Executive Summary

Senate Bill 06-193 (SB06-193) directed the Colorado Water Conservation Board (CWCB) to conduct a study of potential underground water storage areas in the South Platte and Arkansas River Basins. This report presents the results of the SB06-193 investigation.

In 2004 the Colorado Geological Survey (CGS) completed their report "Artificial Recharge of Ground Water in Colorado – A Statewide Assessment." In that study, large aquifer regions were identified statewide for recharge potential. This SB06-193 study uses the CGS study as a beginning point and goes a step further in the South Platte and Arkansas River Basins. The regional aquifers identified in the CGS study are evaluated here on a subregional basis, and some smaller alluvial aquifers not considered in the CGS study in these river basins are included too.

The aquifers in the two basins were divided into four regions: South Platte River Basin alluvial aquifers, Arkansas River Basin alluvial aquifers, Denver Basin bedrock aquifers, and the Ogallala and Dakota-Cheyenne bedrock aquifers. These regions were further divided into subregions for evaluation purposes, resulting in a total of 44 subregions: 16 alluvial subregions in the South Platte Basin, 10 alluvial subregions in the Arkansas Basin, 15 subregions in the four aquifers of the Denver Basin, two subregions for the Ogallala, and one subregion for the Dakota-Cheyenne. The 15 subregions in the Denver Basin were formed by aquifer layer, by location in the basin, and by whether the portion of the aquifer in question was under confined or unconfined groundwater conditions.

These areas were each evaluated for 10 criteria representing hydrogeologic, environmental and implementation considerations. There are many other pertinent issues that were not covered by the criteria, because they were beyond the scope of this study. They include factors such as available sources of water and scale of project, water rights and potential legal issues, water treatment requirements, and interest from local stakeholders. Any of these factors could affect the feasibility of implementing an underground water storage project within the evaluated areas and should be considered on a site-specific basis.

Technical information from a variety of State, federal and other published sources was assembled and used to characterize the areas. From this information a set of quantitative measures were developed and used to score and rank each of the subregions. The study team consulted over 50 technical experts and stakeholders from all areas of the South Platte and Arkansas River Basins. Their input helped identify key sets of data, provided valuable insight into what factors were considered most important, and imparted local knowledge that benefited the study.

The highest scoring subregions in each the alluvial aquifer regions and for the combined bedrock aquifer regions are listed below.

South Platte River Basin Alluvial Aquifer Subregions
Lower Lost Creek
Upper Lost Creek
Lower Kiowa Creek
South Platte River – Fort Morgan Area
Lower Beebe Draw/Box Elder Creek

Arkansas River Basin Alluvial Aquifer Subregions
Upper Black Squirrel Creek
Arkansas River - Crowley Area
Arkansas River - Lamar to State Line
Arkansas River - Buena Vista to Salida
Fountain Creek

Bedrock Aquifer Subregions
Dawson Unconfined West
Arapahoe Confined Northwest
Ogallala - North
Arapahoe Confined Southwest
Arapahoe Unconfined West
Ogallala - South

