

***Mammoth Trails Master Plan EIR
Mammoth Lakes, California***

Hydrology and Water Quality Report

Project 3048

March 2011

Prepared for:
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Date

1. Project Overview

A. Introduction

This section provides an overview of hydrology and water quality within Mammoth Lakes. Information in this section is based on the Town of Mammoth Lakes 2005 Storm Drain Master Plan Update, prepared in May of 2005 by Boyle Engineering Corporation.

B. Environmental Setting

The Mammoth area drainage basin eventually flows into the Owens River system. Within the Town limits there are two watershed basins. The southern portion of the area drains the Lakes Basin and the south part of the Town of Mammoth Lakes including the Sherwin Mountain to Mammoth Creek. The northern portion of the area drains Mammoth Mountain and most of the drainage from Meridian Boulevard northward to Murphy Gulch. During high runoff periods, Murphy Gulch eventually flows into Mammoth Creek.

C. Priority Projects

Nine priority projects have been targeted for near-term implementation and will be evaluated at the project level in the pier, in Section 9, Priority Projects. As future project specific development proposals are initiated subsequent focused project level environmental review will occur.

2. Authority and Permitting

This section discusses authority and permitting as it pertains to water quality. Specifically, permits shall be obtained where waters of the state, potential wetlands, streambed alteration, or as identified in this section. Additional notes are included with the project lists in Section 5, Characterization of Impacts as to permit requirements. All projects shall work to avoid areas that would invoke the requirement of permits. Each project shall be evaluated during design to verify final permit requirements, and obtain said permits. Further permits may be required from state, county or federal agencies.

A. Lahontan Water Board

State law assigns responsibility for protection of water quality in the Lahontan region to the Lahontan Water Board. Permits may be required at many of the project sites. Creek crossings, disturbance of wetland or stream bed alteration will require specific permits.

Expect that final project modifications may be required to avoid and minimize impacts to waters of the State.

Areas not shown to have a potential of wetlands or streambed alteration must be further reviewed during design to verify that there will be no impacts to waters of the state. If at design phase it is determined that waters of the state will be impacted, all permitting requirements must be met.

1. Land disturbance of 1 acre or more may require CWA section 402 stormwater permit including a NPDES GCSP obtained from the SWB or and individual stormwater permit from LWB

2. Discharge of low threat wastes to a surface water, including diverted stream flows, construction and or dredge spoils dewatering, and well construction and hydrostatic testing discharge, may require and NPDES permit for limited threat discharges to surface waters issued by the LWB
3. Discharge of low threat wastes to land including clear water discharges small dewatering projects, and inert wastes may require GWD WDR.
4. Streambed alteration and or discharge of fill material to surface water may require CWA 401 administered by the Lahontan Regional Water Quality Control Board.
5. Mammoth Creek is 303d listed for metals and sediment. The following are excerpts from the 303(d) list taken from The regional water quality control board website.

2006 CWA SECTION 303(d) LIST OF WATER QUALITY LIMITED SEGMENTS REQUIRING TMDLS

USEPA APPROVAL DATE: JUNE 28, 2007

REGION	TYPE	NAME	CALWATER WATERSHED	POLLUTANT/STRESSOR	POTENTIAL SOURCES	ESTIMATED SIZE AFFECTED	PROPOSED TMDL COMPLETION
6	R	Mammoth Creek	60310053	Mercury		12 Miles	2019
					Source Unknown		
				Metals		12 Miles	2019
				<i>Needs monitoring to determine current extent of impairment and need for TMDL.</i>			
				Other Urban Runoff			
				Natural Sources			
				Nonpoint Source			

Figure 2.A.5.1 2006 303(d) list

REGION	WATER BODY NAME	WATER BODY TYPE	WBID	INTEGRATED REPORT CATEGORY	USGS CATALOGING UNIT*	CALWATER WATERSHED	ESTIMATED SIZE AFFECTED	UNIT	POLLUTANT	POLLUTANT CATEGORY	FINAL LISTING DECISION	TMDL REQUIREMENT STATUS*	EXPECTED TMDL COMPLETION DATE**	EXPECTED TMDL ATTAINMENT DATE**	USEPA TMDL APPROVED DATE**	COMMENTS INCLUDED ON 303(d) LIST
6	Mammoth Creek (Old Mammoth Road to Highway 395)	River & Stream	CAR6031005320080816102036	5	18090102	60310053	6	Miles	Manganese	Metals/Metalloids	List on 303(d) list (TMDL required list)	5A	01-Jan-21			
6	Mammoth Creek (Old Mammoth Road to Highway 395)	River & Stream	CAR6031005320080816102036	5	18090102	60310053	6	Miles	Mercury	Metals/Metalloids	Do Not Delist from 303(d) list (TMDL required list)	5A	01-Jan-19			
6	Mammoth Creek (Old Mammoth Road to Highway 395)	River & Stream	CAR6031005320080816102036	5	18090102	60310053	6	Miles	Total Dissolved Solids	Salinity	List on 303(d) list (TMDL required list)	5A	01-Jan-21			
6	Mammoth Creek (Twin Lakes outlet to Old Mammoth Road)	River & Stream	CAR6031005120080816102743	5	18090102	60310051	2	Miles	Manganese	Metals/Metalloids	List on 303(d) list (TMDL required list)	5A	01-Jan-21			
6	Mammoth Creek (Twin Lakes outlet to Old Mammoth Road)	River & Stream	CAR6031005120080816102743	5	18090102	60310051	2	Miles	Mercury	Metals/Metalloids	Do Not Delist from 303(d) list (TMDL required list)	5A	01-Jan-19			
6	Mammoth Creek, unnamed tributary (confluence is near Old Mammoth Rd)	River & Stream	CAR6031005120080630162428	5	18090102	60310051	2	Miles	Arsenic	Metals/Metalloids	List on 303(d) list (TMDL required list)	5A	01-Jan-12			
6	Mammoth Creek, unnamed tributary (confluence is near Old Mammoth Rd)	River & Stream	CAR6031005120080630162428	5	18090102	60310051	2	Miles	Mercury	Metals/Metalloids	List on 303(d) list (TMDL required list)	5A	01-Jan-21			

