Lost Trail Rest Area Source Delineation and Assessment Report (PWSID # MT0062213)

September 2011

Prepared for:

Environmental Services
2701 Prospect Avenue
Helena, MT 59620-1001

Prepared by:

620 W. Addison St.
Missoula, MT 59801

Contents

Section 1
Introduction and Purpose

This source water delineation and assessment report (SWDAR) for a transient public water supply is intended to meet the technical requirements of the Montana Source Water Protection Program (DEQ, 1999) and the Federal Safe Drinking water Act (EPA, 1996). Territorial-Landworks, Inc. prepared this report under contract with the Montana Department of Transportation (MDT).

Public Water Supply:	Lost Trail Rest Area (PWSID # MT0062213)
Location:	Ravalli County 15 miles South of Sula, Montana US-93, Montana/Idaho Border Section 04, Township 02S, Range 19W
Report Date:	September 2011
Contact:	Jason Shorten MDT Missoula Division 2100 West Broadway PO Box 7039 Missoula, MT 59807 406-523-5800
Report Author:	Andrea Day, P.E. Territorial-Landworks, Inc. 620 W. Addison St. Missoula, MT 59801 (406) 721-0142

The Montana Source Water Protection Program is a practical and cost-effective approach to protecting public drinking water supplies from contamination. A major component of the Montana Source Water Protection Program is termed delineation and assessment. The emphasis of the delineation and assessment report is identifying significant potential contaminant threats to public drinking water sources, assessing susceptibility to those threats in order to provide the basis needed to develop a source water protection plan for *Lost Trail Rest Area.*

Delineation is a process whereby areas that contribute water to aquifers or surface waters used for drinking water, called source water protection areas, are identified on a map. Geologic and hydrologic conditions are evaluated in order to delineate source water protection areas. Assessment involves identifying

locations or regions in source water protection areas where contaminants may be generated, stored, or transported and then determining the potential for contamination of drinking water by these sources. For the *Lost Trail Rest Area,* according to the instructions for completing a SWDAR for a transient non-community water supply, the only regulated contaminants required to be identified are nitrate and microbiological (DEQ, 2007).

Information for this SWDAR was obtained from published reports, sanitary surveys, discussions with personnel responsible for managing the site, a site visit and the Montana State Library's Natural Resource Information System (NRIS) website, http://maps2.nris.mt.gov/mapper/ .

Section 2
Public Water Supply Information

2.1 Facility Description

The Lost Trail Rest Area is located off Highway 93, just north of the Montana/Idaho border. The rest area is at approximately 7,020 feet in elevation and is served by a spring that is approximately 2,100 feet away to the west and approximately 7,275 feet in elevation. See Figure 1.

The existing Public Water Supply (PWS) at the Lost Trail Rest Area is classified as a transient, non-community water supply because it supplies at least 25 people per day for six months a year but does not regularly serve the same population. The rest area is open from the Friday before Memorial Day to October 15 and is served by an on-site sewer system. During the winter months, the spring serves Lost Trail Powder Mountain. The rest area has counters on the doors to the restrooms. From August 1 to August 17 it averaged 370 visitors per day. The water supply has a flow meter that is read and recorded daily. Recent flow meter readings show use of approximately 500 gallons per day.

2.2 Public Water Supply System

The Lost Trail Rest Area water supply is served by a spring that has been classified as a groundwater source based on two Microscopic Particulate Analysis (MPA) tests performed in the Fall of 2009 and Spring of 2010. See Attachment A. Water from the spring flows into a locked spring box, then by gravity approximately 500 feet to a 1,000 gallon storage tank then by gravity an additional 2,500 feet before it enters the rest area mechanical room where it is treated with sodium hypochlorite. The storage tank previously had locks on the lid but the chains were broken due to age during the site visit.

2.3 Public Water Supply Quality

The classification of this water supply as a Transient Non-Community water supply requires regular monitoring for quality. This water supply is monitored for Total Coliform monthly and nitrate annually. Currently, one sample for Total Coliform is taken each month. Positive total coliform samples were taken in May and June 2009 with the follow up samples testing negative for E. Coli and total coliform. The occurrence of total coliform positive tests was discussed with Ken Hamblen of the Sula Maintenance office and the cause of the positive samples was determined to be sampler error as the positive samples occurred when a different person took the samples.

This water supply is currently treated with sodium hypochlorite for disinfection. The system has one pressure tank and two 120 gallon chlorine contact tanks however one of the contact tanks is out of order. Residual chlorine readings are taken and recorded daily.

