

RECLAMATION

Managing Water in the West

Windy Gap Firming Project

Air Quality and Noise Technical Report



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Air Quality and Noise Technical Report

Windy Gap Firming Project

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WINDY GAP FIRING PROJECT AIR QUALITY AND NOISE TECHNICAL REPORT

1.0 INTRODUCTION

The Municipal Subdistrict, Northern Colorado Water Conservancy District, acting by and through the Windy Gap Firing Project Water Activity Enterprise (Subdistrict), the Project proponent, is proposing to firm the yield from the existing Windy Gap Project water supply by constructing the Windy Gap Firing Project (WGFP). For more information on the background and purpose of the WGFP, see the Windy Gap Firing Project Purpose and Need Report (ERO Resources 2005a). This technical report was prepared to address the potential environmental effects on wildlife 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 Resources 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 Slope and West Slope reservoirs. The Subdistrict's Proposed Action is the construction of a 90,000 AF Chimney Hollow Reservoir with prepositioning. The alternatives are—

- Alternative 1 (No Action) – Enlarge Ralph Price Reservoir
- Alternative 2 (Proposed Action) – Chimney Hollow Reservoir (90,000 AF) with prepositioning
- 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)

In addition to the action alternatives, a No Action alternative was identified based on what is reasonably likely to occur if the U.S. Bureau of Reclamation (Reclamation) does not approve a permit to connect new Windy Gap Firing Project facilities to Colorado-Big Thompson (C-BT) facilities. Under this assumption, all Project Participants in the near term would maximize delivery of Windy Gap water according to their demand, water rights, availability of storage in Lake Granby, and existing Adams Tunnel conveyance constraints. The City of Longmont is the only Participant that currently has identified a specific option to develop storage independently 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.

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

3.0 STUDY AREAS

3.1. Ralph Price Reservoir Study Area

Ralph Price Reservoir (Button Rock Dam) is located on North St. Vrain Creek, west of the town of Lyons in Boulder County in Sections 17, 18, 19, and 20, T5N, R70W in the Lyons, Colorado USGS Quadrangle (Figure 1) at an elevation of about 6,500 feet. Currently, the reservoir has a storage capacity of about 16,000 AF. The study area for the enlargement of Ralph Price Reservoir includes the potential area of additional inundation surrounding the reservoir including an enlarged dam, new spillway, and possible borrow areas that could provide material for dam enlargement. No new pipelines or other infrastructure is needed. The study area consists mostly of a mixture of ponderosa pine and Douglas-fir forest. North St. Vrain Creek, which flows into the reservoir from the west, is the primary source of water to the reservoir. Other small drainages, including Rattlesnake Gulch from the north and Long Gulch from the south, flow into the reservoir.

3.2. Chimney Hollow Study Area

The Chimney Hollow study area is in Larimer County in Section 33, T5N, R70W and Sections 4, 5, and 9 of T4N, R70W in the Carter Lake Reservoir, Colorado USGS Quadrangle map (Figure 2). The study area includes the Chimney Hollow Valley where the reservoir, dam, pipelines, roads, relocated transmission line, and other disturbances would occur. Chimney Hollow flows into Flatiron Reservoir located at the northeast end of the site and Carter Lake is directly east on the other side of a hogback ridge. Average elevation at the Chimney Hollow Reservoir site is about 5,700 feet.

The study area occurs in a long north-south trending valley between a hogback ridge to the east and foothills to the west. Chimney Hollow is a small intermittent creek that flows through the center of the valley. Several ephemeral to intermittent tributaries drain from the west into the Chimney Hollow. Ponderosa pine forests cover the foothills to the west with mostly native grasslands occurring in openings within the forest. Native and nonnative grasslands cover the valley floor with riparian woodlands and shrublands occurring along the drainages. Native shrublands cover the slopes on the rocky hogback to the east.

3.3. Dry Creek Study Area

The Dry Creek study area is located in Sections 16, 20, 21, and 28 in Larimer County on the Carter Lake Reservoir Colorado USGS Quadrangle map (Figure 3). The study area includes the reservoir, dam, and spillway, as well as pipeline connections to C-BT facilities through Chimney Hollow and across the hogback to Carter Lake, and proposed access roads.

The Dry Creek study area is located in the valley south of Chimney Hollow separated by a gentle saddle. Dry Creek, a tributary to the Little Thompson River, flows south

through the center of the valley. Several small, intermittent or ephemeral tributaries from the foothills to the west and the hogback to the east flow into Dry Creek. The forests, shrubland, and grassland vegetation in the Dry Creek study area is similar to the Chimney Hollow study area.

3.4. Jasper East Study Area

The Jasper East study area is located in Grand County in Sections 8, 9, 16, and 17, T2N, R76W, on the Trail Mountain, Colorado Quadrangle, at elevations ranging from about 8,100 feet to 8,200 feet (Figure 4). The study area for the proposed Jasper East Reservoir includes the area encompassing the project facilities including the new reservoir, dam, and spillway, an new pipeline to the existing Windy Gap pipeline, the relocation of the Willow Creek pump station, canal and forebay, and new or realigned roads. Also included are the immediately adjacent lands that would be temporarily affected during construction. The study area consists mainly of flood-irrigated meadows bordered by areas of sagebrush shrublands and stands of lodgepole pine at higher elevations. An intermittent unnamed tributary to Church Creek flows from east to west through the study area. Natural flows in the tributary are supplemented by irrigation return flow and seepage from the Willow Creek Pump Canal and forebay. The property is currently used for livestock grazing and hay production.

3.5. Rockwell/Mueller Creek Study Area

The Rockwell/Mueller Creek study area is located in Grand County in Section 1 of T 2N, R77W, and Sections 1 and 12 of T 2N, R77 ½W, and an unsurveyed area (Figure 5). The study area for the Rockwell/Mueller Creek Reservoir includes the area encompassing the project facilities, including a pipeline to Windy Gap Reservoir and immediately adjacent lands that would be temporarily affected during construction. Elevations in the study area range from about 8,000 feet to about 8,200 feet. The study area consists mainly of big sagebrush shrublands, with areas of lodgepole pine forest, meadow, and wetland and riparian areas. Two reservoir sizes, a 20,000 AF and a 30,000 AF reservoir, were investigated in the Rockwell/Mueller Creek study areas.

4.0 OBJECTIVES

The purpose of this report is to characterize the affected environment and identify potential environmental effects to air quality and impacts due to noise for the proposed Windy Gap Firing Project alternatives. The information gathered in the technical report will be summarized in the Environmental Impact Statement (EIS) for the proposed project.

5.0 DATA SOURCES

The Air Quality and Noise Technical Report is based on existing information; no field surveys, data collection, or modeling was conducted. Potential impacts to air quality and impacts due to noise were qualitatively assessed in relation to projected construction activity. It is generally assumed that air quality impacts and impacts due to noise would be temporary and associated with dam construction and water conveyance facilities. Regional air quality is described based on available information from the

Environmental Protection Agency (EPA) and the Colorado Department of Public Health and Environment (CDPHE).

