructed along the Colorado River corridor that would affect existing land ownership and land uses. Existing agricultural lands and urban and residential land uses along the Colorado River are supported by existing water rights and would not be affected. Potential effects to recreation on the Colorado River and at East and West Slope reservoir sites are discussed in the Recreation Resources Technical Report (ERO 2008). Potential effects to ground water levels adjacent to the Colorado River and their relationship to agriculture in the Colorado River floodplain are discussed in the Water Resource Technical Report (ERO and Boyle Engineering 2007).

None of the alternatives would directly affect land use at locations beyond the project sites. Land use direction and development patterns for Boulder, Larimer, and Grand counties (and local municipalities and water districts included within these counties) is determined by local land use plans as reflected in Comprehensive Master Plans, local zoning, and other planning-related documents.

### **6.2. Land Use Effects at Project Sites**

A breakdown of the ownership of land at each potential reservoir site that could be disturbed by project facilities is provided in Table 3. Land use effects associated with construction of potential reservoir sites, conveyance facilities, borrow pits, and other structures are discussed below for each of the alternatives.

**Table 3. Current Land Ownership at Potential Reservoir Sites.**

Alternative	Private	Subdistrict	Reclamation	BLM	State Land Board	County/ Municipal
	acres					
Alternative 1 Ralph Price	-	-	-	-	-	77
Alternative 2 Chimney Hollow	36	858	70	-	2	54
Alternative 3 Chimney Hollow	26	750	66	-	2	54
Jasper East	<u>10</u>	<u>536*</u>	<u>70</u>	-	-	<u>-</u>
<b>Total</b>	<b>36</b>	<b>1,286</b>	<b>136</b>		<b>2</b>	<b>54</b>
Alternative 4 Chimney Hollow	26	750	66	-	2	54
Rockwell	<u>443</u>	<u>-</u>	<u>-</u>	<u>29</u>	<u>-</u>	<u>-</u>
<b>Total</b>	<b>469</b>	<b>750</b>	<b>66</b>	<b>29</b>	<b>2</b>	<b>54</b>
Alternative 5 Dry Creek	459	74	18	-	233	7
Rockwell	<u>504</u>	<u>-</u>	<u>-</u>	<u>51</u>	<u>-</u>	<u>-</u>
<b>Total</b>	<b>963</b>	<b>74</b>	<b>18</b>	<b>51</b>	<b>233</b>	<b>7</b>

\*The Subdistrict would need to acquire these lands from the NCWCD.

### 6.2.1. Alternative 1 – Enlargement of Ralph Price Reservoir – No Action Alternative

#### 6.2.1.1. Land Ownership

The enlargement of Ralph Price Reservoir would occur entirely on City of Longmont property (Figure 5). The expanded reservoir would inundate about 77 acres of land. Potential borrow areas are located on City of Longmont, Forest Service, and private land, but specific locations have not been determined. The City of Longmont would need to acquire the rights for use of any property outside of City ownership.

City of Longmont lands are managed for protection of municipal water supplies and recreation at Button Rock Preserve. Following construction of the expanded reservoir, these lands would remain under the ownership and management of the City of Longmont.

#### 6.2.1.2. Land Use

Land use effects associated with Ralph Price Reservoir enlargement are provided below. Potential water storage options pursued by Participants other than Longmont in the future under No Action could affect land uses; however, these effects are unknown because of the uncertainty of the type and location of individual projects Participants may pursue.

**Agriculture.** No effects to agricultural land uses would occur at Ralph Price Reservoir because no agricultural land uses are present at the site.

**Recreation.** During the approximately 30-month construction period, recreation use would be suspended. Recreation users that frequent the area would have to find an



alternative location for angling and hiking. Recreation access and amenities in Button Rock Preserve would be restored following expansion of the reservoir, with long-term use similar to existing conditions.

**Urban and Residential.** Neither of the two private residences near Ralph Price Reservoir would be directly affected by reservoir expansion. The existing ranger residence would not be inundated by reservoir expansion, but some disturbance could occur from spillway construction.

**Transportation.** During the 30-month construction period, traffic on U.S. 36 through the Town of Lyons and County Road 80 would increase due to workers traveling to and from the site and hauling of construction equipment and materials. The total size of the workforce would vary by month, with up to a maximum of 100 workers during peak construction (Bandy 2005).

Construction and workforce traffic associated with expansion of the main dam may result in short-term traffic delays along County Road 80. Assuming that all construction traffic uses this road during peak morning and evening hours, the additional 200 (100 vehicles in the morning and 100 in the afternoon peak hours) vehicles would result in a 63 percent increase from current average daily traffic levels on County Road 80. Added traffic on County Road 80 may result in periodic travel delays due to queuing behind slower-moving vehicles. However, traffic on County Road 80 would decrease during construction because recreation access would be closed. Following construction, maintenance, operation, and recreation traffic at the site is expected to return to near pre-construction levels.

**Utilities.** No new utilities would be needed for expansion of Ralph Price Reservoir.

### ***6.2.1.3. Land Use Planning and Management***

Prior to expansion of Ralph Price Reservoir, Boulder County would review the project through its Special Use Review, Location and Extent Review, and 1041 Review processes to ensure that the project complies with Boulder County planning and zoning policies and regulations. No elements of the expansion of Ralph Price Reservoir were identified that would directly conflict with the Boulder County Comprehensive Plan or other regulations. The county review process would further evaluate the effects of the action and any conditions for approval.

## **6.2.2. Alternative 2 – Chimney Hollow Reservoir (90,000 AF) – Proposed Action**

### ***6.2.2.1. Land Ownership***

The Subdistrict currently owns most of the lands needed for construction and operation of the proposed Chimney Hollow Reservoir (Figure 6). Portions of several small, private parcels near the northeast corner of the proposed reservoir would need to be acquired by the Subdistrict prior to construction. In addition, several easements would have to be acquired prior to construction. In the case of the relocated transmission line, Western would have to acquire easements on Larimer County, the Subdistrict, Reclamation, and possibly State Land Board property depending on the final design and alignment along portions of a 3.8-mile x 100-foot-wide corridor along the west side of

the reservoir. In addition, construction of the pipeline that connects the Bald Mountain Tunnel Surge Tank and the Flatiron Penstock Valve house would require a 1,640-foot easement from Larimer County and a 1,035-foot easement from Reclamation for the construction corridor. The 1.3-mile construction access road at the south dam would require acquisition of an approximately 0.3-mile easement across State Land Board Land, as well as 0.4 mile of easement on private land, and 0.2 mile of easement on Reclamation land (Boyle Engineering 2005).