Figure 2.A.5.2 2010 proposed 303(d) list

B. Federal regulatory requirements - Army Corp of Engineers

Section 404 of the Clean Water Act (CWA) establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. Activities in waters of the United States regulated under this program include fill for development, water resource projects (such as dams and levees), infrastructure development (such as highways and airports) and mining projects. Section 404 requires a permit before dredged or fill material may be discharged into waters of the United States, unless the activity is exempt from Section 404 regulation (e.g. certain farming and forestry activities).

C. California Department of Fish and Game

Fish and Game Code section 1602 requires any person, state or local governmental agency, or public utility to notify the Department before beginning any activity that will do one or more of the following:

1. substantially divert or obstruct the natural flow of any river, stream or lake;
2. substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake; or
3. deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake.

Fish and Game Code section 1602 applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes in the state.

D. Mammoth Lakes Development Code

Projects shall conform to the Mammoth Lakes Development Codes, and shall incorporate water quality measures as directed by the Town of Mammoth Lakes.

3. Potential Impacts to Waters of the State and Mitigations

Appendix G of the CEQA Guidelines states that a project may have a significant impact on hydrology and water quality if it would substantially degrade water quality, violate any water quality standard, substantially degrade or deplete groundwater resources, create or contribute runoff that would exceed the capacity of stormwater drainage systems or provide substantial additional sources of polluted runoff, expose people or structures to a significant risk of loss, injury or death involving flooding, or substantially alter the existing drainage patterns of the site in a manner that would cause substantial flooding, erosion, or siltation on or off site.

A. Drainage and Runoff

The proposed project includes trails, bikeways, parking areas, and small buildings that traverse nearly all parts of the Mammoth Lakes area landscape and topography. Areas crossed include the Lakes Basin, Mammoth Creek area, riparian areas, forested areas, and hillsides. Development of certain trails under the Master Plan, specifically the Class I bikeways or other paved recreation trails or areas, would result in an increase in impervious surfaces, and thereby increasing runoff. While this increase in impervious surface would be relatively small, and would not result in any impacts related to increased flooding, it could cause localized erosion along trail alignments if runoff is not adequately controlled. Unpaved trails, while providing a permeable surface for improved drainage, could also cause localized runoff impacts without proper surface water control. This would be a potentially significant impact.

B. Flooding Hazard

The Trails System Master Plan proposes numerous trail corridors that run adjacent to Mammoth Creek. There are areas identified in the Flood Insurance Study for the Town of Mammoth Lakes, prepared in September 30, 1992 for the federal Emergency Management Agency – Community Number 060724 – identified with water depths in excess of 1 foot. Facilities developed in this area could obstruct flows and revise flood areas. This would be a potentially significant impact.

C. Water Quality

The proposed Trails System Master Plan would not introduce any new point sources of pollutants to the general trails areas, and impacts related to increased in non-point source pollutants (e.g., oil and grease in runoff) would be expected to be negligible given the non-motorized use of the trail system. Construction and operation of new trails could have impacts related to increased sedimentation, if trail runoff were to increase the deposition of silt into adjacent waterways. Excessive siltation of rivers and streams in Mammoth Lakes could have an adverse effect on aquatic vegetation and species, with significant impacts to the local ecosystem. Increased sedimentation from trail construction would be considered a potentially significant impact. Parking Lot locations have the potential to increase non-point source pollutants. Unmitigated this would be considered a potentially significant impact.

4. Identification of Affected Waters and Beneficial Uses

The project is located within the Owens hydrologic unit. Water quality objectives for certain water bodies within the Owens hydrologic unit are outlined in chapter 3 of the Water Quality Control Plan for the Lahontan Region (Basin Plan). Specifically, water quality objectives are listed for total dissolved solids, chloride, nitrate, total nitrogen, and phosphate, as shown on table 3-17 of said basin plan.

Watershed	Descriptive Name	Description
1	Lake Mary Basin	Lakes Basin, tributary to Mammoth
2	Old Mammoth	Town areas tributary to Mammoth
3	Murphy Gulch	Town Areas Tributary to Murphy Gulch, then Mammoth Creek
4	Sherwin Creek	Downstream of Town Areas Tributary to Sherwin Creek, then Mammoth
5	Casa Diablo	Downstream of Town Area North of Murphy Gulch Tributary to Mammoth
6	Hot Creek and Laurel Creek	Downstream of town areas tributary directly to Hot Creek and Laurel Creek

Figure 4.1 Identification of Affected Waters

Areas 1 through 5 are tributary to Mammoth Creek. Beneficial uses of Mammoth Creek that these projects are as follows:

- Municipal and Domestic potable water supply
- Agricultural Supply
- Ground Water Recharge
- Freshwater Replenishment
- Water Contact Recreation
- Non-contact Water Recreation
- Commercial and Sport fishing
- Cold Freshwater Habitat
- Wildlife Habitat
- Rare, Threatened, or Endangered Species
- Migration of Aquatic Organisms
- Spawning, Reproduction, and Development

Area 6 is directly tributary to Hot Creek and Laurel Creek. Hot Creek includes the same beneficial uses as Mammoth Creek except it is not a Freshwater Replenishment source, but adds the following uses:

- Industrial Service Supply
- Aquaculture

Laurel Creek has the following beneficial uses:

- Municipal and Domestic potable water supply
- Water Contact Recreation
- Non-contact Water Recreation
- Commercial and Sport fishing
- Cold Freshwater Habitat

- Wildlife Habitat
- Spawning, Reproduction, and Development

Further descriptions of these beneficial uses are included in Chapter 2 of the Basin Plan.