6.0 AFFECTED ENVIRONMENT

6.1. Air Quality

The Clean Air Act (CAA) of 1970, 42 U.S.C. 7401 et seq., was enacted to protect and enhance air quality and to assist state and local governments with air pollution prevention programs. The CAA requires the EPA to identify and publish a list of common air pollutants that could endanger public health or welfare. The EPA has delegated enforcement of the CAA to the Air Pollution Control Division (APCD) of the CDPHE. All state programs regarding the provisions and enforcement of the CAA are subject to oversight and approval by the EPA.

The EPA has established National Ambient Air Quality Standards (NAAQS) for six criteria air pollutants—carbon monoxide, ozone, nitrogen dioxide, sulfur dioxide, particulate matter fewer than 10 microns in diameter (PM₁₀), and lead—to protect the public from health hazards associated with air pollution. These pollutants are called “criteria air pollutants” because the EPA has regulated them by first developing health-based criteria as the basis for setting permissible levels. One set of limits (primary standard) protects health; another set of limits (secondary standard) is intended to prevent environmental and property damage. A geographic area that has air quality equal to or better than a primary standard is called an attainment area; an area that does not meet a primary standard is a non-attainment area.

Emission sources of pollutants are categorized as either stationary or mobile. Stationary sources of pollutants include combustion of fossil fuels for heat and power, emissions from industrial or commercial processes, fueling operations, and burning from natural fires or other activities. Mobile sources of pollutants include on-road (cars, trucks, and motorcycles) and off-road vehicles (aircraft, locomotives, farm equipment, and construction equipment), and fugitive dust from unpaved roads and construction activities. Fugitive dust can be generated by either earth disturbing activities or by wind.

Colorado’s air quality laws contain requirements for controlling fugitive dust emissions during construction activities. These requirements vary depending on the amount of land disturbed and the duration of the disturbance.

The existing air quality for all of the study areas on both the East Slope and West Slope is good. The reservoir sites and associated facilities are primarily located in rural areas with emissions occurring mostly from on-road and off-road vehicles and from fugitive dust. Nearby urban areas such as Loveland and Lyons on the East Slope and Granby on the West Slope may have slightly lower air quality from vehicle emissions and stationary sources. Concentrations of particulates are higher near unpaved roads, surface disturbances, and fallow agricultural fields compared to vegetated rangeland.

The existing air quality in the study area does not exceed NAAQS. All Colorado communities are currently in attainment of all NAAQS (CDPHE 2006).

6.2. Noise

Noise, usually defined as unwanted or unacceptable sound, is measured in terms of decibels (dB) scaled to approximate the hearing capability of the human ear dB(A). A decibel is a unit of measurement that quantifies the sound pressure differences in the air that is perceived as sound (or noise) on a scale ranging from zero decibels on up. Zero decibels is the threshold of human hearing, 40 to 50 dB(A) is normal for a peaceful neighborhood, 70 to 80 dB(A) is the level adjacent to a busy urban street or 50 feet from a major freeway, and 120 to 140 dB(A) is a typical level at which sound is painful.

The study areas for the No Action Alternative and Action Alternatives are rural, used primarily for livestock grazing, and currently have negligible vibration and low ambient noise levels (35 to 45 dB(A)). Noise from traffic on nearby county roads can be heard at some of the reservoir sites.

Pipeline corridors and associated pump station sites are in undeveloped rural areas, or within urban, rural, or highway transportation corridors. Existing vibration along the pipeline corridors and at proposed pump stations is negligible.

7.0 ENVIRONMENTAL EFFECTS

Potential effects to air quality and impacts from increased noise were evaluated based on anticipated air quality emissions, noise levels, the duration of the effects, and the location of nearby receptors.

Adverse impacts to air quality are possible if—

- National Ambient Air Quality Standards were exceeded

Adverse noise impacts are possible if—

- Persons are exposed to noise levels in excess of local standards or noise ordinances
- Persons are exposed to excessive ground vibrations
- There is a substantial permanent increase in ambient noise levels

7.1. Effects Common to all Alternatives

For the No Action and Action Alternatives, air quality impacts during construction would be primarily from exhaust emissions of construction equipment, employee and delivery vehicles, and from fugitive dust. With the exception of lead, all of the criteria pollutants would be emitted or created due to construction activities. Fugitive dust would be generated from activities associated with soil disturbance and from equipment and vehicular traffic moving over the disturbed site. These emissions would be greatest during the initial site preparation activities and would vary from day to day depending on the construction phase, level of activity, and prevailing weather conditions. The amount of emissions of both fugitive dust and vehicle exhaust would depend on the number of vehicles used at specific sites and the size of the disturbed area.

Because the project area for all alternatives exceeds 25 contiguous acres, one or more land development permits would be required from the Air Pollution Control Division of the CDPHE. As part of the land development permit application, a Fugitive Particulate Emission Control Plan that outlines the specific steps that would be taken to minimize fugitive dust generation would have to be prepared.

A number of the construction-related features are similar for the action alternatives. Unless noted otherwise, all pipelines would be buried. A permanent easement of 50 feet and an additional temporary easement of 100 feet would be needed during pipeline construction. Following construction, areas temporarily disturbed during pipeline construction would be reclaimed and revegetated with native species or with existing species in agricultural areas. Borrow areas outside of the area of inundation, staging areas, and other areas of temporary disturbance needed for construction would likewise be revegetated.

Blasting would be necessary at all of the reservoir sites to 1) obtain a suitable foundation for the dam prior to placement of the embankment materials; 2) produce suitable rock for the upstream and downstream slopes of the dam from the borrow areas; and 3) construct water conveyance facilities, temporary or permanent access roads, and other project features. Blasting activities could take place throughout the construction period depending on the contractor’s plans for producing and stockpiling rock for use in the dam. Blasting would be below the ground and occur for short periods of time during daylight hours. The vibration and sound from blasting can produce a startle effect, although below-ground blasts are somewhat muffled and dissipate with distance depending on the geology and meteorological conditions.

Colorado Revised Statutes (CRS) 30-15-401 (m)(I) authorize counties to enact ordinances that regulate noise on public and private property. Maximum permissible noise levels in Colorado are stated in CRS 25-12-103 and have been adopted into Larimer County and Boulder County ordinances (Table 1). Grand County does not have a noise ordinance (Campbell 2006). The project would adhere to county noise ordinances for allowable noise levels for operation noises of pump stations and other facilities. If construction activities resulted in an exceedance of county noise ordinances, noise monitoring and a mitigation plan may be needed.

Table 1. Maximum noise levels by sound source.

