



May 1, 2019

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**Subject: Submittal of the Heavenly Mountain Resort Mitigation and Monitoring Plan  
Annual Report**

Dear Client:

Please find the enclosed Heavenly Mountain Resort (Heavenly) Mitigation and Monitoring Plan Annual Report (Annual Report) prepared by Cardno in conformance with the requirements of the Heavenly Mountain Resort Master Development Plan, revised and approved in association with the Epic Discovery Summer usage EIR/EIS/EIS in 2015. This Annual Report provides a comprehensive review of all applicable mitigation and monitoring measures associated with mountain operation activities implemented by Heavenly Mountain Resort from October 2017 through September 2018. This time period was chosen to encompass both the 2017-2018 ski season and the 2018 summer construction season.

The report is organized into three levels of detail enabling the reader to choose between a broad overview and specific areas of focus. The **first tier** provides an overview of Heavenly's compliance status during the monitoring period. This tier consists of Table 1, which provides a list of each mitigation measure, its applicability to and status during the October 2017 – September 2018 time period, and whether Heavenly was in compliance with the mitigation measure. The summary table provides a roadmap to the more detailed presentations of the report.

The **second tier** is the body of the Annual Report which contains a moderate level of detail in describing the monitoring and compliance status. For each mitigation measure, this presentation provides a summary of the requirement, activities conducted during the monitoring period that trigger the mitigation measure, and Heavenly's compliance status. The body of the report also directs readers to the appendices, where the greatest level of detail is provided.

The **third tier**, the most detailed tier, includes the appendices at the end of the Annual Report. The appendices contain monitoring reports for individual mitigation measures prepared by subject matter specialists. Individual monitoring reports include: on mountain monitoring, water quality monitoring, water balance and snowmaking usage, the boundary and trash management plans, biological and nesting monitoring, as well as noise monitoring associated with snow making. Water quality data is provided in The Environmental Monitoring Program Annual Report (2018 Water Year) which was submitted on January 15<sup>th</sup>, 2019. An electronic copy of the water quality monitoring report is included with hard bound copies of the report on a flash drive.

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Tahoe Regional Planning Agency (TRPA)  
May 1, 2019



We recommend that paper copies of the Annual Report be made available for public review at the Tahoe Regional Planning Agency offices, the USDA Forest Service Lake Tahoe Basin Management Unit Supervisor's Office (LTBMU), and the Lahontan Regional Water Quality Control Board South Lake Tahoe Office. This document should also be posted online on TRPA's website (<http://www.trpa.org/document/projects-plans/>).

Should you require additional information or have questions regarding this document and its contents, please contact Chris Donley of Cardno at 208-272-9178.

Sincerely,

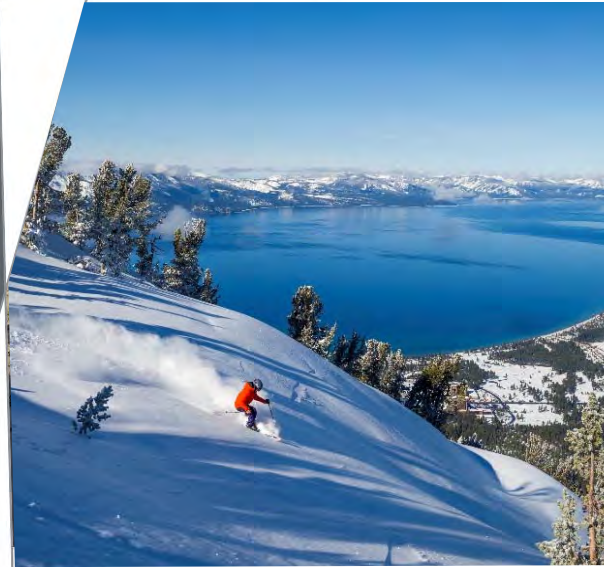


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# Heavenly Mountain Resort

Mitigation and Monitoring Plan  
Annual Report (October 2017 –  
September 2018)



Prepared for  
Tahoe Regional Planning Agency



May 1, 2019

*Photo courtesy of Heavenly Mountain Resort*







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## Executive Summary

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On April 25, 2007, the Tahoe Regional Planning Agency's Governing Board unanimously approved Heavenly Mountain Resort's 2006 Master Plan Amendment (MPA). "In 2013 Heavenly applied for applications with the USDA Forest Service and TRPA to amend the MPA 07 to expand non-skiing and summer use opportunities within the resort. The 2013 proposal, titled Epic Discovery, utilizes existing infrastructure and facilities (e.g., ski lifts, lodges and roads) to provide a wide variety of new summer activities for guests. The proposal was developed following the passage of the Federal Ski Area Recreational Opportunity Enhancement Act of 2011 which allows ski resorts operating on National Forest System lands to propose year round non-skiing activities in order to attract a wider range of visitors to National Forests and help support employment and economic activity in local communities. The 2015 Master Plan amendment is referred to as the Heavenly Master Development Plan (MDP)."<sup>1</sup> This annual report summarizes monitoring and evaluation activities conducted at Heavenly Mountain Resort (Heavenly) between October 2017 and September 2018 as a result of the implementation of the Mitigation and Monitoring Plan (MMP) contained in the approved Master Plan Amendment.

The Mitigation and Monitoring Plan consists of planning measures, construction measures, operations and maintenance measures, and management response to monitoring and evaluation. The content of each measure is developed to mitigate potentially adverse effects from the implementation of Heavenly's Master Development Plan. As Heavenly implements the Master Development Plan, they must meet each applicable measure and utilize monitoring and evaluation results to adapt the measures if necessary.

Monitoring and evaluation is conducted by Heavenly, the Tahoe Regional Planning Agency (TRPA), the USDA Forest Service, Lahontan Regional Water Quality Control Board, and local and county offices. Heavenly and TRPA employ the services of Cardno (formerly Cardno ENTRIX, Inc.), Resource Concepts, Inc., J.C. Brennan and Associates, and Sierra Ecotone Solutions (Garth Alling, formerly with Hauge Brueck Associates), to conduct monitoring in their field of expertise. This annual report summarizes the monitoring results based on the data evaluation.

In summary, Heavenly is in compliance with all applicable mitigation measures of the MMP with the exception of partial compliance with regards to measure 7.4-3 (water quality), 7.5-6 (maintain flows in Heavenly Valley Creek), and non-compliance with measure 7.5-11 (snowmaking noise at Base areas). Heavenly is working to decrease water quality exceedances by decreasing the amount of huck salt applied on the mountain, addressing on-mountain erosion source areas, and implementing liquid brine solution to the parking lots and roadways leading to California Base Lodge to help limit the amount of deicer needed on the roadways. Additionally, Heavenly is continuing to make improvements to the StormFilter vault system to improve and optimize performance (Catalyst 2017). Parking lot improvements during summer 2018 at the Upper California parking lot and planned future improvements at the Boulder lodge will continue to improve downstream water quality. Heavenly has also started to replace inflow stream gage equipment allowing for more accurate measurements of flow into and out of the California reservoir. However, substantial snow depths during the 2016-2017 ski season damaged some of the new equipment and additional repairs are needed to accurately monitor flows into and out of the reservoir. Snowmaking noise exceedances above the PAS boundary limits at the Base areas will continue unless the existing snowmaking equipment is replaced with quieter models, or infrastructure barriers are built around the lodge areas. However, there have been no reported noise complaints associated with snow making over the past few years. Table 1-1 summarizes each of the measures contained in the MMP, the relevance of the measure to the time period of interest, and whether or not Heavenly is in compliance with the measure.

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## Chapter 1 – Introduction

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Heavenly Mountain Resort is located on the south shore of Lake Tahoe within El Dorado and Alpine Counties of California and Douglas County of Nevada (Figure 1-1). Land ownership is shared between the United States Department of Agriculture Forest Service (Forest Service) and Heavenly. Heavenly operates on National Forest lands through a special use permit, renewed in 2002 for a period of 40 years.

A Mitigation and Monitoring Plan was first adopted during the approval of the 1996 Heavenly Master Plan. The MMP was revised based on measures that have been completed, measures that are no longer necessary, and new measures that are required to reduce potential impacts from implementation of the Master Plan Amendment. The amended Master Plan described the long-range development plans for Heavenly Mountain Resort. The latest EIR/EIS/EIS (Heavenly Mountain Resort Epic Discovery Project, February 2015) and August 2014 Master Plan Amendment, known as the Heavenly Master Development Plan (MDP), was finalized in May 2015 and contained updated environmental mitigation conditions, monitoring and reporting requirements. A number of past measures that were no longer applicable were removed, while there were a few additional measures added to address the Epic Discovery Projects.

The MMP requires continued compliance from the Heavenly Mountain Resort with existing local, regional, state, and national regulatory programs both in and out of the Tahoe Basin (Heavenly, 2007). The MMP also contains planning, construction, operations and maintenance measures, and management responses to monitoring and evaluations. Table 1-1 summarizes the measures contained in the MMP and MDP, their relevance to the time period of interest, and whether or not Heavenly is in compliance. As discussed above, additional measures were implemented, revised and/or removed based on the latest EIR/EIS/EIS document and MDP (May 2015). Table 1-1 provides a brief summary and update of these measures.

Implementation of the MMP is conducted through the work of numerous agencies and private consultants including Heavenly, Tahoe Regional Planning Agency (TRPA), the USDA Forest Service, Cardno (formerly Cardno ENTRIX and ENTRIX, Inc.), Resource Concepts, Inc. (RCI), j.c. Brennan and Associates, Sierra Ecotone Solutions, and Liquid Innovations. The monitoring period of October 2017 through September 2018 was chosen for the Annual Report in order to include the 2017–2018 ski season the 2018 water year and the 2018 summer construction season.

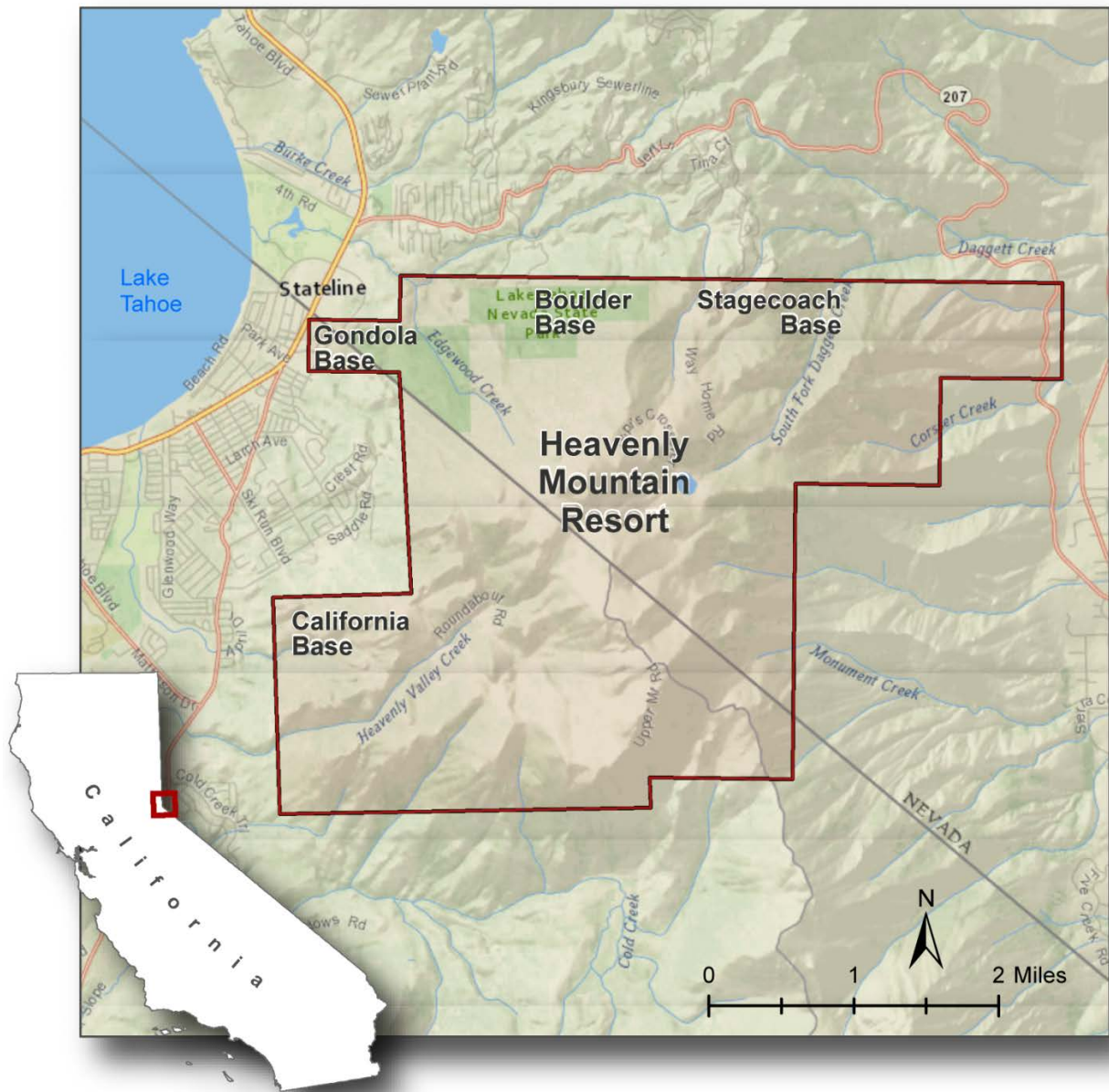


Figure 1-1 Location of Heavenly Mountain Resort

**Table 1-1 Summary of Mitigation and Monitoring Plan Measures**

Measure Number	Measure	2017-2018 Applicability	October 2018 Status	Discussed in Current Report	Compliance
<b>Planning Measures</b>					
7.3-1	TRPA Mitigation Monitoring Activities	All Projects and Operations	Complete	Yes	Yes
7.3.2	Design and site the proposed Powderbowl Lodge to minimize visibility from off-site views	None	Not Built	No	N/A
7.3-3	Design and Site the Proposed Gondola Mid-Station Restaurant to Minimize Visibility From Off-Site Views	None	Not Built	No	N/A
7.3-4	Design and Site the Proposed Sand Dunes Lodge to Minimize Visibility From Off-Site Views	None	Not Built	No	N/A
<b>Construction Measures</b>					
7.4-1	Implement the Construction Erosion Reduction Program	All Projects and Operations	Ongoing	Yes	Yes
7.4-2	Construct Infiltration Facilities	Annual CWE Work List	Ongoing	Yes	Yes
7.4-3	Meet Water Quality Standards	All Projects and Operations	Ongoing	Yes	Partial
7.4-4	Implement Adaptive Ski Run Prescriptions	Existing Ski Slopes and Future Trail Widening Projects.	Ongoing	Yes	Yes
7.4-5	Control Runoff due to Future Construction and Long-Term Operation Facilities	All Projects and Operations	Ongoing	Yes	Yes
7.4-6	Avoid and/or Restore Future Disturbed SEZs	Galaxy Chair and associated roadway improvements avoided SEZ areas.	Project-Specific	Yes	Yes
7.4-7	Avoid and/or Restore Future Disturbed Jurisdictional Wetlands and Waters	All Projects and Operations	Project-Specific	Yes	Yes
7.4-8	TRPA Land Coverage Mitigation	Updated with 2018 Projects	Ongoing	Yes	Yes
7.4-9	(BIO-1) Delay Sky Meadows Challenge Course, Sky Basin Coaster and East Peak Lake Water Activities Until Sierra Nevada Yellow-legged Frog Surveys and USFWS Consultation are Complete	Third Year of Monitoring Conducted in 2017, no additional surveys required for the area at this point.	Completed	Yes	Yes
7.4-10	Reduce and Control Fugitive Dust	Summer Operations	Ongoing	Yes	Yes

Measure Number	Measure	2017-2018 Applicability	October 2018 Status	Discussed in Current Report	Compliance
7.4-11	Minimize Removal/Modification of Deciduous Trees, Wetlands, and Meadows	Galaxy Chair and associated roadway improvements avoided impacts to deciduous trees, wetlands, and meadows.	Project-Specific	Yes	Yes
7.4-12	Active Raptor and Migratory Bird Nest Site Protection Program	All Projects	Ongoing	Yes	Yes
7.4-13	Monitor and Protect Northern Goshawk	All Projects	Ongoing	Yes	Yes
7.4-14	(BIO-4) Wildlife Nursery Site Survey	Surveys were completed prior to the 2018 construction season.	Ongoing	Yes	Yes
7.4-15	Utilize Boundary Management Plan to Manage Skier Access on Adjacent NFS Lands	Winter Operations	Revised/ Ongoing	Yes	Yes
7.4-16	Evaluate and Monitor Known Archaeological Resources Within Comstock Logging Historic District	No Significant Changes	Ongoing	Yes	Yes
7.4-17	Identify and Protect Undiscovered Archaeological Resources	All Projects	Ongoing	Yes	Yes
7.4-18	Protect the Tahoe Rim Trail	Galaxy Chair and associated roadway improvements included safe access measures to the TRT during construction.	Project-Specific; Not Built	Yes	Yes
<b>Operations and Maintenance Measures</b>					
7.5-1	Watershed Maintenance and Restoration Program	Summer Operations	Ongoing	Yes	Yes
7.5-2	(Water-C1b) Ongoing Environmental Monitoring Program	All Projects and Operations	Ongoing	Yes	Yes
7.5-3	(WATER-C1a) CA-1 Erosion Reduction Measures	All Projects and Operations	Ongoing	Yes	Implementing
7.5-4	(Water-C3) NV-1 Erosion Reduction Measures	All Projects and Operations	Ongoing	Yes	Implementing
7.5-5	Maintain Water Rights Balance	All Operations	Ongoing	Yes	Yes
7.5-6	Maintain Water Flows in Heavenly Valley Creek	All Operations	Ongoing	Yes	Partial
7.5-7	Maintain Water Flows in Daggett Creek	All Operations	Ongoing	Yes	Yes

Measure Number	Measure	2017-2018 Applicability	October 2018 Status	Discussed in Current Report	Compliance
7.5-8	Maintain Compliance with Water Entitlements	All Operations	Ongoing	Yes	Yes
7.5-9	Reduce Vehicle Emissions	All Operations	Ongoing	Yes	Yes
7.5-10	Snow Removal Noise Mitigation Methods	Winter Operations	Ongoing	Yes	Yes
7.5-11	Snowmaking Noise Mitigation Methods for Base Areas	Winter Operations	Ongoing	Yes	No
7.5-12	Rock Busting Noise Mitigation Methods	None	Not Built	No	N/A
7.5-13	Restrict Hours of Amphitheater Operations	None	Not Built	No	N/A
7.5-14	(TRANS-1) Traffic and Air Quality Mitigation Program	Heavenly paid into the Air Quality Mitigation Fund.	Completed	Yes	Completed
7.5-15	Implement the Coordinated Transportation System (Public Transit Services)	All Operations	Ongoing	Yes	Yes
7.5-16	Protect Tahoe Draba Populations within Heavenly Mountain Resort	All Projects and Operations	Project-Specific	Yes	Yes
7.5-17	Minimize Loss/Degradation of Sensitive Plant Species	All Operations	Ongoing	Yes	Yes
7.5-18	Invasive Plant Management	All Projects and Operations	Ongoing	Yes	Yes
7.5-19	Monitor and Protect Nesting and Fledgling Bird Species	No concerts occurred	Not Built	Yes	Yes
7.5-20	(BIO-3) Migratory Bird and Habitat Utilization Survey	Surveyed Proposed Epic Discovery Project Locations.	Ongoing	Yes	Implementing
7.5-21	(BIO-8) Wildlife Trash Management and Education Program	All Operations	Ongoing	Yes	Implementing
7.5-22	Maintain Timber Thinning Practices	All Operations	Ongoing	Yes	Yes
7.5-23	Provide Employee Housing	All Operations	Ongoing	Yes	Yes
<b>Management Response to Monitoring and Evaluation</b>					
7.6-1	Soil and Water Quality	All Projects and Operations	Ongoing	Yes	Yes
7.6-2	Traffic and Parking	All Operations	Ongoing	Yes	Yes
7.6-3	Late Seral/Old Growth Enhancement	All Operations	Completed	Yes	Yes

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## Chapter 2 – Planning Measures

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### 2.1 Introduction

A majority of the planning measures are addressed within individual Tahoe Regional Planning Agency permits. Table 2-1 provides an update to the previous season's report (October 2016 to September 2017) project list and updates any existing open permits. Projects and permits completed and closed are not shown. A few of the projects listed are completed but are waiting to receive final inspections for revegetation and Best Management Practices (BMPs) and closure.

**Table 2-1 Update on Projects Constructed Prior to the 2018 Construction Season**

Project	TRPA Permit #	Status as of October 2018
Tamarack Lodge	ERSP 2009-3571	Completed December 2010. BMP security released on 10/21/11. Still holding security until CFA is transferred/relocated allowing summer usage. Permit open until CFA transfer is complete.
Bear Cave Children's Ski School Lodge (Includes tubing hill modifications)	ERSP 2011-0513 & ERSP 2017-0589	Lodge completed in October 2011. Tubing lift road completed.* Permit ESSP 2017-0589 is still active and waiting for final inspection, anticipated in the summer of 2019.
Summer Activity Improvements (Multi-Line Zipline/Gondola Enclosure) and Wedding Arch Site Development	ERSP 2012-1147 & ESRP 2012-1147-01	No additional funding for future projects. Waiting for final inspection, anticipated in the summer of 2019.
Complete Waterfall Lift Removal Top Station Regrading (Top of Epic Mix race Course)	ERSP 2004-0299STD	No additional work will take place under this permit as the permit is closed.

\*Construction is complete. Revegetation and BMPs have not received final inspection.

**Table 2-2 Project Status as of October 2018**

Project	TRPA Permit #	Status as of October 2018
California Lodge Drainage Improvements	ERSP 2018-1133	A grading permit was issued in September 2018 to address drainage concerns at the California Lodge. The permit/project is still active.
Tamarack Area Improvements	ERSP 2016-0149	Trail widening was completed in 2016, while the installation of temporary sales kiosk, decommissioning of timber yard and BMP implementation/ winterization occurred in 2017. Heavenly plans to remove Red Fir towers, install the new Magic Carpet Lift, decommission temporary lift access road, install temporary BMPs/winterize in 2018. The 2019 construction season should conclude the project as construction of a permanent kiosk, Tamarack Lodge deck expansion and final BMPs for inspection and closure are proposed. Project still active until 2020 but a construction schedule for 2019 will be submitted to TRPA if work is planned to be continued.
Epic Discovery East Peak	ERSP 2013-0490 & ENVR2013-0001	Past projects completed under this permit include the Mid-Station Canopy Tour, Alpine Coaster, Kids Zipline, East Peak Canopy Tour, and marked the beginning of Mountain Excursion Tours, hiking pathways, signage and welcome area. The 2017 construction season saw the opening of the Epic Discovery Center, additional trail signage/connections as well as repairs to the Alpine Coaster with additional permanent BMP implementation. Future work under this permit includes: additional repairs to the Alpine Coaster, Panorama trail installation, Sky Meadows Observation Deck, Sky Meadows Zipline Canopy Tour and Challenge Course, Mountain bike demo center park and trails, Ridge Run Lookout Tower, East Peak Lake water activities, Sky Cycle and all various required BMPs that will all occur through 2021. Project still active until 2020 but a construction schedule for 2019 will be submitted to TRPA if work is planned to be continued.

## 2.2 Measure No. 7.3-1 TRPA Mitigation Monitoring Activities

*This measure describes the Mitigation and Monitoring Agreement that Heavenly must enter into with TRPA.*

Heavenly, TRPA, and Cardno ENTRIX entered a three-party ongoing monitoring agreement in January 2008. This 5-year agreement ended in December 2012. TRPA and Heavenly began the public process requesting proposals for contracting work related to the MMP. In February 2013, Cardno (formerly Cardno ENTRIX) was selected to continue this work for an additional four-year period through July of 2017, which required all three parties annually renew funding. Cardno was again selected as the preferred consultant in a new five-year three-party monitoring agreement in August 2017 through July 2022. In addition to the three-party agreement, Heavenly Mountain Resort separately provides funding to TRPA for staffing review related to the MMP measures and report.

## 2.3 Conclusion

Heavenly complied with all applicable planning measures during the 2017-2018 monitoring period. Project-specific measures such as 7.3-2 (Powderbowl Lodge), 7.3-3 (Gondola Mid-Station Restaurant) and 7.3-4 (Sand Dunes Lodge) have yet to be constructed and will be discussed in future MMP annual reports upon planning, construction and/or completion.



## Chapter 3 – Construction Measures

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### 3.1 Introduction

The construction measures contained in the MMP are designed to limit the environmental impacts both during and following the construction of new projects within Heavenly Mountain Resort. Resource Concepts Inc. (RCI) assists Heavenly in developing their BMPs and conducts on-mountain monitoring of temporary construction BMPs and permanent BMPs for all of Heavenly's capital improvement projects and Watershed Maintenance and Restoration Program (WMRP) projects. In 2017, Resource Concepts Inc. (RCI) replaced Integrated Environmental Restoration Services' (IERS) role and monitoring effort associated with the MMP as the firm transitions into retirement. RCI, along with Heavenly staff, assisted in restoration treatment monitoring and directed implementation at troublesome erosive locations in prioritized watersheds within the resort boundaries. In the past, IERS led this effort in addition to providing various slope and soil cover treatment experiments. Adaptive management of these slope treatments provided a guide on which soil cover treatments were successful. Building upon the successful areas, Heavenly restoration crews now implement these documented beneficial slope treatments on continual problem areas to limit erosion runoff and enhancing soil characteristics.

### 3.2 Measure 7.4-1 Implement the Construction Erosion Reduction Program

*Implement the Construction Erosion Reduction Program (CERP) would minimize the rate of soil loss related to construction activities at Heavenly. The CERP and Watershed Management Guidebook are design features that will be incorporated into construction activities through the Master Development Plan.*

Heavenly contracts with RCI to ensure effective BMPs and restoration treatments are designed and implemented for each of their construction projects. During the 2018 construction season, RCI inspected both permanent and temporary constructed BMPs for implementation and effectiveness. RCI completed 26 temporary and 34 permanent BMP inspection evaluations at 34 different locations.

The 2018 inspection reports showed that 100% of the permanent BMPs were fully implemented, thus maintaining these scores for the fifth year in a row. Maintenance and inspection following storm events during the construction season led to permanent BMP "effective" score of 97%. Knowledge gained from years of monitoring and reporting have proven which "methods and structures" are successful to limit erosion runoff on the mountain. Building upon past years' experience and lessons learned, Heavenly continues to share this knowledge by expanding the BMP training program and "spreading awareness of erosion reduction issues and methods company-wide."<sup>2</sup>

During the construction season, 26 temporary BMP evaluations were performed at active construction sites, and 92% of the evaluations identified BMPs that were implemented and effective. One construction site, the Olympic Snowmaking Line Replacement project, has two minor concerns for temporary BMP implementation and two minor concerns for effectiveness. Heavenly addressed BMP deficiencies at the site, and the temporary BMPs were identified as both implemented and effective at the following BMP evaluation inspection. As mentioned above, the temporary BMPs were determined to be 92% effective, resulting in an overall score of "Excellent" in accordance with the rating criteria in the WDR.

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<sup>2</sup> Heavenly Mountain Resort Watershed Maintenance and Restoration Program 2018 Annual Report and Construction Season Summary. Page 9 (Appendix I)

The Watershed Maintenance and Restoration Program (WMRP) 2018 Report (Appendix I) lists conclusions and recommendations for monitoring in 2018. A brief summary of a few of the recommendations are listed below.

- > Maintain collaboration efforts between departments to maximize staff time and resources to complete Annual Work List projects. Clear and consistent communication between management and field crews is critical to successful project completion. Provide the Annual Work list and maps to Heavenly staff and field crews showing location of projects with features such as streams, SEZs, roads, and lifts.
- > Review the CERP prior to developing plans or projects to help select suitable Temporary and Permanent BMPs.
- > Evaluate projects for pertinent permits (stormwater, working in waterways, fugitive dust, etc.) as soon as possible in the planning process, so that required permit applications do not delay project construction.
- > Continue to develop project designs and specifications using temporary and permanent BMPs that are the most effective at Heavenly. Tables 2 and 4 in Appendix I, Attachment A should be referred to during the BMP plan development process.
- > Continue to ensure all staff and especially new employees attend the annual “BMP Breakfast” training session to become familiar with compliance requirements and the internal water quality program. It is essential for conveying the importance of BMPs to staff, third party vendors, utility companies and outside contractors with Mountain access. The training program reinforces Heavenly’s commitment to resource protection and BMP compliance.
- > Maintain dedication to experimenting with new erosion and sediment control techniques and technologies. Tables 3 and 5 in Appendix I, Attachment A should be used as a reference for reviewing project BMPs for effectiveness.
- > Continue to schedule regular maintenance inspections and coordinate on action items to support BMP effectiveness. The Snow Surfaces Manager and the Environmental Manager plays a vital role in the BMP Effectiveness Monitoring Program at Heavenly coordinating training sessions, tracking project status and directing maintenance work at Heavenly, all of which are key to achieving BMP effectiveness.
- > Continue to use the summer trails spreadsheet to track and prioritize project tasks, resources and materials, staff and equipment needs.
- > Review road system drainage needs in conjunction with the roads maintenance project requirements of USFS.
- > Review USFS National Core BMP program to analyze applicability of monitoring requirements at Heavenly.
- > Review the TMDL reporting requirements for potential applicability for monitoring.

Since 2015, the USFS Region 5 has adhered to the new National US Forest Service BMP monitoring program. Protocols from this plan assess BMP implementation and effectiveness for a wide variety of land management practices. Roadways, facilities, and ski runs on USFS lands are included in the sample pool to be randomly selected for annual monitoring. USFS staff will conduct and report results from this monitoring effort.”<sup>3</sup> This USFS monitoring effort will supplement RCI’s on-mountain monitoring effort. RCI’s Watershed Maintenance and Restoration Program 2018 Annual Report is contained in Appendix I. Heavenly is in compliance with this measure.

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<sup>3</sup> Environmental Monitoring Program Annual Report - Heavenly Mountain Resort Water Year 2018. Cardno, Zephyr Cove, Nevada. Page 51.

### 3.3 Measure 7.4-2 Construct Infiltration Facilities

*This measure states that all new projects contributing to impervious surface shall be designed to infiltrate the 20-year, 1-hour storm.*

The 2018 Annual Project and Work List listed nine (9) source locations to be improved within the Heavenly Valley Creek watershed (CA-1). During the 2018 construction season, seven source locations were completed and addressed by BMP maintenance projects (such as maintenance at the Upper Shop), or resort maintenance projects (such as conveyance improvements at the Base of Groove Chair, and gate valve repairs at the Heavenly Valley Creek Culvert). The remaining source locations are to be addressed by the Magic Carpet Ski School Lift project (which has been placed on hold) and the Top of Gondola drainage project (which has been moved to the 2019 Work List). The 2018 completed project list is included as Tables 1 in Appendix I, Attachment A.

Other completed source locations on the 2018 Work List are projects tied to “hotspot” (highly erosive areas) inventory areas mapped and defined per RCI’s Watershed Maintenance and Restoration Program 2017 Annual Report. Erosion “Hot spots” required by the EIR/EIS/EIS have been completed. However, additional maintenance of these priority areas within Heavenly Valley Creek watershed CA-1 occurred in 2018. These included: stabilizing the gully in Ridge Bowl and replacing degraded geotextile fabric; placing rock check dams or riprap; repairing and restoring the gully above and below Ridge Run summer road; and maintaining and cleaning out sediment build up in Maggie’s road shoulder sediment basins.

Within the Bijou Creek watershed (CA-6), Heavenly completed two projects related to inventoried hotspots. The gully on World Cup Run was stabilized using native soil and wood chips and the existing drop structures were repaired. The gully on First Ride Run was similarly stabilized with native soil and wood chip mulch, and waterbars were reestablished to direct and manage sediment movement. Photographs of both these projects are included in the Watershed Maintenance and Restoration Program 2018 Annual Report (Appendix I).

Within the Daggett Creek watershed (NV-2 and NV-5), Heavenly conducted two (2) master plan implementation projects, the Galaxy Lift Replacement and Olympic Downhill water line project. The Galaxy Lift Replacement project included the replacement of the existing Galaxy Lift (including towers) within its current alignment, including improvements to sections of summer roads to allow for lift construction and ongoing maintenance. The project also included impacts, stabilization, and restoration of a section of Daggett Creek adjacent to a lift tower, which is discussed in more detail in Measure 7.4-6 and 7.4-7). The Olympic Downhill project included the replacement of 3000’ of 8” water line and replacement of a snowmaking vault. Disturbed areas were stabilized following replacement work. Lastly, a maintenance project on the Big Dipper Run included maintenance to waterbars, ditches, and culverts was delayed until the 2019 construction season.

Resort-wide efforts addressing BMP maintenance were also scheduled and completed in 2018. The BMP maintenance includes inspecting and restoring all areas damaged or affected by winter resort operations, erecting and maintaining vehicle barriers and/or fences to keep unauthorized vehicles in designated areas and inspecting and maintaining drainage structures. Road maintenance is performed throughout the resort as outlined in the annual Heavenly Forest Service maintenance and monitoring agreement protocol.

Additional details of the 2018 completed projects can be found in RCI’s 2018 BMP Effectiveness Monitoring Report (Appendix I, Attachments A), while the updated 2018 Work List can be found in Appendix III. No additional impervious capital improvement projects were constructed in 2018 (beyond the Galaxy Lift and new NV waterline); however all new and future projects will be designed to infiltrate the 20-year design storm runoff. Heavenly is in compliance with this measure.

### **3.4 Measure 7.4-3 Meet Water Quality Standards**

*To meet water quality standards, several items are identified in the Master Development Plan's MMP. These measures include implementing the Watershed Maintenance and Restoration Program, implementing the CERP, implementing the Environmental Monitoring Program, installation of BMPs at all facilities and parking lots, installation of a monitoring site on Daggett Creek, and prohibiting grooming on ski trails deficient of adequate snow cover.*

From the period of October 2017 to September 2018, Heavenly Mountain Resort continued to implement both the CWE Restoration Program and Watershed Maintenance and Restoration Program. Each year, RCI helps Heavenly utilize adaptive management practices to prioritize maintenance and restoration projects. The completed BMP maintenance and project list for 2018 is located in RCI's 2018 BMP Effectiveness Monitoring Report (Table 1 of Attachment D, Appendix I). Detailed information concerning maintenance, monitoring, and implementation of Watershed Maintenance and Restoration Program projects is located in Appendix I.

The Environmental Monitoring Program is reported on an annual basis and has been ongoing since 1991. The 2018 water year water quality monitoring was conducted monthly between October 1, 2017 and September 30, 2018. Additional biweekly spring runoff samples were collected for all seven of the stream monitoring sites from the beginning of April through the end of June.

More stringent water quality parameters took effect during the 2008-2009 water year at the California Parking Lot site (above Bijou Park Creek). Permit conditions stated that more stringent water quality standards would become effective once the BMP Retrofit Project and treatment system were in place at the California Parking Lot. For the 2018 water year, Heavenly reported annual average violations at Bijou Park Creek (43BPC-4) for the following constituents: total nitrogen, total phosphorus, chloride, and turbidity. Three storm samples were collected during the 2018 water year at the effluent monitoring location at the California parking lot StormFilter vault (43HVP-2). Of the three samples collected at the effluent sampling compliance location for the California parking lot filter vaults (43HVP-2), the not to exceed limits for total nitrogen, turbidity, and oil and grease were each exceeded in two of the collected storm samples. Total phosphorus did not exceed the not to exceed standards for any of the sampling events. Parking lot deterioration overtime likely increased sediment and nutrient loading into the vault system. Therefore, pavement repair at the California Base Area parking lot occurred near and around the storm vault system in September 2018, including asphalt sealing, rotomilling, and repaving.

Annual average standards were exceeded along Heavenly Valley Creek at Sky Meadows (43HVC-1A), Below Patsy's Chair (43HVC-2), and the Property Line (43HVC-3) for total phosphorus and chloride during the 2018 water year. Total phosphorous and chloride were also exceeded at the reference reach along Hidden Valley Creek (43HDVC-5). Because the Hidden Valley Creek site (43HDVC-5) is the undeveloped and undisturbed watershed reference reach for the Heavenly stream monitoring locations, exceedances at this site demonstrate that Heavenly Mountain Resort operations are not solely responsible for elevated total phosphorus and chloride concentrations. The water year 2018 annual Monitoring Report is provided in Appendix II, and provides further discussion and results from water quality sampling at each monitoring location.

In an effort to reduce the amount of huck salt and subsequent chloride readings in the stream samples, Heavenly now requires employee training and management approval for any application use above one 40-pound bag in and around the terrain parks. Salt application is utilized in parking lots, walkways, and tram egress locations to provide a safer guest experience during the winter season. Huck salt is also used in the terrain park to prevent rutting, by allowing the snow surface to refreeze into a harder snow surface, helping to create a more stable base for taking off and landing areas around terrain park jumps. As reported in the 2018 Annual Monitoring Report, huck salt application decreased compared to 2017 (Chapter 5, Table 5-2). The decrease in salt application values can be attributed to the lower precipitation totals, less frequent storm events, and low early season snowfall during the 2018 water year, compared to

the 2017 water year. The 2018 water year marked the fourth year salt application totals were monitored on a monthly basis at the California parking lot.

The Lahontan Water Quality Board amended the monitoring and reporting program in May 2011. The revised permit conditions intent was to provide a better representation of mountain operations with respect to environmental impact. Many of these amended conditions were incorporated into the Waste Discharge Requirements and Monitoring Program (R6T-2015-0021) finalized on May 14, 2015. Heavenly actively works to address mapped treatment areas to meet monitoring goals emphasizing soil and vegetation treatment approaches to reduce runoff and sediment transport. The treatment goals include: implementation measures that will not cause an increase in runoff or sediment transport; sediment source control treatments that are self-sustaining or accompanied by an ongoing maintenance plan; and an adaptive management program for development, management, and future maintenance of problem source areas. As IERS has transitioned out of the Watershed Maintenance and Restoration Program, the 2018 construction season marks the second season that RCI has been retained to continue and maintain this effort. RCI continues to provide watershed monitoring and inventory monitoring and while the methodology may differ from IERS', the end goal of this program is to improve future water quality results.

Additionally, RCI continues to collect flow data at the Daggett Creek flow monitoring station for compliance with water use permits as discussed in Chapter 4 (measure 7.5-7). If and when Ski Lift Z, or Ski Trails Z1, Z2, Z4, or Z8 are proposed for construction, a year prior to construction the Nevada Department of Environmental Protection (NDEP) and the Forest Service will determine the location and if water quality monitoring along Daggett Creek is necessary. Appendix VI contains the Daggett Creek Flow Monitoring report provided by RCI.

Heavenly, with guidance provided from the Lake Tahoe Basin Management Unit (LTBMU) - Forest Service, is required to have a minimum of 12-inches of compacted snow cover over all obstacles before grooming with snow cats is allowed. This policy protects soil and water resources along with preventing significant damage to snow cats and has been the standard practice for a number of years.

Annual average water quality exceedances along Heavenly Valley Creek and Bijou Park Creek denote that even following the Watershed Maintenance and Restoration Program and implementation of mountain wide BMPs, Heavenly remains in partial compliance for this measure.

### **3.5 Measure 7.4-4 Implement Adaptive Ski Run Prescriptions**

*This measure requires all new ski runs to be revegetated according to the ski trail prescriptions in the Easy Street Run Hazard Reduction Program. It also calls for the evaluation of existing ski trails to determine if the prescription would be appropriate.*

Heavenly and IERS have worked together since 2006 to restore and monitor project-specific construction areas using site-specific soil function improvement and revegetation prescriptions built off of an adaptive management approach. Over the years IERS, in conjunction with Heavenly, have attempted a number of treatment methods limiting erosion and runoff. Treatment modifications have been made over time continuously improving restoration techniques and success leading to this adaptive management approach. Beginning in 2015 and continuing through the 2018 construction season, Heavenly, with past assistance from IERS and now RCI, has focused restoration treatment efforts on high and medium high hot spots identified in the CA-1 and NV-1 watersheds based on methodology developed and addressed in IERS's *Watershed Management Guidebook*. Heavenly crews are familiar with the prescribed treatment methodology and address the "hotspots" issues previously described in measure 7.4-2. No new ski trails have been established in recent years and all restoration efforts and slope prescriptions follow the recommended treatment listed in Table 2 of *Heavenly Mountain Resort Outcome-Based Watershed Management, 2016 Restoration and Monitoring Annual Report* (included in the 2016 Mitigation and Monitoring Plan Annual Report as Appendix II).

### **3.6 Measure 7.4-5 Control Runoff Due to Future Construction and Long-Term Operation Facilities**

*Both broad and project-specific measures are identified for Heavenly to comply with the MMP. Each new project is to have permanent and temporary BMPs as part of its design and construction. New snowmaking should be above ground, with certain exceptions. A formal BMP maintenance program shall be continued including annual mapping documenting maintenance activities.*

As discussed in measure 7.4-2, two of the three scheduled master plan projects were completed during the 2018 construction season. The Magic Carpet Ski School Lift master plan project was placed on hold (see 2018 Annual Work List, Appendix III). The completed master plan projects included the Galaxy Lift Replacement project and water line and snowmaking vault replacements on Olympic Downhill, both in the Daggett Creek watershed. All master plan projects include infiltration BMP's designed both within the project plans and permit packages to address construction and project facility runoff (upon project completion). Additional resort-wide work focused on the maintenance of temporary and permanent BMPs on existing facilities.

Proposed projects, hotspot areas to address, as well as proposed maintenance to existing BMPs for the 2019 construction season can be found in the 2019 Annual Watershed Maintenance Restoration Program Work List (informally called the CWE work list) found in Appendix VII. All permanent BMPs are designed and maintained to infiltrate at least the 20-year, 1-hour storm. BMP effectiveness and maintenance monitoring is performed by RCI as part of the Environmental Monitoring Program. The 2018 BMP monitoring results are included in the annual report contained in Appendix I.

No new snowmaking lines were installed in 2018; however, repairs to existing snow making lines were addressed around the mountain, including the replacement of the water line on Olympic Downhill, as mentioned above. All existing lines were repaired in kind. Future snowmaking lines will be constructed above ground unless additional mitigation measures are included allowing for underground installation. As discussed in measure 7.4-4, IERS previously mapped the location of primary sources of erosion "hot spot" locations in past annual reports. These locations have been prioritized and mainly addressed since initially mapped; however continual monitoring and maintenance will be included in future years' restoration and maintenance projects and Work Lists.

Heavenly actively works with the Tahoe Regional Planning Agency (TRPA) and local entities for permit coverage on all new and future projects. Temporary erosion control plans denoting proposed BMP locations are included with project design permit packages.

Heavenly is currently in compliance with this measure.

### **3.7 Measure 7.4-6 Avoid and/or Restore Future Disturbed SEZs**

*A number of project-specific mitigation measures for avoiding disturbance to SEZs are identified in the MMP.*

While no new facilities were constructed that required future mitigation measures to reduce SEZ disturbance, modifications regarding the 2018 Galaxy Chair Lift replacement through an existing SEZ enacted this measure. RCI worked with Heavenly on project-specific measures to aid in avoiding the SEZ during the chairlift modification and roadway improvements. Heavenly almost entirely avoided any SEZ or jurisdictional wetland during construction, with the exception of one lift tower, which required minimal SEZ disturbance that has been restored. Appropriate agency permits were obtained for this project, and all resource protection measures and restorations were conducted, and Heavenly is in compliance with this measure. All associated conifer tree removal included tree felling away from the stream corridor. Heavenly improved the existing roadway to the bottom of the Galaxy Chairlift, which included an improved roadway surface and drainage, and avoided impacts to the SEZ during repair work.

### **3.8 Measure 7.4-7 Avoid and / or Restore Future Disturbed Jurisdictional Wetlands and Waters**

*This measure requires that any project implemented by Heavenly will be located off jurisdictional wetlands and that Sky Meadows Deck and Boulder Operations be relocated off wetlands. If development within the wetlands cannot be avoided, Heavenly is required to obtain a Section 404 permit from the USACE and comply with all requirements set forth in the permit including coordinating with CDFW to comply with Section 1600 if removal of vegetation is needed. Additionally, any tree removal activity needed for ski lifts or trails will be conducted in a fashion that does not disturb wetlands.*

The Galaxy Chair Lift replacement was conducted in 2018. The project work largely occurred outside of any jurisdictional wetlands or waters of the US, with the exception of the replacement of a single lift tower, which was in close proximity to Daggett Creek. The work near Daggett Creek, and subsequent restoration of a 50' segment of the creek was performed under consultation and in compliance with the requirements for US Army Corps of Engineers Nation-Wide Permit 42, NDEP Section 401 Water Quality Certification, and Temporary Working in Waterways permit. Restoration techniques for the section of Daggett Creek included salvage and replacement of existing wetland and riparian sod in disturbed areas. A Stormwater Prevention Pollution Plan (SWPPP) was implemented per the Nevada General Stormwater Construction Permit.

Additional actions regarding this measure will be implemented if and when the Powderbowl Lodge is built and/or the Sky Meadows Deck is relocated. The Sky Meadows log deck area adjacent to Heavenly Valley Creek was restored in 2013 and the area under the deck received a shade tolerant seed mixture and a thin layer of pine needles to protect the seeds in 2016.

The hazard reduction tree removal prescription was applied to approximately 30 additional conifer trees within the resort boundary in 2018 in accordance with the TRPA Code of Ordinance Chapter 6 (tree removal). Trees were marked for removal by USFS staff. Heavenly removed approximately 20 trees along the Sky, Canyon, and Powderbowl Express lift lines, and approximately 10 trees along summer roads within the Nevada boundary of Heavenly. No conifer tree removal operations impacted jurisdictional waters or wetlands. If future trail widening occurs near a stream environmental zone (SEZ), tree removal operations will occur over existing snowpack reducing and limiting ground disturbance and impacts within the watershed and jurisdictional waters.

### **3.9 Measure 7.4-8 TRPA Land Coverage Mitigation**

*To utilize available land coverage within the Heavenly Project area, TRPA must make appropriate relocation findings included in the Code of Ordinances and BMPs must be installed and maintained as outlined in the CERP.*

As outlined in the Draft 06 EIR/EIS/EIS, Heavenly had 434,580 square feet of available banked and available land coverage within the Heavenly Project area designated as stream enhancement zones (SEZ). RCI provided the following updated table (Table 3-1) which reflects changes throughout the years to this initial land coverage value based on completed and proposed projects (updated March 6, 2019). At the present time, Heavenly has 218,278 square feet of available banked land coverage in non-wetland land capability areas.

**Table 3-1 Heavenly Mountain Resort Land Coverage Calculations**

<b>Coverage Summary Table (2019-03-06)</b>			
<b>Maximum Allowable Coverage (per Master Plan)</b>	<b>1a</b>	<b>1b</b>	<b>Total</b>
Maximum Allowable Coverage per Master Plan			2,053,854
Balance Remaining of Coverage and Banked Coverage per Table 3.4-4 of the Final EIR/EIS/EIS <sup>1</sup>	434,580	4,464	439,044
<b>Project Subtotals</b>			
Northbowl/Olympic Express Lifts Project Balances	960	396	1,356
Gondola Hiking trails	54,501	0	54,501
Mid-Station Road	50,469	0	50,469
Northbowl/Olympic Express Lifts - Plan Revision	216	0	216
World Cup/East Bowl Snowmaking - Plan Revision	283	0	283
Calif. Base Surface Lift Replacement	1,572	0	1,572
Skyline Trail Grading and Snowmaking	1,134	0	1,134
Top of the Gondola Lodge	42,387	0	42,387
Adjusted Gondola Permit Coverage	-27,519	0	-27,519
Umbrella Bar Relocation	651	0	651
Covered Surface Lift and Snowmaking	10,039	0	10,039
California Side Trail Widening	0	0	0
Adventure Peak Improvements	6,207	0	6,207
Zipline Adventure Ride	4,916	0	4,916
Verizon Angel's Roost Cell Tower and Back-up Bldg	584	0	584
Epic Race Course Electrical	0	0	0
Summer Activities	22,213	0	22,213
Tamarack Lodge Modifications	537	0	537
Adventure Peak Epic Discoveries	58,154	0	58,154
Removal of Gondola Hiking Trails	-54,501	0	-54,501
East Peak Basin Epic Discoveries	1,210	0	1,210
Sky Meadows Basin Epic Discoveries	26,816	772	27,588
Top of Gondola Temporary Hub	150	0	150
Summer Activities - Climbing Wall Revisions <sup>2</sup>	348	0	348
Tamarack Project Area Additional Activities	6,090	0	6,090
Adventure Peak Epic Discoveries Revisions	8,885	0	8,885
2016 Trail Widening and Hazard Reduction	0	0	0
Cal Base Lodge Drainage BMPs	0	0	0
<i>Subtotals</i>	<i>216,302</i>	<i>1,168</i>	<i>217,470</i>
<b>Balance Remaining Upon Project Completion</b>	<b>218,278</b>	<b>3,296</b>	<b>221,574</b>

<sup>1</sup>. Includes 10,541 square feet of existing coverage attributed to Sky Deck

<sup>2</sup>. Revises original coverage numbers submitted as a part of the Summer Activities Project.



### **3.10 Measure 7.4-9 (BIO-1) Delay Sky Meadows Challenge Course, Sky Basin Coaster and East Peak Lake Water Activities Until Sierra Nevada Yellow-legged Frog Surveys and USFWS Consultation Are Complete**

*Heavenly shall delay implementation of projects in Sky Meadows or East Peak Lake until protocol surveys are completed. If Sierra Nevada yellow-legged frog (SNYLF) are found present, Heavenly will consult with agencies regarding impacts to the species and required protection measures that may or may not allow for the projects to proceed. If SNYLF are not determined to be present, Heavenly may start informal consultation with the California Department of Fish and Wildlife and USFWS regarding habitat protection measures that may allow for the projects to proceed.*

Protocol surveys for the SNYLF were completed in 2014, 2015, and 2016 in accordance with USFWS visual encounter surveys (VES). Protocols require a minimum of three VES surveys in the past 10 years, according to USFS/USFWS standards, and state that at least one survey must be completed following a year having at least 80% snowpack. The 2016-2017 average snowfall winter season produced enough snow to meet the 80% snowpack requirement. Surveys were completed according to protocol and no additional surveys are required to meet this measure. Collected survey information will be presented to the agencies prior to project implementation related to the Epic Discovery Projects in Sky Meadows and East Peak Lake.

SNYLF surveys were completed at Daggett Creek in 2017 and 2018 (two in each year, for a total of four surveys) in accordance with the Galaxy Lift Replacement pre-construction survey requirements for work near and at Daggett Creek, thus completing VES surveys for the work conducted on the Galaxy Lift.

### **3.11 Measure 7.4-10 Reduce and Control Fugitive Dust**

*During project construction, Heavenly employees and contractors are required to implement mitigation measures to minimize the generation and transport of fugitive dust. These measures may include the use of chemical dust suppressants and/or water on unpaved roads, grading and excavated areas, as well as cleaning onsite paved roadways daily in order to remove excess dirt and mud.*

Resource Concepts Inc. (RCI) monitors the effectiveness of the Heavenly Mountain Resort dust control measures during their temporary and permanent BMP inspections. Heavenly continues to utilize a 2,000-gallon water tanker truck for dust abatement of roads, which is the largest potential source of dust at Heavenly. During the 2018 construction season, Heavenly innovated a 4-wheel drive truck which was fitted with two 275 gallon plastic IBC totes and a pump to provide dust control on steeper roadways, such as Galaxy and Hellwinkel's. Approximately half of the 30 miles of roads within the Heavenly boundary are watered daily, unless rain events provide sufficient moisture. Road base and/or binder was applied on the following road segments in 2018: various sections of Nevada Trail between Nevada gate and East Peak pump house, sections near Galaxy, various sections of Roundabout, near the Upper Shop, and at various locations along Pepi's to the top of East Peak.

Table 3-2 summarizes the roadway segments that were improved, regraded or resurfaced with road base. This information can also be found in the in Attachment F of Appendix I.

In 2018, a total of 11.6 miles of Heavenly Forest Service roads have been repaired and/or maintained by Heavenly staff. The Heavenly environmental and compliance manager was in close contact with the driver throughout the summer season discussing watering strategy, truckloads and problem areas.

**Table 3-2 Description of Work Completed at each Road Segment in 2018**

Road Segment	Distance (miles)	Description of Work
13N53B	0.1	Added road base and drain rock, improved / re-built waterbars on the section of road between the NV gate and Titos.
13N53.5	0.2	Added road base and drain rock, improved / re-built waterbars on the section of road along Titos.
13N53	0.4	Added road base and drain rock, improved / re-built waterbars on the section of road between the Chute to Midway Switchbacks.
13N53C	0.3	Regraded and added road base in wet areas, improved / re-built waterbars near the Stage switchbacks.
13N53	0.6	Regraded and added road base in wet areas on the section of road between Titos and the base of NB.
13N53	0.8	Conducted miscellaneous maintenance on the section of road between NV Trail Stage to East Peak.
13N54	0.5	Added road base and improved / re-built waterbars on the section of road between Pepi's/Comet to the base East Peak and the top of East Peak.
13N54	0.2	Conducted miscellaneous maintenance on T7 Road.
13N54	0.9	Regraded and compacted the section of road between Steve's and Crossover.
13N53A	0.4	Regraded the section of road near Power Station Road and conducted roadside tree removal.
13N53E.1	1.2	Conducted a major road overhaul near Galaxy, including regading, compaction, and installation of 300 yards of road base.
12N41	0.6	Regraded, added road base, improved / rebuilt waterbars, conducted repair and maintenance on ditches between Groove Road and the Upper Shop.
	0.9	Regraded and repaired and maintained BMPs on the section of road between Maggie's Creek to CDam.
12N40	0.3	Regraded and repaired and maintained BMPs on the section of road between CD to Sky Deck.
12N40	0.4	Repaired and maintained BMPs on Hellwinkle's steeps.
12N40	1.3	Regraded and applied material to cover utilities on the section of road between LCT to VS/TOG.
12N40.5	0.2	Regraded and compacted the section of road between TOG Tam to Coaster.
12N40	0.7	Regraded, added road base, and improved / re-built waterbars on Roundabout between Top WC and Pistol.
12N40	1.1	Regraded, added road base, and improved / re-built waterbars on Roundabout between Pistol and Cut.

Additionally, quarterly and annual reports to the California Lahontan Water Board document all California Base Lodge sweeping, cinder and dirt removal in the main lodge parking areas. The 2018 water year parking lot sweeping numbers can be found in Appendix II (electronic copy only).

### **3.12 Measure 7.4-11 Minimize Removal/Modification of Deciduous Trees, Wetlands, and Meadows**

*Before any construction project Heavenly must have a qualified biologist conduct a vegetation survey and identify all deciduous trees, wetlands, and meadows located within or adjacent to the proposed construction corridor. Heavenly is then required to implement a final engineered alternative that avoids the loss or degradation of the identified riparian or wetland communities. If these communities are unable to be avoided, Heavenly must mitigate for the impacts.*

Surveys for wetlands, meadows, and deciduous trees occur during the planning stages of the project. Rare plant surveys identify any deciduous trees that may occur in the area and also alert the project managers of any potential wetlands. During the 2018 construction season, Heavenly improved the roadway to the bottom of the Galaxy Chairlift as part of the Galaxy Lift Replacement project. Preceding roadway work and lift replacement, Sierra Nevada Yellow-legged Frog (SNYLF) surveys were conducted twice in 2017 and twice in 2018 (as discussed in Measure 7.4-9) to ensure that work would not impact frog populations/species. No removal or modification of deciduous trees, wetlands, or meadow were planned or occurred as part of the Galaxy Lift replacement project, although a 50-ft segment of Daggett Creek was impacted and restored as part of the replacement of a tower, as discussed in Measure 7.4-12. When planning indicates, Heavenly actively works with RCI on individual projects located in sensitive areas containing deciduous trees, wetlands, and/or meadows.

### **3.13 Measure 7.4-12 (BIO-2) Active Raptor and Migratory Bird Nest Site Protection Program**

*This measure requires that before construction activities, a migratory bird nest site survey will be conducted to identify any active raptor nest sites within the project area. During initial construction activities, a Forest Service biological monitor is required to be onsite to evaluate if any migratory bird nests are within 100 feet of the construction corridor. If any nests are found, the biological monitor will stop construction and consult with the Forest Service and TRPA staff within 24 hours to determine the next appropriate actions.*

Under the direction and oversight of the Forest Service, qualified staff from Sierra Ecotone Solutions conduct annual raptor and migratory bird nest surveys. The project area surveys were completed on June 7, 8, 10, and 11, 2018. The following areas were surveyed for nesting bird species: Skyway Canopy Tour, Silver Rush Canopy Tour, Hot Shot Zip Line, Blue Streak Zip Line, Red Tail Zip Line and all ropes courses. These areas were surveyed for the presence of nesting birds in accordance with the design features identified in the Biological Evaluation and Epic Discovery EIR/EIS/EIS. As noted in previous surveys, a few snags exist within the project areas that contain cavities (none of which were active) that are suitable<sup>4</sup>.

The nesting bird survey indicated there were no active nests within the project areas. However, snags containing cavities were observed and although none of the snags were currently active, they are known to be suitable nesting locations for a variety of present bird species. Sierra Ecotone Solutions recommends retaining these snags within the project area, where feasible, in order to maintain suitable nesting locations for cavity nesters.

Additionally, Sierra Ecotone Solutions performed surveys for auditory and visual detection of the California spotted owl. These surveys are conducted and completed in potentially suitable habitat within the surrounding project areas. Protocol for surveying habitat conservation areas and spotted owls is followed as outlined by the Forest Service. The survey points used since the 2007 field season were

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<sup>4</sup> Alling, Garth. Memo: Heavenly Mountain Resort: 2018 Summer Activities Nesting Bird Survey Results. June 11, 2018. Page 1.

utilized again in 2018 to provide continuity of data collected. No auditory or visual detections of California spotted owls were documented within the survey area during 2018.

California spotted owl surveys conducted in 2018 resulted in no auditory or visual detection of the species within the survey area. Spotted owl protocol states if there has been no detection for two consecutive years, it can be assumed the results are accurate for an additional 2 years without performing additional surveys. The completion of the 2018 field surveys for the California spotted owls results in meeting the 2-year protocol for this species. The 2-year timeline starts on the last day of the last survey, which would be June 26, 2018; therefore, if implementation of projects would commence prior to June 26, 2020, no further surveys for the California spotted owl would be necessary. However, if construction does not commence prior to this date, 2-year protocol surveys must be conducted. A review of the surveyed results can be found in the 2018 Biological Survey Results Summary located in Appendix VIII.

