

8.1 Water Resource-related Categories – Existing Conditions

This SS is located within a confined valley and is constrained on the north by steep rock faces and I-70 and on the south by U.S. 6/40. Clear Creek flows in an easterly direction and adjacent to and along the south side of I-70 through this SS.

8.1.1. Water Quality

CDOT currently operates a maintenance facility located at Empire Junction. This facility serves as an equipment maintenance yard and a storage area for road sand, and chemical deicers. The facility is located on the north side of Clear Creek and downstream of West Fork's confluence with Clear Creek. Recent observations indicated that sand and salt piles and hydrocarbons associated with the facility may be eroding and escaping to soils outside the facility and potentially into Clear Creek.

The Central Clear Creek Sanitation District operates a WWTP that discharges to Clear Creek within SS 6. Historically, ammonia-nitrogen and phosphorus concentrations were being discharged at unacceptable levels. Recently, the operations of this WWTP have improved to control the ammonia-nitrogen and phosphorus concentrations within the effluent (UCCWA, 2001). UCCWA has established a water quality monitoring site at the outfall of the Central Clear Creek Sanitation District WWTP.

Most tributaries draining to this SS of Clear Creek contain historic mines and waste piles. Several mine adits are intercepted or present, contributing point and nonpoint metal loads to Clear Creek in this SS. Ambient water quality criteria for zinc, cadmium, and copper (downstream from Spring Gulch) have periodically been exceeded in this SS as a result of historic mining (CDOW, 1998). Copper and zinc concentrations detected by CDOW within this SS were high enough to possibly induce chronic metal toxicity. A Total Maximum Daily Load (TMDL) for copper and zinc is being developed by CDPHE Water Quality Control Division for this SS. UCCWA has established a water quality monitoring site on Clear Creek near the town of Lawson.

Although the geology in the entire Clear Creek drainage is characterized as mineral-laden (metals) that vary in richness, this SS of Clear Creek demarks the relatively extensive mining and milling of metals rich ore. Historic mining has occurred throughout this SS, and tailings materials generated have been deposited within and adjacent to Clear Creek and its tributaries. Along with numerous historic tailings piles deposited along Clear Creek within this SS, two major abandoned mining operations are located adjacent to Clear Creek: the McClelland Mine east of Dumont and the Donna Juanita Mine west of Idaho Springs.

8.1.2 Hydrology/Hydraulics/Stream Morphology/Floodplains

Within SS 6, Clear Creek flows in an easterly direction at a gradient of approximately 3 percent. Numerous perennial streams enter Clear Creek within this SS, including the West Fork of Clear Creek, Mill Creek and Fall Creek from the north; and Silver Creek and Trail Creek from the south.

One trans-mountain diversion is associated with this SS. The Berthoud Pass Ditch transports water from the west slope to Hoop Creek (a tributary to the West Fork of Clear Creek). Water is then conveyed downstream via the mainstem of Clear Creek to points near the town of Golden where it is diverted for municipal use.

8.1.3 Wetland and Riparian Ecosystems

Palustrine scrub/shrub wetlands and palustrine-forested wetlands occur intermittently throughout SS 6, primarily in association with Clear Creek. These wetlands are adjacent (within approximately 50 feet) to Clear Creek, with the exception of an area immediately downstream from the West Fork of Clear Creek/Clear Creek confluence and the CDOT maintenance facility and an area in the town of Lawson, where the wetlands extend beyond 100 feet from Clear Creek. The downgradient portion of the CDOT maintenance facility is located on wetlands and seasonally may flood. Riparian areas generally occur adjacent to Clear Creek throughout this SS.

8.1.4 Aquatic-dependent Communities

According to CDOW fish population investigations conducted at two locations within this SS (i.e., below the West Fork of Clear Creek and below Spring Gulch) brown trout is the dominant fish species in this SS of Clear Creek. The location downstream from the West Fork of Clear Creek has exhibited a relatively high brown trout population, ranging from approximately 330 fish-per-acre in the spring of 1998 to approximately 830 fish-per-acre in the fall of 1995. The sampling location downstream from Spring Gulch has fewer brown trout. Population estimates at this location range from approximately 100 fish-per-acre the spring of 1998 to approximately 270 fish-per-acre in the fall of 1995. As noted by the CDOW, as the brown trout populations decreased downstream through this SS and downstream SS, the concentration of copper increased. The combination of elevated copper and zinc within this segment may result in lower growth rates of brown trout.