5. Characterization of Impacts

The following pages provide the Characterization of Impacts for each project identified in this Trails System Master Plan. The Characterization of Impacts identified for each path is based on the proposed project. Final impact must be determined during the design process. Each design shall work to avoid or minimize impacts, as well as work toward Low Impact Development.

A. Paved Multiple-Use Paths (MUP)

MUP projects must be designed to minimize their affect on Hydrology and Hydraulics. Stormwater runoff must be allowed to follow its historic path.

MUP projects must be designed such that they are located outside the influence of Mammoth Creek.

MUP trails		Affected waters and beneficial uses		Hydrologic Analysis				Potential Permitting requirements
Priority Project	Project No.	Watershed	Potentially Adjacent to Creek or stream (n-not expected)	Drainage Basin	Drainage Exhibit	Potential FEMA identified Flood Zone (n-not expected)	Potential Wetland (n-not expected)	Not Anticipated (N)
1	MUP 2-1	2	yes	2.3	8.3	yes	yes	401,404,1602
	MUP 2-2	3	n	3.6	8.14	n	n	N
2	MUP 3-1	2/3	n	2.1/3.3	8.1/8.10	n	n	N
	MUP 3-2	3	n	3.3/3.4	8.10/8.11	n	n	N
	MUP 3-3	3	n	3.3	8.10	n	n	N
	MUP 3-4	2	yes	2.3	8.3	yes	yes	401,404,1602
	MUP 3-5	3	yes	3.6	8.13	n	yes	401,404,1602
	MUP 3-6	3	n	3.2	8.1	n	n	N
	MUP 3-7	3	n	3.6	8.14	n	n	N
	MUP 3-8	3	n	3.6	8.14	n	n	N
	MUP 3-9	3	yes	3.6	8.13	n	yes	401,404,1602
	MUP 3-10	3	yes	3.6	8.13	n	yes	401,404,1602
	MUP 3-11	3	yes	3.6	8.13/8.14	n	yes	401,404,1602
	MUP 3-12	3	n	3.7	8.17	n	n	N
	MUP 3-13	3	yes	3.6	8.16	n	yes	401,404,1602
	MUP 4-1	3	n	3.4	8.11	n	n	N
	MUP 4-2	3	n	3.4	8.11	n	n	N
	MUP 4-3	3	n	3.4/3.7	8.11/8.17	n	n	N
	MUP 4-4	2	yes	2.1	8.1	yes	yes	401,404,1602
	MUP 4-5	2	yes	2.4	8.6	yes	yes	401,404,1602

Figure 5.A.1 Paved Multi Use Paths

B. Crossings

These facilities are generally proposed to fit within existing right of way and within existing improved areas. Therefore these projects should not increase impervious surfaces, nor change the hydrologic conditions, but will allow safer crossing of non-motorized path users at intersections with motorized roads.

X crossings				Affected waters and beneficial uses		Avoidance and minimization	Characterization of impacts - Proposed (P)			Hydrologic Analysis				Potential Permitting requirements
Project No.	Street	Location		Watershed	Potentially Adjacent to Creek or stream (n-not expected)	Complete Avoidance (A) - minimization (M)	fits on existing paving	extra pavement required	Comments - No Construction (NC) - Signage Only (SO)	Drainage Basin	Drainage Exhibit	Potential FEMA Identified Flood Zone (n-not expected)	Potential Wetland (n-not expected)	Not Anticipated (N)
X 2-1	Minaret Road	Forest Trail		3	n	A	x		x	3.7	8.17	n	n	N
X 2-2	Minaret Road	North Village (Mid Block)		3	n	A	x		x	3.7	8.17	n	n	N
X 2-3	Lake Mary Road	Davison Road		3	n	M		x		3.6	8.16	n	n	N
X 2-4	Lake Mary Road	Lakeview Road		3	n	A	x		x	3.6	8.18	n	n	N
X 2-5	Lake Mary Road	Canyon Boulevard		3	n	A	x		x	3.6	8.13	n	n	N
X 2-6	Lake Mary Road	Bridges Lane		3	n	A	x		x	3.6	8.16	n	n	N
X 2-7	Lake Mary Road	Lee road		3	n	M		x		3.6	8.16	n	n	N
X 2-8	Main Street	Minaret Road		3	n	M		x		3.6	8.13	n	n	N
X 2-9	Main Street	Mountain Blvd		3	n	A	x		x	3.6	8.13	n	n	N
X 2-10	Main Street	Sierra Blvd		3	n	M		x		3.6	8.13	n	n	N
X 2-11	Main Street	Forest Trail		3	n	M		x		3.4	8.11	n	n	N
X 2-12	Main Street	Sierra Park Road		3	n	A	x		x	3.4	8.11	n	n	N
X 2-13	Meridian Boulevard	Minaret Road		3	n	M		x		3.6	8.14	n	n	N
X 2-14	Meridian Boulevard	Sierra Park Road		3	n	M		x		3.5	8.12	n	n	N
X 2-15	Meridian Boulevard	College Parkway		3	n	M		x		3.3	8.10	n	n	N
X 2-16	Meridian Boulevard	Wagon Wheel Road		3	n	M		x		3.3	8.10	n	n	N
X 2-17	Old Mammoth Road	Chateau Road		2	n	M		x		2.2	8.2	n	n	N
X 2-18	Old Mammoth Road	Minaret Road		2	n	M		x		2.3	8.3	n	n	N
X 2-19	Old Mammoth Road	Ski Trail		2	n	M		x		2.3	8.3	n	n	N
X 2-20	Old Mammoth Road	Waterford Avenue		2	n	M		x		2.3	8.3	n	n	N

Figure 5.B.1

C. On Street Bikeways

Generally the Bike Lane projects will fit within existing right of way, and will fit within existing improved areas. Therefore they will not add to the impervious surfaces, nor change the hydrologic conditions.