### **3.14 Measure 7.4-13 Monitor and Protect Northern Goshawk**

*Any projects that propose to affect or are within half a mile of any suitable northern goshawk habitat are required to have preconstruction surveys completed for northern goshawks. All surveys will be in accordance with the most recent Forest Service Region 5 protocol. Additionally, Heavenly Mountain Resort is required to fund updated northern goshawk habitat maps at 5-year intervals throughout the life of the Master Plan Amendment. These maps will be used when conducting any preconstruction surveys.*

Sierra Ecotone Solutions is approved by the Forest Service to conduct northern goshawk surveys. Surveys were conducted and completed in suitable habitat within and adjacent to the project area for northern goshawk based on the updated habitat map generated by the Forest Service for the environmental analysis of the Master Plan Amendment. In 2018, both dawn acoustical and broadcast survey methods were utilized and completed to protocol. No auditory or visual detections of the northern goshawk were documented within the survey area in 2018. The completion of the 2018 field surveys for the northern goshawk meet the 2-year protocol. The northern goshawk protocol does not include any discussion as to the validity of surveys for any duration of time after protocol has been met. However, since northern goshawks have been detected in previous years, Sierra Ecotone Solutions recommends the continuation of goshawk surveys to determine if goshawks are nesting within the special use permit boundary. Results and data sheets from the surveys conducted in 2018 are contained in the 2018 Biological Survey Results Summary located in Appendix VIII.

### **3.15 Measure 7.4-14 (BIO-4) Wildlife Nursery Site Survey**

*Heavenly shall conduct preconstruction wildlife nursery and den site surveys within 100 meters of ground disturbance activities. Findings of the survey will be reported to the USFS LTBMU, which has the authority to effect the construction schedule, dates of active construction, and/or modify the facility location to provide adequate protection.*

Sierra Ecotone Solutions completed preconstruction surveys for marten den sites with the Galaxy Lift Replacement project area. These areas were surveyed for marten den locations and for the presence of wildlife species in accordance with the design features identified in the Biological Evaluation and the Epic Discovery EIR/EIS/EIS. The project area was surveyed on June 22, 23, and 24, and July 2, 2018.

Each survey was conducted on foot up to 100 meters from the respective proposed project area, and resulted in no nursery and/or den sites being observed at any of the surveyed locations.

A review of the surveyed results can be found in the 2018 Biological Survey Results Summary located in Appendix VIII.

### **3.16 Measure 7.4-15 Utilize Boundary Management Plan to Manage Skier Access on Adjacent NFS Lands.**

*This measure requires that Heavenly Mountain Resort prohibits skier access from the gondola mid-station. Access is permitted through managed skier gates along the ski area boundary.*

Heavenly provides stationed employees at the Gondola mid-station to explain to skiers and riders that the mid-station is only for sightseeing and that one more stop is available where one can ski or ride. If guests with skis or snowboard equipment stop at the mid-station, Heavenly employees require them to leave their equipment on a rack near the gondola where it can be monitored. In past years, during and after larger snow storm events, rider tracks can be seen from the mid-station. The Heavenly Mountain Resort policy calls for employees to contact dispatch and security to apprehend the violators at the bottom of the Gondola.

The mid-station also acts as a physical barrier to accessible skiable terrain. It is an elevated platform with a 10-15 foot drop to the ground. The stairs leading to an area below the mid-station are roped off and marked "For Authorized Personnel Only." Heavenly does its due diligence to maintain compliance with this measure prohibiting skier access from the mid-station.

During years of increased precipitation and snowfall (for example, the 2016-2017 ski season), skiing and prohibiting access from the Gondola mid-station becomes more problematic. The physical barrier and height is limited due to snow depth. Evidence of ski/snowboard tracks below the deck have been visible after large snow events. Unlike in past drought years, the 2017-2018 marked an above average precipitation year; and therefore snowfall totals were often significant enough to provide adequate depth and continuous skiing/access from the Gondola mid-station.

The revised Boundary Management Plan (2016), states that new signage and metal gates in perimeter areas will require "physical action" by a skier/rider to open them will be installed at various locations to provide backcountry access. A steel gate will hang horizontally from one post and will be held against the other by a self-closing mechanism; these gates would be closed when Heavenly staff is actively performing avalanche control with explosive in the adjacent permit area, but would not typically be closed otherwise as this area would be the same as any other backcountry access area.<sup>5</sup> The new warning signs will state the avalanche danger scale, backcountry checklist, and acknowledgement that one will accept full responsibility for their actions and cost associated with their rescue. The gate postings will also include the North American Public Avalanche Danger scale and USDAFS Access Point Notice among other signage. Skiers may also be cited by local authorities and charged for the cost of their rescue.

The gate locations will be placed in areas in which people have traditionally accessed out-of-bounds areas. The five access points and gates will be located at the following locations: Fire Break, Raley's Gulch, Fulstone Canyon, Stateline Gate, the Breach and Broad Daylight. Heavenly will provide and maintain counters at each of the gates for the entire ski season, and gate use will be monitored and reported to the Forest Service. Detailed information on Heavenly's Boundary Management policies can be found in Appendix IX.

### **3.17 Measure 7.4-16 Evaluate and Monitor Known Archaeological Resources within Comstock Logging Historic District**

*Prior to construction activities, a qualified professional must formally evaluate the project area for the National Register of Historic Places (NRHP). The LTBMU Heritage Resources staff keeps a record of possible historic sites at Heavenly Mountain Resort.*

Communication with LTBMU Heritage Resources staff revealed that evaluations of archaeological resources sites within the Comstock Logging Historic District occurred before 2007. Evaluations

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<sup>5</sup> Heavenly Mountain Resort Boundary Management Plan, 2015. Revised April 2017.

concluded that all sites but one (the Flume Site) were eligible for the NRHP (Maher, 2012). Monitoring of these eligible sites occurred throughout 2009 and 2010. Proposed ski runs and potential construction in the Galaxy Pod area prompted monitoring in this area in 2011 (Maher 2012). Likewise surveys, in 2011, were conducted for the trail widening project on the California side to ensure that there was no conflict with the Comstock Logging District site.

New surveys in the area adjacent to the California trails for the Heavenly Mountain Resort Tamarack Project were completed during the 2015 summer months. The survey was performed due to the improvement of winter and summer activities in the area of the Tamarack Pod of Heavenly Mountain Resort. The proposed improvements include a new activity ticketing sales kiosk, relocation of the existing Red Fir handle tow lift, addition of new Magic Carpet ski school lift, Tamarack return trail ski widening and the Blue Streak Zip line tree removal. According to the Heritage Resources Inventory Report, all improvements except for much of the Blue Streak Zip Line tree removal and Tamarack return trail ski widening were previously surveyed. An intensive pedestrian survey of the un-surveyed portions of the Area of Potential Effect (APE) was performed on October 22<sup>nd</sup>, 2015 and observed no cultural resources (Fuller, 2015). The project will have no effect on cultural resources listed on or eligible for inclusion in the National Register of Historic Places. Per communications with Stephanie Heller of the USFS in April of 2019, the LTBMU Heritage Staff position is currently vacant, so USFS did not provide an update on archeological surveys for the 2018 summer season.

The LTBMU Heritage Resources staff keeps a record of possible historic sites at Heavenly Mountain Resort. If and when future projects lie within the known study area, Heavenly will plan for and avoid any known prehistoric site and additional surveys will be conducted as needed.

### **3.18 Measure 7.4-17 Identify and Protect Undiscovered Archaeological Resources**

*The LTBMU Heritage Resources staff will spot-check any proposed construction areas in consultation with the appropriate State Historic Preservation Office. If previously undiscovered resources are discovered during construction, all activity will be put on hold until the LTBMU Heritage Resources staff for either California or Nevada assess it for eligibility to the NRHP, compliance with TRPA Code Section 29, and/or (in the event of a prehistoric or ethnographic find) for Native American values.*

LTBMU Heritage Resources staff has prepared a comprehensive list of historical sites within the Heavenly boundary. Surveys are done prior to choosing locations for projects. Heavenly employees and contracted construction workers receive training prior to project commencement on the protocol for an encounter with possible archaeological resources.

In 2009, to assist in project scoping and field study, a general meeting at the offices of Heavenly Mountain Resort and a site visit focusing on the Gondola's APE was conducted (Lindstrom and Blom, 2009). Heritage concerns were addressed by project archaeologist Susan Lindstrom and John Maher, Heritage Resource Coordinator for the USFS LTBMU. A surface archaeological reconnaissance was conducted by Devin Gonzales Blom and Susan Lindstrom from October 26th through 29th, 2009. In accordance with the Ski Area Recreational Opportunity Enhancement Act of 2011 (SAROE), Heavenly Mountain Resort moved forward with the proposal to add multiple summer use activities on Heavenly Mountain naming this effort the Epic Discovery Proposal. Projects under this proposal aim to attract a large segment of summer and non-ski/ride visitors seeking more managed recreation opportunities. Activities at the following locations: Adventure Peak, East Peak Basin and Sky Meadows Basin include (but are not limited to): zip lining, mountain biking, hiking, kayaking, paddle boarding, fishing, and construction of observations points and lookout towers. Additionally, educational opportunities, mountain excursion tours and emergency evacuation protocol will be implemented mountain-wide.

Supplemental archaeological studies were completed in 2013 reviewing the Top of the Gondola Summer Activities. It was determined that 95% of the area was already surveyed and no cultural resources were

found. A screening undertaking letter was submitted finding that “little or no potential to affect historical properties”<sup>6</sup>. “All other projects for the Heavenly Mountain Resort 2013 Summer Activities (list) are within previously surveyed areas and do not endanger any cultural sites” (Fuller, 2013). It was concluded that these undertakings fell within Stipulation 7.4 (b) of the PA (Fuller, 2015), therefore, the proposed improvements may be implemented without any further Section 106 consultation or review. Furthermore, survey of the project area is documented in multiple previous Historic Resource Records (HRRs) with the most current and relevant being R2005051900022 (Fuller, 2015). As the scope or design of the proposed projects are altered, additional review by the Heritage Resources Program will be required.

Improvements in the Tamarack Pod area of the resort required tree removal along the Blue Streak Zip Line and the Tamarack Return Trail. The tree removal areas were inventoried for cultural resources in 2015 and no cultural resources were located in either area (Fuller, 2016). Additional improvements on the Nevada portion of the Heavenly Mountain Resort are being proposed which include an aerial challenge course called the Discovery Forest Zipline Canopy Tour (which will be self-guided routes consisting of wooden columns, platforms and rope walkways/bridges), the Zipline Center and portions of the Bear Cave Challenge Course similar to the Boulder Cove Challenge Park. “These projects will mostly use current standing trees for support of aerial course and ziplines, two post holes will be dug for the Zipline Center so the total disturbance will be less than one cubic meter of cumulative ground disturbance per acre” (Fuller, 2013).

The 2017/2018 ski season saw below than average early season snowfall, with subsequent late season storms and a spring snowpack that was sufficiently higher than previous extended period of drought conditions. The snow depth would have allowed for the Galaxy Pod sites to be open to the public for skiing during the later months of the season, however, due to the necessity of the Galaxy Lift replacement, the lift and greater area was closed the entire season. In general, Heavenly closes the Galaxy Pod area and archaeological sites when there is insufficient snow cover. The lack of snow prevents skiable trails to the Galaxy Lift Chair and return to higher concentration ski zones. When open, recreational users cross the sensitive site without knowledge and past summer surveys have shown no evidence of impact due to snow cover skiing/riding usage (Fuller, 2016). Per communications with Stephanie Heller of the USFS in April of 2019, the LTBMU Heritage Staff position is currently vacant, so USFS did not provide an update on archeological surveys for the 2018 summer season.

Two road segments were discovered as extensions of a Comstock-era wood haul road which was first recorded by S&S Archaeological Consultants in 1992, as leading downward from the Mott Canyon area to the upper reaches of the South Fork of Daggett Creek (Lindstrom and Blom 2009). These new heritage resources have been recorded on State of Nevada IMACS archaeological site records in accordance with established guidelines. Updates to these forms were completed. Copies of this report and accompanying site records have been forwarded to the USFS LTBMU for their review and processing. An additional copy has been placed on file with the Nevada State Museum, which maintains the archaeological inventory for the State of Nevada (Lindstrom and Blom 2009).

### **3.19 Measure 7.4-18 Protect the Tahoe Rim Trail**

*In order to protect the Tahoe Rim Trail (TRT) and allow for its continued use during construction of resort facilities, Heavenly Mountain Resort is required to rope off any hazardous areas within or adjacent to the TRT, prohibit construction of permanent structures which may block the use of the trail, as well as inform the public of any potential closures along the TRT.*

Portions of the Galaxy Lift Replacement project occurred in the vicinity of the TRT. Due to project construction staging and timing, the sections of the TRT near the project area were never required to be fully closed, or rerouted. For safety reasons, during the use of helicopters for project construction, Heavenly placed guards at the sections of the TRT in the vicinity of helicopter operations to briefly hold the public in

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<sup>6</sup> Lake Tahoe Basin Management Unit, TB-2013-01. RT2013051900013. Screened Undertaking (Class B Undertaking) Letter. 2013.

safe waiting areas until it was appropriate for hikers to move across the trail. TRT utilization was only minimally disrupted, as the use of helicopters for construction was limited to a single day, and safety waiting times were only several minutes, due to helicopter routes and efficiencies.

### **3.20 Conclusion**

During construction, measures of the MMP are implemented during each specific proposed project. Heavenly Mountain Resort maintains compliance with these measures during the planning, design, construction, and post-construction phases for each project. Two Master Plan Implementation Projects were completed during the 2018 construction window and Heavenly followed mitigation and permit requirements for construction. Annual creek water quality results do not meeting the state water board limits (measure 7.4-3), though Heavenly is actively limiting salt and deicer applications and monitoring/tracking salt on-mountain applications. The *Bijou Park Creek Evaluation Report* was completed and submitted as an appendix to the 5-year Comprehensive Report in January 2017. The evaluation of Bijou Park Creek and the surrounding watershed lists three specific recommendations for improvements. “The first measure calls for the continued source reduction for chloride. The second measure suggests modifying and improving the StormFilter system and the third potential recommendation is to develop a site-specific standard for chloride in Bijou Park Creek or establish an alternative background location to better reflect the development of Bijou Park Creek.”<sup>7</sup> At this time Heavenly has not implemented the last two recommendations. The two newest biological monitoring measures (7.4-9 and 7.4-14) were implemented in 2015 and monitoring continued through the 2018 monitoring period. Data collected for the Sierra Nevada Yellow-legged Frog and marten populations as related to the Galaxy Lift Replacement project were presented to the appropriate agencies prior to the lift replacement, and data related to Epic Discovery project will submitted to the appropriate agencies in the future as the project moves forward.

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<sup>7</sup> Catalyst Environmental Solutions. *Bijou Park Creek Evaluation Report – Heavenly Mountain Resort Waste Discharge Requirements Associated with Lahontan Regional Water Quality Control Board Order No. R6T-2015-0021. WDID 6A090033000*. January 2017. Page 62.



## Chapter 4 – Operation and Maintenance Measures

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### 4.1 Introduction

The operation and maintenance measures contained in the MMP govern both summer and winter activities necessary to run Heavenly Mountain Resort. While construction measures are project-specific, operation and maintenance measures encompass annual daily resort operations. These ongoing measures are usually related to either summer or winter activities.

### 4.2 Measure 7.5-1 Watershed Maintenance and Restoration Program

*Heavenly will implement the Watershed Maintenance and Restoration Program. This program will be updated determined by ongoing monitoring. Cumulative Watershed Effects (CWE) tools were used to assess the Epic Discovery Project; however these tools are no longer sensitive enough to be useful on project-level scale. The Forest Service will monitor road maintenance which will be incorporated in developing the restoration and maintenance schedule for road segments. Future Master Plan implementation and monitoring will be reviewed as part of the Ongoing Environmental Monitoring Program (Measure 7.5-2). The Waste Discharge Requirements (WDRs) ensure that measures are implemented and maintained (Heavenly, 2015).*

In the past, each year Heavenly had prioritized CWE projects based on maintenance needs, costs, funds, proximity to water bodies and erosion potential as well as construction implementation. Beginning with the 2016 construction season, all future projects moving forward will be prioritized based on the Watershed Maintenance and Restoration Program (Epic Discovery Draft EIR/EIS/EIS Appendix 3.1-D). These projects have been “organized in phases based on Priority ski trails and road segments treatment needs as well as tied to capital project implementation phasing.”<sup>8</sup> RCI continued BMP implementation and effectiveness monitoring during the 2018 construction season. Results from the 2018 monitoring effort are located in Appendix I. Based on revisions to this measure, RCI will continue to monitoring and inspect BMPs shifting from the CWE tools and instead focus on compliance with the WDRs. Appendix III contains the updated status of the 2018 construction season work list of Watershed Maintenance and Restoration Program projects. Additional BMP and maintenance projects completed are listed in the *Heavenly Mountain Resort Watershed Maintenance and Restoration Program – 2018 Annual Report & Construction Season Summary Report* (found in Appendix I). Appendix VII contains the list of proposed Watershed Maintenance and Restoration Program projects planned for 2019.

### 4.3 Measure 7.5-2 (WATER-C1b) Ongoing Environmental Monitoring Program

*This measure addresses the Lahontan Board Order No. R6T-2003-0032A2 waste discharge requirements (WDRs) and implements the monitoring and reporting program for Heavenly Mountain Resort. The Program includes monitoring the following components: Water Quality, BMP Effectiveness, Riparian Condition and Condition/Trend Monitoring. Additional roads and trails will be monitored within the special use permit boundary to comply with current Forest Service protocols (includes the Mountain Bike Park as it applies only to watershed NV-1); and in-stream fine sediment monitoring will be required for the Heavenly Valley Creek Sky Meadows Reach only. This effort will help to assess poor biotic health scores and document the effectiveness of mitigation measures in the area (Heavenly, 2015).*

The Environmental Monitoring Program continues to be funded by Heavenly, but has been implemented by Cardno (formerly Cardno ENTRIX) and RCI since 2005. Heavenly renewed their contract with Cardno

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<sup>8</sup> Heavenly Mountain Resort Master Development Plan, Page 7-20

(formerly Cardno ENTRIX) and RCI to complete water quality monitoring and BMP effectiveness monitoring in January 2008 for a 5-year period, and 2012 marked the end of the contracted work. Through the public process, TRPA and Heavenly again selected Cardno and their sub-consultant team to continue this work through July 2017, at which another request for proposal was solicited through the public process. Cardno and their sub-consultant teams were again selected through the formal selection process to continue work for the next 5-year period (2017-2022).

Water quality monitoring was conducted monthly between October 1, 2017 and September 30, 2018 and biweekly during spring runoff at the seven sites specified in Appendix II. The 2018 water year marked the third year that the sampling locations abided by the new Waste Discharge Requirements (R6T-2015-0021) and Monitoring and Reporting Program (2015-0021). The biggest change in the revised/new program was with regards to runoff sampling. In the past, runoff sampling was required weekly; however, the revised program only requires biweekly sampling during the runoff season (typically late March to June). The two Nevada Edgewood Creek monitoring locations are outside of the Lahontan Water Control Board's jurisdiction, but will continue to be monitored on a similar frequency. The 2018 water year results were reported to Lahontan and the Forest Service in the quarterly and annual report and as an electronic copy only in Appendix II of this report.

The Lahontan WDR permit also requires storm samples from the three California Base Parking Lot area StormFilter™ sampling locations (43HVP-2, 43HVP-1a and 43HVP-1b). Three storm samples were collected during the 2018 water year. Results from these samples are included as an appendix in the Heavenly Water Year 2018 Annual Report (Appendix II).

Pursuant to the latest State Water Quality Control Board's Mitigation and Monitoring Program (MMP) amendment, BMP effectiveness reporting is now only submitted annually as an appendix to this report. Results from BMP effectiveness monitoring were discussed previously within measure 7.4-1 and can be found in Appendix I. Through an adaptive management approach, the effective soil cover program shifted from a photo monitoring program to an implementation of slope stability and cover at prioritized "hot spots" within the watershed. This approach and shift was previously documented in the in the Environmental Monitoring Program 2014 Annual Report and is reflected in the Mitigation and Monitoring Program.

Riparian stream condition inventory (SCI) monitoring was last collected during the summer of 2015. This information was previously presented and reported in the Environmental Monitoring Program 2015 Annual Report. Trend analysis of the SCI data was reported and discussed in Comprehensive Annual Report submitted in January 2017. The next round of riparian condition monitoring for the California and Nevada streams is scheduled for the 2019 summer season.

A portion of the stream riparian studies includes benthic macro-invertebrate (BMI) studies. Samples are collected, scored, and analyzed in order to provide trends for stream health. Sampling occurs on a 2-year on and 2-year off schedule with results collected in 2006/2007, 2010/2011, 2014/2015, and 2018. The second year of BMI samples will be collected during the summer of 2019. Additional BMI sampling was collected at both the Sky Meadows and Upper Hidden Creek locations in both 2015 and 2016. Due to the poor BMI scores at the Sky Meadows reach, the Upper Hidden Creek reference reach was established in 2015 to compare results at two meadow reach environments. Additional samples were collected at these two sites during the summer of the 2016 water year providing two consecutive years of BMI data for the reference reach. Both water quality and BMI results at the Sky Meadows Reach (43HVC-1a) will need to show improvement before this site can be removed from the sampling regiment. Unfortunately, due to the relatively low number of samples collected and variability in results over the years, "upward trends in biotic conditions at the Heavenly Valley Creek sites cannot be confirmed."<sup>9</sup>

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<sup>9</sup> Suk, Thomas. 2015. Heavenly Valley Creek—Bioassessment Site Scores for 2014. Unpublished internal memo, Lahontan Regional Water Quality Control Board, South Lake Tahoe, California. April 2, 2015.

Proposed Mountain Bike Park Trails will be monitored in compliance with Forest Service protocol upon completion (Nevada side); while fine sediment monitoring along Heavenly Valley Creek at the Sky Meadows established reach will be monitored during the next round of stream condition inventory sampling in 2019.

#### **4.4 Measure 7.5-3 (WATER-C1a) CA-1 Erosion Reduction Measures**

*Prior to or concurrent to disturbance in Sky Basin, sources of erosion that will directly affect Heavenly Valley Creek and BMI scores will be mitigated as outlined in Epic Discovery Draft EIR/EIS/EIS Appendix 3.1F. This measure lists the priority of each project prior to disturbance. The status and implementation of these mitigation measures will be documented through measure 7.5-2 (Heavenly, 2015).*

Upon completion of the 2017 construction season, Heavenly addressed the completion of all remaining hot spot prioritization projects within the CA-1 watershed. Documentation regarding these treatments were provided in RCI's *Watershed Maintenance and Restoration Program 2017 Annual Report & Construction Season Summary* submitted last year (Attachment A of Appendix I). During the 2018 construction season, Heavenly addressed additional hot spot locations within the CA-1 watershed that required repairs and maintenance. Completion of these repairs are documented in the 2018 Annual Summer Work List status update (Appendix III). RCI continues to monitor and document hot spot status updates including work completed and maintenance updates. Documentation of erosion reduction measures proves compliance for future potential construction projects within Sky Basin. The 2018 summarized documentation can be found in Table 1 in Attachment A of Appendix I.

#### **4.5 Measure 7.5-4 (WATER-C3) NV-1 Erosion Reduction Measures**

*Prior to or concurrent to disturbance in Mott Canyon watershed (NV-1), highest risk (greatest potential for sediment loading into the channel) sources of erosion shall be implemented as outlined in Epic Discovery Draft EIR/EIS/EIS Appendix 3.1G. This measure lists the priority of each project prior to disturbance. The status and implementation of these mitigation measures will be documented through measure 7.5-2 (Heavenly, 2015).*

During the 2016 construction season IERS and RCI monitored and documented the listed phase hotspot locations for compliance and potential future construction affecting the Mott Canyon watershed (NV-1). The NV-1 Erosion Hot Spot Summary Matrix table was previously provided in IERS 2016 Restoration and Monitoring Annual Report (Appendix II, Table 4, in the 2016 MMR). As proposed projects are planned and built, these high priority "hotspot" locations will be addressed.

#### **4.6 Measure 7.5-5 Maintain Water Rights Balance**

*This measure specifies that Heavenly shall implement a water use/water rights monitoring program to estimate the quantity of water supplied by each source and where the water is used.*

The Water Use Balance Report for the 2017-2018 season contains detailed records on water used for snowmaking and can be found in Appendix V. The Heavenly Mountain Resort's snowmaking system consumed a total of 151.98 million gallons of water during the 2017-2018 ski season, up from 143.32 million gallons of water during the 2016-17 season. Snowmaking water use in California totaled 80.27 million gallons, and snowmaking water use in Nevada totaled 71.71 million gallons during the 2017-2018 ski season. During the 2017-2018 ski season, Heavenly purchased a total of 64.64 million gallons of water. South Tahoe Public Utility District (STPUD) provided Heavenly with 52.16 million gallons, while Kingsbury General Improvement District (KGID) supplied the remaining 12.48 million gallons purchased. All purchased water supplied by outside utility providers has been supplied in compliance with their approved water rights or similar permits. Results from the water balance report state that 29.03 million gallons of water were transferred out of Basin (Lake Tahoe), while approximately 20.85 million gallons were transferred from California to Nevada during the 2017-2018 ski season.

The sources and use of water for the calendar year of 2018 are as discussed below. Water usage for each of the facilities below fluctuate from past year's values due to snow precipitation, increased summer activities on the mountain as well as changes in usage at the Boulder Lodge on the Nevada side helping to better distribute guests and usage.

- > **California Main Lodge:** Water for the lodge is supplied by South Tahoe Public Utility District. No consumption data is provided by STPUD. Annual flat fee charges for STPUD water are based on the size of the water meter.
- > **Lakeview Lodge/Snow Beach Community Water System:** Water for these facilities is supplied by an underground well. The estimated consumption for the 2018 calendar year is 253,800 gallons, which is slightly less than the 2017 usage.
- > **Sky Deck Barbeque and Bathrooms:** Water for these facilities is supplied by an underground well and two new consumption meters were installed in October, 2017: A single 2-inch meter for the bathrooms and a single 1-inch meter for the restaurant. The total estimated consumption for the 2018 calendar year was 170,043 gallons, which is substantially less than the 2017 unmetered estimated usage of 300,000 gallons, likely due to a combination of 2018's shorter season length and past consumption overestimation prior to meter installation.
- > **Adventure Peak (Top of Gondola/Gondola Mid-Station):** Water for these facilities is supplied by an underground well. The 2018 estimated consumption for the period is 2,363,000 gallons, which is slightly higher than the 2017 usage.
- > **Boulder Lodge:** Water for the lodge is supplied by Kingsbury Improvement District (KGID). Estimated consumption for the period based on water invoices from KGID is 86,557 gallons. The water usage is more than 100,000 gallons less than water usage in 2017, which is likely due to season length and resort activities timing.
- > **Stagecoach Lodge:** Water for the lodge is supplied by KGID. Estimated consumption for the period based on water invoices from KGID is 302,231 gallons, which is a slight decrease from 2017 usage.
- > **East Peak Lodge:** Water for this facility is supplied by an underground well. Estimated potable consumption for the 2018 period is 1,353,100 gallons. The usage value at East Peak Lodge decreased slightly from 2017, which again is likely due to a slightly reduced season length compared to 2017.
- > **East Peak Well:** Water from the well is used to recharge the East Peak Lake/Reservoir and subsequent snowmaking operation. For the 2018 calendar year, 40,214,146 gallons of water were used, which is substantially greater than the 2017 usage (22,765,415 gallons), but more similar to the 2016 usage (47,851,375 gallons), likely due a more average snow pack and need for snowmaking particularly during the early winter months.

#### **4.7 Measure 7.5-6 Maintain Water Flows in Heavenly Valley Creek**

*This measure requires a water use/water rights monitoring program specific to the California Reservoir and Heavenly Valley Creek.*

This mitigation measure requires that Heavenly manage the reservoir and dam such that, "the dam releases equal inflow to the reservoir during the summer such that in-stream flows are not increased" (Heavenly, 2015). A flowmeter was installed on the existing transfer line between the Cal Dam reservoir and East Peak system<sup>10</sup>, helping to calculate interstate water transfers. Additional solar powered equipment, batteries and data loggers were installed at both the Sky Meadows (upstream of the reservoir) and Patsy's flume (downstream) retrofit sites in the summer of 2016 to gauge in the inflow and outflow

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<sup>10</sup> Barthold, Scott. Heavenly Mountain Resort Water Use Report, 2017-2018 Season. Snomatic Controls and Engineering, Inc. Page 3.

from the reservoir. Unfortunately, additional equipment and phone lines were needed in order for the equipment and recorded data to work properly. It was anticipated that these two gauges would be online for the 2017-2018 ski season and snowmaking effort; however, the repaired equipment was further damaged due to the 2016-2017 snow totals<sup>11</sup>, and repairs have not been completed to date. For the 2017-2018 ski season, 41.3 million gallons were discharged from Cal Dam versus 41.4 million gallons flowing into the reservoir, indicating that there was no demonstrable net increase in flows throughout the ski season. The difference in numbers is likely due to significant digits and rounding errors. Heavenly is in partial compliance with this measure as they attempt to maintain and balance flows into and out of the California reservoir continuously to ensure that water rights are not exceeded. Additional monitoring equipment and repairs are needed to ensure the water balance usage associated with the California reservoir is correct.

Prior to the 2015-2016 ski season, during several years of drought conditions, Heavenly had an increased need for snowmaking due to the lack of natural snowfall, which continues in years of low snowfall or years of low early season snowfall, such as the 2017-2018 ski season. The operation of the East Peak well was thought to have reversed the historical experience of transferring water from California to Nevada. The most recent water balance report calculates that a net total of 29.03 million gallons of water were transferred out of the Tahoe basin during the 2017-2018 ski season. 20.85 million gallons were transferred from California to Nevada during the 2016-2017 ski season. The inter-state and inter-basin transfers were larger for the 2017-2018 ski season than normal. New meter installation at Malcolm's vault may simplify the water balance in future years, and additional, "future net transfers will be minimized by further balancing water supplies during the season and managing summer irrigation practices."<sup>12</sup>

The revised measure also requires another source for summertime irrigation besides Heavenly Valley Creek. In future years, other watering sources and drought resistant plants will be incorporated helping to ease the reliance on water from Heavenly Valley Creek, dam and reservoir.

#### **4.8 Measure 7.5-7 Maintain Water Flows in Daggett Creek**

*The MMP specifies that Heavenly shall install a flow gauge at East Peak Lake, monitor input via precipitation and output from East Peak Lake, and maintain release rates that satisfy water right permit 50525.*

The water rights permit is based on snow making usage as opposed to maintaining flows in Daggett Creek. The permit states that 0.5 cfs of water can be used from November through March for snow making operations. There are a number of inputs to determine this value such as: well usage, stream flows out of the dam, and water pumped in and out of the reservoir used for snow making. Appendix V contains the 2017-2018 snowmaking and water balance report, while Appendix VI contains the 2017-2018 estimated stream flow data collected and prepared by RCI on Daggett Creek. Data are collected continuously at 15-minute intervals at the gage located below East Peak Lake on the south fork of Daggett Creek; stored flow data are collected and downloaded twice a year from this location.

In addition to collecting periodic flow measurements, a new data logger equipment was installed in July 2017. The new data logger provides more accurate data collection and software analysis for possible discrepancies. Water depth is calculated by the software from water pressure, barometric pressure, and water temperature. The probe data logger has been set to log continuously at 15-minute intervals, as was the previous data logger. During water year 2018, RCI made multiple in-stream measurements for a range of flow conditions to correlate Daggett Creek discharge to data collected from the new equipment. RCI will continue to make in-stream flow measurements during site visits to further refine the calibration curve for the new data logger equipment.

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<sup>11</sup> Papandrea, Frank. Personal communication April 24, 2017.

<sup>12</sup> Barthold, Scott. Heavenly Mountain Resort Water Use Report, 2017-2018 Season. Snomatic Controls and Engineering, Inc. Page 4.

Installation and calibration of the new gauge is providing reliable high-quality data. However, there were two periods of missing data in water year 2018: May 14 to June 12 and from August 31 to September 30. During these two periods, barometric pressure correction data was not transferred from the data logger. RCI believes the issue was related to information transfer between the data logger and the software, which is anticipated to have been resolved.

Results of the water year 2018 for Daggett Creek discharge is included in Appendix VI. Elevated runoff from record precipitation during the winter water year 2017 carried into the beginning of water year 2018. This is reflected in the relatively high creek flows through November 2017 compared to previous monitoring data. Flows normalized over the winter and into the spring of 2018. Overall, the data demonstrate that minimum flows were maintained in Daggett Creek throughout water year 2018.

#### **4.9 Measure 7.5-8 Maintain Compliance with Water Entitlements**

*Similar to measure 7.5-5, Heavenly shall implement a water use/water rights monitoring program and comply with existing California, Nevada, and local provider water restrictions on an annual basis.*

Heavenly complied with all applicable water rights during the 2017-2018 monitoring period and prepared a water use/water rights report which is contained in Appendix V. Heavenly purchases additional water supplies from both KGID (Nevada) and STPUD (California) to meet water demands above and beyond their water rights. To help combat water needs, the East Peak well was dug, constructed and began operation during 2011-2012 snowmaking season. For the 2017-2018 ski season, 27.7 million gallons of water were pumped from the East Peak Well; a reduction from 2016-2017 pumping numbers.

#### **4.10 Measure 7.5-9 Reduce Vehicle Emissions**

*Heavenly is to work with responsible agencies to implement a mitigation package that will reduce the potential increase of ambient carbon concentrations. The mitigation package includes using contributions to develop best available control technologies and using these technologies for construction, expansion and improvement of the bus system, and improved parking management. In addition, Heavenly shall consider offering skiers/riders the option of both a morning and afternoon half-day lift ticket to reduce peak parking hour traffic.*

To mitigate the resort's contribution to carbon emissions, Heavenly has implemented a carbon mitigation package that is centered on reducing vehicular traffic. Heavenly uses low emission vehicles for both transit and operations. The entire fleet of Heavenly snowmobiles has 4-stroke engines. Heavenly also uses state-of-the-art snowcats with Tier 3 and Tier 4 California Air Resources Board (CARB) engines. The emissions from Tier 3 and Tier 4 snowcats are the cleanest available on the market.

During the ski season, Heavenly provides free shuttle service between all base areas and lodging facilities. Personal vehicular traffic and parking is discouraged at the gondola base through limited paid parking. Employees can buy subsidized monthly bus passes and Heavenly provides free bus service on existing routes to employees from 8:00AM to 6:00PM. During the 2017-2018 ski season, Heavenly coordinated with the operation of 29 ski tour bus trips that included an approximate total of 1,420 guests<sup>13</sup>. Although this is just over 50% the ski tour bus trips taken in during the 2016-2017 season, it accounts for a greater number of guests per bus trip. Heavenly also contributed to the start-up and operation of the Coordinated Transit System (CTS) and continues to contribute the 20% required local match for Capital Vehicle Replacement Grants from the Federal Transit Administration through the spring of 2018. Since 2005, all new and replacement buses on the BlueGo system have been low emission, alternative fuel vehicles.

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<sup>13</sup> Papandrea, Frank. Heavenly Mountain Resort. Environmental Sustainability & Compliance Manager. Vail Resorts, Inc., Personal Communication. April 1, 2019.

Additionally, Heavenly currently offers skiers and riders half-day afternoon lift tickets as discussed as a mitigation measure to help reduce the influx of skiers/riders during the morning rush peak parking hour traffic.

#### **4.11 Measure 7.5-10 Snow Removal Noise Mitigation Methods**

*To reduce noise created from the snow removal process; this measure states that Heavenly should minimize night time snow removal and attempt to construct noise barriers along the perimeters of parking lots using snow.*

There are no formal noise measurements conducted to determine snow removal operations' effect on the CNEL at the base parking areas; however, there were no known complaints filed with the local jurisdictions, Heavenly, TRPA, or the Forest Service. Additionally, Heavenly's snow removal plan calls for constructing snow berm barriers along the perimeter of the California Base, Boulder, and Stagecoach parking lots. Snow is typically removed early in the morning, prior to opening to the public, beginning with areas furthest from adjacent houses and pushed towards the houses to build noise barriers. The 2017-2018 ski season and above average precipitation amounts allowed for snow storage and snow berm noise barriers for form around the perimeter of the aforementioned parking lots.

#### **4.12 Measure 7.5-11 Snowmaking Noise Mitigation Methods for Base Areas**

*This measure calls for a reduction of Community Noise Equivalent Levels (CNELs) at the base areas to 1982 values or TRPA Plan Area Statement (PAS) noise standards, whichever is less, through the implementation of snowmaking technology.*

The CNEL are measured annually by j.c. Brennan and Associates. Results for the 2017-2018 season are contained in the Heavenly Ski Resort Master Plan Noise Monitoring Survey located in Appendix X.

Heavenly has maintained a long-term noise monitoring station at the California Base area which is located on the USFS property directly east of the California Base parking area and across from Keller Road (PAS 085). As discussed in past reports the previous noise monitoring location (adjacent to the Tahoe Seasons Resort) had reached its limitations due to noise associated with vehicular traffic. Continuous snowmaking noise level measurements, at the permanent noise monitoring site, were conducted between November 1, 2017 and March 31, 2018. The monitoring equipment used for the noise level measurements is a Larson Davis Laboratories (LDL) Model 820 precision integrating sound level meter, calibrated with an LDL Model CAL 200 acoustical calibrator. Each month the equipment was checked for calibration and data was downloaded. (Brennan, 2018)

The 2017-2018 ski season CNEL value recorded at the Heavenly Base monitoring location exceeded the 55 dBA standards for PAS 085 and 087 (57.9 dBA). - This is an increase from last year's recorded measurement of 56.1 dBA, likely due to the smaller snowpack in the 2018 water year compared to 2017, and over double the number of snowmaking days (90 days compared to 43). The CNEL measured on days with snowmaking decreased slightly from the previous season value of 59.5 dBA to 58.9 dBA. The CNEL measurement on days without snowmaking was 55.7 dBA. All measurement with and without snowmaking operations were not in compliance with the 085 and 087 Plan Area CNEL standards. It was still noted that when snowmaking did not occur there were noise influences from roadway traffic, wind, and individuals recreating on USFS property where the sound level meter is located.<sup>14</sup>

Heavenly has completely replaced the air-water snowmaking nozzles at the base of California with fan guns.<sup>15</sup> However even with consistent use of fan guns for snowmaking at the lower portion of the

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<sup>14</sup> j.c. Brennan & Associates, Inc., Master Plan Mitigation Monitoring – 2017-2018 Heavenly Ski Resort. j.c. Brennan & Associates, Inc. Auburn, CA. Page 9.

<sup>15</sup> j.c. Brennan & Associates, Inc., Master Plan Mitigation Monitoring – 2017-2018 Heavenly Ski Resort. j.c. Brennan & Associates, Inc. Auburn, CA. Page 16.

California Mountain, CNEL levels associated with snowmaking are exceeded. (Brennen, 2018) Heavenly has implement all but the following Master Plan noise mitigation methods to help reduce CNEL levels:

- > Use of setbacks to reduce noise exposures at PAS boundaries;
- > Use of noise reduction housings for air/water nozzles;
- > Use of barriers at low-mounted air/water nozzles.

In an effort to help reduce CNEL levels, Heavenly staff closely monitored the snowpack produced and snowmaking operations, during the 2017-2018 ski season, to determine the appropriate timeframe for discounting snowmaking operations and reduction of nighttime snowmaking noise levels.

Short-term noise level measurements of snowmaking operations were conducted during the 2017/2018 ski season at the Boulder Base on January 22, 2018. The noise measurements for the Boulder Base area were as follows: 66 dBA at Boulder Base (Site 1) and 63 dBA at the corner of Jack Circle and Bonnie Court (Site 2). The predicted values at these locations, assuming continual operation for a 24 hour period, are 73 dBA and 70 dBA. For the 2017-2018 ski season, these measured values exceed both the Kingsbury Drainage (PAS 080: 50 dBA), Upper Kingsbury (PAS 082: 55 dBA), and Heavenly Valley Nevada (PAS 086: 55 dBA) 24-hour CNEL criteria established by the TRPA Environmental Thresholds for Lake Tahoe.

During the 2017-2018 ski season, short term noise measurements were conducted at the Stagecoach Base area on November 28, 2017 at three different locations. The noise measurements for the Stagecoach Base area sites were as follows: 77 dBA at Quaking Aspen Road (Site 3), 45 dBA at the Entrance to the Ridge (Site 4), and 61 dBA at Eagles Nest (Site 5). The predicted values at these locations, assuming continual operation for a 24-hour period, are 84 dBA, 52 dBA, and 68 dBA, respectively. It is noted that the Entrance to the Ridge site was approximately 10-13 dBA less than the typical measured noise levels. Typically, Heavenly will run an old-style Ratnik sled gun at the lower pump house to produce the maximum amount of snow, however, during the measurements period, only Stick and Fan guns were running near the lower pump house, which have been documented to produce a much lower noise. The average hourly noise levels at the Quaking Aspen Road location (Site 3) conducted for the development of the original Master Plan were between 82 dBA and 92 dBA in 1996, and 24-hour predicted values for the 2017-2018 ski season were within this range. Site 3 and 5 exceeded the 24-hour CNEL criteria for the PAS adjacent to the Stagecoach Base (PAS 086, Tahoe Village: 55 dBA). However, Stagecoach noise monitoring values do not fall under TRPA jurisdiction since the “area is located outside of the TRPA area of influence.”<sup>16</sup>

During the 2017-2018 ski season, only one Remote Plan Area noise measurements was monitored. Monitoring of the Party Rock site (Site 7), which is located within PAS 080, was conducted on January 21, 2018. During this year, noise measurements were not conducted at the upper mountain Remote Plan Area in PAS 095, which is generally located adjacent to the ski area boundary, and southeast Liz’s and Canyon Runs (Site 6). The noise level measurements at Party Rock (Site 7) were conducted to determine if snowmaking operations at the lower mountain and base areas (which included 7 fan guns and 4 air/water guns) would exceed the applicable standards, as upper mountain snowmaking was not occurring on the sampling date due to adequate upper mountain snowpack levels. The noise measurements for the Party Rock site was 39 dBA.

Heavenly has actively pursued several of the mitigation measures for noise reduction at base areas listed in the Master Plan Amendment. Additionally, the average precipitation during the 2017-2018 limited snowmaking to early season snow base-building efforts. The measured CNELs values still exceed the 080, 082, 085, 086, 087, and 088 Plan Area CNEL Standards and the time period for replacing equipment

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<sup>16</sup> j.c. Brennan & associates, Inc., Master Plan Mitigation Monitoring – 2017-2018 Heavenly Ski Resort. j.c. Brennan & associates, Inc. Auburn, CA. Page 19.



with quieter fan gun technology has been exceeded. However, noise measurements at sites within PAS 085 and 087 exceeded the CNEL Standards on days when snowmaking did not occur. This correlation suggests that ambient noise influences snowmaking noise measurements. While no noise measurements within PAS 095 occurred during the 2017-2018 ski season exceedances at other monitoring plan area statements indicate this noncompliance of this measure.

#### **4.13 Measure 7.5-12 Rock Busting Noise Mitigation Methods**

*In order to mitigate the impact to a less than significant level, Heavenly must control the number, size and location of “rock busting” blasts (to meet PAS noise standards). Heavenly will continue to implement Rock Busting Noise Mitigation from the Master Plan.*

There were no rock busting activities and subsequent noise monitoring mitigation measures performed during the 2018 construction season. The Heavenly Noise Monitoring Survey states that, “rock busting is such an infrequent event, and is not considered to be a significant noise source, and therefore it is recommended that this mitigation monitoring measure is removed.” (Brennan 2018). This measure shall be reviewed during the next amendment or Master Plan update.

#### **4.14 Measure 7.5-13 Restrict Hours of Amphitheater Operations**

*This measure restricts the hours of concert noise to the daytime and early evening hours and restricts the concerts to less than 6 hours.*

Heavenly has conducted a concert simulation noise study; however, no concerts occurred or were monitored during the 2018 summer season. At this time this measure is not applicable.

#### **4.15 Measure 7.5-14 (TRANS-1) Traffic and Air Quality Mitigation Measure**

*This measure requires that Heavenly contribute to the Air Quality Mitigation Fund in accordance with Chapter 65 – Traffic and Air Quality Mitigation Program of the TRPA Code of Ordinances. Fees generated will be used to support programs that reduce VMT, improve air quality, and encourage alternate modes of transit (Heavenly 2015).*

Pursuant to Heavenly receiving the TRPA Epic Discovery Summer Improvements Permit, Heavenly contributed to the Air Quality Mitigation Fund in 2016. Contributions to the Air Quality Mitigation Program complete this measure. If and when additional projects are proposed that increase new daily vehicle trips by 200 or more, Heavenly will again be required to contribute to the Mitigation Fund in accordance with the mitigation fee schedule in the TRPA Rules of Procedure.

#### **4.16 Measure 7.5-15 Implement the Coordinated Transportation System (Public Transit Services)**

*This measure states that Heavenly shall continue to implement their portion of the ongoing air quality and traffic mitigation measures contained in the Coordinated Transportation System (CTS) Memorandum of Understanding (MOU).*

Heavenly contributed to the CTS Mitigation Fund in 2017; however in 2018, Heavenly began operating a fully in-house bus fleet to provide better transit services for employees and guests. Heavenly employees and guests experienced delays and lack of service during the winter of 2016/2017 as buses and routes were halted due to weather and staffing issues. To better service their needs, Heavenly stopped paying into the mitigation fund and started their own transit operation in the summer of 2018. The winter bus fleet provides transit between lodges, the Transit Center/Village and employee parking lots. The summer bus fleets transports guests and employees from the California Main Lodge to the Transit Center Village. Heavenly is anticipating expanding the bus fleet capabilities in future seasons.

#### **4.17 Measure 7.5-16 Protect Tahoe Draba Populations within Heavenly Mountain Resort**

*Seven specific measures to protect Tahoe draba populations are identified for implementation in the MMP: surveys, fencing, boardwalks, avoidance, rock removal, monitoring, and an interpretive program.*

During the 2018 construction season, Heavenly Mountain Resort complied with all applicable measures regarding protection of the Tahoe draba populations. Tahoe draba surveys are required prior to projects located within potential draba habitat. In 2018, surveys for Tahoe draba were performed in the vicinity of the Galaxy Life and NV Energy project located between Galaxy Lift and Mott Lift, by Sierra Ecotone Solutions.<sup>17</sup> All species data were recorded with a GPS unit and provided to LTBMU staff for use in future environmental documents. Refer to the LTBMU Botanical Field Reconnaissance Report located in Appendix VIII for species occurrence information.

Each summer, Heavenly places interpretive signs about Tahoe draba along well-used driving and hiking routes to alert employees and visitors. Mandatory summer employee orientation includes a section on Tahoe draba and habitat protection. Future Master Plan projects will incorporate the new out of Basin fencing and boardwalks spanning sensitive area requirements along with the other mitigation measures to protect draba populations.

#### **4.18 Measure 7.5-17 Minimize Loss/Degradation of Sensitive Plant Species**

*To protect sensitive plants at Heavenly, projects must be surveyed prior to construction and buffers must be placed around sensitive plants species. Facilities should also be sited to avoid riparian and old growth habitats.*

During the 2018 construction season, sensitive plant monitoring efforts focused on construction project near the Galaxy Lift Replacement project, NV Energy project, and associated roadway improvement projects below the Galaxy Lift. Surveys were conducted on July 5 and 13, 2018 by Sierra Ecotone Solutions, and the Botanical Field Reconnaissance Report is included in Appendix VIII. Documentation of this monitoring effort was provided to the LTBMU. At this time, no recommendations were made by LTBMU staff for minimizing loss and degradation of sensitive plant species within the Botanical Field Reconnaissance Reports.

#### **4.19 Measure 7.5-18 Invasive Plant Management**

*To prevent the spread of noxious weeds, Heavenly must develop and implement a long-term integrated weed management plan, use clean vehicles and materials for construction and stage them in weed-free areas, monitor new construction for 3 years, and implement an annual employee orientation and training program.*

At the beginning of 2018, there were 12 historically known invasive plant sites within the active Heavenly Mountain project boundary. However, invasive plants were previously eradicated on six (6) of those sites, reducing the total number of known invasive plant sites to six (6). US Forest Service Botanical Plant Technicians visited the six sites on Heavenly Mountain on September 9<sup>th</sup>, 2018. Only one of the six sites contained a single invasive plant, *Lepidium latifolium* (Perennial pepperweed), and the one individual was manually removed. At the end of the 2018 season, four (4) more of the Heavenly sites were changed to an “eradicated” status, and therefore Heavenly will enter 2019 with only two (2) invasive plant sites. In accordance with this measure, the annual BMP breakfast/training provides employees and contractors information regarding invasive plant species and the need for contracted vehicles to be free of debris and seeds prior to driving in/around the mountain.

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<sup>17</sup> Alling, Garth. Memo: Heavenly Mountain Resort 2018 Biological Survey Results Summary. January 14, 2019. Page 1.

#### **4.20 Measure 7.5-19 Monitor and Protect Nesting and Fledgling Bird Species**

*This measure specifies allowable dates (after August 1) for summer concerts at the Gondola top station.*

No concerts occurred at the top of the Gondola during 2018 summer season. Furthermore, no concerts have been held since 2009. If and when concerts are scheduled, they will be scheduled after the mitigated August 1 date. There are three top-of-mountain wedding venues at Heavenly Mountain Resort: Lakeview Lodge, Tamarack Lodge, and the Blue Sky Terrace. The Tamarack Lodge is located near the vicinity of the Gondola top station, while the Blue Sky Terrace is located at the Gondola mid-station. The Lakeview Lodge is located near the top of tram. There are no noise restrictions at the upper mountain venue locations, however noise restrictions are in place for base lodges. Hours are restricted for noise associated with concerts to daytime and early evening and start dates after August 1. If concerts were to occur they would need to cease operations by 10 p.m.; however, it is recommended that concerts cease operation by sunset per the Final EIR/EIS/EIS (February 2015). In addition, concerts should not extend for more than 6 hours. These conditions are consistent with the hours of operations assumed for the amphitheater noise study in the EIR/EIS/EIS. If warranted, Heavenly may conduct additional nesting and fledgling bird species surveys at the top of the gondola area to provide information regarding no detrimental effect allowing for modifications to the hours of limitations associated with concerts. Despite the fact that no concerts were scheduled for the 2018 summer season, nesting bird surveys were performed on June 7, 8, 10, and 11, 2018 at the top of the Gondola venue and surrounding areas in accordance with the Epic Discovery EIR/EIS/EIS. No active nests were observed within the immediate vicinity (Sierra Ecotone Solutions, 2018). See Appendix VII, 2018 Summer Activities Nesting Bird Survey Results for more details.

#### **4.21 Measure 7.5-20 (BIO-3) Migratory Bird and Habitat Utilization Survey**

*Heavenly shall perform annual nesting bird surveys for the following projects: Mid-Station Canopy Tour, Sky Cycle Canopy Tour, East Peak Zipline Canopy Tour, Sky Meadows Zipline Canopy Tour and the Sky Meadows Challenge Course. These surveys shall be completed prior to the start of project operations during the breeding season and shall identify migratory birds nesting on or immediately adjacent to proposed structures and equipment associated with the projects listed above.*

Nesting bird surveys and migratory bird surveys for the top of the Gondola and surrounding areas were performed on June 7, 8, 10, and 11, 2018 by Sierra Ecotone Solutions. The following project areas were surveyed for nesting birds and migratory birds: Skyway Canopy Tour, Silver Rush Canopy Tour, Hot Shot Zip Line, Blue Streak Zip Line, Red Tail Zip Line and all associated ropes courses. No active nests were found, though there is suitable habitat (snags with cavities) for a variety of bird species. “Efforts should be made to retain these snags within the project area where feasible in order to maintain suitable nesting locations for cavity nesters”<sup>18</sup>. The nesting bird results/letter is included in Appendix VIII.

The 2018 monitoring season was the first year that non-nesting migratory birds were monitored. To better understand the extent of migratory bird utilization of the above reference project locations, annual bird point counts were performed to determine species diversity, nesting data, and population sites. The 2018 collected data is considered baseline data, and the results of the initial baseline survey will be compared to future annual surveys in the vicinity of the projects in order to better understand fluctuations and changes of migratory bird utilization of the project areas.

#### **4.22 Measure 7.5-21 (BIO-8) Wildlife Trash Management and Education Program**

*Heavenly shall create and implement a trash management operation for the entire resort consisting of wildlife proof trash containers and a trash removal and management plan. The removal and management*

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<sup>18</sup> Alling, Garth. 2018 Summer Activities Nesting Bird Survey Results. Letter dated June 11, 2018.

*plan will include specified storage areas and practices to prevent access to refuse by wildlife species. Additionally, an educational component will be included in an effort to decrease litter and improper feeding and ramifications to wildlife. The plan shall be reviewed annually by Forest biologists.*

A wildlife trash management and education plan was started in 2016 as a condition of the approved EIR/EIS/EIS for the Epic Discovery Program. The program continues to be implemented annually with reviews provided by Heavenly and the US Forest Service (USFS) LTBMU. The goal of this program is for timely removal of refuse from deposit points; educate Heavenly guests and staff about proper waste management; and to keep interactions between wildlife and humans to a minimum. Wildlife proof receptacles in and around Adventure Peak/Top of Gondola area are serviced each day of operations, and garbage removed from the remote receptacles are consolidated to the Tamarack Lodge loading dock or the top of Gondola (TOG) for transportation down to Heavenly Village trash compactor. These waste operations are handled by the Heavenly Adventure Peak grounds crew, staff, and/or lift personnel. Removing food and garbage waste daily is vital to the success of the program.

Dumpsters are located at the California Main Lodge lower parking lot for different waste streams such as garbage and kitchen food waste recycling. These dumpsters are animal proof and are serviced by the South Tahoe Refuse and Recycling Services and are closely monitored by Heavenly environmental staff and Food and Beverage management staff. Since 2013, all of these California Base dumpsters were made animal proof and the wildlife incidents have been significantly reduced. Bear Bins will be deployed before summer operations and activities begin at the Adventure Peak/Top of Gondola location. These bins are relocated from the TOG area at the end of the summer season, as to not interfere with winter operations. These bins were stored at the East Peak Canopy Tour gear-up deck after the summer 2018 operating season concluded.

The program will expand into Sky Meadows and East Peak Lake/Lodge as these regions come online. Details regarding the Wildlife Trash Management and Education Program can be found in Appendix IV.

A trash concern in Upper Edgewood Creek was reported by an Edgewood Creek neighboring homeowner in mid-October 2018. Although that timeline is outside of the reporting period for this report, it should be noted that Heavenly Trail Crews spent several days addressing the trash concern, and the area will continue to be closely monitored and addressed following spring snow melt.

#### **4.23 Measure 7.5-22 Maintain Timber Thinning Practices**

*Heavenly must work with the Forest Service to determine areas that require timber thinning as established by the LTBMU Land and Resource Management Plan. Practices should help prevent catastrophic wildfire but be consistent with management criteria for maintenance and enhancement of wildlife values.*

Each year, Heavenly and Forest Service vegetation management specialists review thinning and hazard reduction needs. When areas are identified for thinning, timber thinning practices will be consistent with both the Forest Service management criteria and the TRPA Code of Ordinance Chapter 6 (tree removal). The Galaxy Chairlift Replacement project included the removal of 75-80 conifer trees. The hazard reduction tree removal prescription was also applied to approximately 30 additional conifer trees within the resort boundary in 2018 in accordance with the TRPA Code of Ordinance Chapter 6 (tree removal), as discussed in Measure 7.4-7. All removed trees were marked for removal by USFS staff. As new projects and plans are developed, trees to be removed will be mapped, surveyed and submitted for review prior to removal.

#### **4.24 Measure 7.5-23 Provide Employee Housing**

*Heavenly must assist in providing employee housing as well collect and report monthly employee housing. Heavenly will continue to maintain its housing program.*

Based on revisions to this measure, the percentage of occupancy (occupied beds) will be tracked monthly moving forward. Table 4-1 lists the monthly occupancy totals starting in October 2016. Calendar Year 2017 average occupancy values were also calculated. Heavenly’s employee housing assistance program matches workers with available housing. The EIR/EIS/EIS and subsequent Master Development Plan and mitigation measures no longer require employee housing survey information.

**Table 4-1 Heavenly Employee Housing Occupation**

Month/Year	% Occupied	Beds Occupied (88 total available beds, decreased to 73 in November)
October 2017	18%	15
November 2017	27%	23
December 2017	51%	37
January 2018	57%	42
February 2018	53%	39
March 2018	49%	36
April 2018	37%	27
May 2018	36%	26
June 2018	76%	56
July 2018	92%	67
August 2018	81%	59
September 2018	48%	35
Average Occupancy Ski Season Rate (Oct.-Sept.)	52%	36
Average Annual Rate (Jan.-Dec.)	56%	41

## 4.25 Conclusion

Compliance with the operations and maintenance portion of the MMP is an ongoing process. Heavenly complies with the MMP through careful planning, implementation, utilization of industry experts, and educating employees on the importance of each measure. Heavenly is in compliance with nearly all of the existing Operation and Maintenance measures and they are actively addressing newer measures established in the Final EIR/EIS/EIS Epic Discovery Project and MDP. Measures that are non-compliant include the water balance out of California dam in which in-stream monitoring equipment in Heavenly Valley Creek is needed to effectively measure flows in and out of the California reservoir. The noise monitoring measure regarding snowmaking is also non-compliant with the planned CNEL plan area statement levels at the both the California and Nevada Base Areas. However, there have been no public complaints regarding snowmaking activities, as recreationalists understand the need for snowmaking.

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## Chapter 5 – Management Response to Monitoring and Evaluation

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### 5.1 Introduction

The Heavenly Mountain Resort response to monitoring and evaluation is as important as the monitoring and evaluation itself. This portion of the MMP is to encourage an adaptive management approach through collaboration between Heavenly and relevant interested agencies and parties.

