Appendix E

Point Sources

Framework Water Quality Restoration Plan and Total Maximum Daily Loads (TMDLs) for the Lake Helena Watershed Planning Area:

Volume II – Final Report

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1.0 POINT SOURCES

There are eight permitted point sources and seven permitted stormwater discharges in the Lake Helena watershed (Figure 1). There are also six small facilities that are not required to have Montana Pollutant Discharge Elimination System (MPDES) permits. The following sections summarize each facility's flow, and permitted nutrient and metals data. Furthermore, the receiving waterbody, and any other information that might be relative to the Lake Helena TMDL Planning Area are discussed. Information was obtained from EPA's online Permit Compliance System Database (PCS), from Montana DEQ paper records, from the 1998 Helena Area Wastewater Treatment Facility Plan (Damschen & Associates, Inc.), and from personal communications with Montana DEQ staff.

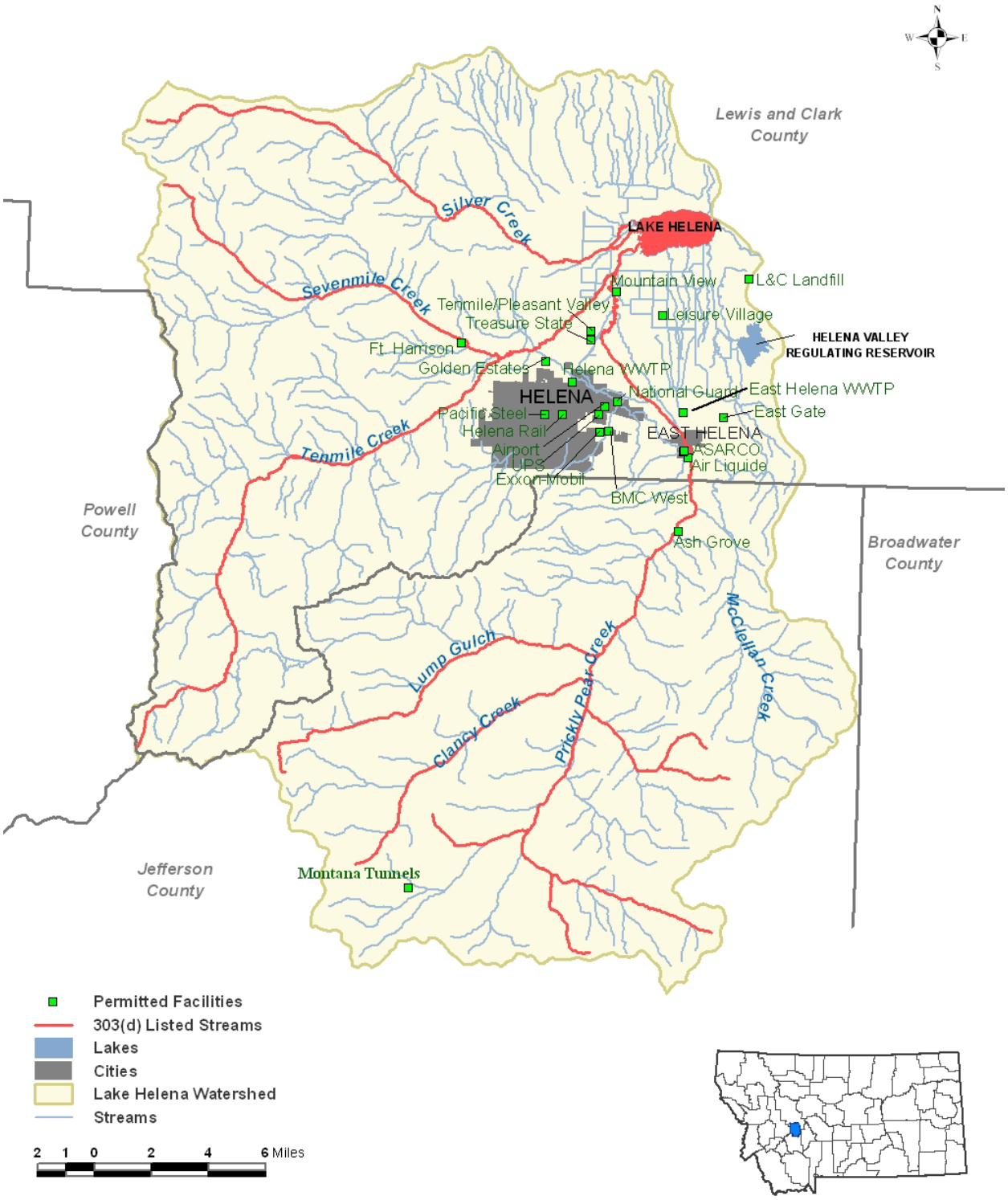

Figure 1. Location of point sources in the Lake Helena watershed.

