



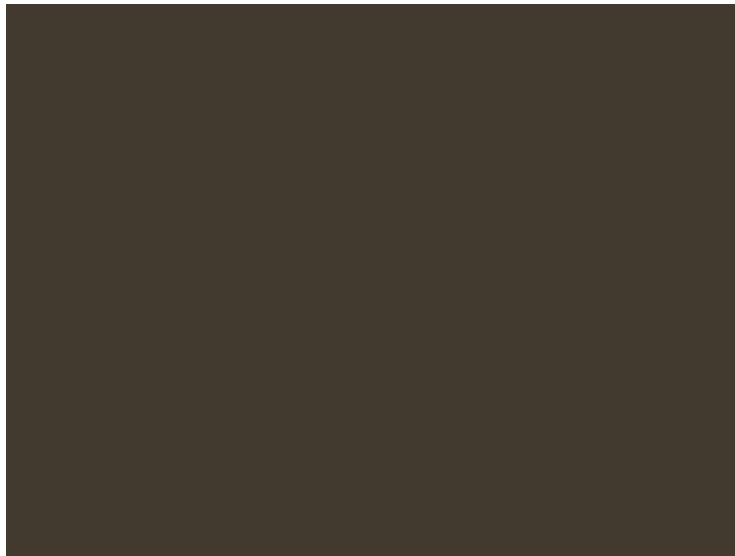
# GIS MAPPING & SPATIAL ANALYSIS

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# GIS MAPPING & SPATIAL ANALYSIS



A project of this nature lends itself well to a digital, geographic-based property, recreation asset and natural resources inventory. Geographic Information Systems (GIS) was utilized for this process and permits the rapid assembly of mapped materials and spatial analysis related to the properties, known assets, natural resources, etc.

## GIS Data Gathering Process

The Norris Design project team received limited GIS base data for the Coal Creek Canyon Park and Recreation District (CCCPRD or the District), as the District was just recently formed in May of 2009 and is completely run through the volunteer efforts. The District was able to supply the team with the following GIS-based data layers:

- Assessors Parcels (Boulder County, Jefferson County)
- Parcel IDs for landowners within the District boundaries

The provided data layers were supplemented with a color, geo-referenced aerial image from the US Department of Agriculture's (USDA) National Agriculture Inventory Program (NAIP). The imagery had a ground resolution of 1 meter and was captured in 2009. Additional base data was created and/or brought in by the Norris Design team to enhance the data provided by the District. The additional layers included:

- Public lands compiled from multiple resources that included the City of Boulder GIS, Boulder County GIS, Jefferson County Open Space GIS and Colorado Ownership and Management Protection (COMaP)
- Alternative recreation facility locations (geocoded from data supplied by CCCPRD)
- Known trail alignments (CCCPRD staff, Boulder County GIS, City of Boulder GIS)
- Public ownership and classifications (as identified in assessors' tables)
- Potentially undeveloped parcels (as identified in assessors' tables)
- Railroad centerline – including tunnels (digitized from 2009 NAIP aerial)

- Road network centerline (Colorado Department of Transportation)
- Surface waters (Colorado Department of Transportation)
- 100' riparian buffer
- Topographic contours (100' intervals derived from 10m National Elevation Dataset)
- Elevation analysis (derived from 10m National Elevation Dataset)
- Slope analysis (derived from 10m National Elevation Dataset)
- Wildlife occurrence data (Colorado Division of Wildlife)
- Flood plains – 100 and 500 year (Federal Emergency Management Agency Q3 data)
- Geology (USGS)

The additional layers created by the Norris Design team comply with the spatial data standards employed by local public agencies. At the completion of the Master Plan process, this data will be supplied to the District staff for acceptance and long-term use within their developing GIS network in ESRI's ArcGIS™ software data and layer format. A detailed database of this data gathering effort will be delivered in ArcReader and MS Office Excel workbook format.

The District supplied the Norris Design team with a Microsoft Office Excel table containing the names and addresses for a variety of alternative recreation providers under the following categories:

- Climbing walls
- Disc golf
- Dog parks
- Facilities in the District
- Fitness and recreation
- Miscellaneous recreation
- Pools
- Skate parks
- Tennis

These records were spatially located as points within the GIS dataset using ArcMap's geocoded location utilities.

The Norris Design team assembled all data layers and aerial photography within ArcGIS software. ArcGIS was employed for all data creation, base maps, and spatial analysis. Additionally, Photoshop and InDesign were used for standard map cartography. The use of this software is widely accepted and is standard for all GIS-based projects.

## GIS Analysis

Following the primary data gathering process, the GIS software and data was used to generate a series of analytical layers and maps used to develop an opportunities and constraints model. A dynamic, digital model of this type is very supportive to a developing district as a means of identifying opportunities for direct acquisition and partnerships with other agencies with land holdings in and around the District boundary. The GIS was also used to determine approximate drive times to alternative recreation providers in an effort to understand how far residents regularly travel, often beyond the District boundaries, to access recreation opportunities.

Additionally, the Norris Design team created a series of base maps that were used by District volunteers in an effort to locate previously unmapped, social trails known by hikers in the District. Existing trails, parking locations and desired alignments were detailed upon the maps and further digitized and transferred to the GIS data. The District trail inventory is current as of October 2010.

## Mapping and Spatial Analysis

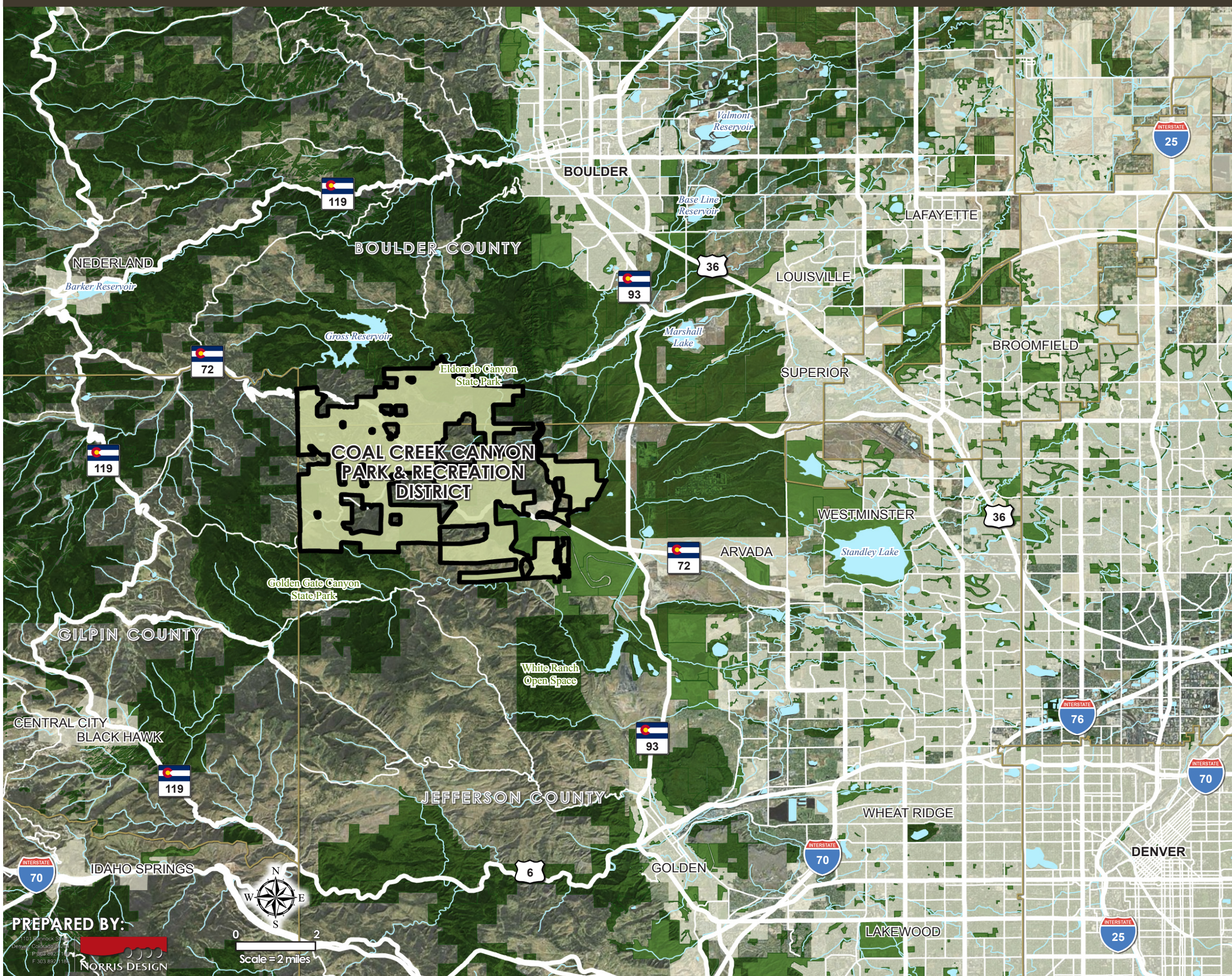
### Overview – Opportunity and Constraints Maps