### 5.2 Measure 7.6-1 Soil and Water Quality

*To comply with measure 7.6-1, the results of various monitoring reports on soil and water quality are contained in this report. Heavenly's response to these reports is integral in achieving environmental improvements. Within 60 days of receiving completed monitoring reports, Heavenly, Forest Service, Lahontan, and TRPA will collaborate as necessary to develop an action plan based on monitoring results.*

Heavenly has employed Cardno in a three-party contract with the TRPA to implement water quality monitoring services. During the 2018 water year (from October 2017 through September 2018) Cardno provided Quarterly Reports to Lahontan, the Forest Service, and the TRPA in fulfillment of the monitoring and reporting requirements set forth in the Lahontan Waste Discharge Requirements (WDR's). Quarterly reports were submitted on the following dates: February 1, May 1, and August 1, of 2018. The 2018 Annual Report which included the fourth quarter results for the 2018 water year, was submitted on January 15, 2019. Due to the close working relationship of Heavenly staff and field monitors, Heavenly often responds to field directives and implements corrective actions before field and work order reports are generated.

Annual averages for total phosphorus and chloride exceeded the state standard at Sky Meadows (43HVC-1A), Property Line (43HVC-3), and Below Patsy's (43HVC-2) monitoring locations for the 2018 water year. The total phosphorus and chloride exceedances cannot be attributed solely to the Heavenly Mountain Resort operations as annual averages of these two parameters were also exceeded at the reference site located along Hidden Valley Creek (43HDVC-5). The annual averages for total phosphorus, total nitrogen, chloride, and turbidity all exceeded the state standards at the Bijou Park Creek (43BPC-4) location for the 2018 water year. Although annual average total phosphorus and chloride standards were exceeded at the reference site along Hidden Valley Creek, values at Bijou Park Creek were substantially higher than the reference reach values collected.

The 2018 water year marked the seventh year the California Parking Lot Filter Vault Effluent point results were reported to the State Water Board. Not to exceed values for turbidity, total nitrogen, and oil and grease were exceeded in two of the three collected storm samples during the 2018 water year. Heavenly has continued to prioritize their maintenance and filter replacement efforts. In the fall of 2018 (September), a total of 156 filters were replaced including the fourteen sacrificial filters which include the Phosphosob™ media. This media has shown some improvement with efficiency of total phosphorus removal, which is demonstrated by the fact that none of the three collected samples exceeded the state standard. Heavenly continues to be proactive in attempting to limit discharge exceedances; and the latest WDR's required a feasibility study with regards to chloride levels within Bijou Park Creek in association with California Parking Lot runoff. The feasibility study included additional sampling along Bijou Park Creek and led to the *Bijou Park Creek Evaluation Report* (Catalyst 2017). The evaluation report concluded that Heavenly should: 1) continue to limit chloride usage; 2) modify and improve the StormFilter system; and, 3) formulate a new site-specific chloride standard for Bijou Park Creek or

establish an alternate background reference location for Bijou Park Creek.<sup>19</sup> At this point in time, Heavenly has not implemented the last two action items, though they are attempting to limit chloride/salt usage. The 2017 ski season marked the first use of brine application as a deicer agent; however, the frequency of storms and snowfall limited application to one single event during the 2017/2018 ski season.

The 2017-2018 winter season experienced an approximately average volume of precipitation, 32.5 inches, (compared to the 1981-2010 average of 33.5 inches), and followed a much greater than average precipitation year in water year 2017. The 2018 water year was marked by low early season snowfall, with much of the precipitation occurring in March 2018. As such, the water year 2018 saw a decrease (compared to the 2017 water year) in storms, snowfall, and precipitation, which correlated with a decrease in use of roadway deicer. Heavenly used 76,543 lbs. of deicer and abrasives in water year 2018, a substantial decrease from 230,644 lbs. in 2017. Deicer and abrasives applied to roadways were recovered by Heavenly and their subcontracted vendors during the spring and summer months of 2018, amounting to a total of 127,180 lbs, some of which is likely a result of the City of South Lake Tahoe deicer application on roadways adjacent to the resort.

Usage of deicer is highly dependent on precipitation storm cycles and cold temperatures which vary year to year. Although the 2017-2018 season experience an approximately average rate of precipitation, the volume of deicer and abrasives applied is most comparable to the 2015 season (59,076 lbs.), which was considered a drought year. Some of this overall reduction in deicer compared to precipitation volume can be attributed to late season snowfall outside of the peak holiday season during the 2018 water year, however, some of it can be attributed to Heavenly's operational changes. Heavenly has moved forward with only using the smaller spreader truck as opposed to the older less accurately reporting dump truck. Heavenly's spreader truck is fitted with a deicer application sensor gauge which accounts for both road conditions and temperature controlling the ideal amount of deicer application needed for success. The sensor also records the amount of deicer applied more accurately. Reducing the amount of deicer applied to the roadways helps limit the amount of chloride detected in the water ways. Residual chloride tends to remain in the environment and is difficult and expensive to remove. Deicer application and recovery results can be found in Table 6-1 of the Heavenly 2018 Annual Report (Appendix II, electronic copy only).

BMP effectiveness and monitoring is performed by RCI. The State Water Board's latest Waste Discharge Requirements/Monitoring and Reporting Program (R6T-2015-0021) requires all quarterly and annual BMP reporting reports to be included and submitted with this Mitigation and Monitoring Plan. The BMP Effectiveness Monitoring 2018 Annual Report is included in Appendix I. This report summarizes findings, results, and trends that occurred throughout the summer/construction season. The annual report also lists recommendations for improving existing and proposed BMP implementation helping to increase the effectiveness. Feedback and comments from each of the agencies as well as lessons learned are passed along for incorporation and implementation by Heavenly's operations staff. The monitoring goal is to always be in compliance with BMP installation and maintenance, with all involved parties in agreement, limiting runoff, erosion, and sediment transport. Modified mitigation measures in the EIR/EIS/EIS and MDP suggest a change in the reporting and monitoring effort; however BMP effectiveness and erosion prevention will remain the focus. Heavenly and their team of consultants will adapt to these changes ensuring compliance with this measure.

Prior erosion resistance monitoring efforts focused on treating primarily high and medium priority hotspots identified in both Sky Basin and Mott Canyon watersheds (CA-1 and NV-1). Due to the watershed drainage area and proximity to Lake Tahoe, the CA-1 watershed remains a priority for addressing erosion hotspot issues as shown on the 2018 and 2019 Watershed Maintenance Restoration Program (WMRP) Work Lists (Appendix III and VII). The 2018 summer and construction season marked the sixth season Heavenly continued to follow the outcome-based watershed management approach formerly in

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<sup>19</sup> Catalyst Environmental Solutions. Bijou Park Creek Evaluation Report – Heavenly Mountain Resort Waste Discharge Requirements Associated with Lahontan Regional Water Quality Control Board Order No. R6T-2015-0021. WDID 6A090033000. January 2017. Page 62



collaboration with IERS and now transitioning to collaboration with RCI. The 2018 results are discussed in the Heavenly Mountain Resort Watershed Maintenance and Restoration Program (WMP) 2018 Annual Report and Construction Season Summary found in Appendix I.

Previous recommendations by RCI have been implemented through process improvements to the planning and communication, implementation, effectiveness and maintenance, and monitoring and assessment processes are provided in RCI's WMP 2018 Annual Report (Appendix I). Within those process categories, RCI has continued to recommend specific and vital improvements.

Within the scope of planning and communication, RCI recommends the continued collaborative efforts between Mountain and Base Operations departments to maximize staff time and resources to complete projects. Direct communication and documents such as the Annual Work Lists, maps, and spreadsheet tracking will be helpful. RCI also recommended evaluating projects for pertinent permits (such as stormwater, working in waterways, fugitive dust, etc.) during the planning process so that permit applications do not delay project construction. Lastly, RCI recommends providing the Annual Work List and maps to Heavenly staff and field crews to highly locations of projects with features such as streams, SEZs, roads, and lifts to support clear communication between management and field staff while providing a simple format for both field documenting erosion hot spots and reporting/communicating watershed management efforts and completed projects.

RCI's recommended treatment and implementation processes include recommendations pertinent to restoration treatments and construction BMPs. For restoration treatments, RCI recommends continuing to utilize equipment such as the hydroseeder (which was borrowed from Northstar and utilized this year) for large scale restoration projects and evaluate the effectiveness after storm events and snowmelt; increase areas of mulch application, particularly along road shoulders and near SEZs; and develop field forms to coincide with the inventory tracking efforts to document site-specific treatments to help understand and improve treatment cost effectiveness. Recommendations for improving construction BMPs include continuing to develop project designs and specifications using temporary and permanent BMPs that are most effective at Heavenly, based on past experience (as included in Appendix I, Attachment A), and continuing to require that all staff, new employees and outside vendors attend the annual training on compliance requirements and the internal water quality program.

The effectiveness and maintenance process recommendations include: maintaining dedication of monitoring logs associated with new erosion and sediment control techniques (as included in Appendix I, Attachment A); scheduling regular maintenance inspections and coordinating on action items to support BMP effectiveness; and utilizing tracking spreadsheets to account and prioritize project tasks, materials, staff, and equipment needs.

The monitoring and assessment process recommendations include continuing to conduct monitoring and reporting for the WMP and BMP effectiveness concurrently to increase efficiency and consistency as well as requesting that field crews utilize internal tracking documents to encourage staff to take active roles in creating successful projects. The Heavenly crews can also identify, assess, and develop integrated plans to resolve road system drainage issues such as converting more water bars to infiltration swales, as nearly all erosion issues observed on ski runs are related to concentration of flows from roads and water bars upslope. Additionally, review of the USFS National Core BMP Program and TMDL reporting requirements will aid in the selection of applicable BMP methodologies. Detailed recommendations from the 2018 RCI report are located in Appendix I.

Through a combined multi-agency effort and key monitoring implementations, Heavenly is presently in compliance with most of these ongoing mitigation measures. Agency and public responses to this annual report during the 60-day comment period will be assessed and integrated into an action plan if necessary. No comments were received for the 2017 report. The implementation of any action plan items will be discussed in the annual report the following year (2018, this report). Removed, modified and new measures in this report were established in the EIR/EIS/EIS Epic Discovery Project and subsequent

MDP. In response to this measure, an electronic copy of this report will be linked from the Heavenly website to the report posting on TRPA's website. Heavenly is currently in compliance with all of their reporting requirements.

### **5.3 Measure 7.6-2 Traffic and Parking**

*Heavenly is to prepare a parking monitoring report at the end of each ski season that includes the following:*

- > *Days during which overflow parking was used on Ski Run Boulevard, South Benjamin Drive, and Galaxy Bowl and any days when overflow parking was full.*
- > *The number of parking spaces used at Galaxy Bowl each day this area was used for overflow parking.*
- > *An explanation regarding any days during which these overflow parking areas were filled.*

*The monitoring reports are to be shared with the TRPA, Douglas County, El Dorado County, and the City of South Lake Tahoe and posted on the appropriate websites, not limited to the Heavenly website. Based on the results of the monitoring reports, an action plan will be devised by Heavenly and interested parties within 60 days.*

The California off-site parking areas are typically used during the holiday weekends and the week between Christmas and New Year's. During the 2018 water year (and 2017/2018 ski season), off-site parking was utilized 20 days between January 14, 2018 and April 1, 2018. No offsite vehicle parking was recorded in December, likely due to the low early season snowpack and subsequent lower early season visitor numbers. A total of 5,373 vehicles were counted along California off-site parking locations at the lower Ski Run Boulevard, Saddle, and Keller roadways. The roadway width along Ski Run Boulevard allows for additional paved parking along both sides of the street; while still allowing ample width for two-way traffic. Additional overflow parking, available on the Nevada side of the Heavenly Ski Resort, was not utilized during the 2017-2018 ski season due to safety protocols implemented by the Douglas County Sherriff's Department and Heavenly Security, which no longer allow vehicles to park on the roads outside of the Boulder or Stagecoach parking lots.

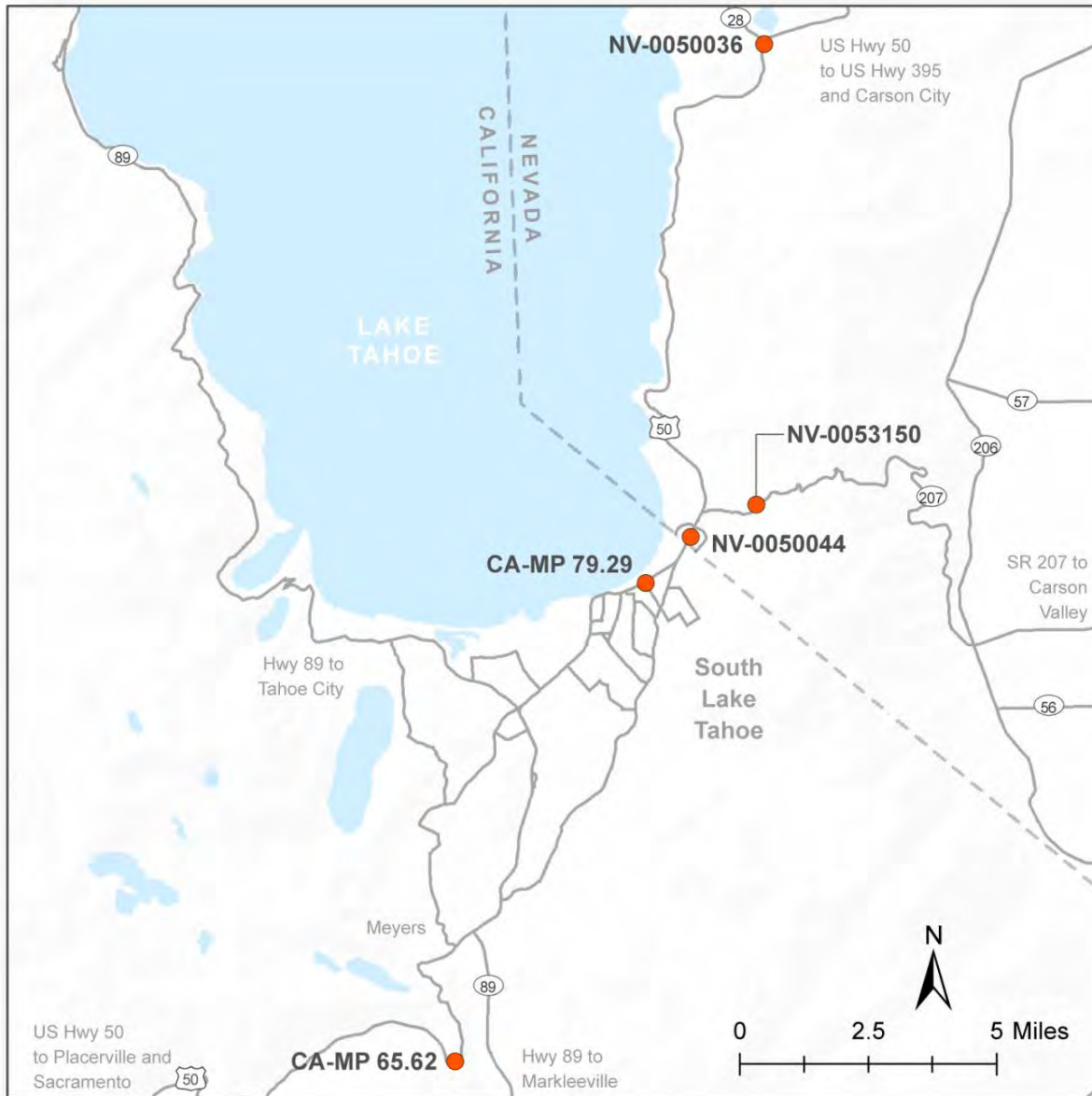
To assess Heavenly compliance with the mitigation measure to reduce vehicle traffic, data was gathered from Nevada Department of Transportation (NDOT) and the California Department of Transportation (Caltrans) on average annual daily traffic (AADT) on US Highway 50 and Kingsbury Grade. Sites along these two passes were chosen to represent major points of access to Heavenly. These sites are displayed in Figure 5-1. AADT values from 2008 through 2017 for each site are shown in Table 5-1 and graphically displayed in Figure 5-2. Traffic volume values are reported for the prior year of record (2017) and the 2018 values will be reported in next year's report.

Traffic numbers, for the major access points to Heavenly Mountain Resort for the 2016 year, increased from the 2015 values for all of the traffic monitoring sites except at the US Hwy 50/Intersection of Echo Lakes Road (CA – MP 65.62), which stayed consistent. The US Hwy 50/Ski Run Intersection values decreased from 32,000 counts in 2015, to 29,400 in 2016, and then increased again to 33,000 in 2017. Traffic counts for state station NV-0050036, located 0.4 mile west of SR-28 (Spoooner Summit) increased from 13,500 in 2016, to 13,900 in 2017. Likewise, state station NV-0053150 located on Kingsbury Grade (SR-207) increased from 10,800 in 2016 to 12,400 in 2017 and the 2016 traffic count number at state station NV-0050044 (Highway 50 near the state line) increased from 26,000 in 2016 to 27,000 in 2017. Traffic counts for vehicles traveling east into the basin along US Hwy 50 at Echo Summit (CA-MP 79.29) remained constant between 2016 and 2017 (10,800 in both years). State stations at NV-0050044 and CA-MP 79.29 continue to show the highest traffic counts compared to all the other major access routes traveling towards Heavenly Mountain Resort.

While vehicular numbers to South Lake Tahoe fluctuate year to year, these values do not necessarily correlate with skier visits or Heavenly's influence on traffic numbers. Media coverage of drought cycles

and snow storm events tend to correlate better with the number of skier visits. Figure 5.2 shows graphical representation of the traffic count data from 2007 through 2017. With this limited data set, it is hard to draw finite conclusions or trends; however in recent years the traffic count values appear to be increasing. Reviewing the ten years of traffic data collected, the general trend for four of the five traffic monitoring locations show an increase traffic volume into South Lake Tahoe. The 2015-2016 ski season was an average precipitation and snowfall year that followed a number of consecutive drought years. The increased snowfall may correlate with the increased traffic counts reported. The 2016-2017 ski season, a well above average precipitation and snowfall year, exhibited increased traffic counts, but not substantially greater than the upward trajectory of the data suggests.

As stated above, this report, which includes the traffic information, will be posted on TRPA’s website.



**Figure 5-1 Mapping Locations of the Traffic Count Sites**

**Table 5-1 Traffic Data on US Highway 50 and State Route 207**

State – Station	Location	AAADT 2008	AAADT 2009	AAADT 2010	AAADT 2011	AAADT 2012	AAADT 2013	AAADT 2014	AAADT 2015	AAADT 2016	AAADT 2017
NV - 0050036	US-50, 0.4 Mile West of SR-28 at MP 12	10,000	10,000	12,000	12,000 <sup>1</sup>	11,500 <sup>1</sup>	11,500	13,000	13,000	13,500 <sup>1</sup>	13,900 <sup>1</sup>
NV – 0053150	SR-207 (Kingsbury Grade) 0.5 Mile East of US-50	11,000	11,000	11,100 <sup>1</sup>	11,100 <sup>1</sup>	10,000	10,200	9,500	10,000	10,800	12,400
NV – 0050044	US-50, 300' East of the NV-CA State line	25,000	24,000	24,000 <sup>1</sup>	27,000	22,500	21,500	21,500 <sup>1</sup>	25,000	26,000 <sup>1</sup>	27,000 <sup>1</sup>
CA – MP 79.29	US-50 at the intersection of Ski Run Blvd <sup>2</sup>	31,500	31,500	30,000	30,500	30,500	30,500	31,500	32,000	29,400	33,000
CA – MP 65.62	US-50 at the intersection of Echo Lakes Road <sup>3</sup>	8,900	8,900	8,900	8,900	8,000	8,000	8,100	10,000	10,800	10,800

Sources:

NDOT Data: <https://www.nevadadot.com/doing-business/about-ndot/ndot-divisions/operations/traffic-information/-folder-199>

Caltrans Data: <http://www.dot.ca.gov/hq/traffops/saferestr/trafdata/index.htm>

Notes:

<sup>1</sup> Data Adjusted or Estimated

<sup>2</sup> Annual Average Daily Traffic (Back AADT) Traveling West Bound

<sup>3</sup> Annual Average Daily Traffic (Ahead AADT) Traveling East Bound

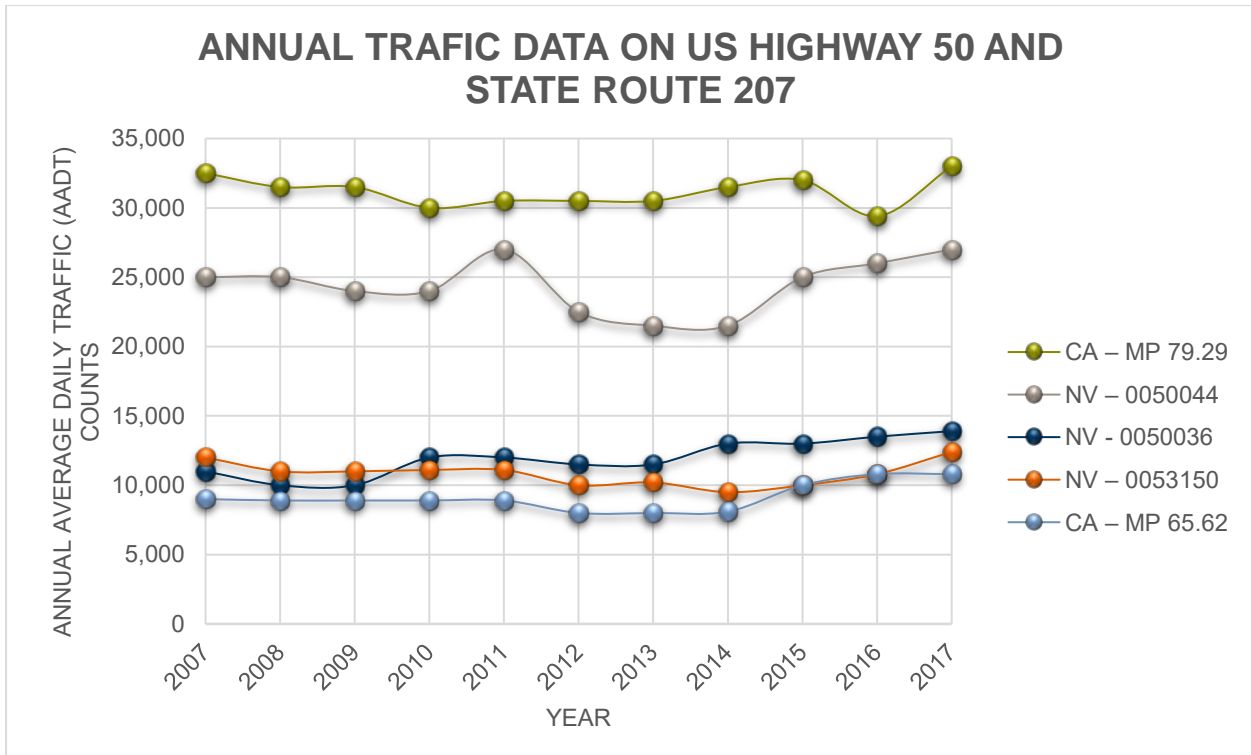


Figure 5-2 Graphical AADT Values 2008-2017

#### 5.4 Measure 7.6-3 Late Seral/Old Growth Enhancement

*Monitoring is required every 5 years to track the progress of any enhanced forest or stand.*

The forestry work for the restored stand was completed in 2007. In 2013, the LTBMU staff visited the restoration stand site to review the mitigation measure requirements. Results from the monitoring effort proved that the past mitigation measure objectives have been met. The EIR/EIS/EIS Epic Discovery Project and MDP removed past mitigation measure VEG-3 (7.5-25 Late Seral/Old Growth Forest Enhancement) in response to the monitoring conclusions. The LTBMU compliance letter is included in Appendix XIII. No new additional late seral/old growth stands were removed during the 2018 construction season, nor were there additional stands that required monitoring. If and when an old growth stand is scheduled for removal, a new stand of equal or greater acreage will be established and future monitoring of the new stand will be governed by this measure. Heavenly is currently in compliance with this ongoing measure.

#### 5.5 Conclusion

Heavenly continues to work proactively with their subject-area experts and their own trained employees to immediately respond and address on-mountain erosion issues and problem areas. More often than not, Heavenly modifies and repairs minor BMP and erosion source issues before they become potential problems and larger issues. The 2018 BMP monitoring results exemplify this methodology as results show that permanent BMPs were 100% implemented and 97% effective, while temporary BMPs were 92% implemented and effective. Resolving and preventing erosion is one key component in improving future water quality monitoring results. Heavenly's active on-mountain involvement and attention to each of mitigation measures listed in the Master Development Plan have not triggered an action plan. If measures fall out of compliance, action plans will be developed ensuring a path for future compliance while addressing responses and feedback gathered from the local agencies and interested parties generated from this report.

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Heavenly Mountain Resort  
Mitigation and Monitoring Plan Annual Report  
(October 2017 – September 2018)

APPENDIX

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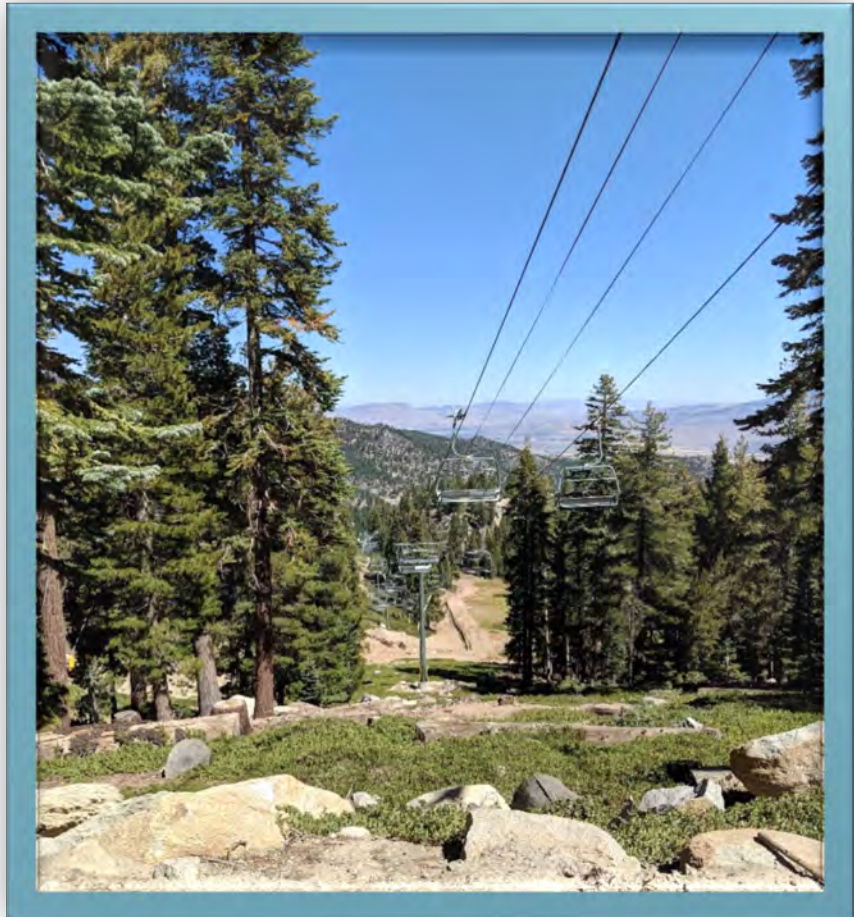
HEAVENLY MOUNTAIN RESORT WATERSHED  
MAINTENANCE AND RESTORATION  
PROGRAM (WMP) 2017 ANNUAL REPORT &  
CONSTRUCTION SEASON SUMMARY (RCI)



April 2019

# Heavenly Mountain Resort

## Watershed Maintenance and Restoration Program 2018 Annual Report & Construction Season Summary



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April 2019

# Heavenly Mountain Resort

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Watershed Maintenance and Restoration Program  
2018 Annual Report & Construction Season Summary

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## Attachments

- Attachment A 2018 Tables
- Attachment B 2018 BMP Effectiveness Monitoring Evaluation Forms

## Acronyms & Abbreviations

BMPs	Best Management Practices
CERP	Construction Erosion Reduction Program
Heavenly	Heavenly Mountain Resort
IERS	Integrated Environmental Restoration Service's IERS
Lahontan	Lahontan Regional Water Quality Control Board
LTBMU	Lake Tahoe Basin Management Unit
MDP	Heavenly Master Development Plan MDP
MMP	Mitigation and Monitoring Plan
RCI	Resource Concepts, Inc.
TRPA	Tahoe Regional Planning Agency
WMP	Watershed Maintenance and Restoration Program
WDR	Waste Discharge Requirements

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## Introduction

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This report provides a summary of activities and monitoring results for the Heavenly Mountain Resort (Heavenly) Watershed Maintenance and Restoration Program (WMRP) for the 2018 construction season. The purpose of the annual report is to address WMRP implementation and monitoring, including elements of the Construction Erosion Reduction Program (CERP), in relation to the following requirements:

- Heavenly's 2015 Waste Discharge Requirements (WDR, Board Order No. R6T-2015-0021, WDID No. 6A090033000).
- The Mitigation and Monitoring Plan (MMP) as updated through the 2015 EIR/EIR/EIS for the Heavenly Master Development Plan (MDP), which incorporates requirements of the USDA Forest Service Lake Tahoe Basin Management Unit (LTBMU), the Tahoe Regional Planning Agency (TRPA), and the Lahontan Regional Water Quality Control Board (Lahontan).

The 2018 annual report has been prepared by Resource Concepts, Inc. (RCI) under contract with Cardno. RCI has conducted monitoring to evaluate the success of Best Management Practices (BMPs) at Heavenly since 2005. Commencing in 2017, RCI replaced Integrated Environmental Restoration Service's (IERS) role in monitoring and reporting for the WMRP when the firm transitioned into retirement (Cardno 2018). Elements of monitoring and reporting, completed separately by RCI and IERS in past years, have been combined in the 2018 annual report.

## Regulatory Overview

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### Evaluation Criteria

The summary of activities and monitoring provided by the annual report addresses the requirements in Section C of the 2015 WDRs:

1. *Track and report the status of mitigation/restoration projects included in the WMRP.*
2. *Complete an annual erosion assessment of the ski area and identify restoration projects to be completed.*
3. *Develop an Annual Worklist with maintenance and restoration projects to be completed during the summer construction season, including mitigation projects required from previous Master Plan commitments and projects identified by BMP monitoring and erosion assessments.*
4. *Implement and report the results of the Construction Erosion Reduction Program, including the review of the temporary and permanent construction BMPs implemented at the Facility (BMP maintenance and effectiveness).*

Rating criteria is provided in the WDRs, Section I.A.D, Table 3 “Heavenly Valley Creek TMDL Targets” for both WMRP implementation and BMP effectiveness scoring or monitoring results. Heavenly must result in a rating of “Good” or better.

#### WMRP Implementation Criteria

<i>Excellent:</i>	<i>All WMRP projects implemented and maintained according to Annual Work List timeline</i>
<i>Good:</i>	<i>All WMRP projects implemented according to Annual Work List; but some project components need reestablishing (for example, reseeding is necessary on some revegetation sites)</i>
<i>Fair:</i>	<i>Only partial implementation of Annual Work List projects has been achieved according to timeline; or Annual Work List projects are one year behind schedule</i>
<i>Poor:</i>	<i>No Annual Work List projects have been implemented, or Annual Work List projects are two years or more behind schedule</i>

#### BMP Effectiveness Scoring Criteria

<i>Excellent:</i>	<i>90% of BMPs implemented correctly and functioning effectively; no evidence of sediment leaving the site and entering the stream channel</i>
<i>Good:</i>	<i>75% to 90% of BMPs implemented correctly and functioning effectively; some evidence of sediment leaving the site, but no sediment reaching the stream channel</i>
<i>Fair:</i>	<i>50% to 75% of BMPs implemented correctly and functioning effectively; some evidence of sediment leaving the site, some sediment reaching the stream channel</i>
<i>Poor:</i>	<i>Less than 50% of BMPs implemented correctly and functioning correctly; evidence of sediment leaving the site, excessive sediment reaching the stream channel</i>

For the purposes of the WMRP Implementation Criteria, “WMRP Projects” and “Annual Work List Projects” are those projects designated as EH-CA or EH-NV on the Annual Work List, whose primary purpose is watershed restoration. Other capital projects (P) or Resort Maintenance Projects (RM or M)



are primarily infrastructure construction and maintenance projects. While these projects utilize construction BMPs (CERP requirements) subject to BMP effectiveness monitoring, the implementation does not satisfy a watershed restoration objective.

## Reporting Period

As explained in previous annual reports, the construction season (typically June through October) is a logical for reporting period for operations at Heavenly. However, it does not correspond directly with the Water Year reporting timeframe indicated in the WDRs.

- The first quarter of the 2018 Water Year (October 1 through December 31, 2017) was reported previously as part of the “Heavenly Mountain Resort Watershed Maintenance and Restoration Program 2017 Annual Report & Construction Season Summary” (RCI, April 2017).
- Evaluations were not conducted during the second quarter of the 2018 Water Year (January 1 through March 31, 2018) because Heavenly was covered with snow.
- Evaluations were started for the construction season on June 22, 2018 at the end of the third quarter of the 2018 Water Year (April 1 through June 30, 2018).
- Evaluations were conducted during the 4th quarter of the 2018 Water Year (July 1 through September 30, 2018) and the 1st quarter of the 2018 Water Year (October 1 through December 31, 2018).

These evaluation periods have been combined into one report to present the logical progression of summer maintenance and construction projects. This report format satisfies the WDR requirement for submittal of an annual report for WMRP and BMP effectiveness monitoring.

## Outcome Based Watershed Management Approach

---

Watershed maintenance and restoration is an on-going long-term commitment throughout the Lake Tahoe Basin with an actively managed program at Heavenly. For the last 10 years, Heavenly has been utilizing an outcome-based management system that both meets compliance standards and assesses actual performance of BMPs. IERS pioneered this outcome-based watershed approach in the *Watershed Management Guidebook* prepared for the California State Water Resources Control Board. This management style acknowledges the complexities of a watershed and allows for collection of useful information to make decisions that result in measurable sediment control. Outcome-based management provides a framework to encourage new ideas and methods that achieve quantifiable results. The *Watershed Management Guidebook* outlines five steps that drive the outcome-based management process being used at Heavenly:

- **AIMING:** articulating goals and objectives, defining success criteria, and identifying known and unknown information.
- **GAINING UNDERSTANDING:** gathering on-the-ground information the site/project and watershed and assessing strategies for a site-specific implementation plan. Monitoring results from past projects are used as the basis for developing treatment strategies for new projects that are most likely to achieve project objectives and success criteria. Often this step includes small-scale development plots to test different treatment approaches.
- **DOING:** the part of the process where the plan is understood, implemented, and documented to support monitoring and continual improvement.
- **ACHIEVING:** directly assessing project performance/effectiveness relative to goals and success criteria and reporting this information annually.
- **IMPROVING:** embracing unexpected project outcomes, sharing project successes and failures with others, making adjustments to projects that did not achieve their intended outcome(s), and integrating lessons learned into future projects.

For example, one of the results of this outcome-based watershed management approach is the shift from “effective soil cover” based heavily on vegetative cover to “erosion resistance.” Erosion resistance combines a wide range of factors including mulch, rock, soil density, infiltration, slope and surface roughness as well as vegetation. The WRMP has helped Heavenly to shift efforts away from watershed restoration projects that require temporary irrigation and repeated reseeding of disturbed areas. By emphasizing soil edaphic factors (the physical, chemical and biologic conditions of the soil), projects have become more successful over time since plant cover is not the only contributor to erosion resistance.

Heavenly’s program continues to be one of the most successful, multi-year examples of adaptive management applied to erosion and sediment control in the Lake Tahoe Basin. The following fundamental goals guiding these efforts (IERS 2016).

### *Treatment Goals*

- *To implement projects that result in no net increase in runoff or sediment transport;*
- *To implement sediment source control treatments that are either self-sustaining OR are accompanied by a plan for ongoing maintenance and management to maintain erosion resistance; and,*

- *To develop and demonstrate an applied adaptive management program for development, management and maintenance activities in upper watersheds.*

### *Monitoring Goals*

- *To quantitatively assess whether projects result in no net increase in runoff or sediment transport;*
- *To identify and quantify indices of long-term ecosystem sustainability to the greatest extent possible;*
- *To use monitoring data to determine the cost-effectiveness of restoration techniques; and,*
- *To use monitoring data to improve effectiveness of future treatments.*

Adaptive management principles have been similarly applied to Heavenly's CERP through BMP effectiveness monitoring. The CERP and *Watershed Management Guidebook* provide guidelines for the temporary and permanent BMPs incorporated into all construction projects at Heavenly. Since 2004, monitoring results and recommendations have been used by Heavenly to improve to structural and non-structural BMPs. Nonstructural practices range from long standing traffic management on summer access roads to new communication technology for allocating resources during the hectic summer construction season. BMP effectiveness monitoring provides a framework within the WRMP to track performance and meet compliance standards.

## Construction Season Overview

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The 2018 construction season began in late June following snowmelt and ended with the storms received in mid-November. Activities at Heavenly focused on resort-wide maintenance and capital projects to improve efficiencies in the snowmaking system and in lift operations. The 2018 work list projects scheduled and completed are included as Table 1 in Attachment A.

With respect to WDR evaluation criteria, 2018 activities at Heavenly received scores of “Excellent” meeting the criteria for both the WMP Implementation (erosion “hot spot” projects were implemented and maintained according to Annual Work List timeline) and BMP Effectiveness (90% of BMPs implemented correctly and functioning effectively; no evidence of sediment leaving the site and entering the stream channel).

### Construction Projects

Heavenly’s construction season work load has grown significantly over the past decade with the addition of summer activities including the alpine coaster, tubing runs, ropes courses, climbing structures, hiking trails and zip lines. Crews routinely maintain infrastructure, install erosion reduction BMPs, and prepare the Top of Gondola (Adventure Peak) area for summer guest access. Heavenly managers utilize a detailed electronic spreadsheet to track and allocate resources (personnel, materials, and equipment). In addition to specific projects highlighted in the Annual Work List, the work load typically includes routine annual inspections of water quality protection measures; summer access road maintenance; lift and snowmaking system maintenance; preparation for summer activities (installation and removal of split rail fence, tubing lanes, ropes course infrastructure, zip lines, gem panning, and interpretive signs); hazard tree removal; tree trimming and brush cutting.

The largest construction projects completed in 2018 were the Galaxy Chair Lift Replacement and the Olympic Snowmaking Line Upgrade.

- The Galaxy Chair Lift Replacement Project included erosion reduction improvements for the existing summer access road down Galaxy Ski Trail, restoration of a 50-foot segment of Daggett Creek for replacement of an existing lift tower, and stabilization of disturbed areas at upper and lower Galaxy Lift terminals. A Stormwater Prevention Pollution Plan (SWPPP) was implemented per the Nevada General Stormwater Construction Permit. The Daggett Creek channel restoration was performed in compliance with the requirements for US Army Corps of Engineers Nation-Wide Permit 42, Section 401 Water quality Certification, and Temporary Working In Waterways. Restoration techniques for included salvage and replacement of existing wetland sod in disturbed areas.
- The Olympic Snowmaking Line included replacement of 3000 feet of 8-inch waterline and the Way Home snowmaking vault. NV Energy completed several power upgrade/maintenance projects on the Nevada side (\$100 Saddle and Galaxy). Heavenly ensured BMPs were in place prior to and during construction. All disturbed areas were stabilized following construction. Disturbed areas were stabilized by Heavenly crews with hydro seeding techniques that will be evaluated for erosion resistance in 2019.

## WMP Projects

Through the WMP process (Drake 2013 and IERS 2016) erosion hot spots are identified and ranked, then treatments are developed based on site conditions. Each hot spot may require a different treatment level ranging from mulch to the “full restoration” with mulch, soil tilling, seeding and compost application. Heavenly has implemented a range of restoration methods over more than a decade of erosion control work; the goal is to continue to explore innovative approaches to increase cost efficiencies and ecologically sound outcomes in watershed management.

Past WMP projects (2015 through 2017) focused on completing treatments for the priority hot spots identified in the 2015 EIR/EIS/EIS for the MDP (Hauge Brueck 2015). Detailed descriptions and mapping of these completed projects are included in the *WMP 2017 Annual Report & Construction Season Summary* (RCI 2018). In 2018, treatments were applied to erosion hot spots identified through 2017 assessments in watershed CA-6 (Bijou Creek) by RCI and through Heavenly’s annual inspection program. Projects included locations Ridge Bowl, Maggie’s, First Ride and World Cup.

Treatments applied at the Ridge Bowl project are featured in a Key Project Summary in the Monitoring Results section of this report. Repairs to the two gullies in the CA-6 watershed, on World Cup and First Ride, were implemented by re-grading section of the ski trails with native soils and using wood chip mulch over the disturbed surfaces to improve erosion resistance. A tilling treatment was conducted on First Run and, due the steep slope, World Cup received an extra thick layer of wood chips. Before and after photos show these 2018 hot spot treatments.

### First Ride



Before: Gully extending across ski slope in erosive soil causing sediment deposition.

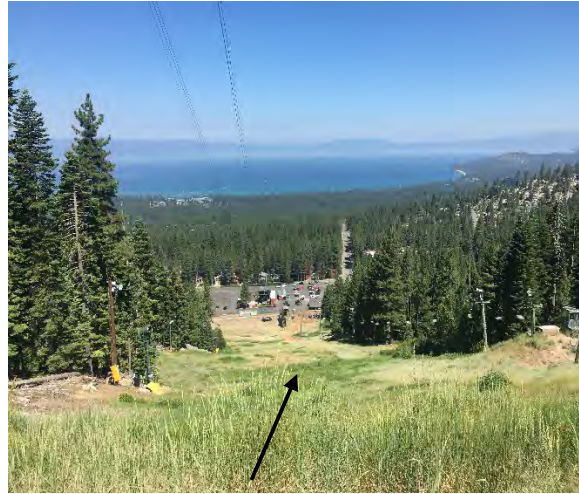


After: Area tilled and mulched to provide erosion resistance and effective cover.

### World Cup



Before: Work in progress on covering gully with mulch on steep ski slope.



After: Repaired gully from above, fully mulched for erosion resistance.

## Monitoring Overview

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Monitoring for the WRMP includes both observations and quantitative scoring methods. Observations capture successful management activities necessary to implement the WMRP through the outcome-based management approach. Quantitative methods include the protocols for scoring treatment outcomes at erosion hot spots developed by IERS (Hauge Brueck 2014 and Hauge Brueck 2015), as well as the protocol used by RCI (Parsons 2006) to score BMP “effectiveness”. The following overview summarizes both treatment and management activities monitored at Heavenly for MMP and WDR reporting.

### Planning

The WRMP starts with planning. The Annual Work List provides a reference for Heavenly and consultants conducting monitoring to track anticipated capital projects, maintenance projects, and WMRP hot spot projects. During the prior year, Heavenly staff provide status updates on project progress and the completion status of each project is noted at the end of the construction season. Table 1 (Attachment A) summarizes projects completed in 2018 based on recommendations made in 2017 and maintenance inspections conducted by Heavenly in 2018.

In addition, targeted watershed assessments for erosion hot spots are conducted each year then ranked to prioritize WRMP hot spot projects using the erosion-focused rapid assessment process (IERS 2016). For Example, assessments conducted for watershed CA-6 (Bijou Creek) in 2017 resulted in the 2018 First Ride and World Cup erosion hotspot projects (see the section Construction Season Overview). In 2018, annual erosion hot spot assessments were coordinated with on-going construction activity for the Galaxy Lift (Nevada watershed) and have been added to recommendation for projects in 2019 shown in Table 6 of Attachment A. A new erosion hot spot observed near the Tram Top Station (watershed CA-6) was also added to the 2019 project recommendations.

### Communication

Training has been consistent in spreading awareness of erosion reduction issues and methods company-wide. In addition to the long standing Facilities and Watershed Awareness Training, AKA the “BMP Breakfast”, held prior to each construction season. Experienced Heavenly crews are proactively identifying and implementing erosion reduction measures throughout the resort. Annually, Tables 2 through 5, Attachment A, are also updated with Heavenly’s solutions for improving permanent and temporary BMPs. Inspectors, design professionals, and Heavenly staff refer to these observations and recommendations as supplemental guidance for applying effective BMPs and implementing the CERP.

### Resources Tracking

Heavenly continued to track materials used for restoration and BMP projects on the Mountain. In 2018, approximately 200 pounds of seed, 160 cubic yards of pine needles, 710 cubic yards of wood chips, 50 tons of riprap, 300 tons of road base and 8 bales of Cori mat coconut fiber (Heavenly 2018). In addition to materials used, staff hours dedicated increased from 4,100 hours in 2017 to 4,800 hours in 2018.

Using the tracking inventory spreadsheet developed in 2017, maintenance and capital projects were tracked and updated throughout the construction season by and for Heavenly staff. The inventory includes useful information such as project tasks and location, schedule, personnel required, estimated hours of labor required, priority ranking, materials anticipated, and actual material imported or utilized. This inventory helped allocate resources and facilitate implementation of erosion reduction measures throughout the season.

## Road Maintenance & Dust Control

As required by the WDR, roads monitoring is conducted in accordance with USFS protocols as required by Heavenly's Road Maintenance Agreement with the LTBMU for system roads. In keeping with the WMRP approach to provide targeted monitoring to address on-the-ground erosion issues, Heavenly is tracking road projects on an annual basis. USFS Road Monitoring is included in Appendix E of the 2018 Environmental Monitoring Program Annual Report submitted on January 15, 2019 to Lahontan, LTBMU and TRPA. As discussed in the January 15 report, 11.6 miles of on-mountain roadway network were improved and/or maintained in 2018. Of this total, 9.4 miles of roads were maintained, and 2.2 miles of roads were improved. Road improvements include road base placement (Orion, NV Trail, Round-about). Additionally, many road shoulders throughout the Mountain were covered with pine needle or wood chip mulch to slow sheet flow leaving road surfaces and discourage vehicle traffic outside of road corridors.

A 2,000-gallon water tanker truck was used for dust abatement on roads, which are the largest potential source of dust on the Mountain. A 2018 innovation by Heavenly was a 4-wheel drive truck which was fitted with two 275 gallon plastic IBC totes and a pump to provide dust control on steeper roadways, specifically developed for dust control at Galaxy and Hellwinkel's. Approximately half of the 30 miles of roads are watered daily; unless rain events provide sufficient moisture. The most effective road BMPs continue to be regularly completed maintenance to repair roads after snowmelt and storm events.

## Treatment Outcomes

Over more than a decade, monitoring programs at Heavenly have been using protocols that quantify erosion reductions and indicators of erosion resistance. Assessment methods are used before implementation of erosion control treatments and after treatments to assess the effectiveness of a project at reducing erosion and establishing erosion resistance. The following 2018 monitoring locations are associated with past completed erosion hot spot projects.

- California Trail Waterbars
- Canyon Express - Lower Terminal
- First Ride
- Groove - Lower Terminal
- Hand Grenade Corner
- Hellwinkel's Road Segment
- Lower Maggie's Corner
- Maggie's Corner to Cal Dam
- Orion's
- Ridge Bowl



- Upper Maggie's Corner
- World Cup

Treatment outcomes were evaluated by visual assessment method using the “BMP Effectiveness” protocol (Parsons 2006). Results were scored and included in the BMP monitoring database (naming consistent with the BMP effectiveness monitoring program may include several hot spots) for reporting. A summary of the scores is provided under Monitoring Results & Conclusions and Attachment B includes the data forms for each evaluation. Attachment A, Tables 2 through 5, document treatments and techniques for achieving WMRP goals.

## Monitoring Results & Conclusions

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Heavenly continued to prioritize reducing erosion and increasing soil resistance for maintenance, construction and restoration projects during the summer of 2018. Results of the monitoring include BMP effectiveness scoring used for each inspection, as well as observation of innovative treatments and treatment outcomes.

According to the rating criteria in the WDR, BMP Effectiveness for 2018 received an overall score of “Excellent” since 90% or more of the BMPs were implemented correctly and functioning effectively; there was no evidence of sediment leaving sites and entering the stream channels. According to the rating criteria in the WDR, WMP projects for 2018 received an overall score of “Excellent” since all WMP projects were implemented and maintained according to the 2018 work list timeline.

### BMP Effectiveness Score

The annual monitoring conducted for projects during the 2018 construction season included active construction monitoring, post-construction monitoring (1-year), follow up visits after maintenance activities and two post-storm monitoring events. A total of 26 Temporary BMP evaluations and 34 Permanent BMP evaluations were performed at 34 different sites. BMP Evaluation Forms are included in Attachment B.

Permanent BMPs monitored were fully implemented at 100% of the sites evaluated, which indicates permanent BMPs were installed in accordance with project specific plans and the CERP throughout the 2018 construction season. In addition, 97% of the sites monitored for permanent BMPs were effective. Scheduled maintenance of existing structures continues to be a priority at Heavenly, which results in high effectiveness scores. Heavenly brings knowledge from over a decade of experience with BMP installation and maintenance methods to positively influence permanent BMPs installed throughout Heavenly projects.

During the construction season, 26 temporary BMP evaluations were performed at active construction sites and 92% of the evaluations identified BMPs that were implemented and effective. One site, the Olympic Snowmaking Line Replacement project, had two minor concerns for implementation and two minor concerns for effectiveness during construction of the project. This was due to improper BMP installation at the beginning of the project and additional BMP maintenance needed following storm events. BMP deficiencies were addressed at this site by Heavenly before the next inspection where the site scored both implemented and effective.

### Treatment Method Highlights

Heavenly continues to explore innovative techniques tailored to the unique environmental conditions. The combined WMP monitoring and BMP effectiveness monitoring helps to support the watershed management efforts by providing insights that Heavenly can incorporate into future projects. Methods that have been employed as a result of the WMP include mulch application on large scales, mulch filter berms, converting water bars to swales, soil-based treatment approaches, and prioritizing projects with

high connectivity to surface waters. Highlights of the promising treatment methods observed in 2018 include the following.

In past years, large-scale mulch applications have been used to effectively increase “erosion resistance” at Heavenly for both “hot spots” and construction projects. However, this treatment has been difficult to implement on steeper ski trails. In 2017, Heavenly crews utilized a hydroseeder for the Hand Grenade Chute restoration project. Monitoring in 2018 found that the vegetation growth was sufficient to provide erosion resistance following spring runoff and seasonal storm events. In 2018, hydroseeding equipment was used again to stabilize the \$100 Saddle Power Upgrade and the Olympic Snowmaking Line Upgrade projects. The effectiveness of this treatment method will continue to be evaluated through monitoring of these project outcomes in 2019.

Water bars are prevalent throughout Heavenly’s network of summer access roads and ski trails and typically are constructed to divert runoff onto adjacent rocky, vegetated, or wooded areas that have greater erosion resistance than road or ski trails surfaces. However, concentrated flows at water bars can cause erosion when outlet areas energy dissipators are not effective. Heavenly continued working on converting some water bars to infiltration swales, which are wider, shallower and have deeply tilled in mulch treatments and are sometimes seeded and given the full restoration treatment. These infiltration swales slow and disperse flows, reducing the erosion potential at their outlets.

## Key Project Summaries

### *Key Project Summary – Hand Grenade Chute/Corner*

Hand Grenade Chute/Corner received a full restoration treatment in 2017; a culvert was also installed to address drainage from multiple locations. The steep ski slope was receiving runoff from upgradient road switchbacks and discharging across the lower switchback of the road. An existing waterbar was directing runoff from the upper switchbacks to the lower road which resulted in continual maintenance issues after storm events. A gully was also forming from the upper switchback and causing additional maintenance issues.

The restoration treatment included placing rock armor on the gully, restoring the water bar above the switch back to function properly, applying the “rip and chip” method to the steep ski slope and installing a new culvert at the road crossing. The restoration treatment included 21 cubic yards of pine needle mulch, 18 cubic yards of wood chips, 22 tons of riprap and 20 pounds of Heavenly seed mix. A row of pine needle wattles was installed at the toe of the slope. The “rip and chip” method involves tilling and loosening the soil to provide depressions for water to collect (“rip”) and mulch application provides organic matter to support microorganism growth in the existing soils (“chip”). A hydroseeder was used to apply mulch and seed to the slope. This was the first project at Heavenly to utilize a hydroseeder (borrowed from Northstar) to apply mulch and seed.

In 2018, the Hand Grenade Corner project was reevaluated. Vegetation growth was robust and healthy with minimal supplemental irrigation. The culvert functioned and passed flows successfully during storm events and spring runoff. The rock lined cutoff ditch at the top switchback collected sediment that may need to be cleaned out in 2019.



Hand Grenade Chute 2017 Before: bare soils, rilling, water bar minimally functioning



Hand Grenade Chute 2017 After: erosion resistance significantly improved on steep slope and toe of slope protection provided by cutoff ditch and pine needle wattle



Hand Grenade Chute After 2017: rock riprap protection on gully with geotextile and covered culvert inlet to pass flows across roadway



Hand Grenade Chute 2018: erosion resistance significantly improved with revegetation

**Key Project Summary – Ridge Bowl**

Ridge Bowl is located in the Heavenly Valley Creek Watershed upstream from the Sky Meadows area. The soils in Ridge Bowl are highly erosive decomposed granite. Past erosion control efforts in the area had degraded and were no longer functional. Remnants of erosion control fabric and several gullies were identified in the area following an inspection in 2017. Heavenly crews regraded spreading basins and check dams. An excavator placed angular riprap (12-inch minus) on outlets of the spreading basins. Evidence of excavator access was raked and covered with existing natural material and old erosion control blankets were removed. A visual assessment will be conducted in 2019 during the spring runoff season to ensure the spreading basins are functioning properly. The site will be evaluated for need of erosion control fabric.





Ridge Bowl Before: bare soils, gully not protected



Ridge Bowl After: gully regraded with riprap  
protection of outlets

## Recommendations

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### Planning & Communication Process

- Continue collaboration efforts between Mountain and Base Operations departments to maximize staff time and resources to complete projects.
- Evaluate projects for pertinent permits (stormwater, working in waterways, fugitive dust, etc.) as soon as possible in the planning process, so that required permit applications do not delay project construction.
- Provide the Annual Work List and maps to Heavenly staff and field crews showing locations of projects with features such as streams, SEZs, roads and lifts.

### Implementation Process

#### *Restoration Treatments*

- Continue exploring equipment like the hydroseeder for large scale restoration projects and evaluate effectiveness after storm events and snowmelt.
- Increase areas of mulch application especially along road shoulders and near SEZs.
- Develop field forms to coincide with the inventory tracking efforts to document site-specific treatments to help understand and improve treatment cost effectiveness.

#### *Construction BMPs*

- Continue to develop project designs and specifications using temporary and permanent BMPs that are the most effective at Heavenly. Refer to Attachment A.
- Continue to require that all staff, new employees and outside vendors attend the annual training on compliance requirements and the internal water quality program.

### Effectiveness & Maintenance Process

- Maintain dedication to experimenting with new erosion and sediment control techniques and technologies. Refer to Attachment A.
- Continue to schedule regular maintenance inspections and coordinate on action items to support BMP effectiveness.
- Continue using the summer trails spreadsheet developed to track and prioritize project tasks, resources and materials, staff and equipment needs.

### Monitoring & Assessment Process

- Review road system drainage needs in conjunction with the roads maintenance program requirements of the USFS.
- Review the status of the USFS National Core BMP Program for selecting, implementing and monitoring water quality BMPs and its potential applicability to the monitoring programs at Heavenly.

- Review the Lake Tahoe TMDL reporting systems for potential applicability to monitoring programs at Heavenly.

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# Attachment A

2018 Tables

**Table 1. 2018 Completed Projects and BMP Installation/Maintenance**

Location	Treatment
<b>California Projects</b>	
Upper Shop (M)	Maintain existing waterbars, ditches and culverts. Reduce mud spot locations.
Groove Chair Base (M/RM)	Improve conveyance from Base of Groove Chair to the base of the Powderbowl basin. Drop inlet not used due existing utilities located in road.
Heavenly Valley Creek Culvert (RM)	Repair existing gate valve.
Ridge Bowl (EH-CA)	Stabilize gully in Ridge Bowl above Canyon Express Lift, remove and replace degraded geotextile fabric, place rock check dams or riprap.
Ridge Run above test plots (EH-CA)	Hotspot #7: Repair, loosen and restore gully above and below summer road near snowmaking vault.
Maggie’s Sediment Basins (EH-CA)	Hot Spot #25: Maintain and clean out sediment build up in Maggie’s road shoulder sediment basins.
Top of Gondola Snowmaking/Electrical Infrastructure (RM)	Upgrade water metering capability in existing snowmaking valve vault known as “Malcolm’s Vault”. Repair and replace existing underground snowmaking line in the Von Schmidt’s area to loop the line to allow for equal water pressure.
World Cup (EH_CA)	Stabilize gully on World Cup Run and protect existing drop inlets.
First Ride (EH-CA)	Stabilize gully on First Ride Run, reestablish waterbar and manage sediment moving towards lift terminal.
<b>Nevada Projects</b>	
Galaxy Chair Lift Replacement (P)	Replace existing Galaxy Lift in its current alignment. Improve specific summer road segments to allow lift construction and ongoing maintenance access. Daggett Creek realignment and stabilization.
Olympic Snowmaking Line Upgrade (P)	Replace 3000’ of 8” water line and Way Home snowmaking vault. Stabilize disturbed areas following construction.
\$100 Saddle and Mott Power Upgrade (RM)	NV Energy upgrades to powerlines and vaults at \$100 Saddle and Mott/S turn area. Access areas stabilized after vault and powerline maintenance.
Big Dipper Run Waterbar Maintenance (M)	On-going maintenance to waterbars, ditches and culverts.