2.4 Source Water Hydrogeology

The water source is located on the slopes of Lost Trail Powder Mountain, see Figure 1. The NRCS map unit descriptions in the area of the spring are Lolopeak-Mohaggin-Crawfish families, complex, mountain ridges and Rubycreek family-Typic Vitricryands-Lilylake family, cirque basins (NRIS, 2011). The soils in this area are identified as ashy silt loam at shallow depths to very stony to very gravelly sandy loam to loamy sand with bedrock at 50 to 60 inches.

Section 3
Delineation

The delineation process identifies the areas that contribute to an aquifer for groundwater sources. Since this is a transient non-community water system and has been classified as groundwater, the delineation process for this aquifer has a control region with a fixed radius of 100 feet and an inventory region with a fixed radius of one mile, see Table 1 below (DEQ, 1999).

If your public Water System Classification Is:	And Your Aquifer Type Is:	Then your Source Water Protection Regions are:	You Can Use This Delineation Method For Each Region:	And Your delineation Must Meet these Criteria and Minimum Values:
Community	Unconfined or semi-confined	Control Inventory Recharge	Fixed radius Analytical method Hydrogeologic mapping	Distance - 100 feet Distance - larger of 1,000 feet up-gradient or 3 -year TOT Flow boundaries - physical and hydrologic + surface waters that cross the Inventory Region
Community	Confined or artesian	Control Inventory Recharge	Fixed radius Analytical Method Hydrogeologic mapping	Distance - 100 feet Distance B 1000 feet for flowing wells and one-half mile for non-flowing wells, must include any aquifer formation outcrop that occurs within a 3-year TOT Flow boundaries-physical and hydrologic + surface waters that cross inventory regions
Community	Surface water	Spill Response Watershed	Fixed radius Hydrologic Mapping	One-half mile buffer extending upstream a distance corresponding to a 4-hour TOT but not to exceed ten miles or the nearest intake. Buffer will not exceed the extent of the watershed. Limits of one of four watershed regions.
Non-community	Ground water Surface water	Control Inventory Spill Response	Fixed radius Fixed radius Fixed radius	Distance - 100 feet Distance - 1 mile One-half mile buffer extending upstream a distance corresponding to a 4-hour TOT but not to exceed ten miles or the nearest intake. Buffer will not exceed the extent of the watershed.

Table 1: Methods and Criteria for Delineating Source Water Protection Regions for PWSs (DEQ, 1999)

Section 4
Inventory

The Montana Department of Environmental Quality (DEQ) requires an inventory of possible acute health risks be completed for transient non-community public water supplies. (DEQ, 1999).

4.1 Control Region

The Control Region for this non-community public water supply is the area within 100 feet of the PWS as identified in Figure 1. Potential sources of contamination identified within this region are limited due to the location of the source. The source is in a forested area of the Lost Trail ski slopes and is relatively difficult to find. The spring is surrounded by forest within 100 feet of the source which significantly limits the potential sources of contamination. Within the 100 foot control zone, sources of contamination could include vandalism or contamination caused by animal waste. Contamination could also be caused by spills on the ground surface from the equipment used for the Lost Trail Powder Mountain Ski Area.

4.2 Inventory region

The inventory region for this well head is the area within 1 mile of the wellhead. The inventory process identifies potential sources of pollution that may contaminate the PWS. Based on the land uses, a determination of the risk of contamination to the public water supply is made. Within one mile of this PWS, potential sources of contamination and land uses were identified to be: on-site wastewater disposal systems including the systems for the Lost Trail Rest Area and the Lost Trail Powder Mountain Ski Lodge, spills from equipment at the ski area; Highway 93 right-of-way (HRW); and Forest (F). See Figure 3.

No remediation response sites or mine sites were identified within the inventory region. No animal feeding operation sites, wastewater treatment facilities, sludge handling sites, land application sites, landfills, sewer mains or other significant potential sources of microbiological and nitrate contamination were identified within the inventory region. The only apparent significant potential contaminant sources for the Lost Trail Rest Area are septic systems and spills from equipment. The septic system density in the inventory region is identified as “low density” (NRIS).

4.3 Buffer Zone

A Ground Water Under the Direct Influence of Surface Water (GWUDISW) analysis has been completed for this system. Since this source is a Spring, it failed the GWUDISW. Additional analysis was completed in the form of a Microscopic Particulate Analysis (MPA), at the conclusion of which it was

determined that this source could be considered groundwater. See Attachment A.

Section 5
Susceptibility

To determine the susceptibility of this public water supply to contamination, the potential sources of contamination identified in the inventory are analyzed to determine how susceptible the water supply is to contamination from these potential sources. This is completed through two steps:

1. Assignment of a hazard rating to each potential contaminant source identified during the inventory.
2. Identification of barriers to contamination.

