

Evolution of the Landscape along the Clear Creek Corridor, Colorado—Urbanization, Aggregate Mining, and Reclamation

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Introduction

The landscape along lower Clear Creek, defined for this report as between Golden, Colorado, and its confluence with the South Platte River, has changed and continues to change due to human activity. It is a microcosm of the human impact upon many streams and rivers in the Western Plains of North America. Indeed, the Clear Creek valley landscape has been transformed by the human impacts of mining, settlement, agriculture, major water diversions and reservoirs, transportation, and recreation. There is an increasing demand for infrastructure resources, such as aggregate, energy, and water, due to the expanding metropolitan Denver area. Most of the change has occurred within the last 100 years, accelerating through time and increasing in scale, with reclamation of aggregate resource mines now nearly complete.

Photographs, maps, journals, interviews, and fieldwork were used to examine aggregate mining, site history, ecology, and geologic (sense of place) from approximately 1900 through 2000 along lower Clear Creek. The two map sheets reduce a complex three-dimensional stream corridor environment into a two-dimensional visual and text description. The authors recognize the limitations of such a methodology but believe it is a starting point for further discussion and research. This study of classic land use conflict may be of use to land planners, industry, and the general public.

1873



Figure 5. The Lee residence of Wheatridge, Colorado, built in 1873. (Photograph by D.L. Jarrett in 1961, courtesy Colorado Historical Society, Negative no. 38,764.)

1894



History

Our Western culture, society, and individuals have left their imprint upon the landscape, visible at times, unrecognizable at others. Although initial land use in the Clear Creek valley tended to be associated with hunter-gatherers and later gold mining, public policy such as the Land Ordinance of 1785, Homestead Act of 1862, and Doctrine of Prior Appropriation in 1876 helped define the landscape through the rectangular land survey grid, ranches and farms, and water irrigation, respectively.

Colorado lost people during the mid-1860's and mid-1890's due to gold and silver booms (Neil and others, 1994), while cities along Clear Creek increased from 136,746 residents in 1900 to more than one million people in 2000. The metropolitan area is dependent upon snowmelt in the spring for summer water needs and stores water for municipal use during the rest of the year. Less than half of the Clear Creek water passing through Golden flows into the South Platte River. Future urban growth will require increasing amounts of water and aggregate.

Planners are not always able to connect natural resources with transportation and community planning. Scientists, farmers, ranchers, and the general public may become at odds over what is the "best" land use of an area. Colorado culture appears to treat settlement separate from nature, local zoning separate from regional planning, and production of infrastructure separate from the processes of obtaining necessary natural resources.