Sound Source	Maximum Noise (dB(A)) 7 am to 7 pm	Maximum Noise (dB(A)) 7 pm to 7 am
Residential zones	55	50
Construction/Demolition	80	75

Source: Boulder County 2006; Larimer County 2006.

Noise-evaluation criteria are based on land use compatibility and on the direction and magnitude of noise level changes. Annoyance effects are typically the primary consideration. Often, the magnitude of a noise level change is as important as the resulting overall noise level. A noticeable increase in noise levels often is considered a substantive effect by local residents, even if the overall noise level remains within land

use compatibility guidelines or complies with local ordinances. Conversely, sometimes noise levels that are somewhat above land use compatibility guidelines or ordinance-specified levels are not noticeable to people.

Direct and indirect effects would include noise from construction equipment, increased traffic noise from project-vicinity roadways, and noise from operation of pump stations. Construction of the project would generate noise from diesel-powered earth moving equipment such as dump trucks and bulldozers, back-up alarms on certain equipment, compressors, and pile drivers, if necessary. Construction noise at off-site receptor locations is usually dependent on the loudest one or two pieces of equipment operating at the moment. Noise levels from diesel-powered equipment range from 80 to 95 dB(A) at a distance of 50 feet. Impact equipment such as rock drills and pile drivers can generate louder noise levels (FTA 1995).

It is difficult to predict reliable levels of construction noise at a particular receptor or group of receptors. Heavy machinery, the major source of noise in construction, is constantly moving in unpredictable patterns. Daily construction normally occurs during daylight hours when occasional loud noises are more tolerable. No one receptor is expected to be exposed to construction noise of long duration; therefore, extended disruption of normal activities is not anticipated. However, provisions will be included in the plans and specifications requiring the contractor to comply with local and state noise ordinances for construction noise.

The noise would be loudest near the point of generation and would decrease with increased distance from the source. Sound intensity decreases in proportion with the square of the distance from the source. Generally, sound levels for a point source will decrease by 6 dB(A) for each doubling of distance (Table 2) (FHWA 1995).

Construction of project components would be phased depending on need; however, once all components are constructed, construction noise would cease. Noise levels during operations would be negligible.

Table 2. Distance attenuation for construction noise.

Receptor Distance (feet)	Noise Level at Receptor (decibels)
50	95
100	89
200	83
400	77
800	71
1,600	65
3,200	59

Notes: Reference noise level is 95 dB(A) for construction equipment.

Basic sound level decrease is 6 dB(A) for each doubling of distance.

Sound level decrease does not include atmospheric absorption or terrain and vegetative barriers.

7.2. Alternative 1—No Action, Ralph Price Reservoir Enlargement

Raising the existing Button Rock dam under the No Action Alternative is estimated to require two construction seasons. Construction activity would increase emissions from vehicle exhaust and fugitive dust. These minor increases would be localized and temporary during construction, and limited to Boulder County. Different portions of the project may be constructed simultaneously (e.g., spillway and dam construction) resulting in greater emissions during a shorter period. The No Action Alternative would have only negligible to minor impacts on existing air quality during construction. It is unlikely that the increased pollutants from construction would exceed NAAQS for any criteria pollutants because of the relatively small and localized nature of construction in comparison to regional construction activities and emissions occurring throughout the Boulder-Longmont area. There would be no long-term increase in emissions following construction.

Noise and vibration would result from raising the existing Button Rock dam, excavation, and the rumbling and other associated noises from heavy machinery. Noise from construction would be heard at residences that are about 200 feet from the reservoir. Based on information presented in Table 2, these noise levels could be as much as 83 dB(A), which would exceed Larimer County's maximum permissible noise levels. This could require noise monitoring and implementation of mitigation measures.

7.3. Alternative 2—Chimney Hollow (90,000 AF) (Proposed Action)

Construction of Chimney Hollow dam and the associated pipeline, roads, and related facilities would take about 3 to 5 years. The work force needed to construct proposed facilities would depend on the final design specifications and contractor construction equipment and construction methods. The average work force based on a 4-year construction schedule and reduced activity during the winter would be 235 people. Peak employment is estimated to reach about 500 people.

Activities would include construction of the new access road, relocation of the transmission line, development of borrow areas, excavation of the dam foundation, and inlet and outlet facilities, spillway, and delivery pipelines. The majority of the construction material for the dam would be excavated on-site. However, truck deliveries for steel, cement, fuel, and other materials would be needed. Average truck deliveries are estimated at five trucks per day, with peak truck traffic of 10 truck deliveries per day. Pipe delivery would add about three additional trucks per day. Construction activities and associated traffic would increase emissions from vehicle exhaust and fugitive dust. These minor increases would be localized and temporary during construction, and limited to Larimer County.

Alternative 2 would have only negligible to minor impacts on existing air quality during construction. It is unlikely that the increased air pollutants from construction would exceed NAAQS for any criteria pollutants because of the relatively small and localized nature of construction in comparison to regional construction activities

simultaneously occurring throughout Larimer County. There would be no long-term construction-related emissions after the reservoir and facilities are completed.

Noise and vibration would result from construction of Chimney Hollow dam and the associated pipeline, roads, and related facilities. Nearby residents located on the hogback about 1,000 feet east of the proposed reservoir would experience temporary increased noise levels during construction. These noise levels could reach about 71 dB(A) based on information presented in Table 2. This temporary noise level would conform to the maximum noise level for construction activity permitted by Larimer County (Table 1).

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. Larimer County recreation plans for Chimney Hollow Reservoir include non-motorized recreational opportunities, 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 county and Subdistrict land. No overnight camping would be allowed. Recreation activities proposed on the property include boating, hiking, biking, and horseback riding.

After project completion, recreational access would be allowed at Chimney Hollow Reservoir and adjacent Larimer County Open Space. Visitor traffic would increase emissions and noise from existing levels, but would have negligible effects on air quality and noise over the long-term. Residents on the hogback ridge east of the Chimney Hollow Reservoir site are unlikely to experience substantial changes in sound levels from recreation activities.

Power supply to the reservoir and conveyance facilities would come from the existing facilities associated with the Flatiron Power Plant. A substation may be needed to step down voltage; however, the noise generated would not exceed 50 dB(A) at the property boundary, which is the nighttime noise allowance for residential areas in Larimer County.

7.4. Alternative 3—Chimney Hollow Reservoir (70,000 AF) and Jasper East Reservoir (20,000 AF)

The construction program for a 70,000 AF Chimney Hollow Reservoir would be similar to that described for Alternative 2. The smaller dam would not substantially change the size of the work force, construction traffic, and amount of construction material. Construction of the dam and associated facilities is estimated to take 2.5 to 5 years. For construction for the 70,000 AF Chimney Hollow Reservoir, impacts to air quality and noise would be similar to that described for Alternative 2.