1.1 MPDES Permits

The following sections summarize the MPDES permitted point sources in the Lake Helena watershed.

1.1.1 Evergreen Nursing Facility (MT0023566)

The Evergreen Nursing Facility is located in Clancy, Montana in the Prickly Pear Creek subwatershed. The facility operates a secondary treatment activated sludge wastewater system with a design flow of 15,000 GPD. Under Montana DEQ Permit #MT0023566 (issued for December 1995 to November 2000), the facility has a permitted discharge of 15,000 GPD, and does not currently have permit limits for any species of nitrogen or phosphorus. Thirty-four occupants along with all support staff for the Evergreen Nursing facility are served by this system. Discharge from the facility enters a small cooling pond (1-5 hour retention time) before finally discharging to Prickly Pear Creek (Jim Llyod, Personal Communications, September 27, 2005). Water from the facility's geothermal heating system is also routed through the retention pond. The average observed flow rate from January 1998 to April 2005 was 6,876 GPD, with an average TN concentration of 11.9 mg/L, an average TP concentration of 2.9 mg/L, and an average NO_2NO_3 concentration of 8.4 mg/L.

1.1.2 City of Helena WWTP (MT0022641)

The City of Helena wastewater treatment facility is located in the northeast section of Helena, Montana in the Prickly Pear Creek subwatershed. Prior to 2001, the facility operated a secondary treatment biotower system. In June of 2001, an advanced secondary treatment wastewater system with nitrification/ denitrification went online. Under Montana DEQ Permit #MT0022641 (issued for December 1996 to October 2001), the facility has a permitted discharge of 6.2 MGD, and permitted ammonia limits that vary per month (see Montana DEQ Circular WQB7). No other nutrient parameters have permit limits. At the time of the permit application, the system served approximately 30,000 people from the City of Helena and surrounding areas, encompassing an area of 15.8 square miles. With 30,000 people, the system is running at half capacity (assuming 100 GPD per person). The City of Helena currently has plans to annex an additional 5.3 square miles in the Tenmile Creek and the Prickly Pear Creek subwatersheds (see Figure 2). Transitional areas of concern (15.9 sq. mi.) have also been identified for possible annexation at a later date.

Discharge from the Helena treatment plant enters an unnamed irrigation ditch that originates near the facility, and eventually flows into Prickly Pear Creek. However, during the irrigation season (April-October), irrigators withdraw water from the ditch, and surface water flows from the plant rarely reach Prickly Pear Creek. Solid waste is either composted, land applied, or stored in a landfill. The average observed flow rate from June 2001 to July 2005 was 3.1 MGD, with an average TN concentration of 7.9 mg/L, an average TP concentration of 4.9 mg/L, and an average NO_2NO_3 concentration of 5.2 mg/L.