Within the one mile inventory region for this Public Water Supply (PWS) the following potential contaminant sources are identified:

- On-site septic system
- Off-site septic systems of low density (NRIS)
- Highway ROW
- Vandalism
- Equipment fluid spills

Sources of contamination of this PWS are limited due to the location of this source. Nearly all potential sources of contamination are a significant distance down gradient form the source.

The primary sources of contamination to this PWS are the on-site and off-site septic systems, vandalism and spills from equipment used for maintenance of the ski area. The septic systems have the potential to introduce nitrate and pathogens into the aquifer. The on-site septic system that serves the Rest Area is located approximately 2,100 feet east and 240 feet below the source. The Lost Trail Ski Area septic system is located approximately 1,700 feet east and 180 feet below the source. The distance between the PWS and the onsite disposal systems and that the septic systems are down gradient of the PWS are barriers against possible contamination. The spring box for this system is remotely located and locked. The storage tank was previously locked until the chain degraded due to age. Replacement of the chains as they age and routine inspection of the source will help protect water quality from vandalism.

Routine testing of this PWS indicates that it has low nitrate levels (0.13 mg/L), which indicates that the aquifer is not being contaminated by the on-site or off-site septic systems. Monitoring of this testing should continue to ensure the nitrate levels remain low. Two positive test results for total coliform occurred in May and June 2009. The maintenance contact for this site, Ken Hamblen indicated that the cause was determined to be sampler error since a different person took the water samples for those tests.

Additional potential sources of contamination to this PWS include the Highway ROW. Contamination from the Highway could be from spills from transporters using this infrastructure. The location of the PWS, which is upgradient of the highway, provides a barrier to contamination from potential spills.

No additional Significant Potential Sources of Microbiological and Nitrate Contamination (DEQ, 2007) *w*ere identified from searches performed on the NRIS site.

Each of the potential contaminants, their hazard rating and the susceptibility of the PWS to these contaminants is outlined in Table 2 on the following page.

Source	Contaminants	Description	Hazard Rating	Barriers	Susceptibility	Management Options
On-site Septic System	Pathogens and Nitrates	On-site septic systems located approximately 2,100	High	-Separation (distance and elevation)	Low	-Continue regular maintenance and inspection of septic systems
Off-site Septic Systems	Pathogens and Nitrates	Lost Trail System located 1,700 feet East of PWS	High	-Separation (distance and elevation)	Low	-Monitor samples for increased nitrates
Highway ROW	Potential for spill of hazardous materials being transported (i.e. petroleum, chemicals, solvents, etc.)	Hwy 93 located approximately 2,500 feet East and approximately 260 feet below PWS	High	-Separation -State HAZMAT Response Plan	Low	-Document spills occurring near site -Should a spill occur near site, increase monitoring of water quality
Vandalism	Chemicals, solvents, metals, etc.	Potential for contamination of PWS through vandalism	High	-Locked lid to Spring Box	Moderate (if chain replaced)	-Replace chains on storage tank lock
Equipment Fluid Spills	Petroleum, chemicals, etc.	Equipment used on the Ski Area near the PWS could have fluid spills.	High	-Equipment use area is 200 feet from PWS	High	-Develop and maintain a spill cleanup program -Regularly inspect the area around the PWS for spills

Table 2: Potential Contaminant Sources of Quartz Flat West Rest Area (PWSID #0062213)

Section 6
Limitations

Identification of potential contaminant sources is limited to those regulated for this class of PWS and is generally based on readily available information and reports. Unregulated activities or unreported contaminant releases may not be considered in this report. The delineation method utilizes simplifying assumptions that may not fully represent complex ground water flow systems but is intended to be conservative and protective of public health. (DEQ, 2007)

Section 7
References

Montana Department of Environmental Quality (DEQ). *Department Circular PWS 6, Source Water Protection Delineation*, 1999 Edition

Montana Department of Environmental Quality (DEQ). *Instructions for Completing a Source Water Delineation and Assessment Report (SWDAR) and PWS-6 Report for Transient Public Water Supplies.* Source Water Protection. Revised 2007.

Montana Natural Resource Information System (NRIS), http://maps2.nris.mt.gov/mapper/ . August, 2011.

Montana Department of Environmental Quality (DEQ), Public Water Supply Online Query Reports, http://deq.mt.gov/wqinfo/pws/reports.mcpx . August, 2011.