Maps A through J were created by graphically illustrating elements of analysis related to the access to existing park and recreation amenities, as well as the opportunities and constraints for the preservation and creation of facilities and resources. ArcGIS software and related utilities were used to develop and analyze these various subjects including elevation, slope analysis, distribution and overlap of select wildlife species, proximity to surface waters and floodplains.

## Map A – Regional Vicinity Map

Map A serves as a quick reference regarding the locations of the Coal Creel Park and Recreation District within the context of the northwest metropolitan Denver region. Generally, there are a large number of owners and providers of recreation lands and easements in the region. These properties and easements are cataloged within the Colorado Ownership Management and Protection (COMap) data, which are displayed on this map. The COMap data details lands and easements with an even regional distribution. Many of these are city parks and county open spaces. Concentrations of large, contiguous properties are within or adjacent to the District including city, county, state and federal lands. Significant properties in this region include Eldorado Canyon State Park and Golden Gate Canyon State Park. Other significant county-owned properties include White Ranch Open Space (Jefferson) and Walker Ranch Open Spaces (Boulder).





## REGIONAL VICINITY MAP

### COAL CREEK CANYON PARK & RECREATION DISTRICT - OPPORTUNITY AND CONSTRAINTS MAPPING

## PRIMARY MAP DESCRIPTION

This map serves as a quick reference regarding the location of Coal Creek Canyon Park & Recreation District (CCCRD) within a regional context. The map also details the locations of the publicly owned land holdings and conservation easements. These lands are cataloged within the Colorado Ownership Management and Protection (COMap) data.

## MAP DISCLAIMER:

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## Map B – Public Properties & Conservation Easements

Map B serves as a quick reference regarding the locations, classifications and names of the large publicly owned land holdings and conservation easements within and adjacent to the Coal Creek Canyon Park and Recreation District boundary. Trails – as available from various GIS departments are also displayed for reference. This map serves as a visual tool in displaying the classifications assigned to each of the publicly owned parcels, as well as a comprehensive view of the size and geographic locations of these properties.

Conservation easements are not graphically designated on the map due to legibility. The GIS database developed for this project includes attributes for properties that are designated as conservation easements. The GIS database will be provided to the District as a final deliverable.

**Table 10.1: District Property Ownership and Acreage**

PROPERTY CLASSIFICATION	ACRES IN DISTRICT
USFS	161.9
BLM	331.2
Colorado State Land Board	647.1
Colorado State Parks	779.1
Boulder County Open Space	474.7
Boulder County Open Space (Conservation Easement)	180.3
Jefferson County Open Space	1762.1
Jefferson County	5.3
City of Boulder Open Space and Mountain Parks	1.5
City of Boulder Open Space and Mountain Parks (Conservation Easement)	125.8

