Watershed Management Plan for the Upper Lefthand Creek Watershed, Boulder County, Colorado

Lefthand Watershed Oversight Group

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4 Water Quality Concerns

Research conducted by the EPA (1995a) and the University of Colorado (Wood et al, 2004; Wood, 2004) identifies stream contamination by metals and acidity from inactive mines as a major threat to water quality. This topic is discussed in detail in Section 5 of this plan, and metal loading to streams is used as the driver for the site reclamation prioritization system presented in Sections 6, and the BMPs considered in Section 7.

At LWOG meetings and other forums, watershed stakeholders have identified other potential threats to water quality pertinent to the Lefthand Creek watershed, including sedimentation, nutrient loading, road salting, and dewatering. In general, little, if any, quantitative data is available on these topics. Therefore, this section addresses these water quality concerns, identifies data gaps, and recommends general courses of action for LWOG. Due to the lack of water quality data related to stream contamination other than metal loading, the water quality issues presented in this section will not be used in prioritization of sites for reclamation or in the discussion of BMPs. As more data becomes available to LWOG in the future, updates to the watershed plan may include management actions related to diverse water quality issues in addition to metal loading and acidity.

4.1 Sedimentation

Sediment in streams refers to rock, gravel, sand, clay, and silt particles which are large enough to settle onto the streambed during low-flow periods and in still-water areas such as pools. Sediments tend to enter the stream systems and move downstream during high flow periods, such as spring snowmelt and summer thunderstorms. When sediments settle to the streambed in large quantities the sediment clogs the spaces in between the rocks and gravel in the streambed. Excessive sediment in streams smothers aquatic habitat and may reduce the numbers and diversity of aquatic organisms that form the base of the food chain. During the summer of 2004, EPA researchers conducted a study of benthic macroinvertebrate (insect larvae) populations and habitats within the watershed. This study included evaluation of stream embeddedness from sediments and the impacts of sediments on macroinvertebrate habitats. This data will be incorporated into the Watershed Plan as it becomes available.

Sediment concentrations in streams also correspond to impacts on human health. The measure of the suspended particles content of water, measured in nephelometric turbidity units (NTUs), provides a surrogate measure of a water treatment plant's ability to remove hazardous microorganisms such as pathogens. In the Lefthand Creek watershed, a slow sand filter treatment plant treats water from James Creek for use by the town's 200 residents. The treatment plant has consistently failed to remove suspended sediments to the turbidity level of 1.0 NTU, which is required by the Safe Drinking Water Act. The CDPHE currently allows the plant to produce finished water with a turbidity of 5.0 NTU, the highest variance in effect in Colorado.

In addition to natural sources of sediment loading, observed anthropogenically-driven potential sediment loading sources in the Lefthand Creek watershed include off-

highway vehicle (OHV) use, sanding roads during icy conditions, and dirt and gravel driveways located near streams, and loose mine waste piles near streams.

4.1.1 Sediment Loading from Runoff

There are many sources of sediment loading to the streams of the Lefthand Creek watershed, including naturally sediment-rich runoff from rainfall and snowmelt events. According to a study of James Creek conducted by researchers at the University of Colorado, suspended sediment concentrations in stream water increase during periods of rapid snowmelt and heavy rainfall (Ryan and Duren, 2003). Additionally, forest fires such as the Overland Fire which burned approximately 3000 acres in the watershed on October 29, 2003, damage the vegetative cover which stabilizes steep hillsides adjacent to streams. Currently, local citizens, government officials, and agencies such as the USFS are working together to study the impact of the Overland Fire and to develop management plans which will lessen the risk of future forest fires. However, current conditions in the Lefthand Creek watershed suggest a high risk for future wildfires. Considering the impacts of forest fires on general ecosystem health and water quality, LWOG should support and participate in efforts to mitigate fire hazards.

4.1.2 Sediment Loading from OHV activity

In an analysis of sediment loading from a now closed OHV area located approximately 5 km upstream of the Jamestown water treatment plant on gravel-based, unmaintained County Road (CR) 102J, researchers at the University of Colorado mimicked OHVs by driving an all-terrain vehicle over a short portion of CR 102J that is covered by James Creek, and then tracking the transport of the sediment downstream (Ryan and Duren, 2003). The experiment showed that of the 150 kg of sediment added to the stream by the researchers, 50 kg (33%) traveled downstream the entire distance to the treatment plant. Additionally, the researchers monitored James Creek and tributary suspended sediment concentrations during one heavy rainfall event, finding that tributaries with a flow path that contacted CR 102J carried higher sediment loads than those tributaries not in contact with the road. The researchers concluded that sediment generation from both OHV use and tributary flow over CR 102J places additional sediment burden on the downstream water treatment system. The report supported closure of both the road and OHV area and called for restoration of the area. In 1999, the road and the OHV area were closed and JCWI and its partners are currently working on a restoration project of that closure area.