The brook trout population decreased in the main stem of Clear Creek between 1989 and 1996. CDOW sampling during 1997 and 1998 resulted in no more than three brook trout at the location downstream from the West Fork of Clear Creek, and no brook trout were collected downstream from Spring Gulch during the sampling program.

CDOW has stocked Snake River cutthroat trout in Clear Creek near Spring Gulch and, as a result, these fish are found upstream and downstream of this location. According to CDOW, the Snake River cutthroat trout do not reproduce in Clear Creek, but populations have historically been maintained by stocking. Stocking was curtailed in 1995 (CDOW, 1998). Longnose suckers have also been collected by CDOW on occasion within this SS.

Primary water-based recreational opportunities in SS 6 are fishing, rafting, and kayaking. The populations of fish—particularly brown trout—in this SS offer opportunity for angling.

8.2 Issues

8.2.1 Historical Mining (Mineral) Influences

Because of historic mining activities, the materials (e.g., heavy metals) generated—whether solid or in solution—continue to enter Clear Creek via surface water runoff or groundwater inflow, potentially adding to the metals concentrations and loading in Clear Creek (Figure 8-2). Disturbance of these areas through mining, processing, and excavation activities not associated with mining (e.g., I-70 construction) result in exposure of these minerals to oxidation and eventual transport to receiving streams such as Clear Creek. Additionally, numerous mine adits exist in the east portion of this SS and north of I-70. Many of these adits contribute to the metals loading of Clear Creek.

8.2.2 Adjacent Land Use

Discharge from the Central Clear Creek Sanitation District WWTP may contribute pollutant (nutrient) loading to Clear Creek.

8.2.3 Highway-related Construction, Operation and Maintenance Activities

Accidents involving the transportation of hazardous materials on I-70 impact Clear Creek. Because I-70 is a designated hazardous materials transportation route, the potential exists for such incidences to occur within this SS. Within this SS, accidents are common in the vicinity of Fall River and the town of Dumont.

Based on a review of current aerial photographs and wetland maps, construction of I-70 has eliminated or encroached upon approximately 17 acres of wetlands adjacent to Clear Creek.

Highway runoff containing traction sand (sand/salt mixture) and chemical deicers used for winter maintenance on I-70 and U.S.6/40 may be entering Clear Creek. The runoff affects the total dissolved or suspended solids and metals concentrations throughout SS 6.

8.2.4 Sedimentation

Sand from CDOT winter maintenance on U.S. 6 and I-70 may contribute to the sediment load in Clear Creek. However, sand usage decreases below 9,000 feet elevation. This entire SS is below 9,000 feet. The relatively steeper gradient within this SS increases the transport of these particles downstream.

8.2.5 Channelization/Downcutting

Because of the confined valley associated with Clear Creek within SS 6, the stream has been channelized or encroached on by I-70 and U.S. 6/40 construction (Figure 8-2). Of the 7 miles of Clear Creek in this SS, approximately 6 miles (85 percent) has been channelized or encroached upon as a result of highway development. The natural morphology of upper Clear Creek is described as a B2/B3 high gradient narrow mountain stream with coarse substrate and sinuosity typically greater than 1.2 (Rosgen, 1996). The historic sinuosity for this SS is estimated at 1.18. The current sinuosity is estimated to be 1.14, indicating slightly reduced sinuosity compared to historic or natural conditions as a result of channelization.

The channelization or encroachment (85 percent of the SS) of Clear Creek by highway construction in this SS has affected fish habitat (Figure 8-2). For the most part, this SS has demonstrated ability to support populations of brown trout, particularly immediately downstream from the West Fork of Clear Creek. It should be noted that, based on a review of historic photographs and recent observations of Clear Creek, in-stream habitat has improved over the years in the extensively channelized segments of SS 6. Prior to I-70 construction, placer mining activities had degraded stream habitat conditions in this segment Clear Creek. Although highway construction resulted in channelization of Clear Creek and habitat conditions may not be similar to pre-mining conditions, the overall stream habitat has improved since historic placer mining.

8.2.6 Habitat Reduction and Fragmentation

Although wetlands and riparian areas generally persist throughout this SS in association with Clear Creek, highway construction (channelization) has eliminated areas within these wetlands. Infrared photographs indicate the construction and operation of I-70 has removed or encroached on wetlands near the CDOT maintenance facility approximately 0.2 mile downstream from West Fork Clear Creek and where highway construction has caused channelization of Clear Creek. Channelization reduces floodplain area, increased bank slope, deepened the stream channel and, as a result, reduced the opportunity for wetland/riparian vegetation to become established. As previously mentioned, the highway has removed or encroached upon approximately 5 acres of wetlands within this SS.