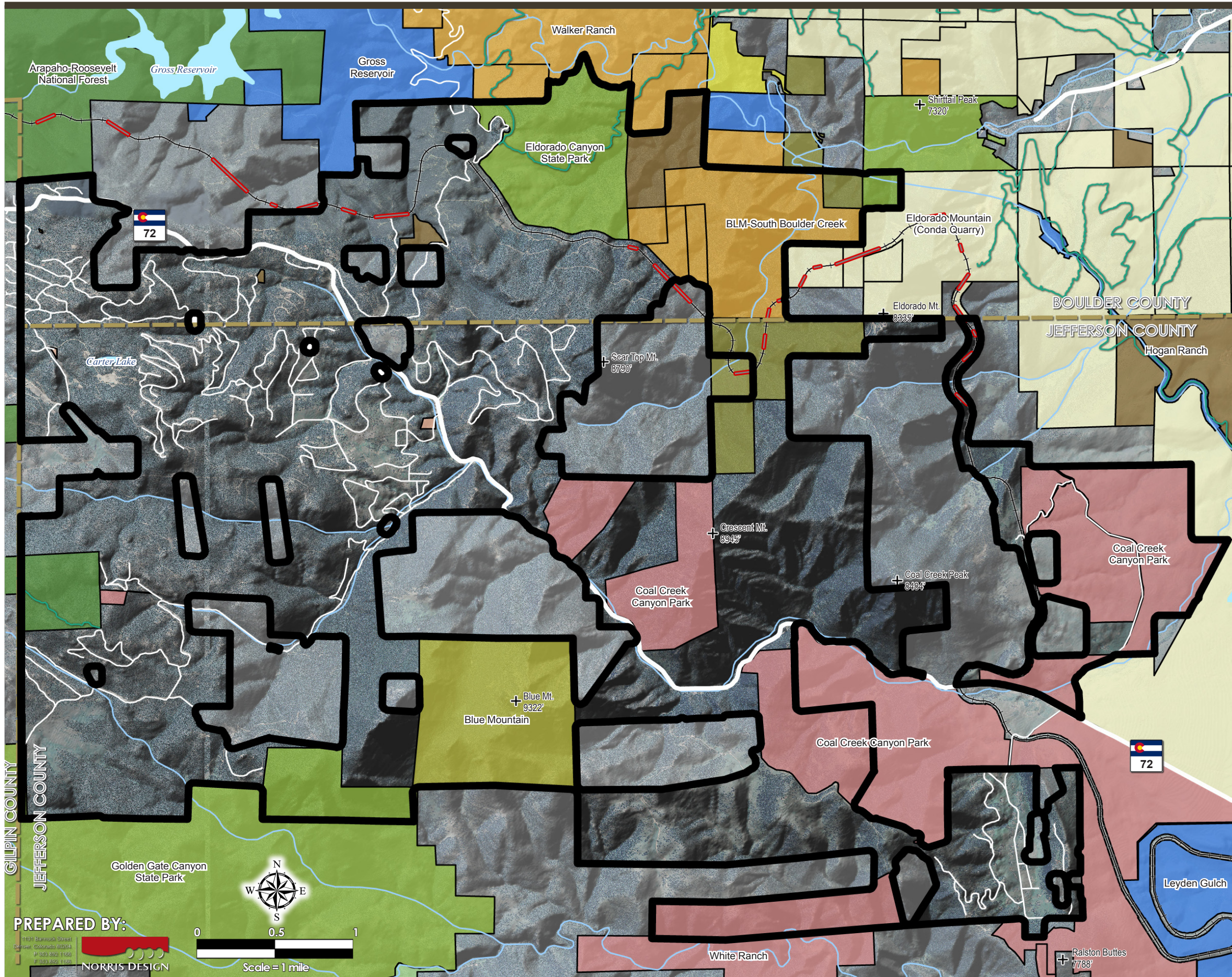
## Analysis

In looking at public lands, the CCCPRD has a good distribution of large, undeveloped public lands, which often serve as outdoor recreation destinations, in the sparsely populated areas of the District. Generally, the more densely populated areas of the District located in the northwest do not have immediate access to as many publicly owned properties. The properties do not serve the District at the traditional neighborhood level and are typically located in areas of complex, mountainous terrain. It should also be noted that several properties, including those listed as conservation easements are not open to the public.

Publicly owned lands and conservation easements within the District total approximately 4,500 acres of the nearly 14,000 acre district – or approximately 32% of the District's area, which provides a high Level of Service (LOS), but also limits the tax dollars that the District can collect for the creation and maintenance of facilities and services. The breakdown of these properties is detailed in **Table 10.1**.

Trails within the District are primitive and limited to only two significant locations. The Walker Ranch loop extends from Walker Ranch, south into Eldorado Canyon State Park in the north part of the district. The trail to Thorodin Mountain in the southwest crosses property within the Arapaho-Roosevelt National Forest. These single-track trails total approximately 2 miles in combined length within the District and primarily serve avid hikers and mountain bikers.





# PUBLIC PROPERTIES & CONSERVATION EASEMENTS

## OPPORTUNITY AND CONSTRAINTS MAPPING

### MAP LEGEND

- + PEAK WITH ELEVATION
- EXISTING TRAILS
- ||||| RAILROAD
- RAILROAD TUNNEL
- COUNTY LINE
- PUBLIC LANDS & CONSERVATION EASEMENTS (CE)
  - USFS - US FOREST SERVICE
  - BLM - BUREAU OF LAND MANAGEMENT
  - COLORADO STATE PARKS
  - COLORADO STATE LAND BOARD
  - COLORADO DIVISION OF WILDLIFE
  - BOULDER COUNTY OPEN SPACE
  - BOULDER COUNTY OPEN SPACE (CE)
  - JEFFERSON COUNTY OPEN SPACE
  - JEFFERSON COUNTY
  - CITY OF BOULDER OPEN SPACE & MOUNTAIN PARKS
  - CITY OF BOULDER OPEN SPACE & MOUNTAIN PARKS (CE)
  - DENVER WATER BOARD

### PRIMARY MAP DESCRIPTION

This map serves as a quick reference regarding the locations, classifications and names of the large publicly owned land holdings and conservation easements within and adjacent to the CCCPRD boundary. This map serves as a visual tool in displaying the classifications assigned to each of the publicly owned parcels. Publicly owned lands and conservation easements within the District total approximately 4,500 acres of the nearly 14,000 acre District – or approximately 32% of the District's area. Trails are also displayed for reference.

### MAP DISCLAIMER:

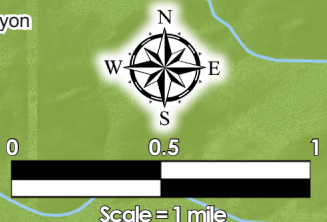
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PREPARED BY:

1101 Barnes Street  
Denver, Colorado 80203  
P 303.892.1100  
F 303.892.1100  
NORRIS DESIGN





## Map C – Regional Alternative Outdoor Recreation Providers

Map C serves as a quick reference regarding the locations of 40 *outdoor* alternative providers and many other public land holdings and easements at a regional scale. These locations were identified and entered into a database maintained by the District. Each location was placed in ArcGIS using standard geocoding analysis to locate the facility by address. The database focused on outdoor facilities with special interest amenities including, swimming pools, dog parks and disc golf courses (compared to the undeveloped recreation opportunities provided by through Public Properties and Conservation Easements – **Map B**). Most alternative providers, symbolized with a yellow point are located east of the District within the northwestern reaches of the Denver/Boulder Metropolitan Area. None of the outdoor alternative providers listed in the database exist within the District and only one is located west of the District in the Town of Nederland.

It should be noted that generally, there are also many outdoor providers with land holdings and easements in the region. These properties and easements are cataloged within the Colorado Ownership Management and Protection (COMap) data – displayed on this map. The COMap data details lands and easements with an even regional distribution. Many of these are city parks and county open spaces. Concentrations of large, contiguous properties are adjacent to the District including city, county, state and federal lands.

