

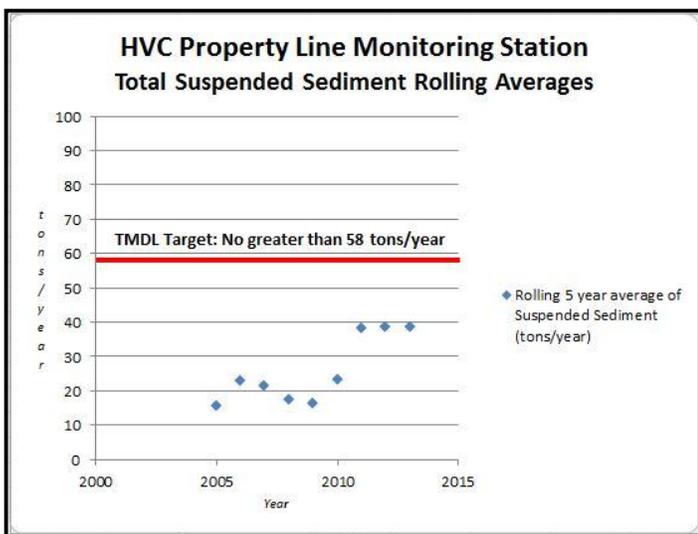
[Click here](#) for a description of sampling sites

Background Information

- **Date of Approval:**
 January 2001 (Lahontan Region); September 30, 2002 (USEPA)
- **Basis for TMDL:**
 With the development of the ski resort beginning in 1955/56, the creek has been altered by hydromodification. This includes a snowmaking reservoir, a diversion of part of the creek into a culvert, and by erosion of the hillslope.
- **Project Implementers:**
 United States Forest Service, Lake Tahoe Basin Management Unit and Heavenly Ski Resort
- **Target:**
 The TMDL will be met when the instream total sediment load does not exceed 58 tons/yr as a 5 year rolling average, as measured at the Property Line monitoring station (HVC-3)
- **Attainment of TMDL:**
 Instream standards projected to occur within 20 years after final approval of TMDL (2022).

Permitting and Reporting

- **TMDL Implementation Permits:**
 Monitoring and Reporting Program No. R6T-2003-0032 (2003)
 Including amendments
 R6T-2003-0032A1 (2006)
 R6T-2003-0032A2 (2013)
- **Period of Evaluation:**
 2001 – 2013
- **Reporting**
 Annual and comprehensive monitoring reports are submitted to the Lahontan Water Board for review as part of the Heavenly Ski Resort Permit.



Target	Evaluation Schedule	Source Reported	2015 Compliance Comments
Instream total sediment load maximum of 58 tons/yr as a 5 year rolling average, as measured at the Property Line monitoring station	Annually, as a 5 year rolling average	Annual Monitoring Reports and Comprehensive Monitoring Report Heavenly Mountain Resort Epic Discovery Project EIR & EIS	Meets Requirements: Since 2005, the five-year rolling average has been significantly lower than the Lahontan TMDL target of 58 tons/year of total suspended sediment. See Table 1 for Total Suspended Sediment Data
USFS Region 4 “Stream Condition Inventory” improving trends in channel morphology over time	Conducted every three years beginning in 2006	Annual Monitoring Report; Heavenly Mountain Resort Epic Discovery Project EIR & EIS	Meets Requirements: <u>Sky Meadows (HVC-1):</u> Improved and consistent channel conditions as compared to Upper Hidden Valley Reference Reach. 97% bank stability & 29% stream shading. <u>Below Patsy’s (HVC-2):</u> Physical habitat parameters are good. Habitat types, pool numbers and dimensions are stable, and stream shading is good. <u>Property Line (HVC-3):</u> Improved and consistent channel conditions as compared to Lower Hidden Valley Reference Reach. See Table 4 for <i>Instream Biotic Condition criteria</i>
Macroinvertebrate community health improving to approach conditions at Hidden Valley Creek	Sampling has been conducted in a 2 year on, 2 year off cycle: 2001-2003; 2006-2007; 2010-2011 & 2014-2015	Annual Monitoring Report; Heavenly Mountain Resort Epic Discovery Project EIR & EIS	In progress: Improving trend cannot be determined from current data set. <u>Sky Meadows (HVC-1):</u> The Instream biotic condition is Very Poor. However, TMDL implementation efforts are in progress and biological conditions often take years to respond. It is premature to conclude whether macroinvertebrate conditions imply a lack of compliance. <u>Below Patsy’s (HVC-2) & Property Line (HVC-3):</u> The Instream biotic condition is Poor to Fair; not yet “approaching conditions in Hidden Valley Creek.” See Table 2 for <i>Bioassessment Scores</i> See Table 3 for <i>IBI and CSCI Thresholds</i>
Maintaining/implementing BMPs for roads and ski runs with effectiveness reported	Yearly, on-going basis yearly	Annual Monitoring Report	Meets Requirements: Between 3 and 37 BMP evaluations were completed each year in Heavenly Valley Creek. On average 90.5% of the inspections concluded that permanent BMPs were fully implemented and fully effective. BMP effectiveness is rated as Excellent.
Overall rating of “good” or better for effective soil cover on ski runs and roads using the LTBMU evaluation criteria. <i>The Forest Service recommended that the measurements be discontinued because the tests were too time intensive and did not support monitoring objectives.</i>	In 2013, an erosion-focused rapid assessment process was tested for identification of erosion “hot spots.” ¹	Annual Monitoring Report; Heavenly Mountain Resort Epic Discovery Project EIR & EIS	Meets requirements: In 2005 soil coverage was rated as excellent. Eight of 25 hotspots were completed in 2013 & indicate measurable improvement in erosion resistance. Seven more treatment projects are scheduled for 2014.