M	BMP Maintenance
P	Master Plan Implementation Project
RM	Resort maintenance Project
EH-CA	Erosion Hotspot Inventory California
EH-NV	Erosion Hotspot Inventory Nevada

**Table 2. Permanent BMP Implementation – Recommendations and Responses**

Year Added	Observations/Recommendations	2018 Responses/Actions
2004/2005	Revegetation specifications need to be updated to present standards in the Lake Tahoe Basin.	Heavenly seed mix was used for the Olympic Snowmaking Line, \$100 Saddle & Mott Power Upgrade, and Galaxy Chair Lift Replacement.
2004/2005	Design of facilities to treat or infiltrate the 20-yr 1-hour event need to be site-specific. Infiltration areas should be flat bottomed, filled with sufficient gravel or drain rock, bordered with rocks (4 to 8" diam.).	Maintenance and reconstruction of infiltration facilities was implemented at the Groove and Powderbowl rock lined ditches.
2004/2005	Trench settlement can be prevented by compaction and mounding.	Backfill for trenching was compacted for the Olympic Snowmaking Line.
2004/2005	Use fiber rolls for long-term slope stabilization as well as temporary erosion control.	Permanent fiber rolls (pine needle coir logs and straw wattles) were installed at the Olympic Snowmaking Line, \$100 Saddle Power Upgrade, and Galaxy Chair Lift Replacement.
2006	Gravel and riprap specifications should include: sizing, gradation, angularity and geotextile installation underneath.	Riprap was used on the Ridge Bowl stabilization project.
2007	Geotextile fabric installation for slope stabilization must address anchor trenches at fabric edges, overlaps, and appropriate anchor intervals for lined channels and steep slopes/	Riprap and geotextile was used in Ridge Bowl to stabilize check dam outlets.
2008	New prescriptions for soil amendments and revegetation need better coordination regarding timing, accessibility, and materials availability.	The tracking spreadsheet developed and updated by the snow surfaces manager continues to help in coordination for revegetation and soil amendment materials.
2009	Water bars should be elongated and installed at an angle to the direction of traffic.	The Galaxy Road Project included installation of elongated and angled water bars.
2009	Road base should be applied in areas with steep slopes, water quality concerns (proximity to SEZ/stream crossings), and high traffic areas where rutting and dust may be a problem.	Road base was applied on the Galaxy Road Project and select switchbacks and high traffic areas throughout the Mountain (see the road maintenance list for details).
2010	Excess fill could be reused on-site to build up road base in depressed areas and improve drainage.	Sediment from collection areas was placed in low areas on roads during maintenance activities.
2011	Riprap installation on steep slopes provides better stabilization than cover with mulch.	Riprap may be needed in some areas for slope stabilization on the Olympic Snowmaking Line and \$100 Saddle Power Upgrade projects.

Year Added	Observations/Recommendations	2018 Responses/Actions
<b>2012</b>	Incorporation of wood chip mulch provides erosion resistance and effective cover.	Wood chip mulch was incorporated at Olympic Snowmaking Line, \$100 Saddle Power Upgrade, and Galaxy Chair Lift Replacement.
<b>2013</b>	Wattles constructed by Heavenly in-house from coir fabric and pine needles on-site provide a cost effective, easily constructible alternative to straw wattles.	Pine needle coir logs were deployed at the active Olympic Snowmaking Line, \$100 Saddle Power Upgrade, and Galaxy Chair Lift Replacement. They were also placed at water bar outlets on Hellwinkel's and Cal Dam to Maggie's Corner.
<b>2014</b>	Removal of sediment from collection areas can be achieved by dry vactoring for extra capacity.	Sediment vactoring of drop inlets was completed at the Boulder Parking Lot, and CA Base Parking Lot.
<b>2015</b>	Testing of new available BMP technology helps determine innovative methods to incorporate into plans.	The hydroseeder was used on the Olympic Snowmaking Line, \$100 Saddle Power Upgrade, and Galaxy Chair Lift Replacement. Hand Grenade Chute hydroseeding in 2017 was successful.
<b>2016</b>	Compost filter socks may be used as an alternative to straw wattles for permanent stabilization in select areas.	Compost filter socks were not implemented again on the Mountain since winter conditions caused them to freeze, become ineffective, and hindered snow cat traffic.
<b>2017</b>	Culvert installation in locations of concentrated flows can help pass runoff under roads rather than across.	Culverts were inspected and maintained on the Mountain; no new culverts were installed.
<b>2018</b>	Mulch and seed applied with a hydroseeder can help establish erosion resistance in steep areas.	A hydroseeder was used on the Olympic Snowmaking Pipeline, Galaxy Chair Lift Replacement and \$100 Saddle Power Upgrade Project.

**Table 3. Permanent BMP Effectiveness – Recommendations and Responses**

Year Added	Observations/Recommendation	2018 Responses/Actions
2004/2005	Soil cover was not typically achieved with straw mulch after the first construction season.	Wood chips were reapplied in high traffic areas, along road shoulders, and larger scale restoration projects like Olympic Snowmaking Line, \$100 Saddle Power Upgrade, and Galaxy Chair Lift Replacement. No straw has been used on the Mountain for more than a decade.
2004/2005	Revegetation develops minor deficiencies after construction requiring on-going correction for several years to provide effective soil cover.	Mulch incorporation/tilling has resulted in higher revegetation success rates so less need for ongoing correction than past years. Erosion resistance rather than effective soil cover was successful on Hand Grenade Corner.
2006	Fabric installed on steep slopes often slides down in small sections, even anchored securely during installation. Geotextile needs continuing maintenance if vegetation is not established.	Geotextile fabric and revegetation has been phased out in favor of riprap or mulching and tilling restoration treatments. In lieu of geotextile, hydromulch was applied on the Olympic Snowmaking Line and \$100 Saddle Power Upgrade.
2007	Projects using wood chip mulch and soil amendments appear to provide longer lasting effective cover, particularly in high traffic areas. Heavenly will continue spot treatments at facility sites where barren areas occur.	New wood chips added annually throughout high traffic areas at Adventure Peak/Gondola Top Station area where most Summer Activities are located. Olympic Snowmaking Line, \$100 Saddle Power Upgrade, and Galaxy Chair Lift Replacement all had wood chips to provide erosion resistance.
2008	Sediment from outside the project area has the potential to impair the long-term effectiveness of SEZ restoration and soil stabilization projects unless follow-up work is performed.	Follow-up work completed this year to address sediment from upgradient areas is especially pertinent at waterbar outlets along roadways at Hellwinkel's, Maggie's, and Galaxy.
2009	Wood borders for infiltration areas and trenches are often caught and pulled out by equipment in the winter, particularly in areas alongside roadways. Rock borders keyed into the soil are a more stable option to prevent movement of gravel.	Wood borders have been replaced with rock borders around all infiltration areas. Rock borders were observed to hold up well from previous years; wood borders are no longer used.
2010	Rock armored channels routing runoff from drip lines to infiltration areas are more effective than drip line trenches. Channel low points must be well defined; otherwise, new channels erode around rocks.	Channels were refurbished throughout the Resort as routine maintenance. Sediment was removed from rock lined ditches near Lower Powderbowl Express and Lower Groove Terminals, Face Patrol, Lower Dipper and Lower Comet, and Middle Stagecoach.
2011	Water bar outlet protection using energy dissipaters and enhanced infiltration is effective.	Maggie's Run and Hellwinkel's water bar outlets were protected with pine needle coir logs and rock check dams.

Year Added	Observations/Recommendation	2018 Responses/Actions
2012	Channels lined with rock or fabric accumulate sediment over time. Sediment should be routinely removed from the channels and used for fill in low areas on roads or removed from the site.	Channels were refurbished throughout the Resort as routine maintenance. Sediment was removed from rock lined ditches near Lower Powderbowl Express and Lower Groove Terminals, Face Patrol, Lower Dipper and Lower Comet, and Middle Stagecoach.
2013	On steep slopes requiring pedestrian access, rock steps provide access without causing erosion.	Rock steps were not installed on projects this year.
2014	Water bar outlets, energy dissipaters and areas to enhance infiltration of road runoff accumulate sediment and need to be cleaned periodically.	Ongoing road maintenance is conducted after storm events on projects with water bar outlets directed to SEZs include Hellwinkel's and Maggie's Run.
2014	New mulch incorporation and revegetation treatment for slope stabilization should be implemented in areas prone to erosion or with erosive soils.	Slope stabilization and restoration of larger ski runs are effective when seeded and mulch is incorporated to a depth of 12 to 18 inches and the surface has been roughened to allow water to infiltrate. Hand Grenade Chute and Orion's are excellent examples of mulch incorporation.
2015	New available BMP technology should continue to be considered (past years: "Filtrexx Compost Filter Socks", "Durawattles" and "Shred Vac" and hydroseeder) and evaluated for effective erosion resistance.	In 2018, a hydroseeder was used to spray tackifier and seed on Olympic Snowmaking Line, \$100 Saddle Power Upgrade, and Galaxy Chair Lift Replacement.
2016	Pine needle filter berms along ski slopes are effective at slowing and infiltrating runoff.	Filter berms installed on ski runs above Sky Meadows in 2015 were still somewhat effective in 2018. No new filter berms were installed in 2018.
2017	Culverts installed where concentrated flows cross roadways help to abate chronic erosion and protect water quality.	Culverts were effective at passing flows at the Upper Shop SEZ and Hand Grenade Chute as observed during post-storm inspections. The culvert at High Roller was also maintained and functioning well.
2018	Hydroseeding can be effective when used on steep slopes or hard to reach areas.	Mulch and seed was applied via hydroseeder on Olympic Snowmaking Line, \$100 Saddle Power Upgrade, and Galaxy Chair Lift Replacement projects. Hand Grenade Corner was successfully stabilized using a hydroseeder in 2017.

**Table 4. Temporary BMP Implementation – Recommendations and Responses**

Year Added	Observations/Recommendation	2018 Responses/Actions
2004/2005	BMPs should not be disassembled prematurely. Specifically, plans did not specify clearly that fiber rolls were to remain after construction.	Sediment fence is always removed before the end of the season. Fiber rolls/coir logs typically remain in place at water bar outlets and parallel to slopes.
2004/2005	Place BMPs prior to construction, to ensure readiness for summer storms or winter closures.	BMPs were in place prior to construction project initiation, including small maintenance projects and stockpiles. Construction projects were Olympic Snowmaking Line, \$100 Saddle Power Upgrade, and Galaxy Chair Lift Replacement.
2004/2005	Clean out/repair BMPs after runoff events.	Repairs to and maintenance of water bars, rock lined channels and sediment basins at Hellwinkel's, from Cal Dam to Maggie's, at Lower Powderbowl/Lower Groove.
2004/2005	Maintain BMPs through project, to ensure readiness for summer storms or winter closures.	Temporary BMPs were in place at the active construction sites for the Olympic Snowmaking Line, \$100 Saddle Power Upgrade, and Galaxy Chair Lift Replacement.
2006	Temporary BMPs may concentrate runoff to a discharge point (sediment fence, fiber rolls, and temporary diversion). Provide energy dissipation and stabilization at the point where the temporary BMPs terminate.	Sediment fence on the Galaxy Chair Lift Replacement was installed downgradient of several stockpiles near the SEZ and was extended to provide sufficient energy dissipation.
2006	If a construction project initially proposed for a single season must be extended over the winter, winterization plans should be added to the design documents.	Construction was completed on projects started in 2018; no winterization plans were required.
2007	Maintenance of sediment fence can be reduced by using proper T-Posts for support and adequate burial of fabric edges. Designs should allow for alternative fencing at sites with substantial rock or limited access.	Sediment fence on the Galaxy Chair Lift Replacement was installed properly and successfully prevented sediment from reaching Daggett Creek.
2007	Dust control for soil stockpiles can be improved. If snowmaking water is unavailable, stockpiles should be covered with plastic sheeting.	Stockpiles closest to Daggett Creek were covered with plastic sheeting to control dust on the Galaxy Chair Lift Replacement.

Year Added	Observations/Recommendation	2018 Responses/Actions
2008	Location of sediment barriers shown on project plans needs to be parallel to slopes or with energy dissipaters along the flow line and at discharge points.	Sediment barriers were shown correctly on plans and implemented properly by experienced field crews at the Olympic Snowmaking Line, \$100 Saddle Power Upgrade, and Galaxy Chair Lift Replacement.
2009	Staging areas should have Temporary BMPs in place before materials stockpiled on-site.	Staging areas had fiber rolls around active construction projects Olympic Snowmaking Line, \$100 Saddle Power Upgrade, and Galaxy Chair Lift Replacement.
2011	Rope fencing for road delineation is typically removed prior to winter. Vehicles and equipment should observe road corridors when fencing is not in place.	Crews were reminded at the BMP Breakfast and throughout the season to observe delineated road corridors.
2012	Communication with outside contractors regarding importance of observing BMPs.	Outside contractors were notified of BMPs during the BMP Breakfast Training. Doppelmayr, the contractor building the new Galaxy Chair Lift, was reminded to observe rope corridor fencing periodically throughout the project.
2013	Coir logs constructed in-house from coir fabric and pine needles can be used in lieu of straw wattles.	Coir logs were used at the Upper Shop SEZ, outlets from Maggie's Corner to Stein's and at active construction sites Construction projects were Olympic Snowmaking Line, \$100 Saddle Power Upgrade, and Galaxy Chair Lift Replacement.
2014	Employee training on BMPs including field installation methods should be conducted for all new employees and as a refresher for continuing employees.	Employee training for key employees includes the annual BMP Breakfast which reviews the Water Quality Program and BMP program. Trail crew employees receive additional field training in the proper installation of BMPs.
2015	Reports completed by field crews can be beneficial in tracking materials used, types of BMPs installed and manpower required to help in project planning.	Tracking documents were maintained Heavenly with quantities of pine needles, wood chips, fiber rolls, water truck loads, BMPs and road base.
2016	Compost filter socks are a good alternative to straw wattles and sediment fence in select areas.	Filtrexx Compost Filter Socks at Hellwinkel's Road left in place were not feasible to utilize again due to freezing in winter conditions.
2017	Stockpiling wood chip or pine needle mulch in several strategic locations (near active construction sites, near observed erosion) provides quick access for field crews to spread mulch for erosion resistance.	Wood chips and pine needles were stockpiled at the Olympic Snowmaking Line, \$100 Saddle Power Upgrade, and Galaxy Chair Lift Replacement along with areas along roadways.
2018	Alternative dust control methods may be necessary on steep roadways.	A 4WD truck rigged with 2-275 gallon water filled IBC totes and a pump provided dust control for the Galaxy Road Project and on Hellwinkel's.



**Table 5. Temporary BMP Effectiveness – Recommendations and Responses**

Year Added	Observations/Recommendation	2018 Responses/Actions
2004/2005	Disturbance outside construction limits should be controlled by delineating access areas with rope fencing.	Construction projects with rope fencing were the Olympic Snowmaking Line and Galaxy Chair Lift Replacement. Roadways were also lined with rope fencing.
2006	Exposed soils with potential for sediment delivery to SEZ should be managed with sediment barriers.	Pine needle wattles and rock check dams were replaced as needed at water bar outlets on Hellwinkel’s and Maggie’s Run to prevent sediment delivery to SEZ.
2007	Dust control for stockpiles is more effective when snowmaking water can wet down soils. Plastic sheeting is less effective and difficult to keep anchored in windy conditions.	Soil stockpiles in close proximity to SEZs were covered with plastic sheeting for the Galaxy Chair Lift Replacement project. Plastic sheeting was anchored properly so it did not blow away.
2008	Sediment fence is effective in containing excavated stockpiled soils. If stockpiles are larger than initially anticipated, the fence must be extended.	Soil stockpiles in close proximity to SEZs were covered with plastic sheeting for the Galaxy Chair Lift Replacement project.
2010	Despite proper installation, buried sediment fence edges can still be pulled out by wind requiring consistent maintenance.	Pine needle coir logs manufactured by Heavenly continue to be used as an alternative to sediment fence which reduces maintenance needs.
2011	Fiber rolls are most effective when keyed into the native soil and anchored securely.	Fiber rolls and coir logs in construction areas were keyed in and staked per the plans. Compost filter socks are heavy enough to not require staking or anchoring.
2012	Communication to all outside contractors and subcontractors to convey importance of observing and maintaining temporary BMPs around an active construction site.	Outside contractors were required to attend the BMP Breakfast to learn about BMPs and non-Heavenly staff working on the Alpine Coaster were aware of the construction corridor and wattles.
2013	Coir logs constructed by Heavenly in-house from coir fabric and pine needles appear to be an effective alternative to typical straw wattles.	Pine needle coir logs were installed at water bar outlets on Hellwinkel’s and Maggie’s Run, Hand Grenade Chute, and at road base stockpiles.
2014	Pine needle coir logs constructed by Heavenly in-house can be used in erosion prone areas but usually need to be replaced annually.	Pine needle coir logs were installed in areas throughout the Mountain and maintained annually at locations such as the Upper Maintenance Shop SEZ.

Year Added	Observations/Recommendation	2018 Responses/Actions
<b>2015</b>	Reports from field crew supervisors can help determine effective BMPs based on material availability, manpower required and type of BMP most often utilized.	A project inventory list was developed with materials, staff hours, and priority by task which was extremely helpful for tracking project completion status and budgeting.
<b>2016</b>	Compost filter socks provide a good alternative to straw wattles which decompose rapidly and sediment fence which requires near constant maintenance.	Compost filter socks were installed at the Hellwinkel's Road Project and acted as an alternative sediment barrier requiring less maintenance and left in place after construction; however, they are not feasible to be left in place
<b>2017</b>	Stockpiling wood chip or pine needle mulch in strategic locations (near active construction sites, near observed erosion) allows crews to quickly access and spread mulch for erosion resistance.	Wood chips and pine needles were stockpiled for the active construction projects Galaxy Chair Lift Replacement, \$100 Saddle Power Upgrade, and the Olympic Snowmaking Line Upgrade.
<b>2018</b>	Alternative dust control methods may be more effective to reduce fugitive dust on steep roadways.	A 4WD truck rigged with 2-275 gallon water filled IBC totes and a pump successfully provided dust control for the Galaxy Road Project and on Hellwinkel's.

**Table 6. 2019 Annual Work List Projects & Related BMPs**

Location	Treatment
<b>Priority Projects in California</b>	
Upper Shop	Maintain existing waterbars, ditches and culverts. Reduce mud in shop yard.
Groove Chair Base	Maintain rocklined ditches at Base of Groove Chair to basin at Base of Powderbowl.
Maggie’s Sediment Basins	Maintain and clean out sediment build up in Maggie’s road shoulder sediment basins.
Hellwinkel’s Sediment Basins	Maintain and clean out sediment build up in Hellwinkel’s road shoulder sediment basins.
Cal Dam Snowmaking Pond	Remove sediment and placement at low point/former location of wind fence at Liz’s/Ridge Run.
Top of Gondola	Complete drainage improvements to manage snowmelt runoff including swales, shallow basins, and piping.
Crossover Waterline Replacement	Replacement of 3000 feet of 6-inch waterline on Crossover in existing roadway.
Top of Tram	Stabilize gully on slope between Tram Top Station and Lakeview Lodge.
American Tower Company Cell Tower & Fiber Optic Line Replacement	Third party project to install several monopine towers, small buildings at lodges and at the top of the Gondola.
<b>Priority Projects in Nevada</b>	
Boulder Parking Lot	Continue phased approach to repair pavement in coordination with Base Ops.
Galaxy Road	Maintain and clean out sediment build up in Galaxy road shoulder sediment basins. Close out SWPPP.
East Peak Dam Liner Replacement	Drain East Peak Reservoir and replace existing liner.
Big Dipper Run Waterbar Maintenance	Maintenance to waterbars, ditches and culverts and existing snowmaking hydrants. Replace outdated “can hydrants” with standard hydrants on skiers left of run.

# Attachment B

2018 BMP Effectiveness Monitoring Evaluation Forms

**Form HV1: Temporary BMPs for On-going Construction**

UTM Zone	11	Construction Site Name	Galaxy Chair Lift Replacement		Survey Date	6/22/2018	ID#	668	
Easting	249800	Reviewer Name(s)	K. Kvasnicka, J. Azevedo		Selection Code	S03			
Northing	4314757	Construction Type	Lift	Other (Describe)	Forest	Toiyabe	District	State NV	
Construction Foreman	Doppelmayr	Date of Project Start	6/18/2018		Township	13N	Range	19E	Section 31
Project Type	New Construction	Watershed	NV-2+5						
Plan Title	Galaxy Chair Lift Replacement		Date	06/19/2018	Rev Date	07/02/2018		Job No.	18-148.1
Specific concerns associated with project and BMP measures designed to achieve resource protection									
Protection of Daggett Creek and Galaxy Wetland during road upgrade and new chair lift installation									

<b>Implementation</b>	1	1) Were BMPs designed to maintain resource protection and meet water quality standards? 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs	<b>Implementation Score:</b>	I
	1	2) Are BMP measures constructed according to contract design specifications/plans? 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow design specifications		

<b>Effectiveness</b>		<b>Effectiveness Score:</b>	E
<b>1) Source Control BMPs</b>			
a) Are soil protection measures providing effective cover and erosion resistance?	<input checked="" type="radio"/> Meets/Exceeds <input type="radio"/> Minor Concern <input type="radio"/> Major Concern <input type="radio"/> NA		
b) Are cut and fill slopes protected from surface erosion and slope failure potential?	<input checked="" type="radio"/> Meets/Exceeds <input type="radio"/> Minor Concern <input type="radio"/> Major Concern <input type="radio"/> NA		
<b>2) Runoff Infiltration and Drainage Control System Effectiveness</b>			
a) Are erosion control measures applied limiting erosion processes and sediment delivery to SEZ?	<input checked="" type="radio"/> Meets/Exceeds <input type="radio"/> Minor Concern <input type="radio"/> Major Concern <input type="radio"/> NA		
b) Are constructed detention ponds stable and is site free from unexpected ponding of runoff?	<input checked="" type="radio"/> Meets/Exceeds <input type="radio"/> Minor Concern <input type="radio"/> Major Concern <input type="radio"/> NA		
c) Are natural or constructed infiltration zones effectively collecting and treating runoff?	<input checked="" type="radio"/> Meets/Exceeds <input type="radio"/> Minor Concern <input type="radio"/> Major Concern <input type="radio"/> NA		
<b>3) Designation of Construction Zone and Equipment Exclusion Zones</b>			
a) Are sensitive areas and construction zones adequately delineated?	<input checked="" type="radio"/> Meets/Exceeds <input type="radio"/> Minor Concern <input type="radio"/> Major Concern <input type="radio"/> NA		
<b>4) Effectiveness of Hazardous Substance Control Measures</b>			
a) Are BMPs for hazardous/toxic substances controlling chemical delivery to soils/water?	<input checked="" type="radio"/> Meets/Exceeds <input type="radio"/> Minor Concern <input type="radio"/> Major Concern <input type="radio"/> NA		

Additional Comments	Staging areas and tower excavations protected with fencing, concrete washout located near top station, top station and bottom station construction areas delineated with fencing, suggest coir logs at low point at bottom station. SWPPP on-site, Discussed creek diversion BMPs with crew.
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**Form HV1: Temporary BMPs for On-going Construction**

UTM Zone  ID#

Easting  Construction Site Name  Survey Date  Selection Code

Northing  Reviewer Name(s)  Forest  District  State

Construction Type  Other (Describe)  Township  Range  Section

Construction Foreman  Date of Project Start  Watershed

Project Type  Other (Describe)

Plan Title  Date  Rev Date  Job No.

Specific concerns associated with project and BMP measures designed to achieve resource protection

Protection of Daggett Creek and Galaxy Wetland during road upgrade and new chair lift installation

**Implementation**  1) Were BMPs designed to maintain resource protection and meet water quality standards?  
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs **Implementation Score:**

2) Are BMP measures constructed according to contract design specifications/plans?  
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow design specifications

**Effectiveness** **Effectiveness Score:**

**1) Source Control BMPs**

a) Are soil protection measures providing effective cover and erosion resistance?  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Are cut and fill slopes protected from surface erosion and slope failure potential?  Meets/Exceeds  Minor Concern  Major Concern  NA

**2) Runoff Infiltration and Drainage Control System Effectiveness**

a) Are erosion control measures applied limiting erosion processes and sediment delivery to SEZ?  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Are constructed detention ponds stable and is site free from unexpected ponding of runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA

c) Are natural or constructed infiltration zones effectively collecting and treating runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA

**3) Designation of Construction Zone and Equipment Exclusion Zones**

a) Are sensitive areas and construction zones adequately delineated?  Meets/Exceeds  Minor Concern  Major Concern  NA

**4) Effectiveness of Hazardous Substance Control Measures**

a) Are BMPs for hazardous/toxic substances controlling chemical delivery to soils/water?  Meets/Exceeds  Minor Concern  Major Concern  NA

Additional Comments

**Form HV1: Temporary BMPs for On-going Construction**

UTM Zone  ID#   
 Easting  Construction Site Name  Survey Date  Selection Code   
 Northing  Reviewer Name(s)  Forest  District  State   
 Construction Type  Other (Describe)  Township  Range  Section   
 Construction Foreman  Date of Project Start  Watershed   
 Project Type  Other (Describe)   
 Plan Title  Date  Rev Date  Job No.

Specific concerns associated with project and BMP measures designed to achieve resource protection

**Implementation**  1) Were BMPs designed to maintain resource protection and meet water quality standards?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs **Implementation Score:**   
 2) Are BMP measures constructed according to contract design specifications/plans?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow design specifications

**Effectiveness** **Effectiveness Score:**

**1) Source Control BMPs**

a) Are soil protection measures providing effective cover and erosion resistance?  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Are cut and fill slopes protected from surface erosion and slope failure potential?  Meets/Exceeds  Minor Concern  Major Concern  NA

**2) Runoff Infiltration and Drainage Control System Effectiveness**

a) Are erosion control measures applied limiting erosion processes and sediment delivery to SEZ?  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Are constructed detention ponds stable and is site free from unexpected ponding of runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA

c) Are natural or constructed infiltration zones effectively collecting and treating runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA

**3) Designation of Construction Zone and Equipment Exclusion Zones**

a) Are sensitive areas and construction zones adequately delineated?  Meets/Exceeds  Minor Concern  Major Concern  NA

**4) Effectiveness of Hazardous Substance Control Measures**

a) Are BMPs for hazardous/toxic substances controlling chemical delivery to soils/water?  Meets/Exceeds  Minor Concern  Major Concern  NA

Additional Comments

**Form HV1: Temporary BMPs for On-going Construction**

UTM Zone  ID#

Easting  Construction Site Name  Survey Date  Selection Code

Northing  Reviewer Name(s)  Forest  District  State

Construction Type  Other (Describe)  Township  Range  Section

Construction Foreman  Date of Project Start  Watershed

Project Type  Other (Describe)

Plan Title  Date  Rev Date  Job No.

Specific concerns associated with project and BMP measures designed to achieve resource protection

Protection of Daggett Creek and Galaxy Wetland during road upgrade and new chair lift installation

**Implementation**  1) Were BMPs designed to maintain resource protection and meet water quality standards?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs **Implementation Score:**

2) Are BMP measures constructed according to contract design specifications/plans?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow design specifications

**Effectiveness** **Effectiveness Score:**

**1) Source Control BMPs**

a) Are soil protection measures providing effective cover and erosion resistance?  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Are cut and fill slopes protected from surface erosion and slope failure potential?  Meets/Exceeds  Minor Concern  Major Concern  NA

**2) Runoff Infiltration and Drainage Control System Effectiveness**

a) Are erosion control measures applied limiting erosion processes and sediment delivery to SEZ?  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Are constructed detention ponds stable and is site free from unexpected ponding of runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA

c) Are natural or constructed infiltration zones effectively collecting and treating runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA

**3) Designation of Construction Zone and Equipment Exclusion Zones**

a) Are sensitive areas and construction zones adequately delineated?  Meets/Exceeds  Minor Concern  Major Concern  NA

**4) Effectiveness of Hazardous Substance Control Measures**

a) Are BMPs for hazardous/toxic substances controlling chemical delivery to soils/water?  Meets/Exceeds  Minor Concern  Major Concern  NA

Additional Comments



**Form HV1: Temporary BMPs for On-going Construction**

UTM Zone  ID#   
 Easting  Construction Site Name  Survey Date  Selection Code   
 Northing  Reviewer Name(s)  Forest  District  State   
 Construction Type  Other (Describe)  Township  Range  Section   
 Construction Foreman  Date of Project Start  Watershed   
 Project Type  Other (Describe)   
 Plan Title  Date  Rev Date  Job No.

Specific concerns associated with project and BMP measures designed to achieve resource protection

**Implementation**  1) Were BMPs designed to maintain resource protection and meet water quality standards?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs **Implementation Score:**   
 2) Are BMP measures constructed according to contract design specifications/plans?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow design specifications

**Effectiveness** **Effectiveness Score:**

**1) Source Control BMPs**

a) Are soil protection measures providing effective cover and erosion resistance?  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Are cut and fill slopes protected from surface erosion and slope failure potential?  Meets/Exceeds  Minor Concern  Major Concern  NA

**2) Runoff Infiltration and Drainage Control System Effectiveness**

a) Are erosion control measures applied limiting erosion processes and sediment delivery to SEZ?  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Are constructed detention ponds stable and is site free from unexpected ponding of runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA

c) Are natural or constructed infiltration zones effectively collecting and treating runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA

**3) Designation of Construction Zone and Equipment Exclusion Zones**

a) Are sensitive areas and construction zones adequately delineated?  Meets/Exceeds  Minor Concern  Major Concern  NA

**4) Effectiveness of Hazardous Substance Control Measures**

a) Are BMPs for hazardous/toxic substances controlling chemical delivery to soils/water?  Meets/Exceeds  Minor Concern  Major Concern  NA

Additional Comments

**Form HV1: Temporary BMPs for On-going Construction**

UTM Zone  ID#   
 Easting  Construction Site Name  Survey Date  Selection Code   
 Northing  Reviewer Name(s)  Forest  District  State   
 Construction Type  Other (Describe)  Township  Range  Section   
 Construction Foreman  Date of Project Start  Watershed   
 Project Type  Other (Describe)   
 Plan Title  Date  Rev Date  Job No.

Specific concerns associated with project and BMP measures designed to achieve resource protection

**Implementation**  1) Were BMPs designed to maintain resource protection and meet water quality standards?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs **Implementation Score:**   
 2) Are BMP measures constructed according to contract design specifications/plans?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow design specifications

**Effectiveness** **Effectiveness Score:**

**1) Source Control BMPs**

a) Are soil protection measures providing effective cover and erosion resistance?  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Are cut and fill slopes protected from surface erosion and slope failure potential?  Meets/Exceeds  Minor Concern  Major Concern  NA

**2) Runoff Infiltration and Drainage Control System Effectiveness**

a) Are erosion control measures applied limiting erosion processes and sediment delivery to SEZ?  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Are constructed detention ponds stable and is site free from unexpected ponding of runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA

c) Are natural or constructed infiltration zones effectively collecting and treating runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA

**3) Designation of Construction Zone and Equipment Exclusion Zones**

a) Are sensitive areas and construction zones adequately delineated?  Meets/Exceeds  Minor Concern  Major Concern  NA

**4) Effectiveness of Hazardous Substance Control Measures**

a) Are BMPs for hazardous/toxic substances controlling chemical delivery to soils/water?  Meets/Exceeds  Minor Concern  Major Concern  NA

Additional Comments

**Form HV1: Temporary BMPs for On-going Construction**

UTM Zone: 11 ID#: 674  
 Easting: 249800 Construction Site Name: Galaxy Chair Lift Replacement Survey Date: 8/9/2018 Selection Code: S03  
 Northing: 4314757 Reviewer Name(s): K. Kvasnicka, J. Azevedo  
 Forest: Toiyabe District: State: NV  
 Construction Type: Lift Other (Describe):  
 Township: 13N Range: 19E Section: 31  
 Construction Foreman: Doppelmayr Date of Project Start: 6/1/2018  
 Watershed: NV-2+5  
 Project Type: New Construction Other (Describe):  
 Plan Title: Galaxy Chair Lift Replacement Date: 06/19/2018 Rev Date: 07/02/2018 Job No.: 18-148.1

Specific concerns associated with project and BMP measures designed to achieve resource protection  
 Protection of Daggett Creek and Galaxy Wetland during road upgrade and new chair lift installation

**Implementation**  1) Were BMPs designed to maintain resource protection and meet water quality standards?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs **Implementation Score:**   
 2) Are BMP measures constructed according to contract design specifications/plans?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow design specifications

**Effectiveness** **Effectiveness Score:**

**1) Source Control BMPs**

a) Are soil protection measures providing effective cover and erosion resistance?  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Are cut and fill slopes protected from surface erosion and slope failure potential?  Meets/Exceeds  Minor Concern  Major Concern  NA

**2) Runoff Infiltration and Drainage Control System Effectiveness**

a) Are erosion control measures applied limiting erosion processes and sediment delivery to SEZ?  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Are constructed detention ponds stable and is site free from unexpected ponding of runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA

c) Are natural or constructed infiltration zones effectively collecting and treating runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA

**3) Designation of Construction Zone and Equipment Exclusion Zones**

a) Are sensitive areas and construction zones adequately delineated?  Meets/Exceeds  Minor Concern  Major Concern  NA

**4) Effectiveness of Hazardous Substance Control Measures**

a) Are BMPs for hazardous/toxic substances controlling chemical delivery to soils/water?  Meets/Exceeds  Minor Concern  Major Concern  NA

Additional Comments: Concrete complete at top and bottom terminals, BMPs still in place, Daggett Creek sufficiently protected with coir logs and sediment fence.

**Form HV1: Temporary BMPs for On-going Construction**

UTM Zone	11	ID#	675
Easting	249800	Construction Site Name	Galaxy Chair Lift Replacement
Survey Date	8/21/2018	Selection Code	S03
Northing	4314757	Reviewer Name(s)	K. Kvasnicka, J. Azevedo
Construction Type	Lift	Forest	Toiyabe
Other (Describe)		District	
Construction Foreman	Doppelmayr	State	NV
Date of Project Start	6/1/2018	Township	13N
Project Type	New Construction	Range	19E
Other (Describe)		Section	31
Plan Title	Galaxy Chair Lift Replacement	Watershed	NV-2+5
Date	06/19/2018	Rev Date	07/02/2018
Job No.	18-148.1		

Specific concerns associated with project and BMP measures designed to achieve resource protection  
 Protection of Daggett Creek and Galaxy Wetland during road upgrade and new chair lift installation

<b>Implementation</b>	1	1) Were BMPs designed to maintain resource protection and meet water quality standards? 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs	<b>Implementation Score:</b>	I
	1	2) Are BMP measures constructed according to contract design specifications/plans? 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow design specifications		

<b>Effectiveness</b>	<b>Effectiveness Score:</b>	E
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**1) Source Control BMPs**

a) Are soil protection measures providing effective cover and erosion resistance?  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Are cut and fill slopes protected from surface erosion and slope failure potential?  Meets/Exceeds  Minor Concern  Major Concern  NA

**2) Runoff Infiltration and Drainage Control System Effectiveness**

a) Are erosion control measures applied limiting erosion processes and sediment delivery to SEZ?  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Are constructed detention ponds stable and is site free from unexpected ponding of runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA

c) Are natural or constructed infiltration zones effectively collecting and treating runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA

**3) Designation of Construction Zone and Equipment Exclusion Zones**

a) Are sensitive areas and construction zones adequately delineated?  Meets/Exceeds  Minor Concern  Major Concern  NA

**4) Effectiveness of Hazardous Substance Control Measures**

a) Are BMPs for hazardous/toxic substances controlling chemical delivery to soils/water?  Meets/Exceeds  Minor Concern  Major Concern  NA

Additional Comments: Preparation for stream diversion complete: area delineated with construction fencing, vegetation cut, diversion piping in place and wattles alongside work area.

**Form HV1: Temporary BMPs for On-going Construction**

UTM Zone: 11 ID#: 676  
 Easting: 249800 Construction Site Name: Galaxy Chair Lift Replacement Survey Date: 9/19/2018 Selection Code: S03  
 Northing: 4314757 Reviewer Name(s): K. Kvasnicka Forest: Toiyabe District: State: NV  
 Construction Type: Lift Other (Describe): Township: 13N Range: 19E Section: 31  
 Construction Foreman: Doppelmayr Date of Project Start: 6/1/2018 Watershed: NV-2+5  
 Project Type: New Construction Other (Describe):  
 Plan Title: Galaxy Chair Lift Replacement Date: 06/19/2018 Rev Date: 07/02/2018 Job No.: 18-148.1

Specific concerns associated with project and BMP measures designed to achieve resource protection  
 Protection of Daggett Creek and Galaxy Wetland during road upgrade and new chair lift installation

**Implementation**  1) Were BMPs designed to maintain resource protection and meet water quality standards?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs **Implementation Score:**   
 2) Are BMP measures constructed according to contract design specifications/plans?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow design specifications

**Effectiveness** **Effectiveness Score:**

**1) Source Control BMPs**

a) Are soil protection measures providing effective cover and erosion resistance?  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Are cut and fill slopes protected from surface erosion and slope failure potential?  Meets/Exceeds  Minor Concern  Major Concern  NA

**2) Runoff Infiltration and Drainage Control System Effectiveness**

a) Are erosion control measures applied limiting erosion processes and sediment delivery to SEZ?  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Are constructed detention ponds stable and is site free from unexpected ponding of runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA

c) Are natural or constructed infiltration zones effectively collecting and treating runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA

**3) Designation of Construction Zone and Equipment Exclusion Zones**

a) Are sensitive areas and construction zones adequately delineated?  Meets/Exceeds  Minor Concern  Major Concern  NA

**4) Effectiveness of Hazardous Substance Control Measures**

a) Are BMPs for hazardous/toxic substances controlling chemical delivery to soils/water?  Meets/Exceeds  Minor Concern  Major Concern  NA

Additional Comments: Stream diversion complete and Tower 7 footing complete. Appears to be very successful: stream fully contained in new channel, no evidence of sediment in creek from tower work. Any evidence of equipment access removed with full mulch application between road and tower. Excellent resource protection.

**Form HV1: Temporary BMPs for On-going Construction**

UTM Zone: 11 ID#: 677  
 Easting: 249800 Construction Site Name: Galaxy Chair Lift Replacement Survey Date: 10/10/2018 Selection Code: S03  
 Northing: 4314757 Reviewer Name(s): K. Kvasnicka Forest: Toiyabe District: State: NV  
 Construction Type: Lift Other (Describe): Township: 13N Range: 19E Section: 31  
 Construction Foreman: Doppelmayr Date of Project Start: 6/1/2018 Watershed: NV-2+5  
 Project Type: New Construction Other (Describe):  
 Plan Title: Galaxy Chair Lift Replacement Date: 06/19/2018 Rev Date: 07/02/2018 Job No.: 18-148.1

Specific concerns associated with project and BMP measures designed to achieve resource protection  
 Protection of Daggett Creek and Galaxy Wetland during road upgrade and new chair lift installation

**Implementation**  1) Were BMPs designed to maintain resource protection and meet water quality standards?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs **Implementation Score:**   
 2) Are BMP measures constructed according to contract design specifications/plans?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow design specifications

**Effectiveness** **Effectiveness Score:**

- 1) Source Control BMPs**
- a) Are soil protection measures providing effective cover and erosion resistance?  Meets/Exceeds  Minor Concern  Major Concern  NA
- b) Are cut and fill slopes protected from surface erosion and slope failure potential?  Meets/Exceeds  Minor Concern  Major Concern  NA
- 2) Runoff Infiltration and Drainage Control System Effectiveness**
- a) Are erosion control measures applied limiting erosion processes and sediment delivery to SEZ?  Meets/Exceeds  Minor Concern  Major Concern  NA
- b) Are constructed detention ponds stable and is site free from unexpected ponding of runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA
- c) Are natural or constructed infiltration zones effectively collecting and treating runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA
- 3) Designation of Construction Zone and Equipment Exclusion Zones**
- a) Are sensitive areas and construction zones adequately delineated?  Meets/Exceeds  Minor Concern  Major Concern  NA
- 4) Effectiveness of Hazardous Substance Control Measures**
- a) Are BMPs for hazardous/toxic substances controlling chemical delivery to soils/water?  Meets/Exceeds  Minor Concern  Major Concern  NA

Additional Comments: Post storm event monitoring (0.67"). Excavation work complete on project, above ground work remaining. Crews still observing construction equipment corridor. Slash added to revegetated/mulched areas near Tower 7, stream restoration project appears very successful (will be evaluated after 2019 winter season).

**Form HV1: Temporary BMPs for On-going Construction**

UTM Zone  ID#   
 Easting  Construction Site Name  Survey Date  Selection Code   
 Northing  Reviewer Name(s)  Forest  District  State   
 Construction Type  Other (Describe)  Township  Range  Section   
 Construction Foreman  Date of Project Start  Watershed   
 Project Type  Other (Describe)   
 Plan Title  Date  Rev Date  Job No.

Specific concerns associated with project and BMP measures designed to achieve resource protection

**Implementation**  1) Were BMPs designed to maintain resource protection and meet water quality standards?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs **Implementation Score:**   
 2) Are BMP measures constructed according to contract design specifications/plans?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow design specifications

**Effectiveness** **Effectiveness Score:**

**1) Source Control BMPs**

a) Are soil protection measures providing effective cover and erosion resistance?  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Are cut and fill slopes protected from surface erosion and slope failure potential?  Meets/Exceeds  Minor Concern  Major Concern  NA

**2) Runoff Infiltration and Drainage Control System Effectiveness**

a) Are erosion control measures applied limiting erosion processes and sediment delivery to SEZ?  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Are constructed detention ponds stable and is site free from unexpected ponding of runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA

c) Are natural or constructed infiltration zones effectively collecting and treating runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA

**3) Designation of Construction Zone and Equipment Exclusion Zones**

a) Are sensitive areas and construction zones adequately delineated?  Meets/Exceeds  Minor Concern  Major Concern  NA

**4) Effectiveness of Hazardous Substance Control Measures**

a) Are BMPs for hazardous/toxic substances controlling chemical delivery to soils/water?  Meets/Exceeds  Minor Concern  Major Concern  NA

Additional Comments

**Form HV1: Temporary BMPs for On-going Construction**

UTM Zone	11	ID#	679
Easting	249800	Construction Site Name	Galaxy Chair Lift Replacement
Survey Date	11/6/2018	Selection Code	S03
Northing	4314757	Reviewer Name(s)	K. Kvasnicka, C. Kuhn, J. Azevedo
Construction Type	Lift	Forest	Toiyabe
Other (Describe)		District	
Construction Foreman	Doppelmayr	State	NV
Date of Project Start	6/1/2018	Township	13N
Project Type	New Construction	Range	19E
Other (Describe)		Section	31
Plan Title	Galaxy Chair Lift Replacement	Watershed	NV-2+5
Date	06/19/2018	Rev Date	07/02/2018
Job No.	18-148.1		

Specific concerns associated with project and BMP measures designed to achieve resource protection  
 Protection of Daggett Creek and Galaxy Wetland during road upgrade and new chair lift installation

<b>Implementation</b>	<input type="checkbox"/> 1	1) Were BMPs designed to maintain resource protection and meet water quality standards? 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs	<b>Implementation Score:</b>	<input type="checkbox"/> I
	<input type="checkbox"/> 1	2) Are BMP measures constructed according to contract design specifications/plans? 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow design specifications		

<b>Effectiveness</b>	<b>Effectiveness Score:</b>	<input type="checkbox"/> E
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**1) Source Control BMPs**

a) Are soil protection measures providing effective cover and erosion resistance?  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Are cut and fill slopes protected from surface erosion and slope failure potential?  Meets/Exceeds  Minor Concern  Major Concern  NA

**2) Runoff Infiltration and Drainage Control System Effectiveness**

a) Are erosion control measures applied limiting erosion processes and sediment delivery to SEZ?  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Are constructed detention ponds stable and is site free from unexpected ponding of runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA

c) Are natural or constructed infiltration zones effectively collecting and treating runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA

**3) Designation of Construction Zone and Equipment Exclusion Zones**

a) Are sensitive areas and construction zones adequately delineated?  Meets/Exceeds  Minor Concern  Major Concern  NA

**4) Effectiveness of Hazardous Substance Control Measures**

a) Are BMPs for hazardous/toxic substances controlling chemical delivery to soils/water?  Meets/Exceeds  Minor Concern  Major Concern  NA

Additional Comments: Temporary BMPs (sediment fence, equipment exclusion fencing) being removed for winter. No evidence of sediment movement or erosion as a result of the lift construction project. Disturbed areas have been stabilized; will be evaluated in 2019.



**Form HV1: Temporary BMPs for On-going Construction**

UTM Zone 11 ID# 680  
 Easting 247850 Construction Site Name Adventure Peak Trails Survey Date 10/22/2018 Selection Code S03  
 Northing 4313936 Reviewer Name(s) K. Kvasnicka Forest LTMBU District State CA  
 Construction Type Trails Other (Describe) Township 12N Range 18E Section 1  
 Construction Foreman Bill Brown Date of Project Start 7/1/2011 Watershed CA-1  
 Project Type New Construction Other (Describe)  
 Plan Title Date Rev Date Job No.

Specific concerns associated with project and BMP measures designed to achieve resource protection  
 Temp BMPs to address erosion control, including: boundary fence, tree protection fencing, restricted access, water truck for dust control, covered/watered stockpiles, sediment barriers.

**Implementation**  1) Were BMPs designed to maintain resource protection and meet water quality standards?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs **Implementation Score:**   
 2) Are BMP measures constructed according to contract design specifications/plans?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow design specifications

**Effectiveness** **Effectiveness Score:**

- 1) Source Control BMPs**
- a) Are soil protection measures providing effective cover and erosion resistance?  Meets/Exceeds  Minor Concern  Major Concern  NA
  - b) Are cut and fill slopes protected from surface erosion and slope failure potential?  Meets/Exceeds  Minor Concern  Major Concern  NA
- 2) Runoff Infiltration and Drainage Control System Effectiveness**
- a) Are erosion control measures applied limiting erosion processes and sediment delivery to SEZ?  Meets/Exceeds  Minor Concern  Major Concern  NA
  - b) Are constructed detention ponds stable and is site free from unexpected ponding of runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA
  - c) Are natural or constructed infiltration zones effectively collecting and treating runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA
- 3) Designation of Construction Zone and Equipment Exclusion Zones**
- a) Are sensitive areas and construction zones adequately delineated?  Meets/Exceeds  Minor Concern  Major Concern  NA
- 4) Effectiveness of Hazardous Substance Control Measures**
- a) Are BMPs for hazardous/toxic substances controlling chemical delivery to soils/water?  Meets/Exceeds  Minor Concern  Major Concern  NA

Additional Comments Trail surfacing in progress, mostly hand crew work, surfacing material approved (non-hazardous) for use in the Basin.

**Form HV1: Temporary BMPs for On-going Construction**

UTM Zone  ID#   
 Easting  Construction Site Name  Survey Date  Selection Code   
 Northing  Reviewer Name(s)  Forest  District  State   
 Construction Type  Other (Describe)  Township  Range  Section   
 Construction Foreman  Date of Project Start  Watershed   
 Project Type  Other (Describe)   
 Plan Title  Date  Rev Date  Job No.

Specific concerns associated with project and BMP measures designed to achieve resource protection

BMPs include: exclusion fence, sediment barrier, revegetation. Resource concerns: restore effective cover and minimize disturbance.

**Implementation**  1) Were BMPs designed to maintain resource protection and meet water quality standards?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs **Implementation Score:**

2) Are BMP measures constructed according to contract design specifications/plans?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow design specifications

**Effectiveness** **Effectiveness Score:**

- 1) Source Control BMPs**
- a) Are soil protection measures providing effective cover and erosion resistance?  Meets/Exceeds  Minor Concern  Major Concern  NA
- b) Are cut and fill slopes protected from surface erosion and slope failure potential?  Meets/Exceeds  Minor Concern  Major Concern  NA
- 2) Runoff Infiltration and Drainage Control System Effectiveness**
- a) Are erosion control measures applied limiting erosion processes and sediment delivery to SEZ?  Meets/Exceeds  Minor Concern  Major Concern  NA
- b) Are constructed detention ponds stable and is site free from unexpected ponding of runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA
- c) Are natural or constructed infiltration zones effectively collecting and treating runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA
- 3) Designation of Construction Zone and Equipment Exclusion Zones**
- a) Are sensitive areas and construction zones adequately delineated?  Meets/Exceeds  Minor Concern  Major Concern  NA
- 4) Effectiveness of Hazardous Substance Control Measures**
- a) Are BMPs for hazardous/toxic substances controlling chemical delivery to soils/water?  Meets/Exceeds  Minor Concern  Major Concern  NA

Additional Comments

**Form HV1: Temporary BMPs for On-going Construction**

UTM Zone  ID#   
 Easting  Construction Site Name  Survey Date  Selection Code   
 Northing  Reviewer Name(s)  Forest  District  State   
 Construction Type  Other (Describe)  Township  Range  Section   
 Construction Foreman  Date of Project Start  Watershed   
 Project Type  Other (Describe)   
 Plan Title  Date  Rev Date  Job No.

Specific concerns associated with project and BMP measures designed to achieve resource protection

BMPs include: exclusion fence, sediment barrier, revegetation. Resource concerns: restore effective cover and minimize disturbance.

**Implementation**  1) Were BMPs designed to maintain resource protection and meet water quality standards?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs **Implementation Score:**

2) Are BMP measures constructed according to contract design specifications/plans?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow design specifications

**Effectiveness** **Effectiveness Score:**

- 1) Source Control BMPs**
- a) Are soil protection measures providing effective cover and erosion resistance?  Meets/Exceeds  Minor Concern  Major Concern  NA
- b) Are cut and fill slopes protected from surface erosion and slope failure potential?  Meets/Exceeds  Minor Concern  Major Concern  NA
- 2) Runoff Infiltration and Drainage Control System Effectiveness**
- a) Are erosion control measures applied limiting erosion processes and sediment delivery to SEZ?  Meets/Exceeds  Minor Concern  Major Concern  NA
- b) Are constructed detention ponds stable and is site free from unexpected ponding of runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA
- c) Are natural or constructed infiltration zones effectively collecting and treating runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA
- 3) Designation of Construction Zone and Equipment Exclusion Zones**
- a) Are sensitive areas and construction zones adequately delineated?  Meets/Exceeds  Minor Concern  Major Concern  NA
- 4) Effectiveness of Hazardous Substance Control Measures**
- a) Are BMPs for hazardous/toxic substances controlling chemical delivery to soils/water?  Meets/Exceeds  Minor Concern  Major Concern  NA

Additional Comments

**Form HV1: Temporary BMPs for On-going Construction**

UTM Zone 11 ID# 686  
 Easting 248872 Construction Site Name Olympic Snowmaking Line Replacement Survey Date 7/27/2018 Selection Code S03  
 Northing 4314848 Reviewer Name(s) K. Kvasnicka Forest Toiyabe District State NV  
 Construction Type Other Other (Describe) Snowmaking Line Replacement Township 13N Range 19E Section 31  
 Construction Foreman Bryan Hickman Date of Project Start 7/2/2018 Watershed NV-3  
 Project Type Reconstruction Other (Describe) Snowmaking Line Replacement  
 Plan Title CERP Date Rev Date Job No.

Specific concerns associated with project and BMP measures designed to achieve resource protection  
 BMPs include: exclusion fence, sediment barrier, revegetation. Resource concerns: restore effective cover and minimize disturbance.

**Implementation**  1) Were BMPs designed to maintain resource protection and meet water quality standards?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs **Implementation Score:**   
 2) Are BMP measures constructed according to contract design specifications/plans?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow design specifications

**Effectiveness** **Effectiveness Score:**

**1) Source Control BMPs**

a) Are soil protection measures providing effective cover and erosion resistance?  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Are cut and fill slopes protected from surface erosion and slope failure potential?  Meets/Exceeds  Minor Concern  Major Concern  NA

**2) Runoff Infiltration and Drainage Control System Effectiveness**

a) Are erosion control measures applied limiting erosion processes and sediment delivery to SEZ?  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Are constructed detention ponds stable and is site free from unexpected ponding of runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA

c) Are natural or constructed infiltration zones effectively collecting and treating runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA

**3) Designation of Construction Zone and Equipment Exclusion Zones**

a) Are sensitive areas and construction zones adequately delineated?  Meets/Exceeds  Minor Concern  Major Concern  NA

**4) Effectiveness of Hazardous Substance Control Measures**

a) Are BMPs for hazardous/toxic substances controlling chemical delivery to soils/water?  Meets/Exceeds  Minor Concern  Major Concern  NA

Additional Comments Post Storm Event (1.01") Construction equipment corridor delineated with fencing, trenching in progress on upper section. Some erosion noted after storm event on steeper section of ski slope below road; sediment did not move past tow of slope. BMPs in place along road on lower section, sediment fence installed improperly for use as sediment capture; however, it appears to be functioning as equipment corridor delineation (confirmed with crew).

**Form HV1: Temporary BMPs for On-going Construction**

UTM Zone 11 ID# 687  
 Easting 248872 Construction Site Name Olympic Snowmaking Line Replacement Survey Date 8/9/2018 Selection Code S03  
 Northing 4314848 Reviewer Name(s) K. Kvasnicka Forest Toiyabe District State NV  
 Construction Type Other Other (Describe) Snowmaking Line Replacement Township 13N Range 19E Section 31  
 Construction Foreman Bryan Hickman Date of Project Start 7/2/2018 Watershed NV-3  
 Project Type Reconstruction Other (Describe) Snowmaking Line Replacement  
 Plan Title CERP Date Rev Date Job No.

Specific concerns associated with project and BMP measures designed to achieve resource protection  
 BMPs include: exclusion fence, sediment barrier, revegetation. Resource concerns: restore effective cover and minimize disturbance.

**Implementation**  1) Were BMPs designed to maintain resource protection and meet water quality standards?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs **Implementation Score:**   
 2) Are BMP measures constructed according to contract design specifications/plans?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow design specifications

**Effectiveness** **Effectiveness Score:**

**1) Source Control BMPs**

a) Are soil protection measures providing effective cover and erosion resistance?  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Are cut and fill slopes protected from surface erosion and slope failure potential?  Meets/Exceeds  Minor Concern  Major Concern  NA

**2) Runoff Infiltration and Drainage Control System Effectiveness**

a) Are erosion control measures applied limiting erosion processes and sediment delivery to SEZ?  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Are constructed detention ponds stable and is site free from unexpected ponding of runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA

c) Are natural or constructed infiltration zones effectively collecting and treating runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA

**3) Designation of Construction Zone and Equipment Exclusion Zones**

a) Are sensitive areas and construction zones adequately delineated?  Meets/Exceeds  Minor Concern  Major Concern  NA

**4) Effectiveness of Hazardous Substance Control Measures**

a) Are BMPs for hazardous/toxic substances controlling chemical delivery to soils/water?  Meets/Exceeds  Minor Concern  Major Concern  NA

Additional Comments Wood chips staged along upper section, active trenching on upper section in progress, construction corridor wider than anticipated, additional stabilization of the ski run may be necessary. Stabilization effectiveness will be evaluated after spring runoff 2019. Lower section delineated with construction fencing (not sediment fence as previous), no trenching yet.

**Form HV1: Temporary BMPs for On-going Construction**

UTM Zone: 11 ID#: 688  
 Easting: 248872 Construction Site Name: Olympic Snowmaking Line Replacement Survey Date: 8/21/2018 Selection Code: S03  
 Northing: 4314848 Reviewer Name(s): K. Kvasnicka Forest: Toiyabe District: State: NV  
 Construction Type: Other Other (Describe): Snowmaking Line Replacement Township: 13N Range: 19E Section: 31  
 Construction Foreman: Bryan Hickman Date of Project Start: 7/2/2018 Watershed: NV-3  
 Project Type: Reconstruction Other (Describe): Snowmaking Line Replacement  
 Plan Title: CERP Date: Rev Date: Job No.:

Specific concerns associated with project and BMP measures designed to achieve resource protection  
 BMPs include: exclusion fence, sediment barrier, revegetation. Resource concerns: restore effective cover and minimize disturbance.

**Implementation**  1) Were BMPs designed to maintain resource protection and meet water quality standards?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs **Implementation Score:**

2) Are BMP measures constructed according to contract design specifications/plans?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow design specifications

**Effectiveness** **Effectiveness Score:**

**1) Source Control BMPs**

a) Are soil protection measures providing effective cover and erosion resistance?  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Are cut and fill slopes protected from surface erosion and slope failure potential?  Meets/Exceeds  Minor Concern  Major Concern  NA

**2) Runoff Infiltration and Drainage Control System Effectiveness**

a) Are erosion control measures applied limiting erosion processes and sediment delivery to SEZ?  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Are constructed detention ponds stable and is site free from unexpected ponding of runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA

c) Are natural or constructed infiltration zones effectively collecting and treating runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA

**3) Designation of Construction Zone and Equipment Exclusion Zones**

a) Are sensitive areas and construction zones adequately delineated?  Meets/Exceeds  Minor Concern  Major Concern  NA

**4) Effectiveness of Hazardous Substance Control Measures**

a) Are BMPs for hazardous/toxic substances controlling chemical delivery to soils/water?  Meets/Exceeds  Minor Concern  Major Concern  NA

Additional Comments: Construction corridor delineated for larger area, BMPs in place. Construction corridor larger than anticipated; however, crew has discussed a stabilization plan that will apply to all disturbed areas including tilling, mulching and hydroseeding/mulching. Method will be evaluated for effectiveness in 2019.

**Form HV1: Temporary BMPs for On-going Construction**

UTM Zone 11 ID# 689  
 Easting 248872 Construction Site Name Olympic Snowmaking Line Replacement Survey Date 9/19/2018 Selection Code S03  
 Northing 4314848 Reviewer Name(s) K. Kvasnicka Forest Toiyabe District State NV  
 Construction Type Other Other (Describe) Snowmaking Line Replacement Township 13N Range 19E Section 31  
 Construction Foreman Bryan Hickman Date of Project Start 7/2/2018 Watershed NV-3  
 Project Type Reconstruction Other (Describe) Snowmaking Line Replacement  
 Plan Title CERP Date Rev Date Job No.

Specific concerns associated with project and BMP measures designed to achieve resource protection  
 BMPs include: exclusion fence, sediment barrier, revegetation. Resource concerns: restore effective cover and minimize disturbance.

**Implementation**  1) Were BMPs designed to maintain resource protection and meet water quality standards?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs **Implementation Score:**   
 2) Are BMP measures constructed according to contract design specifications/plans?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow design specifications

**Effectiveness** **Effectiveness Score:**

- 1) Source Control BMPs**
- a) Are soil protection measures providing effective cover and erosion resistance?  Meets/Exceeds  Minor Concern  Major Concern  NA
- b) Are cut and fill slopes protected from surface erosion and slope failure potential?  Meets/Exceeds  Minor Concern  Major Concern  NA
- 2) Runoff Infiltration and Drainage Control System Effectiveness**
- a) Are erosion control measures applied limiting erosion processes and sediment delivery to SEZ?  Meets/Exceeds  Minor Concern  Major Concern  NA
- b) Are constructed detention ponds stable and is site free from unexpected ponding of runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA
- c) Are natural or constructed infiltration zones effectively collecting and treating runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA
- 3) Designation of Construction Zone and Equipment Exclusion Zones**
- a) Are sensitive areas and construction zones adequately delineated?  Meets/Exceeds  Minor Concern  Major Concern  NA
- 4) Effectiveness of Hazardous Substance Control Measures**
- a) Are BMPs for hazardous/toxic substances controlling chemical delivery to soils/water?  Meets/Exceeds  Minor Concern  Major Concern  NA

Additional Comments Construction equipment corridor delineated with fencing, stabilization with wood chips in progress on upper section. Trenching in progress on lower section, all disturbed areas will receive same treatment as upper section (hydromulch and seed).

