

## 7.1 Water Resource-related Categories – Existing Conditions

SS 5 begins immediately downstream from Georgetown Lake dam where the stream continues to flow south of I-70 for approximately 2 miles before crossing under I-70 immediately upstream from the confluence with West Fork Clear Creek.

### 7.1.1. Water Quality

The CDOT storm water quality monitoring program initiated during the fall of 2000 (JFSA, 2000) includes one sampling location at the U.S. Geological Survey (USGS) gage on Clear Creek immediately upstream from its confluence with the West Fork of Clear Creek.

There is a large area of natural and road cut drainage washouts on the north side of I-70 opposite Clear Creek. During intense precipitation events, several drainages in this area contribute total suspended solids and sediment to Clear Creek.

The town of Georgetown maintains a wastewater treatment plant immediately downstream from the Georgetown Lake dam (Figure 7-2) that serves both Georgetown and Silver Plume. The plant is inadequately serving the existing population and is going to need major upgrades (Ballofet & Associates, 2000). Although the plant has not exceeded its permitted discharge limits, it has at times received an average daily flow that is approximately 60% greater than its permitted capacity. UCCWA has established a water quality monitoring site at the outfall of the town of Georgetown wastewater treatment plant.

Based on water quality analyses conducted by CDOT and the CDOW, ambient water quality criteria for zinc and cadmium have periodically been exceeded in this SS. The 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 the CDPHE Water Quality Control Division for this SS.

Disturbance to SS 5 due to mining for mineral-rich ores, or excavation activities not associated with mining (i.e., road cuts, rural development), result in the exposure of minerals to oxidation and transport to receiving streams.

### 7.1.2 Hydrology/Hydraulics/Stream Morphology/Floodplains

Within SS 5, Clear Creek flows in a meandering northeasterly direction at a gentle gradient of less than 2 percent. No major perennial streams confluence with Clear Creek in this SS. Most of the 3 miles of stream in SS 5 consists of natural montane stream morphology, including braided channels and wetlands. However, certain segments are channelized with boulder riprap through private land in this SS.

### 7.1.3 Wetland and Riparian Ecosystems

Palustrine scrub/shrub, palustrine emergent, and palustrine forested wetlands occur intermittently throughout SS 5, primarily in association with Clear Creek. The palustrine scrub/shrub wetlands are the most abundant wetland types in this SS. These wetlands are located immediately downstream from Lake Georgetown, near MP-223, and again in the vicinity of the West Fork Clear Creek confluence. The palustrine emergent wetlands are restricted to an area near MP-230.8 between Clear Creek and US 6. Palustrine forested wetlands are limited to an area near MP-230.8 (in association with the palustrine emergent wetlands) and again in the vicinity of the West Fork Clear Creek confluence. Riparian areas generally occur adjacent to Clear Creek throughout this SS. CDOT has recently acquired over 30 acres of land adjacent to Clear Creek within this SS with the intent of restoring, enhancing, or creating nearly 20 acres of wetlands and riparian habitat.

### 7.1.4 Aquatic-dependent Communities

According to CDOW fish population investigations conducted between 1988 and 1998, brown trout is the dominant fish species in this section of Clear Creek. Brown trout population estimates ranged from 270 to 650 fish-per-acre during this period; some of the highest densities of brown trout within the nine segments included in this assessment. Other fish potentially inhabiting SS 5 include Snake River cutthroat trout and brook trout. This SS affords quality brown trout habitat. Stream habitat near the middle of this segment appears to have benefited from in-stream habitat enhancement (pools and backwater created by boulder placement). The fish population offers opportunity for angling. Based on field observations this SS does not appear to be affected by sedimentation. The cumulative effects of sediments originating upstream may be ameliorated by Georgetown Lake serving as a sediment trap.

## 7.2 **Issues**

### 7.2.1 Historical Mining (Mineral) Influences

Although not documented, the excavation of the mineralized geology in SS 5, as a result of general development of the area, may contribute to increased metals loading in Clear Creek.