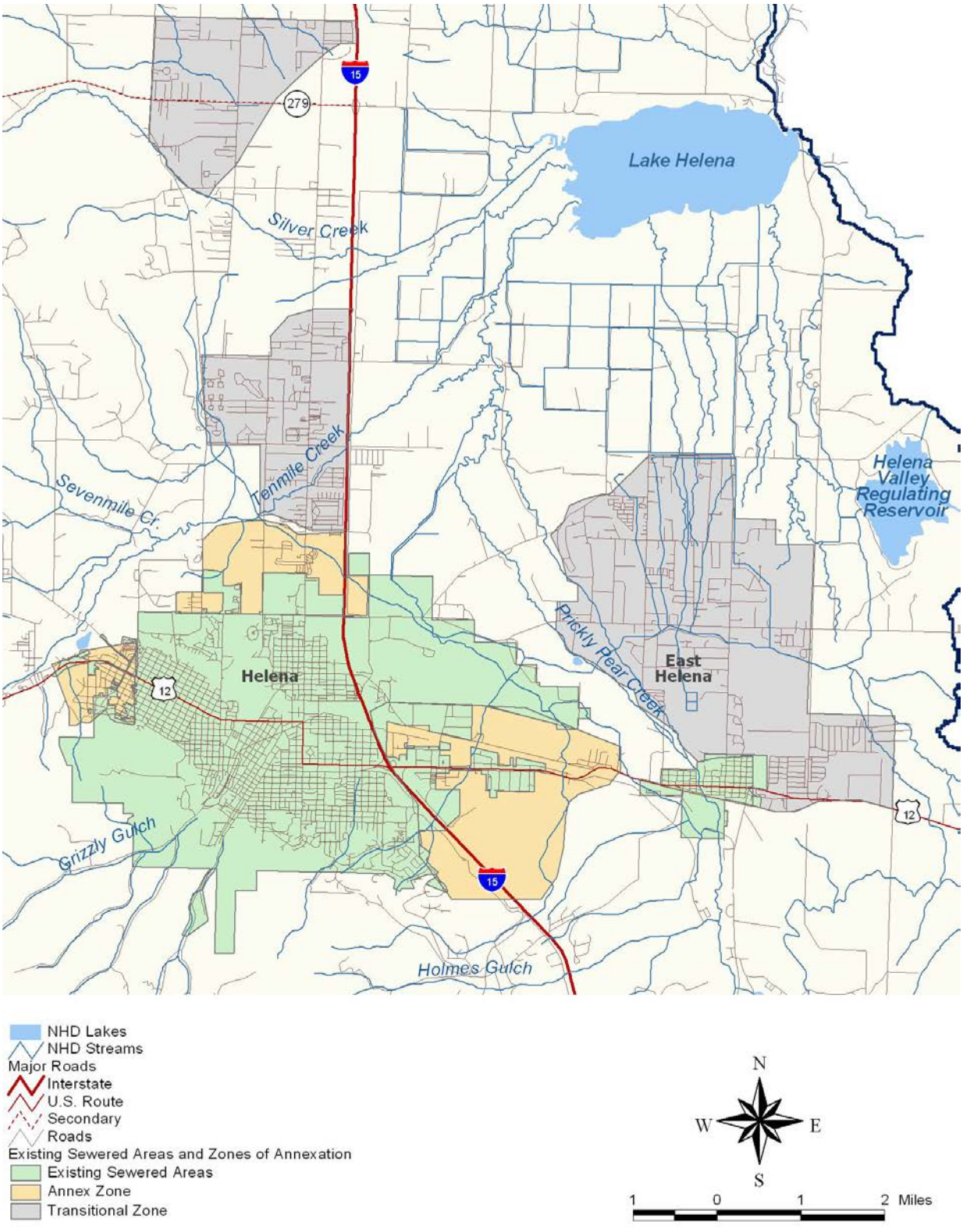

Figure 2. Area served by the city of Helena and East Helena wastewater treatment systems.

1.1.3 City of East Helena WWTP (MT0022560)

The City of East Helena wastewater treatment facility is located approximately 0.5 miles north of the city in the Prickly Pear Creek subwatershed. Prior to 2003, the facility operated three partially mixed ponds with a designed retention time of 30-days. In 2003, the plant was renovated and now operates an advanced secondary treatment activated sludge system with nitrification. Under Montana DEQ Permit #MT0022560 (issued for April 1997 to March 2002), the facility has a permitted discharge of 0.43 MGD, permitted TP load of 20 lbs/day, and a permitted TN load of 80 lbs/day. At the time of the permit application, the system served approximately 1,673 people from East Helena and the surrounding area (excluding the Eastgate Subdivision), encompassing an area of approximately one square mile (see Figure 2). With 1,673 people, the system is running at 39 percent of capacity (assuming 100 GPD per person).

Discharge from the East Helena treatment plant enters an unnamed ditch that discharges into Prickly Pear Creek. The average observed flow rate from January 2003 to July 2005 was 0.20 MGD, with an average TN concentration of 23.2 mg/L, an average TP concentration of 3.6 mg/L, and an average NO_2NO_3 concentration of 14.3 mg/L. Ammonia concentrations were non-detectable for most sampling events (less than 0.1 mg/L). Prior to the plant upgrade, ammonia concentrations were much higher (average of 4.1 mg/L) and NO_2NO_3 concentrations much lower (average of 1.0 mg/L). The current values reflect the facility's new nitrification system, which converts ammonia to nitrate and nitrite.