Rennick and Stimson, DEQ. *Lost Trail Rest Stop, Source Water Delineation and Assessment Report, Public Water Supply: PWSID #MT0062213,* April, 2006.

Montana Department of Environmental Quality (DEQ), Sanitary Survey, Morgan Farrell, Ravalli County Environmental Health, 2003.

Figures

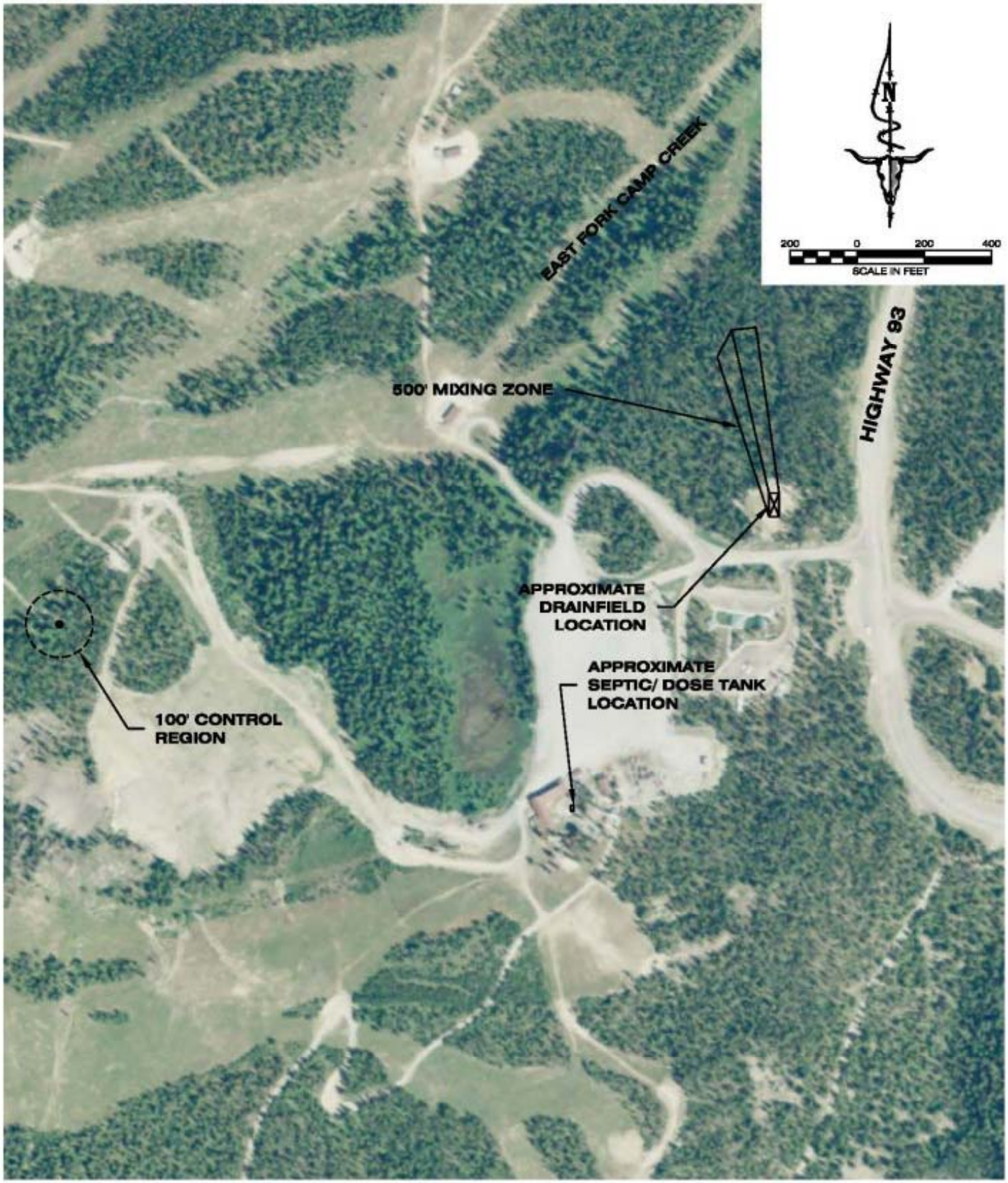

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FIGURE 1
CONTROL REGION
LOST TRAIL PASS REST AREA
SEC. 4, T2S, R19W, P.M.M.
RAVALLI COUNTY, MONTANA