#### **6.2.2.2. Land Use**

**Agriculture.** Construction of Chimney Hollow Reservoir could affect 63 acres of lands classified as farmland of local importance and farmland of statewide importance based on soil types (NRCS 2005a). In addition, portions of these areas that have a 6 percent slope or less would qualify as prime farmland if irrigated with an adequate supply of water (SCS 1982). However, none of the property potentially affected by construction is irrigated, so it is not considered prime farmland. There would be no loss of prime farmland associated with construction of Chimney Hollow Reservoir.

**Recreation.** Subdistrict land surrounding the reservoir would be managed by Larimer County in an agreement with the Subdistrict as part of the larger Chimney Hollow Open Space area (Larimer County 2004b). Open space lands would be protected from development and would be open to a variety of nonmotorized recreational opportunities including hiking, biking, and horseback riding. Water-based recreation opportunities would include angling and nonmotorized boating (except for small electric motors on watercraft). Anticipated recreation features include a parking area, trails, boat dock and ramp, picnic facilities, and vault toilets. It is estimated that 10 miles of trail would be constructed on both Larimer County and Subdistrict land (Larimer County-Subdistrict 2004). No overnight camping would be allowed.

Larimer County would prepare a recreation management plan for county and Subdistrict property prior to completion of the reservoir. Recreation improvements and general public access are expected to be completed about the same time as the reservoir is completed. Prior to reservoir construction, the county may conduct tours or allow limited public access to county property (Larimer County-Subdistrict 2004).

**Urban and Residential.** Because there is no existing or planned residential, commercial, or urban land uses at the Chimney Hollow Reservoir site, there would be no affect to these land uses. Nearby residents located on the hogback east of the proposed reservoir would experience temporary increased noise levels during construction and long-term changes in visual quality (ERO 2006; Holdeman and ERO 2008).

**Transportation.** Construction access from County Road 18E (Pole Hill Road) to the main dam and future recreation area would be via 1.5 miles of new road that would extend from County Road 18E to the vicinity of the west dam abutment. This road would serve as the primary route of entry for workers throughout reservoir construction and would provide access to open space following construction. The road would be closed during evening hours. Construction access to the saddle dam on the southern end of the reservoir could be made via improvements to an existing maintenance road for the transmission line that branches off County Road 31 at the south end of Carter Lake

(Boyle Engineering 2005) and/or from the north through the reservoir site.<sup>1</sup> Fewer workers would use the southern construction access road (Bandy 2005). The southern construction access road would be closed to the public following construction activity.

Considering truck traffic resulting from delivery of fuel, materials, and other supplies, the average peak traffic for the 38-month construction period is estimated to range from 5 to 10 trucks per day. Traffic could increase during construction of the delivery pipeline and conveyance facilities.

Workforce traffic would contribute to additional traffic to the site. The total size of the workforce would vary by month up to a maximum of 500 workers during peak construction, many of which would likely commute from surrounding communities (Boyle Engineering 2005). Assuming that there is little or no carpooling, and that all workforce and construction traffic uses this road during peak morning and evening hours, the number of peak-hour vehicle trips could be as high as 1,020 vehicle trips per day (510 vehicles in the morning and 510 vehicles in the afternoon peak hours).

Workforce traffic associated with construction of the main dam may result in short-term traffic delays along County Road 18E. Assuming that all construction traffic uses this road during peak hours, the additional 1,020 vehicles would result in a 79 percent increase from current average daily traffic levels on County Road 18E. This increase would remain within Larimer County's designated vehicle per day capacity levels for County Road 18E. Added traffic on County Road 18E may result in periodic travel delays due to queuing behind slower-moving vehicles on two-lane roads (particularly during peak traffic hours), and queuing at intersections where large vehicle turn movements are more difficult.

Following construction of Chimney Hollow Reservoir, maintenance, operation, and recreation traffic would increase traffic on local roads. An estimated four full-time personnel would be in charge of operation and maintenance, with additional part-time workers assisting with operation and maintenance efforts as needed. These workers would not noticeably affect traffic flow along nearby county roads. Recreation visitation at Chimney Hollow Reservoir is expected to be substantially lower than that occurring at Carter Lake (ERO 2008). Carter Lake currently has about 300,000 visitors per year and offers a wide variety of recreation opportunities such as camping, motorized boating, a swim beach, and a large number of picnic facilities (Rieves 2005). A long-term increase in traffic on County Road 18E would occur from projected recreation of 50,000 visitors annually (Flenniken, pers. comm. 2006). Recreation traffic likely would be greatest on weekends during the summer.

**Utilities.** Construction of Chimney Hollow Reservoir would require the relocation of a 115 kV transmission line that currently bisects the proposed reservoir site. As part of another project, the Western would upgrade the 115 kV transmission line to 230 kV. The upgrade and realignment would happen concurrently if Chimney Hollow Reservoir is

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<sup>1</sup>The southern access route is an optional access to the saddle dam for the contractor. A contractor may choose to use the southern access or northern access depending on the efficiency and cost effectiveness of the two access points.

constructed. Rerouting of the transmission line would require acquisition of about 3.8 miles x 100-foot easement across undeveloped land owned by Larimer County and included as part of Chimney Hollow Open Space. The upgraded transmission line and new reservoir would not affect planned open space and trail use in the area. Trail alignments would be developed based on the realignment of the transmission line.

Power supply to the reservoir and conveyance facilities would come from the existing facilities and transmission lines associated with the Flatiron Power Plant. Power supply of the necessary voltage may be readily available to meet the needs of the dam itself. Voltage from the Flatiron Power Plant would need to be stepped down via a substation to supply the appropriate voltage for water conveyance (Boyle Engineering 2005).

### ***6.2.2.3. Land Use Planning and Management***

Prior to construction of Chimney Hollow Reservoir and associated facilities, Larimer County would review the project through its Location and Extent Review process to ensure that it complies with the Larimer County master plan. The reservoir would provide additional recreation opportunities in a fast-growing portion of the county and would complement Larimer County open space preservation efforts for the Blue Mountain Ranch area and the Chimney Hollow Open Space (Larimer County 1998, 2004b). No elements associated with the construction of Chimney Hollow Reservoir and facilities were identified that would directly conflict with Larimer County land use plans or other regulations. The county review process would further evaluate the effects of the action and any conditions for approval.