1.1.4 ASARCO (East Helena Lead Smelter) (MT0030147)

The ASARCO wastewater treatment facility is located in the City of East Helena, Montana in the Prickly Pear Creek subwatershed. Due to the history of plant operations and upgrades, wastewater flows and quality have dramatically changed over the years. This analysis focuses on the operation of the ASARCO facility from April 2001 (when the plant stopped full operations) through the present (September 2005).

Currently, the ASARCO facility operates a three-phase high-density sludge (HDS) wastewater treatment system. Under Montana DEQ Permit #MT0030147 (issued for November 1996 to September 2001), the facility has a permitted discharge of 158,400 GPD, and a load based permit for various metals. Permitted metals loads include arsenic (2.55 lbs/day), cadmium (0.2061 lbs/day), copper (2.354 lbs/day), lead (0.515 lbs/day), and zinc (1.88 lbs/day). No species of nitrogen or phosphorus have permit limits. Since the plant is not currently operational, the wastewater facility currently only treats water from remediation wells and onsite general water use (bathrooms, sinks, etc.). Water from these sources is stored in large tanks, and then is processed by the treatment plant when needed. Therefore, discharge from the facility only occurs several times per month (Jim Llyod, Personal Communications, September 27, 2005).

The ASARCO facility has a 4.6 CFS water right for Prickly Pear Creek dating back to 1862, which it uses to fill two ponds located on the property. Discharge from treatment plant then enters the unnamed downstream (lower) pond, which has approximately a 10-day retention time. The pond is directly connected to Prickly Pear Creek. The average observed flow rate from April 2001 to August 2005 (during months having flow) was 33,535 GPD, with 19 months having no discharge. No TN or NO_2NO_3 data have been collected at the facility. TP concentrations averaged 0.08 mg/L, and total ammonia nitrogen averaged 1.2 mg/L.

1.1.5 Golden Estates Subdivision (MTX000135)

The Golden Estates Subdivision is located approximately 0.3 miles north of the City of Helena in the Prickly Pear Creek subwatershed. The subdivision operates a pressure dosed subsurface drainfield with a design flow of 12,600 GPD. Under Montana DEQ Permit #MTX000135 (issued for September 2002 to September 2007), the facility has a permitted discharge of 12,600 GPD, and has load based permit limits for total nitrogen and total phosphorus (2.42 and 1.11 pounds per day, respectively). At full build out, 42 homes in the Golden Estates Subdivision are served by this facility (approximately 101 people). Discharge from the facility enters the drainfield and groundwater. The average observed flow rate from March 2004 to June 2005 was 6,289 GPD, with an average TN concentration of 28.1 mg/L, and an average TP concentration of 6.8 mg/L. No nitrate-nitrite or ammonia data were available.

1.1.6 Ash Grove Cement Company (MT0000451)

The Ash Grove Cement Company is located Montana City, Montana in the Prickly Pear Creek subwatershed. The facility operates two sedimentation ponds that are used to dispose of process water (Montana DEQ Permit #MT0000451). The permit was issued for March 1996 to October 2000. The facility has no permit limits for flow or nutrients. Water generally infiltrates into the groundwater, and any overflows from the sedimentation basins flow into Prickly Pear Creek. In 91 months of sampling (January 1998 to July 2005), there were no discharge events from the ponds.

1.1.7 Air Liquide (MT0000426)

The Air Liquide Facility is located in East Helena, Montana in the Prickly Pear Creek subwatershed. The facility discharges non-contact cooling water (Montana DEQ Permit # MT0000426) into Prickly Pear Creek. The permit was issued for December 2003 to January 2009. The facility has no permit limits for flow, metals, or nutrients. Water is discharged into a drainage ditch that flows into Prickly Pear Creek. Average discharge from the facility between March 2004 and June 2005 was 20,808 GPD, and the facility is not required to monitor nutrient concentrations in the industrial effluent.

1.1.8 Montana Tunnels Mine (MT0028428)

The Montana Tunnels Mine is an open pit gold mine located approximately 7 miles southwest of Jefferson City, Montana in the Spring Creek, Clancy Creek, and Corbin Creek subwatersheds. The Montana DEQ Permit (MT0028428) covers an area of 2,116 acres, although only 1,146.4 acres are permitted for disturbance (MDEQ, 2002). In 2002, an environmental assessment was approved by Montana DEQ to allow Montana Tunnels, Inc. to expand the mining operation by 17.2 acres. The Montana Tunnels Mine produced 33,743 ounces of gold in 2004, and also had payable production of 970,751 ounces of silver, 10,064,265 pounds of lead and 26,222,805 pounds of zinc (Apollo Gold, 2005).