PROJECT#: 11-2831A
TAB: AERIAL
DRAFTER: JW
DATE: 8/24/2011
SHEET 1 OF 1

PLOT DATE: 9/14/2011 11:50 AM
DWG LOCATION: T:\1_ACTIVE FILES\2011 PROJECTS\2831A- MDT TERM CONTRACT SWDAR LOST TRAIL\DWG\EXH-SWDAR.DWG

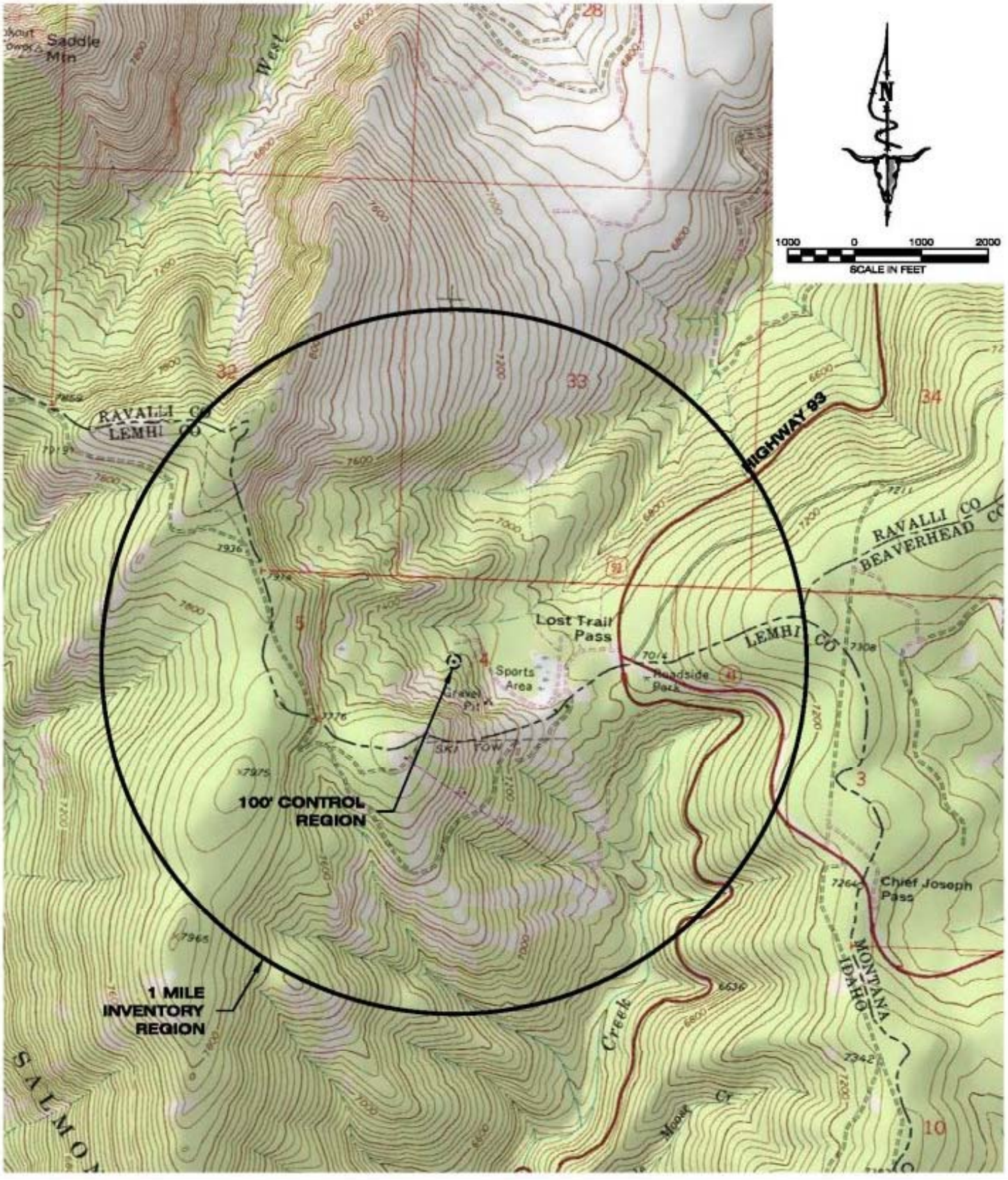

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FIGURE 2
INVENTORY REGION
LOST TRAIL PASS REST AREA
SEC. 4, T2S, R19W, P.M.M.
RAVALLI COUNTY, MONTANA