Bike Lane Projects				Affected waters and beneficial uses		Avoidance and minimization	Characterization of impacts - Proposed (P)			Hydrologic Analysis				Potential Permitting requirements
Project No.	Location	from	to	Watershed	Potentially Adjacent to Creek or stream (n-not expected)	Complete Avoidance (A) - minimization (M)	Bike Lane on existing paving	extra pavement required		Drainage Basin	Drainage Exhibit	Potential FEMA Identified Flood Zone (n-not expected)	Potential Wetland (n-not expected)	Not Anticipated (N)
B 2-1	Minaret	Scenic Loop	Mammoth Knolls	3	n	A	x			3.7	8.17	n	n	N
B 2-2	Minaret	Mammoth Knolls	Main	3	n	A	x			3.7	8.17	n	n	N
B 2-3	Lake Mary	Davison	Minaret	3	n	A	x			3.6	8.16	n	n	N
B 2-4	Meridian	S. Majestic Pines	N. Majestic	3	n	A	x			3.6	8.16	n	n	N
B 2-5	Meridian	Sierra Park	203	3	n	A	x			3.3	8.10	n	n	N
B 2-6	Old Mammoth Road	Red Fir	Minaret	2	n	M		x		2.3	8.4	n	n	N
B 2-7	Old Mammoth Road	Main	Mammoth Creek	2/3	yes	A	x			3.5/2.2	8.12/8.2	n	n	N, (no extra pavement)
B 3-1	Forest Trail	Minaret	Canyon	3	n	M		x		3.7	8.18	n	n	N
B 3-2	Canyon	Lake Mary	Hillside	3	n	A	x			3.7	8.18	n	n	N
B 3-3	Lakeview Blvd	Rainbow	Canyon	3	n	A	x			3.7	8.18/8.19	n	n	N
B 3-4	Majestic Pines	Silver Tip	Lodestar	3	n	M		x		3.6	8.16	n	n	N
B 3-5	Chateau	Minaret	End	2	n	M		x		2.2	8.2	n	n	N
B 3-6	Sierra Nevada	Azimuth	Sierra Park	3	n	A	x			3.5	8.12	n	n	N
B 3-7	Laurel Mountain	Main	Sierra Nevada	3	n	A	x			3.5	8.12	n	n	N
B 3-8	Tavern	Laurel Mountain	Sierra Park	3	n	A	x			3.5	8.12	n	n	N
B 3-9	Sierra Manor	Tavern	Meridian	3	n	A	x			3.5	8.12	n	n	N
B 3-10	Sierra Park	Main	end	3	n	M		x		3.5	8.12	n	n	N
B 3-11	Kelley	Lake Mary	Majestic Pines	3	n	M		x		3.6	8.16	n	n	N
B 3-12	South Majestic Pines	Meridian	Waterford	2	yes	M		x		2.3	8.5	n	n	401,404,1602
B 4-1	Forest Trail	Canyon	Lakeview	3	n	M		x		3.7	8.19	n	n	N
B 4-2	Majestic Pines	Silver Tip	Lodestar	3	n	M		x		3.6	8.16	n	n	N
B 4-3	North Waterford	Majestic Pines	Old Mammoth	2	n	M		x		2.3	8.5	n	n	N
B 4-5	Davison Road	Lake Mary	Lakeview	3	n	M		x		3.6	8.16	n	n	N
B 5-f	Sherwin Creek Road	Borrow	395	2/4/6	yes	M		x		2.1	8.1	n	n	401,404,1602

Figure 5.C.1 On Street Bikeways

D. Recreation Nodes

These project consist of improvements including parking lots, bathrooms, signage and other trail amenities at specific nodes or decision making points.