According to Montana DEQ, mill process water and storm water runoff are contained in a closed loop system that recycles water for the mill operations (Personal Communications, Jim Lloyd, November 22, 2005). The closed system is comprised of a sedimentation basin in the Pen Yan Creek watershed, the mill, the mine, and the tailings impoundment. No surface water discharges have been recorded in the Montana DEQ permit records (1987-2005).

Permit limits for the Montana Tunnels Mine are 0.29 mg/L for arsenic, 0.004 mg/L for cadmium, 0.01 mg/L for copper, 0.05 mg/L for lead, and 0.12 mg/L for zinc. It should be noted that the current arsenic permit limit is 0.28 mg/L greater than revised Montana DEQ human health arsenic standard of 0.01 mg/L.

1.2 Stormwater Permits

The following sections summarize the stormwater permits in the Lake Helena watershed.

1.2.1 ASARCO (MTR000072)

ASARCO has a stormwater permit (MTR000072) that was issued for January 2002 through September 2006. Stormwater from the facility is routed into a sedimentation basin that is designed to accommodate a 50-year storm event. When needed, discharge from the basin flows into the hay fields adjacent to the facility. However, no discharge has been recorded from the basin.

1.2.2 Helena Regional Airport (MTR000271), National Guard (MTR000428), and UPS (MTR000334)

The Helena Regional Airport is located in the northeast section of Helena, Montana in the Prickly Pear Creek subwatershed. The facility has a permit (Montana DEQ Permit #MTR000271) to discharge stormwater into multiple ponds that eventually drain to Prickly Pear Creek, the Helena Irrigation Canal, the City of Helena sewer system, and groundwater. The permit was issued for January 2002 through September 2006. The Helena Airport stormwater drainage system is complex in that it receives water from a large area including portions of East Helena, Interstate 15, and the upper east section of Helena (From Saddle Mountain to the Airport). Furthermore, there are multiple ponds draining to multiple waters, which make tracking and monitoring difficult. Between June 2002 and June 2005, there were no reported discharge events from the detention ponds. Both the Army National Guard (Montana DEQ Permit #MTR000428) and the United Parcel Service (Montana DEQ Permit #MTR000334) facilities are located at or near the Helena Airport, and essentially share the same stormwater runoff system.

1.2.3 Montana Rail Link (MTR000361)

Montana Rail Link is located in central Helena, Montana in the Prickly Pear Creek subwatershed. The facility has a permit (Montana DEQ Permit #MTR000361) to discharge stormwater into the City of Helena storm sewer via several storm drains, ditches, and vaults. The permit was issued for January 2002 through September 2006, and addresses runoff from 34 acres of the Montana Rail Link Facility. Between June 2002 and June 2005, there were five reporting periods (one reporting period equals 6 months) with runoff events, and the average flow was 20,000 GPD. Two reporting events had no flow. No nutrient data were available for the runoff events.

1.2.4 Pacific Steel and Recycling (MTR000430)

Pacific Steel and Recycling has a permit (Montana DEQ Permit #MTR000430) to discharge stormwater into an onsite detention pond designed to contain a 25 year storm event. The pond then discharges into the City of Helena Storm Sewer, which flows to Tenmile Creek. The permit was issued for October 2001 through September 2006, and addresses runoff from the recycling yard. The facility is not required by Montana DEQ to monitor stormwater runoff.

1.2.5 Ash Grove Cement Company (MTR300113)

The Ash Grove Cement Company is located Montana City, Montana in the Prickly Pear Creek subwatershed. The facility operates two sedimentation ponds that are used to dispose of onsite stormwater (Montana DEQ Permit #MTR300113) and process water (see Section 1.1.6). The permit was issued for March 1996 to October 2000. The facility has no permit limits for flow or nutrients. Water generally infiltrates into the groundwater, and any overflows from the sedimentation basins flow into Prickly Pear Creek. In 91 months of sampling (January 1998 to July 2005), there were no discharge events from the ponds.

1.2.6 Air Liquide (MTR000006)

The Air Liquide Facility is located in East Helena, Montana in the Prickly Pear Creek subwatershed. The facility discharges onsite stormwater (Montana DEQ Permit #MTR000006) into Prickly Pear Creek. The permit was issued for December 2003 to January 2009. The facility has no permit limits for flow or nutrients. Water is discharged into a drainage ditch that flows into Prickly Pear Creek, and no monitoring data were available for stormwater runoff.