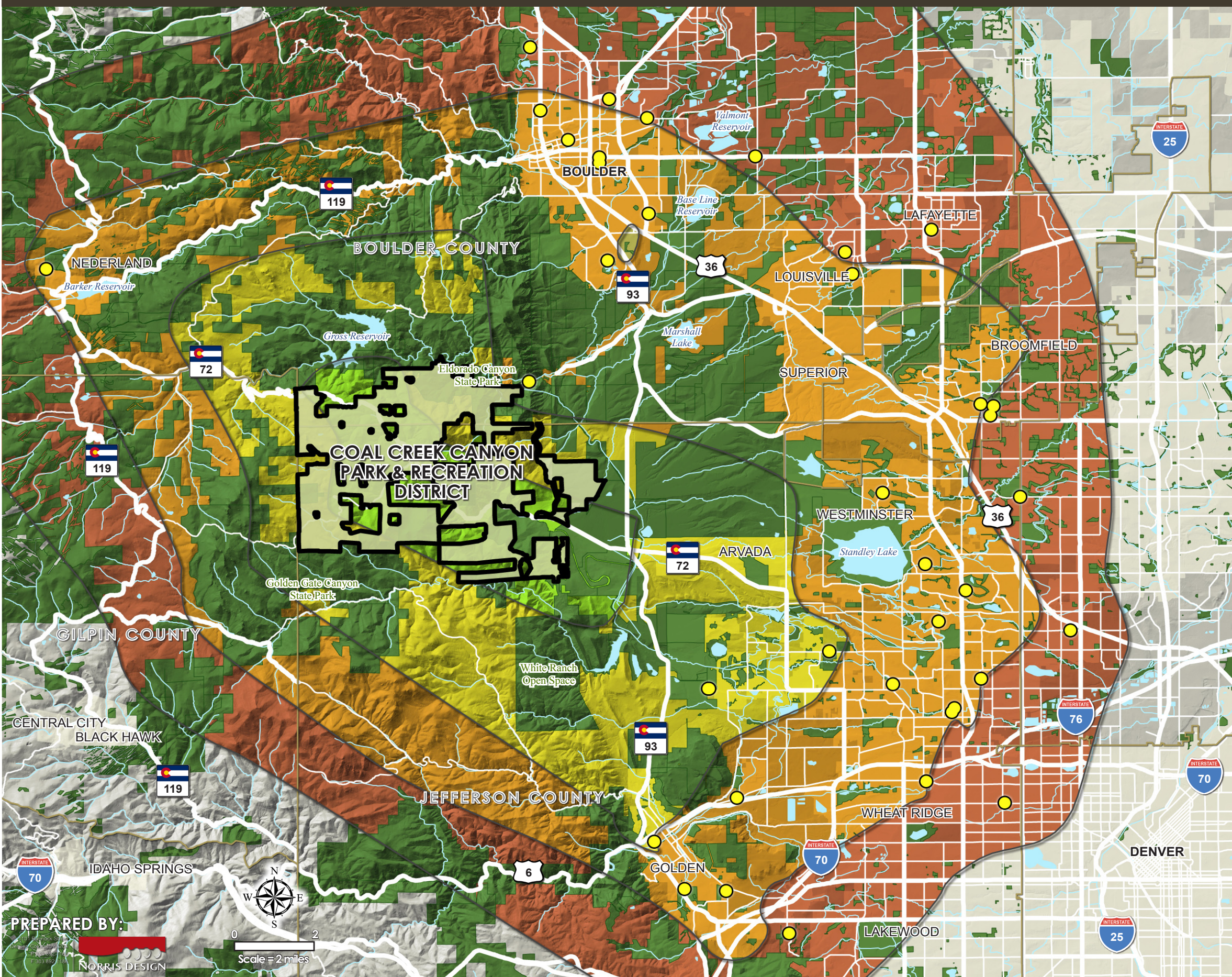
### Analysis

An additional analysis was generated by developing 10 minute contours based upon the estimated drive times from the District to each location. The drive time contours provide a visual reference to help understand the distance from the District as well as grouping the estimated drive times to alternative providers. Estimated drive times were generated using online mapping resources that produce this projected result. The length of drive times illustrates the mountainous terrain of the District and the significant variation that occurs due to a non-grid roadway system. Each alternative provider was analyzed for drive times based upon a well-known fixed

location within the Canyon – Coal Creek Coffee and Books.

- No alternative providers are within the 0-10 minute range
- Four providers are within the 10-20 minute range. The types of amenities available at these locations include disc golf, a dog park, and swimming pools.
- Twenty-three providers are within the 20-30 minute range. The types of amenities available at these locations include disc golf, dog parks, an ice rink, swimming pools, skate parks and tennis courts.
- Thirteen providers within the 30-40 minute range. The types of amenities available at these locations include disc golf, dog parks, swimming pools, a shooting range and skate parks.





# REGIONAL ALTERNATIVE OUTDOOR RECREATION PROVIDERS

OPPORTUNITY AND CONSTRAINTS MAPPING

- MAP LEGEND
- ALTERNATIVE OUTDOOR RECREATION PROVIDER
  - COUNTY LINE
  - PUBLIC LANDS & CONSERVATION EASEMENTS (CE)
- TIME FROM COAL CREEK CANYON PARK & REC DISTRICT TO ALTERNATIVE PROVIDERS  
APPROXIMATE TIME IN MINUTES
- 0 TO 10 MINS
  - 10 TO 20 MINS
  - 20 TO 30 MINS
  - 30 TO 40 MINS

**PRIMARY MAP DESCRIPTION**

This map serves as a quick reference regarding the locations of 40 outdoor alternative providers and many other public land holdings and easements at a regional scale. These are outdoor facilities with special interest amenities including swimming pools, dog parks and disc golf courses. Public properties and easements are cataloged within the Colorado Ownership Management and Protection (COMap) data – displayed on this map. An additional analysis was generated to provide a visual reference to help understand the relative distance from the District as well as the estimated drive times to alternative providers.

A series of 10 minute contours, or zones, based upon the estimated drive times from the District provide a visual reference to show the length of time required to drive from the District to alternative providers. Estimated drive times were generated using online mapping resources that produce this projected result. Each alternative provider was analyzed for drive times based upon a central, fixed location within the Canyon.

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## Map D – Regional Alternative Indoor Recreation Providers

Map D serves as a quick reference regarding the locations of 62 *indoor* alternative providers at a regional scale. These locations were identified as primary recreation facilities by the District and entered into a database maintained by CCCPRD. Each location was placed in ArcGIS using standard geocoding analysis to locate the facility by address and is identified as a yellow point within the map.

Five (5) of these sites were physically inventoried and evaluated by the project team in order to better understand the quality of resources within these public alternative resources and include:

- Apex Recreation Center
- Gilpin County Recreation Center
- Golden Community Center
- Nederland Community Center
- South Boulder Recreation Center

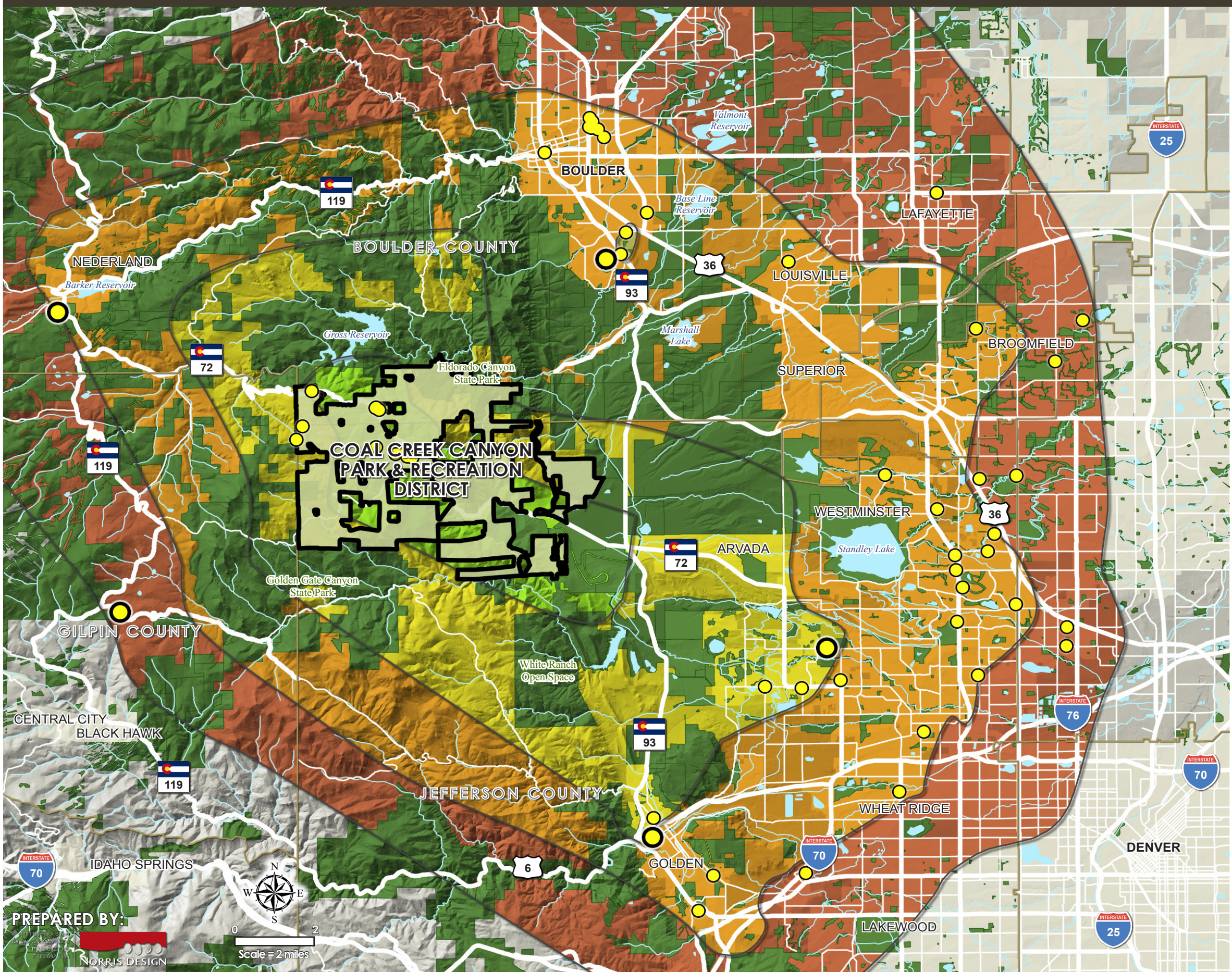
These sites are symbolized with a bold yellow point and have also been labeled for reference. Most alternative providers are located east of the District, within the northwestern reaches of the Denver/Boulder Metropolitan Area. Thirteen (13) indoor alternative providers exist within the District and two other facilities are located just west of the District in the towns of Black Hawk and Nederland (see the **Alternative Recreation Providers and Programming** section of the report for descriptions of relevant providers).