### **6.2.3. Alternative 3 – Chimney Hollow Reservoir (70,000 AF) and Jasper East Reservoir (20,000 AF)**

Land use effects for a 70,000 AF Chimney Hollow Reservoir are similar to those described for the 90,000 AF Chimney Hollow in Alternative 2. The smaller Chimney Hollow Reservoir would affect 10 fewer acres of private land and 4 fewer acres of Reclamation land. In addition, about 108 fewer acres of Subdistrict land would be affected by reservoir construction. Land use effects for Jasper East Reservoir are discussed below.

#### ***6.2.3.1. Land Ownership***

Most of Jasper East Reservoir, dam, and facilities would be located on land owned by the NCWCD (536 acres). About 70 acres of Jasper East Reservoir facilities would be located on land now owned by Reclamation. If the Jasper East Reservoir is constructed, Reclamation and the Subdistrict would develop an appropriate agreement to permit construction of the reservoir. This could involve either a land exchange or a contract between Reclamation and the Subdistrict, which would allow construction activities on Reclamation lands. About 1.6 miles of County Road 40 would be realigned to the south of the Jasper East Reservoir along NCWCD and private lands, and about 1.7 miles of the Willow Creek Pump Canal would be realigned to the north of the reservoir site on NCWCD lands. The realigned road would require purchase of about 4.4 acres of private land. The remaining 6.9 acres of road would occur on NCWCD land. The Subdistrict would likely pay for the new road construction, which would need to be constructed to Grand County Road and Drainage Standards. Maintenance would remain with Grand

County if the road construction were approved by the Grand County Road Supervisor and County Engineer. The Jasper East-Windy Gap pipeline connection would extend along 1.1 miles of NCWCD land, which would need to be acquired by the Subdistrict along with other NCWCD lands the reservoir would affect.

#### **6.2.3.2. Land Use**

**Agriculture.** Construction of Jasper East Reservoir and associated facilities would permanently remove about 313 acres of irrigated hay meadows from use for grazing and hay production. There would be a loss in lease and agricultural production revenue associated with the change in land use. Although the project would result in the loss of this land use, this amounts to less than a 1 percent reduction in the countywide total acreage of farmland. No prime farmland would be affected (SCS 1982). Relocation of County Road 40 would require acquisition of private lands and could affect existing land uses, which currently appear to support livestock.

**Urban and Residential.** Because there are no existing or planned residential, commercial, or urban land uses at the Jasper East Reservoir site, there would be no affect to these land uses. Nearby residents located on private lands north and south of County Road 40 may experience temporary increased noise levels, long-term changes in visual quality and disruption in travel during construction (ERO 2006; Holdeman and ERO 2008).

**Recreation.** Construction of Jasper East Reservoir and associated facilities would not affect recreation at nearby Willow Creek Reservoir. Initial stages of reservoir construction would include the relocation of County Road 40, which would maintain access to Willow Creek Reservoir during construction. Visitors to Willow Creek Reservoir may experience occasional noise impacts during construction (Noise Technical Report, ERO 2006). Following construction, some recreation such as fishing and boating could occur at the reservoir, but currently, no agency has been identified to manage recreation at this site. Should the U.S. Forest Service be interested in managing recreation use at the reservoir, they would likely require that some of the lands adjacent to Jasper East Reservoir be conveyed or transferred to the agency as part of any agreement to manage recreation (Forest Service 2005). If an entity were found to manage recreation facilities, a management plan would be prepared to determine what types of activities to allow and how the facility would operate. Development of recreation facilities would add to the land use changes associated with recreation, public access, and traffic.

**Transportation.** County Road 40 provides access from U.S. 34 to the Jasper East reservoir site as well as to Willow Creek Reservoir, private land, and residences. Initial stages of construction would include the relocation of County Road 40, which would ensure access to Willow Creek Reservoir and other properties during reservoir construction. The majority of the new alignment would follow an unimproved access road west of the reservoir to County Road 405.

Considering truck traffic resulting from delivery of fuel, materials, and other supplies, the average peak truck traffic for the 38-month construction period is estimated to range between 5 to 10 trucks per day. Construction traffic may increase during construction of

the delivery pipeline and conveyance facilities. Workforce traffic would contribute to the majority of traffic to the site. The total size of the workforce varies seasonally with up to about 160 workers, many of which would likely commute from the surrounding towns such as Granby, Hot Sulfur Springs, and Kremmling. Assuming that there is little or no carpooling, and that all workforce and construction traffic uses this road during peak morning and evening hours, the number of peak-hour vehicle trips could be as high as 340 vehicle trips per day (170 vehicles in the morning and 170 in the afternoon peak hours) (Boyle Engineering 2005).

Construction and workforce traffic may result in short-term traffic delays along Highway 34 and County Road 40. Because Grand County does not have an average daily traffic count for County Road 40, it is not possible to quantify the percent increase in traffic as a result of the estimated 340 additional daily vehicle trips to Jasper East. Along U.S. 34, the 340 peak-hour vehicle trips would be an 8 percent increase from average daily traffic levels. Such an increase during peak-hour traffic may result in minor vehicle delays due to queuing behind slower-moving vehicles on two-lane roads, and queuing at intersections where large vehicle turn movements are more difficult.

Following construction of Jasper East Reservoir, maintenance, operation, and recreation traffic at the site is expected to return to near pre-construction levels. An estimated four full-time personnel would be in charge of operation and maintenance, with additional part-time workers assisting with operation and maintenance efforts as needed. The small amount of traffic associated with the operation and maintenance of Jasper East Reservoir would not noticeably affect traffic along U.S. 34 and County Road 40. Recreation traffic to the area following construction is dependant upon whether the Forest Service or some other entity agrees to develop and manage recreation at the new reservoir. If so, minor increases in traffic are likely, particularly during the peak summer recreation season. However, it is not anticipated that recreation-related traffic would have a substantial effect on overall traffic levels.