Amenities at Nodes		Affected waters and beneficial uses		Avoidance and minimization	Characterization of impacts - future(F) - existing (x)						Hydrologic Analysis					Potential Permitting requirements
Project No.	Project	Watershed	Potentially Adjacent to Creek or stream (n-not expected)	Complete Avoidance (A) - minimization (M)	Parking	restroom	Bus	Trail access	Signage	Comments	season	Drainage Basin	Drainage Exhibit	Potential FEMA identified Flood Zone (n-not expected)	Potential Wetland (n-not expected)	Not Anticipated (N)
13	staging area	3	n	A	x	x	x	x	F	signage only	Winter			n	n	N
14	Eagle Lodge - temp	2/3	n	A	x	F	x	x	F	part of Eagle lodge project	Year-Round	3.6	8.15	n	n	N
21	Uptown/Downtown	3	n	A					F	signage only	Summer			n	n	N
27	Tamarack Street	2	n	A					F	signage only	Year-Round	2.5	8.7	n	n	N
28	Mill City	2	yes	M	x		F	x	F	added impervious surface	Winter	2.3	None	n	yes	401/404/1602
34	Twin Lakes Parking	1/2	yes	A	x		F	x	F	on existing paving	Summer	1	None	n	yes	N (on existing paving)
35	Lake Mary Terminus	1	yes	A	x		F	x	F	on existing paving	Winter			n	n	N
36	Tamarack Lodge	1	yes	A	x	x	x	x	F	signage only	Year-Round	1	None	n	yes	N (signage only)
38	MMSA at Austria Hof	3	n	A					F	signage only	Summer	3.7	8.19	n	n	N
41	Lake Mary Bike Path NE Terminus	1	n	M		F	F	F	F	on existing paving	Summer			n	n	N
42	Earthquake Fault	3	n	M	x	x	F	x	F	on existing paving	Year-Round			n	n	N
44	Power Plant	3	n	M	F	F	F	F	F	up to 15 new parking spaces	Winter			n	n	N
46	Main Lodge	3	n	A	x	x	x	x	F	signage only	Year-Round			n	n	N
52	Sledz	3	n	A	x	x	x			signage only	Winter			n	n	N
64	Sierra Blvd at Forest Trail	3	n	M	F	F	F	x	F	up to 15 new parking spaces	Year-Round			n	n	N
67	Highway 203 Motorized Access	3	n	M	F	F					Year-Round			n	n	N
80	Horseshoe Lake	1	yes	M	x	x	F	x	F		Summer	1	None	n	yes	401/404/1602
86-87	Lake George	1	n	M	x	x	F	x	F		Summer	1	None	n	yes	401/404/1602
88-90	Coldwater Campground		yes	M	x	x	F	x	F		Summer	1	None	n	yes	401/404/1602
97	Shady Rest Park	3	n	M	x	x	F	x	F		Year-Round	3.4	8.11	n	n	N
124	Welcome Center	3	n	M	x	x	F	x	F		Year-Round	3.4	8.11	n	n	N
134	Mammoth Creek Park, East	2	yes	M	F	x	x	x	F	up to 15 new parking spaces	Year-Round	2.2, 2.3	8.3	yes	yes	401/404/1602
152	Mammoth Creek Park, West	2	yes	A	x	x	x	x	F	signage only	Year-Round	2.2, 2.3	8.3	yes	yes	401/404/1602
158	Path along Snowcreek V Fenceline	2	n	M			F	F			Winter			n	yes	401/404/1602
163	Sherwin Creek Road USFS gravel borrow pit	2	n	M	F	F	F	x	F	up to 15 new parking spaces	Year-Round			n	n	N
191	North Village	3	n	A	x	x	x	x	F	signage only	Year-Round	3.6, 3.7, 3.8	8.17	n	n	N
192	Shady Rest Sawmill Cutoff Road	3	n	M	x	F	F	x	F		Winter			n	n	N
193	Trails End Park	3	n	M	x	x	F	x	F		Year-Round	3.3	8.10	n	n	N
195	Community Center	3	n	M	x	x	F	F	F		Year-Round			n	n	N
200	Snowcreek 8 Access Egress Point	2	n	M				F	F		Year-Round	2.4	8.3	n	yes	N

Figure 5.D.1 Recreation Nodes

E. SHARP projects

There are two tables for the SHARP projects. Winter and Summer. These tables identify the specific work proposed for each project. Also identified are the priority projects.

SHARP SUMMER				Affected waters and beneficial uses		Avoidance and minimization	Characterization of impacts - future(F)										Hydrologic Analysis				Potential Permitting requirements
Priority Project	Project No.	Project	SHARP winter designation	Watershed	Potentially Adjacent to Creek or stream (n-not expected)	Complete Avoidance (A) - minimization (M)	Parking	Signage	soft surface non motorized	hard surface non motorized	restroom	use existing trails	creek crossing	bridge	Drainage Basin	Drainage Exhibit	Potential FEMA identified Flood Zone (n-not expected)	Potential Wetland (n-not expected)	Not Anticipated (N)		
3	1	staging area	1,2,3	2	n	M	F	F			F				2.1	8.1	n	n	N		
	2	trailhead	5c	2	n	M	F	F							2.5	8.4	n	n	N		
	3	access point	5a	2	yes	A		F							2.4	8.6	n	yes	N (signage only)		
	4	staging area	6	2	n	M	F	F			F				2.3	8.4	n	n	N		
	5a	connector trail	7,8	2	n	M			F						2.5	8.4	n	n	N		
4	5b	connector trail		2	n	M									1, 2,3	None	n	n	N		
	5c	connector trail		2	n	M			F						1, 2,3	None	n	n	N		
5	6	connector trail		3	n	M				F					2.1	8.1	n	n	N		
6	7	backbone trail		2	yes	M				F					2.1, 2.4, 2.5	8.6, 8.7	n	yes	401/404/1602		
	8	stacked loop trail	9a	2	n	M									2.4	None	n	n	N		
	9a	convert USFS road		2/4	n	A			F		F				4	None	n	n	N		
	9b	stacked loop trail		4	n	A			F						4	None	n	n	N		
	10	connector trail		2/3	yes	M			F			F	F		3.2, 4	8.9	yes	yes	401/404/1602		
	11	consolidate existing trails		2	yes	A			F			F			4	None	yes	yes	401/404/1602		
	12a	staging area		2	yes	M	F	F							1	None	n	yes	401/404/1602		
7	12b	connector trail		2	yes	M			F				F		1	None	n	yes	401/404/1602		
8	13	connector trail		2	n	M			F						4	None	n	n	N		
	14	connector trail		2	n	M			F						2.3	None	n	n	N		
9	15	connector trail		2	n	M			F						2.3	None	n	n	N		
	16	connector trail		2	n	M			F						2.3	None	n	n	N		
	17	access point		2	n	M			F						2.3	None	n	n	N		
	18	connector trail		2	n	A			F		F				2.4	None	n	n	N		
	19	study (no project)		2	n	A									4	None	n	n	N		
	20	omitted			n	A									-	-	n	n	N		
	21	summer biathlon course		4	n	A					F				4	None	n	n	N		
	22	dog-leash policy	9b	all	n	A					F				-	-	n	n	N		
	23	omitted			n	A									-	-	n	n	N		
	24	interpretive trail promote Hayden Cabin	10a	2	yes	A					F				2.1	8.1	yes	yes	401/404/1602		
	26	trail		2	n	A			F			F			2.4	None	n	n	N		
	27	omitted			n	A									-	-	n	n	N		
	28	public transit stops		1/2/3/4	n	A									1, 2.1, 2.3, 2.4	8.1, 8.4, 8.6	n	n	N		
	29	connector trail		2/4	n	M			F						4	None	n	n	N		
	30	signage and wayfinding retain USFS system trails		all	n	M	F	F							-	-	n	n	N		
	31			all	n	M	F								-	-	n	n	N		