1900–1920

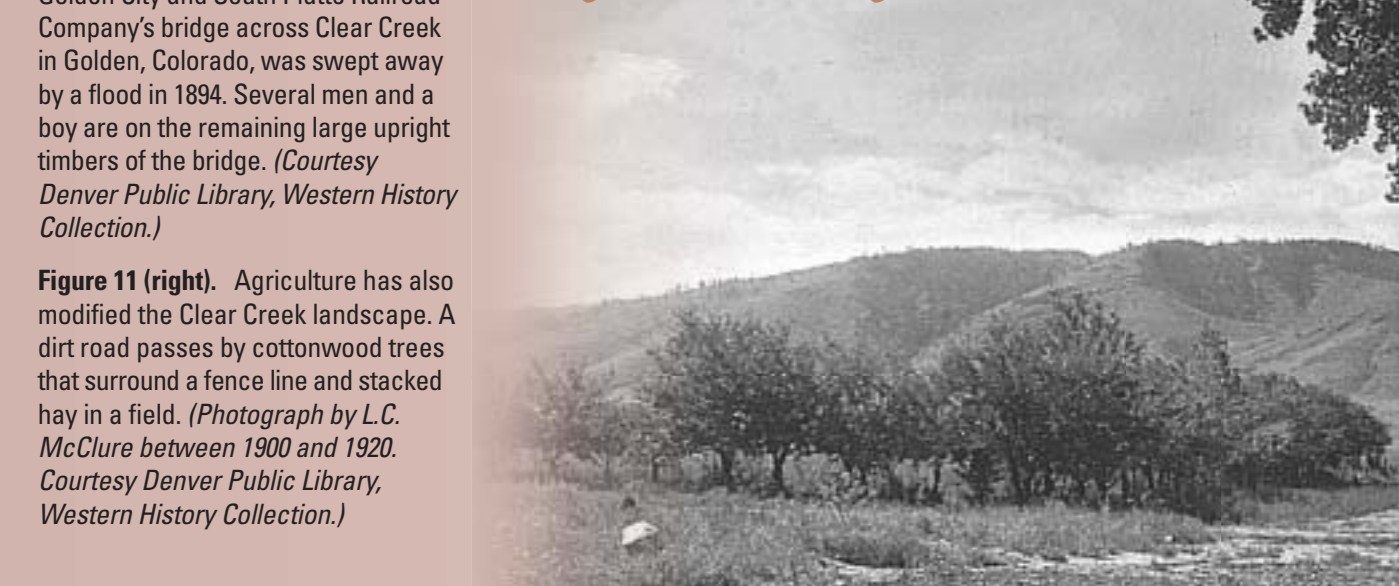


Figure 11 (right). Agriculture has also modified the Clear Creek landscape. A dirt road passes by cottonwood trees that surround a fence line and stacked hay in a field. (Photograph by L.C. McClure between 1900 and 1910, courtesy Denver Public Library, Western History Collection.)

Aggregate Mining

Within the study area, the best quality surficial sand and gravel resources are found in the modern flood plain and low terrace deposits. Assuming good operating procedures, "Most environmental impacts associated with aggregate mining are benign . . . The most obvious environmental impact . . . is the conversion of land use, most likely from undeveloped or agricultural to a hole in the ground" (Knepper, 2002, p. 6). This report focuses on six sites (see fig. 30) that contain areas mined and reclaimed by the aggregate mining industry.

Although precious minerals initially drew miners to the region, sand and gravel increasingly became more important economically. The value of Colorado sand and gravel was \$230 million in 2000 (U.S. Geological Survey, 2001). Schwachow and others (1974a) determined more than half of the original sand and gravel deposits along Clear Creek have been lost to suburban, commercial, and industrial growth.

Figure 26 (below). Gold dredging in the Clear Creek valley between 1900 and 1910. A hydraulic dredge machine in floating platform is in operation. (Courtesy Denver Public Library, Western History Collection.)

Landform Evolution

Like an artist's canvas, the landscape and views are transformed by mining and other human activities. Few people can detect the presence of reclaimed gravel pits throughout the area. The term "mine reclamation planning" appears to be a misnomer because the sites evolve over time, with society inheriting and changing the landscape, unable to visualize the past or forecast future use 20 years from now. Although aggregate extraction is only one of the land uses that affected the creek morphology in the last century, it is useful to examine because the lessons learned can provide choices in future landscape planning.

Figure 31. Architectural plan showing symbolic landforms that represent uses of sand and gravel pits along Clear Creek and the South Platte River. There are four symbolic landforms associated with mining reclamation in the Denver metropolitan area: water storage facilities, wildlife greenbelt space, multiple purpose reservoirs, and "hidden scenery" (such as light industry, residential housing, or simple revegetation).