PROJECT#: 11-2831A
TAB: USGS
DRAFTER: JW
DATE: 8/24/2011
SHEET 1 OF 1

PLOT DATE: 9/14/2011 11:57 AM

DWG LOCATION: T:\1_ACTIVE FILES\2011 PROJECTS\2831A- MDT TERM CONTRACT SW\DAR LOST TRAIL\DWG\EXH-SWDAR.DWG

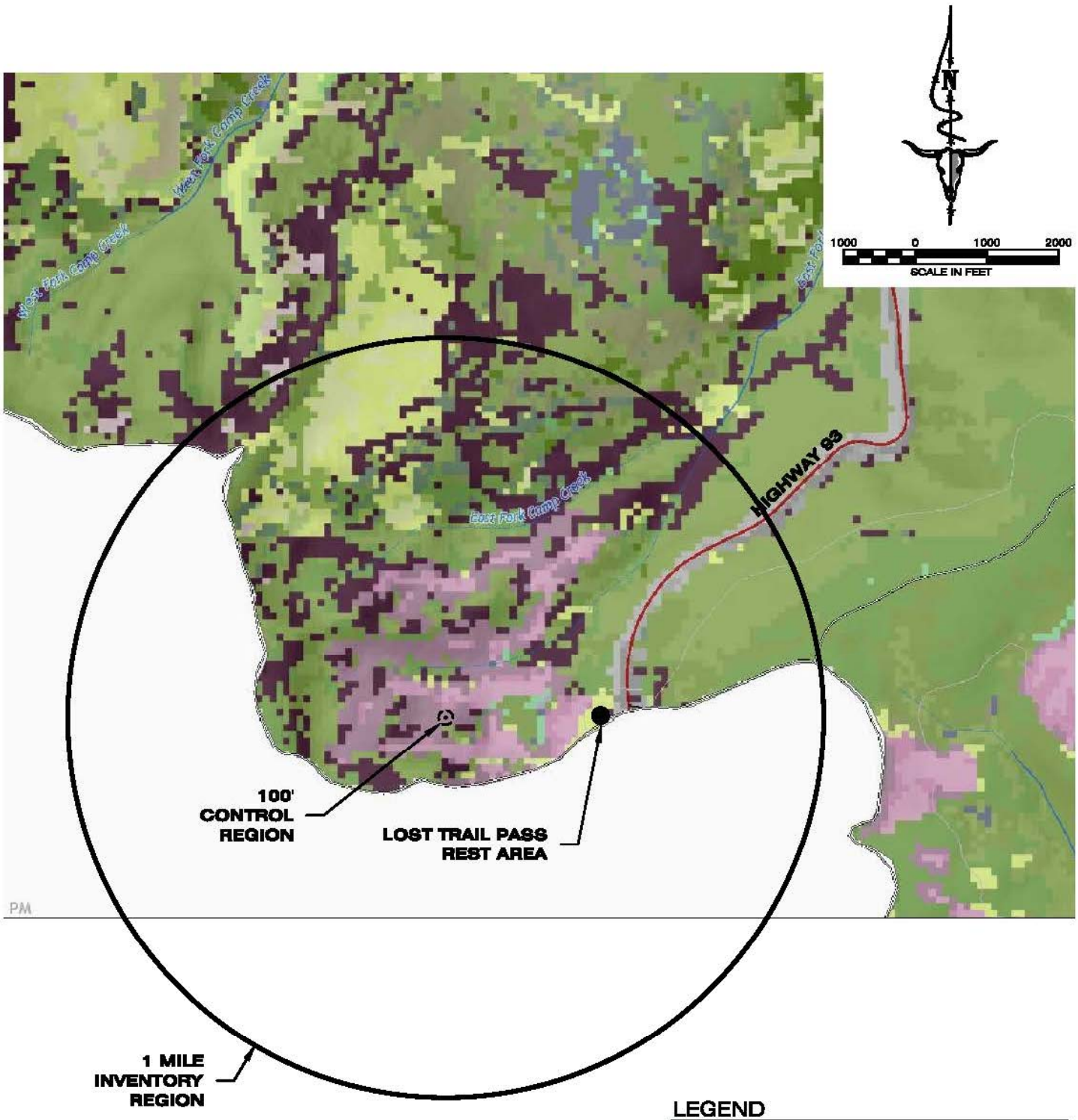

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FIGURE 3
LAND USE
LOST TRAIL PASS REST AREA
SEC. 4, T2S, R19W, P.M.M.
RAVALLI COUNTY, MONTANA

PROJECT#: 11-2831A
TAB: LAND USE
DRAFTER: JW
DATE: 8/24/2011
SHEET 1 OF 1

PLOT DATE: 9/14/2011 11:42 AM
DWG LOCATION: T:\1_ACTIVE FILES\2011 PROJECTS\2831A - MDT TERM CONTRACT SWDAR LOST TRAIL\DWG\EXH SWDAR.DWG