Figure 5.E.1 SHARP Summer

SHARP Winter				Affected waters and beneficial uses		Avoidance and minimization	Characterization of impacts - future(F) - existing (x)					Hydrologic Analysis				Potential Permitting requirements	
Priority Project	Project No.	Project	Summer Designation	Watershed	Potentially Adjacent to Creek or stream (n-not expected)	Complete Avoidance (A) minimization (M)	Parking	Signage	groomed	restroom	use existing trails	Comments - No Construction (NC) - Signage Only (SO)	Drainage Basin	Drainage Exhibit	Potential FEMA identified Flood Zone (n-not expected)	Potential Wetland (n-not expected)	Not Anticipated (N)
3	1	staging area	1	2	n								2.1	8.1	n	n	N
	2	snowplay area	1	2	n	A						NC	2.1	None	n	n	N
	3	Off loading	1	2	n	A		F				SO	2.1	8.1	n	n	N
	4	omitted			n	A						NC	-	-	n	n	N
	5a	access point	3	2	yes	A		F				SO	2.4	8.6	n	yes	N (signage only)
	5b	access point		2	n	A		F				SO	2.5	8.7	n	n	N
	5c	trailhead	2	2	n	A		F				SO	2.5	8.7	n	n	N
	6	staging area	4	2	n			F		F		added impervious surface	2.3	8.4	n	n	N
	7	connector	5a	2	n	M		F				SO	2.4	None	n	n	N
	8	grooming		2	n	A			F			NC	2.3	None	n	n	N
	9a	convert USFS road	8	2	n	A		F	F			SO	2.4	None	n	n	N
	9b	dog policy			n	A		F				SO	-	-	n	n	N
	10a	connector trail	6/25	2	yes	M			F			NC	2.1	8.1	yes	yes	401/404/1602
	10b	Off leash dog area		2	n	A		F				SO	2.1	8.1	n	n	N
	11	omitted			n	A						NC	-	-	n	n	N
	12	Public transit stops	28		n	A						NC	1, 2.1, 2.3, 2.4	8.1, 8.4, 8.6	n	n	N
	13	Signage			n	A		F				SO	-	-	n	n	N
	14	omitted			n	A						NC	-	-	n	n	N
	15	omitted			n	A						NC	-	-	n	n	N
	16	staging area	12a	1	yes	M		F	F			added impervious surface	1	None	n	yes	401/404/1602
	17	Improved trail partly groomed zone		1	n	A		F	F			SO	1	None	n	n	N
	18	Retain Trails depicted as USFS trails on Summer Map		2	n	A			F			SO	2.4, 4	None	n	n	N
	19		31		n	A				F		NC	-	-	n	n	N

Figure 5.E.2 SHARP Winter

6. Hydrologic Analyses

All projects shall be designed such that post-construction hydrologic conditions match pre-construction conditions to avoid erosion due to constructions restricting the passage of peak flows or the retention of flows that may adversely affect downstream reaches. A professional engineer, registered in the State of California, shall perform analyses of different storm event flows up to the 100-year storm event and evaluate the project’s potential impacts to the existing hydrologic systems. The results of these types of analyses must be considered in the design of a project to verify that the proposed in-channel modifications shall not result in hydrologic changes that exacerbate flooding, erosion, scouring, sedimentation, and/or loss of either upstream or downstream flows.

7. Low Impact Development

The Lahontan Water Board encourages that a low-impact planning approach be used for each project. Low impact design (LID) provides opportunities to avoid and minimize impacts starting at the source at initial stages of planning and project design.

The following are some of the Specific Low Impact design elements that shall be considered:

- A. Avoid creating source pollutants.
- B. Avoid concentration of runoff.
- C. Maintain historic runoff conditions.

- D. Minimize changes to grades.
- E. Place trails as close to grade as feasible.
- F. Encourage users to follow paths such that natural areas are left undisturbed, thus reducing source pollutants.
- G. There shall be no placement of pollutants in path of runoff.

8. Stormwater Management, Mitigation Avoidance and Minimization

The Mammoth Lakes Trail System Master Project shall avoid discharge of stormwater to natural drainage systems. Where possible runoff shall be directed to areas where they can dissipate by percolation into landscape. In each project type indicated below, design shall avoid stormwater impact and avoid potential post-construction hydrologic impacts. The following identifies best management practices to be implemented in the project.