**Form HV1: Temporary BMPs for On-going Construction**

UTM Zone: 11 ID#: 690  
 Easting: 248872 Construction Site Name: Olympic Snowmaking Line Replacement Survey Date: 10/10/2018 Selection Code: S03  
 Northing: 4314848 Reviewer Name(s): K. Kvasnicka Forest: Toiyabe District: State: NV  
 Construction Type: Other Other (Describe): Snowmaking Line Replacement Township: 13N Range: 19E Section: 31  
 Construction Foreman: Bryan Hickman Date of Project Start: 7/2/2018 Watershed: NV-3  
 Project Type: Reconstruction Other (Describe): Snowmaking Line Replacement  
 Plan Title: CERP Date: Rev Date: Job No.:

Specific concerns associated with project and BMP measures designed to achieve resource protection  
 BMPs include: exclusion fence, sediment barrier, revegetation. Resource concerns: restore effective cover and minimize disturbance.

**Implementation**  1) Were BMPs designed to maintain resource protection and meet water quality standards?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs **Implementation Score:**

2) Are BMP measures constructed according to contract design specifications/plans?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow design specifications

**Effectiveness** **Effectiveness Score:**

- 1) Source Control BMPs**
- a) Are soil protection measures providing effective cover and erosion resistance?  Meets/Exceeds  Minor Concern  Major Concern  NA
  - b) Are cut and fill slopes protected from surface erosion and slope failure potential?  Meets/Exceeds  Minor Concern  Major Concern  NA
- 2) Runoff Infiltration and Drainage Control System Effectiveness**
- a) Are erosion control measures applied limiting erosion processes and sediment delivery to SEZ?  Meets/Exceeds  Minor Concern  Major Concern  NA
  - b) Are constructed detention ponds stable and is site free from unexpected ponding of runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA
  - c) Are natural or constructed infiltration zones effectively collecting and treating runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA
- 3) Designation of Construction Zone and Equipment Exclusion Zones**
- a) Are sensitive areas and construction zones adequately delineated?  Meets/Exceeds  Minor Concern  Major Concern  NA
- 4) Effectiveness of Hazardous Substance Control Measures**
- a) Are BMPs for hazardous/toxic substances controlling chemical delivery to soils/water?  Meets/Exceeds  Minor Concern  Major Concern  NA

Additional Comments: Post Storm Event Monitoring (0.67"). Construction equipment corridor delineated with fencing, trenching and stabilization complete on upper section. Trenching in progress on lower section, anticipated to be completion soon. All disturbed areas to be stabilized with hydromulch and seed.



**Form HV1: Temporary BMPs for On-going Construction**

UTM Zone	11	ID#	691
Easting	248872	Construction Site Name	Olympic Snowmaking Line Replacement
Survey Date	10/22/2018	Selection Code	S03
Northing	4314848	Reviewer Name(s)	K. Kvasnicka
Construction Type	Other	Other (Describe)	Snowmaking Line Replacement
Construction Foreman	Bryan Hickman	Date of Project Start	7/2/2018
Project Type	Reconstruction	Other (Describe)	Snowmaking Line Replacement
Plan Title	CERP	Date	
		Rev Date	
		Job No.	

Forest	Toiyabe	District		State	NV
Township	13N	Range	19E	Section	31
		Watershed	NV-3		

Specific concerns associated with project and BMP measures designed to achieve resource protection

BMPs include: exclusion fence, sediment barrier, revegetation. Resource concerns: restore effective cover and minimize disturbance.

<b>Implementation</b>	<input checked="" type="checkbox"/> 1	1) Were BMPs designed to maintain resource protection and meet water quality standards? 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs	<b>Implementation Score:</b>	<input type="checkbox"/> I
	<input checked="" type="checkbox"/> 1	2) Are BMP measures constructed according to contract design specifications/plans? 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow design specifications		

<b>Effectiveness</b>	<b>Effectiveness Score:</b>	<input type="checkbox"/> E
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**1) Source Control BMPs**

a) Are soil protection measures providing effective cover and erosion resistance?  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Are cut and fill slopes protected from surface erosion and slope failure potential?  Meets/Exceeds  Minor Concern  Major Concern  NA

**2) Runoff Infiltration and Drainage Control System Effectiveness**

a) Are erosion control measures applied limiting erosion processes and sediment delivery to SEZ?  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Are constructed detention ponds stable and is site free from unexpected ponding of runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA

c) Are natural or constructed infiltration zones effectively collecting and treating runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA

**3) Designation of Construction Zone and Equipment Exclusion Zones**

a) Are sensitive areas and construction zones adequately delineated?  Meets/Exceeds  Minor Concern  Major Concern  NA

**4) Effectiveness of Hazardous Substance Control Measures**

a) Are BMPs for hazardous/toxic substances controlling chemical delivery to soils/water?  Meets/Exceeds  Minor Concern  Major Concern  NA

Additional Comments: Hydromulch applied to upper and lower section disturbed area, water bars replaced across ski run, Coir logs to remain in place along roadway.

**Form HV1: Temporary BMPs for On-going Construction**

UTM Zone  ID#   
 Easting  Construction Site Name  Survey Date  Selection Code   
 Northing  Reviewer Name(s)  Forest  District  State   
 Construction Type  Other (Describe)  Township  Range  Section   
 Construction Foreman  Date of Project Start  Watershed   
 Project Type  Other (Describe)   
 Plan Title  Date  Rev Date  Job No.

Specific concerns associated with project and BMP measures designed to achieve resource protection

BMPs include: exclusion fence, sediment barrier, revegetation. Resource concerns: restore effective cover and minimize disturbance.

**Implementation**  1) Were BMPs designed to maintain resource protection and meet water quality standards?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs **Implementation Score:**

2) Are BMP measures constructed according to contract design specifications/plans?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow design specifications

**Effectiveness** **Effectiveness Score:**

- 1) Source Control BMPs**
- a) Are soil protection measures providing effective cover and erosion resistance?  Meets/Exceeds  Minor Concern  Major Concern  NA
- b) Are cut and fill slopes protected from surface erosion and slope failure potential?  Meets/Exceeds  Minor Concern  Major Concern  NA
- 2) Runoff Infiltration and Drainage Control System Effectiveness**
- a) Are erosion control measures applied limiting erosion processes and sediment delivery to SEZ?  Meets/Exceeds  Minor Concern  Major Concern  NA
- b) Are constructed detention ponds stable and is site free from unexpected ponding of runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA
- c) Are natural or constructed infiltration zones effectively collecting and treating runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA
- 3) Designation of Construction Zone and Equipment Exclusion Zones**
- a) Are sensitive areas and construction zones adequately delineated?  Meets/Exceeds  Minor Concern  Major Concern  NA
- 4) Effectiveness of Hazardous Substance Control Measures**
- a) Are BMPs for hazardous/toxic substances controlling chemical delivery to soils/water?  Meets/Exceeds  Minor Concern  Major Concern  NA

Additional Comments

**Form HV1: Temporary BMPs for On-going Construction**

UTM Zone: 11 ID#: 693  
 Easting: 248872 Construction Site Name: \$100 Saddle Power Upgrade Survey Date: 9/19/2018 Selection Code: S03  
 Northing: 4314848 Reviewer Name(s): K. Kvasnicka Forest: Toiyabe District: State: NV  
 Construction Type: Other Other (Describe): Powerline & Vault Township: 13N Range: 19E Section: 31  
 Construction Foreman: NV Energy Date of Project Start: 9/4/2018 Watershed: NV-3  
 Project Type: Maintenance Other (Describe): Powerline & Vault  
 Plan Title: CERP Date: Rev Date: Job No.:

Specific concerns associated with project and BMP measures designed to achieve resource protection  
 BMPs during construction: exclusion fence, coir logs. Resource concerns post construction: restore effective cover/erosion resistance and minimize disturbance.

**Implementation**  1) Were BMPs designed to maintain resource protection and meet water quality standards?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs **Implementation Score:**

2) Are BMP measures constructed according to contract design specifications/plans?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow design specifications

**Effectiveness** **Effectiveness Score:**

- 1) Source Control BMPs**
- a) Are soil protection measures providing effective cover and erosion resistance?  Meets/Exceeds  Minor Concern  Major Concern  NA
- b) Are cut and fill slopes protected from surface erosion and slope failure potential?  Meets/Exceeds  Minor Concern  Major Concern  NA
- 2) Runoff Infiltration and Drainage Control System Effectiveness**
- a) Are erosion control measures applied limiting erosion processes and sediment delivery to SEZ?  Meets/Exceeds  Minor Concern  Major Concern  NA
- b) Are constructed detention ponds stable and is site free from unexpected ponding of runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA
- c) Are natural or constructed infiltration zones effectively collecting and treating runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA
- 3) Designation of Construction Zone and Equipment Exclusion Zones**
- a) Are sensitive areas and construction zones adequately delineated?  Meets/Exceeds  Minor Concern  Major Concern  NA
- 4) Effectiveness of Hazardous Substance Control Measures**
- a) Are BMPs for hazardous/toxic substances controlling chemical delivery to soils/water?  Meets/Exceeds  Minor Concern  Major Concern  NA

Additional Comments: Construction equipment corridor delineated with fencing, trenching near fuel station for upgrade to existing powerlines and vaults. No access outside corridor.

**Form HV1: Temporary BMPs for On-going Construction**

UTM Zone: 11 ID#: 694  
 Easting: 248872 Construction Site Name: \$100 Saddle Power Upgrade Survey Date: 10/10/2018 Selection Code: S03  
 Northing: 4314848 Reviewer Name(s): K. Kvasnicka Forest: Toiyabe District: State: NV  
 Construction Type: Other Other (Describe): Powerline Upgrades Township: 13N Range: 19E Section: 31  
 Construction Foreman: NV Energy Date of Project Start: 7/2/2018 Watershed: NV-3  
 Project Type: Maintenance Other (Describe): Powerline Upgrades  
 Plan Title: CERP Date: Rev Date: Job No.:

Specific concerns associated with project and BMP measures designed to achieve resource protection  
 BMPs during construction: exclusion fence, coir logs. Resource concerns post construction: restore effective cover/erosion resistance and minimize disturbance.

**Implementation**  1) Were BMPs designed to maintain resource protection and meet water quality standards?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs **Implementation Score:**   
 2) Are BMP measures constructed according to contract design specifications/plans?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow design specifications

**Effectiveness** **Effectiveness Score:**

**1) Source Control BMPs**

a) Are soil protection measures providing effective cover and erosion resistance?  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Are cut and fill slopes protected from surface erosion and slope failure potential?  Meets/Exceeds  Minor Concern  Major Concern  NA

**2) Runoff Infiltration and Drainage Control System Effectiveness**

a) Are erosion control measures applied limiting erosion processes and sediment delivery to SEZ?  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Are constructed detention ponds stable and is site free from unexpected ponding of runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA

c) Are natural or constructed infiltration zones effectively collecting and treating runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA

**3) Designation of Construction Zone and Equipment Exclusion Zones**

a) Are sensitive areas and construction zones adequately delineated?  Meets/Exceeds  Minor Concern  Major Concern  NA

**4) Effectiveness of Hazardous Substance Control Measures**

a) Are BMPs for hazardous/toxic substances controlling chemical delivery to soils/water?  Meets/Exceeds  Minor Concern  Major Concern  NA

Additional Comments: Trenching complete and powerline upgrade complete. Slope between road switchbacks hydroseeded and some mulch applied with logs in strategic locations. May need additional tilling and potential permanent coir logs if erosion noted after spring runoff season. To be evaluated in 2019.

**Form HV1: Temporary BMPs for On-going Construction**

UTM Zone 11 ID# 695  
 Easting 249800 Construction Site Name Galaxy Power Upgrade Survey Date 10/10/2018 Selection Code S03  
 Northing 4314757 Reviewer Name(s) K. Kvasnicka Forest Toiyabe District State NV  
 Construction Type Other Other (Describe) Powerline Upgrades Township 13N Range 19E Section 31  
 Construction Foreman NV Energy Date of Project Start 10/1/2018 Watershed NV-2+5  
 Project Type Maintenance Other (Describe) Powerline Upgrades  
 Plan Title CERP Date Rev Date Job No.

Specific concerns associated with project and BMP measures designed to achieve resource protection  
 BMPs during construction: exclusion fence, coir logs. Resource concerns post construction: restore effective cover/erosion resistance and minimize disturbance.

**Implementation**  1) Were BMPs designed to maintain resource protection and meet water quality standards?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs **Implementation Score:**   
 2) Are BMP measures constructed according to contract design specifications/plans?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow design specifications

**Effectiveness** **Effectiveness Score:**

**1) Source Control BMPs**

a) Are soil protection measures providing effective cover and erosion resistance?  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Are cut and fill slopes protected from surface erosion and slope failure potential?  Meets/Exceeds  Minor Concern  Major Concern  NA

**2) Runoff Infiltration and Drainage Control System Effectiveness**

a) Are erosion control measures applied limiting erosion processes and sediment delivery to SEZ?  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Are constructed detention ponds stable and is site free from unexpected ponding of runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA

c) Are natural or constructed infiltration zones effectively collecting and treating runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA

**3) Designation of Construction Zone and Equipment Exclusion Zones**

a) Are sensitive areas and construction zones adequately delineated?  Meets/Exceeds  Minor Concern  Major Concern  NA

**4) Effectiveness of Hazardous Substance Control Measures**

a) Are BMPs for hazardous/toxic substances controlling chemical delivery to soils/water?  Meets/Exceeds  Minor Concern  Major Concern  NA

Additional Comments Trenching in progress for vault and powerline, equipment corridor delineated, crews aware of need for BMPs during construction, no resource concerns.

**Form HV1: Temporary BMPs for On-going Construction**

UTM Zone  ID#   
 Easting  Construction Site Name  Survey Date  Selection Code   
 Northing  Reviewer Name(s)  Forest  District  State   
 Construction Type  Other (Describe)  Township  Range  Section   
 Construction Foreman  Date of Project Start  Watershed   
 Project Type  Other (Describe)   
 Plan Title  Date  Rev Date  Job No.

Specific concerns associated with project and BMP measures designed to achieve resource protection

BMPs during construction: exclusion fence, coir logs. Resource concerns post construction: restore effective cover/erosion resistance and minimize disturbance.

**Implementation**  1) Were BMPs designed to maintain resource protection and meet water quality standards?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs **Implementation Score:**

2) Are BMP measures constructed according to contract design specifications/plans?  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow design specifications

**Effectiveness** **Effectiveness Score:**

- 1) Source Control BMPs**
- a) Are soil protection measures providing effective cover and erosion resistance?  Meets/Exceeds  Minor Concern  Major Concern  NA
- b) Are cut and fill slopes protected from surface erosion and slope failure potential?  Meets/Exceeds  Minor Concern  Major Concern  NA
- 2) Runoff Infiltration and Drainage Control System Effectiveness**
- a) Are erosion control measures applied limiting erosion processes and sediment delivery to SEZ?  Meets/Exceeds  Minor Concern  Major Concern  NA
- b) Are constructed detention ponds stable and is site free from unexpected ponding of runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA
- c) Are natural or constructed infiltration zones effectively collecting and treating runoff?  Meets/Exceeds  Minor Concern  Major Concern  NA
- 3) Designation of Construction Zone and Equipment Exclusion Zones**
- a) Are sensitive areas and construction zones adequately delineated?  Meets/Exceeds  Minor Concern  Major Concern  NA
- 4) Effectiveness of Hazardous Substance Control Measures**
- a) Are BMPs for hazardous/toxic substances controlling chemical delivery to soils/water?  Meets/Exceeds  Minor Concern  Major Concern  NA

Additional Comments

UTM Zone  **Form HV2: Permanent BMPs for Buildings and Structures** ID#

Easting  Building/Structure Name  Survey Date  Selection Code

Northing  Reviewer Name(s)  Township  Range  Section

Date Project Start  Date Project End  Watershed  State

Date BMP Implementation Complete  Date Last BMP Maintenance  Job No  Storm Depth

Structure Type  Other (Describe)  Survey Type

Plan Title  Plan Date  Plan Revision Date

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

**Implementation**  1) BMPs are designed to maintain resource protection and meet water quality standards  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs **Implementation Score:**

2) BMPs are constructed according to contract design specifications  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

**Effectiveness** **Effectiveness Score:**

**1) Source area erosion control, protection/stabilization of site, especially erosive areas**

- a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact  Meets/Exceeds  Minor Concern  Major Concern  NA
- b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion  Meet/Exceeds  Minor Concern  Major Concern  NA
- c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion  Meets/Exceeds  Minor Concern  Major Concern  NA

**2) Runoff infiltration and drainage control system effectiveness**

- a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ  Meets/Exceeds  Minor Concern  Major Concern  NA
- b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened  Meets/Exceeds  Minor Concern  Major Concern  NA

**3) Effectiveness of hazardous substance control measures**

- a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality  Meets/Exceeds  Minor Concern  Major Concern  NA

Additional Comments

UTM Zone 11

Form HV2: Permanent BMPs for Buildings and Structures

ID# 584

Easting 247202 Building/Structure Name Sky Express - Lower Terminal Survey Date 7/27/2018 Selection Code S03

Northing 4312286 Reviewer Name(s) K. Kvasnicka, J. Azevedo Township 12N Range 18E Section 1

Date Project Start 8/7/2006 Date Project End Watershed CA-1 State CA

Date BMP Implementation Complete Date Last BMP Maintenance Job No Storm Depth 0.89"

Structure Type Lift-Base Other (Describe) Survey Type Post Storm Survey

Plan Title Infiltration BMP Maintenance Plan Date Plan Revision Date

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

Infiltration trenches for impervious surfaces (roof drip lines), prevent soil erosion, erosion resistance

Implementation

- 1) BMPs are designed to maintain resource protection and meet water quality standards
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs
1) 2) BMPs are constructed according to contract design specifications
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

Implementation Score: I

Effectiveness

Effectiveness Score: E

1) Source area erosion control, protection/stabilization of site, especially erosive areas

- a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact
b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion
c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion

2) Runoff infiltration and drainage control system effectiveness

- a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ
b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened

3) Effectiveness of hazardous substance control measures

- a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality

Additional Comments

Infiltration trenches in good condition; may require maintenance in upcoming years. Minimal trash and debris, and are well maintained. No evidence of sediment transport or erosion. Wood chip mulch in place and in good condition.



UTM Zone 11

Form HV2: Permanent BMPs for Buildings and Structures

ID# 586

Easting 247777

Building/Structure Name Gondola Top Station Drainage

Survey Date 7/27/2018

Selection Code S03

Northing 4313572

Reviewer Name(s) K. Kvasnicka, J. Azevedo

Township 12N

Range 18E

Section 1

Date Project Start 6/17/2013

Date Project End 9/10/2015

Watershed CA-1

State CA

Date BMP Implementation Complete 9/10/2015

Date Last BMP Maintenance

Job No 12-602.4

Storm Depth 0.75"

Structure Type Other

Other (Describe) Drainage System

Survey Type Post Storm Survey

Plan Title Heavenly Summer Activities

Plan Date 11/9/2012

Plan Revision Date

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

Effective cover/erosion resistance, permanent drainage system piping, infiltration areas and berms.

Implementation

1) BMPs are designed to maintain resource protection and meet water quality standards
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs

Implementation Score: 1

1) 2) BMPs are constructed according to contract design specifications
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

Effectiveness

Effectiveness Score: E

1) Source area erosion control, protection/stabilization of site, especially erosive areas

- a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact
b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion
c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion

Radio button options for effectiveness: Meets/Exceeds, Minor Concern, Major Concern, NA

2) Runoff infiltration and drainage control system effectiveness

- a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ
b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened

Radio button options for effectiveness: Meets/Exceeds, Minor Concern, Major Concern, NA

3) Effectiveness of hazardous substance control measures

- a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality

Radio button options for effectiveness: Meets/Exceeds, Minor Concern, Major Concern, NA

Additional Comments

Ongoing drainage plan to be determined this year or next to address ponding and area-wide drainage. Comprehensive plan being developed to address all areas.

UTM Zone 11

Form HV2: Permanent BMPs for Buildings and Structures

ID# 592

Easting 246207

Building/Structure Name Powderbowl Express - Lower Terminal

Survey Date 7/27/2018

Selection Code S02

Northing 4312490

Reviewer Name(s) K. Kvasnicka, J. Azevedo

Township 12N

Range 18E

Section 1

Date Project Start 9/1/2016

Date Project End 9/10/2016

Watershed CA-1

State CA

Date BMP Implementation Complete 9/10/2016

Date Last BMP Maintenance

Job No

Storm Depth 0.89"

Structure Type Lift-Base

Other (Describe)

Survey Type

Post Storm Survey

Plan Title BMP Maintenance, CERP applies

Plan Date

Plan Revision Date

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

Sediment basin capacity, rock lined ditch,

Implementation

1 1) BMPs are designed to maintain resource protection and meet water quality standards
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs

Implementation Score: 1

1 2) BMPs are constructed according to contract design specifications
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

Effectiveness

Effectiveness Score: E

1) Source area erosion control, protection/stabilization of site, especially erosive areas

- a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact
b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion
c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion

Meets/Exceeds. Minor Concern Major Concern NA

Meet/Exceeds Minor Concern Major Concern NA

Meets/Exceeds Minor Concern Major Concern NA

2) Runoff infiltration and drainage control system effectiveness

- a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ
b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened

Meets/Exceeds Minor Concern Major Concern NA

Meets/Exceeds Minor Concern Major Concern NA

3) Effectiveness of hazardous substance control measures

- a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality

Meets/Exceeds Minor Concern Major Concern NA

Additional Comments

Rock lined ditch functioned after storm, sediment build up should be addressed before next storm.

UTM Zone 11

Form HV2: Permanent BMPs for Buildings and Structures

ID# 594

Easting 246846

Building/Structure Name Maggie's Corner to Cal Dam

Survey Date 10/10/2018

Selection Code S03

Northing 4312787

Reviewer Name(s) K. Kvasnicka

Township 12N

Range 18E

Section 1

Date Project Start 8/1/2016

Date Project End 8/1/2016

Watershed CA-1

State CA

Date BMP Implementation Complete 8/1/2016

Date Last BMP Maintenance 7/27/2017

Job No

Storm Depth 0.45"

Structure Type Other

Other (Describe) Road

Survey Type

Post Storm Survey

Plan Title CERP applies, Erosion Hotspot Inventory Epic Discovery EIR/EIS/EIS

Plan Date

Plan Revision Date

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

Water bar connection to SEZ, road shoulder effective cover, soil stabilization, prevention of sediment transport, improve erosion resistance, water bar outlet protection.

Implementation

1 1) BMPs are designed to maintain resource protection and meet water quality standards
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs

Implementation Score: 1

1 2) BMPs are constructed according to contract design specifications
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

Effectiveness

Effectiveness Score: E

1) Source area erosion control, protection/stabilization of site, especially erosive areas

- a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact
b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion
c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion

Radio button options for effectiveness: Meets/Exceeds, Minor Concern, Major Concern, NA

2) Runoff infiltration and drainage control system effectiveness

- a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ
b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened

Radio button options for effectiveness: Meets/Exceeds, Minor Concern, Major Concern, NA

3) Effectiveness of hazardous substance control measures

- a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality

Radio button options for effectiveness: Meets/Exceeds, Minor Concern, Major Concern, NA

Additional Comments

Wattles in place at water bar outlets, needs sediment clean out prior to next storm.

UTM Zone 11

Form HV2: Permanent BMPs for Buildings and Structures

ID# 595

Easting 247277

Building/Structure Name Sky Meadows Stream Crossing

Survey Date 7/27/2018

Selection Code S02

Northing 4312421

Reviewer Name(s) K. Kvasnicka, J. Azevedo

Township 12N

Range 18E

Section 1

Date Project Start 6/15/2016

Date Project End 6/15/2016

Watershed CA-1

State CA

Date BMP Implementation Complete 6/15/2016

Date Last BMP Maintenance 6/15/2016

Job No

Storm Depth 0.89"

Structure Type Other

Other (Describe) Road

Survey Type

Post Storm Survey

Plan Title CERP Applies

Plan Date

Plan Revision Date

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

Protection of SEZ crossing with wattles/fiber rolls

Implementation

1) BMPs are designed to maintain resource protection and meet water quality standards
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs

Implementation Score: 1

1) 2) BMPs are constructed according to contract design specifications
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

Effectiveness

Effectiveness Score: E

1) Source area erosion control, protection/stabilization of site, especially erosive areas

- a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact
b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion
c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion

Meets/Exceeds Minor Concern Major Concern NA

Meet/Exceeds Minor Concern Major Concern NA

Meets/Exceeds Minor Concern Major Concern NA

2) Runoff infiltration and drainage control system effectiveness

- a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ
b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened

Meets/Exceeds Minor Concern Major Concern NA

Meets/Exceeds Minor Concern Major Concern NA

3) Effectiveness of hazardous substance control measures

- a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality

Meets/Exceeds Minor Concern Major Concern NA

Additional Comments

Coir wattles in place with proper placement and anchoring. Wattles filled with sediment near max capacity and compacted to ground surface. Stream crossing in good shape. Culverts in excellent condition and functional.

UTM Zone 11

Form HV2: Permanent BMPs for Buildings and Structures

ID# 596

Easting 246312

Building/Structure Name Stein's

Survey Date 7/27/2018

Selection Code S05

Northing 4312609

Reviewer Name(s) K. Kvasnicka, J. Azevedo

Township 12N

Range 18E

Section 1

Date Project Start

Date Project End 10/15/2006

Watershed CA-1

State CA

Date BMP Implementation Complete

Date Last BMP Maintenance

Job No

Storm Depth 0.89"

Structure Type Building

Other (Describe)

Survey Type

Post Storm Survey

Plan Title No plan set, CERP applies

Plan Date

Plan Revision Date

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

No plans available. Resource concern is soil stabilization accomplished by providing effective cover. Containment of the 20-yr 1-hr event is a requirement.

Implementation

1 1) BMPs are designed to maintain resource protection and meet water quality standards
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs

Implementation Score: 1

1 2) BMPs are constructed according to contract design specifications
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

Effectiveness

Effectiveness Score: E

1) Source area erosion control, protection/stabilization of site, especially erosive areas

- a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact
b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion
c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion

Meets/Exceeds, Minor Concern, Major Concern, NA radio button options for items a, b, and c.

2) Runoff infiltration and drainage control system effectiveness

- a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ
b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened

Meets/Exceeds, Minor Concern, Major Concern, NA radio button options for items a and b.

3) Effectiveness of hazardous substance control measures

- a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality

Meets/Exceeds, Minor Concern, Major Concern, NA radio button options for item a.

Additional Comments

Rock lined channel in good condition with little sediment build-up. Drop inlet in good condition with cover in place, area around may need cleaning. Area is well vegetated and stable. Debris in channel may need clean-up.

UTM Zone 11

Form HV2: Permanent BMPs for Buildings and Structures

ID# 599

Easting 246846

Building/Structure Name Maggie's Corner to Cal Dam

Survey Date 9/19/2018

Selection Code S03

Northing 4312787

Reviewer Name(s) K. Kvasnicka

Township 12N

Range 18E

Section 1

Date Project Start 8/1/2016

Date Project End 8/1/2016

Watershed CA-1

State CA

Date BMP Implementation Complete 8/1/2016

Date Last BMP Maintenance 7/27/2017

Job No

Storm Depth

Structure Type Other

Other (Describe) Road

Survey Type Follow-up

Plan Title CERP applies, Erosion Hotspot Inventory Epic Discovery EIR/EIS/EIS

Plan Date

Plan Revision Date

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

Water bar connection to SEZ, road shoulder effective cover, soil stabilization, prevention of sediment transport, improve erosion resistance, water bar outlet protection.

Implementation

1 1) BMPs are designed to maintain resource protection and meet water quality standards
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs

Implementation Score: 1

1 2) BMPs are constructed according to contract design specifications
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

Effectiveness

Effectiveness Score: E

1) Source area erosion control, protection/stabilization of site, especially erosive areas

- a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact
b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion
c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion

Meets/Exceeds, Minor Concern, Major Concern, NA radio button options for items a, b, and c.

2) Runoff infiltration and drainage control system effectiveness

- a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ
b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened

Meets/Exceeds, Minor Concern, Major Concern, NA radio button options for items a and b.

3) Effectiveness of hazardous substance control measures

- a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality

Meets/Exceeds, Minor Concern, Major Concern, NA radio button options for item a.

Additional Comments

Wattles in place at water bar outlets, sediment build up has been removed. Road shoulders mulched and in good condition.

UTM Zone 11

Form HV2: Permanent BMPs for Buildings and Structures

ID# 612

Easting 247287

Building/Structure Name Hellwinkle's Road Segment

Survey Date 8/21/2018

Selection Code S03

Northing 4312392

Reviewer Name(s) K. Kvasnicka, J. Azevedo

Township 12N

Range 18E

Section 1

Date Project Start 8/7/2006

Date Project End 9/30/2006

Watershed CA-1

State CA

Date BMP Implementation Complete 9/30/2006

Date Last BMP Maintenance 7/11/2017

Job No

Storm Depth

Structure Type Other

Other (Describe) Road

Survey Type Routine

Plan Title CERP applies, Erosion Hotspot Inventory Epic Discovery EIR/EIS/EIS

Plan Date

Plan Revision Date

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

Water bar connection to SEZ, road shoulder effective cover, soil stabilization, prevention of sediment transport, improve erosion resistance, water bar outlet protection.

Implementation

1 1) BMPs are designed to maintain resource protection and meet water quality standards
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs

Implementation Score: 1

1 2) BMPs are constructed according to contract design specifications
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

Effectiveness

Effectiveness Score: m

1) Source area erosion control, protection/stabilization of site, especially erosive areas

- a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact
b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion
c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion

Meets/Exceeds. Minor Concern Major Concern NA

Meet/Exceeds Minor Concern Major Concern NA

Meets/Exceeds Minor Concern Major Concern NA

2) Runoff infiltration and drainage control system effectiveness

- a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ
b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened

Meets/Exceeds Minor Concern Major Concern NA

Meets/Exceeds Minor Concern Major Concern NA

3) Effectiveness of hazardous substance control measures

- a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality

Meets/Exceeds Minor Concern Major Concern NA

Additional Comments

Water bar outlets have sufficient capacity, road binder destabilizing in some areas, may need new application in coming years.

UTM Zone 10

Form HV2: Permanent BMPs for Buildings and Structures

ID# 620

Easting 0 Building/Structure Name Orion's Survey Date 9/19/2018 Selection Code S02

Northing 0 Reviewer Name(s) K. Kvasnicka Township Range Section

Date Project Start Date Project End Watershed NV-1 State NV

Date BMP Implementation Complete Date Last BMP Maintenance Job No Storm Depth

Structure Type Other (Describe) Survey Type Follow-up

Plan Title Plan Date Plan Revision Date

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

Implementation

1 1) BMPs are designed to maintain resource protection and meet water quality standards
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs

Implementation Score: I

1 2) BMPs are constructed according to contract design specifications
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

Effectiveness

Effectiveness Score: E

1) Source area erosion control, protection/stabilization of site, especially erosive areas

a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact

Meets/Exceeds Minor Concern Major Concern NA

b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion

Meet/Exceeds Minor Concern Major Concern NA

c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion

Meets/Exceeds Minor Concern Major Concern NA

2) Runoff infiltration and drainage control system effectiveness

a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ

Meets/Exceeds Minor Concern Major Concern NA

b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened

Meets/Exceeds Minor Concern Major Concern NA

3) Effectiveness of hazardous substance control measures

a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality

Meets/Exceeds Minor Concern Major Concern NA

Additional Comments

Pine needle and wood chip mulch application along road shoulders in good condition, road binder in good shape, no rilling on road.



UTM Zone 11

Form HV2: Permanent BMPs for Buildings and Structures

ID# 623

Easting 246148

Building/Structure Name Pioneer Poma

Survey Date 11/6/2018

Selection Code S03

Northing 4313086

Reviewer Name(s) K. Kvasnicka, C. Kuhn, J. Azevedo

Township 12N

Range 18E

Section 1

Date Project Start

Date Project End

Watershed CA-1

State CA

Date BMP Implementation Complete 7/31/2002

Date Last BMP Maintenance

Job No 00-607-0

Storm Depth

Structure Type Lift

Other (Describe)

Survey Type Routine

Plan Title Pioneer Poma Lift Replacement

Plan Date 12-14-2001

Plan Revision Date

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

Soil stabilization and sediment transport to SEZ, revegetation.

Implementation

- 1) BMPs are designed to maintain resource protection and meet water quality standards
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs
1) 2) BMPs are constructed according to contract design specifications
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

Implementation Score: I

Effectiveness

Effectiveness Score: E

1) Source area erosion control, protection/stabilization of site, especially erosive areas

- a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact
b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion
c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion

Radio button options for effectiveness: Meets/Exceeds, Minor Concern, Major Concern, NA

2) Runoff infiltration and drainage control system effectiveness

- a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ
b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened

Radio button options for effectiveness: Meets/Exceeds, Minor Concern, Major Concern, NA

3) Effectiveness of hazardous substance control measures

- a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality

Radio button options for effectiveness: Meets/Exceeds, Minor Concern, Major Concern, NA

Additional Comments

Run area in great condition with excellent surface cover. Few areas of bare soil, good revegetation growth from full restoration treatment.

UTM Zone 11

Form HV2: Permanent BMPs for Buildings and Structures

ID# 629

Easting 247158

Building/Structure Name Canyon Express - Lower Terminal

Survey Date 7/27/2018

Selection Code S03

Northing 4312234

Reviewer Name(s) K. Kvasnicka, J. Azevedo

Township 12N

Range 18E

Section 1

Date Project Start 8/18/2015

Date Project End 9/30/2016

Watershed CA-1

State CA

Date BMP Implementation Complete 9/30/2016

Date Last BMP Maintenance

Job No

Storm Depth 0.89"

Structure Type Lift-Base

Other (Describe)

Survey Type

Post Storm Survey

Plan Title Infiltration BMP Maintenance, Erosion Hotspot Inventory Epic Discovery EIR/EIS/EIS

Plan Date 10/15/2006

Plan Revision Date 10/15/200

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

Roof downspout outfall infiltration, soil erosion. Reference construction plans job #00-607-11 4/14/2003 revision date 7/14/2003, Canyon lift replacement and Ridge lift removal erosion control.

Implementation

1 1) BMPs are designed to maintain resource protection and meet water quality standards
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs

Implementation Score: 1

1 2) BMPs are constructed according to contract design specifications
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

Effectiveness

Effectiveness Score: E

1) Source area erosion control, protection/stabilization of site, especially erosive areas

- a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact
b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion
c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion

Meets/Exceeds. Minor Concern Major Concern NA

Meet/Exceeds Minor Concern Major Concern NA

Meets/Exceeds Minor Concern Major Concern NA

2) Runoff infiltration and drainage control system effectiveness

- a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ
b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened

Meets/Exceeds Minor Concern Major Concern NA

Meets/Exceeds Minor Concern Major Concern NA

3) Effectiveness of hazardous substance control measures

- a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality

Meets/Exceeds Minor Concern Major Concern NA

Additional Comments

Rock lined ditch functioning, no active flow. Little sediment accumulation in ditch.

UTM Zone 11

Form HV2: Permanent BMPs for Buildings and Structures

ID# 630

Easting 247287

Building/Structure Name Sky Deck Restaurant

Survey Date 7/27/2018

Selection Code S03

Northing 4312392

Reviewer Name(s) K. Kvasnicka, J. Azevedo

Township 12N

Range 18E

Section 1

Date Project Start 8/7/2006

Date Project End

Watershed CA-1

State CA

Date BMP Implementation Complete 9/30/2006

Date Last BMP Maintenance

Job No

Storm Depth 0.89"

Structure Type Building

Other (Describe) Completed BMP Proj.

Survey Type

Post Storm Survey

Plan Title No plan set, CERP applies

Plan Date

Plan Revision Date

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

Revegetation, infiltration areas, erosion resistance on bare areas.

Implementation

1 1) BMPs are designed to maintain resource protection and meet water quality standards
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs

Implementation Score: 1

1 2) BMPs are constructed according to contract design specifications
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

Effectiveness

Effectiveness Score: E

1) Source area erosion control, protection/stabilization of site, especially erosive areas

- a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact
b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion
c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion

Meets/Exceeds. Minor Concern Major Concern NA

Meet/Exceeds Minor Concern Major Concern NA

Meets/Exceeds Minor Concern Major Concern NA

2) Runoff infiltration and drainage control system effectiveness

- a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ
b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened

Meets/Exceeds Minor Concern Major Concern NA

Meets/Exceeds Minor Concern Major Concern NA

3) Effectiveness of hazardous substance control measures

- a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality

Meets/Exceeds Minor Concern Major Concern NA

Additional Comments

Wood chip mulch intact over bare parking area. Rope fencing adjusted to allow parking access for two vehicles. Straw wattles in place and anchored down.

UTM Zone 10

Form HV2: Permanent BMPs for Buildings and Structures

ID# 638

Easting 0

Building/Structure Name California Trail Waterbars

Survey Date 7/27/2018

Selection Code S02

Northing 0

Reviewer Name(s) K. Kvasnicka, J. Azevedo

Township

Range

Section

Date Project Start

Date Project End

Watershed CA-1

State CA

Date BMP Implementation Complete

Date Last BMP Maintenance

Job No

Storm Depth 0.89"

Structure Type

Other (Describe)

Survey Type

Post Storm Survey

Plan Title

Plan Date

Plan Revision Date

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

Implementation

1 1) BMPs are designed to maintain resource protection and meet water quality standards
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs

Implementation Score: 1

1 2) BMPs are constructed according to contract design specifications
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

Effectiveness

Effectiveness Score: E

1) Source area erosion control, protection/stabilization of site, especially erosive areas

- a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact
b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion
c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion

Meets/Exceeds Minor Concern Major Concern NA

Meet/Exceeds Minor Concern Major Concern NA

Meets/Exceeds Minor Concern Major Concern NA

2) Runoff infiltration and drainage control system effectiveness

- a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ
b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened

Meets/Exceeds Minor Concern Major Concern NA

Meets/Exceeds Minor Concern Major Concern NA

3) Effectiveness of hazardous substance control measures

- a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality

Meets/Exceeds Minor Concern Major Concern NA

Additional Comments

Waterbars in excellent condition; many waterbars have been reshaped during summer. Waterbars shown to be effective in directing runoff away from roads.

UTM Zone  **Form HV2: Permanent BMPs for Buildings and Structures** ID#

Easting  Building/Structure Name  Survey Date  Selection Code

Northing  Reviewer Name(s)  Township  Range  Section

Date Project Start  Date Project End  Watershed  State

Date BMP Implementation Complete  Date Last BMP Maintenance  Job No  Storm Depth

Structure Type  Other (Describe)  Survey Type

Plan Title  Plan Date  Plan Revision Date

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

Water bar refurbishment, slope stabilization, prevention of sediment transport, improve erosion resistance, culvert installation

**Implementation**  1) BMPs are designed to maintain resource protection and meet water quality standards  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs **Implementation Score:**

2) BMPs are constructed according to contract design specifications  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

**Effectiveness** **Effectiveness Score:**

**1) Source area erosion control, protection/stabilization of site, especially erosive areas**

a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion  Meet/Exceeds  Minor Concern  Major Concern  NA

c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion  Meets/Exceeds  Minor Concern  Major Concern  NA

**2) Runoff infiltration and drainage control system effectiveness**

a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened  Meets/Exceeds  Minor Concern  Major Concern  NA

**3) Effectiveness of hazardous substance control measures**

a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality  Meets/Exceeds  Minor Concern  Major Concern  NA

Additional Comments

UTM Zone 11

Form HV2: Permanent BMPs for Buildings and Structures

ID# 643

Easting 246207

Building/Structure Name Powderbowl Express - Lower Terminal

Survey Date 10/10/2018

Selection Code S02

Northing 4312490

Reviewer Name(s) K. Kvasnicka

Township 12N

Range 18E

Section 1

Date Project Start 9/1/2016

Date Project End 9/10/2016

Watershed CA-1

State CA

Date BMP Implementation Complete 9/10/2016

Date Last BMP Maintenance

Job No

Storm Depth 0.45"

Structure Type Lift-Base

Other (Describe)

Survey Type

Post Storm Survey

Plan Title BMP Maintenance, CERP applies

Plan Date

Plan Revision Date

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

Sediment basin capacity, rock lined ditch,

Implementation

1) BMPs are designed to maintain resource protection and meet water quality standards
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs

Implementation Score: 1

1) 2) BMPs are constructed according to contract design specifications
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

Effectiveness

Effectiveness Score: E

1) Source area erosion control, protection/stabilization of site, especially erosive areas

- a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact
b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion
c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion

Meets/Exceeds Minor Concern Major Concern NA

Meet/Exceeds Minor Concern Major Concern NA

Meets/Exceeds Minor Concern Major Concern NA

2) Runoff infiltration and drainage control system effectiveness

- a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ
b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened

Meets/Exceeds Minor Concern Major Concern NA

Meets/Exceeds Minor Concern Major Concern NA

3) Effectiveness of hazardous substance control measures

- a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality

Meets/Exceeds Minor Concern Major Concern NA

Additional Comments

Rock lined ditch and drainage area in good condition, some sediment build up after storm event, may need maintenance prior to more storms.

UTM Zone 11

Form HV2: Permanent BMPs for Buildings and Structures

ID# 645

Easting 246118

Building/Structure Name Upper Maintenance Shop

Survey Date 7/13/2018

Selection Code S03

Northing 4312927

Reviewer Name(s) K. Kvasnicka, J. Azevedo

Township 12N

Range 18E

Section 1

Date Project Start 8/22/2006

Date Project End 10/15/2010

Watershed CA-1

State CA

Date BMP Implementation Complete 9/19/2016

Date Last BMP Maintenance 7/11/2017

Job No 00-607-4

Storm Depth

Structure Type Maintenance Station

Other (Describe)

Survey Type Routine

Plan Title Upper Shops Water Quality and Stream Environment Zone Improvements

Plan Date 4/25/06

Plan Revision Date 8/31/06

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

BMPs to protect adjacent SEZ - drainage diversion, concrete wall, SEZ drop pool design, revegetation

Implementation

1 1) BMPs are designed to maintain resource protection and meet water quality standards
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs

Implementation Score: I

1 2) BMPs are constructed according to contract design specifications
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

Effectiveness

Effectiveness Score: E

1) Source area erosion control, protection/stabilization of site, especially erosive areas

- a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact
b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion
c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion

Meets/Exceeds, Minor Concern, Major Concern, NA radio button options for items a, b, and c.

2) Runoff infiltration and drainage control system effectiveness

- a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ
b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened

Meets/Exceeds, Minor Concern, Major Concern, NA radio button options for items a and b.

3) Effectiveness of hazardous substance control measures

- a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality

Meets/Exceeds, Minor Concern, Major Concern, NA radio button options for item a.

Additional Comments

Sediment basins and culvert passing under road are functioning, Some sediment accumulated in basin below road, may need maintenance. Drop inlets have minimal sediment accumulation.

UTM Zone 11

Form HV2: Permanent BMPs for Buildings and Structures

ID# 646

Easting 246183

Building/Structure Name Groove - Lower Terminal

Survey Date 7/27/2018

Selection Code S03

Northing 4312513

Reviewer Name(s) K. Kvasnicka, J. Azevedo

Township 12N

Range 18E

Section 1

Date Project Start 9/1/2016

Date Project End 9/19/2016

Watershed CA-1

State CA

Date BMP Implementation Complete 9/19/2016

Date Last BMP Maintenance 9/19/2016

Job No

Storm Depth 0.89"

Structure Type Lift-Base

Other (Describe)

Survey Type

Post Storm Survey

Plan Title Infiltration BMP Maintenance

Plan Date

Plan Revision Date

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

Dripline infiltration, drywell, rock-lined ditch, soil stabilization

Implementation

1 1) BMPs are designed to maintain resource protection and meet water quality standards
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs

Implementation Score: 1

1 2) BMPs are constructed according to contract design specifications
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

Effectiveness

Effectiveness Score: E

1) Source area erosion control, protection/stabilization of site, especially erosive areas

a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact

Meets/Exceeds Minor Concern Major Concern NA

b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion

Meets/Exceeds Minor Concern Major Concern NA

c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion

Meets/Exceeds Minor Concern Major Concern NA

2) Runoff infiltration and drainage control system effectiveness

a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ

Meets/Exceeds Minor Concern Major Concern NA

b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened

Meets/Exceeds Minor Concern Major Concern NA

3) Effectiveness of hazardous substance control measures

a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality

Meets/Exceeds Minor Concern Major Concern NA

Additional Comments

Rock lined ditch functioned after storm, sediment build up should be addressed before next storm.



UTM Zone 11

Form HV2: Permanent BMPs for Buildings and Structures

ID# 649

Easting 246846

Building/Structure Name Upper Maggie's Corner

Survey Date 7/27/2018

Selection Code S03

Northing 4312787

Reviewer Name(s) K. Kvasnicka, J. Azevedo

Township 12N

Range 18E

Section 1

Date Project Start 8/1/2016

Date Project End 8/1/2016

Watershed CA-1

State CA

Date BMP Implementation Complete 8/1/2016

Date Last BMP Maintenance 7/27/2017

Job No

Storm Depth 0.89"

Structure Type Other

Other (Describe) Road

Survey Type

Post Storm Survey

Plan Title CERP applies, Erosion Hotspot Inventory Epic Discovery EIR/EIS/EIS

Plan Date

Plan Revision Date

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

Water bar connection to SEZ, road shoulder effective cover, soil stabilization, prevention of sediment transport, improve erosion resistance, water bar outlet protection.

Implementation

1 1) BMPs are designed to maintain resource protection and meet water quality standards
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs

Implementation Score: 1

1 2) BMPs are constructed according to contract design specifications
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

Effectiveness

Effectiveness Score: E

1) Source area erosion control, protection/stabilization of site, especially erosive areas

- a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact
b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion
c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion

Radio button options for effectiveness: Meets/Exceeds, Minor Concern, Major Concern, NA

2) Runoff infiltration and drainage control system effectiveness

- a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ
b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened

Radio button options for effectiveness: Meets/Exceeds, Minor Concern, Major Concern, NA

3) Effectiveness of hazardous substance control measures

- a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality

Radio button options for effectiveness: Meets/Exceeds, Minor Concern, Major Concern, NA

Additional Comments

Basin sediment build-up moderate. Rock lined ditch along road has sediment build-up. Basin appears to have captured most of runoff. Maintenance required (cleanout of sediment started already).

UTM Zone 11

Form HV2: Permanent BMPs for Buildings and Structures

ID# 650

Easting 246846

Building/Structure Name Lower Maggie's Corner

Survey Date 7/27/2018

Selection Code S03

Northing 4312787

Reviewer Name(s) K. Kvasnicka, J. Azevedo

Township 12N

Range 18E

Section 1

Date Project Start 8/1/2016

Date Project End 8/1/2016

Watershed CA-1

State CA

Date BMP Implementation Complete 8/1/2016

Date Last BMP Maintenance 7/27/2017

Job No

Storm Depth 0.89"

Structure Type Other

Other (Describe) Road

Survey Type

Post Storm Survey

Plan Title CERP applies, Erosion Hotspot Inventory Epic Discovery EIR/EIS/EIS

Plan Date

Plan Revision Date

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

Water bar connection to SEZ, road shoulder effective cover, soil stabilization, prevention of sediment transport, improve erosion resistance, water bar outlet protection.

Implementation

1 1) BMPs are designed to maintain resource protection and meet water quality standards
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs

Implementation Score: 1

1 2) BMPs are constructed according to contract design specifications
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

Effectiveness

Effectiveness Score: E

1) Source area erosion control, protection/stabilization of site, especially erosive areas

- a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact
b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion
c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion

Meets/Exceeds. Minor Concern Major Concern NA

Meet/Exceeds Minor Concern Major Concern NA

Meets/Exceeds Minor Concern Major Concern NA

2) Runoff infiltration and drainage control system effectiveness

- a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ
b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened

Meets/Exceeds Minor Concern Major Concern NA

Meets/Exceeds Minor Concern Major Concern NA

3) Effectiveness of hazardous substance control measures

- a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality

Meets/Exceeds Minor Concern Major Concern NA

Additional Comments

Wattles in place around drainage basin. Basin sediment build-up prevalent and wattles were overtopped. Rock lined ditch has prevalent sediment build-up. Maintenance required (cleanout of sediment started already).

UTM Zone 11

Form HV2: Permanent BMPs for Buildings and Structures

ID# 651

Easting 247287

Building/Structure Name Hellwinkle's Road Segment

Survey Date 9/19/2018

Selection Code S03

Northing 4312392

Reviewer Name(s) K. Kvasnicka

Township 12N

Range 18E

Section 1

Date Project Start 8/7/2006

Date Project End 9/30/2006

Watershed CA-1

State CA

Date BMP Implementation Complete 9/30/2006

Date Last BMP Maintenance 7/11/2017

Job No

Storm Depth

Structure Type Other

Other (Describe) Road

Survey Type Follow-up

Plan Title CERP applies, Erosion Hotspot Inventory Epic Discovery EIR/EIS/EIS

Plan Date

Plan Revision Date

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

Water bar connection to SEZ, road shoulder effective cover, soil stabilization, prevention of sediment transport, improve erosion resistance, water bar outlet protection.

Implementation

1 1) BMPs are designed to maintain resource protection and meet water quality standards
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs

Implementation Score: 1

1 2) BMPs are constructed according to contract design specifications
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

Effectiveness

Effectiveness Score: E

1) Source area erosion control, protection/stabilization of site, especially erosive areas

- a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact
b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion
c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion

Meets/Exceeds, Minor Concern, Major Concern, NA radio button options for items a, b, and c.

2) Runoff infiltration and drainage control system effectiveness

- a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ
b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened

Meets/Exceeds, Minor Concern, Major Concern, NA radio button options for items a and b.

3) Effectiveness of hazardous substance control measures

- a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality

Meets/Exceeds, Minor Concern, Major Concern, NA radio button options for item a.

Additional Comments

Waterbars have moderate sediment build-up; maintenance may be required before end of season.

UTM Zone 11

Form HV2: Permanent BMPs for Buildings and Structures

ID# 659

Easting 247767

Building/Structure Name Tubing Lift

Survey Date 7/16/2018

Selection Code S02

Northing 4313590

Reviewer Name(s) K. Kvasnicka

Township

Range

Section

Date Project Start

Date Project End

Watershed CA-1

State NV

Date BMP Implementation Complete

Date Last BMP Maintenance

Job No

Storm Depth

Structure Type

Other (Describe)

Survey Type

Routine

Plan Title

Plan Date

Plan Revision Date

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

Implementation

1

1) BMPs are designed to maintain resource protection and meet water quality standards
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs

Implementation Score:

1

1

2) BMPs are constructed according to contract design specifications
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

Effectiveness

Effectiveness Score:

E

1) Source area erosion control, protection/stabilization of site, especially erosive areas

- a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact
b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion
c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion

Meets/Exceeds Minor Concern Major Concern NA

Meet/Exceeds Minor Concern Major Concern NA

Meets/Exceeds Minor Concern Major Concern NA

2) Runoff infiltration and drainage control system effectiveness

- a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ
b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened

Meets/Exceeds Minor Concern Major Concern NA

Meets/Exceeds Minor Concern Major Concern NA

3) Effectiveness of hazardous substance control measures

- a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality

Meets/Exceeds Minor Concern Major Concern NA

Additional Comments

Wood chip mulch in place and in good condition. Area well maintained. No recommendations as no evidence of erosion, ponding or sediment movement.

UTM Zone 11

Form HV2: Permanent BMPs for Buildings and Structures

ID# 676

Easting 247740

Building/Structure Name High Roller Terrain Park

Survey Date 9/19/2018

Selection Code S03

Northing 4311300

Reviewer Name(s) K. Kvasnicka

Township 12N

Range 18E

Section 1

Date Project Start 8/7/2006

Date Project End 9/1/2006

Watershed CA-1

State CA

Date BMP Implementation Complete 9/1/2006

Date Last BMP Maintenance 10/1/2010

Job No

Storm Depth

Structure Type Other

Other (Describe) Terrain Park

Survey Type Follow-up

Plan Title No plan set, CERP applies

Plan Date

Plan Revision Date

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

Erosion identified from snowmelt runoff.

Implementation

1 1) BMPs are designed to maintain resource protection and meet water quality standards
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs

Implementation Score: 1

1 2) BMPs are constructed according to contract design specifications
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

Effectiveness

Effectiveness Score: E

1) Source area erosion control, protection/stabilization of site, especially erosive areas

- a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact
b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion
c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion

Radio button options for effectiveness: Meets/Exceeds, Minor Concern, Major Concern, NA

2) Runoff infiltration and drainage control system effectiveness

- a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ
b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened

Radio button options for effectiveness: Meets/Exceeds, Minor Concern, Major Concern, NA

3) Effectiveness of hazardous substance control measures

- a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality

Radio button options for effectiveness: Meets/Exceeds, Minor Concern, Major Concern, NA

Additional Comments

Culvert functioning and sediment maintained in basin. Road surfaced with road base and erosion resistance is effective.

UTM Zone 11

Form HV2: Permanent BMPs for Buildings and Structures

ID# 677

Easting 246183

Building/Structure Name Groove - Lower Terminal

Survey Date 10/10/2018

Selection Code S03

Northing 4312513

Reviewer Name(s) K. Kvasnicka

Township 12N

Range 18E

Section 1

Date Project Start 9/1/2016

Date Project End 9/19/2016

Watershed CA-1

State CA

Date BMP Implementation Complete 9/19/2016

Date Last BMP Maintenance 9/19/2016

Job No

Storm Depth 0.45"

Structure Type Lift-Base

Other (Describe)

Survey Type

Post Storm Survey

Plan Title Infiltration BMP Maintenance

Plan Date

Plan Revision Date

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

Dripline infiltration, drywell, rock-lined ditch, soil stabilization

Implementation

1) BMPs are designed to maintain resource protection and meet water quality standards
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs

Implementation Score: 1

1) 2) BMPs are constructed according to contract design specifications
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

Effectiveness

Effectiveness Score: E

1) Source area erosion control, protection/stabilization of site, especially erosive areas

- a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact
b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion
c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion

Meets/Exceeds, Minor Concern, Major Concern, NA radio button options for items a, b, and c.

2) Runoff infiltration and drainage control system effectiveness

- a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ
b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened

Meets/Exceeds, Minor Concern, Major Concern, NA radio button options for items a and b.

3) Effectiveness of hazardous substance control measures

- a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality

Meets/Exceeds, Minor Concern, Major Concern, NA radio button options for item a.

Additional Comments

Rock lined ditch and drainage area in good condition, some sediment build up after storm event, may need maintenance prior to more storms.

UTM Zone  **Form HV2: Permanent BMPs for Buildings and Structures** ID#

Easting  Building/Structure Name  Survey Date  Selection Code

Northing  Reviewer Name(s)  Township  Range  Section

Date Project Start  Date Project End  Watershed  State

Date BMP Implementation Complete  Date Last BMP Maintenance  Job No  Storm Depth

Structure Type  Other (Describe)  Survey Type

Plan Title  Plan Date  Plan Revision Date

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

Erosion resistance along roadway

**Implementation**  1) BMPs are designed to maintain resource protection and meet water quality standards  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs **Implementation Score:**

2) BMPs are constructed according to contract design specifications  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

**Effectiveness** **Effectiveness Score:**

- 1) Source area erosion control, protection/stabilization of site, especially erosive areas**
- a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact  Meets/Exceeds  Minor Concern  Major Concern  NA
  - b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion  Meet/Exceeds  Minor Concern  Major Concern  NA
  - c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion  Meets/Exceeds  Minor Concern  Major Concern  NA
- 2) Runoff infiltration and drainage control system effectiveness**
- a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ  Meets/Exceeds  Minor Concern  Major Concern  NA
  - b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened  Meets/Exceeds  Minor Concern  Major Concern  NA
- 3) Effectiveness of hazardous substance control measures**
- a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality  Meets/Exceeds  Minor Concern  Major Concern  NA

Additional Comments

UTM Zone 11

Form HV2: Permanent BMPs for Buildings and Structures

ID# 683

Easting 244964

Building/Structure Name Calif. Main Lodge Parking Lot

Survey Date 7/27/2018

Selection Code S03

Northing 247137

Reviewer Name(s) K. Kvasnicka, J. Azevedo

Township 12N

Range 18E

Section 1

Date Project Start 8/27/2007

Date Project End 9/13/2006

Watershed CA-6

State CA

Date BMP Implementation Complete 10/1/2009

Date Last BMP Maintenance 7/11/2017

Job No 00-607.5

Storm Depth 0.77"

Structure Type Other

Other (Describe) Parking Lot

Survey Type

Post Storm Survey

Plan Title Phase III, Calif. Base Lodge Parking Lot Water Quality Treatment System

Plan Date 05-05-2007

Plan Revision Date

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

Revegetation, groundwater

Implementation

1) BMPs are designed to maintain resource protection and meet water quality standards
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs

Implementation Score: 1

1) 2) BMPs are constructed according to contract design specifications
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

Effectiveness

Effectiveness Score: E

1) Source area erosion control, protection/stabilization of site, especially erosive areas

- a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact
b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion
c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion

Meets/Exceeds. Minor Concern Major Concern NA

Meet/Exceeds Minor Concern Major Concern NA

Meets/Exceeds Minor Concern Major Concern NA

2) Runoff infiltration and drainage control system effectiveness

- a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ
b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened

Meets/Exceeds Minor Concern Major Concern NA

Meets/Exceeds Minor Concern Major Concern NA

3) Effectiveness of hazardous substance control measures

- a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality

Meets/Exceeds Minor Concern Major Concern NA

Additional Comments

Drainage improvements functioning after storm, no flow across parking lot.