Attachment A
Groundwater Under the Direct Influence of Surface Water Determination of Status

July 27, 2010

Ken Hamblen
Lost Trail Section Supervisor
MDT
8216 US 93
Sula, MT 59781

Re: Groundwater Under the Direct Influence of Surface Water/Determination Of Status for SP002 Spring MT0062213 Lost Trail Rest Area Class NC

Dear Mr. Hamblen:

The Department of Environmental Quality (DEQ) is required by federal and state regulations to determine whether a public water supply system's (PWS) ground water sources are under the direct influence of surface water (GWUDISW). The GWUDISW determination process begins with a Preliminary Assessment (PA). The DEQ must complete a PA form for each existing ground water source. The PA uses a point system to evaluate the water sources based on the results of the PA. Sources that score less than 40 points may be classified as ground water unless other information becomes available that suggests that further review is necessary. Sources that score higher than 40 points will require further analysis, source rehabilitation, or additional source information to complete the GWUDISW determination.

On September 16, 2003, the spring received a failing score of 40 on the Preliminary Assessment (PA) for GWUDISW. Further assessment was required. Further assessment done using two Microscopic Particulate Analysis (MPA) tests conducted on September 22, 2009 and June 6, 2010. The results of both tests were Low Risk. Using the criteria of the DEQ Water Quality Circular PWS_5, **the spring is, therefore, classified as a groundwater source.** Please note that the GWUDISW evaluation (including the MPA tests) assessed the spring for the potential for surface water microorganisms (specifically the larger parasitic protozoa Giardia and Cryptosporidium) entering the water supply.

Because this spring is the shared source between the Lost Trail Rest Area system and the Lost Trail Powder Mountain Sula system, a similar letter classifying the spring as a groundwater source has been sent to the Lost Trail Powder Mountain Sula system.

The potential still exists for contamination of the spring by bacteria and viruses. The MPA tests revealed water quality characteristics that should be further investigated. Nematodes, a soil organism, were found at the very abundant level of 129 per 100 gallons during the spring 2010 test. The results of the fall 2009 test showed much lower levels of nematodes (2 per 100 gallons). This suggests that soil particles entered the

water supply during the spring runoff this year. Roger DeHann has suggested that soil particles may be entering under the spring box lid.

I would like to do a field inspection of the spring in early August. Before setting the date of the visit I will try to find complete drawings of the spring box.

Please note the Department is required to reassess each source for any changes in and around the source when a sanitary survey inspection is done on the Lost Trail Rest Area system. Depending on that reassessment and other issues that may impact this source, you may be asked to conduct further source water monitoring.

Please call me at 406-444-4633 or email me at jkandelin@mt.gov if you have questions.

Respectfully,

Jake Kandelin

Jake Kandelin
Public Water Supply Section, Montana Department of Environmental Quality

cc: PWS File
Judy Grasser, Lost Trail Powder Mountain
Pat Driscoll, Environmental Services Bureau, Helena, MDT
Roger DeHaan, Pinnacle Engineering
DEQ Kalispell Field Office
County Sanitarian

Attachment B
Lost Trail Rest Area SWDAR
Sampling Results

Montana Department of
ENVIRONMENTAL QUALITY
Data Source: Public Water Supply Section

Public Water Supply System

Return to PWS Query
Return to PWS Reports

PWSID: MT0062213 **Name:** LOST TRAIL REST AREA

City: SULA **County:** RAVALLI **Tot Pop:** 50

Pri Src: GW **Class:** NC **Last Snty Srv Dt:** 07/30/2009 **Activity Status:** A

Type	Conn's	In Srvc Dts	Eff Begin Dt	Avg Daily Cnt	Type
RS	1	5/15-10/31	09/16/2003	50	T