1.2.7 Lewis and Clark County Landfill (MTR000363)

The Lewis and Clark County Landfill is located approximately two miles southeast of Lake Helena in the subwatershed draining directly to Lake Helena. The facility has a permit (Montana DEQ Permit #MTR000363) to discharge stormwater into a ditch draining to Lake Helena. The permit was issued for April 2002 through September 2006. In 1999, the facility renovated the south drainage ditch and created a detention pond with 150,000 square feet of capacity capable of containing a 50-year storm event. Stormwater infiltrates into the groundwater through this system. Between June 2002 and December 2004, there were no reported discharge events from the detention pond.

1.3 Non-Permitted Discharges

The following sections summarize the non-permitted point sources in the Lake Helena watershed.

1.3.1 Eastgate Subdivision (No DEQ Permit)

The Eastgate Subdivision Homeowners Association is located approximately one mile northeast of the city of East Helena in the subwatershed draining directly to the Helena Valley irrigation system, and ultimately Lake Helena. The subdivision currently operates a wastewater treatment system consisting of two mechanically aerated ponds that are designed to treat 0.15 MGD. Montana DEQ does not require a permit from this facility. Final effluent is disposed via irrigation to cropland, and this system is currently in compliance and meeting design specifications. The concentrations reported for total nitrogen and total phosphorus after stabilization are of 14.5 mg-N/L and 5 mg-P/L. No groundwater monitoring data are available.

1.3.2 Treasure State Acres Subdivision (No DEQ Permit)

The Treasure State Acres Subdivision is located approximately 1.5 miles north of the city of Helena (Helena Valley) in the Prickly Pear Creek subwatershed. There is currently a wastewater treatment system consisting of two storage ponds treating 0.1 MGD. Montana DEQ does not require a permit from this facility. There is currently insufficient pond storage capacity for the population served by the ponds. Therefore, full treatment is unlikely. Effluent is applied to cropland. However, there is insufficient pond

storage capacity for the population served, so full treatment is unlikely**.** The Treasure State system is designed to discharge via land application and should have no seepage or direct discharge. If this system were operating as designed, annual TN loads would decrease from 0.07 to 0.04 mt/yr. The TP loads would decrease from 0.11 to 0.07 mt/yr.

1.3.3 Tenmile and Pleasant Valley Subdivisions (No DEQ Permit)

The Tenmile and Pleasant Valley subdivisions are located approximately 1.5 miles north of the City of Helena (Helena Valley) in the Prickly Pear Creek subwatershed, and just north of the Treasure State Acres subdivision. Tenmile and Pleasant Valley are served by a 0.09 MGD wastewater treatment system consisting of four ponds designed for total retention with disposal via evaporation. Montana DEQ does not require a permit from this facility. Though current wastewater flows should fill all four ponds, only one pond currently fills. Water balance calculations performed by the authors of the Facility Plan conclude that excessive seepage is occurring from the ponds. Because of this, Montana DEQ is currently pursuing enforcement action against the subdivision (Jim Llyod, Personal Communications, September 27, 2005). It is assumed that 25 percent of the flow is discharged to the subsurface with concentrations typical of "stabilization pond effluent" and that 75 percent of the effluent is discharged to the subsurface at "after sedimentation" concentrations.

1.3.4 Leisure Village Mobile Home Park (No DEQ Permit)

The Leisure Village Mobile Home Park is located approximately 1.5 miles northeast of the city of Helena in the Helena Valley, and it is located in the subwatershed draining directly to Lake Helena. Four treatment/storage ponds receiving 0.1 MGD serve the Leisure Village Mobile Home Park. Montana DEQ does not require a permit from this facility. Only one pond currently fills, but waste flows are sufficient to fill all four ponds. It is assumed that 25 percent of the flow is discharged to the subsurface with concentrations typical of "stabilization pond effluent" and that 75 percent of the effluent is discharged to the subsurface at "after sedimentation" concentrations.

1.3.5 Mountain View Academy (No DEQ Permit)

The Mountain View Law Enforcement Academy is located approximately 3.5 miles north of the city of Helena in the subwatershed draining directly to Lake Helena. The academy currently possesses two small, facultative treatment ponds that treat 0.007 MGD. Montana DEQ does not require a permit from this facility. Effluent discharge occurs by evaporation, seepage, and direct discharge to Prickly Pear Creek. There is no evidence that the system is not operating as designed, so it is assumed that 100% of the flow discharges to Prickly Pear Creek with stabilization pond effluent values. No surface area information or actual flow measurements are available to account for evaporative losses.