UTM Zone 10

Form HV2: Permanent BMPs for Buildings and Structures

ID# 684

Easting 0 Building/Structure Name Hand Grenade Corner Survey Date 6/22/2018 Selection Code S02

Northing 0 Reviewer Name(s) K. Kvasnicka, J. Azevedo Township Range Section

Date Project Start 6/15/2017 Date Project End 9/15/2017 Watershed CA-4 State CA

Date BMP Implementation Complete Date Last BMP Maintenance 7/11/2017 Job No Storm Depth

Structure Type Other (Describe) Ski Run Survey Type Follow-up

Plan Title Plan Date Plan Revision Date

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

Water bar refurbishment, slope stabilization, prevention of sediment transport, improve erosion resistance, culvert installation

Implementation

- 1) BMPs are designed to maintain resource protection and meet water quality standards
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs
2) BMPs are constructed according to contract design specifications
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

Implementation Score: 1

Effectiveness

Effectiveness Score: E

1) Source area erosion control, protection/stabilization of site, especially erosive areas

- a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact
b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion
c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion

2) Runoff infiltration and drainage control system effectiveness

- a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ
b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened

3) Effectiveness of hazardous substance control measures

- a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality

Additional Comments Revegetation appears to be coming back and slope in excellent condition with no evidence of sediment movement. Culvert outlet is free of debris.

UTM Zone 11

Form HV2: Permanent BMPs for Buildings and Structures

ID# 686

Easting 247287

Building/Structure Name Hellwinkle's Road Segment

Survey Date 10/10/2018

Selection Code S03

Northing 4312392

Reviewer Name(s) K. Kvasnicka

Township 12N

Range 18E

Section 1

Date Project Start 8/7/2006

Date Project End 9/30/2006

Watershed CA-1

State CA

Date BMP Implementation Complete 9/30/2006

Date Last BMP Maintenance 7/11/2017

Job No

Storm Depth 0.45"

Structure Type Other

Other (Describe) Road

Survey Type

Post Storm Survey

Plan Title CERP applies, Erosion Hotspot Inventory Epic Discovery EIR/EIS/EIS

Plan Date

Plan Revision Date

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

Water bar connection to SEZ, road shoulder effective cover, soil stabilization, prevention of sediment transport, improve erosion resistance, water bar outlet protection.

Implementation

- 1) BMPs are designed to maintain resource protection and meet water quality standards
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs
2) BMPs are constructed according to contract design specifications
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

Implementation Score: I

Effectiveness

Effectiveness Score: E

1) Source area erosion control, protection/stabilization of site, especially erosive areas

- a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact
b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion
c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion

Radio button options for effectiveness: Meets/Exceeds, Minor Concern, Major Concern, NA

2) Runoff infiltration and drainage control system effectiveness

- a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ
b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened

Radio button options for effectiveness: Meets/Exceeds, Minor Concern, Major Concern, NA

3) Effectiveness of hazardous substance control measures

- a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality

Radio button options for effectiveness: Meets/Exceeds, Minor Concern, Major Concern, NA

Additional Comments

Waterbar outlets need sediment removal after storm event, road binder may need additional application in future.

UTM Zone  **Form HV2: Permanent BMPs for Buildings and Structures** ID#

Easting  Building/Structure Name  Survey Date  Selection Code

Northing  Reviewer Name(s)  Township  Range  Section

Date Project Start  Date Project End  Watershed  State

Date BMP Implementation Complete  Date Last BMP Maintenance  Job No  Storm Depth

Structure Type  Other (Describe)  Survey Type

Plan Title  Plan Date  Plan Revision Date

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

Effective cover/erosion resistance, permanent drainage system piping, infiltration areas and berms.

**Implementation**  1) BMPs are designed to maintain resource protection and meet water quality standards  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs **Implementation Score:**

2) BMPs are constructed according to contract design specifications  
 1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

**Effectiveness** **Effectiveness Score:**

**1) Source area erosion control, protection/stabilization of site, especially erosive areas**

a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion  Meet/Exceeds  Minor Concern  Major Concern  NA

c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion  Meets/Exceeds  Minor Concern  Major Concern  NA

**2) Runoff infiltration and drainage control system effectiveness**

a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ  Meets/Exceeds  Minor Concern  Major Concern  NA

b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened  Meets/Exceeds  Minor Concern  Major Concern  NA

**3) Effectiveness of hazardous substance control measures**

a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality  Meets/Exceeds  Minor Concern  Major Concern  NA

Additional Comments

UTM Zone 11

Form HV2: Permanent BMPs for Buildings and Structures

ID# 688

Easting 247850

Building/Structure Name Alpine Coaster

Survey Date 7/16/2018

Selection Code S03

Northing 4313936

Reviewer Name(s) K. Kvasnicka

Township 12N

Range 18E

Section 1

Date Project Start 6/15/2015

Date Project End 11/15/2015

Watershed CA-1

State CA

Date BMP Implementation Complete 11/15/2015

Date Last BMP Maintenance 11/15/2015

Job No 15-102.1

Storm Depth

Structure Type Other

Other (Describe) Coaster

Survey Type Follow-up

Plan Title Forest Flyer Alpine Coaster

Plan Date 4/27/2015

Plan Revision Date NA

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

Attainment of effective ground cover, splash and scour erosion protection: roofline infiltration trenches, wood chip mulch

Implementation

1) BMPs are designed to maintain resource protection and meet water quality standards
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs

Implementation Score: 1

1) 2) BMPs are constructed according to contract design specifications
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

Effectiveness

Effectiveness Score: E

1) Source area erosion control, protection/stabilization of site, especially erosive areas

- a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact
b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion
c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion

Radio button options for effectiveness: Meets/Exceeds, Minor Concern, Major Concern, NA

2) Runoff infiltration and drainage control system effectiveness

- a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ
b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened

Radio button options for effectiveness: Meets/Exceeds, Minor Concern, Major Concern, NA

3) Effectiveness of hazardous substance control measures

- a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality

Radio button options for effectiveness: Meets/Exceeds, Minor Concern, Major Concern, NA

Additional Comments

Repairs from damage sustained during winter 2016/2017 complete, no additional mulch application required, no threat to SEZ.

UTM Zone 11

Form HV2: Permanent BMPs for Buildings and Structures

ID# 691

Easting 245483

Building/Structure Name World Cup

Survey Date 7/17/2018

Selection Code S03

Northing 4314602

Reviewer Name(s) K. Kvasnicka

Township 12N

Range 18E

Section 1

Date Project Start 8/22/2006

Date Project End 10/15/2010

Watershed CA-6

State CA

Date BMP Implementation Complete 9/19/2016

Date Last BMP Maintenance 7/11/2017

Job No 00-607-4

Storm Depth

Structure Type Maintenance Station

Other (Describe)

Survey Type Follow-up

Plan Title Upper Shops Water Quality and Stream Environment Zone Improvements

Plan Date 4/25/06

Plan Revision Date 8/31/06

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

BMPs to protect adjacent SEZ - drainage diversion, concrete wall, SEZ drop pool design, revegetation

Implementation

1) BMPs are designed to maintain resource protection and meet water quality standards
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs

Implementation Score: I

1) 2) BMPs are constructed according to contract design specifications
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

Effectiveness

Effectiveness Score: E

1) Source area erosion control, protection/stabilization of site, especially erosive areas

- a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact
b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion
c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion

Radio button options for effectiveness: Meets/Exceeds, Minor Concern, Major Concern, NA

2) Runoff infiltration and drainage control system effectiveness

- a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ
b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened

Radio button options for effectiveness: Meets/Exceeds, Minor Concern, Major Concern, NA

3) Effectiveness of hazardous substance control measures

- a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality

Radio button options for effectiveness: Meets/Exceeds, Minor Concern, Major Concern, NA

Additional Comments

Erosion hotspot identified in 2017. Gully filled with sediment and wood chips, wood chip mulch spread over bare areas.

UTM Zone 11

Form HV2: Permanent BMPs for Buildings and Structures

ID# 692

Easting 244964

Building/Structure Name First Ride

Survey Date 7/17/2018

Selection Code S03

Northing 247137

Reviewer Name(s) K. Kvasnicka

Township 12N

Range 18E

Section 1

Date Project Start 8/27/2007

Date Project End 9/13/2006

Watershed CA-6

State CA

Date BMP Implementation Complete 10/1/2009

Date Last BMP Maintenance 7/11/2017

Job No 00-607.5

Storm Depth

Structure Type Other

Other (Describe) Parking Lot

Survey Type Follow-up

Plan Title Phase III, Calif. Base Lodge Parking Lot Water Quality Treatment System

Plan Date 05-05-2007

Plan Revision Date

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

Revegetation, groundwater

Implementation

1) BMPs are designed to maintain resource protection and meet water quality standards
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs

Implementation Score: I

1) 2) BMPs are constructed according to contract design specifications
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

Effectiveness

Effectiveness Score: E

1) Source area erosion control, protection/stabilization of site, especially erosive areas

- a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact
b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion
c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion

Radio button options for effectiveness: Meets/Exceeds, Minor Concern, Major Concern, NA

2) Runoff infiltration and drainage control system effectiveness

- a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ
b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened

Radio button options for effectiveness: Meets/Exceeds, Minor Concern, Major Concern, NA

3) Effectiveness of hazardous substance control measures

- a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality

Radio button options for effectiveness: Meets/Exceeds, Minor Concern, Major Concern, NA

Additional Comments

Erosion hotspot identified in 2017. Gully regraded, sediment tilled with wood chip mulch and pine needles spread over all disturbed areas.

UTM Zone 11

Form HV2: Permanent BMPs for Buildings and Structures

ID# 693

Easting 247158

Building/Structure Name Ridge Bowl

Survey Date 8/9/2018

Selection Code S03

Northing 4312234

Reviewer Name(s) K. Kvasnicka, J. Azevedo

Township 12N

Range 18E

Section 1

Date Project Start 8/18/2015

Date Project End 9/30/2016

Watershed CA-1

State CA

Date BMP Implementation Complete 9/30/2016

Date Last BMP Maintenance

Job No

Storm Depth

Structure Type Lift-Base

Other (Describe)

Survey Type Follow-up

Plan Title Infiltration BMP Maintenance, Erosion Hotspot Inventory Epic Discovery EIR/EIS/EIS

Plan Date 10/15/2006

Plan Revision Date 10/15/200

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

Roof downspout outfall infiltration, soil erosion. Reference construction plans job #00-607-11 4/14/2003 revision date 7/14/2003, Canyon lift replacement and Ridge lift removal erosion control.

Implementation

1 1) BMPs are designed to maintain resource protection and meet water quality standards
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs

Implementation Score: 1

1 2) BMPs are constructed according to contract design specifications
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

Effectiveness

Effectiveness Score: E

1) Source area erosion control, protection/stabilization of site, especially erosive areas

- a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact
b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion
c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion

Radio button options for effectiveness: Meets/Exceeds, Minor Concern, Major Concern, NA

2) Runoff infiltration and drainage control system effectiveness

- a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ
b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened

Radio button options for effectiveness: Meets/Exceeds, Minor Concern, Major Concern, NA

3) Effectiveness of hazardous substance control measures

- a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality

Radio button options for effectiveness: Meets/Exceeds, Minor Concern, Major Concern, NA

Additional Comments

Regraded ditch and sedimentation basins to collect and convey runoff, rock riprap check dams installed at basin outlets to slow flow. Reevaluate during spring runoff following large winters. No evidence of equipment access.

UTM Zone 11

Form HV2: Permanent BMPs for Buildings and Structures

ID# 694

Easting 246148

Building/Structure Name Tram Top Station

Survey Date 11/6/2018

Selection Code S03

Northing 4313086

Reviewer Name(s) K. Kvasnicka, C. Kuhn, J. Azevedo

Township 12N

Range 18E

Section 1

Date Project Start

Date Project End

Watershed CA-1

State CA

Date BMP Implementation Complete 7/31/2002

Date Last BMP Maintenance

Job No

Storm Depth

Structure Type Lift

Other (Describe)

Survey Type Routine

Plan Title

Plan Date

Plan Revision Date

Specific concerns associated with construction project and BMP measures designed to achieve resource protection

Soil stabilization and sediment transport to SEZ, revegetation.

Implementation

1 1) BMPs are designed to maintain resource protection and meet water quality standards
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to address BMPs

Implementation Score: 1

1 2) BMPs are constructed according to contract design specifications
1 = Meets/Exceeds 2 = Minor concerns 3 = Major concerns 4 = Failure to follow specifications

Effectiveness

Effectiveness Score: m

1) Source area erosion control, protection/stabilization of site, especially erosive areas

- a) Soil protection measures, artificial or vegetative, eliminating erosion by runoff and rain-drop impact
b) Revegetation establishment proceeding as expected, vegetative cover mitigating erosion
c) Cut/fill slope protection (vegetation, erosion control blankets, retention walls) preventing erosion

Radio button options for effectiveness: Meets/Exceeds, Minor Concern, Major Concern, NA

2) Runoff infiltration and drainage control system effectiveness

- a) Infiltration zones (detention basins, driplines, gravel armor areas, infiltration trenches, system outlets) functioning properly with little potential for sediment and/or nutrient delivery to SEZ
b) Ponding of runoff does not threaten fill slope or foundation integrity, erosion is not evident and no downstream resources are threatened

Radio button options for effectiveness: Meets/Exceeds, Minor Concern, Major Concern, NA

3) Effectiveness of hazardous substance control measures

- a) Mitigation measures of hazardous/toxic substances sufficient with no potential risk to water quality

Radio button options for effectiveness: Meets/Exceeds, Minor Concern, Major Concern, NA

Additional Comments

Gully identified from Tram Top Station running down slope to Lakeview Lodge. Repair added to 2019 Work List.



Heavenly Mountain Resort  
Mitigation and Monitoring Plan Annual Report  
(October 2017 – September 2018)

APPENDIX



ENVIRONMENTAL MONITORING ANNUAL  
REPORT HEAVENLY MOUNTAIN RESORT  
WATER YEAR 2018  
(ELECTRONIC COPY ONLY)





January 15, 2019

Ms. Elizabeth van Diepen  
Engineering Geologist  
Lahontan Regional Water Quality Control Board  
2501 Lake Tahoe Boulevard  
South Lake Tahoe, CA 96150

Re: Heavenly Mountain Resort 2018 Environmental Monitoring Program Annual Report

Dear Ms. van Diepen:

Enclosed, please find for your review the Environmental Monitoring Program Annual Report for the 2018 water year submitted in fulfillment of the monitoring and reporting requirements set forth in the California Regional Water Quality Control Board Lahontan Region Monitoring and Reporting Program No. 2015-0021 for Heavenly Ski Resort. This report also fulfills the fourth quarter sampling, covering the months of July, August and September 2018. The annual reporting requirements and location found in the report are listed below:

- Water Quality Monitoring Results and Laboratory Analysis for 4<sup>th</sup> Quarter (Appendix A)
- Storm Vault Water Quality Monitoring Results and Laboratory Analysis (Appendix B)
- Facilities Maintenance Monitoring for 4<sup>th</sup> Quarter (Appendix D)
- Snow Conditioning and Snowmaking Monitoring (Appendix D)
- Deicer and Abrasives Application and Recovery (Appendix D)
- USFS Road Monitoring (Appendix E)
- Facilities/Watershed Awareness Training (Appendix F)
- On-Mountain Photo Monitoring (Appendix G)

Should you require additional information or have questions regarding this report and its contents, please contact Chris Donley of Cardno at 208-272-9178.

Sincerely,

DocuSigned by:  
  
88703E1EA8B0471

Mike Goar  
Vice President & Chief Operating Officer

Cc: Stephanie Heller, USDA Forest Service LTBMU  
Julie Roll, Tahoe Regional Planning Agency

PO Box 2180  
Stateline, NV 89449  
775/586-7000  
www.skuheavenly.com

**VAIL RESORTS**  
EXPERIENCE OF A LIFETIME





Date: January 15, 2019

California Regional Water Quality Control Board  
Lahontan Region  
2501 Lake Tahoe Boulevard  
South Lake Tahoe, CA 96150

Facility Name: Heavenly Mountain Resort  
Address: Post Office Box 2180  
Stateline, Nevada 89449  
Contact Person: Mike Goar  
Job Title: Vice President & Chief Operating Officer  
Phone: (775) 586-2311  
Email: mgoar@vailresorts.com  
WDR/NPDES Order Number: R6T-2015-0021  
WDID Number: 6A090033000

Type of Report (circle one):      Monthly      Quarterly      Semi-Annual      **Annual**      Other

Month(s) (circle applicable month(s)\*:

JAN      FEB      MAR      APR      MAY      JUN  
JUL      AUG      SEP      **OCT**      NOV      DEC

\*Annual Reports (circle the first month of the reporting period)

Year: Water Year 2018

Violation(s)?      NO      YES\*      X

(Please check one)      \*If YES is marked complete a-g (Attach Additional information as necessary)

a) **Brief Description of Violation:**

1. Heavenly Valley Creek station 43HVC-1A, Sky Meadow's site, has an annual average value exceedance of the Lahontan standards for: Total Phosphorus and Chloride.
2. Heavenly Valley Creek station 43HVC-2, Below Patsy's site, has an annual average value exceedance of the Lahontan standards for: Total Phosphorus and Chloride.
3. Heavenly Valley Creek station 43HVC-3, Property Line site, has an annual average value exceedance of the Lahontan standards for: Total Phosphorus and Chloride.
4. Bijou Park Creek station 43HVC-4, CA Parking Lot site, has annual average exceedances of the Lahontan standards for: Turbidity, Total Nitrogen, Total Phosphorus, and Chloride.
5. California Parking Lot Filter Vault Effluent Point station 43HVP-2, exceeded not to exceed limits of the Lahontan standards for: Turbidity, Total Nitrogen,

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and Oil & Grease in Water Year 2018.

- b) **Section(s) of WDRs/  
NPDES Permit Violated:** Board Order No. R6T-2015-0021, WDID NO. 6A090033000
- c) **Reported Value(s) or  
Volume:**
- 43HVC-1A: Total Phosphorus: 0.022 mg/L.  
Chloride: 0.34 mg/L.
- 43HVC-2: Total Phosphorus: 0.025 mg/L.  
Chloride: 0.73 mg/L.
- 43HVC-3: Total Phosphorus: 0.020 mg/L.  
Chloride: 0.58 mg/L.
- 43BPC-4: Turbidity: 27.6 NTU  
Total Nitrogen: 0.539 mg/L  
Total Phosphorus: 0.147 mg/L.  
Chloride: 50.8 mg/L.
- 43HVP-2: (Results from the 4<sup>th</sup> Quarter)  
Turbidity: 100 NTU.  
Total Nitrogen: 2.2 mg/L.  
Oil and Grease: 3.3 mg/L.
- d) **WDRs/NPDES  
Limit/Condition:** Maximum concentrations not to exceed for discharge to surface waters in the Lake Tahoe Hydrologic Unit (Applies to the Effluent Storm Filter Site 43HVP-2):  
Turbidity: 20.0 NTU  
Total Nitrogen: 0.5 mg/L  
Total Phosphorus: 0.10 mg/L  
Oil and Grease: 2.0 mg/L

Effluent limits for surface water runoff in the Lake Tahoe Hydrologic Unit and Additional Receiving Water Limits for Lake Tahoe (Applies to the Bijou Park Creek Site 43BPC-4):

Turbidity: 20 NTU<sup>1</sup>  
Total Nitrogen: 0.15 mg/L  
Total Phosphorus: 0.008 mg/L  
Chloride: 3.0 mg/L  
Total Suspended Solids: 60 mg/L<sup>2</sup>

Maximum receiving water concentrations for discharge in the Heavenly Valley Creek watershed to Trout Creek (Applies to 43HVC-1A, 43HVC-2, 43HVC-3 and the reference site 43HDVC-5):

Total Nitrogen: 0.19 mg/L  
Total Phosphorus: 0.015 mg/L  
Chloride: 0.15 mg/L  
Total Suspended Solids: 60 mg/L<sup>2</sup>

<sup>1</sup>The turbidity maximum surface water runoff effluent value is based on the average daily samples collected from a single discharge point for the Lake Tahoe Hydrologic Unit.

<sup>2</sup>Total Suspended Solids (TSS) value based on Lake Tahoe Basin 90<sup>th</sup> percentile value.

e) **Date(s) and Duration of Violation(s):**

Water Year 2018 (October 1, 2017 – September 30, 2018)

f) **Explanation of Cause(s):**

Heavenly Valley Creek – Annual averages for total phosphorus and chloride were exceeded at each of the three sampling locations along Heavenly Valley Creek (43HVC-1A, 43HVC-2, and 43HVC-3). Annual averages for total nitrogen were also exceeded at the upper elevation sampling locations (43HVC-1A and 43HVC-2) during the spring snowmelt season, (April-June), likely as a result of increased exposure to meadow vegetation during snowmelt. The annual average for total phosphorus and chloride were also exceeded at the reference reach sampling location (43HDVC-5). Heavenly Mountain Resort operations are not solely responsible for water quality exceedances since the back ground levels at the reference reach site are also high.

Bijou Park Creek – Annual averages for turbidity, total nitrogen, total phosphorus and chloride exceeded the state standard for the below California Parking Lot sampling site along Bijou Park Creek (43BPC-4). Total phosphorus and chloride values were also exceeded at the reference site along Hidden Valley Creek (43HDVC-5); however, the annual averages for Bijou Park Creek (43BPC-4) are well above the reference reach exceedance values.

California Parking Lot Filter Vault Effluent Sampling Location (43HVP-2) – Turbidity, total nitrogen, and oil & grease exceeded the not to exceed standards twice out of the three water year sampling events. Total phosphorus did not exceed the not to exceed standards for any of the sampling events. During the 4<sup>th</sup> quarter of water year 2018, turbidity, total nitrogen, and oil & grease were in exceedance. These parameters were also in excess of the standard at the two inlet locations (43HVP-1A and 43HVP-1B). Comparison of the inlet and effluent concentrations shows a reduction in turbidity, total phosphorus, total nitrogen, and oil & grease in nearly all instances. Although annual maintenance of the vaults and cartridge replacement continued in 2018, storm and snow melt runoff samples at all three monitoring locations continue to be in exceedance and problematic. The Bijou Park Creek Evaluation Report, submitted with the Comprehensive Report in January 2017, outlines additional vault improvement recommendations that Heavenly should undertake in the future to help improve the filter vault water quality results.

g) **Corrective Action(s): (Specify actions taken and a schedule for actions to be taken)**

Heavenly swept and collected cinders from the parking lot following resort activities in late spring resulting in a greater total weight of material collected than applied, during the 2018/2019 ski season. This is likely due to collection of City applied materials as well as the collection of loose degraded parking lot pavement materials. The increased effort to collect abrasives and deicer limits the loading on the CA parking lot filtration system as well as storm water runoff from mobilizing constituents of interest into the nearby Bijou Park Creek and watershed. During the fourth quarter, Heavenly inspected the vaults/filters, replaced filters, conducted vault maintenance, and removed excess debris within the vaults. In the past this level of effort, including filter replacement, has led to cleaner water quality samples. For example, first quarter filter vault storm sampling resulted in no exceedances for any of the measured constituents, demonstrating that water quality is being filtered and improved through the system. Future runoff/storm sampling results hope to show this continued water quality trend. If not, bi-annual filter replacement (spring/fall) may be needed to address and treat winter runoff flows.

During the 2017/2018 ski season, Heavenly continued pre-storm brine application in effort to limit the amount of deicer needed while still providing safe travel for their employees and guests. Brine usage helps to prevent roadway icing and limit additional sand/salt (chloride) introduced into the watershed. On three separate occasions in February 2018, application of liquid brine occurred prior to storm

cycles in and around the parking lots and roadways adjacent to the California Base Area. Heavenly is planning to continue brine application for the 2018/2019 season in hopes to continue the reduction of deicer application.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision following a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my knowledge of the person(s) who manage the system or those directly responsible for data gathering, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

If you have any questions or require additional information, please contact Mike Goar at the number provided above.

Sincerely,

Signature: \_\_\_\_\_  
  
88703E1EA6B0471...

Name: Mike Goar

Title: Vice President & Chief Operating Officer



# Environmental Monitoring Program Annual Report

Heavenly Mountain Resort Water  
Year 2018

January 1, 2019





## Document Information

Project Name Environmental Monitoring Program Annual Report  
Heavenly Mountain Resort Water Year 2018

WDID Number 6A090033000

Job Reference E318100700

Date January 2019

Version Number 1.0

Effective Date January 2019

Date Approved

Prepared for



Heavenly Mountain Resort  
224 Kingsbury Grade, (State Route 207), Suite 202, Stateline, NV 89449

Submitted to:



Lahontan Regional Water Quality Control Board  
2501 Lake Tahoe Boulevard, South Lake Tahoe, CA 96150  
&



Lake Tahoe Basin Management Unit (LTBMU) USFS  
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Prepared by:



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## Acronyms

BMI	Benthic Macroinvertebrate
BMPs	Best Management Practices
BMPEP	Best Management Practices Effectiveness Program
EIR/EIS	Environmental Impact Report / Environmental Impact Statement
IBI	Index of Biological Integrity
Lahontan	Lahontan Regional Water Quality Control Board (of the state of California)
LTBMU	Lake Tahoe Basin Management Unit (USDA Forest Service)
M or m	Meter
mg/L	milligrams/liter
MRP	Monitoring and Reporting Program
NDEP	Nevada Department of Environmental Protection
NTU	Nephelometric Turbidity Units
RCI	Resources Concepts Inc.
SCI	Stream Control Inventory
SWE	Snow Water Equivalent
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Load
TRPA	Tahoe Regional Planning Agency
TSS	Total Suspended Sediment
USDA	United States Department of Agriculture
USFS	United States Forest Service
WDR	Waste Discharge Requirements

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# 1 Introduction

---

Submittal of the annual report is in partial fulfillment of monitoring and reporting requirements set forth in the Lahontan Regional Water Quality Control Board and Monitoring and Reporting Program Order No. R6T-2015-0021. This report summarizes monitoring and evaluation activities conducted at Heavenly Mountain Resort (Heavenly) during the 2018 water year as a result of the implementation of the Water Quality and Best Management Practices Monitoring Program. This program is a component of the Heavenly Mountain Resort Master Plan (Heavenly 1996), and the Heavenly Mountain Resort Master Plan Amendments (Heavenly 2007 and 2015).

The Monitoring Program was originally developed and implemented by the United State Department of Agriculture (USDA) Forest Service (USFS) as part of the Heavenly Master Plan Draft Environmental Impact Statement (USFS 1996a) and later incorporated into the Heavenly Ski Resort Master Plan as Chapter 7 (Heavenly 1996). In 2003, the Lahontan Regional Water Quality Control Board (Lahontan) issued a Revised Board Order and a Revised Monitoring Plan. In 2005, monitoring and reporting duties were transferred from the USFS to ENTRIX, Inc. (now Cardno) who were retained by Heavenly. The 2007 amendment to the Heavenly Mountain Resort Master Plan, approved by the Tahoe Regional Planning Agency (TRPA) on April 25, 2007, went into effect and began the implementation stage of the plan by Heavenly in collaboration with Lahontan, the USDA Forest Service, and TRPA. Modifications resulting from the Master Plan Amendment included incorporating all mitigation monitoring into a single report that is to be submitted annually in May to the TRPA, USDA Forest Service, and Lahontan. The mitigation and monitoring report schedule and submittal is ongoing and due annually.

Due to newly proposed on-mountain expansion plans, a joint Environmental Impact Report/Environmental Impact Statement/Environmental Impact Statement (EIR/EIS/EIS) was developed and approved in the spring of 2015. The EIR/EIS/EIS followed the past report format and submittal which (where appropriate) updated and refined mitigation measures from the previous Master Plan. The Master Plan represents a comprehensive twenty-year development plan for Heavenly Mountain Resort. Master Plan and Master Plan Amendment implementation objectives of Heavenly, TRPA, and the USDA Forest Service regarding protection of the environment include (Heavenly 1996):

Making optimal use of the natural attributes of the site without creating a significant impact on the environment (Heavenly):

- > Restoring the health of sub-watersheds and other natural resource values disturbed by past activities (Heavenly);
- > Protecting the environmental quality of the area (USDA Forest Service);
- > Providing a quality ski experience within the resort with ski runs and other disturbed areas stabilized to reduce the potential for soil erosion (USDA Forest Service);
- > Improving the visual quality of the area (USDA Forest Service); and
- > Providing for long-term preservation and restoration of Stream Environment Zones (TRPA).

The requirements of the Annual Water Quality and Best Management Practices Monitoring Reports remain the same following approval of the Master Plan Amendment. As the CEQA lead agency, the Water Board is the responsible party for ensuring all mitigation measures are in accordance with the program. "The Water Board recognizes that another agency (Forest Service or TRPA) has responsibilities for ensuring implementation" for monitoring mitigation measures outside of the Water Boards authority.<sup>1</sup>

---

<sup>1</sup> California Regional Water Quality Control Board-Lahontan Region. Board Order No. R6T-2015-0021. WDID No. 6A090033000.Waste Discharge Requirements for Heavenly Mountain Resort. 2015 (pages 16-17).

As with past annual report submittals, the BMP monitoring report will be submitted with the TRPA Annual Mitigation and Monitoring Report due on May 1st of the following year (May 2019).

Implementation of the Collection/Monitoring Agreement between Heavenly and the USDA Forest Service (Monitoring Program) provides sufficient data to determine compliance with agency water quality standards and validate the efficiency of management practices in protecting against adverse cumulative watershed effects.

## **1.1 Location**

Heavenly Mountain Resort is located on the south shore of Lake Tahoe within El Dorado and Alpine Counties of California and Douglas County of Nevada (Figure 1-1). Land ownership is shared between the USDA Forest Service and Heavenly. Heavenly operates on National Forest lands through a special-use permit, renewed in 2002 for a period of 40 years. Heavenly has been a special-use permittee from the USDA Forest Service since 1955. In 2002, the current owners Vail Resorts, Inc. acquired Heavenly Mountain Resort.

The California/Nevada state line divides the special-use permit boundary with approximately 60 percent of the ski area in Nevada and 40 percent in California. Approximately 60 percent of Heavenly lies within the jurisdiction of the Tahoe Regional Planning Agency (TRPA) within the Lake Tahoe Basin (Heavenly 1996).

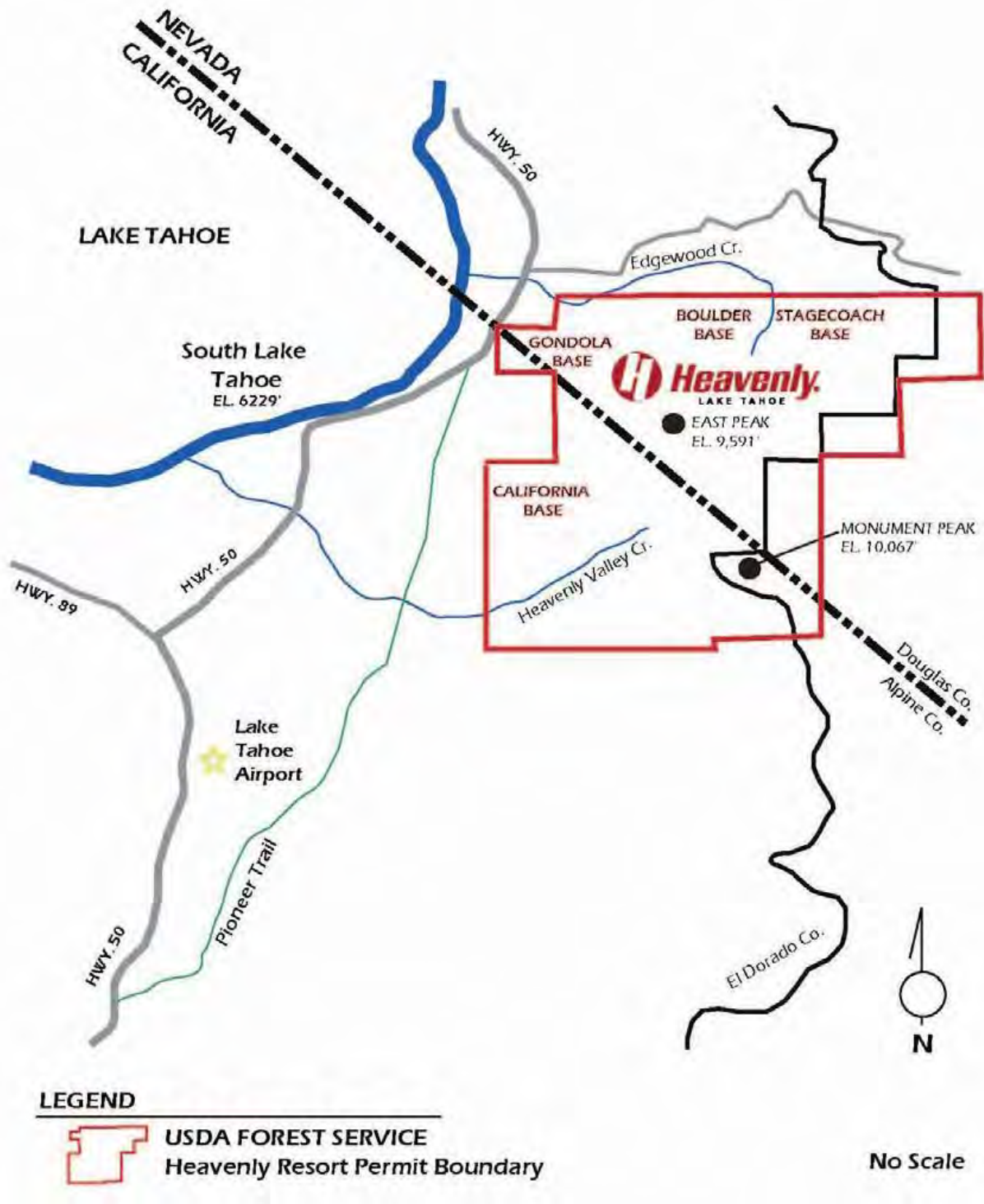


Figure 1-1 Location of Heavenly Mountain Resort (Heavenly 2007)

## 1.2 Environmental Monitoring Program

The overall objective of the Environmental Monitoring Program is to evaluate and monitor water quality and overall ecological health of Heavenly creeks and watersheds while satisfying California, Nevada, and TRPA regulatory water quality requirements. The Environmental Monitoring Program is comprised of five major components (Heavenly 1996):

- > Water quality monitoring to comply with regulatory monitoring requirements;
- > ~~Soil cover monitoring to gain understanding of how to prevent soil loss and protect water quality;~~
- > Monitoring to determine BMP effectiveness under the various conditions at the ski area;
- > Riparian condition monitoring to determine riparian area response to Heavenly Mountain Resort activities; and,
- > Overall watershed condition and trend monitoring.

Four of the objectives of the Environmental Monitoring Program have not changed; however amendments and modifications regarding the objectives have with acceptance of the EIR/EIS/EIS (2015). Soil cover monitoring was removed as a standalone objective due to the difficulty monitoring and assessing improvement and instead was converted and covered under BMP monitoring (hot spot and roadways monitoring) and overall watershed condition monitoring.

## 1.3 Mitigation and Monitoring Plan

The Environmental Monitoring Program Plan was Chapter 7 of the Draft Master Plan Amendment (updated in 2007). Revised measures were addressed in the Heavenly Mountain Resort Epic Discovery Project EIR/EIS/EIS and shall replace and update the Heavenly Master Plan measures (EIR/EIS/EIS 2015). The Monitoring Program was designed to satisfy the requirements of Lahontan Board Order No. R6T-2015-0021. The Monitoring Plan addresses the four components stated above. Key plan requirement updates are summarized as follows.

### 1.3.1 Water Quality Monitoring

Lahontan Board Order Number R6T-2003-0032 updated the waste discharge requirements, monitoring, and reporting program in 2003. The Monitoring and Reporting Program was amended in 2011 under Board Order Number 2003-0032A1 and again in November 2013 under Board Order Number 2003-0032A2. In conjunction with the EIR/EIS/EIS Master Development Plan to protect water quality, the Water Board rescinded Board Order Number R6T-2003-0032 with the passage of new Board Order Number R6T-2015-0021 (May 14, 2015).

The new Monitoring Program includes water quality monitoring at five California stream stations as well as three California Base Parking Area StormFilter™ locations. Monitoring and sampling is stated to occur at all California stream sites monthly as safety and stream flows permit. During the spring snowmelt period, sampling is to occur bi-weekly (every two weeks). Five runoff-sampling events at each of the three California Base Parking Area StormFilter™ locations shall be collected to reflect rainfall and snow runoff to assess performance of the StormFilters™.<sup>2</sup>

Results and discussion are to be reported to Heavenly, TRPA, and Lahontan in this annual report.

Constituents are identified in the Monitoring Program for sampling at each of the stations. The following primary list of constituents are monitored at each of the receiving water sampling stations:

- > Discharge (Flow)

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<sup>2</sup>California Regional Water Quality Control Board-Lahontan Region. 2015. Monitoring and Reporting Program No. 2015-0021 WDID NO. 6A090033000 for Heavenly Mountain Resort. 2015 (pages 1-2).

- > Turbidity
- > Suspended Sediment
- > Total Nitrogen (Total Kjeldahl Nitrogen+Nitrate+Nitrite)
- > Total Phosphorus
- > Chloride

Influent and effluent sampling locations for the StormFilters™ at the California Base parking lot shall include monitoring the following list of constituents:

- > Oil and Grease with silica gel treatment
- > Total Nitrogen (Total Kjeldahl Nitrogen+Nitrate+Nitrite)
- > Total Phosphorus
- > Turbidity
- > Chloride

### **1.3.2 BMP Effectiveness**

The Monitoring Program includes Best Management Practices (BMP) monitoring to determine the effectiveness of the BMPs in preventing soil erosion and protecting water quality under various conditions. The BMP component of the Environmental Monitoring Program was developed and initiated by the USDA Forest Service LTBMU in 2004. RCI assisted in finalizing the monitoring methods and began conducting the monitoring in 2005 through the Revised Environmental Monitoring Program (December 2005) as set forth in the 1996 Master Plan and the approved Master Plan Amendment (2007). The Epic Discovery EIR/EIS/EIS (February 2015) included updates to the Environmental Monitoring Program at Heavenly and the current Lahontan Waste Discharge Requirements (WDR) (May 2015) provided additional monitoring requirements. The Watershed Maintenance and Restoration Program (WMRP) updates the requirement for status updates of restoration/mitigation projects as well as annual hot spot assessments on the mountain. This monitoring and reporting effort complies with regulatory jurisdictions Lahontan, TRPA, Nevada Division of Environmental Protection (NDEP), and USDA Forest Service.

The BMP Monitoring Program is currently being implemented by Resource Concepts Inc. (RCI). Implementation and monitoring reporting results for both temporary and permanent BMPs for the 2018 construction season (through the end of November 2018) will be presented in the TRPA Annual Mitigation and Monitoring Report submitted in May 2019 as outlined by the Waste Discharge Requirements (WDR).

### **1.3.3 Riparian Condition Monitoring**

Waste Discharge Requirements outline the sampling schedule and monitoring requirements for stream condition inventory (SCI) collection, as well as macro-invertebrate monitoring to assess the desired conditions for Heavenly Valley Creek<sup>3</sup>:

- > Over time, show a trend of increasing stability in channel morphology.
- > Over time, there should be improving trends in benthic macroinvertebrate (BMI) community metrics, approaching conditions in Hidden Valley Creek.

Since inception, the riparian condition monitoring program has evolved with many of the changes captured in Riparian Conditions Monitoring Plan developed by ENTRIX (now Cardno) in 2005. These

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<sup>3</sup> California Regional Water Quality Control Board-Lahontan Region. 2015. Monitoring and Reporting Program No. 2015-0021 WDID NO. 6A090033000 for Heavenly Mountain Resort. 2015. Attachment A: *Heavenly Mountain Resort Epic Discovery Project Environmental Impact Report (CEQA)*, page 8.

monitoring efforts were implemented in 2006, 2009, 2011, and most recently in 2015. *The Environmental Monitoring Program Comprehensive Report – Heavenly Mountain Resort Water Years 2012-2016* discuss both the past monitoring schedule as well as the monitoring results. The 2015 monitoring effort included both the Edgewood and Daggett Creeks reaches to align with the California stream surveys in future monitoring years. The next schedule for SCI monitoring will occur in 2019 in line with the WDR requirement for monitoring once every four years.

Macro-invertebrate monitoring occurred in 2006, 2007, 2010, 2011, 2014, 2015, and 2018 for the California stream sites. The historical methodology, sampling schedule and data are included in *The Environmental Monitoring Program Comprehensive Report – Heavenly Mountain Resort Water Years 2012-2016*. As discussed in the Comprehensive Report, additional BMI samples were collected by Cardno and Heavenly at the Sky Meadows reach along Heavenly Valley Creek as well as the Upper Hidden Creek reach in 2016 to provide additional data for comparison and baseline analysis. The 2016 sampling results were included in the *Environmental Monitoring Program Annual Report – WY 2017* as they were not yet available to be included in the Comprehensive Report. The 2018 sampling results for all sites will be included in the *Environmental Monitoring Program Annual Report – WY 2019*, as they are not yet available to be included in this report.

In accordance with the WDR and Monitoring and Reporting Program, macro-invertebrate monitoring for all three reaches along Heavenly Valley Creek (Sky Meadows, Below Pasty's, and USFS property line) as well as the reaches at Lower Hidden Valley Creek and Upper Hidden Valley Creek is expected to occur again during the summer of 2019. The latest Monitoring and Reporting Program includes additional stream samples for pebble counts and cobble embeddedness in conjunction with BMI sampling. This protocol was incorporated into the 2018 sampling effort and will be included in future sampling efforts (2019 and beyond).

#### **1.3.4 Condition and Trend Monitoring**

Condition and trend monitoring encompasses a number of monitoring requirements outlined in the Monitoring and Reporting Program. Monitoring requirements pertinent to the Annual Report are listed below with further discussion and annual results found embedded in the body of this report.

##### **1.3.4.1 Facilities Maintenance Monitoring**

As required by the Mitigation and Reporting Program in the WDR, the operation and maintenance program requires “quarterly inspection at all lodges, maintenance shops and paved parking areas where snow removal and deicing activities are conducted”<sup>4</sup>. At a minimum, storm water collection facilities as well as erosion control and sediment vaults are inspected for damage, blockage and sediment build-up. If required, corrective measures are documented. In a good faith effort, Heavenly provides monthly inspections of their California base lodge parking lot facility. Fourth quarter facilities and maintenance inspection monitoring logs covering the months of July, August and September are included in Appendix D. Detailed discussion of the monitoring findings are discussed below in Section 4. Additionally, during the summer months when on-mountain vehicular access is available, Heavenly photo monitors on mountain erosion control and drainage infrastructure for documentation and potential maintenance concerns. See Section 9 for additional information regarding on-mountain monitoring.

##### **1.3.4.2 Snow Conditioning and Snowmaking Materials**

Heavenly actively tracks and reports monthly snow conditioning totals. Huck salt is added during winter operations around pedestrian walkways and heavily congested areas to prevent slip and falls. In addition, huck salt can be applied in terrain parks at jump feature interfaces (lips) to melt the very top layer of snow which essentially freezes and hardens to increase the longevity and durability of the snow at the jump. No snow enhancement chemicals or additives were used around the lodges or on-mountain slopes during the fourth quarter of water year 2018. On-mountain snow operations are non-existent during the fourth quarter (July, August, and September) as these months are typically the warmest and driest of the water

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<sup>4</sup> California Regional Water Quality Control Board-Lahontan Region. 2015. Monitoring and Reporting Program No. 2015-0021 WDID NO. 6A090033000 for Heavenly Mountain Resort. 2015 (page 7).

years. Snow making did not occur during the fourth quarter. In addition, Heavenly does not add any additional snowmaking enhancement chemicals during their snowmaking practices. Heavenly's snowmaking equipment and operations only require water and compressed air for their on-mountain snow making efforts. Annual summaries of application can be found in Section 5.

#### **1.3.4.3 Deicer and Abrasives Application and Recovery**

Heavenly actively tracks the amount of deicer and abrasives it applies to the parking lot and roadways leading to and from the California base parking lot as required by the WDR and Monitoring and Reporting Program. Monthly application and recovery totals are reported with the monthly inspection and monitoring logs found in Appendix D. Typically recovery (sweeping) occurs during the third and fourth quarters of the water year after winter resort operations and when the asphalt roadways and parking areas are free of snow. Recovered materials are collected and delivered to South Tahoe Refuse for disposal. Heavenly includes the dumpster material weight sheets with the maintenance and inspection logs for recovery tracking purposes. Fourth quarter application and recovery totals as well as 2018 water year annual totals are discussed in Section 6.

As part of the WDR and Monitoring and Reporting Program, Heavenly is also required to analyze the chemical composition of the deicer applied to the roadways. The deicer applied must meet the Caltrans "specifications H" or similar<sup>5</sup>. Heavenly has provided this information to Lahontan Water Board for past deicer samples and through discussions with Board, it was determined that as long as the material (sand and ice) was being purchased from the same vendor and same source no additional analysis was needed. Initial analysis of the source material performed in December 2015, and analysis was performed again in March 2018, following the receipt of a new stockpile of abrasives on February 27. The March 2018 results were presented in the Third Quarterly Report and are included in Appendix D.

#### **1.3.4.4 USFS Roads Monitoring**

The WDR and Monitoring and Reporting Program requires that Heavenly conduct road monitoring in accordance with the Road Maintenance Agreement (between Heavenly and the LTBMU)<sup>6</sup>. The signed agreement outlining Heavenly's maintenance and inspection requirements as well as the Forest Service standards regarding on-mountain roadways is included in Appendix E. Additional discussion regarding the roadway monitoring requirements is discussed in Section 7.

#### **1.3.4.5 Facilities Watershed Awareness Training**

Heavenly provides awareness training for its summer employees, subcontractors and vendors annually as part of the WDR and Monitoring and Reporting Program. Confirmation and discussion of this training is provided in Section 8 and Appendix F.

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<sup>5</sup> California Regional Water Quality Control Board-Lahontan Region. 2015. Monitoring and Reporting Program No. 2015-0021 WDID NO. 6A090033000 for Heavenly Mountain Resort. 2015 (page 8).

<sup>6</sup> California Regional Water Quality Control Board-Lahontan Region. 2015. Monitoring and Reporting Program No. 2015-0021 WDID NO. 6A090033000 for Heavenly Mountain Resort. 2015 (page 9).

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## 2 Water Quality

### 2.1 Station Description

Heavenly Mountain Resort (Heavenly) measures water quality parameters along four creeks to determine the effects of ski area development on background conditions. Water samples were collected at seven stations for the 2018 water year. Station ID and sampling rationale are given in Table 2-1 and include the required filter vault sampling locations. The approximate location of each station is shown in Figure 2-1.

**Table 2-1 Heavenly Valley Mountain Resort Monitoring Program Water Quality Stations**

Site	Site Description	Site Rationale
43HVC-1A	Heavenly Valley Creek at Sky Meadows, above Snowmaking Pond	Characterized water quality in Heavenly Valley Creek drainage from the developed ski area
43HVC-2	Heavenly Valley Creek Below Patsy's and Groove Chair Lifts	Characterized water quality in Heavenly Valley Creek drainage from the developed ski area
43HVC-3	Heavenly Valley Creek located at the Forest Service Property Line	Characterized water quality in Heavenly Valley Creek leaving National Forest Lands below Heavenly Mountain Resort
43BPC-4	Bijou Park Creek located below the Heavenly California Base parking Lot	Characterized water quality in Bijou Park Creek below the California Main Lodge and parking area
43HDVC-5	Hidden Valley Creek Baseline Station	Characterized water quality in creek draining a similar, mostly undeveloped watershed
43HVE-1	Edgewood Creek above Boulder parking lot	Characterized water quality in Edgewood Creek above Boulder parking lot and below the ski runs
43HVE-2	Edgewood Creek below Boulder parking lot	Characterized water quality in Edgewood Creek below Boulder parking lot
43HVP-1A	North Manhole Influent Pipe Into the Filter System	Characterized water quality inflow from the lower parking lot into the filter system
43HVP-1B	South Manhole Influent Pipe into the Filter System	Characterized water quality inflow from the upper parking lot into the filter system
43HVP-2	West Manhole Effluent Pipe Out Of The Filter System	Characterized water quality exiting the filter system

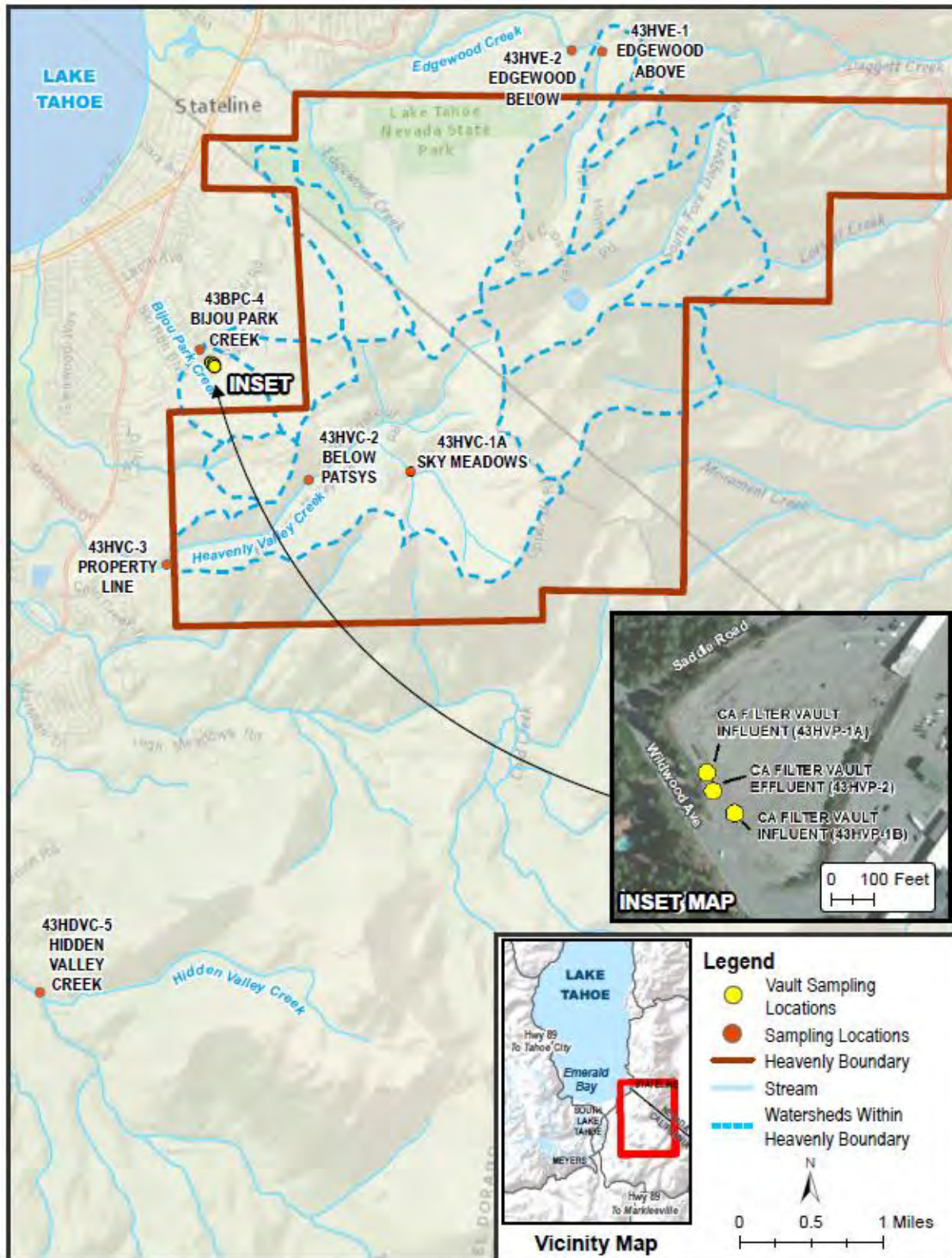


Figure 2-1 Approximate Location of Water Quality Sampling Sites

## 2.2 Precipitation Summary

Precipitation data for the 2018 water year are shown in Figure 2.2, as taken and summarized from the National Resource Conservation Service, National Water and Climate Center website (<http://www.wcc.nrcs.usda.gov>). This graph represents accumulated precipitation and snow water equivalent (SWE) measured at SNOTEL Station 19L24S ("Heavenly Valley"), operated by the USDA Natural Resource Conservation Service. This station is located in the upper watershed of Heavenly Valley Creek near the current Sky Meadows monitoring station (43HVC-1A) at latitude 38° 56' N, longitude 119° 54' W, and elevation 8,850 feet.

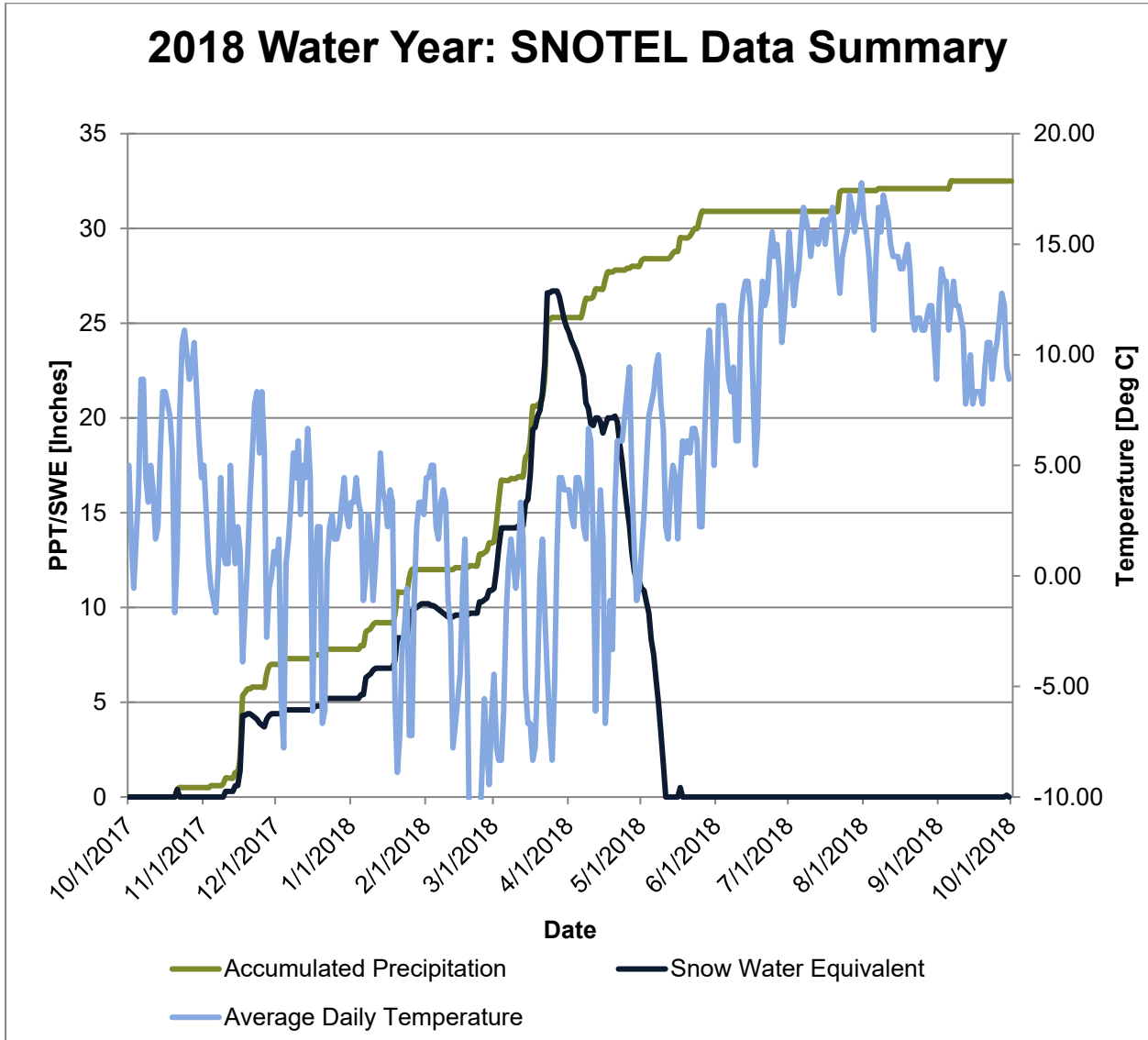


Figure 2-2 SNOTEL Weather Graph for the Water Year 2018

## 2.3 Sampling Frequency and Analysis

A total of 114 stream samples were collected during the 2018 water year. Seventeen samples each were collected at Bijou Park Creek (43BPC-4), Hidden Valley Creek (43HDVC-5), Property Line (43HVC-3), below Patsy’s Chair (43HVC-2), and Lower Edgewood (43HVE-2) locations. Sixteen samples were collected at the Sky Meadows (43HVC-1A) location, as mountain access issues prohibited sampling in November 2017, and discharge was not measured on one additional occasion due to stream ice cover in December 2017. Only thirteen samples were collected at the Upper Edgewood (43HVE-1) site, due to ice/snow cover and resort activities during the months of December 2017, February 2018, and March 2018, and low flows in September 2018. The number of samples collected along the two Edgewood Creek sites typically vary due to low flow conditions and resort activities that can prevent sampling. An additional three storm samples were collected for each influent and effluent sample at the California Base parking area filter vault locations (43HVP-1A, 43HVP-1B, and 43HVP-2). Table 2-2 provides a summary of sampling and analysis for the 2018 water year.

Analyses for specific conductivity, turbidity, suspended sediment, total nitrogen (nitrate/nitrite and total Kjeldahl nitrogen), total phosphorus, soluble reactive phosphorus, and dissolved phosphorus were performed by High Sierra water Lab located near Tahoe City, California. Western Environmental Testing Laboratory (WET Lab) in Reno, Nevada performed analyses for chloride. Additionally, WET Lab performed all constituent testing for the influent and effluent filter water quality vault samples. Analytical results by sampling location for the fourth quarter are provided in Appendix A and Appendix B. The remaining 2018 laboratory results were previously submitted with the quarterly reports and are omitted in this report (duplication).

**Table 2-2 Summary of Sampling Analysis Conducted for the Water Year of 2018**

Station ID	Station Name	# of Samples	Constituents Tested
43HVC-1A	Heavenly Creek at Sky Meadows	16	Full Suite <sup>1, 2</sup>
43HVC-2	Heavenly Creek below Patsy’s	17	Full Suite
43HVC-3	Heavenly Creek at Property Line	17	Full Suite
43BPC-4	Bijou Park Creek below the California parking lot	17	Full Suite
43HDVC-5	Hidden Valley Creek	17	Full Suite
43HVE-1	Edgewood Creek above Boulder parking lot	13	Full Suite, Specific Conductivity, SRP, & DP
43HVE-2	Edgewood Creek below Boulder parking lot	17	Full Suite, Specific Conductivity, SRP, & DP
43HVP-1A	North Manhole Influent Pipe Into the Filter System	3	Full Suite, and Oil & Grease <sup>3</sup>
43HVP-1B	South Manhole Influent Pipe into the Filter System	3	Full Suite, and Oil & Grease <sup>3</sup>
43HVP-2	West Manhole Effluent Pipe Out Of The Filter System	3	Full Suite, and Oil & Grease <sup>3</sup>

<sup>1</sup>Full suite = Discharge, turbidity, suspended sediment, nitrate/nitrite, total Kjeldahl nitrogen, total nitrogen, total phosphorus, and chloride.