**Utilities.** Power supply to Jasper East Reservoir and the relocated Willow Creek and new Jasper East Pump Stations would be supplied from the existing transmission line running south and east of the site. No improvements or upgrades of the transmission line are anticipated. Voltage of this line would need to be stepped down via a substation to supply the appropriate voltage to any of these facilities. Construction of substations would be included as part of both pump stations (Boyle Engineering 2005). All of the power and distribution costs associated with operation of Jasper East Reservoir would be borne by the Municipal Subdistrict and would have no impact on Grand County residents' power supply or cost.

### ***6.2.3.3. Land Use Planning and Management***

Most of the land area at the Jasper East Reservoir site is within the Forestry/Open zoning district. Zoning regulations for this district allow for “reservoirs and dams engineered to contain one hundred (100) acre feet of water or less, and water diversion structures, ditches and pipeline structures engineered to convey fifteen (15) cubic feet of water per second of time or less.” Reservoirs, dams, and other water management structures larger than the thresholds given are permitted by special review. The zoning regulations contain specific regulations for special use permits to “construct or operate

facilities for a trans-basin diversion” (Grand County 2006). Jasper East Reservoir would be located outside of the Three Lakes Design Review Area and would not be in conflict with zoning regulations. No elements associated with the construction of Jasper East Reservoir and facilities were identified that would directly conflict with Grand County land use plans or other regulations. The county review process would further evaluate the effects of the action and any conditions for approval through its Special Use Review and 1041 Regulations to ensure that the project complies with county planning and zoning policies and regulations.

The Headwaters Trails Master Plan was developed to prevent or mitigate the loss of existing trails, to guide planned expansion, and generally improve Grand County’s Trails System (Headwaters Trails Alliance 2008). The goals in the plan include: providing trails in Grand County that link towns and recreational areas; developing, preserving, and maintaining a secondary trail system connecting historic, cultural, and recreational sites to communities and adjoining counties; and mapping the existing trails and proposed trail corridors within Grand County (Elicker, pers. comm. 2008). Conceptual trail corridors are identified between the Town of Granby and Grand Lake, between Granby and Hot Sulphur Springs, and between Kremmling and Summit County. Construction of Jasper East Reservoir would not affect these or other existing or proposed trails, or affect the possibility of implementing proposed trails.

#### **6.2.4. Alternative 4 – Chimney Hollow Reservoir (70,000 AF) and Rockwell/Mueller Creek Reservoir (20,000 AF)**

Land use effects for Chimney Hollow Reservoir would be the same as described for Alternative 3. Land use effects for Rockwell/Mueller Creek Reservoir are discussed below.

##### ***6.2.4.1. Land Ownership***

Rockwell/Mueller Creek Reservoir and associated facilities would require Subdistrict acquisition of about 443 acres of private land owned by several landowners and about 29 acres of BLM land. According to the BLM, the Subdistrict would have to obtain a BLM special use permit prior to using an additional 56 acres of BLM lands for a potential borrow pit (Cassel 2005). Realignment of 2,200 feet of County Road 56 would require acquisition of an easement along about 1 acre of currently open and undeveloped BLM property. Construction of the 3.2-mile pipeline and booster station would require acquisition of a 100-foot-wide construction easement, as well as a 50-foot-wide permanent easement directly adjacent to County Road 57 from private landowners (Boyle Engineering 2005). The total area for these easements is about 57 acres. The realignment of County Roads 56 and 57 would need to be constructed to Grand County Road and Drainage Standards. Maintenance would remain with Grand County if the road construction were approved by the Grand County Road Supervisor and County Engineer.

##### ***6.2.4.2. Land Use***

**Agriculture.** About 53 acres of pastureland located at the Rockwell/Mueller Creek Reservoir site would be inundated. Current livestock grazing would be displaced.

**Urban and Residential.** Construction of Rockwell/Mueller Creek Reservoir would result in the permanent displacement of four residences located within the reservoir footprint. In addition, nearby residents may experience temporary increased noise levels and long-term changes in visual quality (ERO 2006; Holdeman and ERO 2008). The tax base would change on the portion of the property currently used for residences when converted to use as a reservoir site.

**Recreation.** Construction of Rockwell/Mueller Creek Reservoir and associated facilities would not affect recreation because no recreation currently occurs at the site. Following construction, recreation activities such as fishing and boating may occur at the reservoir; however, no agency has been identified to manage recreation at this time. If an entity is found to manage recreation facilities, a management plan would be prepared to determine what types of activities to allow and how the facility would be operated. Development of recreation facilities would add to the land use changes associated with recreation, public access, and traffic.

**Transportation.** Access to the Rockwell/Mueller Creek site would occur from County Road 57 from the north and County Road 56 to the east. Both of these roads would likely need to be improved to handle construction traffic. About 2,200 feet of County Road 56 would need to be realigned south of the dam prior to construction.

Considering truck traffic resulting from delivery of fuel, materials, and additional supplies, the average peak truck traffic for the 38-month construction period is estimated to range between five to 10 trucks per day. Traffic could increase during construction of the delivery pipeline and conveyance facilities (Boyle Engineering 2005).

Workforce traffic would contribute to additional traffic area to the site. The total size of the workforce varies by month up to a maximum of 152 workers during peak construction, most of which would likely commute from surrounding communities. Assuming that there is little or no carpooling, and that all workforce and construction traffic uses this road during peak morning and evening hours, the number of peak-hour vehicle trips could be as high as 324 vehicle trips per day (162 vehicles in the morning and 162 in the afternoon peak hours).

Construction and workforce traffic may result in short-term traffic delays along U.S. 40, County Road 56, and County Road 57. Assuming that construction traffic is split between County Road 56 or County Road 57 via U.S. 40 during peak hours, the additional vehicles would result in a 4 percent increase in average daily traffic on U.S. 40 near the intersection of County Road 56, and a 5 percent increase from average daily traffic on U.S. 40 near the intersection of County Road 57. This added traffic may result in periodic traffic delays due to queuing behind slower-moving vehicles on two-lane roads (particularly during peak traffic hours), and queuing at intersections where large vehicle turn movements are more difficult.

Following construction of Rockwell/Mueller Creek Reservoir, maintenance, operation, and recreation traffic at the site is expected to return to near pre-construction levels. An estimated four full-time personnel would be in charge of operation and maintenance, with additional part-time workers assisting with operation and maintenance efforts as needed. The small amount of traffic associated with the operation and



maintenance of Rockwell/Mueller Creek Reservoir would not affect traffic flow along County Roads 56 and 57. Recreation traffic to the area following construction is contingent upon whether the Forest Service or some other entity agrees to provide and manage recreation opportunities at the new reservoir. If so, minor increases in traffic are likely, particularly during the peak summer recreation season.