A. General Mitigation Measures

1. Adequate mitigation must be implemented within each project to limit adverse impacts to water quality or the potential to cumulative impacts that could have the potential to permanently alter the hydrological and ecological function of the aquatic resources within the project area, thereby adversely affecting beneficial uses.
2. **Hydrologic modification shall be avoided:**
 - a. There shall be no alteration of flow regimes
 - b. There shall be no alteration to groundwater
 - c. There shall be no alteration to Watershed level effects
 - d. There shall be no disruption of watershed – level aquatic function, including pollutant removal, floodwater retention, and habitat connectivity.
3. **Potential impacts that must be avoided are as follows:**
 - a. Reducing the available riparian habitat
 - b. Eliminating the natural buffer system to filter runoff and enhance water quality
 - c. Decreasing water storage capacity and increasing water flow velocity, which increases severity of peak discharges which exacerbate flooding, erosion scouring, sedimentation and may lead to near-total loss of natural functions and values, etc.
4. **Stormwater Management practices that should be incorporated:**
 - a. Where feasible, design alternative shall be considered that redirect flows from surface waters to areas where they will dissipate by percolation into the landscape.
 - b. Concentrated flows shall be directed to “level spreaders” to revise runoff to historic runoff conditions or overland sheet flow.
 - c. Paths shall be set to avoid concentration of runoff.
 - d. Natural depressions shall be maintained to continue to allow natural storm attenuation.

B. Construction Best Management Practices (BMP's)

Though each project may not be required to file a SWPPP on the SMARTS system, each project shall install and maintain appropriate BMP's in conformance to the methods identified in the CASQA handbook of Best Management Practices. The BMP's used shall relate to the type of work required for each project. All BMP's shall be considered for

each project following the BMP checklist. A note shall be made as to the reason for not incorporating any specific BMP.

C. Water Quality, Wetlands, Floodplains and Stream Stormwater Management

1. Avoid wet areas. Trails should avoid wet areas, springs, floodplains, stream corridors, wetland, and the lower portions of slopes, especially those that are north facing.
2. Identify and map water resources within 200 feet of the trail system. Accurately locating wetlands, streams, and riparian areas relative to the trail is an important element of trail planning. The location of these potential “receiving resources” for trail drainage and associated sediments will affect decisions about placement of trail drainage structures, maneuvering of maintenance equipment, season of work, interception and infiltration of trail drainage, and disposal of earth materials generated during maintenance activities.
3. Minimize crossing of streams and wetlands. Minimize channel crossings and changes to natural drainage patterns.
4. Minimize trail drainage to streams and wetland. Minimize the hydrologic connectivity of trails with streams, wetlands, and other water resources.
5. Keep heavy equipment off wet trails. Avoid operating heavy equipment on trails when they are wet. Use alternate routes for heavy equipment when trails are wet.
6. Provide crossing structures where needed. Where trails traverse wet areas, structures should be provided to avoid trail widening and damage at go-around spots. Crossing structures also help protect water quality, wetlands, and riparian areas.
7. Establish minimum 50 foot vegetation buffers between trails, streams and wetlands. Retain a buffer between trails and water resources by establishing riparian and streamside management zones, within which trail influences such as drainage, disturbance and trail width are minimized.

D. Non-Motorized Trail Stormwater Management

1. Avoid steep trail grades in excess of 12 percent where less steep alternative alignments are available and feasible. If necessary to construct trails on grades steeper than 12 percent, implement runoff control measures in the trail design, as noted below.
2. Maintain minimum trail gradients. Maintain positive surface drainage by means of out-sloped, in-sloped, or crowned sections having cross slopes of 3 percent to 5 percent for soft surfaced trails at 2% for hard surfaced trails. The road surface should be graded to shed water before it can run very far down the road.
3. Maintain minimum trail width for uses specified. Maintain only the width of trail necessary to support the designated uses.
4. Provide drainage at frequencies appropriate for soils and gradients. Roll grades or undulate the road profile frequently to disperse water from the trail. Rolling dips and water bars provide essential drainage relief.
5. Prevent erosion at outlets of rolling dips and culverts. Drainage outlets should be armored with rock to prevent erosion. Brush or native organic debris can be spread in lead-off ditches to slow the velocity of the runoff and facilitate the deposition of sediments.

6. Install pipes and ditches as a last resort; assure funds are available to maintain them. Road and trail under-drains (culverts) and associated ditches should be used only as a last resort to achieve good drainage.
7. Avoid long sustained grades that concentrate flows.
8. Avoid discharging trail runoff onto fill slopes and unprotected slopes. Fill slopes should be armored where runoff is discharged onto them or the runoff should be conveyed in a down drain to a location where sediments can be deposited and flow infiltrated.
9. Prevent watercourses from running down the trail.
10. Avoid floodplain stream crossings. Cross streams at narrow spots where there is enough root support for bridge footings, the span will be out of reach of flood waters, and will not be subject to floodplain dynamics.
11. Select pipe sizes based on hydrologic data. All culvert sizes should be prescribed based on the size of the contributing watershed and best hydrologic data available.
12. Avoid maintenance activities that generate sediment. To prevent the generation of sediments from runoff, only road surfaces that need to be reshaped should be bladed and only ditches that are plugged with sediments should be cleaned.
13. Season of work. Maintenance work that results in disturbed earth should be delayed until after the wet season (October 15 to May 1). Blading should be done when the trail surface materials are moist, but not dry.
14. Disposal of excess earth materials. Areas for disposal of excess earth materials generated during maintenance activities should be designated in the maintenance plan.
15. Management of spoils piles. Excess earth materials that must be stored on slopes or where runoff from them can reach wetlands riparian areas, streams, or other sensitive resources should be covered with plastic or a thick layer of wood chips.
16. Stabilize disturbed earth. Areas of disturbed earth should be seeded with native plant materials and mulched as soon as possible after disturbance.