<sup>2</sup>Discharge was not measured on 1 occasion due to unsafe conditions and stream ice cover (43HVC-1A).

<sup>3</sup>Suspended sediment analysis is not required for the filter system sampling locations.

## 2.4 Results and Discussion

### 2.4.1 Discharge

Stream flow was measured using a Marsh-McBirney meter at all of the stream sites except at the Heavenly Valley Creek Below Patsy's (43HVC-2) site where flow was calculated from stage values in a Parshall Flume. There is also a Parshall Flume at the Sky Meadows (43HVC-1A) site, however the outlet of the flume has become submerged over time thus reducing the accuracy of the stage-discharge relationship. As such, flow is also measured with the Marsh-McBirney meter at the Sky Meadows site when conditions permit. During the winter months, the flume is the only viable option for estimating flow due to significant snow depths and ice cover that can make accessing the stream very difficult and unsafe. Peak runoff discharge occurred near the end of May at both the Heavenly Valley Creek monitoring location at Property Line (43HVC-3) and Hidden Valley Creek (43HDVC-5). The Heavenly Valley Creek monitoring locations at Below Patsy's (43HVC-2) and Sky Meadows (43HVC-1A) exhibited peak discharge values near the beginning of June; while the Upper and Lower Edgewood Creek (43HVE-1 and 43HVE-2, respectively) sampling sites exhibited peak discharge values in the beginning of May. Peak discharge values for the Bijou Park Creek (43BPC-4) monitoring location were observed in the middle of April. While there was variation in the timing of peak flows at the various monitoring locations throughout the spring runoff period, the peaks occurred within the May-June window. This is typical of the Sierra Nevada Mountain range, although the runoff trend over time is moving towards occurring during the earlier months. The 2018 water year and early runoff are likely due to lower than average accumulated precipitation over the winter months. Variations in watershed size and elevation are likely to be the cause for the earlier runoff peaks along Edgewood Creek and Bijou Park Creek. It does not appear that the snowmaking efforts performed during the 2017/2018 ski season had a significant impact on the Heavenly Valley Creek watershed, as the runoff peaked at approximately the same time as the Hidden Valley Creek reference reach monitoring location.

Accumulated precipitation during the 2018 water year (32.5 inches) was slightly less than 1981-2010 average of 33.5 inches, and far less than the 2017 water years accumulation (70.5), although more similar to the four previous water years, which were near or below average. As such, the peak runoff values were more typical of average conditions. The 2016 water year experienced relatively normal precipitation compared to the previous four years of prolonged drought (2012-2015), and precipitation and snow water equivalent (SWE) measurements for the 2017 water year were substantially higher than those for the 2016 water years, as well as those for the previous 12 water years. The total precipitation values for the 2018 water year were less than the 2016 year, but greater than the preceding four years of drought (2012-2015 water years). Figure 2-3 represents the past thirteen water years of SNOTEL precipitation data. Figures 2-4 through 2-7 represent the hydrographs at each of the seven sampling stations and associated creeks.

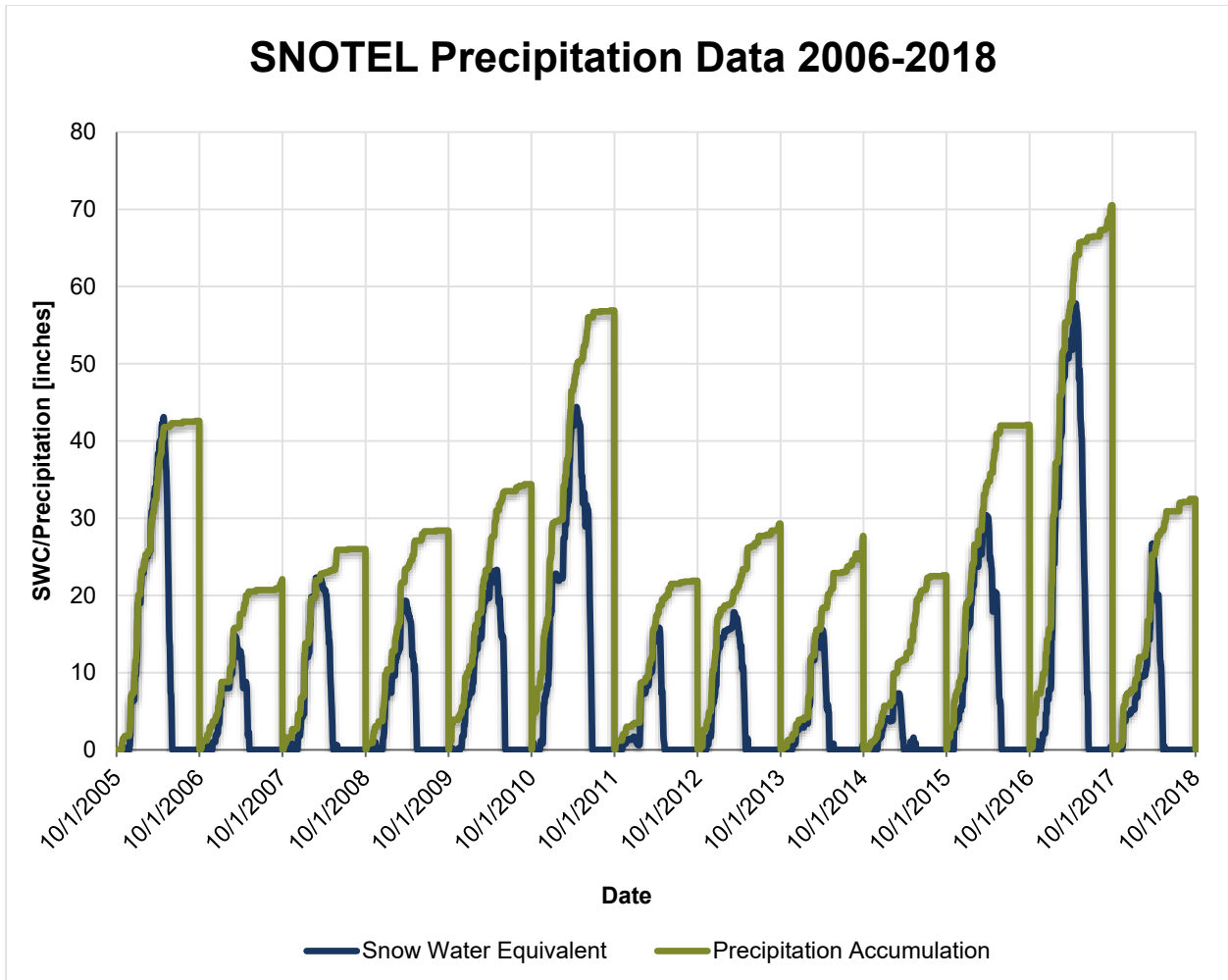
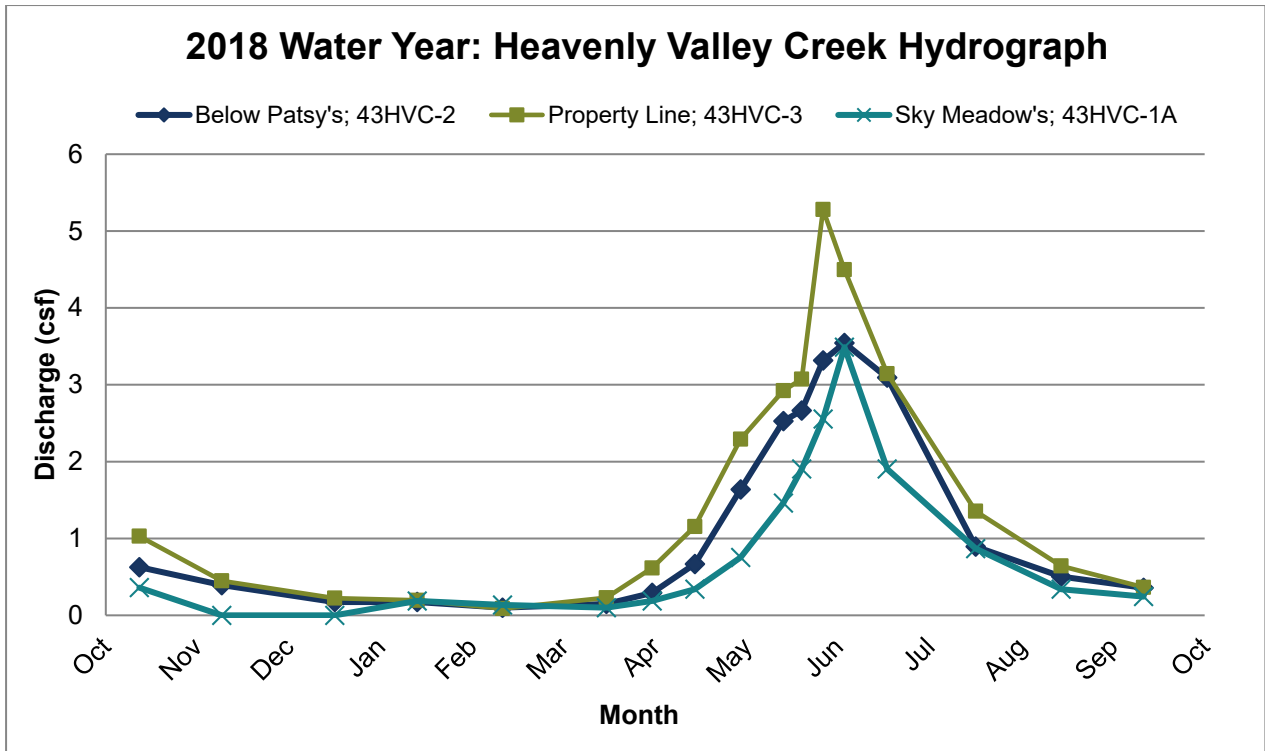
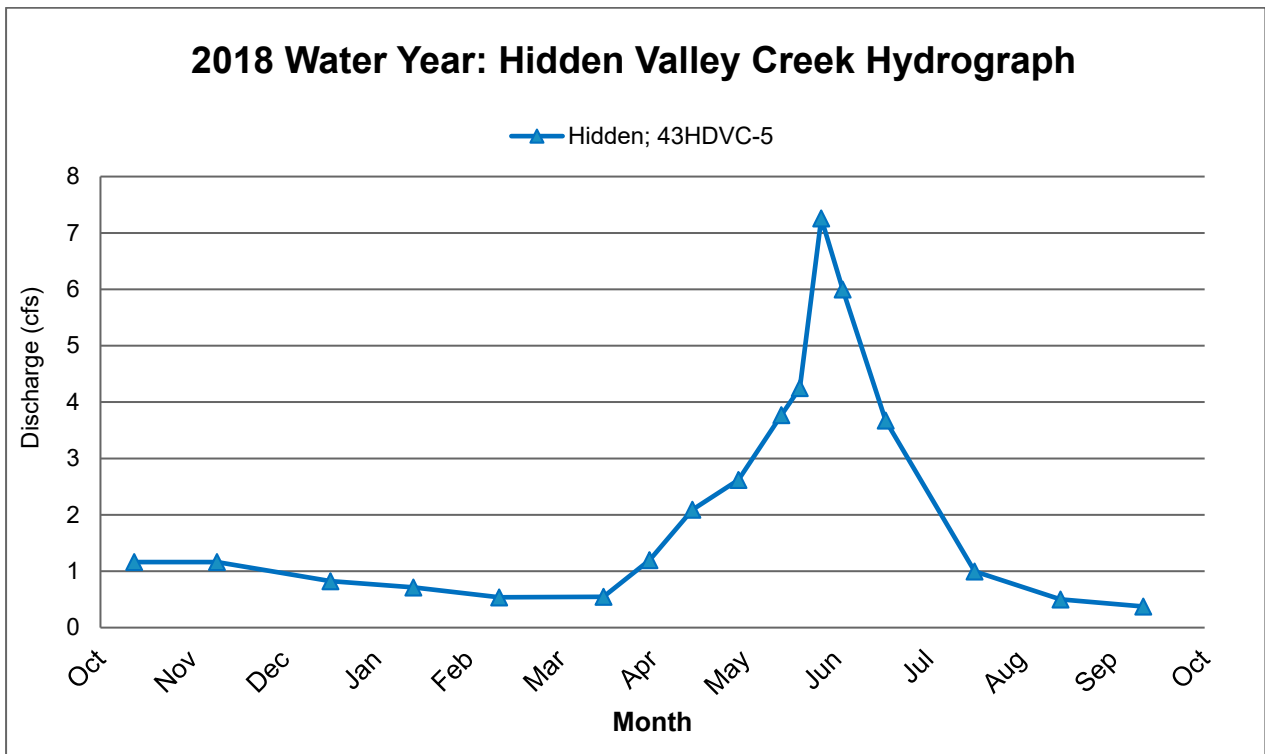


Figure 2-3 SNOTEL Precipitation Graph for Water Years 2006-2018





**Figure 2-4 Hydrographs Representing Heavenly Valley Creek for the Water Year Ending in 2018**



**Figure 2-5 Hydrograph Representing Hidden Valley Creek for the Water Year Ending 2018**

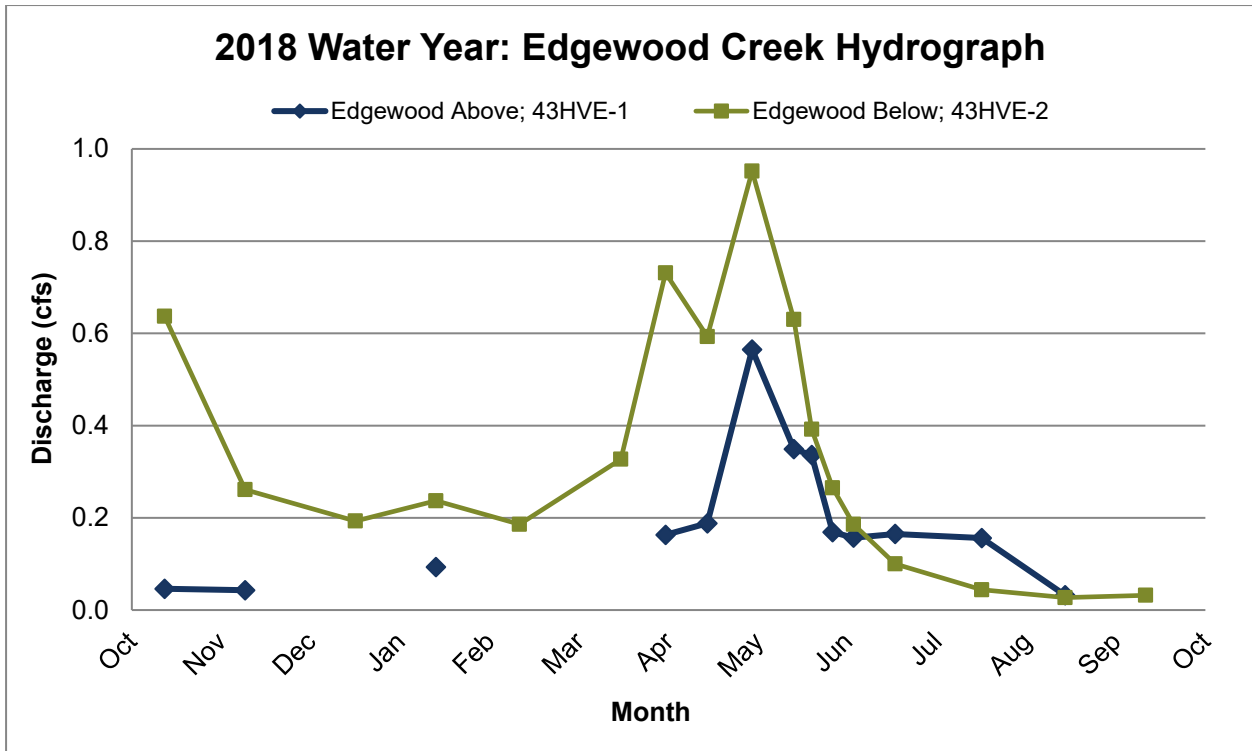


Figure 2-6 Hydrographs Representing Edgewood Creek for the Water Year Ending in 2018

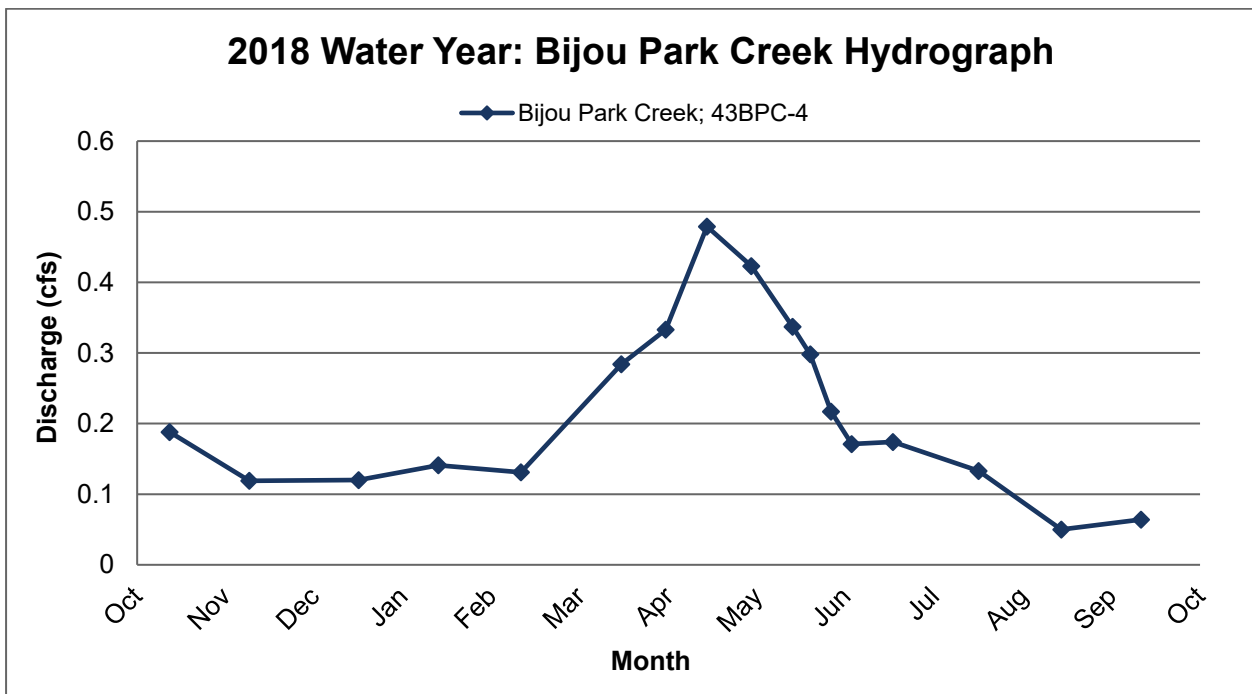


Figure 2-7 Hydrographs for Bijou Park Creek for the Water Year Ending in 2018



## 2.5 Annual Load Estimates

Table 2-3 presents the annual load values calculated from flow-weighted concentration data for total nitrogen, total phosphorus and suspended sediment at the Heavenly Valley Creek at Property Line sampling location and at the Hidden Valley Creek baseline station from 2014 through 2018 water year (5-year cycle). Annual load values are calculated by weighting the number of days between sample collections and multiplying the weighted average times the discharge measurements collected in the field. This calculated value represents the weighted flow. Laboratory values for total nitrogen, total phosphorus and suspended sediment are multiplied and summed. The final unit conversion is applied and the annual loading values are reported in Table 2-3 and Table 2-4. The method used to calculate annual loading values is based on constituent concentrations, discharge, and days between samples as discussed above. The methodology has been used in previously submitted annual reports and was verified by Lahontan staff in spring 2010.

The Total Maximum Daily Load (TMDL) for sediment at Heavenly Valley Creek is a five-year rolling average. The calculated 5-year rolling average from water years 2014 through the 2018 is shown in Table 2-4 and equates to a total of 34.27 tons/year along Heavenly Valley Creek. This is approximately 0.3 tons/year more than that calculated for the 2017 water year rolling average. The Lahontan permit TMDL standard along Heavenly Valley Creek for suspended sediment is 58 tons/year. For comparison, the suspended sediment rolling average for Hidden Valley Creek was calculated at 14.95 tons/year for the 2018 water year, which was a 0.2 tons/year decrease from the previous year's rolling average.

The suspended sediment load for Heavenly Valley Creek for the 2018 water year was calculated as 2.47 tons/year, which was a substantial decrease from the suspended sediment load of 161.84 tons/year for the previous year. Hidden Valley Creek experienced a proportionally similar decrease. Although the suspended sediment load for the 2017 water year was calculated at 161.8 tons, the 5-year rolling average has remained relatively low due to the previous years of drought and the 2018 near normal conditions, and thus a typically lower sediment load. Overall, the 2018 water year decrease in constituent loading (total nitrogen, total phosphorus and suspended sediment) from the 2017 water year is consistent with expectations given the substantially lower precipitation totals and flow conditions during spring runoff.

**Table 2-3 Annual Load Values at Heavenly Valley Creek (Property Line 43HVC-3) and Hidden Valley Creek (43HDVC-5).**

Year	Discharge (m <sup>3</sup> /yr)	Total Nitrogen (kg/yr)	Total Phosphorus (kg/yr)	Suspended Sediment (tons/yr)
<b>Property Line (43HVC-3)</b>				
2014	149,688	19	3	0.24
2015	92,131	8	2	0.16
2016	977,818	30	30	6.63
2017	3,912,677	983	431	161.84
2018	966,860	94	20	2.47
<b>Hidden Valley Creek (43HDVC-5)</b>				
2014	594,447	93	15	1.5
2015	412,713	48	10	1.4
2016	1,498,026	365	64	18.8
2017	4,277,635	770	164	50.5
2018	1,339,792	117	26	2.5

**Table 2-4 Five Year Suspended Sediment Rolling Average for Heavenly Valley Creek (Property Line 43HVC-3) and Hidden Valley Creek (43HDVC-5) Stations.**

Water Year	Property Line (HV-C3) Suspended Sediment (Tons/Year)	Hidden Valley Creek (HV-H5) Suspended Sediment (Tons/Year)
2009	0.5	1.9
2010 <sup>1</sup>	70.5	18.6
2011	118.6	60.9
2012	1.7	3.4
2013	1.0	3.5
2014	0.24	1.5
2015	0.16	1.4
2016	6.63	18.8
2017	161.84	50.5
2018	2.47	2.5
<b>5 Year Rolling Average</b>	<b>34.27</b>	<b>14.95</b>

<sup>1</sup> The 2010 water year discharge values were revisited and changed the annual load calculations.

## 2.6 Heavenly Valley and Hidden Valley Creeks

### 2.6.1 Summary Statistics for Water Quality Constituents: Water Year 2018

Statistical summaries for Heavenly Valley and Hidden Valley Creeks for water year 2018 are shown in Table 2-5 through Table 2-8 (exceedance values in bold). The raw data are provided in Appendix A. The statistics were computed over the seventeen samples for each site, which consist of twelve monthly monitoring samples and an additional five samples collected during spring runoff in April, May, and June at each site. The one exception is discharge at Sky Meadows (43HVC-1A), for which water quality statistics were computed over the sixteen discharge samples collected, and flow statistics were computed over the fifteen discharge measurements taken. Annual average values for total phosphorus and chloride exceeded the state standard for all three sites on Heavenly Valley Creek (43HVC-1A, 43HVC-2, and 43HVC-3), as well as at the reference site (43HDVC-5).

All sampling sites on Heavenly Valley and Hidden Valley Creeks (43HVC-1A, 43HVC-2, 43HVC-3, and 43HDVC-5) had total suspended sediment (TSS) values below the 90<sup>th</sup> percentile state standard value of 60 mg/L. The highest daily peak TSS reading was recorded at Below Patsy's Chair on Heavenly Valley Creek (29.0 mg/L at 43HVC-2), while the reference site at the Hidden Valley Creek had a daily TSS peak of 3.0 mg/L (43HDVC-5). Both of these TSS peaks are well below the annual state standard for the water year 2018. The maximum observed TSS concentrations coincide with the rising limb and peak of the spring runoff hydrograph, which is to be expected as suspended sediment is typically mobilized along the stream banks and transported during the spring runoff period. Substantial bank erosion was observed in the vicinity of the Property Line (43HVC-3) monitoring site during the 2017 water year, where undercutting of the streambank toe caused the bank to collapse and thus acting as a localized source of fine sediments. The bank erosion did not substantially worsen during the 2018 water year, likely due to lower creek stage and flows compared to the 2017 water year. Throughout all four of the sampling sites, TSS concentrations were lower than the 2017 water year, and more similar to the concentrations of the prior four years, which were low water/precipitation years.

The California Lahontan Water Board's annual state standard for total nitrogen (0.19 mg/L) is the sum of the total Kjeldahl nitrogen (TKN), which is representative of the ammonia and organic nitrogen concentrations, total nitrate, and total nitrite. Although there were exceedances on individual dates throughout the water year at Sky Meadows (43HVC-1A) and Below Patsy's Chair (43HVC-2) on Heavenly

Valley Creek, the annual average total nitrogen concentrations at all four of the monitoring sites along both Heavenly Valley and Hidden Valley Creeks (43HVC-1A, 43HVC-2, 43HVC-3, and 43HDVC-5) are below the state standard. No exceedances on individual dates occurred at Property Line on Heavenly Valley Creek (43HVC-3) or Hidden Valley Creek sampling site (43HDVC-5). The highest total nitrogen concentrations were observed at Sky Meadows (43HVC-1A) during May and June, which could be due to the prolonged exposure of meadow vegetation to overbank flows, which can act as a nitrogen source. Overall, the total nitrogen concentrations on Heavenly Valley Creek were similar to those on Hidden Valley Creek, suggesting that resort operations have a less than significant impact on total nitrogen concentrations.

Annual averages for total phosphorus are required to be below the 0.015 mg/L Lahontan state standard for Heavenly Valley Creek and Hidden Valley Creek. The annual average total phosphorus concentrations for water year 2018 were above the state standard at all four of the monitoring sites (43HVC-1A, 43HVC-2, 43HVC-3 and 43HDVC-5). Average values for the four stations were as follows: Sky Meadows (43HVC-1A) 0.022 mg/L, Below Patsy's Chair (43HVC-2) 0.025 mg/L, Property Line (43HVC-3) 0.020 mg/L and Hidden Valley Creek (43HDVC-5) 0.020 mg/L. All daily samples collected throughout the water year at the Hidden Valley Creek site (the reference reach 43HDVC-5) exceeded the state standard. Daily samples for the sites on Heavenly Valley Creek exceeded the state standard on 10 (43HVC-1A), 12 (43HVC-3) and 13 (43HVC-2) individual sample dates. However, Hidden Valley Creek had similar average values of total phosphorus, compared to sites on Heavenly Valley Creek, suggesting that during average precipitation years resort activities along Heavenly Valley Creek have a less than significant impact on total phosphorus.

Annual average chloride values along Heavenly Valley Creek and Hidden Valley Creek for water year 2018 were above the state standard of 0.15 mg/L at all four of the monitoring sites (43HVC-1A, 43HVC-2, 43HVC-3 and 43HDVC-5). All daily samples collected throughout the water year also exceeded the state standard for each of the Heavenly Valley Creek sites. Thirteen of the seventeen daily samples collected at the reference site on Hidden Valley Creek (43HDVC-5) also exceeded the state standard, suggesting that chloride is naturally occurring in this region of the Lake Tahoe Basin. Chloride levels at all of these sites have been problematic in exceeding the state standard over the past decade. While the annual average chloride concentration was also above the state standard at Hidden Valley Creek (43HDVC-5), the sampled values throughout the water year were relatively low compared to those obtained along Heavenly Valley Creek (43HVC-1A, 43HVC-2 and 43HVC-3). Although the values at the highest elevation site Sky Meadows (43HVC-1A) were considerably lower than the downstream sites. The exact cause for these increased chloride levels along Heavenly Valley Creek is unknown. Application of salts on the terrain parks within the Heavenly Valley watershed may be one plausible cause; however, the fact that the undisturbed watershed reference site along Hidden Valley Creek (43HDVC-5) also exceeds the state standards for chloride concentrations suggests that there may be additional naturally occurring sources.

Following the implementation of the Amended Monitoring and Reporting Program in May 2011, monitoring requirements for specific conductivity, soluble reactive phosphorus (SRP) and total iron were removed from the daily sampling regime along the Heavenly Valley Creek sites (43HVC-1A, 43HVC-2 and 43HVC-3) as well as the Hidden Valley Creek site (43HDVC-5).

**Table 2-5 Heavenly Valley Creek Sky Meadows 2018 Water Year Statistical Summary**

<b>Exceedances of the California Lake Tahoe Receiving Water Limits – Sky Meadows (43HVC-1A)</b>						
	<b>Q (cfs)</b>	<b>Turbidity (NTU)</b>	<b>Total Suspended Sediment (mg/L)</b>	<b>Total Nitrogen (mg/L)</b>	<b>Total Phosphorus (mg/L)</b>	<b>Chloride (mg/L)</b>
	-	-	<b>60</b>	<b>0.19</b>	<b>0.015</b>	<b>0.15</b>
# Samples	15	16	16	16	16	16
Min	0.10	0.88	1.00	0.076	0.010	0.28
Max	3.49	7.03	9.00	0.237	0.042	0.40
Annual Average	1.19	2.72	3.53	0.132	<b>0.022</b>	<b>0.34</b>
90 <sup>th</sup> Percentile	-	-	7.95	-	-	-

**Table 2-6 Heavenly Valley Creek Below Patsy’s Chair 2018 Water Year Statistical Summary**

<b>Exceedances of the California Lake Tahoe Receiving Water Limits – Below Patsy’s Chair (43HVC-2)</b>						
	<b>Q (cfs)</b>	<b>Turbidity (NTU)</b>	<b>Total Suspended Sediment (mg/L)</b>	<b>Total Nitrogen (mg/L)</b>	<b>Total Phosphorus (mg/L)</b>	<b>Chloride (mg/L)</b>
		-	<b>60</b>	<b>0.19</b>	<b>0.015</b>	<b>0.15</b>
# Samples	17	17	17	17	17	17
Min	0.10	0.67	1.00	0.096	0.011	0.44
Max	3.54	32.30	29.00	0.213	0.114	1.40
Annual Average	1.46	4.05	4.12	0.126	<b>0.025</b>	<b>0.73</b>
90 <sup>th</sup> Percentile	-	-	13.40	-	-	-

**Table 2-7 Heavenly Valley Creek Property Line 2018 Water Year Statistical Summary**

<b>Exceedances of the California Lake Tahoe Receiving Water Limits – Property Line (43HVC-3)</b>						
	<b>Q (cfs)</b>	<b>Turbidity (NTU)</b>	<b>Total Suspended Sediment (mg/L)</b>	<b>Total Nitrogen (mg/L)</b>	<b>Total Phosphorus (mg/L)</b>	<b>Chloride (mg/L)</b>
	-	-	<b>60</b>	<b>0.19</b>	<b>0.015</b>	<b>0.15</b>
# Samples	17	17	17	17	17	17
Min	0.09	0.43	0.50	0.056	0.014	0.31
Max	5.28	3.33	11.5	0.151	0.028	0.97
Annual Average	1.85	1.61	2.35	0.085	<b>0.020</b>	<b>0.58</b>
90 <sup>th</sup> Percentile	-	-	5.50	-	-	-

**Table 2-8 Hidden Valley Creek (Lower Hidden) 2018 Water Year Statistical Summary**

<b>Exceedances of the Lake Tahoe Receiving Water Limits for Trout Creek - Hidden Valley Creek (43HDVC-5)</b>						
	<b>Q (cfs)</b>	<b>Turbidity (NTU)</b>	<b>Total Suspended Sediment (mg/L)</b>	<b>Total Nitrogen (mg/L)</b>	<b>Total Phosphorus (mg/L)</b>	<b>Chloride (mg/L)</b>
			<b>60</b>	<b>0.19</b>	<b>0.015</b>	<b>0.15</b>
# Samples	17	17	17	17	17	17
Min	0.38	0.60	1.00	0.064	0.016	0.12
Max	7.26	2.09	3.00	0.128	0.027	0.39
Annual Average	2.49	1.17	1.62	0.088	<b>0.020</b>	<b>0.23</b>
90th Percentile	-	-	2.60	-	-	-

## 2.7 Bijou Park Creek and California Parking Lot Effluent

### 2.7.1 Summary Statistics for Water Quality Constituents: Water Year 2018

Raw data for both the Bijou Park Creek (below California parking 43BPC-4) and Effluent of the California Base parking Lot (43HVP-2) can be found in Appendices A and B. Table 2-9 summarizes the Lahontan State Standards relative to Bijou Park Creek that have been in place in the past. The State Standards that apply to the Bijou Park Creek sampling site (43BPC-4) are governed by the Lake Tahoe receiving water limits for: total dissolved solids (TDS), total nitrogen, total phosphorus and chloride. The maximum concentration for discharge to a surface water governs the turbidity standard at the Bijou Park Creek sampling site (43BPC-4). Likewise, the sampling location for effluent from the parking lot filter system (43HVP-2) is governed by the maximum not-to-exceed concentrations for discharge to surface water. These standards took effect in May 2011, when the Amended Monitoring and Reporting Program was finalized. Table 2-10 shows the water quality analysis results for Bijou Park Creek sampling site for the 2018 water year.

**Table 2-9 Summary of the Sampling Analysis Limits for the 2018 Water Year**

<b>Constituents</b>	<b>Units</b>	<b>Maximum Concentration for Discharge to Land Treatment <sup>1</sup></b>	<b>Maximum Concentration for Discharge to Surface Water <sup>2</sup></b>	<b>Lake Tahoe Receiving Water Limits <sup>3</sup></b>
Turbidity	NTU	200	20	
Total Dissolved Solids	mg/L	-	-	60
Total Nitrogen	mg/L	5.0	0.5	0.15
Total Phosphorus	mg/L	1.0	0.1	0.008
Chloride	mg/L	-	-	3.0

<sup>1</sup>The effluent limits for discharge to land were effective for discharge from the California Base area on December 31, 2004.

<sup>2</sup>The effluent limits not-to-exceed for discharge to surface waters were effective for discharge from the California Base area beginning November 30, 2008.

<sup>3</sup>The Amended Monitoring and Reporting Program, effective May 30, 2011, for the 2012 Water Year and beyond required monitoring of the outfall of the filter vault system. Bijou Creek effluent limits to discharge moved to Lake Tahoe receiving water limits and the outfall to the filter vaults effluent limits fall under the maximum concentration for discharge to surface waters.

**Table 2-10 Bijou Park Creek 2018 Water Year Statistical Summary**

Exceedances of the California Lake Tahoe Receiving Water Limits for Bijou Park Creek - Below the California Parking Lot (43BPC-4)						
	Q (cfs)	Turbidity (NTU)	Total Suspended Sediment (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	Chloride (mg/L)
<b>CA State Standard</b>		<b>20</b>	<b>60</b>	<b>0.15</b>	<b>0.008</b>	<b>3.0</b>
# Samples	17	17	17	17	17	17
Min	0.050	9.49	3.50	0.396	0.049	21.0
Max	0.479	208	108	1.580	0.590	350.0
Annual Average	0.211	<b>27.6</b>	15.4	<b>0.539</b>	<b>0.147</b>	<b>50.8</b>

The annual average turbidity measurement at the Bijou Park Creek (43BPC-4) sampling location was 27.6 NTU, which exceeded the annual state standard of 20 NTU for receiving water bodies. Four of the seventeen samples collected at this site were above the turbidity standard with the highest turbidity reading recorded on March 20<sup>th</sup>, 2018 (208 NTU). It seems possible that this reading was associated with a specific event, as it is an extreme outlier compared to the other measurements (the second highest measurement was 27.6 NTU on September 12<sup>th</sup>). However, in general, due to relative smaller size of the watershed and increased impervious areas associated with housing, parking lots and roadways, sheet flow runoff likely mobilizes suspended particulates, thereby increasing turbidity readings at this location.

The annual average for TSS of 15.4 mg/L was well below the state standard of 60 mg/L for Bijou Park Creek (43BPC-4). The maximum daily measurement for TSS was 108 mg/L and was collected on March 20<sup>th</sup>, 2018. With the exception of this maximum reading, the remaining sixteen samples collected throughout the 2018 water year were below the state standard limit. As stated in the discussion of Heavenly Valley and Hidden Valley Creeks, increases in TSS concentrations typically correspond to increases in precipitation, runoff, and high stream flows. However, the Bijou Park Creek monitoring location is downstream of the storm filtration system, which can influence the occurrence and timing of increased TSS levels in the stream.

The annual average for total nitrogen at Bijou Park Creek (43BPC-4) of 0.539 mg/L was above the state standard of 0.15 mg/L. All seventeen of the daily samples collected were well above the state standard. Since the state standard for total nitrogen was lowered from 0.50 mg/L to 0.15 mg/L, the concentrations at the Bijou Park Creek (43BPC-4) monitoring site have consistently exceeded the standard. Table 2-11 shows the annual average total nitrogen concentrations for Bijou Park Creek (43BPC-4) over the past twelve years of monitoring, clearly demonstrating these exceedances.

**Table 2-11 Total Nitrogen Annual Average Values versus Flow at Bijou Park Creek (43BPC-4)**

Water Year	Annual Average Total Nitrogen Values – (mg/L)	Annual Average Flows – (cfs)
2007	1.47	0.26
2008	1.88	0.33
2009	0.88	0.20
2010	0.73	0.15
2011	0.66	0.46
2012	0.61	0.24
2013	0.74	0.22
2014	0.54	0.14
2015	0.54	0.11
2016	0.69	0.12
2017	0.57	0.39
2018	0.54	0.21

The annual average for total phosphorus at Bijou Park Creek (43BPC-4) for the water year 2018 was 0.147 mg/L. This annual average is above the state receiving water standard of 0.008 mg/L, and all seventeen of the daily samples collected were well above the state standard. Annual average concentrations of total phosphorus also exceeded the state receiving water standard at the reference reach on Hidden Valley Creek (43HDVC-5) for the water year 2018, indicating that phosphorus is naturally present within the watersheds surrounding Heavenly Mountain Resort. Total phosphorus and total nitrogen concentrations in surface water can vary with vegetation uptake, decay, and removal, as well as changes in the hydrologic cycle such as fluctuations in precipitation and flows.

All seventeen daily samples collected exceeded the state standard for annual average chloride concentrations at Bijou Park Creek (43BPC-4) during the water year of 2018. The 2018 annual average for chloride was 50.8 mg/L, which is substantially higher than the state standard of 3.0 mg/L. The annual average for chloride was also exceeded at the reference reach at Hidden Valley Creek (43HDVC-5). However, the relative level of exceedance was approximately 17 times the state standard at Bijou Park Creek (43BPC-4), versus 1.5 times the state standard at Hidden Valley Creek (43HDVC-5). Chloride readings have been problematic at Bijou Park Creek for the past decade, as Heavenly and the City of South Lake Tahoe apply deicer to the roadways during storm events and prolonged freezing periods. Icy roads and entrances are a public safety concern that can lead to potential vehicular accidents. Residual chloride is known to accumulate in the environment and removal mechanisms/processes are not readily available or affordable.

With the signing of the Amended Monitoring and Reporting Program in May 2011, monitoring and constituent test requirements for specific conductivity, soluble reactive phosphorus (SRP) total iron, total lead, dissolved ammonia and total petroleum hydrocarbons (TPH) were removed from the daily sampling regime at the Bijou Park Creek site below the California parking lot (43BPC-4).

The signed Amended Monitoring and Reporting Program also enforced the submittal of the California parking lot filter vault effluent results. The filter vault system collects storm and snow melt runoff from both the upper and lower parking lots. Table 2-12 provides a summary of the results for the water year 2018. Three storm samples were collected and analyzed during the 2018 water year. See Appendix B, for the storm filter sampling results for the two inlet and outlet locations (43HVP-1A, 43HVP-1B and 43HVP-2).

At the effluent sampling location (outlet 43HVP-2) in water year 2018, two of the three samples collected exceeded the not-to-exceed limit for turbidity of 20 NTU (on sample dates May 24<sup>th</sup> and July 22<sup>nd</sup>, 2018). Two out of the three samples collected exceeded the not-to-exceed limit for total nitrogen of 0.50 mg/L (also on May 24<sup>th</sup> and July 22<sup>nd</sup>); while none of the samples collected equaled or exceeded the total



phosphorus not-to-exceed state limit (0.10 mg/L). Two out of the three samples analyzed for oil and grease exceeded the state not-to-exceed limit of 2.0 mg/L (May 24<sup>th</sup> and July 22<sup>nd</sup>). These storm samples typically reflect the first flush effect, where the highest concentrations of constituents are expected to be mobilized and transported into and through the filter system. However, the May sampling event followed a reported shuttle bus fuel leak that occurred near the upper California parking lot on April 7<sup>th</sup>. A report of this event is detailed in Appendix D, as booms and absorbent mats were placed at storm drain inlets and at the parking lot entrance containing the affected area and minimizing contamination of nearby water bodies. Heavenly’s sub contractor Clean Harbor removed and replaced soiled booms and “no residual hydrocarbons were observed in the creek”. This spill may have contributed to the higher readings during the storm/runoff sample collected in May.

Since 2011, the sacrificial filters have been replaced annually due to sediment loading. Due to the variable storm and sediment loading, not all filters require replacement each year. In September 2013, the media in the sacrificial filters was changed from the originally installed Zeolite, Perlite and Granular Activated Carbon media (ZPG™) to a PhosphoSorb™ absorbent media in hopes to reduce total phosphorus exceedances. Due to the added cost associated with the PhosphoSorb™ media, only the sacrificial filters have this media. The remaining filters are still using and being replaced with ZPG™ media.

In total, 156 total filters were replaced on September 11<sup>th</sup>, 2018. All 14 filters in the two sacrificial units were replaced with PhosphoSorb™ media, while an additional 114 units were replaced in Unit 4 and Unit 11 (the large southeast Hydro-Dynamic Separator vaults) which collects bypass water from the upper parking lot and California base lodge. Additional maintenance was performed on the Hydro-Dynamic Separators located near the intersection of Wildwood Avenue and Saddle Road. Maintenance records along with photographs regarding the filter replacement and separator are included with the September Facilities Maintenance Monitoring Reports in Appendix D.

Comparing the water quality results with the annual PhosphoSorb™ media and filter replacement show slight improvements with regards to the minimum tested constituent values. While total phosphorus exceedances did not occur during the three samples collected in water year 2018, two of the three storm samples exceeded the total nitrogen limits. Continued annual maintenance and filter replacement appear to show some water quality improvement as exceedance and maximum constituent values (spikes) have not risen significantly over time. Chloride and turbidity results from the 2018 water year remain high, although maximum phosphorus results have fallen below the exceedance limits.

**Table 2-12 California Base Storm Filter Effluent 2018 Water Year Statistical Summary**

Exceedances of the California Maximum Concentration for Discharge to Surface Waters Limits for the Storm Filter Effluent Site (43HVP-2)					
	Turbidity (NTU)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	Chloride (mg/L)	Oil & Grease (mg/L)
<b>CA State Standard</b>	<b>20</b>	<b>0.5</b>	<b>0.10</b>	-	<b>2.0</b>
# Samples	3	3	3	3	3
Min	6.7	0.49	0.043	14.0	ND
Max	100	2.2	0.09	36	3.3
% of the time in Exceedance	<b>67%</b>	<b>67%</b>	<b>0%</b>	-	<b>67%</b>

## 2.8 Edgewood Creek

Edgewood Creek is located in Nevada, outside of Lahontan’s jurisdiction, and included in this report for compliance with the Master Plan Amendments that are within TRPA’s basin jurisdiction. The two Edgewood Creek locations are sampled for compliance with the Nevada Department of Environmental Protection (NDEP) standards. Data are summarized in Table 2-13 and Table 2-14, and the raw data tables are provided for reference in Appendix A.



Out of the thirteen daily samples collected at the Upper Edgewood Creek sampling site (43HVE-1) above the Boulder parking lot, two exceedances of NDEP standards for turbidity occurred, and one exceedance occurred for both suspended sediment and total phosphorus – all during the low flow months of July and/or August. No exceedances occurred for total nitrogen. Of the seventeen daily samples collected at the Lower Edgewood Creek sampling site (43HVE-2) below the Boulder parking lot, three daily samples exceeded the NDEP state standard for turbidity and suspended sediment, and two exceedances for total phosphorus occurred. Exceedances at Lower Edgewood Creek site (43HVE-2) occurred in December, March, April, and May. The turbidity exceedances ranged from 15.7 to 125 NTUs, with the maximum occurring on March 20<sup>th</sup>, 2018. The exact cause of these turbidity spikes are not known, although the exceedances in April and May occurred during sustained high flows on the rising limb of the hydrograph. The daily exceedances of suspended sediment and total phosphorus, occurred on days when the turbidity standard was also exceeded, suggesting that most of the exceedances are likely correlated with sediment transport and high flows.

**Table 2-13 Edgewood Creek Above the Boulder Parking Lot 2018 Water Year Statistical Summary**

Exceedances of the State (NDEP) Standards for the Edgewood Creek Site – Above the Boulder Parking Lot (43HVE-1)								
	Q (cfs)	Specific Conductivity (mmhos)	Turbidity (NTU)	Suspended Sediment (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	SRP (mg/L)	DP (mg/L)
<b>NDEP Standards<sup>1</sup></b>	-	-	<b>10.0</b>	<b>25</b>	<b>0.6<sup>2</sup></b>	<b>0.10</b>	-	-
# Samples	13	13	13	13	13	13	13	13
Min	0.032	54.2	0.79	0.50	0.064	0.015	0.003	0.007
Max	0.565	118.4	33.30	34.0	0.289	0.184	0.012	0.023
Annual Average	0.192	75.0	5.43	6.42	0.142	0.050	0.007	0.015

<sup>1</sup>NDEP Standards are from the Nevada Administrative Code (NAC) Chapter 445A.1915. All listed numbers are standards for single values no greater than a given parameter unless otherwise noted

<sup>2</sup>Annual Average

**Table 2-14 Edgewood Creek Below the Boulder Parking Lot 2018 Water Year Statistical Summary**

Exceedances of the State (NDEP) Standards for the Edgewood Creek Site – Below the Boulder Parking Lot (43HVE-2)								
	Q (cfs)	Specific Conductivity (mmhos)	Turbidity (NTU)	Suspended Sediment (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	SRP (mg/L)	DP (mg/L)
<b>NDEP Standards<sup>1</sup></b>	-	-	<b>10.0</b>	<b>25</b>	<b>0.6<sup>2</sup></b>	<b>0.10</b>	-	-
# Samples	17	17	17	17	17	17	17	17
Min	0.027	55.70	3.44	1.50	0.141	0.022	0.004	0.008
Max	0.952	212.0	125	82.0	0.574	0.254	0.014	0.025
Annual Average	0.341	104.9	<b>15.1</b>	11.32	0.221	0.051	0.007	0.016

<sup>1</sup>NDEP Standards are from the Nevada Administrative Code (NAC) Chapter 445A.1915. All listed numbers are standards for single values no greater than a given parameter unless otherwise noted

<sup>2</sup>Annual Average

## 2.9 Conclusions and Recommendations

The 2018 water year experienced nearly average precipitation, immediately following a well above average precipitation year, which followed a prolonged period of drought from water years 2012 through 2015. Although the 2018 water year was more similar to the 2016 water year, precipitation total was nearly 10 inches less, while the water content of the snowpack was only several inches less. Figure 2-3 presents a great comparison of the snow water equivalent (water) and precipitation totals since 2005. While 2017 annual noncompliance values were higher than seen in the previous years, 2018 noncompliance values and frequency returned to levels similar to pre-2017 years, more typical of the levels experienced in the average and below average years 2012-2016. Annual noncompliance values are typically lower and less frequent in low water years than in higher precipitation years, as a result in increased stream flows during storm events and spring runoff during higher precipitation years. The monitoring results demonstrate that constituent values in noncompliance are not solely due to mountain operations associated with the resort activities, as values at the baseline reference station at Hidden Valley Creek (43HDVC-5) also exceeded annual averages. The following sections include a summary of the Monitoring Program and the 2018 findings for each creek and applicable recommendations.

### 2.9.1 Heavenly Valley Creek

Annual average values for both total phosphorus and chloride were exceeded at all three sampling locations along Heavenly Valley Creek (43HVC-1A, 43HVC-2 and 43HVC-3). Annual averages for these two constituents were also exceeded for the 2016 and 2017 water years. Total phosphorus and chloride annual average values have also been consistently exceeded at the reference site along Hidden Valley Creek (43HDVC-5). The exceedances observed at the reference reach demonstrate that resort operations and development within the watershed are not solely responsible for these exceedances along Heavenly Valley Creek.

Suspended sediment Total Maximum Daily Load (TMDL) weighted annual average values have been calculated since 2001 and the five year rolling average has been below the limit since 2005. Low precipitation and runoff during the prolonged drought period, which correlate with lower sediment loading, likely lowered the 5-year rolling average despite the total suspended sediment load at Property Line (43HVC-3) in water year 2017 being substantially higher than the previous 4 years. Additional erosion control resources (BMPs), increased employee awareness, and on-mountain improvements are also likely contributors to an overall reduction in sediment loading. While total suspended sediment values are in compliance for Heavenly Valley Creek other metrics such as benthic macroinvertebrate (BMI) and stream condition inventory results (Section 3) will need to show improvement before possible discussion and potential (TMDL) de-listing of the Heavenly Valley Creek were to occur.

### 2.9.2 Bijou Park Creek / California Parking Lot Effluent

Since the state standards along Bijou Park Creek were lowered to the Lake Tahoe receiving water limits, the annual average values obtained at the monitoring location have not met the standards for total nitrogen, total phosphorus and chloride. The Amended Monitoring and Reporting Program in 2011 lowered the standards by almost a factor of ten for these three constituents. As discussed above, total phosphorus and chloride levels were also exceeded at the reference reach along Hidden Valley Creek (43HDVC-5), suggesting concentrations of these constituents can be elevated due to natural factors. However, the exceedances at Bijou Park Creek (43BPC-4) relative to state standards were substantially greater than those at Hidden Valley Creek or Heavenly Valley Creek.

The Amended Monitoring and Reporting Program in 2015 also lists turbidity “contributing to a condition of pollution or nuisance in Bijou Park Creek and its downstream receiving waters (Lake Tahoe)”<sup>7</sup>. As discussed above, elevated turbidity values at this location are likely due to the increased impervious area in this smaller watershed contributing sheet flow and dissolved nutrient loading to the creek. Corrective

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<sup>7</sup> California Regional Water Quality Control Board-Lahontan Region. 2015. No. 2015-0021 WDID NO. 6A090033000 for Heavenly Mountain Resort. 2015 (page 10).

actions have been listed in the past and are summarized in the Bijou Park Creek Evaluation Report (Catalyst, 2017) previously submitted with the 2012-2016 Comprehensive Report.

Chloride exceedances continue to be problematic at the Bijou Park Creek and parking lot effluent locations, as well as the other California stream monitoring locations (i.e., Heavenly Valley Creek and Hidden Valley Creek). The 2016 water year (2015/2016 ski season) marked the first year Heavenly implemented a 5:1 Washoe sand to salt mixture as their deicer for parking lots and roadways assessing the California base lodge. The smaller spreader truck and sensor allows for adequate deicer application, where in the past the large dump truck had problems dispensing a Washoe sand mixture. Heavenly continued this mixture and practice for the 2018 water year (2017/2018) ski season. In addition to limiting the amount of crystalized salt applied to the roadways, Heavenly also contracted with an outside vendor to apply liquid brine (salt/chloride) when plausible prior to storm events to aid in limiting icing of roadways and the amount of deicer needed after a storm. Liquid brine was utilized prior to three separate storms during February 2018. In order to maintain safe road conditions for their guests during and following storm events, Heavenly continues to apply deicer to the roadways leading to the California parking lot when liquid brine cannot be utilized due to storm timing, frequency, and other logistics. Further discussion on this issue can be found in Section 7.

The 2018 water year marks the seventh year that effluent results from the California parking lot filter vault system (location 43HVP-2) were reported to the State Water Board. Two of the three effluent storm samples collected had constituents that exceeded the state standard. The November 2017 effluent storm sample was below all of the state's not-to-exceed standards, although the May and July 2018 samples exceeded the standards for turbidity, total nitrogen, and oil and grease. None of the effluent storm samples exceeded the standard for total phosphorus. Although there is no state standard exceedance limit for the filter vault outlet location (43HVP-2) for chloride, it is worth noting that the average chloride concentration in the effluent was calculated to be approximately 27.67 mg/L, which is substantially lower than the 2018 annual average concentration of 50.8 mg/L for Bijou Park Creek (43BPC-4) located downstream. However, there is a larger cumulative watershed area and additional inputs at Bijou Park Creek, which would be expected to contribute additional chloride mass to the stream. The Water Board language does state that the metric for exceedance is 10% above background levels; however, there is not a sampling location upstream of the parking lot and vault inlet locations to determine the background value.

As mentioned above, a total of 156 filters were replaced in September 2018. The 2018 water year marks the fifth year of data collected using the new PhosphoSorb™ media. Water quality results demonstrate that the use of this new media has limited the total phosphorus exceedance spikes. While there were no total phosphorus exceedances from the vaults in water year 2018, 20% of the samples collected in the 2017 water year exceeded the total phosphorus limits. Compared with the 2017 water year, maximum exceedance values were greater in 2018 for turbidity, nitrogen, and chloride. However, fewer samples exceeded the not-to-exceed value for turbidity. Heavenly continues to be proactive in attempting to limit discharge exceedances by replacing cartridges, maintaining the system, updating sampling equipment and new filtration media. Continued filter inspections, maintenance and replacement is annually budgeted for by Heavenly, with the next round of inspections set to occur after the 2018/2019 winter season.

### **2.9.3 Edgewood Creek**

Thirteen samples were collected at the Edgewood Creek site above the Boulder parking lot (43HVE-1), while seventeen samples were collected downstream the Lower Edgewood Creek site (43HVE-2). The discrepancy between the total samples collected is due to ice and snow build-up at the Upper Edgewood site during the winter months, as well as a lack of flowing water and heavy vegetation within the channel during the baseflow period. Documented daily exceedances of NDEP standards occurred at the Upper Edgewood Creek sampling site (43HVE-1) only during the baseflow period (July and August): turbidity in July, and for turbidity, suspended sediment, and total phosphorus in August. Flows were too low to sample in September. NDEP daily standards at the Lower Edgewood Creek sampling site (43HVE-2) were exceeded for turbidity, suspended sediment and total phosphorus during the winter and runoff period. Since the restoration project in 2007 along Edgewood Creek, below the Boulder parking lot, there have been six water years in which the daily not-to-exceed NDEP stream effluent limits were not met for all 3 constituents (Table 2-15). The 2008, 2009, 2013, 2016, 2017 and 2018 water years all had daily

exceedances for turbidity, suspended sediment and total phosphorus. Exceedances that occurred in water year 2018 along Edgewood Creek are likely related to sediment transport, constituents bound to particles/sediment, at higher flows during runoff season (March-May). Exceedances also occurred late in the summer/early fall when low flow conditions cause stagnant water and suspended particulate matter to accumulate. Heavenly is committed to comprehensive improvements at the Boulder parking lot and is beginning a four year plan to repair the parking lot beginning next construction season. Parking lot improvement should improve future water quality results.

**Table 2-15 Lower Edgewood Creek 43HVE-2 Constituent Exceedances (2007-2018 Water Years)**

Water Year	Turbidity (20 NTU)	Suspended Sediment (25.0 mg/L)	Total Phosphorus (0.1 mg/L)
2007	19 (NTU)	31.3 (mg/L)	0.13 (mg/L)
2008*	18 & 48 (NTU)	55.3 & 81.7 (mg/L)	0.29 & 0.40 (mg/L)
2009	15 & 22 (NTU)	28.2 & 82 (mg/L)	0.14 (mg/L)
2010	14 (NTU)	32.8 & 30.8 (mg/L)	Not Exceeded
2011	14 (NTU)	25.2 (mg/L)	Not Exceeded
2012	13 (NTU)	Not Exceeded	Not Exceeded
2013	18.5, 18 & 20 (NTU)	31.5 (mg/L)	0.15, 0.11, 0.139 & 0.101 (mg/L)
2014	10.1 (NTU)	30.0 (mg/L)	Not Exceeded
2015	10.9 & 11.6 (NTU)	Not Exceeded	Not Exceeded
2016	18.7 & 22.9 (NTU)	26.0 (mg/L)	0.102 (mg/L)
2017	18.2, 11.0 & 30.0 (NTU)	39.0 & 26.0 (mg/L)	0.15 & 0.106 (mg/L)
2018	125, 44.6, 15.7 (NTU)	25.5, 82.0 & 34.0 (mg/L)	0.25 & 0.14 (mg/L)

\*Restoration along Edgewood Creek occurred during the summer of 2007. The 2008 water year would mark the first year after construction.

## 3 Riparian Condition Summary

The objective of this long-term monitoring and data collection effort is to assess the effectiveness of erosion control measures and restoration activities on stream health. Monitoring is conducted to characterize stream and riparian conditions along selected stream reaches within the Heavenly Mountain Resort area as well as along reference reaches that are unaffected by Resort activity. The evaluation and comparison of monitoring data is used to assess changes in stream and riparian conditions over time, and if changes are encountered, determine whether they are associated with operations at the Resort.

In accordance with the EIR/EIS/EIS and subsequent Total Maximum Daily Load (TMDL) criteria from the Monitoring and Reporting Program, Heavenly is required to monitor and survey stream condition inventory (SCI) at least once every four years corresponding with the second year of the benthic macroinvertebrate (BMI) sampling on Heavenly Valley and Hidden Valley Creeks.<sup>8</sup> The monitoring schedule is documented in the Lahontan Water Board's Monitoring and Reporting Program No. 2015-002 (WDID NO. 6A090033000).