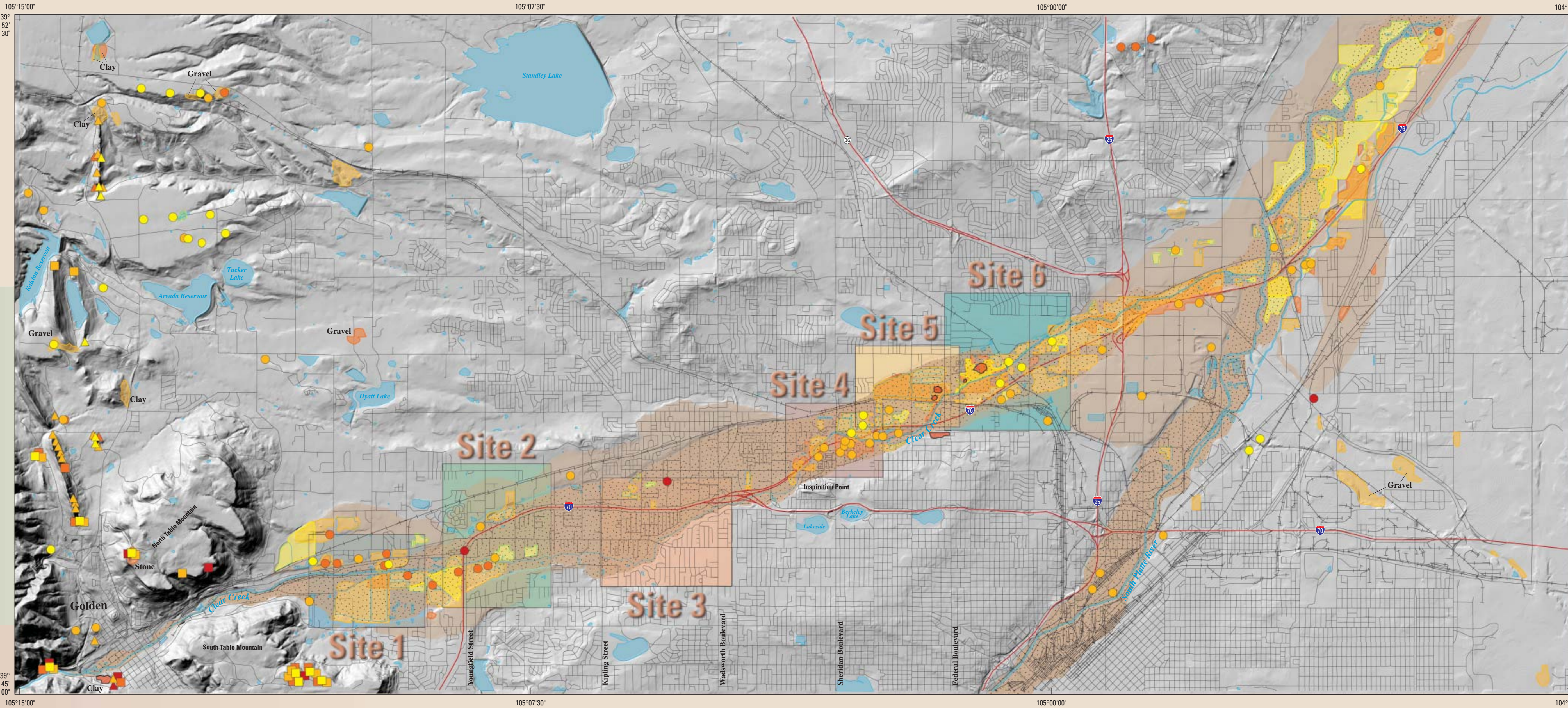