E. Parking Area Stormwater Management

1. Avoid grades in excess of 5% where possible. If necessary to construct steeper than 5 percent, implement runoff control measures, as noted below.
2. Design Parking areas to minimize concentration of runoff.
3. Maintain the smallest area feasible to meet parking requirements.
4. Install sand/oil separators to collect and contain pollutants from runoff from parking areas.
5. Install infiltrators to collect initial runoff from Parking Lots.
6. Prevent erosion where runoff exits parking areas by connecting to existing storm drainage systems or installing level spreaders. If necessary drainage outlets should be armored with rock to prevent erosion. Brush or native organic debris can be spread in lead-off ditches to slow the velocity of the runoff and facilitate the deposition of sediments.
7. Assure funds are available to maintain drainage facilities including gutters, inlets, pipes, sand/oil separators, and infiltrators.
8. Avoid discharging runoff onto fill slopes and unprotected slopes. Fill slopes should be armored where runoff is discharged onto them or the runoff should be

- conveyed in a down drain to a location where sediments can be deposited and flow infiltrated.
9. Parking areas shall be placed in areas that avoid water courses or affect wetlands or water quality.
 10. Select pipe sizes based on hydrologic data. All culvert sizes should be prescribed based on the size of the contributing watershed and best hydrologic data available.
 11. Avoid maintenance activities that generate sediment. To prevent the generation of sediments from runoff, only road surfaces that need to be reshaped should be bladed and only ditches that are plugged with sediments should be cleaned.
 12. Season of work. Maintenance work that results in disturbed earth should be delayed until after the wet season (October 15 to May 1).
 13. Disposal of excess earth materials. Areas for disposal of excess earth materials generated during maintenance activities should be designated in the maintenance plan.
 14. Management of spoils piles. Excess earth materials that must be stored on slopes or where runoff from them can reach wetlands riparian areas, streams, or other sensitive resources should be covered with plastic or a thick layer of wood chips.
 15. Stabilize disturbed earth. Areas of disturbed earth should be seeded with native plant materials and mulched as soon as possible after disturbance.

F. Bathroom/Restroom Construction Stormwater Management

1. Avoid condition that allows runoff from roof to cause initiation of erosion.
2. Areas that collect roof drainage shall be designed as erosion resistant.
3. Direct runoff from roofs to non erodible surfaces.
4. Avoid discharging runoff onto fill slopes and unprotected slopes. Fill slopes should be armored where runoff is discharged onto them or the runoff should be conveyed in a down drain to a location where sediments can be deposited and flow infiltrated.
5. Prevent watercourses from running down the trail.
6. Avoid floodplains. Structures shall not be constructed in Floodplains.
7. Select pipe sizes and roof drainage collection systems based on hydrologic data. All facility sizes should be prescribed based on the size of the contributing watershed and best hydrologic data available.
8. Avoid maintenance activities that generate sediment or discharge of pollutants.
9. Season of work. Maintenance work that results in disturbed earth should be delayed until after the wet season (October 15 to May 1).
10. Disposal of excess earth materials. Areas for disposal of excess earth materials generated during maintenance activities should be designated in the maintenance plan.
11. Management of spoils piles. Excess earth materials that must be stored on slopes or where runoff from them can reach wetlands riparian areas, streams, or other sensitive resources should be covered with plastic or a thick layer of wood chips.
12. Stabilize disturbed earth. Areas of disturbed earth should be seeded with native plant materials and mulched as soon as possible after disturbance.

9. Priority Projects

Priority Project		Affected waters and beneficial uses		Avoidance and minimization	Characterization of impacts - future(F)								Hydrologic Analysis				Low impact development	Potential Permitting requirements	
Priority Project	Project No. (Sharp Summer except as noted MUP)	Project	Watershed	Potentially Adjacent to Creek or stream (n-not expected)	Complete Avoidance (A) - minimization (M)	Parking	Signage	soft surface non motorized	hard surface non motorized	restroom	use existing trails	creek crossing	bridge	Drainage Basin	Drainage Exhibit	Potential FEMA identified Flood Zone (n-not expected)	Potential Wetland (n-not expected)		Not Anticipated (N)
1	MUP 2-1		2	yes	M									2,3	8,3	yes	yes	yes	401,404,1602
2	MUP 3-1		2/3	n	M									2.1/3.3	8.1/8.10	n	n	yes	N
3	1	staging area	2	n	M	F	F			F				2.1	8.1	n	n	yes	N
4	5b	connector trail	2	n	M			F						1, 2,3	None	n	n	yes	N
5	6	connector trail	3	n	M				F					2.1	8.1	n	n	yes	N
6	7	backbone trail	2	yes	M				F					2.1, 2.4, 2.5	8.6, 8.7	n	yes	yes	401/404/1602
7	12b	connector trail	2	yes	M			F				F		1	None	n	yes	yes	401/404/1602
8	13	connector trail	2	n	M			F						4	None	n	n	yes	N
9	15	connector trail	2	n	M			F						2,3	None	n	n	yes	N

Figure 9.1 priority projects

10.Cumulative Impacts

Future development in the Mammoth Lakes Basin would lead to an increase in the amount of impervious surfaces, thereby increasing runoff. The amount of paved surface resulting from development of the Trails System Master Plan would not be sufficient to be cumulatively considerable, and would not represent a significant impact. Future development in the Mammoth Lakes Basin would also lead to an increase in water quality impacts, such as sedimentation. However, provided that all future development projects are subject to the policies, standards, and regulations of the Town of Mammoth Lakes General Plan, Trails System Master Plan, and The Lahontan Basin Plan as well as conformance with any required permits with respect to water quality protection, no significant impacts would result

11.Significance after Mitigation

Implementation of the mitigation measures indentified in the Trails System Master Plan, conformance with Low Impact design and other items included in this EIR, as well as conformance with any required permits would reduce all hydrology and water quality impacts to a less-than-significant level.