## Analysis

An additional analysis was generated by developing 10 minute contours based upon the estimated drive times from the District to each location. The drive time contours provide a visual reference to help understand the distance from the District as well as grouping the estimated drive times to alternative providers. Estimated drive times were generated using online mapping resources that produce this projected result. The length of drive times illustrates the mountainous terrain of the District and the significant variation that occurs due to a non-grid roadway system. Each alternative provider was analyzed for drive times based upon a well-known fixed location within the Canyon – Coal Creek Coffee and Books.

- Thirteen alternative providers are within the 0-10 minute range. These locations are indoor meeting locations.
- Ten providers are within the 10-20 minute range. The types of amenities available at these locations include indoor climbing walls, ice rinks, private fitness centers, and public recreation and/or community centers.
- Twenty-seven alternative providers are within the 20-30 minute range. The types of amenities available at these locations include indoor climbing walls, private fitness centers, and public recreation and/or senior centers.
- Twelve alternative providers are within the 30-40 minute range. The types of amenities available at these locations include indoor climbing walls, private fitness centers, and public recreation and/or senior centers.





# REGIONAL ALTERNATIVE INDOOR RECREATION PROVIDERS

## OPPORTUNITY AND CONSTRAINTS MAPPING

- MAP LEGEND
- ALTERNATIVE INDOOR RECREATION PROVIDER
  - EVALUATED ALTERNATIVE INDOOR PUBLIC RECREATION PROVIDER
  - COUNTY LINE
  - PUBLIC LANDS & CONSERVATION EASEMENTS (CE)

TIME FROM COAL CREEK CANYON PARK & REC DISTRICT TO ALTERNATIVE PROVIDERS  
APPROXIMATE TIME IN MINUTES

- 0 TO 10 MINS
- 10 TO 20 MINS
- 20 TO 30 MINS
- 30 TO 40 MINS

### PRIMARY MAP DESCRIPTION

This map serves as a quick reference regarding the locations of 62 indoor alternative providers at a regional scale. Five of the sites were evaluated by the project team in order to better understand the quality of resources within these public alternative resources:

- Apex Recreation Center
- Gilpin County Recreation Center
- Golden Community Center
- Nederland Community Center
- South Boulder Recreation Center

An additional analysis was generated to provide a visual reference to help understand the relative distance from the District as well as the estimated drive times to alternative providers.

A series of 10 minute contours, or zones, based upon the estimated drive times from the District provide a visual reference to show the length of time required to drive from the District to alternative providers. Estimated drive times were generated using online mapping resources that produce this projected result. Each alternative provider was analyzed for drive times based upon a central, fixed location within the Canyon.

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NORRIS DESIGN



## Map E – Elevation Analysis

This map provides an analysis that visually details the range of elevations within the District without the potentially difficult interpretation of standard elevation contour lines. Lower elevations are symbolized with lighter blues and greens. Intermediate elevations are symbolized with yellows and browns. The highest elevations are symbolized with grays and white. The lower elevations are located in the northeast sections of the District with a progression of increasing elevations along the south and west sides of the District. Elevations within the District range from 6,200' to 9,400'.

### Analysis

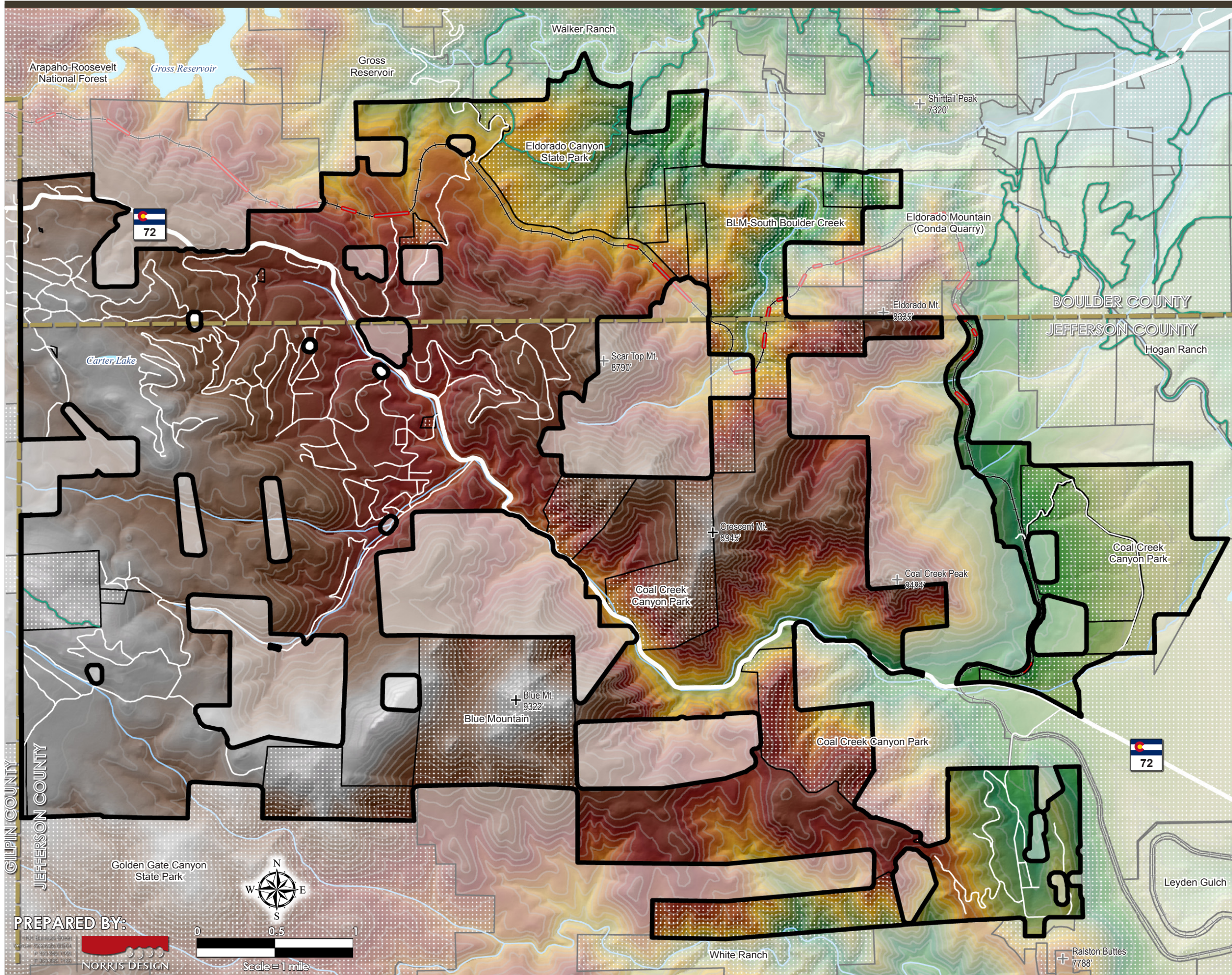
Noteworthy highpoints include the following summits.