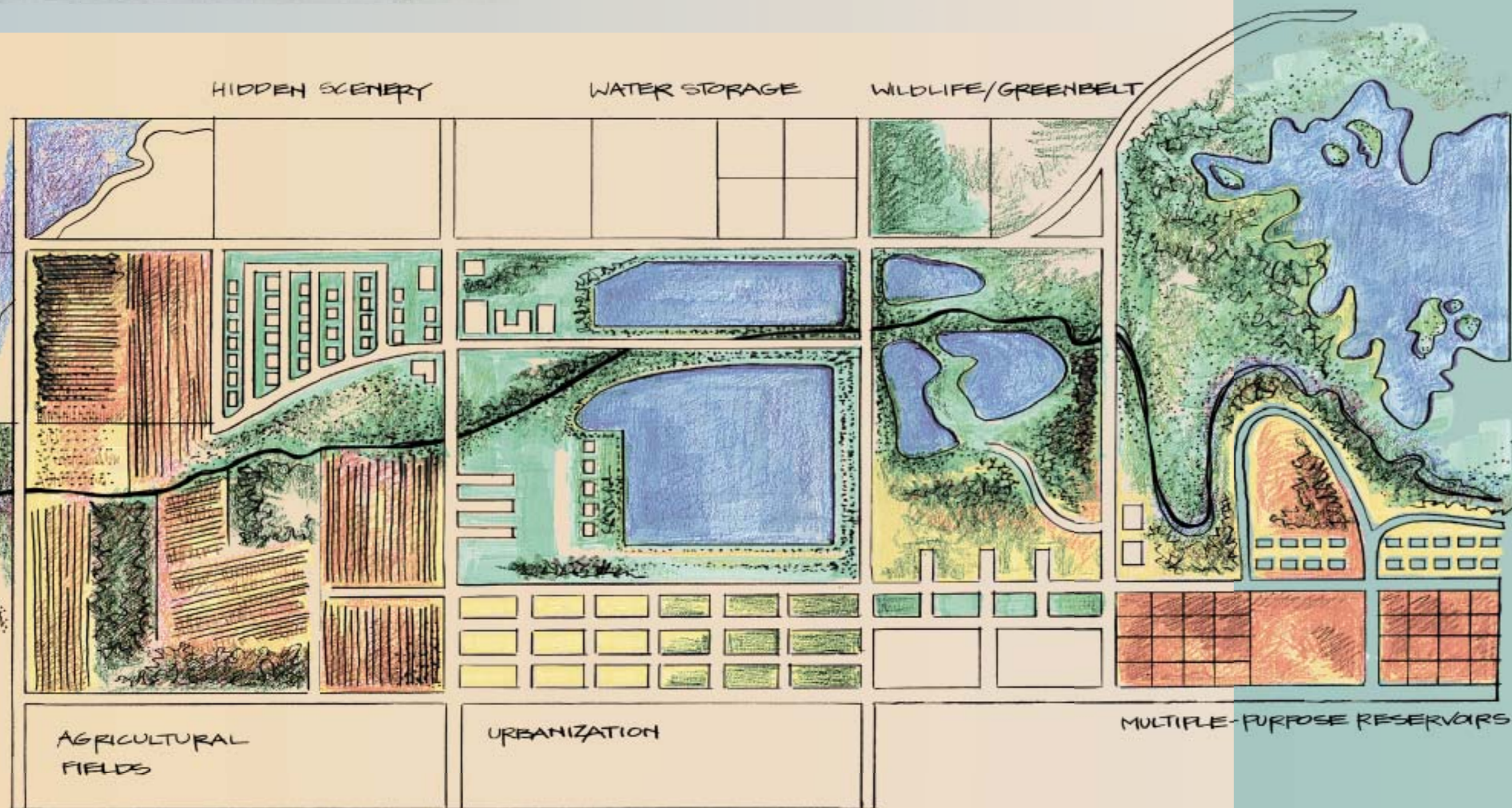