Construction of Jasper East Reservoir also is estimated to take 2.5 to 5 years. Construction activities would include the development of staging areas, relocation of the Willow Creek Pumping Station, relocation of County Road 40 followed by development of borrow areas, dam construction, spillways, and pipeline and booster pump installation. A construction workforce of up to about 160 workers would commute to the site.

Most construction materials for the Jasper East dams would be excavated from materials within the reservoir basin or adjacent areas. The amount of concrete needed for spillway and outlet works does not warrant an on-site batch plant; therefore, two to six concrete trucks per day would be needed during construction of these facilities. Including traffic for other supplies, the average truck traffic to the site would be five vehicles per day, peaking at 10 vehicles per day. If pipe were delivered concurrent with dam construction, an additional three trucks per day would travel to the site. For the Jasper East reservoir, construction activities and associated traffic would increase emissions from vehicle exhaust and fugitive dust. These minor emission increases would be localized and temporary during construction, and limited to Grand County.

Alternative 3 would have only negligible to minor impacts on existing air quality during construction. It is unlikely that the increased air pollutants from construction would exceed NAAQS for any criteria pollutants because of the relatively small and localized nature of construction-related emissions. There would be no long-term construction-related emissions after the reservoir and facilities are completed.

For the booster pump station required for Jasper East, the outdoor air handling equipment would contribute to exterior noise levels; however, the noise generated would not exceed 50 dB(A) at the property boundary.

Nearby residents located on private lands north and south of County Road 40 and along Highway 34 may experience temporary increased noise levels during construction of Jasper East. The closest residences are about 1,600 feet from the reservoir site and would experience noise levels of up to about 65 dB(A) based on information presented in Table 2. Visitors to Willow Creek Reservoir may experience occasional increased noise levels during construction; however, the intensity of the impact would vary according to the activity in progress, and would likely be temporary and minor. If recreation facilities were developed, there could be minor levels of noise from visitor traffic, fishing, non-motorized boating, and other recreation activity.

7.5. Alternative 4—Chimney Hollow Reservoir (70,000 AF) and Rockwell/Mueller Creek Reservoir (20,000 AF)

The construction program for a 70,000 AF Chimney Hollow Reservoir would be similar to that described for Alternative 2. Impacts to air quality and noise would be similar to that described for Alternative 2.

Construction of Rockwell/Mueller Creek Reservoir is estimated to take 2.5 to 4.5 years and would include the development of staging areas, development of borrow areas, dam construction, spillways, and pipeline and booster pump installation.

The majority of the construction materials for the Rockwell/Mueller dams would be excavated from the reservoir basin or adjacent areas; however, riprap for slope protection on the dam would likely have to come from off-site. The estimated duration of riprap placement is 15 months with an average traffic volume of 13 trucks per day. The amount of concrete needed for spillway and outlet works does not warrant an on-site batch plant; therefore, an average of about 4 to 5 concrete trucks per day would be needed during placement of concrete. Including traffic for other supplies, the average truck traffic to the

site would be about 18 vehicles per day, peaking at as many as 45 vehicles per day during dam construction. Assuming 50 percent of the bedding material needed for pipeline placement comes from off-site locations, and that removal of excess excavated material and pipeline deliveries occur concurrently, then about 26 trucks per day would access the project area during this phase of construction. For the Rockwell/Mueller Creek Reservoir, construction activities and associated traffic would increase emissions from vehicle exhaust and fugitive dust. These minor increases would be localized and temporary during construction, and limited to Grand County.

Alternative 4 would have only negligible to minor impacts on existing air quality during construction. It is unlikely that the increased air pollutants from construction would exceed NAAQS for any criteria pollutants because of the relatively small and localized nature of construction-related emissions. Construction-related emissions would cease after the reservoir and facilities are complete, although if recreation facilities were developed at the reservoir, there would be negligible long-term increases in vehicle exhaust and dust along county access roads from visitor traffic.

Residents near the Rockwell/Mueller Creek Reservoir may experience temporary increased noise levels. Residences are generally at least 800 feet from the proposed reservoir and would experience noise levels of up to 71 dB(A) based on information presented in Table 2. For the booster pump station that would assist in the delivery to Lake Granby, the outdoor air handling equipment would contribute to exterior noise levels; however, the noise generated would not exceed 50 dB(A) at the property boundary. If recreation facilities were developed, there could be minor levels of noise from visitor traffic, fishing, non-motorized boating, and other recreation activity.

7.6. Alternative 5—Dry Creek Reservoir (60,000 AF) and Rockwell/Mueller Creek Reservoir (30,000 AF)

The construction program for a Rockwell/Mueller Reservoir would be similar to that described for Alternative 4. The larger dam may require more time to complete but, in general, construction activities would be similar. The size of the workforce and level of construction traffic also would be similar. Impacts to air quality and impacts due to noise would be similar to that described for Alternative 4.

Construction of the Dry Creek dam and appurtenances is estimated to take 2.5 to 4.5 years and includes the establishment of staging areas, development of borrow areas, and construction of the dam, spillways, and pipelines including the outlet boring to Carter Lake.

Most construction materials for the Dry Creek dam would be excavated from the reservoir basin. Depending on the type of rockfill dam selected, the cement for a concrete face or bitumen for an asphalt core would be trucked to the site. The average traffic during dam construction is estimated at five vehicles per day with peak deliveries of 10 vehicles per day. An additional three trucks per day would deliver pipe during construction of the pipelines. Construction equipment, truck deliveries, and traffic from a workforce of up to 460 workers would increase vehicle emissions and fugitive dust. These minor increases would be localized and short-term during construction, and limited to Larimer County.

It is unlikely that the increased air pollutants from construction would exceed NAAQS for any criteria pollutants because of the relatively small and localized nature of construction-related emissions. Construction-related emissions would cease after the reservoir and facilities are completed, although if recreation facilities were developed at the reservoir, there would be negligible long-term increases in vehicle exhaust and dust along county access roads from visitor traffic.

Residents near the Dry Creek Reservoir may experience temporary increased noise levels. Residences are generally at least 800 feet from the proposed reservoir and would experience construction noise levels of up to 71 dB(A) based on information presented in Table 2. Some residences located about 200 feet from the outlet boring to Carter Lake would experience higher temporary noise levels due to construction. Temporary noise levels could reach about 83 dB(A) based on information presented in Table 2, which would exceed Larimer County's maximum permissible noise levels. This may require noise monitoring and additional mitigation. If recreation facilities were developed, there could be minor levels of noise from visitor traffic, fishing, non-motorized boating, and other recreation activity.

8.0 CUMULATIVE EFFECTS

No reasonably foreseeable actions were identified in the vicinity of the reservoir sites for the No Action or action alternatives that would result in a cumulative long-term effect to air quality or noise. However, as discussed for Alternative 2, future recreation activities on Larimer County Open Space adjacent to the Chimney Hollow Reservoir site would result in a minor long-term increase in noise.