1.3.6 Fort Harrison (No DEQ Permit)

The Fort Harrison treatment ponds are located approximately 1.8 miles northeast of the city of Helena in the Sevenmile Creek subwatershed. Prior to 2004, The Fort Harrison facility treated wastewater from Fort Harrison, the National Guard, and the VA Center/Hospital. At the time, Montana DEQ did not require a permit from this facility. Currently, the facility is closed. Prior to 2004, two 5-acre facultative treatment ponds received 0.07 MGD of wastewater.

1.4 City of Helena MS4 Stormwater Permit (MTR040003)

For areas with a population below 50,000, the federal Phase II Stormwater regulations require states to establish designation criteria for use in designating which small MS4s must develop storm water management programs. The State of Montana has decided that the City of Helena falls under the regulations of the small MS4 program, and therefore requires a stormwater permit. Montana DEQ received the draft MS4 permit (#MTR040003) in March 2003. Currently, there are no permit limits for the city stormwater system.

On June 1, 2005, USEPA and PBS&J employees toured the stormwater system with personnel from the Helena Utility Maintenance Department. The purpose of the field assessment was to observe flows and outfalls throughout the city to better understand the Helena stormwater system. June 1, 2004 was one of the wettest days in 2004, and Helena received almost 1.5 inches of rain on this day. The tour was conducted after more than 0.75 inches of rain had fallen. The following paragraphs summarize the observed flows and outfalls from the tour.

The first sites visited were the main outfall locations of the Airport and Bull Run basins (numbers 1 to 3, see Figure 3). Water from both of these basins is ultimately discharged to the Prickly Pear subwatershed upstream of the Helena WWTP. The majority of stormwater runoff from the Bull Run basin is routed through the Airport settling ponds. The settling ponds appeared to retain quite a bit of flow, as very little water was seen exiting the Airport outfall locations (numbers 1 and 2 on Figure 3). The runoff from the two outlet locations viewed will ultimately discharge to groundwater and Prickly Pear Creek

Site 3 on Figure 3 is actually the outfall location of stormwater mixed from the Airport and Bull Run basins and the Davis Gulch Basin. Water was seen ponding here behind the Helena Valley Irrigation Canal (HVIDC). Jim Wilbur of the Lewis and Clark County Water Quality Protection District reported that on occasion this runoff will discharge to the Helena Valley Irrigation District Canal (HVIDC).

Site 4 on Figure 3 is the outfall location of stormwater from the Davis Gulch Basin. Stormwater is routed through a series of ponds, with very short retention times. Near the city boundary (Custer Avenue), the outfall flow from the "K-Mart ponds" is split and approximately half flows under the I-15 and along Custer Avenue to outfall location 3, while the remainder flows north along I-15 and discharges to the HVIDC. Ken Olsen of the Helena Valley Irrigation District reported that the City is aware of this situation and has been asked to address this matter. Some stormflow along Montana Avenue from the Last Chance Gulch Basin was seen ponding in fields on the north side of Custer Avenue. Based on patterns visible on the aerial photos, it is likely that this flow is eventually routed to discharge to the same location as the Davis Gulch Basin on the HVIDC at I-15.

Site 5 on Figure 3 is the major outfall location of stormwater from the Last Chance Gulch Basin. Stormwater south of this area is routed to Nature Park, an old placer mining site that now has a ravine that carries flow. Within less than a quarter of a mile at Cole Avenue, the surface flow discharges to groundwater.

Site 6 on Figure 3 is the major outfall location of stormwater from the West Basin. Stormwater in this basin is routed through a series of wetlands, with very short retention times. The wetlands outfall flows to Crystal Spring Creek, a natural spring that empties to Tenmile Creek. According the Jim Wilbur, the Crystal Spring area was once a large wetland. The County Fairgrounds, as well as the Dunbar subdivision and the developing Crystal Springs Subdivision are built on the historical wetland area. Crystal Spring drains flow from the Fairgrounds trough a series of pipes, including one from the duck pond. The Dunbar subdivision is one of the areas in the valley that has been reported as having groundwater contamination from nitrates. The lots are too small to relocate wells and septic systems, so

the city is planning to annex the subdivision to city water and sewer. The new Crystal Springs Subdivision has a 200-foot setback requirement from Crystal Spring. The Water Quality Protection district is trying to find landowners downstream of the Crystal Springs Subdivision who are willing to restore some wetland area along the spring.