- Blue Mountain (9,322')
- Crescent Mountain (8,945')
- Scar Top Mountain (8,790')
- Coal Creek Peak (8,484')

Clearly defined elevation ranges in the District help identify potential locations that should be preserved to protect natural vistas to the higher locations north, south and west of the District, such as Indian Peaks or the nighttime cityscape east of the District. One can use the color gradient to understand simple point to point views. High elevations shown with the gray to white gradients provide views over lower elevations shown with brown, yellow and green gradients. The map shows that Blue Mountain provides a point to point vista of Crescent Mountain.

The map provides an alternative reference to understand the slopes detailed in Map F, in particular the steep slopes that define the District. For instance, one can quickly understand how Blue Mountain and Crescent Mountain both rise sharply from the floor of Coal Creek Canyon within a very short horizontal distance. While these locations may have obvious value for recreation, the steep slopes may present a challenge when considering new trail alignments.





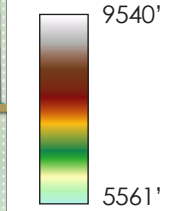
## ELEVATION ANALYSIS

### OPPORTUNITY AND CONSTRAINTS MAPPING

#### MAP LEGEND

- + PEAK WITH ELEVATION
- EXISTING TRAILS
- ==== RAILROAD
- RAILROAD TUNNEL
- COUNTY LINE
- PUBLIC LANDS & CONSERVATION EASEMENTS (CE)

#### ELEVATION ANALYSIS



#### PRIMARY MAP DESCRIPTION

This map provides an analysis that visually details the range of elevations within the District. Lower elevations are symbolized with lighter blues and greens. Intermediate elevations are symbolized with yellows and browns. The highest elevations are symbolized with grays and white. The lower elevations are located in the northeast sections of the district with a progression of increasing elevations along the south and west sides of the district. Elevations within the District range from 6,200' to 9,400'.

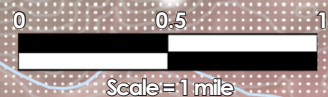
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PREPARED BY:





## Map F – Slope Analysis

This map provides a topographic slope analysis of the entire District. The analysis was constructed using four NED 10 meter digital elevation model (DEM) tiles and the Spatial Analyst extension for ArcMap. Slope values are provided in “Percent Slope.” Additional categorization was developed to simplify the data into the following six groups:

- 0 – 5%
- 5 – 10%
- 10 – 15%
- 15 – 20%
- 20 – 25%
- 25% and greater

### Analysis

Complex, mountainous terrain presents a challenge in terms of design, construction and related costs.

This analysis shows that 18.8% of the District has gentle slopes classified in the 0 – 5% category and an additional 3.4% classified in the steeper, 5 – 10% category. However, much of this gently sloping property exists in areas that have already been subdivided for residential development. The analysis further shows that 6.9% of the District has slopes classified in the even steeper 10 – 15% category.

The remaining 70.9% of the District is made up of the steepest slopes of 15% and greater. These steepest areas are found throughout the District with the greatest concentrations located in a broad arc of canyons curving from the northeast corner along the southeast and west sections of the District.







## Map G – Slope Analysis & Undeveloped Parcels

This map is similar to Map F and provides a topographic slope analysis of the entire District, but is overlaid with the Undeveloped Parcels in the area. The analysis was constructed using four NED 10 meter digital elevation model (DEM) tiles and the Spatial Analyst extension for ArcMap. Slope values are provided in “Percent Slope”.