9.0 RECOMMENDATIONS

Additional investigations and measures would be applied during final design and construction for all of the alternatives to reduce potential air and noise effects. Recommended measures to reduce impacts to air quality include—

- Conform to applicable local and state management practices to minimize particulate and dust emissions from construction work sites as specified in permits that would be obtained for this project. Include dust palliative application and/or dust abatement as bid items if they are considered among the management practices.
- Ensure construction equipment (especially diesel equipment) meets opacity standards for operating emissions.
- Promptly revegetate disturbances. Revegetation of disturbed land is discussed in the Vegetation and Wetlands Technical Report (ERO 2006).

Compliance with the following design features would be required to obtain construction permits. These features, when implemented, would reduce potential adverse effects from noise and vibration:

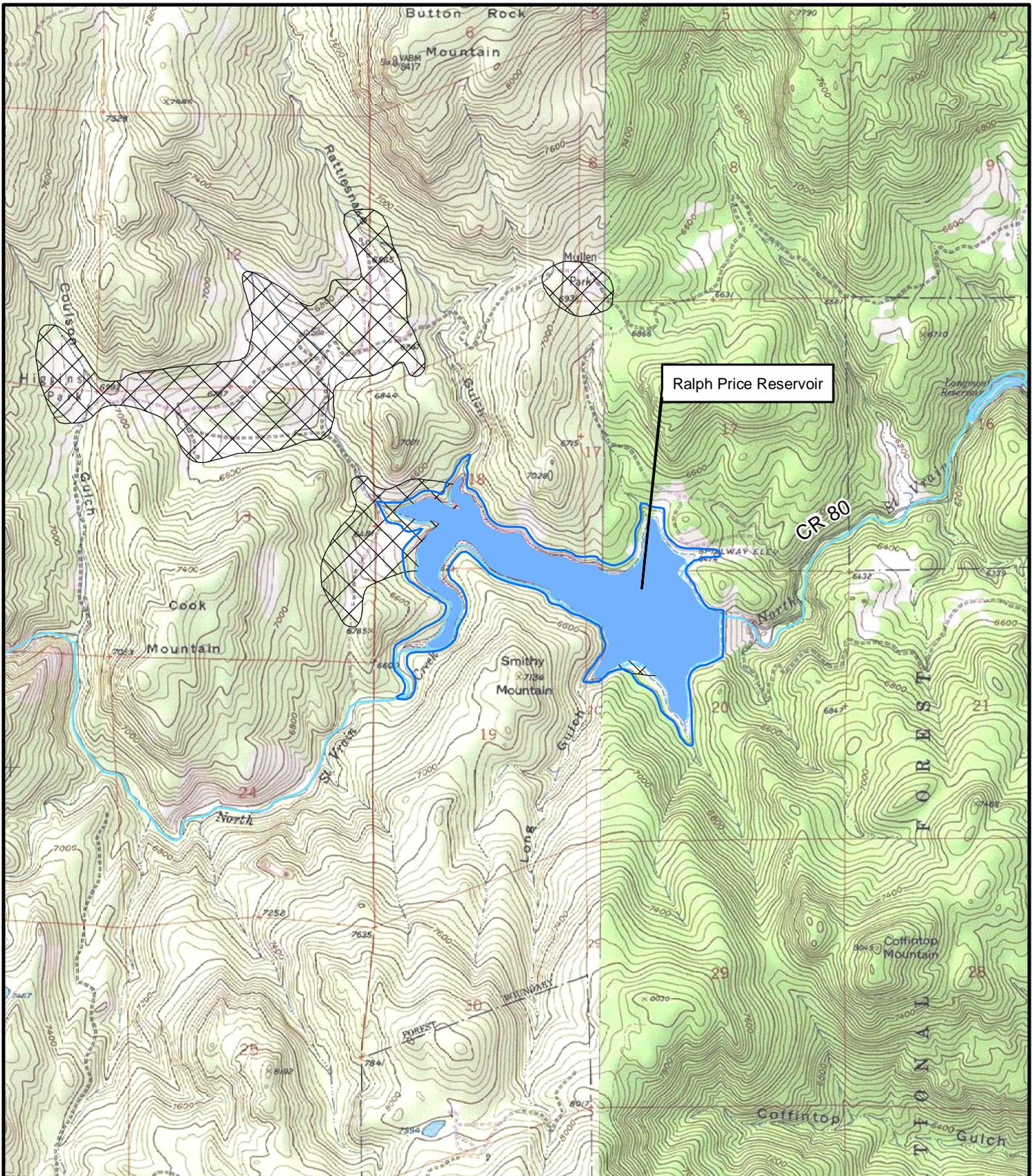
- Construction equipment used by contractors would function as designed and would conform to applicable noise emission standards.

- The contractor would adhere to project work hour restrictions.
- Access to construction areas would be restricted so that the public could not be in close proximity to loud equipment or blasting.
- A blasting schedule would be developed to notify nearby residents when blasting is anticipated to occur. Blasting would be preceded by a warning alarm. Blasting plans would require the implementation of seismographs for vibration measurements and air blast recordings for noise.
- Project operating equipment (e.g., pump stations) would be housed in structures designed to minimize radiated noise outside the structure, and would meet local noise ordinance requirements.
- Noise monitoring and a noise mitigation plan would be completed if the project is expected to exceed maximum permissible noise levels.

10.0 REFERENCES

- Boulder County. 2006. Ordinance Pertaining to the Regulation of Noise on Public and Private Property, No. 92-28. Available at: <<http://www.boco.org/bocc/Ordinances/noise.htm>>. Accessed May 22.
- Boyle Engineering. 2005. Windy Gap EIS Alternatives Descriptions Report.
- CDPHE (Colorado Department of Public Health and Environment). 2006. Air Pollution and Control Division. Attainment/Maintenance Plans for Colorado Communities. Available at: <<http://www.cdphe.state.co.us/ap/attainmaintain.asp>>. May 19.
- Campbell, D. 2006. Email communication with Debra Campbell, Director, Department of Planning and Zoning, Grand County, Colorado and Andy Cole, Natural Resource Planner, ERO Resources. December 9.
- ERO Resources. 2005a. Purpose and Need Report for the Windy Gap Firing Project EIS.
- ERO Resources. 2005b. Windy Gap Firing Project: Alternatives Report.
- ERO Resources. 2006. Vegetation and Wetlands Technical Report for the Windy Gap Firing Project EIS.
- FHWA (Federal Highway Administration). 1995. Highway Traffic Noise Analysis and Abatement Policy and Guidance. Available at: <<http://www.dot.state.co.us/environmental/CulturalResources/Noise/polguid.pdf>>. Accessed May 29.
- FTA (Federal Transit Administration). 1995. U.S. Department of Transportation Transit Noise and Vibration Impact Assessment.
- Larimer County-Subdistrict. 2004. Intergovernmental Agreement for Chimney Hollow Reservoir and Open Space Partnership. June 22.
- Larimer County. 2006. Ordinance Concerning Noise Levels in Unincorporated Larimer County, No. 97-03. Available at: <<http://www.co.larimer.co.us/policies/noise.htm>>. Accessed May 23.