**Utilities.** Rockwell Reservoir would be served by an existing transmission line located north of the site near the Windy Gap Pump Station. This line would need to be stepped down via a substation to supply the appropriate voltage to these facilities. No improvements or upgrades of the transmission line are anticipated (Boyle Engineering 2005). All of the power and distribution costs associated with operation of Rockwell Reservoir would be borne by the Municipal Subdistrict and would have no impact on Grand County residents' power supply or cost.

#### ***6.2.4.3. Land Use Planning and Management***

Most of the land area at the Rockwell/Mueller Creek Reservoir site is within the Forestry/Open zoning district. Zoning regulations for this district allow for "reservoirs and dams engineered to contain one hundred (100) acre feet of water or less, and water diversion structures, ditches and pipeline structures engineered to convey fifteen (15) cubic feet of water per second of time or less." Reservoirs, dams, and other water management structures larger than the thresholds given are permitted by special review. The zoning regulations contain specific regulations for special use permits to "construct or operate facilities for a trans-basin diversion" (Grand County 2006). Rockwell/Mueller Creek Reservoir would be located outside of the Three Lakes Design Review Area and would not be in conflict with zoning regulations. No elements associated with the construction of Rockwell/Mueller Creek Reservoir and facilities were identified that would directly conflict with Grand County land use plans or other regulations. The county review process would further evaluate the effects of the action and any conditions for approval through its Special Use Review and 1041 Regulations to ensure that the project complies with county planning and zoning policies and regulations.

The Headwaters Trails Master Plan was developed to prevent or mitigate the loss of existing trails, to guide planned expansion, and generally improve Grand County's Trails System (Headwaters Trails Alliance 2008). The goals in the plan include: providing trails in Grand County that link towns and recreational areas; developing, preserving, and maintaining a secondary trail system connecting historic, cultural, and recreational sites to communities and adjoining counties; and mapping the existing trails and proposed trail corridors within Grand County. Conceptual trail corridors are identified between the Town of Granby and Grand Lake, between Granby and Hot Sulphur Springs, and between Kremmling and Summit County. Construction of Rockwell/Mueller Creek Reservoir would not affect these or other existing or proposed trails or affect the possibility of implementing proposed trails.

#### **6.2.5. Alternative 5 – Dry Creek Reservoir (60,000 AF) and Rockwell/Mueller Creek Reservoir (30,000 AF)**

Land ownership and land use effects associated with the Rockwell/Mueller Creek Reservoir site (30,000 AF) are similar to those described for Rockwell/Mueller Creek

Reservoir (20,000 AF) in Alternative 4. However, the duration of effects may be longer and the larger size of the Rockwell/Mueller Creek Reservoir would require that County Road 56 be rerouted an additional 0.1 mile to the south, resulting in a slight increase in the amount of disturbed and undeveloped private land in the area (Boyle Engineering 2005). The 30,000 AF Rockwell/Mueller Creek Reservoir would require Subdistrict acquisition of about 504 acres of private land and about 51 acres of BLM land. According to the BLM, the Subdistrict would have to obtain a BLM special use permit prior to using 56 acres of BLM lands for a potential borrow pit (Cassel 2005). Land use effects at Dry Creek Reservoir are provided below.

#### **6.2.5.1. Land Ownership**

The Dry Creek Reservoir site would require Subdistrict purchase of about 459 acres of private lands and purchase or exchange about 233 acres of State Land Board lands. About 18 acres of Reclamation lands would be disturbed by new or improved access roads and pipeline connections. Another potential access route is from the south of the reservoir via Meadow Hollow and travel along existing unimproved or two track roads that eventually join an existing unnamed private access road that extends along the Little Thompson River. Any improvements to this road would require acquisition of an easement from private landowners. The pipeline connection to C-BT facilities would extend across about 317 feet of Reclamation property and 3 miles of Subdistrict land. Construction of a 2-mile-long pipeline between Dry Creek and Carter Lake would require acquisition of a 100-foot-wide construction and 50-foot-wide permanent easement from private landowners and Reclamation property (Boyle Engineering 2005).

#### **6.2.5.2. Land Use**

**Agriculture.** Construction of Dry Creek Reservoir would permanently displace the existing llama breeding, showing, and packing operation. In addition, the reservoir would affect 10.5 acres of lands classified as farmland of statewide importance (NRCS 2005a). Any portions of these areas that are 6 percent slope or less would qualify as prime farmland if irrigated with an adequate supply of water (SCS 1982). None of the property potentially affected by construction of Dry Creek Reservoir is irrigated so it is not considered prime farmlands. Thus, there would be no loss of prime farmland associated with construction of Dry Creek Reservoir.

**Urban and Residential.** Construction of Dry Creek Reservoir would result in the permanent displacement of three residences located within the reservoir footprint. In addition, nearby residents may experience temporary increased noise levels and long-term changes in visual quality (ERO 2006; Holdeman and ERO 2008).

**Recreation.** Construction of Dry Creek Reservoir and associated facilities would not affect recreation because no recreation currently occurs at the site. Following construction, some recreation such as fishing and boating may occur at the reservoir. However, no agency has been identified to manage recreation at this time. If an entity is found to manage recreation facilities, a management plan would be prepared to determine the types of activities to allow and how the facility would be operated. Development of recreation facilities would add to the land use changes associated with recreation, public access, and traffic.

**Transportation.** The transportation effects analysis assumes that access is from the north. Construction access from County Road 18E to the main dam would be via the unimproved access road that extends from north to south through Chimney Hollow. This road would require improvements such as grading and gravel prior to construction (Figure 7).

Considering truck traffic resulting from delivery of fuel, materials, and other supplies, the average peak traffic for the 38-month construction period is estimated to range between 5 to 10 trucks per day. Traffic could increase during construction of the delivery pipeline and conveyance facilities.

Workforce traffic would contribute to additional traffic area to the site. The total size of the workforce varies by month up to a maximum of 460 workers during peak construction, many of which would likely commute from surrounding communities. Assuming that there is little or no carpooling, and that all workforce and construction traffic uses this road during peak morning and evening hours, the number of peak-hour vehicle trips could be as high as 920 vehicle trips per day (460 vehicles in the morning and 460 in the afternoon peak hours).