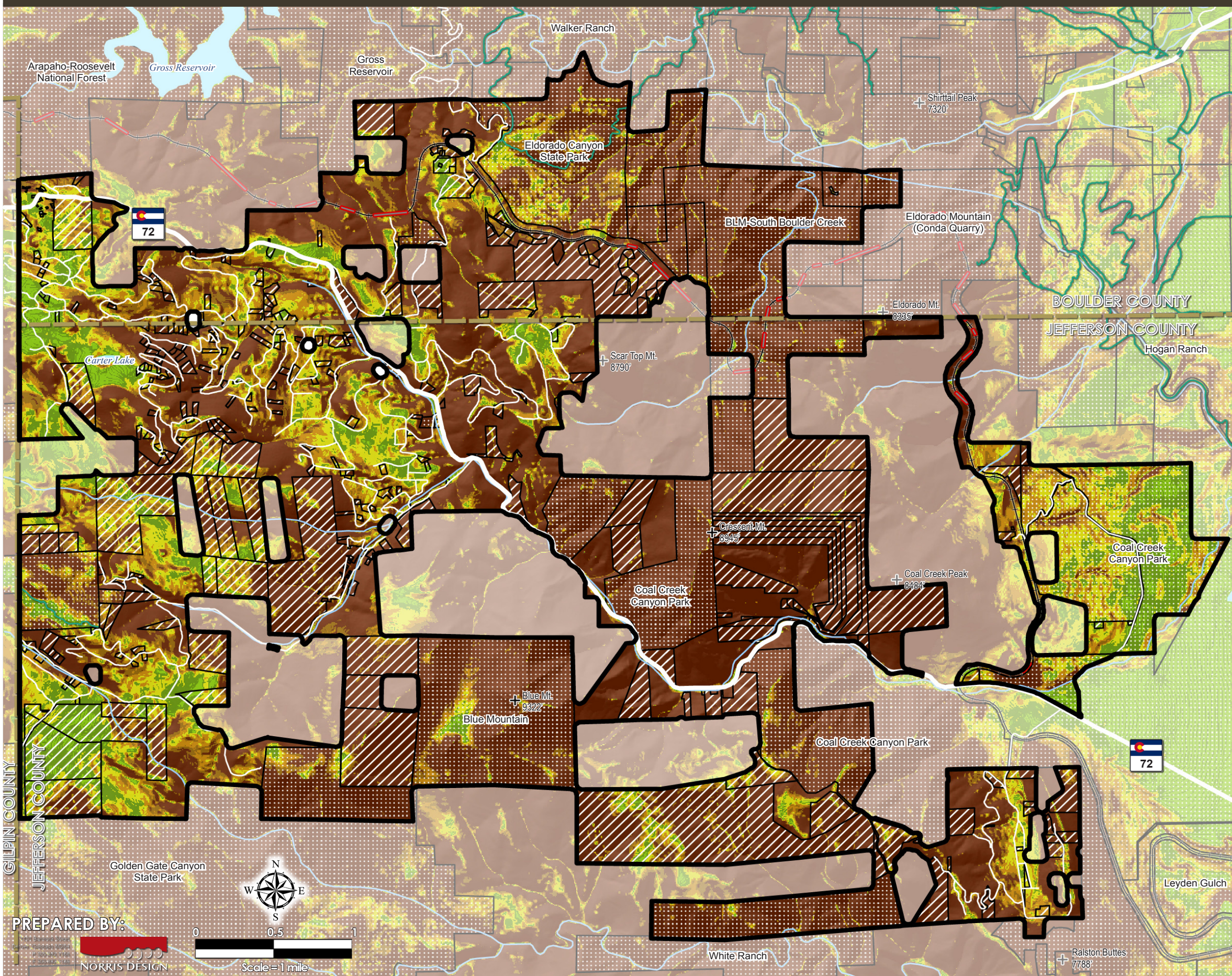
Additionally this map highlights parcels that are potentially undeveloped without a structure. This data was produced through a query of the current Boulder and Jefferson County tax assessors’ data – as supplied to the District.

### Analysis

Undeveloped properties may provide future opportunities for the District. The lack of (modern) structures may preserve the natural appeal of the Coal Creek area. Connecting adjacent undeveloped properties further supports this sort of preservation on a larger scale. Overlays of the slope analysis and undeveloped properties can work together to identify locations for District trail corridors, future District structures and other recreation facilities. However, it is important to note that the District intends to only work with willing land owners when the District is seeking property for facilities, eminent domain will not occur.

It should be noted that these are very high level analysis tools for conceptual planning. Further in the field investigation and surveys of sites would provide the details needed to support decision making.





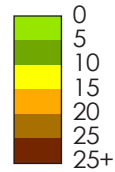
# SLOPE ANALYSIS & UNDEVELOPED PARCELS

## OPPORTUNITY AND CONSTRAINTS MAPPING

### MAP LEGEND

- + PEAK WITH ELEVATION
- EXISTING TRAILS
- ==== RAILROAD
- RAILROAD TUNNEL
- COUNTY LINE
- PUBLIC LANDS & CONSERVATION EASEMENTS (CE)
- POTENTIALLY UNDEVELOPED PARCELS

### SLOPE ANALYSIS



### PRIMARY MAP DESCRIPTION

This map provides a topographic slope analysis of CCCPRD. The analysis was constructed using four NED 10 meter digital elevation model (DEM) tiles and the Spatial Analyst extension for ArcMap. Slope values are provided in "Percent Slope". Complex, mountainous terrain is a dominant and physically challenging development constraint of the District. Structure and trail development and related costs are both affected by the constraints of steeper slopes. 18.8% of the District has gentle slopes in the 0 - 5% category. An additional 3.4% classified in the steeper, 5 - 10% category. 6.9% of the District has slopes classified in the even steeper 10 - 15% category. The remaining 70.9% of the District is made up of the steepest slopes of 15% and greater. Potentially undeveloped parcels were selected from county assessors data and are highlighted on this map.

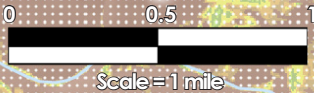
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PREPARED BY:





## Map H – Overlap and Distribution of DOW NDIS Species Habitat Ranges

This map provides an analysis of the distribution and overlap of species habitat data. The analysis was derived from the Colorado Division of Wildlife (CDOW) Natural Diversity Information Source (NDIS). The NDIS data provides a very general, digital resource to understand the spatial distribution of species habitat and ranges mapped and tracked within the NDIS data network.\*

The following species occurrences are incorporated into this overlay analysis.

- Aberts squirrel
- Black bear
- Black-tailed prairie dog
- Elk
- Moose
- Mountain lion
- Mule deer
- Osprey
- Peregrine falcon
- Preble jumping mouse
- Turkey
- White-tailed deer

Please note that the habitat range of many other species may be located within the District; however, their ranges have not been included in the CDOW NDIS.

### Analysis

Each species occurrence and range from the above list is displayed using an overlay technique that accurately illustrates the distribution and overlap of the individual ranges. Yellows and lighter green areas in the central and southwestern sections of the district indicate fewer coincident or overlapping species ranges. Areas with darker blues – in particular the area northeast of the District at the mouth of Eldorado Canyon - indicate areas of perhaps greater diversity as the species common to higher, mountainous elevations mingle with the species common to the lower high plains elevations. As many as nine species ranges overlap at this location. Identification of these various species ranges and their interaction with the

human interface is a critical factor in the District's interests in enhancing recreation opportunities and natural resource preservation as detailed in the **Conservation and Natural Resource Assessment** section of the report.

*\*When looking closely at this data is important to understand the digital data disclaimer published by CDOW:*

*"The information portrayed on these maps should not replace field studies necessary for more localized planning efforts. Data discrepancies may become apparent at scales different than those at which data was created. The areas portrayed here are graphic representations of phenomena that are difficult to reduce to two dimensions. Animal distributions are fluid; animal populations and their habitats are dynamic."*







## Map I – Floodplain and Riparian Buffer

This map provides analysis related to the surface waters and drainage network in proximity to the District. The Federal Emergency Management Agency (FEMA) provides digital data (Q3) that details the officially mapped floodplain – illustrated with areas of medium to dark orange. The analysis displayed on this map depicts both the 100 and 500 year floodplain as recognized by FEMA. An additional analysis was created in ArcGIS by generating a 100 foot buffer either side of all surface waters seen in the map to designate areas with riparian influence. This equates to a corridor 200 feet or more wide depending upon the width or area of the water body being analyzed. These areas are illustrated as blue corridors that parallel the drainages or surround the few bodies of water.

This map is intended to generally delineate the areas within the District where surface waters provide various opportunities and constraints as a resource. For instance, a riparian corridor can support recreation interests such as hiking trails that parallel the stream. In turn the corridor may have a valued natural resource such as a protected animal species that would not benefit from human activity. Similarly, the flood plain designation may limit structural development; however, hiking trail corridors may not have any limitations within the same flood plain.







## Map J –Trail Opportunities

This map illustrates multiple elements that influence trail network planning and creation in the District including: existing trails in and surrounding the District, planned and/or desired conceptual trail corridors, slope, and potential locations to cross the railroad where tunnels exist.