FIGURES



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-  Ralph Price Reservoir Enlargement
-  Potential Borrow Areas

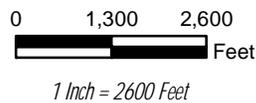
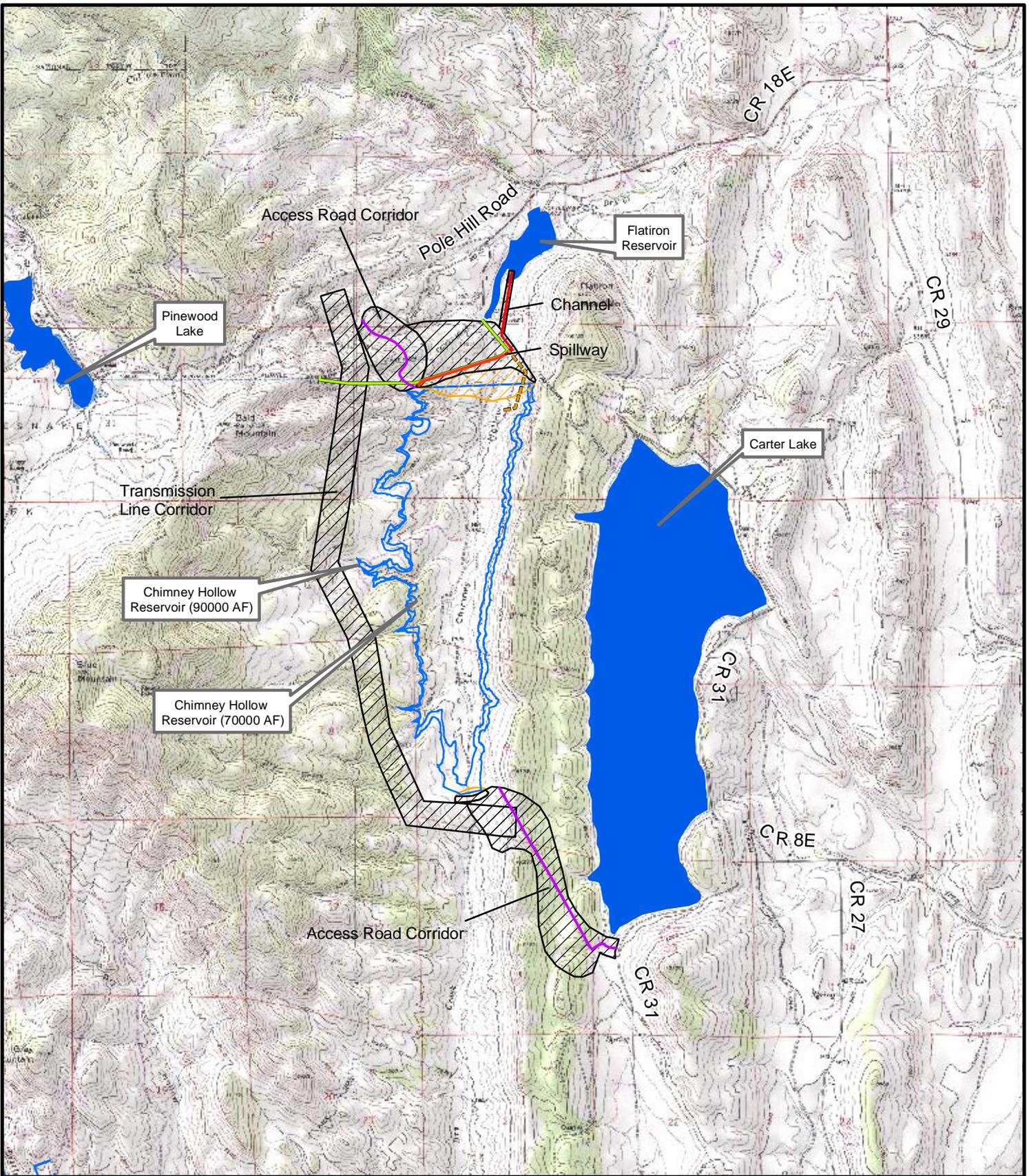