¹The Monitoring Program was amended in November 2013 under Board Order Number R6T-2003-0032A2 to update effective soil cover monitoring with an erosion-focused rapid assessment process described in the *Watershed Management Guidebook* (Drake and Hogan 2012). Erosion hot spot identification and ranking criteria include: erosion risk, active erosion, active deposition, proximity to stream, connectivity to stream and stream environment zone, watershed priority, and operational priority.

Implementation Measure	Evaluation Schedule	Source Reported	2015 Compliance Comments
Abandon and restore 7.59 acres of existing unpaved roads ¹	Completed by 2006	TRPA Land Coverage Removal Verification Permits	Meets requirements: Reported in Tahoe Regional Planning Agency Land Coverage Verification letter to Heavenly Ski Resort December 5, 2005.
Stabilize 21.10 acres of existing roads which will remain in use ¹	Completed by 2006	2003 and 2006 Forest Service Comprehensive Monitoring Report	Meets requirements: Reported in Heavenly Ski Resort TMDL Compliance Report for stabilized and treated summer maintenance roads submitted to Lahontan July 16, 2010.
Restore 182 acres of existing ski runs ¹	Completed by 2006	2003 and 2006 Forest Service Comprehensive Monitoring Report.	Meets requirements Reported in Heavenly Ski Report TMDL Compliance Report for Stabilized and Treated Ski Runs - July 16, 2010 Heavenly Ski Run Erosion Control Measures Since 2001/2002 - July 30, 2010
Maintain BMPS as necessary ¹	On-going basis	Annual Monitoring Report	Meets requirements: BMP monitoring frequency is biweekly during construction and after precipitation events. Between 3 and 37 BMP evaluations were completed each year in Heavenly Valley Creek. On average 90.5% of the inspections concluded that permanent BMPs were fully implemented and fully effective. BMP effectiveness is rated as Excellent.
Review success of specific BMPs at specific sites; identify and implement improvements through adaptive management approach ¹	On-going basis	Annual Monitoring Report & Environmental Monitoring Program Comprehensive Reports.	Meets requirements: BMP effectiveness monitoring and recommendations are conducted by Resource Concepts, Inc. from 2001-2014. Resource Concepts Inc. submits their findings in the "Environmental Monitoring Program Comprehensive Reports."
Conduct a comprehensive review of progress toward watershed restoration and attainment of water quality standards and identify needs for change through adaptive management system ¹	On-going basis	Annual Monitoring Reports and Comprehensive Monitoring Report	Meets requirements: A comprehensive review of watershed restoration can be found in the "Heavenly Mountain Resort Epic Discovery Project Environmental Impact Report and Environmental Impact Statement – August 2014."

¹Incorporated by reference in Tahoe Regional Planning Agency (TRPA) Draft EIR/EIS/EIS for Heavenly Ski Resort Master Plan (1995), pages 4.150 to 4.172 (CWE Soil Erosion Reduction Program) and Appendices H and I; TRPA (1996), pages 6.41to 6.56 (Revised Mitigation and Monitoring Plan); and U.S. Forest Service (1998), Appendix G (CWE Technical Memorandum No. 1).