Existing, digitally mapped trails are symbolized with continuous, green lines. Trail alignments were provided by the City of Boulder, Boulder County and Jefferson County. A significant backcountry trail network exists within Golden Gate State Park; however, this alignment data was not available in an accurate digital format.

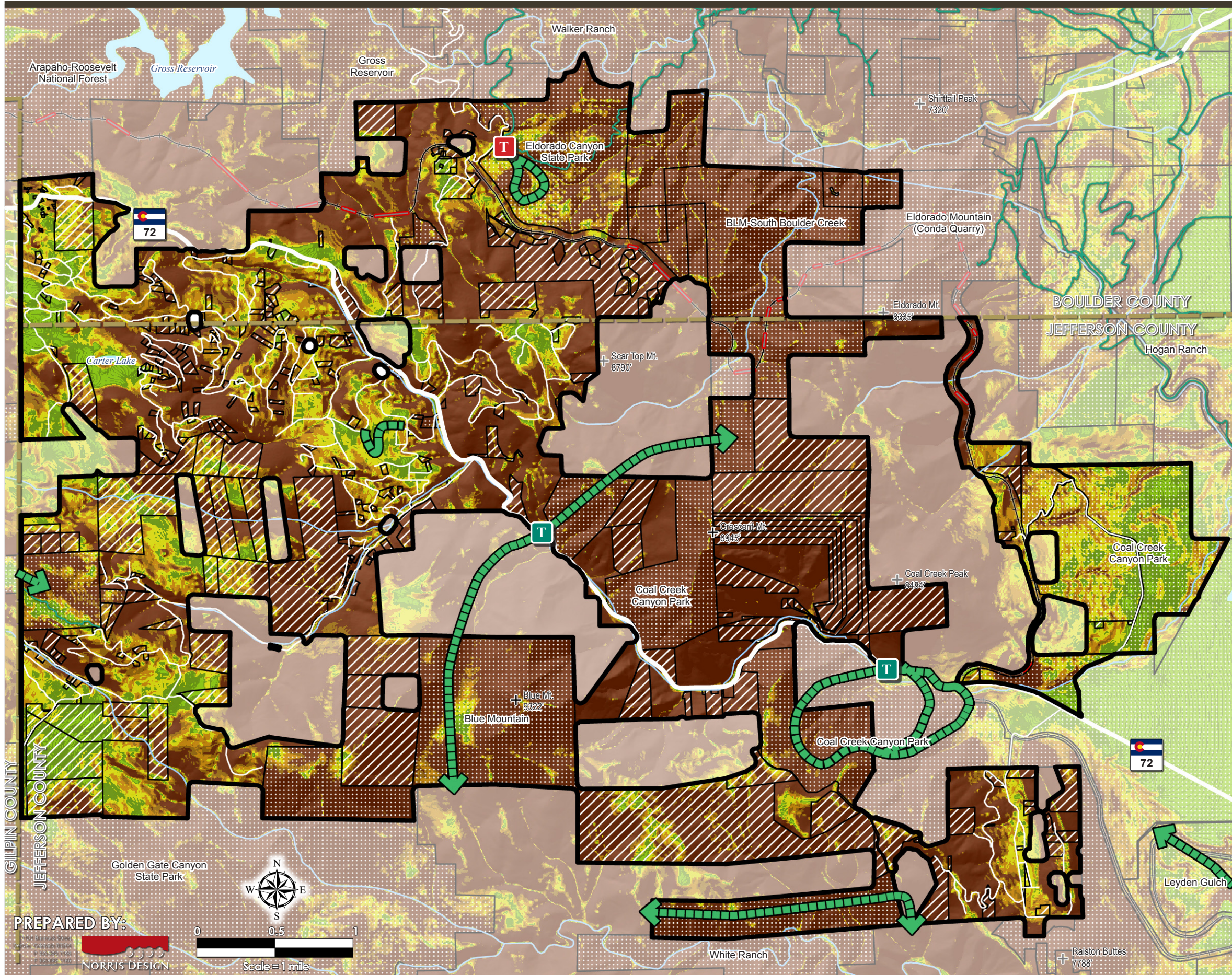
Conceptual trail connection corridors are displayed as bold, dashed green lines. These are unofficial, conceptual alignments interpreted from corridors illustrated in other agencies' long range planning studies, as well as from input provided by the Trail Volunteers from the District. Several trailheads are used by local residents to access the few trails within the District. These formal locations are marked with a "T" within a red square, while intended or informal trailheads are noted with a "T" within a green square.

**Analysis** - These alignments have been identified as potential connections between existing networks that stretch from Golden to Boulder and throughout the District. These outlying networks reside in Golden Gate Canyon State Park, Eldorado Canyon State Park, White Ranch Open Space, Walker Ranch Open Space and various other open space lands located northeast of the District.

Slopes play a very distinct role in the location of potential alignments in the District. The District is located in complex, mountainous terrain. Understanding the slopes between two locations can provide valuable answers to the decision-making process at a very basic level. Steeper, more complex areas require a greater effort for construction and maintenance of the trails. Slopes dictate trail grade and who the potential users may be (i.e. – avid hikers vs. young children).

A significant barrier to north-south connections is the existing railroad corridor that parallels the eastern boundary of the District before climbing the foothill grade along the northern extents of the District. Red areas along the corridor highlight sections where the railroad is located within tunnels. These areas provide natural crossing locations for wildlife and perhaps hikers as well.





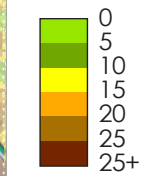
## TRAIL OPPORTUNITIES

### OPPORTUNITY AND CONSTRAINTS MAPPING

#### MAP LEGEND

- + PEAK WITH ELEVATION
- EXISTING TRAILS
- ==== RAILROAD
- RAILROAD TUNNEL
- COUNTY LINE
- RECOMMENDED TRAIL
- T EXISTING TRAILHEAD
- T INFORMAL TRAILHEAD
- PUBLIC LANDS & CONSERVATION EASEMENTS (CE)
- POTENTIALLY UNDEVELOPED PARCELS

#### SLOPE ANALYSIS



#### PRIMARY MAP DESCRIPTION

This map illustrates multiple elements that influence trail network planning and development in the District including: existing trails in and surrounding the District, planned and/or desired conceptual trail corridors, slope, and potential locations to cross the railroad where tunnels exist. Slopes play a role in the location of potential alignments in the District. A significant barrier to north-south connections is the existing railroad corridor. Areas on the map are highlighted where the railroad is located within tunnels. These areas provide natural crossing locations for wildlife and hikers. Several informal trailheads are used by local residents to access the trails within the District.

#### MAP DISCLAIMER:

Map produced for The Coal Creek Canyon P&R District - By Norris Design, and developed through input by stakeholders and trail users. This map is intended for planning & discussion purposes only. Legend elements may vary in size, color and transparency from those shown on the map.

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PARKS, TRAILS, OPEN SPACE & OUTDOOR RECREATION  
**COAL CREEK CANYON MASTER PLAN**  
PARK & RECREATION DISTRICT - COLORADO  
*Health. Joy. Community.*

PREPARED BY:

NORRIS DESIGN