Construction and workforce traffic may result in short-term traffic delays along County Road 18E. Based on vehicle trips associated with construction and workforce traffic, the total highest number of trips for dam and reservoir construction is about 940 vehicle trips, which would be a 72 percent increase from average daily traffic levels on County Road 18E. This increase would remain within Larimer County's designated vehicle per day capacity levels for County Road 18E. This added traffic may result in periodic traffic delays due to queuing behind slower-moving vehicles on two-lane roads (particularly during peak traffic hours), and queuing at intersections where large vehicle turn movements are more difficult.

Following construction of Dry Creek Reservoir traffic on access roads is expected to return to near pre-construction levels. An estimated four full-time personnel would be in charge of operation and maintenance, with additional part-time workers assisting with operation and maintenance efforts as needed. These workers would not noticeably affect traffic flow along nearby county roads. Recreation traffic to the area following construction is dependant upon whether Larimer County or some other entity agrees to provide and manage recreation opportunities at the new reservoir. If so, traffic would increase over the long-term, particularly during the peak summer recreation season.

**Utilities.** The site would be served by an existing transmission line that runs through the Chimney Hollow project site. Connections to the existing transmission line would require approximately 1.5 to 2 miles of new line, depending on the final route. The route for the new portion would generally follow the Dry Creek Pipeline alignment between Dry Creek and Carter Lake. This line would need to be stepped down via a substation to supply the appropriate voltage to these facilities. No improvements or upgrades of the transmission line are anticipated (Boyle Engineering 2005).

**Minerals.** Quarrying of moss rock by a private party on State Land Board lands would no longer be permitted following the sale of State Land Board lands to the Subdistrict for construction of Dry Creek Reservoir.

### **6.2.5.3. Land Use Planning and Management**

Prior to construction of Dry Creek Reservoir, Larimer County would review the project through its Location and Extent Review Process to ensure that it complies with the Larimer County comprehensive plan. No elements associated with the construction of Dry Creek Reservoir and facilities were identified that would directly conflict with Larimer County land use plans or other regulations. The county review process would further evaluate the effects of the action and any conditions for approval.

## **7.0 CUMULATIVE EFFECTS**

Cumulative effects are those resulting from the incremental impact of an alternative when added to other past, present, and reasonably foreseeable future actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a time period.

Several reasonably foreseeable actions are anticipated to occur in the future regardless of the implementation of any of the action alternatives or the no action alternative. Reasonably foreseeable actions include water-based actions that affect portions of the Colorado River also affected by the WGFP, and land-based actions that include ground disturbances near potential WGFP facilities.

### **7.1. Water-Based Reasonably Foreseeable Actions**

Reasonably foreseeable water-based actions expected to occur in the future include the Denver Water Moffat Collection System Project, urban growth in Grand and Summit counties, reduction of Excel Energy's Shoshone Power Plant call, changes in releases from Williams Fork and Wolford Mountain Reservoirs to meet U.S. Fish and Wildlife Service flow recommendations for endangered fish in the 15-mile reach, Wolford Mountain Reservoir contract demand, and the expiration of Denver Water's contract with Big Lake Ditch in 2013.

Reasonably foreseeable water-based actions on the West Slope would affect streamflows in the Colorado River, but would not have any direct incremental effect on land ownership or use that overlap the effects of the WGFP. The expiration of Denver Water's contract with Big Lake Ditch in 2013 would reduce the amount of irrigated agriculture in the Reeder Creek drainage, which would add to the cumulative loss of agricultural production in Grand County with construction of Jasper East Reservoir under Alternative 3. No other cumulative effects were identified for water-based reasonably foreseeable actions. Potential cumulative effects to recreation are discussed in the Recreation Technical Report (ERO 2008).

### **7.2. Land-Based Reasonably Foreseeable Actions**

The following are land-based reasonably foreseeable actions that are relevant to the WGFP.

**Land Development.** A variety of new land developments are expected to occur in the vicinity of the potential WGFP reservoir sites in Larimer and Grand counties. Land use changes or developments within about 5 miles of the Jasper East and Rockwell Reservoir site were identified to provide a context for assessing potential local

cumulative effects of multiple land disturbances. Near Jasper East, this includes about 1,590 acres of planned residential and commercial development southwest of the Town of Granby and about 980 acres of planned residential development at C-Lazy-U Preserves located north of the reservoir site (Hale pers. comm. 2005; Campbell pers. comm. 2006) (Figure 8). Near the Rockwell Reservoir site, about 4,770 acres of residential, commercial, and mixed development would continue in the Granby Ranch area. Portions of Granby Ranch have already been developed.