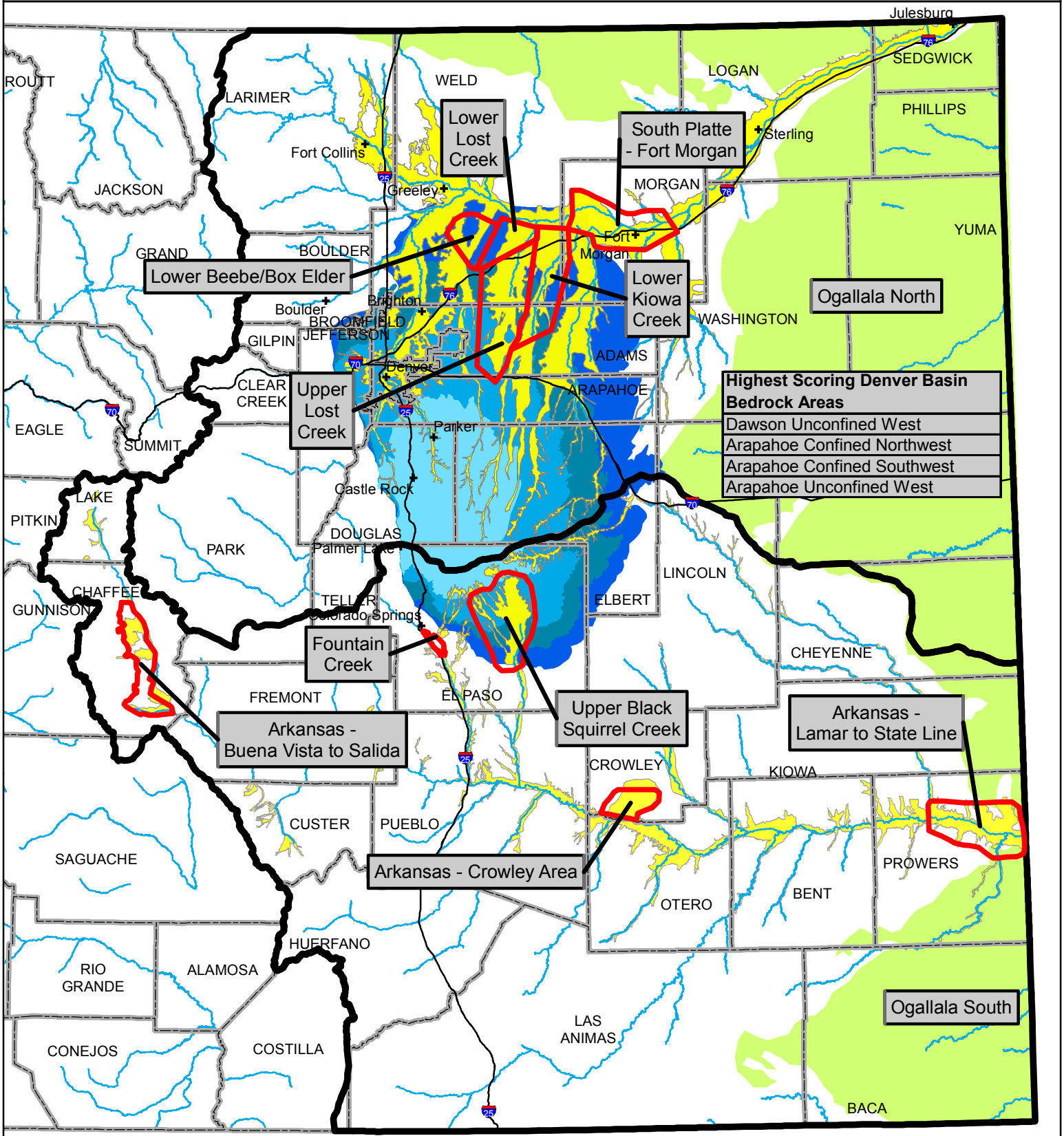
The locations of these areas are shown on Figure ES-1. Specific locations are shown for all subregions except for the Denver Basin. Because of the layered nature of the Denver Basin aquifers, the specific locations of the higher-scoring subregions in the Denver Basin region could not be shown on this figure. Figure 24 in the main report shows the locations of the Denver Basin subregions in more detail.

The scoring results show that for the alluvial aquifers there are high-scoring areas that exist both away from and along the mainstems of the South Platte and Arkansas Rivers. Among the bedrock aquifers, there are high-scoring areas within both unconfined and confined portions of the Denver Basin, as well as the Ogallala. However, there was not much spread in the scores for many of the subregions. Consequently, most of the areas evaluated in this study, regardless of their ranking, could contain feasible underground storage sites worthy of more detailed investigation. The findings in this report, along with site-specific factors outside the scope of this study such as available water supply and local stakeholder interest, should be considered in the selection of areas for further investigation.

The CWCB is a potential source of funding for underground storage projects through means such as the Water Supply Reserve Account created by Senate Bill 06-179 and non-reimbursable grants from the CWCB's Severance Tax Trust Fund Operational Account and Construction Fund. More information can be found at CWCB's web page: http://www.cwcb.state.co.us.

SB06 - 193 Underground Water Storage Study

Highest Scoring Aquifer Areas in the South Platte and Arkansas Basins



Sources: CDM 2004a; CDM 2004b; Topper et al. 2003

Scale: 1:2,100,000

10 5 0 10 Miles

- City
- Highway
- County
- Alluvial Extent

Denver Basin Aquifers

- Dawson Extent
- Denver Extent
- Arapahoe Extent
- Laramie-Fox Hills Extent

- Alluvial Subregions
- Ogallala Extent

Colorado Water Conservation Board

Prepared by: CDM

Figure ES-1