Figure 1
Ralph Price Reservoir
Study Area

Prepared for: Windy Gap Firing Project
 File: Ralph_Price_Reservoir_Study_Area.mxd
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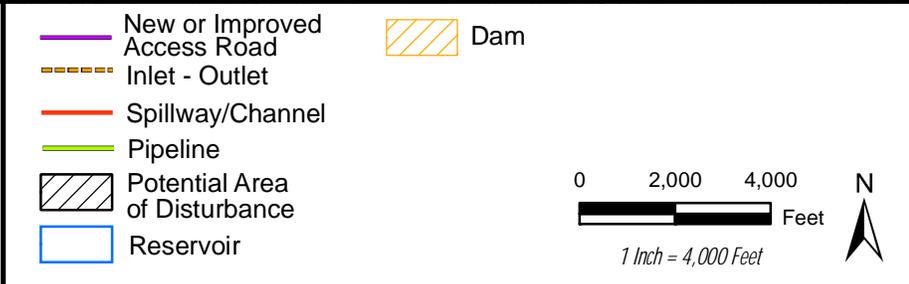
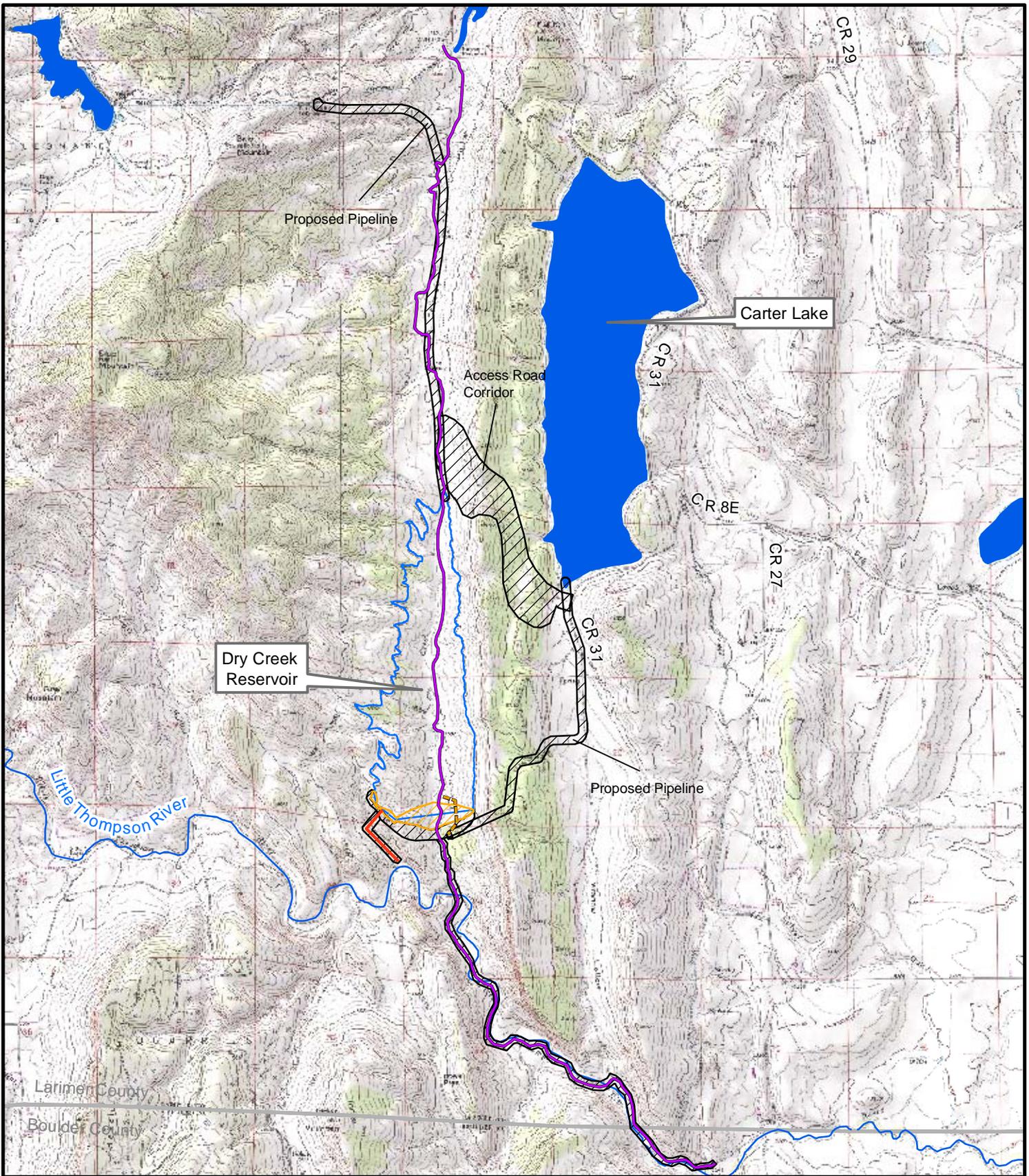


Figure 2
Chimney Hollow Study Area

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 File: Chimney_Hollow_Wildlife_Study_Area.mxd
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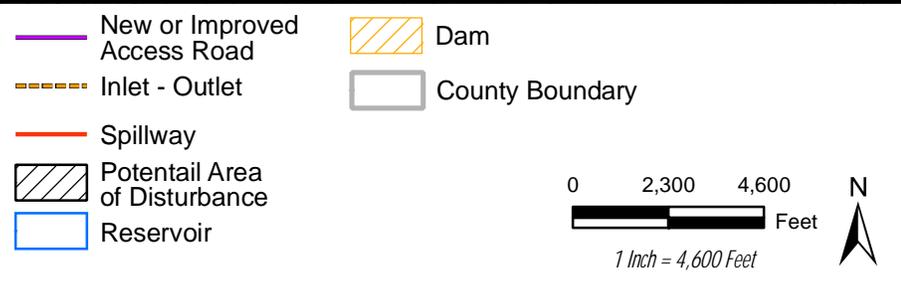
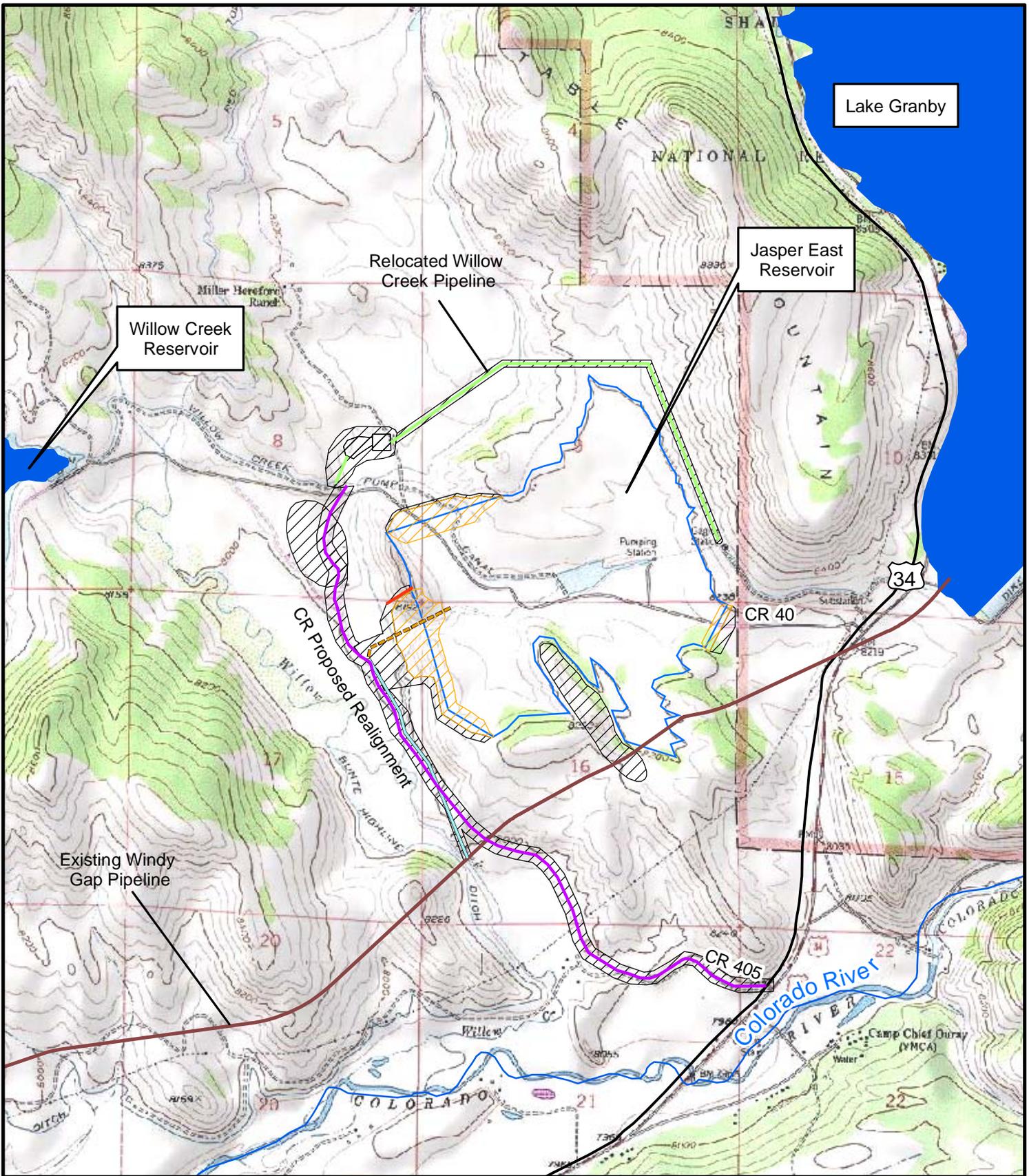