Currently, the area with the heaviest recreational OHV use occurs in the Lefthand OHV area, located on USFS property off of Lefthand Canyon Drive approximately 9.6 km from Highway 36. Unfortunately, there is a lack of data describing the types and frequency of use of this area, as well as potential sediment loading impacts. Adam Mehlberg, president of the Trailridge Runners 4-Wheel Drive Club which sponsored a restoration effort in the Lefthand OHV area in 2004, provided some qualitative use information (personal communication, 2005). Mt. Mehlberg describes use of the Lefthand OHV area as heavy, with the primary user groups being vehicles and motorcycles, with all-terrain vehicles and mountain bikes used to a lesser degree. Recreationalists utilize the area year-round, but less often during winter months. Peak use occurs on the weekends. Mr. Mehlberg points out the need for future projects to

revegetate damaged hillsides and to provide mechanisms to keep recreationalists on designated routes. The USFS is in the process of eliciting community feedback for the development of the Lefthand Canyon Travel Plan, which will include a management plan for the Lefthand OHV area.

With the exception of the University of Colorado report outlined above, no formal studies of the sources or magnitudes of sediment loading within the Lefthand Creek watershed have been conducted. This represents a significant gap in the quantitative data available to LWOG for watershed planning; LWOG should attempt to find funding to conduct sediment loading and impact studies, and will strongly encourage local, state, and federal agencies, universities, and other parties to collect such data. Similarly, statistics describing the frequency and intensity of all types of recreational uses of the watershed are sparse and need to be supplemented when possible.

4.2 Nutrient Loading

Nutrients in streams, primarily nitrogen and phosphorus, are essential for healthy aquatic life; however, an overload of nutrients in a stream often leads to excessive algal growth and productivity. This, in turn, may reduce the availability of dissolved oxygen to aquatic organisms, alter stream habitats, lead to unfavorable aesthetics and odors, and lead to the release of heavy metals from streambed sediments. Sources of increased nutrient loads to streams generally include municipal and industrial discharges, runoff of lawn and garden fertilizers, and agricultural runoff. All of these nutrient sources may be contributing factors in the agricultural and residential areas in the eastern plains portion of the Lefthand Creek watershed. In the mountainous western region of the watershed, home septic systems and septic leach fields present a potential nutrient-loading concern.

As with sediment, little nutrient data has been collected within the streams of the Lefthand Creek watershed. Nutrient data from the summer 2004 EPA-led sampling event will be available to LWOG in the future. LWOG should encourage and participate in efforts to collect such data and incorporate this information into watershed management planning.

4.3 Road Salting

Along the roadways of the Lefthand Creek watershed, approximately 40 km of which lie adjacent to streams, Boulder County Road Maintenance workers apply a 5 – 15% salt mixture as a snow and ice melting agent. Additionally, the County applies magnesium chloride (MgCl) as a dust control and soil stabilizing product to gravel roads during dry summer months (Boulder County, 2005) In high concentrations for extended periods of time, chloride in streams is toxic to aquatic life. Chloride may also negatively impact vegetation near the roadside; in the Lefthand Creek watershed roadside vegetation is often also an important part of the riparian corridor. Other potential concerns related to road salting include increased availability and toxicity of heavy metals and corrosion of pavement, bridges, and culverts.

4.4 Dewatering

Dewatering of streams—the result of diverting water from a stream for agricultural, municipal, or other uses—can lead to increased stream water temperatures

and algal growth, and harm to fisheries. This issue has not been studied in the Lefthand Creek watershed, and the impacts of dewatering in this watershed are unknown.

4.5 Summary of Water Quality Issues

This chapter has briefly discussed key threats to water quality that likely exist in the Lefthand Creek watershed. Toxic metals and acidity from inactive mining sites, currently the most prominent source of water quality degradation, will be discussed in detail in the following chapters. For all other potential water quality issues, including sedimentation, excessive nutrient loading, chlorination, and dewatering, the current deficit of quantitative data prohibits LWOG from determining the actual water quality impacts of these potential threats, and from identifying reclamation priorities and appropriate reclamation activities. Considering this, LWOG should encourage and participate in future data collection activities that allow for more detailed watershed characterization. In particular, LWOG should encourage and participate in further data collection by attempting to secure funding for further watershed characterization. Such data can be incorporated into future updates of the Watershed Plan. It is important to note, however, that the lack of data should not preclude LWOG from participating in efforts to manage the watershed, such as the developing a USFS travel management plan. Additionally, LWOG should consider taking pre-emptive measures, such as public outreach and education, to focus on preventing the occurrences or exacerbation of the potential water quality threats mentioned here. For instance, LWOG could promote proper driveway building practices that lessen sediment loads from gravel driveways to streams.