Bacti Results

FROM 01/01/2008 TO 08/15/2011

Collection D	Lab Number	Type	Orig Lab #	Code		TCR Presence		Fec/EC Result
07/13/2011	203011	RT		3100	COLIFORM (TCR)	A	-	
06/07/2011	156111	RT		3100	COLIFORM (TCR)	A	-	
05/23/2011	139111	RT		3100	COLIFORM (TCR)	A	-	
10/12/2010	295910	RT		3100	COLIFORM (TCR)	A	-	
09/14/2010	265510	RT		3100	COLIFORM (TCR)	A	-	
08/04/2010	229510	RT		3100	COLIFORM (TCR)	A	-	
07/06/2010	187710	RT		3100	COLIFORM (TCR)	A	-	
06/15/2010	169610	RT		3100	COLIFORM (TCR)	A	-	
05/27/2010	146810	RT		3100	COLIFORM (TCR)	A	-	
10/06/2009	341809	RT		3100	COLIFORM (TCR)	A	-	
09/09/2009	309909	RT		3100	COLIFORM (TCR)	A	-	
08/11/2009	272209	RT		3100	COLIFORM (TCR)	A	-	
07/06/2009	214209	RT		3100	COLIFORM (TCR)	A	-	
07/06/2009	214309	RT		3100	COLIFORM (TCR)	A	-	
07/06/2009	214409	RT		3100	COLIFORM (TCR)	A	-	
07/06/2009	214509	RT		3100	COLIFORM (TCR)	A	-	
07/06/2009	214609	RT		3100	COLIFORM (TCR)	A	-	
06/22/2009	193509	RT		3100	COLIFORM (TCR)	A	-	
06/08/2009	178309	RT		3100	COLIFORM (TCR)	A	-	
06/02/2009	170609	RT		3100	COLIFORM (TCR)	P	+	
06/02/2009	170609	RT		3014	E. COLI	A		-
06/02/2009	170709	RT		3100	COLIFORM (TCR)	P	+	
06/02/2009	170709	RT		3014	E. COLI	A		-
06/02/2009	170809	RT		3014	E. COLI	A		-
06/02/2009	170809	RT		3100	COLIFORM (TCR)	P	+	
06/02/2009	170909	RT		3100	COLIFORM (TCR)	P	+	
06/02/2009	170909	RT		3014	E. COLI	A		-
06/02/2009	171009	RT		3100	COLIFORM (TCR)	P	+	
06/02/2009	171009	RT		3014	E. COLI	A		-
05/26/2009	152309	RT		3100	COLIFORM (TCR)	A	-	
05/26/2009	152409	RT		3100	COLIFORM (TCR)	A	-	
05/26/2009	152509	RT		3100	COLIFORM (TCR)	A	-	
05/26/2009	152609	RT		3100	COLIFORM (TCR)	A	-	
05/19/2009	144809	RT		3100	COLIFORM (TCR)	P	+	
05/19/2009	144809	RT		3014	E. COLI	A		-

PWSID: MT0062213 Name: LOST TRAIL REST AREA **(continued)**

Collection D	Lab Number	Type	Orig Lab #	Code		TCR Presence	Fec/EC Result
10/01/2008	284308	RT		3100	COLIFORM (TCR)	A	-
09/03/2008	248908	RT		3100	COLIFORM (TCR)	A	-
08/13/2008	222708	RT		3100	COLIFORM (TCR)	A	-
07/08/2008	177408	RT		3100	COLIFORM (TCR)	A	-
06/03/2008	135708	RT		3100	COLIFORM (TCR)	A	-

Montana Department of
ENVIRONMENTAL QUALITY
Data Source: Public Water Supply Section

Public Water Supply System

Return to PWS Query
Return to PWS Reports

PWSID: MT0062213 **Name:** LOST TRAIL REST AREA

City: SULA **County:** RAVALLI **Tot Pop:** 50

Pri Src: GW **Class:** NC **Last Snty Srv Dt:** 07/30/2009 **Activity Status:** A

Type	Conn's	In Srvc Dts	Eff Begin Dt	Avg Daily Cnt	Type
RS	1	5/15-10/31	09/16/2003	50	T

Nitrate Results

FROM 01/01/2008 TO 08/15/2011

Fac ID: SP002 **Fac Name:** SPRING **Avl:** P **Status:** A **Src:** GW

Smp Pt ID: EP502 **Status:** I **Description:** INACT EP FOR SPRING **Src Typ**

Analyte/CAS No	Code	Analyte Name	Type	Collection D	Lab	Sample Number	Result	
IOC	1038	NITRATE-NITRITE	RT	05/23/2011	02	110407601	0.18	MG/L

Fac ID: TP001 **Fac Name:** TREATMENT PLANT **Avl:** S **Status:** A **Src:** GW

Smp Pt ID: EP502 **Status:** A **Description:** EP FOR TP OFF SP **Src Typ** FN

Analyte/CAS No	Code	Analyte Name	Type	Collection D	Lab	Sample Number	Result	
IOC	1038	NITRATE-NITRITE	RT	05/27/2010	02	100445801	0.13	MG/L
IOC	1038	NITRATE-NITRITE	RT	05/19/2009	02	90416001	0.12	MG/L
IOC	1038	NITRATE-NITRITE	RT	06/02/2008	02	80448901	0.09	MG/L