In October of 1999, the Lewis and Clark County Water Quality Protection District submitted a TMDL mini-grant report on the assessment of wetland treatment of stormwater runoff for the City of Helena. Included in the report are surface and groundwater samples collected in the Crystal Spring Area pre-runoff and during storm events.

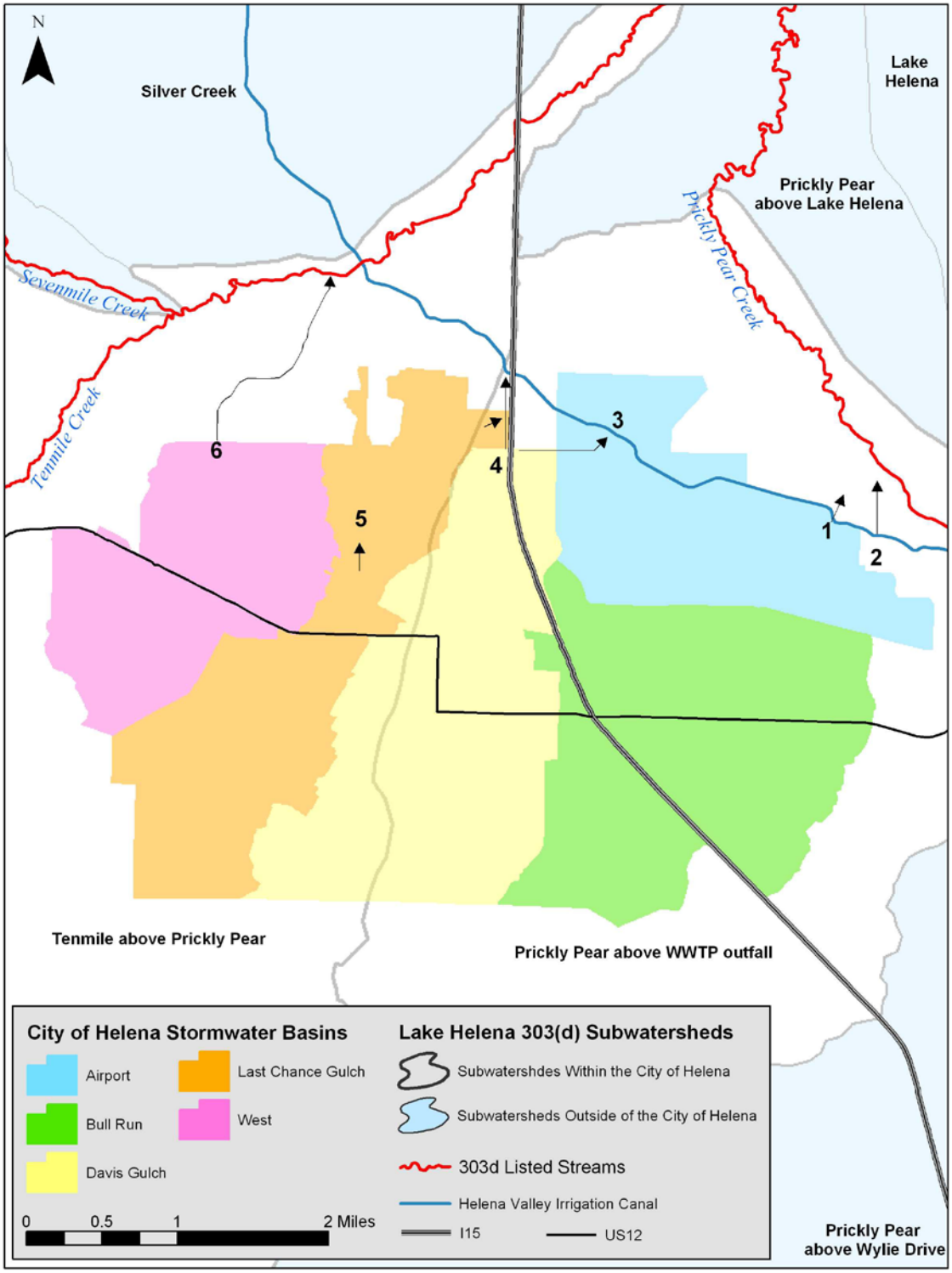

Figure 3. City of Helena Stormwater Basins with respect to the 303(d) Listed Streams and Subwatersheds

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