Table 1. Heavenly Valley Creek Property Line (43-HV-C3) monitoring station instream suspended sediment loading.

Water Year	Suspended Sediment (tons/year)	Rolling 5 year average of Suspended Sediment (tons/year)
2001	6.6	-
2002	9.1	-
2003	20.4	-
2004	5.2	-
2005	36.9	15.6
2006	42.6	22.8
2007	1.3	21.3
2008	0.6	17.3
2009	0.5	16.4
2010	70.5	23.1
2011	118.6	38.3
2012	1.7	38.4
2013	1.0	38.5

Table 2. Bioassessment Scores for Heavenly Valley Creek and Hidden Valley Creek sampling sites.

Sample Year	Sample Date	HVC-1 Heavenly Valley Cr "Sky Meadows"		HVC-2 Heavenly Valley Cr "Below Patsy's"		HVC-3 Heavenly Valley Cr "Property Line"		LHC-1 (Lower) Hidden Valley Cr (control)	
		ESIBI	CSCI	ESIBI	CSCI	ESIBI	CSCI	ESIBI	CSCI
2001	Jul-01	35.6 ^(a)	0.56 ^(a)	49.4 ^(a)	0.74 ^(a)	84.2 ^(b)	1.08 ^(b)	93 ^(b)	0.95 ^(b)
2002	Jul-02	37.9 ^(a)	0.69 ^(a)	53.9 ^(a)	0.91 ^(a)	75.3 ^(b)	0.87 ^(b)	96.8 ^(b)	1.15 ^(b)
2003	Jul-03	49.6	0.84	56.6	0.85	48.7	0.93	78.2	1.06
2006	Sep-06	55.3	0.92	52.2	0.95	69.1	1.02	80.6	1.15
2007	Aug-07	23.6	0.44	67	0.98	74.7	1.1	93.3	1.04
2010	Aug-10	36.8	0.74	55.2	0.99	80.7	0.9	94.6	1.08
2011	Aug-11	49.8	0.69	75	0.86	83.5	1.02	87.8	0.86
2014	Jul-14	13.5	0.26	52.7	0.79	72.7	0.88	80.5	0.89

Note: For years 2001-02, (a) = collected by USFS; (b) = collected by UC-SNARL (Herbst)

Table 3 – Eastern Sierra Index of Biological Integrity (IBI) Thresholds & California Stream Condition Index (CSCI) Thresholds

Eastern Sierra Index of Biological Integrity (IBI) Thresholds					
Supporting (Unimpaired)			Impaired		
Acceptable		Intermediate supporting but uncertain	Partially-supporting	Not supporting	
>89.7	89.7–80.4	80.4 – 63.2	63.2 – 42.2	<42.2	
A	B	C	D	F	
Very good	Good	Fair	Poor	Very poor	
Good		Fair	Poor		

Source: Herbst and Silldorf 2009 (Lahontan 2014)

California Stream Condition Index (CSCI) Thresholds					
Index	Very Likely Intact (>=0.50)	Likely Intact (0.30 to 0.50)	Possibly Altered (0.10 to 0.30)	Likely Altered (0.091 to 0.10)	Very Likely Altered (<0.01)
CSCI	>1.00	1.00 – 0.92	0.91 – 0.79	0.78 – 0.63	0.62 – 0.00

Source: Drs. Andrew Rehn and Peter Ode (Lahontan 2014)

Table 4 – Stream Condition Monitoring status ratings are based on the following criteria

Excellent:	All channel conditions are stable or improving
Good:	Most channel conditions are stable or improving
Fair:	Some channel conditions are stable or improving
Poor:	Most channel conditions are not stable or improving

Description of Sampling Sites

HVC-1 Sky Meadows: HVC-1 is a high elevation, low gradient meadow. It is located on Heavenly Ski Resort and in a high use area for guests.

HVC-2 Below Patsy’s: HVC-2 is a high elevation, higher gradient reach of the creek. It is directly below Heavenly Valley ski operations and captures the impacts coming off the mountain.

HVC-3 Property Line: HVC-3 is the lowest elevation sampling location and is close to the confluence with Trout Creek. HVC-3 is where sediment data is collected for the TMDL.