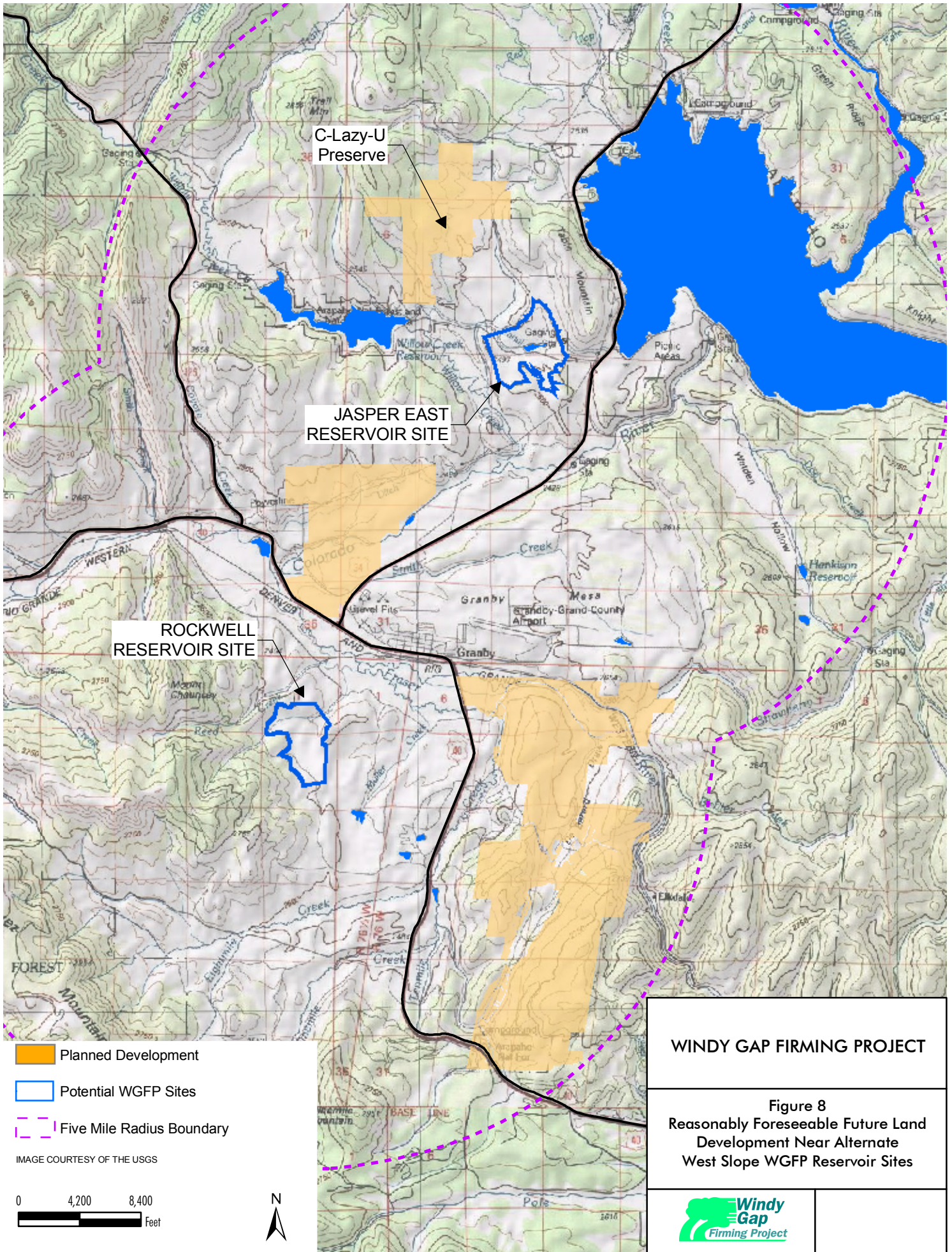
On the East Slope, several land developments are planned near potential reservoir sites. As of June 2007, about 1,440 acres of land located within about 5 miles of Chimney Hollow and 1,460 acres of land within about 5 miles of Dry Creek Reservoir were under county development review for subdivision, dispersed residential development, commercial development, and/or special review for a proposed change in land use (Larimer County 2007) (Figure 9).

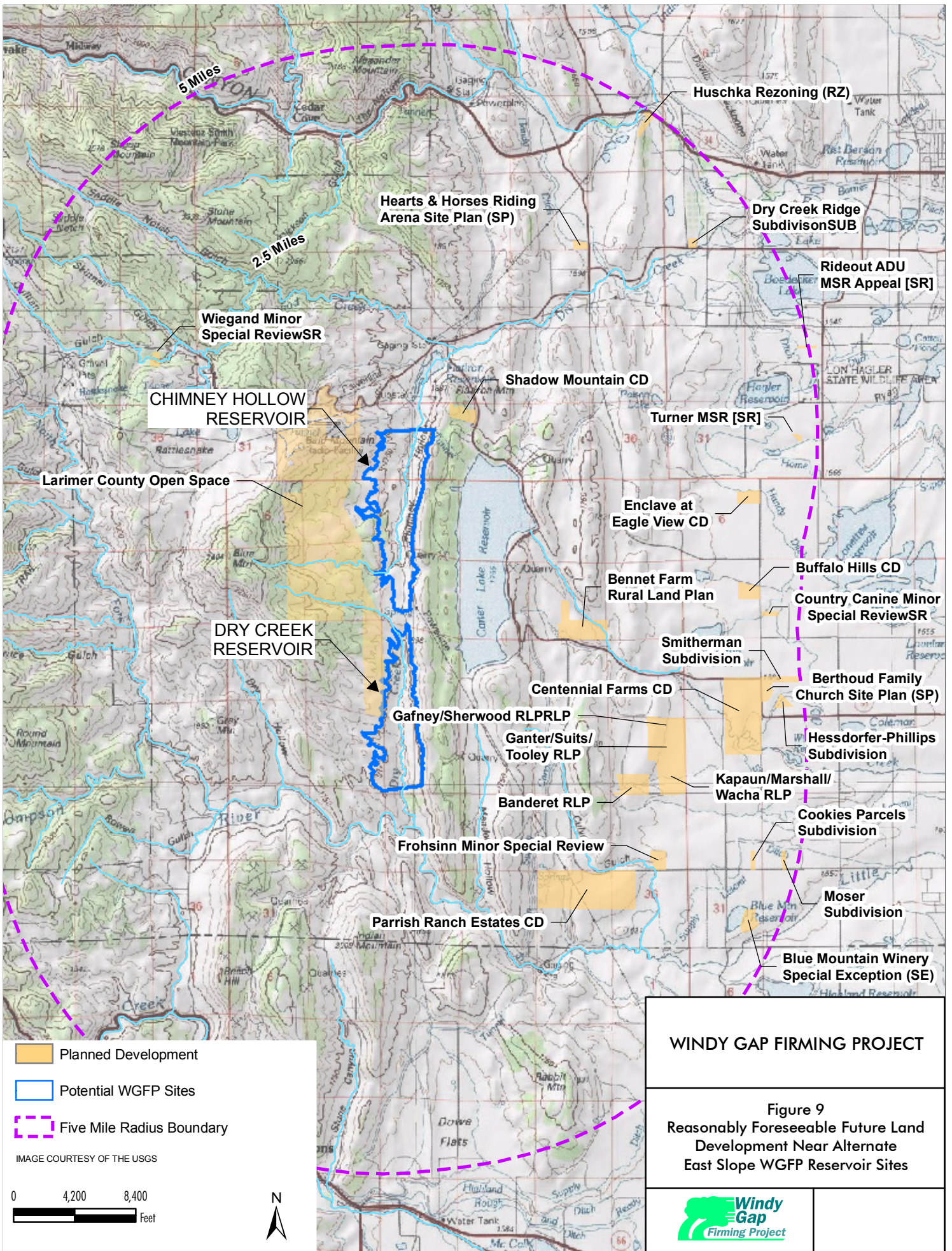
**Larimer County Open Space.** Larimer County Parks and Open Lands acquired about 1,850 acres of land adjacent to the proposed Chimney Hollow Reservoir site. The county intends to manage this property for recreation use in the future regardless of whether Chimney Hollow Reservoir is constructed.