Figure 28. Map showing best quality gravel deposits and clay, gravel, and stone mine operations within the region, 1920–1998. The six sites selected as specific areas of interest along Clear Creek are also highlighted. These sites are described in detail on sheet 2. Mining occupies one of the smallest amounts of the major land uses in the study area. Approximately 1,240 acres of best quality gravel deposits were mined from 1984 to 1990. The last large gravel reserve in the Denver area extends from the confluence of Clear Creek with the South Platte River to 14th Avenue about 11 miles northeast along the South Platte River (Schwachow, 1980). To aid readability of the map, reservoirs are shown as blue outlines where they overlap gravel pits.

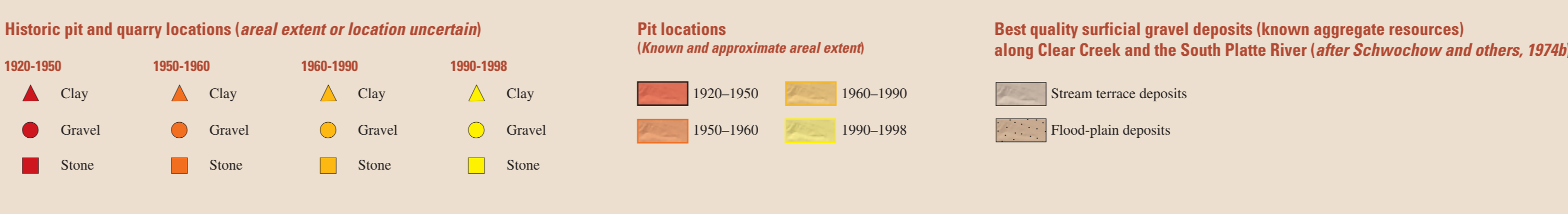


Figure 29 (below). View east from the foothills across the braided, sinuous channel of Clear Creek to Golden and on to the plains in about 1890-1910. This photograph by L.C. McClure shows the tree-lined streets of the town, smokestacks of mills and hotels, South Table Mountain, and Castle Rock. (Courtesy Denver Public Library, Western History Collection.)