Figure 3
Dry Creek Study Area

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 Date: March 2006



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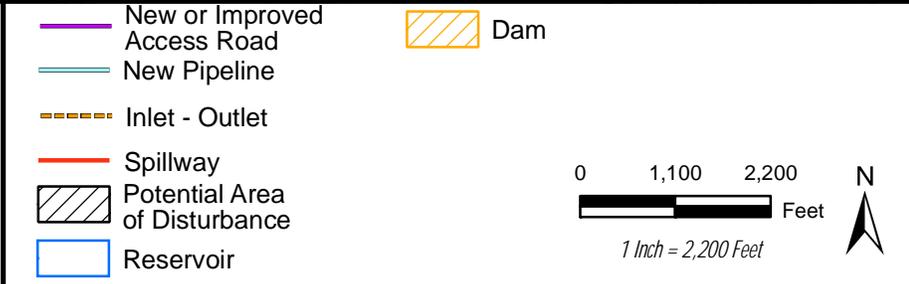
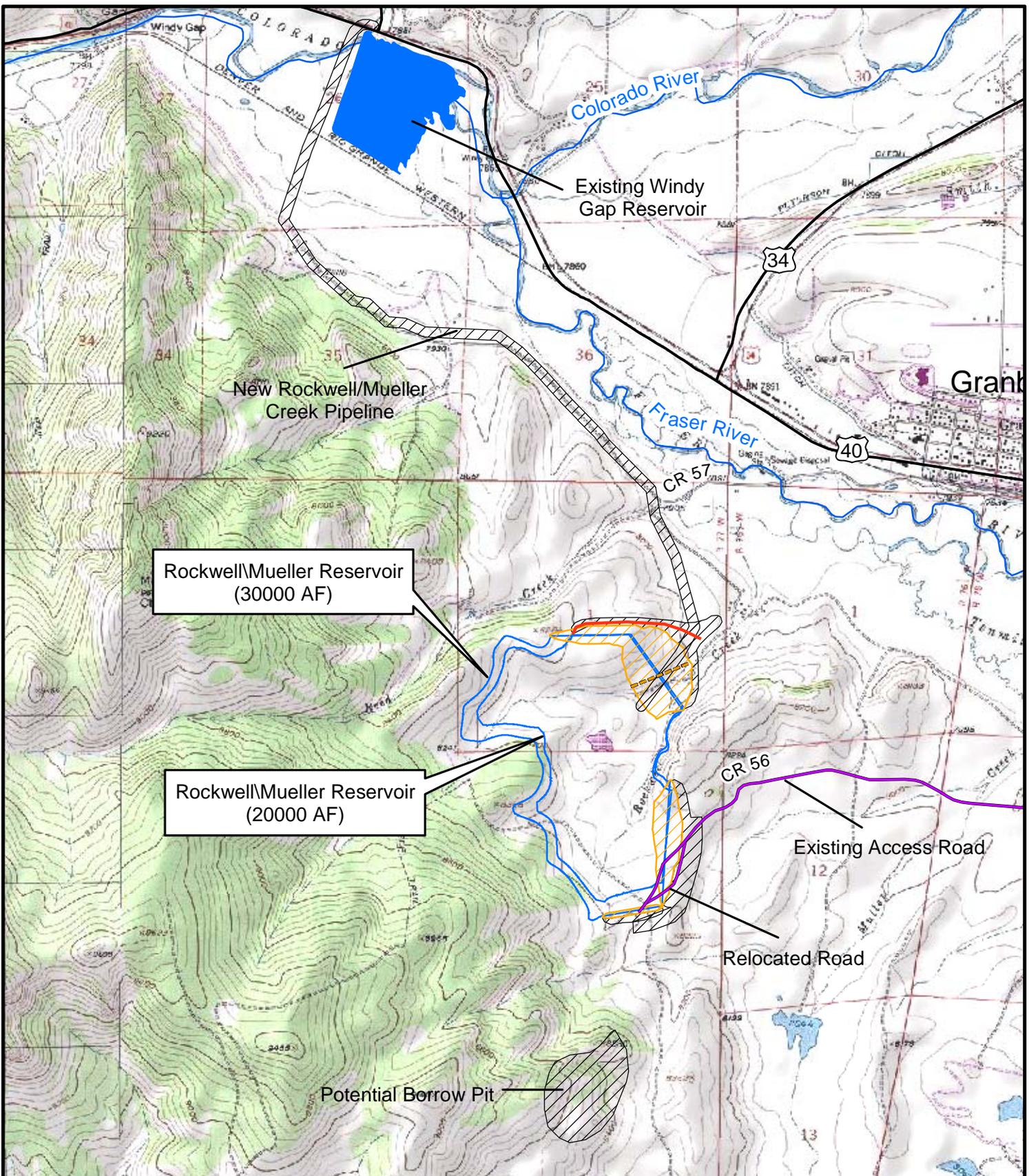


Figure 4
Jasper East Study Area

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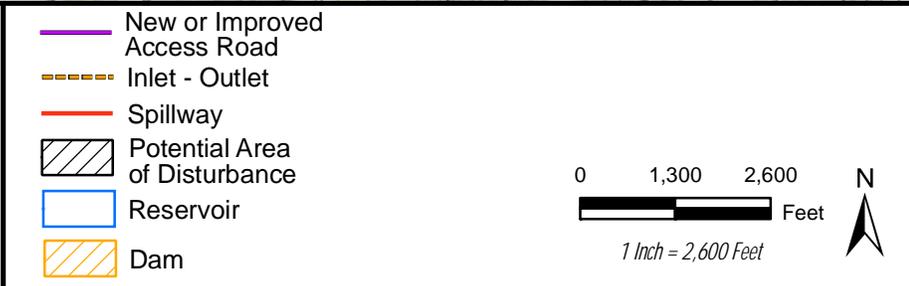


Figure 5
Rockwell/Mueller Creek
Study Area

Prepared for: Windy Gap Firing Project
 File: Rockwell_Wildlife_Study_Area.mxd
 Date: March 2006