### 7.2.2 Adjacent Land Use

Discharge from the Georgetown wastewater treatment plant may contribute organic and inorganic pollutant loading to Clear Creek. Runoff from pasture and other private land development in this SS may contribute suspended solids and nutrients to Clear Creek.

### 7.2.3 Highway-related Construction, Operation and Maintenance Activities

Accidents involving the transportation of hazardous materials on I-70 could impact Clear Creek. Because I-70 is a designated hazardous materials transportation route, the potential exists for such incidences to occur throughout this SS.

Highway runoff containing traction sand and chemical deicers used for winter maintenance on I-70 may be entering Clear Creek. Current water quality monitoring by CDOT in SS 5 is designed to assess the potential concentrations of constituents in the creek during intense storm events, which is when it is believed runoff is transported to the stream.

Base on a review of current aerial photographs and wetland maps, construction of I-70 has eliminated or encroached upon approximately 5 acres of wetlands adjacent to Clear Creek.

The installation of culverts associated with the construction of I-70 and the frontage road (U.S. 6) may have resulted in only minor dewatering of wetlands in this SS.

### 7.2.4 Sedimentation

Within SS 5, Clear Creek may be affected by sedimentation originating from the application and erosion of traction sand on I-70 and US 6 (Figure 7-2). Sediment is also being conveyed to Clear Creek from natural and road cut drainage washouts along the south-facing hillsides. Effects from sedimentation within SS 5 are limited to these sources (i.e., not attributed to sources upstream from the section), since Georgetown Lake serves as a trap for sediments originating upstream.

Although sediment is expected to enter Clear Creek from the erosive south-facing hillsides, based on observations made during field visits to the area, sedimentation within this SS appears minimal. Furthermore, this SS has probably not been substantially impacted by upstream sedimentation because Georgetown Lake serves as trap for most sediment generated upstream.

### 7.2.5 Channelization/Downcutting

Clear Creek has been locally channelized or encroached on by I-70 construction (Figure 7-2). Of the 3 miles of Clear Creek in this SS, approximately 1.1 miles (37 percent) have been channelized or encroached on because of highway development. Most of the I-70 channelization occurs upstream of West Fork's confluence with Clear Creek. Additional channelization has occurred toward the middle of this SS to protect private property and I-70. The stream channel within this private property has been occasionally diked resulting in the natural wetland areas becoming upland areas. 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 of this SS is estimated to be 1.22. The current sinuosity is estimated at 1.20, indicating a slight reduction in sinuosity as a result of channelization.

The minor cutbacks of the steep hillsides immediately west of the highway during original I-70 construction may have facilitated downcutting of the drainages, particularly during intense precipitation events (Figure 7-2).

The minor extent of channelization or encroachment of highway construction in this SS has caused a slight reduction in overall fish habitat (Figure 7-2). However, this SS maintains good habitat overall, as indicated by fish-per-acre estimates provided by CDOW.

Channelization associated with the construction of I-70 at the downstream segment of this SS allows for limited fish habitat. However, segments upstream from this channelization provide some of the best Clear Creek habitat for brown trout.

### 7.2.6 Habitat Reduction and Fragmentation

Although wetlands and riparian areas generally persist throughout this SS in association with Clear Creek, I-70 channelization has reduced portions of these areas and has occasionally covered or encroached on these wetlands. Infrared photographs indicate the construction of I-70 has removed or encroached on approximately 0.3 mile of palustrine scrub/shrub wetlands between MP-229.6 and MP-230.0, near MP-230.6, and at MP-231. Palustrine-emergent and palustrine-forested wetlands have not been affected by I-70. Additionally, the dikes established along Clear Creek within the private property of this SS have reduced wetlands and riparian habitat by preventing flooding of these areas.

As previously mentioned, construction of I-70 has eliminated or encroached upon approximately 5 acres of wetlands adjacent to Clear Creek within this SS.