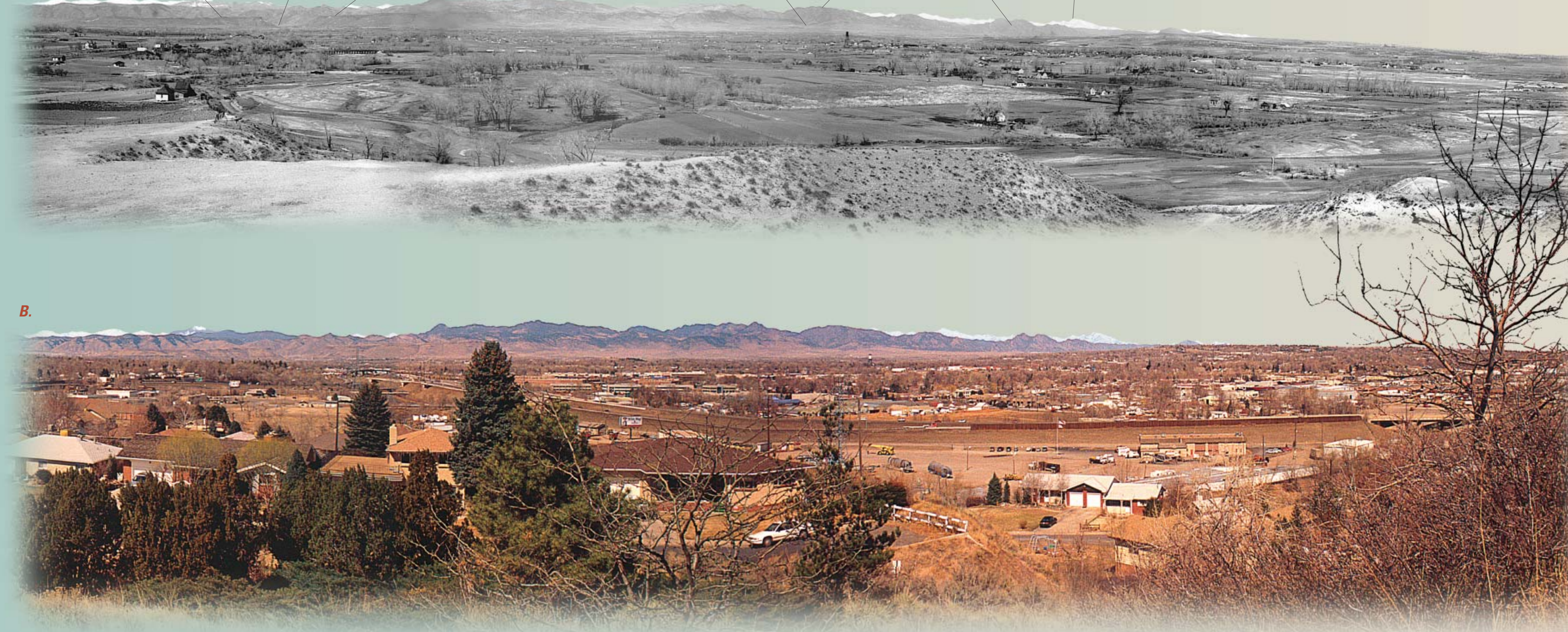
Wildlife Viewing

The reclamation of sand and gravel pits in the study area provides varied habitat in which wildlife may be seen. The urban landscapes include a mix of native and exotic vegetation: grasslands, cottonwood, willow woodlands, meadow, marsh, open water, suburban park, light industrial, and residential. Mammals in the Clear Creek corridor include badgers, prairie dogs, deer, beavers, red foxes, muskrats, and raccoons. The badger is a compulsive burrower and over time "a badger settlement becomes a series of small quarries." (The Living Desert, 2002). Birds that inhabit open, dry grasslands include small hawks, numerous songbirds, burrowing owls, and the State Bird of Colorado—lark bunting or prairie lark-finch. The burrowing owl is diurnal and one of the smallest owl species. It nests underground by digging a burrow, or more frequently it takes over a burrow dug by prairie dogs or pocket gophers. Birds such as ducks, great blue herons (the largest heron in North America), belted kingfishers, and red-winged blackbirds are attracted to aquatic habitats. The greenbelt from Prospect Park to Johnson Park (figs. 36 and 43 on sheet 2) offers excellent wildlife habitat (Gray, 1992).

Figure 29 (right). A variety of Colorado wildlife may be viewed within the study area. Seventy-five percent of wildlife species in Colorado are dependent upon riparian areas, which make up less than 1 percent of Colorado's landmass (State of Colorado, 2000). (Watercolor by Steve Elliott, courtesy Colorado Wildlife Viewing Guide Commission.)



Figure 29 (left). Panoramic view showing pasture lands and distant Front Range, photographed in 1910 by L.C. McClure from Inspiration Point in Denver Mountain Park. Inspiration Point (formerly Lookout Point) is a knoll of ground west of Sheridan Boulevard and north of Interstate 70. On the left of the photograph are North Table Mountain and South Table Mountain with the Clear Creek Valley between them. Railway bridges cross Clear Creek and electric power poles follow the mountain ridges (red line). Brick commercial buildings and a black water tower are visible in Arvada in the middle of the photograph. On the right are the Boulder Plateaus and snow-covered Longs Peak. Clear Creek is visible across most of the frame. (Courtesy Denver Public Library, Western History Collection.)



Panoramic Views

Figure 56 (left). The powerful change from farmlands to urban settlement across Clear Creek valley.

1910

A panoramic view west showing pasture lands and distant Front Range, photographed in 1910 by L.C. McClure from Inspiration Point in Denver Mountain Park. Inspiration Point (formerly Lookout Point) is a knoll of ground west of Sheridan Boulevard and north of Interstate 70. On the left of the photograph are North Table Mountain and South Table Mountain with the Clear Creek Valley between them. Railway bridges cross Clear Creek and electric power poles follow the mountain ridges (red line). Brick commercial buildings and a black water tower are visible in Arvada in the middle of the photograph. On the right are the Boulder Plateaus and snow-covered Longs Peak. Clear Creek is visible across most of the frame. (Courtesy Denver Public Library, Western History Collection.)

2002

B. Soaring growth by 2002 has filled the view of the Clear Creek valley with rooftops, highways, and power poles. Clear Creek is barely visible between two large Colorado blue spruce trees to the left of center. The mountain backdrop appears changeless over time, but it is changeless over geologic time. The water tower in Arvada is now painted white, and Interstate 76 cuts across most of the panoramic view.