**Urban Growth and in the Northern Front Range.** Continued population growth and urban development is expected to occur in the northern Front Range Colorado communities served by many of the Firing Project Participants regardless of the proposed WGFP.

### **7.3. Land Use Effects Common to All Alternatives**

Urban and residential growth on the West Slope and northern Front Range will likely contribute to the continued reduction in undeveloped and agriculture land uses and the expansion of urban and residential land uses. This growth is likely to occur with or without the WGFP. This report does not address possible future land use changes associated with the service areas of Firing Project Participants. Land use direction and development for the municipalities, water districts, and power providers in the Firing Project is determined by local land use plans as reflected in Comprehensive Master Plans and other planning-related documents and is not directly related to the results of the proposed action or other alternatives.





**WINDY GAP FIRMING PROJECT**

Figure 9  
Reasonably Foreseeable Future Land  
Development Near Alternate  
East Slope WGFP Reservoir Sites



## **7.4. Land Use Effects at Project Sites**

### **7.4.1. Alternative 1 – Enlargement of Ralph Price Reservoir – No Action Alternative**

The majority of land immediately adjacent to Ralph Price Reservoir has remained undeveloped, open land under the ownership of the City of Longmont or the Forest Service since the late 1950s when the original reservoir was constructed.

No specific reasonably foreseeable actions have been identified in the vicinity of Ralph Price Reservoir. City-owned land will continue to be managed for protection of municipal water supplies and recreation at Button Rock Preserve. Lands adjacent to city-owned lands are publicly owned by either the Forest Service or Boulder County and land uses in these areas are not expected to change. Scattered private lands in the vicinity of Ralph Price Reservoir could be permitted in the future for a small number of single-family residences. However, these lands lay within one of the more growth restrictive areas of Boulder County, and large-scale subdivisions would not be permitted (Lornatos 2005). Thus, cumulative effects to regional land use and ownership are expected to be minimal and surrounding land would remain mostly undeveloped.

### **7.4.2. Alternative 2 – Chimney Hollow Reservoir (90,000 AF) – Proposed Action**

Land uses in and around Chimney Hollow Reservoir have been affected by historical livestock operations and nearby land development including construction of Carter Lake, Flatiron Reservoir, and other C-BT facilities, Reclamation offices, rural residential development, and roads. Increasingly, many lands throughout the northern Front Range and in the vicinity of Chimney Hollow have been developed to support increased demand for residential land uses. Private lands near the Chimney Hollow Reservoir site zoned *Open Lands*, *Estate*, and *FAI-Farming* that were not included as part of the recent approximate 1,700-acre purchase by Larimer County Parks and Open Land, are likely to be converted from undeveloped, open land to residential and/or mixed land uses in the future.

Reasonably foreseeable future development includes about 1,440 acres of land located within about 5 miles of Chimney Hollow that were under county development review for subdivision, dispersed residential development, commercial development, and/or special review for a proposed change in land use (Figure 9). These developments in combination with Chimney Hollow Reservoir would contribute to reductions in agricultural and undeveloped open lands in the vicinity of the proposed reservoir.

The Chimney Hollow Open Space area, which would be located just west of the proposed reservoir, would provide a variety of opportunities for hiking, biking, picnicking, and wildlife viewing. Non-motorized recreation planned for Chimney Hollow Reservoir would provide expanded recreation opportunities on Subdistrict lands such as trails for hiking, boating, and angling (Larimer County-Subdistrict 2004). These opportunities would provide positive cumulative addition to the recreational resources in the area.



#### **7.4.3. Alternative 3 – Chimney Hollow Reservoir (70,000 AF) and Jasper East Reservoir (20,000 AF)**

Cumulative land use effects associated with the Chimney Hollow Reservoir are similar to those described for Alternative 2.

Land uses at the Jasper East Reservoir site have historically included irrigated pastureland; operation of the Willow Creek Canal, pump station, and forebay; and the presence of County Road 40, which bisects the reservoir site. Much of the adjacent land has remained open, undeveloped private land or publicly owned National Forest land. Construction of Jasper East Reservoir would not contribute to urban or residential development in the area. While no development is planned for lands immediately adjacent to Jasper East Reservoir, about 980 acres of land less than 1 mile to the northwest of the Jasper East Reservoir site is included as part of “C Lazy U Preserves,” which would be subdivided into 35-acre parcels. In addition, about 1,590 acres are planned for residential and commercial development southwest of the Town of Granby (Figure 8). These developments, in addition to Jasper East Reservoir, would further reduce agricultural and undeveloped open lands in the region.

#### **7.4.4. Alternative 4 – Chimney Hollow Reservoir (70,000 AF) and Rockwell/Mueller Creek Reservoir (20,000 AF)**

Cumulative land use effects associated with the Chimney Hollow Reservoir would be the same as Alternative 2.

Land use at Rockwell/Mueller Creek Reservoir has historically included low-density residential housing on the reservoir site and surrounding lands, property owner access roads, grazing of a small number of horses, and adjacent county roads. About 4,770 acres of residential, commercial, and mixed development in the Granby Ranch area would occur near the Rockwell Reservoir site (Figure 8). This development would further reduce agricultural and undeveloped open lands in combination with Rockwell/Mueller Creek Reservoir.

#### **7.4.5. Alternative 5 – Dry Creek Reservoir (60,000 AF) and Rockwell/Mueller Creek Reservoir (30,000 AF)**

Cumulative land use effects at Rockwell/Mueller Creek are identical to those described for Rockwell/Mueller Creek Reservoir in Alternative 4.

Private lands zoned as *Open Lands*, *Estate-1*, and *FAI- Farming* near Dry Creek Reservoir are likely to be developed in the future, and would displace open, undeveloped land. Approximately 1,460 acres of land within about 5 miles of Dry Creek Reservoir under county development review for subdivision, dispersed residential development, and/or special review for a proposed change in land use could be developed (Figure 9). These developments would further reduce agricultural and undeveloped open lands in the vicinity of Dry Creek Reservoir.

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