The *Environmental Monitoring Program Comprehensive Report Heavenly Mountain Resort Water Years 2012-2016*<sup>9</sup> (Comprehensive Report) submitted last winter provides detailed data regarding the riparian condition over time.

### 3.1 Benthic Macroinvertebrate Surveys

Although BMI data were collected at all five sampling sites during the summer months of 2018, the laboratory analysis was not available for inclusion in this report. It will be included in the following year's report (for water year 2019). Table 3-1 includes all past scoring data for each of the five sites, while Tables Table 3-2 and Table 3-3 lists the threshold criteria for both the Eastern Sierra IBI (ESIBI) and California Stream Condition Inventory (CSCI).

**Table 3-1 Bioassessment scores for sampling events at five stream location near Heavenly Ski Resort (2006-2016)**

Sample Year	Sample Dates	HVC-1 Sky Meadows		HVC-2 Below Patsy's		HVC-3 Property Line		LHC-1 Lower Hidden Valley Creek		LHC-2 Upper Hidden Valley Creek <sup>1</sup>	
		ESIBI	CSCI	ESIBI	CSCI	ESIBI	CSCI	ESIBI	CSCI	ESIBI	CSCI
2006	9/6 & 9/7	55.3	0.93	52.2	0.92	69.1	0.95	80.6	1.21	-	-
2007	8/29 & 8/30	23.6	0.41	67	0.96	74.7	0.98	93.3	1.15	-	-
2010	8/10 & 8/11	36.8	0.67	55.2	0.86	80.7	1.04	94.6	1.11	-	-
2011	8/29	49.8	0.61	75	0.75	83.5	1.01	87.8	0.90	-	-
2014	7/28 & 7/29	13.5	0.26	52.7	0.75	72.7	0.82	80.5	0.88	-	-
2015 <sup>1</sup>	6/8 & 6/11	55.2	0.93	39.5	0.77	72.2	0.87	91.6	0.92	32.1	0.58
2016	7/21 & 7/22	56.0	0.88	-	-	-	-	-	-	44.8	0.73
2018 <sup>2</sup>	7/9-7/11	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD

<sup>8</sup> California Regional Water Quality Control Board-Lahontan Region. 2015. Monitoring and Reporting Program No. 2015-0021 WDID NO. 6A090033000 for Heavenly Mountain Resort. 2015 (pages 3-4).

<sup>9</sup> Cardno 2017 Environmental Monitoring Program Comprehensive Report Heavenly Mountain Resort Water Years 2012-2016. Cardno, Zephyr Cove, Nevada.

Sample Year	Sample Dates	HVC-1 Sky Meadows		HVC-2 Below Patsy's		HVC-3 Property Line		LHC-1 Lower Hidden Valley Creek		LHC-2 Upper Hidden Valley Creek <sup>1</sup>	
		ESIBI	CSCI	ESIBI	CSCI	ESIBI	CSCI	ESIBI	CSCI	ESIBI	CSCI

<sup>1</sup> 2015, marked the first time BMI data was collected at Upper Hidden Valley Creek.

<sup>2</sup> 2018 results have not been analyzed by the laboratory at this time.

Scoring calculated using Eastern Sierra IBI (ESIBI), 9-point metric values and the California Stream Condition Index (CSCI).

**Table 3-2 Thresholds applicable to Eastern Sierra IBI (from Herbst and Silldorff 2009)**

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		

**Table 3-3 Thresholds used to Define Condition Classes for the CSCI (Suk, 2014)**

Index	Very Likely Intact (≥0.50)	Likely Intact (0.30 to 0.50)	Possibly Altered (0.10 to 0.30)	Likely Altered (0.01 to 0.10)	Very Likely Altered (< 0.01)
CSCI	> 1.0	1.00 – 0.92	0.91 – 0.79	0.78 – 0.63	0.62 – 0.00

As stated and referenced in the Comprehensive Report, annual scores can be assigned a rating; however, definitive long-term positive trending analysis cannot be made at this time due to the low number of samples collected (Suk, 2015). Using the tables above and the parameters established in the Heavenly Valley Creek – Bioassessment Site Scores for 2014 (Suk, 2015) memorandum, the 2016 scores indicate the following biotic conditions for the two sites sampled:

- > HVC-1 (“Sky Meadows”) is in poor biotic condition according to the ESIBI, and is very likely intact according to the CSCI. The 2015 and 2016 scores show improvement in the biotic condition over the 2014 scores.
- > LHC-2 (Upper Hidden Valley Creek “control” site) is in poor biotic condition according to the ESIBI, and is likely altered according to the CSCI. Both thresholds scores improved over the initial samples collected in 2015.

The inclusion of this high altitude undisturbed meadow reach is to gather data to be used as a baseline to compare and contrast future measurements at this site and against the disturbed meadow environment at Sky Meadows (HVC-1) along Heavenly Valley Creek. Future BMI samples along with snow pack and stream flow data are needed to help determine variability and stream health.

## 4 Facilities Maintenance Monitoring

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Appendix D includes the facilities monitoring checklist for the months of July, August and September. Previous monthly facility monitoring checklists (October through June) can be found in past quarterly reports for the water year 2018. No salt application occurred on-mountain or in and around the parking lots during the fourth quarter, since these months are typically the warmest months of the year and snow resort operations are non-existent with regards to skiing and snowboarding. Additionally, due to the timing of storms and resort operation, salt application was limited only to the Terrain Park during the third quarter. During March (end of the second quarter), parking lot maintenance, inspections and sweeping occurred in and around the California parking lot facility. Sweeping and recovery is discussed in greater detail in Section 6.

A reported shuttle bus fuel leak occurred near the upper California parking lot on April 7<sup>th</sup>. Booms and absorbent mats were placed at storm drain inlets and at the parking lot entrance containing the affected area and minimizing contamination of nearby water bodies. Heavenly's subcontractor Clean Harbor removed and replaced soiled booms. This spill may have contributed to the higher oil and grease readings in the storm/runoff sample collected in May at the California parking lot storm filter influent and effluent sampling locations (43HVP-1a, 43HVP-1b, and 43HVP-2). The detailed event and response was discussed in the Third Quarterly Report and was included as Appendix D of the report.

Clean Harbors inspected the oil and grease separator in July ensuring that the system was still working as designed. They also removed sediment accumulation within the sediment traps and sumps around the parking lot in August 2018, prior to the storm vaults filter replacements.

Pacific Stormwater BMP Solutions inspected storm vaults in June 2018, and replaced filters in September 2018. Appendix C contains the filter vaults maintenance inspection report and photos from Pacific Stormwater BMP Solutions. A total of 156 new cartridges were replaced in September 2018. Also in late September, pavement repair at the California Base Area parking lot occurred near and around the storm vault system. During the 2018 summer construction season, Heavenly asphalt sealed the upper California Parking lot (350,000 ft<sup>2</sup>) and rotomilled/repaved the lower parking lot and entrance travel lanes (37,125 ft<sup>2</sup>). The parking lot deterioration likely increased the sediment (and nutrient) loading into the vault system. Pictures of repair are included with the 4<sup>th</sup> Quarter Erosion and Facilities Photo Report found in Appendix G.

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## 5 Snow Condition and Snowmaking Materials

Table 5-1 was created in order to summarize the annual water year's total application of huck salt applied at four initially monitored sites around the mountain. Huck salt application at the Adventure Peak Tubing location has ceased since the 2014 water year due to procedural changes, and this originally monitored site is no longer included in annual summaries of huck salt. The CA parking lot site was added in water year 2015, and beginning in water year 2017, monitoring began at three additional sites: Tamarack Lodge, Tram Base and World Cup Foundation Building. These additional sites have been added to adequately track all salt (deicer) applied in and around the resort during winter operations. Table 5-1 summarizes the annual application and water year totals, noting that no huck salt was applied during the fourth quarter of the 2018 water year.

**Table 5-1 Location and the Application Amount of Huck Salt (Obtained from the Monthly Monitoring Logs, Water Year 2018)**

Month/ Year	Top of the Gondola (lbs.)	World Cup Race Course (lbs.)	Terrain Park (lbs.)	CA Parking Lot Application (lbs.)	Tamarack Lodge Deck (lbs.)	Tram Base Deck (lbs.)	World Cup Foundation Building (lbs.)
October 2017	0	0	0	0	0	0	0
November 2017	0	0	0	50	25	0.5	0
December 2017	0	0	0	100	25	6	0
January 2018	0	0	0	125	50	102.5	0
February 2018	0	0	10	200	50	259	0
March 2018	0	0	80	200	150	574.5	0
April 2018	0	0	280	0	0	60	0
May 2018	0	0	0	0	0	0	0
June 2018	0	0	0	0	0	0	0
July 2018	0	0	0	0	0	0	0
August 2018	0	0	0	0	0	0	0
September 2018	0	0	0	0	0	0	0
<b>Totals</b>	<b>0 lbs.</b>	<b>0 lbs.</b>	<b>370 lbs.</b>	<b>675 lbs.</b>	<b>200 lbs.</b>	<b>641 lbs.</b>	<b>0 lbs.</b>

Snow and ice melt are applied to heavily used pedestrian areas including parking lots, walkways, and tram egress locations providing safer guest access during the ski/snowboarding season. Salt application at the Upper California Main Lodge (CA parking lot), Tamarack Lodge, Tram Base and World Cup Foundation Building are addressed using a hand spreader or similar, although no salt was applied at the World Cup Foundation Building in the 2018 water year. Since no salt was applied at any locations during the fourth quarter, a letter stating such is included in Appendix D.

Table 5-2 summarizes the past eight water year's salt application totals for each of the eight locations. The 2017 water year marked the first year that the Tamarack Lodge, Tram Base and World Cup Foundation Building sites were monitored. Salt application usage was minimal during the 2018 water year, particularly in comparison to the 2017 water year, in part to average precipitation and low early season snowfall (see Section 2.2 and 2.4.1 for water year precipitation and stream discharge values). At many sites, no huck salt was utilized during the 2018 water year. Employee training and manager's salt application approval have been implemented over the years helping to limit salt usage and chloride levels in water samples. As mentioned above, salt application at the Adventure Peak Tubing location has ceased since the 2013 water year due to procedural changes, and although this site is no longer included in future monitoring submittals, it is included in Table 5-2 as a past reference. Additional monitoring records over a longer period of time, and over varying precipitation years, will help to verify the application relationship with water year precipitation (snow fall) totals.

**Table 5-2 Annual Huck Salt Application Records (2011-2018).**

Water Year	Top of the Gondola (lbs.)	World Cup Race Course (lbs.)	Terrain Park (lbs.)	Adventure Peak – Tubing Area (lbs.)	CA Parking Lot Application (lbs.)	Tamarack Lodge Deck (lbs.)	Tram Base Deck (lbs.)	World Cup Foundation Building (lbs.)	Total Summary (lbs.)
2011 Water Year	250	900	3,360	3,400	-	-	-	-	7,910
2012 Water Year	300	800	1,962	100	-	-	-	-	3,162
2013 Water Year	450	1,680	4,160	400	-	-	-	-	6,690
2014 Water Year	80	60	2,840	-	-	-	-	-	2,980
2015 Water Year <sup>1</sup>	16	50	418	-	544	-	-	-	1,028
2016 Water Year	38	240	0	-	2,982	-	-	-	3,260
2017 Water Year <sup>2</sup>	0	0	555	-	3,295	463	1,050	31	5,394
2018 Water Year	0	0	370	-	675	200	641	0	1,886

<sup>1</sup> The 2015 Water Year marked the first year that deicer/salt application near and around the CA lodge was tracked on a monthly basis. Application has occurred in the past water years; however the amounts were not recorded.

<sup>2</sup> The 2017 Water Year marked the first year that deicer/salt application near and around the following locations: Tamarack Lodge, Tram Base and World Cup Foundation Building was tracked on a monthly basis. Application likely occurred in the past water years; however the amounts were not recorded.

## 6 Deicer and Abrasives Application and Recovery

Application of deicer and abrasives began on November 27, 2017 during the first quarter of the 2018 water year. Application continued through the winter/ski season into March 2018. No deicer/abrasive application occurred during the third or fourth quarters according to the daily and monthly deicer logs. As discussed in other sections, the 2018 water year precipitation and snowfall totals were approximately average, which correlated with approximately average use of deicer. Although the resort was open through mid-April, no deicer was utilized during April due to warm temperature conditions. Deicer recovery typically occurs in the late spring and summer months after the resort operations have concluded for the year, or when there is a break in weather allowing recovery to occur. As such, recovery occurred in late March, prior to resort closing, but following the need for deicer application. No deicer/abrasives were applied following the March recovery. Liquid brine was applied to the parking lots and roadways adjacent to the California Base Area on three separate occasions in February 2018, and not utilized at all in the third quarter as warmer weather negated the need. In March, 32,280 lbs. of abrasives were collected in and around the California parking lots by a mechanical sweeper. This value differs from the value previously reported in the second quarterly report. Likewise, Heavenly collected 55,760 lbs. of abrasives during three separate events in April. The third quarterly report, previously noted that zero recovery occurred during this month. The missing weigh tickets are included in Appendix D. The recovery total for water year 2018 is higher than past recovery efforts in that it accounts for loose parking lot debris associated with potholes, loose asphalt and gravels. Daily and monthly deicer logs can be found in Appendix D. Table 6-1 provides the 2018 water year volumes of deicer application and recovery.

Material applied to the roadways was recovered by Heavenly and their subcontracted vendor (sweeping truck) during March, April and July 2018. Additionally, the City of South Lake Tahoe sweeps the roadways leading up to Heavenly Mountain Resort, collecting debris, cinders, and sand that Heavenly applies to roadways leading to the resort (Ski Run Blvd., Needle Peak Road, Wildwood Avenue and Saddle Road). In theory, the city's sweeper collection values should be added to the tracked recovery volumes below. However, the city also applies deicer to the roadways adjacent the resort, and at this time neither application nor recovery is tracked and accounted for.

**Table 6-1 Summary of Deicer Application and Recovery (Water Year 2018)**

Month/Year	Total Amount of Deicer and Abrasives Applied (lbs.)	Total Amount of Deicer and Abrasives Recovered (lbs.)	Total Amount of Liquid Brine Applied (Gallons)
October 2017	0	0	0
November 2017	2,020	0	0
December 2017	13,127	0	0
January 2018	35,545	0	0
February 2018	11,310	0	550
March 2018	14,541	32,280	0
April 2018	0	55,760	0
May 2018	0	0	0
June 2018	0	0	0
July 2018	0	39,140	0
August 2018	0	0	0
September 2018	0	0	0
<b>Totals</b>	<b>76,543 lbs.</b>	<b>127,180 lbs.</b>	<b>550 Gallons</b>

The 2017/2018 ski season marked the third year of Washoe sand deicer mixture and application. Previously, deicer consisted of a cinder base that had more porous spaces that was not as beneficial to the environment due to the larger porous void space, nutrient attachment and durability. Improvements to the spreader equipment allowed Heavenly to switch to the Water Boards preferred abrasive/deicer

material (Washoe sand). Heavenly has also maintained the sand to salt ratio of 5:1, respectively, limiting the amount of salt applied to the roadways and entering the water ways. Heavenly received a new stockpile of abrasives on February 27, 2018. Samples of this material were delivered to El Dorado County and their in-house laboratory for analysis and comparison. El Dorado County also uses the same “spec H aggregate” Washoe sand from Cinderlite. Laboratory analysis was performed in March 2018 on the Washoe sand sample and included in the Third Quarterly Report. Results from this analysis are also included in Appendix D.

February 18<sup>th</sup>, 2018 marked the first application of liquid brine to the parking lots and roadways during the 2018 water year. Liquid brine was applied prior to two other storms in late February 2018. Liquid brine is comprised of dissolved magnesium and sodium chloride and was first utilized by Heavenly in 2017 to pre-treat roadways before storms. Unlike deicer, sprayed application of the liquid does not bounce (like sand particles) off the asphalt roadway surface and provides more complete coverage in cracks, helping to melt snow and prevent ice build-up.

Annual application and recovery amounts for the past seven seasons (since application and recovery have been tracked) are shown in Table 6-2 below. In the 2018 water year, the percentage of applied material that was recovered was the highest recovered percentage to date, as Heavenly has increased its effort and effectiveness of removing abrasives from the watershed. This is also due in part to the existing California parking lot surface condition. Heavenly is actively rebuilding and repairing sections of the parking lot over time to help eliminate future pavement failures. During the 2018 summer construction season, 350,000 ft<sup>2</sup> of the upper California parking lot were asphalt sealed; while an additional 37,125 ft<sup>2</sup> were repaved in and around the entrance travel lanes and lower parking lot.

**Table 6-2 Deicer Application and Recovery 7-Year Totals**

<b>Yearly Totals</b>	<b>Total Amount of Deicer and Abrasives Applied (lbs.)</b>	<b>Total Amount of Deicer and Abrasives Recovered (lbs.)</b>
2012	255,570	88,600
2013	390,121	105,020
2014	124,824	66,060
2015	59,076	33,900
2016	178,735	124,240
2017	230,644	171,620
2018	76,543	127,180
<b>Total</b>	<b>1,315,513 lbs.</b>	<b>716,620 lbs.</b>

## 7 USFS Roads Monitoring

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The latest Monitoring and Reporting Program (MRP) requires monitoring United States Forest Service (USFS) roads within the boundary of Heavenly Mountain Resort.<sup>10</sup> In March 2015, Vail Resorts (Heavenly) and the Lake Tahoe Basin Management Unit (USFS) entered a roads maintenance and reporting agreement to coordinate and cooperate future maintenance and monitoring of the on-mountain roadway network<sup>11</sup>. This agreement lays out the framework for roadway maintenance, new roadway construction, annual meetings and annual reporting activities.

The Heavenly Roads Maintenance Report for 2018 was submitted to the LTBMU Forest Service in September 2018. The 2018 summary and map are included in this report as Appendix E. During the 2018 construction season, 11.6 miles of on-mountain roadway network were improved and/or maintained. Of this total, 9.4 miles of roads were maintained, and 2.2 miles of roads were improved. Effectiveness of road BMPs were evaluated in 2017, fulfilling a separate monitoring requirement to be completed once every four years, and results were included as part of the BMP Effectiveness Annual Report, submitted in May 2018.

In addition to the new MRP, the USFS Region 5 has phased out the Regional BMP Evaluation Program (BMPEP). In the past, this program provided additional roadway maintenance and monitoring protocol. Moving forward, the USFS will require the new National US Forest Service BMP Monitoring Program that will address roadways, ski runs, and facilities. The program and protocol are still in draft form at this time; however, the agency has actively been using the protocols over the past few years. A final version of the technical guide is still not available to the public at this time. The new National BMP protocols programmatically assess BMP implementation and effectiveness for roadways and other land management practices (facilities and ski runs for example). All management practices associated with Heavenly Mountain Resort will be included in the sample pool for random selection and annual monitoring in which the USFS staff will conduct and report.

Due to the low number of sites selected and random monitoring associated with the National BMP monitoring targets (approximately six evaluations per Forest per year); Heavenly and their consultants will continue to identify and address erosion and BMP effectiveness on resort roadways, ski runs and facilities annually.

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<sup>10</sup> California Regional Water Quality Control Board – Lahontan Region. 2015. Monitoring and Reporting Program for Heavenly Mountain Resort. Board Order 2015-0021. WDID No. 6A090033000. 2015. Page 9. Section D.

<sup>11</sup> US Department of Agriculture. Forest Service Lake Tahoe Basin Management Unit. Forest Road Maintenance and Reporting Agreement between the USDA USFS LTBMU and Heavenly Mountain Resort. March 23, 2015.

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## 8 Facilities Watershed Awareness Training

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As required by the Monitoring and Reporting Program, Appendix F includes the compliance letter stating that a Facilities Watershed Awareness Training was completed on June 18, 2018. In addition to the letter, Appendix F also includes the sign-in sheet documenting attendance to the training as well as a copy of the PowerPoint presentation. This training is typically called the "BMP Breakfast Training" and had 96 attendees sign-in in spring of 2018. The training covers: recent on-mountain projects, resort maintenance operations, identification of noxious weeds and sensitive species (Draba), the incorporation of lessons learned from past projects, information regarding the summer road rules (speed and dust), as well as providing information regarding new BMP technologies as well as reviewing correct BMP installation and implementation.

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## 9 On-Mountain Monitoring

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Additional on-mountain monitoring documentation can be found in Appendix G. The table and associated photos represent the fourth quarter of the 2018 water year (July through September) and assists with developing a draft of annual work list submitted with the Mitigation and Monitoring Report. Due to snow cover and limited on-mountain access, photo monitoring and documentation is typically limited to once per water year. A number of on-mountain erosion issues were addressed by the summer maintenance crews. Examples of on-mountain repairs include the Upper Shop Road rock line ditch restoration, maintenance and sediment removal of the roadside drainage along Maggie's, and implementation of erosion control measures at Ridge Bowl Ski Trail. Additionally, all on-mountain culverts were inspected and were noted to be adequate at this time. Erosion control measures implemented during summer 2017 construction season at Hand Grenade/Roundabout were also inspected and showed revegetation progress. As stated earlier in the report, annual storm vault inspections were performed and filter replacement occurred in September 2018 as discussed in Section 2.7.

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Heavenly Mountain Resort  
Water Year 2018

APPENDIX

A

RAW WATER QUALITY  
CONSTITUENTS, WATER YEAR  
2018



## Appendix A

# RAW WATER QUALITY CONSTITUENTS, WATER YEAR 2018

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- A.1      43HVC-1A – Sky Meadows Annual Water Quality Data**
- A.2      43HVC-2 – Patsy’s Annual Water Quality Data**
- A.3      43HVC-3 – Property Line Annual Water Quality Data**
- A.4      43BPC-4 – Below California Parking Lot Annual Water Quality Data**
- A.5      43HDVC-5 – Lower Hidden Annual Water Quality Data**
- A.6      43HVE-1 – Upper Edgewood Creek Annual Water Quality Data**
- A.7      43HVE-2 – Lower Edgewood Creek Annual Water Quality Data**
- A.8      WetLab July Analysis**
- A.9      High Sierra July Analysis**
- A.10     WetLab August Analysis**
- A.11     High Sierra August Analysis**
- A.12     WetLab September Analysis**
- A.13     High Sierra September Analysis**





Heavenly Valley Creek -Sky Meadows  
(43HVC-1A)

Table B-1:		Heavenly Mountain Resort water year 2017/2018 water quality monitoring data from station 43HVC-1A, Heavenly Valley Creek at Sky Meadows. This station is located above the snowmaking pond at an elevation of 8,525 feet.										
Date	Time	Discharge (cfs)	Turbidity (ntu)	Suspended Sediment <sup>2</sup> (mg/L)	Total Nitrite/Nitrate (mg/L)	Total Kjeldahl N (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	Chloride (mg/L)	Average Temperature (Deg C)	Precipitation (in)	
Lahontan Standards <sup>1</sup>		N/A	N/A	60	N/A	N/A	0.190	0.015	0.15	N/A	N/A	
<b>First Quarter WY 2017-2018</b>												
10/18/17	14:00	0.361	0.88	1.0	0.012	0.074	0.086	0.014	0.31	7.22	0	
11/14/17	***UNABLE TO SAMPLE DUE TO ACCESS ISSUES ON MOUNTAIN										0.56	0.3
12/21/17 <sup>3</sup>	13:50	-	0.92	1.0	0.027	0.071	0.098	0.010	0.40	-6.11	0.2	
<b>Second Quarter WY 2017-2018</b>												
1/17/18	13:30	0.187	1.30	1.5	0.009	0.093	0.102	0.013	0.38	3.89	0	
2/14/18	14:25	0.135	2.73	1.5	0.020	0.062	0.082	0.015	0.36	-5.56	0	
3/20/18	14:15	0.100	1.92	1.5	0.032	0.057	0.089	0.013	0.35	0.00	0.1	
<b>Third Quarter WY 2017-2018</b>												
4/4/18	14:25	0.187	3.49	4.5	0.036	0.099	0.135	0.019	0.34	4.44	0	
4/18/18	13:35	0.340	1.93	2.5	0.036	0.089	0.125	0.015	0.38	-1.11	0	
5/3/18	13:50	0.753	4.88	6.0	0.036	0.201	0.237	0.041	0.33	5.00	0	
5/17/18	14:15	1.462	7.03	9.0	0.037	0.174	0.211	0.042	0.31	4.44	0.7	
5/23/18	13:45	1.904	4.38	6.0	0.044	0.149	0.193	0.032	0.31	6.67	0.2	
5/30/18	14:00	2.554	2.36	5.0	0.038	0.128	0.166	0.027	0.31	9.44	0	
6/6/18 <sup>4</sup>	13:30	3.489	5.85	7.5	0.063	0.171	0.234	0.038	0.35	8.89	0	
6/20/18	13:20	1.904	1.39	2.5	0.030	0.073	0.103	0.020	0.35	13.33	0	
<b>Fourth Quarter WY 2017-2018</b>												
7/19/18	13:20	0.868	1.37	2.5	0.020	0.073	0.093	0.020	0.30	16.67	0	
8/16/18	14:05	0.340	1.54	2.0	0.018	0.066	0.084	0.013	0.28	13.89	0	
9/12/18	14:00	0.244	1.52	2.5	0.016	0.060	0.076	0.019	0.30	7.78	0	
Annual Summary	Minimum	0.10	0.88	1.00	0.009	0.057	0.076	0.010	0.28	-6.1	-	
	Maximum	3.49	7.03	9.00	0.063	0.201	0.237	0.042	0.40	16.7	-	
	Average	1.19	2.72	3.53	0.030	0.103	0.132	0.022	0.34	5.3	-	
	90th Percentile	-	-	7.95	-	-	-	-	-	-	-	

<sup>1</sup> Standards are annual averages for the receiving waters of Trout Creek.

<sup>2</sup> Standards are for receiving waters of Trout Creek, 90th Percentile.

<sup>3</sup> Unable to measure flow due to ice on 12/21; however, water quality samples collected

<sup>4</sup> Unable to measure flow/depth at the flume due to flood stage (overtopping flume). Flow was measured using the Marsh Mcbirney flow meter.

**Heavenly Valley Creek - Below Patsys  
(43HVC-2)**

<b>Table B-2:</b>		<b>Heavenly Mountain Resort water year 2017/2018 water quality monitoring data from station 43HVC-2, Heavenly Valley Creek below Patsy's Chair. This station is located just beyond ski area development within this watershed at an elevation of 8,000 feet.</b>									
<b>Date</b>	<b>Time</b>	<b>Discharge (cfs)</b>	<b>Turbidity (ntu)</b>	<b>Suspended Sediment <sup>2</sup> (mg/L)</b>	<b>Total Nitrite/Nitrate (mg/L)</b>	<b>Total Kjeldahl N (mg/L)</b>	<b>Total Nitrogen (mg/L)</b>	<b>Total Phosphorus (mg/L)</b>	<b>Chloride (mg/L)</b>	<b>Average Temperature (Deg C)</b>	<b>Precipitation (in)</b>
<b>Lahontan Standards<sup>1</sup></b>		N/A	N/A	<b>60</b>	N/A	N/A	<b>0.190</b>	<b>0.015</b>	<b>0.15</b>	N/A	N/A
<b>First Quarter WY 2017-2018</b>											
10/18/17	13:40	0.626	1.05	1.5	0.015	0.101	0.116	<b>0.017</b>	<b>0.55</b>	7.22	0
11/14/17	13:40	0.393	0.67	1.5	0.028	0.068	0.096	<b>0.019</b>	<b>0.76</b>	0.56	0.3
12/21/17	13:50	0.174	0.77	1.5	0.063	0.095	0.158	0.011	<b>1.00</b>	-6.11	0.2
<b>Second Quarter WY 2017-2018</b>											
1/17/18	14:00	0.174	5.24	4.5	0.048	0.073	0.121	<b>0.027</b>	<b>0.96</b>	3.89	0
2/14/18	15:00	0.100	1.47	1.0	0.047	0.064	0.111	0.012	<b>0.95</b>	-5.56	0
3/20/18	14:35	0.148	1.42	1.0	0.051	0.050	0.101	<b>0.016</b>	<b>0.96</b>	0.00	0.1
<b>Third Quarter WY 2017-2018</b>											
4/4/18	15:15	0.292	0.76	1.0	0.049	0.053	0.102	0.012	<b>1.40</b>	4.44	0
4/18/18	13:40	0.668	1.38	1.5	0.051	0.054	0.105	0.014	<b>0.81</b>	-1.11	0
5/3/18	14:05	1.638	32.3	29.0	0.051	0.162	<b>0.213</b>	<b>0.114</b>	<b>1.00</b>	5.00	0
5/17/18	13:50	2.527	8.73	9.5	0.018	0.171	0.189	<b>0.041</b>	<b>0.63</b>	4.44	0.7
5/23/18	13:30	2.665	3.31	2.5	0.027	0.107	0.134	<b>0.022</b>	<b>0.55</b>	6.67	0.2
5/30/18	13:45	3.316	2.40	3.0	0.030	0.085	0.115	<b>0.021</b>	<b>0.49</b>	9.44	0
6/6/18	13:15	3.543	2.04	3.5	0.021	0.089	0.110	<b>0.024</b>	<b>0.44</b>	8.89	0
6/20/18	13:10	3.093	1.85	2.0	0.016	0.096	0.112	<b>0.017</b>	<b>0.44</b>	13.33	0
<b>Fourth Quarter WY 2017-2018</b>											
7/19/18	13:05	0.894	1.46	3.0	0.017	0.112	0.129	<b>0.021</b>	<b>0.46</b>	16.67	0
8/16/18	13:50	0.505	2.0	3.0	0.018	0.104	0.122	<b>0.017</b>	<b>0.49</b>	13.89	0
9/12/18	13:35	0.358	2.0	1.0	0.017	0.084	0.101	<b>0.022</b>	<b>0.54</b>	7.78	0
<b>Annual Summary</b>	<b>Minimum</b>	0.10	0.67	1.00	0.015	0.050	0.096	0.011	0.44	-6.1	-
	<b>Maximum</b>	3.54	32.30	29.00	0.063	0.171	0.213	0.114	1.40	16.7	-
	<b>Average</b>	1.46	4.05	4.12	0.033	0.092	0.126	<b>0.025</b>	<b>0.73</b>	5.3	-
<b>90th Percentile</b>		-	-	13.40	-	-	-	-	-	-	-

<sup>1</sup> Standards are annual averages for the receiving waters of Trout Creek.

<sup>2</sup> Standards are for receiving waters of Trout Creek, 90th Percentile.

**Heavenly Valley Creek - Property Line  
(43HVC-3)**

<b>Table B-3:</b>		<b>Heavenly Mountain Resort water year 2017/2018 water quality monitoring data from station 43HVC-3, Heavenly Valley Creek at the Property Line. This station is located just above the Forest Service property line and subdivision development at an elevation of 6,620 feet.</b>									
<b>Date</b>	<b>Time</b>	<b>Discharge (cfs)</b>	<b>Turbidity (ntu)</b>	<b>Suspended Sediment<sup>2</sup> (mg/L)</b>	<b>Total Nitrite/Nitrate (mg/L)</b>	<b>Total Kjeldahl N (mg/L)</b>	<b>Total Nitrogen (mg/L)</b>	<b>Total Phosphorus (mg/L)</b>	<b>Chloride (mg/L)</b>	<b>Average Temperature (Deg C)</b>	<b>Precipitation (in)</b>
<b>Lahontan Standards<sup>1</sup></b>		N/A	N/A	<b>60</b>	N/A	N/A	<b>0.190</b>	<b>0.015</b>	<b>0.15</b>	N/A	N/A
<b>First Quarter WY 2017-2018</b>											
10/18/17	12:10	1.029	0.70	0.5	0.001	0.068	0.069	0.015	<b>0.51</b>	7.22	0
11/14/17	12:05	0.448	0.45	1.0	0.003	0.063	0.066	<b>0.020</b>	<b>0.69</b>	0.56	0.3
12/21/17	12:25	0.223	2.89	11.5	0.004	0.13	0.134	<b>0.024</b>	<b>0.87</b>	-6.11	0.2
<b>Second Quarter WY 2017-2018</b>											
1/17/18	11:40	0.195	0.46	0.5	0.004	0.054	0.058	0.015	<b>0.76</b>	3.89	0
2/14/18	12:25	0.088	1.34	1.0	0.005	0.06	0.065	0.015	<b>0.76</b>	-5.56	0
3/20/18	12:55	0.229	0.43	0.5	0.004	0.052	0.056	0.014	<b>0.79</b>	0.00	0.1
<b>Third Quarter WY 2017-2018</b>											
4/4/18	12:30	0.616	2.50	2.5	0.004	0.075	0.079	<b>0.022</b>	<b>0.97</b>	4.44	0
4/18/18	11:50	1.155	1.04	1.0	0.007	0.056	0.063	0.015	<b>0.77</b>	-1.11	0
5/3/18	12:20	2.292	1.78	1.5	0.011	0.067	0.078	<b>0.016</b>	<b>0.33</b>	5.00	0
5/17/18	12:00	2.923	3.33	3.0	0.010	0.083	0.093	<b>0.027</b>	<b>0.31</b>	4.44	0.7
5/23/18	12:15	3.073	2.59	3.0	0.007	0.086	0.093	<b>0.022</b>	<b>0.31</b>	6.67	0.2
5/30/18	12:15	5.280	2.45	2.5	0.010	0.097	0.107	<b>0.020</b>	<b>0.31</b>	9.44	0
6/6/18	11:50	4.497	2.59	4.0	0.009	0.091	0.100	<b>0.028</b>	<b>0.45</b>	8.89	0
6/20/18	11:50	3.144	1.84	2.0	0.009	0.142	0.151	<b>0.023</b>	<b>0.46</b>	13.33	0
<b>Fourth Quarter WY 2017-2018</b>											
7/19/18	11:35	1.354	1.26	2.5	0.008	0.082	0.090	<b>0.020</b>	<b>0.48</b>	16.67	0
8/16/18	12:25	0.642	1.13	2.0	0.010	0.072	0.082	<b>0.016</b>	<b>0.51</b>	13.89	0
9/12/18	12:25	0.364	0.63	1.0	0.007	0.053	0.060	<b>0.022</b>	<b>0.57</b>	7.78	0
<b>Annual Summary</b>	<b>Minimum</b>	0.09	0.43	0.50	0.001	0.052	0.056	0.014	0.31	-6.1	-
	<b>Maximum</b>	5.28	3.33	11.5	0.011	0.142	0.151	0.028	0.97	16.7	-
	<b>Average</b>	1.85	1.61	2.35	0.007	0.078	0.085	<b>0.020</b>	<b>0.58</b>	5.3	-
<b>90th Percentile</b>		-	-	5.50	-	-	-	-	-	-	-

<sup>1</sup> Standards are annual averages for the receiving waters of Trout Creek.

<sup>2</sup> Standards are for receiving waters of Trout Creek, 90th Percentile.

**Bijou Park Creek - Below California Parking Lot  
(43BPC-4)**

Table B-4:		Heavenly Mountain Resort water year 2017/2018 water quality monitoring data from station 43BPC-4, Bijou Park Creek below California Parking Lot. This station is located 1/4 miles below the culvert outlet draining the parking lot off of Wildwood Avenue at an elevation of 6,530 feet.									
Date	Time	Discharge (cfs)	Turbidity (ntu)	Suspended Sediment (mg/L)	Total Nitrite/ Nitrate (mg/L)	Total Kjeldahl N (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	Chloride (mg/L)	Average Temperature (Deg C)	Precipitation (in)
<b>Lahontan Standards<sup>1</sup></b>		N/A	<b>20</b>	<b>60</b>	N/A	N/A	<b>0.15</b>	<b>0.008</b>	<b>3.0</b>	N/A	N/A
<b>First Quarter WY 2017-2018</b>											
10/18/17	12:55	0.188	<b>23.4</b>	11.0	0.106	0.759	<b>0.865</b>	<b>0.193</b>	<b>46</b>	7.22	0
11/14/17	12:55	0.119	9.52	3.5	0.169	0.303	<b>0.472</b>	<b>0.095</b>	<b>36</b>	0.56	0.3
12/21/17	14:30	0.120	16.0	11.5	0.205	0.680	<b>0.885</b>	<b>0.136</b>	<b>40</b>	-6.11	0.2
<b>Second Quarter WY 2017-2018</b>											
1/17/18	12:25	0.141	18.2	7.0	0.207	0.200	<b>0.407</b>	<b>0.049</b>	<b>35</b>	3.89	0
2/14/18	13:10	0.131	10.8	3.5	0.210	0.211	<b>0.421</b>	<b>0.088</b>	<b>40</b>	-5.56	0
3/20/18	15:10	0.284	<b>208</b>	<b>108</b>	0.182	1.398	<b>1.580</b>	<b>0.590</b>	<b>350</b>	0.00	0.1
<b>Third Quarter WY 2017-2018</b>											
4/4/18	13:30	0.333	18.2	12	0.282	0.300	<b>0.582</b>	<b>0.095</b>	<b>45</b>	4.44	0
4/18/18	12:35	0.479	11.3	7.0	0.352	0.261	<b>0.613</b>	<b>0.077</b>	<b>37</b>	-1.11	0
5/3/18	13:30	0.423	11.7	5.5	0.227	0.185	<b>0.412</b>	<b>0.073</b>	<b>21</b>	5.00	0
5/17/18	12:50	0.337	9.5	5.5	0.207	0.222	<b>0.429</b>	<b>0.080</b>	<b>28</b>	4.44	0.7
5/23/18	14:30	0.298	12.4	5.0	0.239	0.185	<b>0.424</b>	<b>0.074</b>	<b>32</b>	6.67	0.2
5/30/18	13:05	0.217	15.1	12.0	0.184	0.212	<b>0.396</b>	<b>0.072</b>	<b>27</b>	9.44	0
6/6/18	12:30	0.171	16.3	9.0	0.193	0.256	<b>0.449</b>	<b>0.117</b>	<b>27</b>	8.89	0
6/20/18	12:30	0.174	15.6	5.5	0.190	0.236	<b>0.426</b>	<b>0.091</b>	<b>26</b>	13.33	0
<b>Fourth Quarter WY 2017-2018</b>											
7/19/18	12:15	0.133	<b>21.4</b>	42.0	0.134	0.409	<b>0.543</b>	<b>0.408</b>	<b>21</b>	16.67	0
8/16/18	13:05	0.050	<b>23.6</b>	6.0	0.151	0.256	<b>0.407</b>	<b>0.137</b>	<b>26</b>	13.89	0
9/12/18	16:00	0.064	<b>27.6</b>	8.5	0.150	0.246	<b>0.396</b>	<b>0.131</b>	<b>27</b>	7.78	0
<b>Annual Summary</b>	<b>Min</b>	0.050	9.49	3.50	0.106	0.185	0.396	0.049	21.0	-6.1	-
	<b>Max</b>	0.479	208	108	0.352	1.398	1.580	0.590	350.0	16.7	-
	<b>Average</b>	0.211	<b>27.6</b>	15.4	0.199	0.372	<b>0.539</b>	<b>0.147</b>	<b>50.8</b>	5.3	-

<sup>1</sup> Standards are for receiving water objectives from the Lahontan Basin Plan expressed as an annual average.

**Hidden Valley Creek - Lower Hidden  
(43HDVC-5)**

<b>Table B-5:</b>		<b>Heavenly Mountain Resort water year 2017/2018 water quality monitoring data from station 43HDVC-5, Hidden Valley Creek baseline station. This station is located just above the confluence with Trout Creek, at an elevation of 6,680 feet.</b>									
<b>Date</b>	<b>Time</b>	<b>Discharge (cfs)</b>	<b>Turbidity (ntu)</b>	<b>Suspended Sediment (mg/L)</b>	<b>Total Nitrite/Nitrate (mg/L)</b>	<b>Total Kjeldahl N (mg/L)</b>	<b>Total Nitrogen (mg/L)</b>	<b>Total Phosphorus (mg/L)</b>	<b>Chloride (mg/L)</b>	<b>Average Temperature (Deg C)</b>	<b>Precipitation (in)</b>
<b>Lahontan Standards<sup>1</sup></b>		N/A	N/A	<b>60</b>	N/A	N/A	<b>0.19</b>	<b>0.015</b>	<b>0.15</b>	N/A	N/A
<b>First Quarter WY 2017-2018</b>											
10/18/17	10:35	1.163	0.60	1.0	0.002	0.082	0.084	<b>0.020</b>	<b>0.24</b>	7.22	0
11/14/17	11:00	1.163	0.65	1.5	0.003	0.076	0.079	<b>0.027</b>	<b>0.32</b>	0.56	0.3
12/21/17	10:45	0.824	0.86	1.0	0.006	0.085	0.091	<b>0.016</b>	<b>0.29</b>	-6.11	0.2
<b>Second Quarter WY 2017-2018</b>											
1/17/18	10:30	0.713	1.3	1.5	0.006	0.114	0.120	<b>0.018</b>	<b>0.26</b>	3.89	0
2/14/18	11:00	0.538	0.94	1.0	0.008	0.058	0.066	<b>0.018</b>	<b>0.28</b>	-5.56	0
3/20/18	10:50	0.547	1.29	1.5	0.009	0.055	0.064	<b>0.020</b>	<b>0.29</b>	0.00	0.1
<b>Third Quarter WY 2017-2018</b>											
4/4/18	10:30	1.197	2.09	2.0	0.007	0.121	0.128	<b>0.021</b>	<b>0.27</b>	4.44	0
4/8/18	10:30	2.091	1.66	2.5	0.006	0.099	0.105	<b>0.020</b>	<b>0.24</b>	-1.11	0
5/3/18	11:05	2.619	1.14	1.0	0.006	0.062	0.068	<b>0.016</b>	<b>0.21</b>	5.00	0
5/17/18	10:35	3.771	1.06	2.0	0.006	0.070	0.076	<b>0.021</b>	<b>0.16</b>	4.44	0.7
5/23/18	11:00	4.249	1.28	1.0	0.004	0.067	0.071	<b>0.016</b>	0.14	6.67	0.2
5/30/18	11:00	7.259	1.50	2.5	0.004	0.093	0.097	<b>0.018</b>	0.12	9.44	0
6/6/18	10:45	5.997	0.81	2.0	0.005	0.096	0.101	<b>0.016</b>	0.12	8.89	0
6/20/18	10:40	3.672	1.93	1.5	0.001	0.076	0.077	<b>0.018</b>	0.12	13.33	0
<b>Fourth Quarter WY 2017-2018</b>											
7/19/18	10:30	0.997	0.97	3.0	0.010	0.090	0.100	<b>0.023</b>	<b>0.23</b>	16.67	0
8/16/18	11:05	0.501	0.69	1.5	0.016	0.074	0.090	<b>0.018</b>	<b>0.20</b>	13.89	0
9/12/18	11:00	0.375	1.09	1.0	0.017	0.068	0.085	<b>0.027</b>	<b>0.22</b>	7.78	0
<b>Annual Summary</b>	<b>Minimum</b>	0.38	0.60	1.00	0.001	0.055	0.064	0.016	0.12	-6.1	-
	<b>Maximum</b>	7.26	2.09	3.00	0.017	0.121	0.128	0.027	0.32	16.7	-
	<b>Average</b>	2.49	1.17	1.62	0.007	0.082	0.088	<b>0.020</b>	<b>0.22</b>	5.3	-
	<b>90th Percentile</b>	-	-	2.60	-	-	-	-	-	-	-

<sup>1</sup> Standards are annual averages for the receiving waters of Trout Creek. For Suspended Sediment, standards are for streams tributary to Lake Tahoe. Suspended Sediment concentrations shall not exceed a 90th percentile value of 60 mg/L.

**Edgewood Creek - Above  
(43HVE-1)**

Table B-6:		Heavenly Mountain Resort water year 2017/2018 water quality monitoring data from station 43HVE-1, Edgewood Creek above Boulder Parking Lot. This station is located in Edgewood Bowl above the learn-to-ski center, at an elevation of 7,280 feet.											
Date	Time	Discharge (cfs)	Specific Conductivity (mmhos)	Turbidity (ntu)	Suspended Sediment (mg/L)	Total Nitrite/Nitrate (mg/L)	Total Kjeldahl N (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	Soluble Reactive P (mg/L)	Dissolved P (mg/L)	Average Temperature (Deg C)	Precipitation (in)
<b>NDEP Standards<sup>1</sup></b>		N/A	N/A	10	25	N/A	N/A	0.6 <sup>2</sup>	0.1	N/A	N/A	N/A	N/A
<b>First Quarter WY 2017-2018</b>													
10/18/17	14:50	0.05	85.1	1.11	2.0	0.001	0.126	0.127	0.023	0.004	0.011	7.22	0
11/14/17	14:35	0.04	73.2	5.47	13.0	0.003	0.224	0.227	0.1	0.006	0.016	0.56	0.3
12/21/17	15:15	***UNABLE TO SAMPLE DUE TO ICE ON STREAM***										-6.11	0.2
<b>Second Quarter WY 2017-2018</b>													
1/17/18	14:45	0.09	59.0	0.87	1.00	0.002	0.104	0.106	0.015	0.005	0.01	3.89	0
2/14/18	15:45	***UNABLE TO SAMPLE DUE TO ICE ON STREAM***										-5.56	0
3/20/18	15:42	***UNABLE TO SAMPLE DUE TO ICE ON STREAM***										0.00	0.1
<b>Third Quarter WY 2017-2018</b>													
4/4/18	16:05	0.16	78.2	3.17	3.5	0.003	0.124	0.127	0.029	0.003	0.007	4.44	0
4/18/18	15:05	0.19	70.5	0.84	1.0	0.002	0.062	0.064	0.017	0.005	0.012	-1.11	0
5/3/18	15:00	0.57	56.2	2.97	3.0	0.002	0.131	0.133	0.034	0.008	0.013	5.00	0
5/17/18	16:15	0.35	54.2	1.05	1.0	0.002	0.080	0.082	0.025	0.009	0.021	4.44	0.7
5/23/18	15:30	0.34	54.9	0.95	1.0	0.002	0.095	0.097	0.021	0.007	0.016	6.67	0.2
5/30/18	14:55	0.17	60.0	0.79	0.5	0.001	0.106	0.107	0.022	0.004	0.015	9.44	0
6/6/18	15:00	0.16	67.7	0.93	1.5	0.003	0.084	0.087	0.029	0.006	0.020	8.89	0
6/20/18	14:40	0.17	80.2	2.89	6.0	0.003	0.191	0.194	0.053	0.007	0.015	13.33	0
<b>Fourth Quarter WY 2017-2018</b>													
7/19/18	14:45	0.16	101.7	11.7	10.5	0.004	0.166	0.170	0.065	0.012	0.023	16.67	0
8/16/18	14:50	0.03	118.4	33.3	34.0	0.004	0.285	0.289	0.184	0.012	0.016	13.89	0
9/12/18	15:30	**UNABLE TO SAMPLE DUE TO LOW FLOWS, STAGNANT WATER, AND HEAVY VEGETATION IN CHANNEL**										7.78	0
<b>Annual Summary</b>	<b>Minimum</b>	0.032	54.2	0.79	0.50	0.001	0.062	0.064	0.015	0.003	0.007	-6.11	-
	<b>Maximum</b>	0.565	118.4	33.30	34.0	0.004	0.285	0.289	0.184	0.012	0.023	16.67	-
	<b>Average</b>	0.192	75.0	5.43	6.42	0.003	0.140	0.142	0.050	0.007	0.015	6.507	-

<sup>1</sup> NDEP Standards are from the Nevada Administrative Code (NAC) Chapter 445A.1915. All listed numbers are standards for single values no greater than a given parameter unless otherwise noted.

<sup>2</sup> Annual Average

**Edgewood Creek - Below  
(43HVE-2)**

Table B-7:		Heavenly Mountain Resort water year 2017/2018 water quality monitoring data from station 43HVE-2, Edgewood Creek below Boulder Parking Lot. This station is located 1/4 mile below the parking lot, underneath the power lines at an elevation of 7,120 feet.											
Date	Time	Discharge (cfs)	Specific Conductivity (mmhos)	Turbidity (ntu)	Suspended Sediment (mg/L)	Total Nitrite/Nitrate (mg/L)	Total Kjeldahl N (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	Soluble Reactive P (mg/L)	Dissolved P (mg/L)	Average Temperature (Deg C)	Precipitation (in)
<b>NDEP Standards<sup>1</sup></b>		N/A	N/A	<b>10.0</b>	<b>25.0</b>	N/A	N/A	<b>0.6<sup>2</sup></b>	<b>0.1</b>	N/A	N/A	N/A	N/A
<b>First Quarter WY 2017-2018</b>													
10/18/17	15:15	0.637	123.3	4.43	1.5	0.034	0.117	0.151	0.022	0.005	0.014	7.22	0
11/14/17	15:00	0.261	107.4	4.11	2.5	0.034	0.13	0.164	0.029	0.006	0.017	0.56	0.3
12/21/17	15:30	0.193	72.2	5.50	<b>25.5</b>	0.046	0.224	0.270	0.037	0.005	0.011	-6.11	0.2
<b>Second Quarter WY 2017-2018</b>													
1/17/18	15:10	0.237	94.9	7.19	3.5	0.048	0.135	0.183	0.024	0.005	0.011	3.89	0
2/14/18	16:00	0.186	55.7	4.81	1.5	0.046	0.117	0.163	0.024	0.006	0.014	-5.56	0
3/20/18	16:02	0.327	212.0	<b>125</b>	<b>82.0</b>	0.061	0.513	0.574	<b>0.254</b>	0.004	0.008	0.00	0.1
<b>Third Quarter WY 2017-2018</b>													
4/4/18	16:35	0.731	96.4	<b>44.6</b>	<b>34.0</b>	0.038	0.262	0.300	<b>0.142</b>	0.004	0.008	4.44	0
4/18/18	14:35	0.593	96.2	6.9	5.0	0.028	0.128	0.156	0.032	0.005	0.013	-1.11	0
5/3/18	15:30	0.952	73.3	<b>15.7</b>	11.0	0.015	0.178	0.193	0.065	0.007	0.012	5.00	0
5/17/18	16:00	0.630	75.5	4.13	3.0	0.018	0.123	0.141	0.032	0.008	0.021	4.44	0.7
5/23/18	15:15	0.392	83.0	3.44	3.0	0.019	0.145	0.164	0.027	0.007	0.019	6.67	0.2
5/30/18	15:30	0.265	88.8	3.90	2.0	0.023	0.132	0.155	0.031	0.005	0.018	9.44	0
6/6/18	14:30	0.186	97.8	4.67	3.0	0.039	0.141	0.180	0.032	0.007	0.025	8.89	0
6/20/18	14:00	0.100	109.6	3.75	2.5	0.057	0.121	0.178	0.027	0.007	0.016	13.33	0
<b>Fourth Quarter WY 2017-2018</b>													
7/19/18	14:20	0.044	126.2	6.18	4.5	0.093	0.147	0.240	0.033	0.010	0.022	16.67	0
8/16/18	14:30	0.027	135.8	8.19	6.0	0.082	0.290	0.372	0.036	0.014	0.018	13.89	0
9/12/18	15:05	0.032	134.4	4.53	2.0	0.046	0.123	0.169	0.026	0.006	0.019	7.78	0
<b>Annual Summary</b>	<b>Minimum</b>	0.027	55.70	3.44	1.50	0.015	0.117	0.141	0.022	0.004	0.008	-6.1	-
	<b>Maximum</b>	0.952	212.0	125	82.0	0.093	0.513	0.574	0.254	0.014	0.025	16.7	-
	<b>Average</b>	0.341	104.9	<b>15.1</b>	11.32	0.043	0.178	0.221	0.051	0.007	0.016	5.3	-

<sup>1</sup> NDEP Standards are from the Nevada Administrative Code (NAC) Chapter 445A.1915. All listed numbers are standards for single values no greater than a given parameter unless otherwise noted.

<sup>2</sup> Annual Average





8/1/2018

Cardno  
PO Box 1533  
Zephyr Cove, NV 89448  
Attn: Michelle Hochrein

OrderID: 1807689

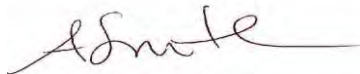
Dear: Michelle Hochrein

This is to transmit the attached analytical report. The analytical data and information contained therein was generated using specified or selected methods contained in references, such as Standard Methods for the Examination of Water and Wastewater, online edition, Methods for Determination of Organic Compounds in Drinking Water, EPA-600/4-79-020, and Test Methods for Evaluation of Solid Waste, Physical/Chemical Methods (SW846) Third Edition.

The samples were received by WETLAB-Western Environmental Testing Laboratory in good condition on 7/20/2018. Additional comments are located on page 2 of this report.

If you should have any questions or comments regarding this report, please do not hesitate to call.

Sincerely,



Andy Smith  
QA Manager

**SPARKS**

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Las Vegas, Nevada 89102  
tel (702) 475-8899  
fax (702) 622-2868  
EPA LAB ID: NV00932

# Western Environmental Testing Laboratory

## Report Comments

---

Cardno - 1807689

---

### Specific Report Comments

None

### Report Legend

- B -- Blank contamination; Analyte detected above the method reporting limit in an associated blank
- D -- Due to the sample matrix dilution was required in order to properly detect and report the analyte. The reporting limit has been adjusted accordingly.
- HT -- Sample analyzed beyond the accepted holding time
- J -- The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit
- M -- The matrix spike/matrix spike duplicate (MS/MSD) values for the analysis of this parameter were outside acceptance criteria due to probable matrix interference. The reported result should be considered an estimate.
- N -- There was insufficient sample available to perform a spike and/or duplicate on this analytical batch.
- NC -- Not calculated due to matrix interference
- QD -- The sample duplicate or matrix spike duplicate analysis demonstrated sample imprecision. The reported result should be considered an estimate.
- QL -- The result for the laboratory control sample (LCS) was outside WETLAB acceptance criteria and reanalysis was not possible. The reported data should be considered an estimate.
- S -- Surrogate recovery was outside of laboratory acceptance limits due to matrix interference. The associated blank and LCS surrogate recovery was within acceptance limits
- SC -- Spike recovery not calculated. Sample concentration >4X the spike amount; therefore, the spike could not be adequately recovered
- U -- The analyte was analyzed for, but was not detected above the level of the reported sample reporting/quantitation limit

### General Lab Comments

Per method recommendation (section 4.4), Samples analyzed by methods EPA 300.0 and EPA 300.1 have been filtered prior to analysis.

The following is an interpretation of the results from EPA method 9223B:

A result of zero (0) indicates absence for both coliform and Escherichia coli meaning the water meets the microbiological requirements of the U.S. EPA Safe Drinking Water Act (SDWA). A result of one (1) for either test indicates presence and the water does not meet the SDWA requirements. Waters with positive tests should be disinfected by a certified water treatment operator and retested.

Per federal regulation the holding time for the following parameters in aqueous/water samples is 15 minutes: Residual Chlorine, pH, Dissolved Oxygen, Sulfite.

---

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fax (702) 622-2868  
EPA LAB ID: NV00926

# Western Environmental Testing Laboratory

## Analytical Report

Cardno  
 PO Box 1533  
 Zephyr Cove, NV 89448  
 Attn: Michelle Hochrein  
 Phone: (775) 588-9069 Fax: (775) 588-9219  
 PO\Project: E317602500

Date Printed: 8/1/2018  
 OrderID: 1807689

Customer Sample ID: 20180719 43HDVC-5 Collect Date/Time: 7/19/2018 10:30  
 WETLAB Sample ID: 1807689-001 Receive Date: 7/20/2018 08:10

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
<u>Anions by Ion Chromatography</u>							
Chloride	EPA 300.0	0.39	mg/L	1	0.10	7/20/2018	NV00925

Customer Sample ID: 20180719 43HVC-3 Collect Date/Time: 7/19/2018 11:45  
 WETLAB Sample ID: 1807689-002 Receive Date: 7/20/2018 08:10

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
<u>Anions by Ion Chromatography</u>							
Chloride	EPA 300.0	0.48	mg/L	1	0.10	7/20/2018	NV00925

Customer Sample ID: 20180719 43BPC-4 Collect Date/Time: 7/19/2018 12:15  
 WETLAB Sample ID: 1807689-003 Receive Date: 7/20/2018 08:10

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
<u>Anions by Ion Chromatography</u>							
Chloride	EPA 300.0	21	mg/L	1	0.10	7/20/2018	NV00925

Customer Sample ID: 20180719 43HVC-2 Collect Date/Time: 7/19/2018 13:05  
 WETLAB Sample ID: 1807689-004 Receive Date: 7/20/2018 08:10

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
<u>Anions by Ion Chromatography</u>							
Chloride	EPA 300.0	0.46	mg/L	1	0.10	7/20/2018	NV00925

Customer Sample ID: 20180719 43HVC-1A Collect Date/Time: 7/19/2018 13:20  
 WETLAB Sample ID: 1807689-005 Receive Date: 7/20/2018 08:10

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
<u>Anions by Ion Chromatography</u>							
Chloride	EPA 300.0	0.30	mg/L	1	0.10	7/20/2018	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Page 3 of 4

### SPARKS

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 tel (702) 475-8899  
 fax (702) 622-2868  
 EPA LAB ID: NV00932

## Western Environmental Testing Laboratory QC Report

QCBatchID	QCType	Parameter	Method	Result	Actual	% Rec	Units
QC18070839	Blank 1	Chloride	EPA 300.0	ND			mg/L

QCBatchID	QCType	Parameter	Method	Result	Actual	% Rec	Units
QC18070839	LCS 1	Chloride	EPA 300.0	10.1	10.0	101	mg/L

QCBatchID	QCType	Parameter	Method	Spike Sample	Sample Result	MS Result	MSD Result	Spike Value	Units	MS %Rec	MSD %Rec	RPD %
QC18070839	MS 1	Chloride	EPA 300.0	1807689-004	0.462	1.90	1.91	1.25	mg/L	115	116	<1
QC18070839	MS 2	Chloride	EPA 300.0	1807689-005	0.303	1.71	1.73	1.25	mg/L	112	114	1

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Las Vegas, Nevada 89102  
tel (702) 475-8899  
fax (702) 622-2868  
EPA LAB ID: NV00932







<b>ANALYSIS REPORT</b>												
<b>Client:</b>	Cardno - Heavenly Water Quality Sampling						<b>Lab:</b>	High Sierra Water Lab				
	295 Highway 50, Suite 1							Collin Strassenburgh				
	PO Box 1533							PO Box 843				
	Zephyr Cove, NV 89448							Tahoe City, CA 96145				
	(208) 272-9178							Phone 530 584 2438				
	E-mail: chris.donley@cardno.com							Fax 530 584 2439				
								E-mail: collin@highsierrawaterlab.com				
<b>Report Date: 7/31/18 (file name: HV073118.xls)</b>												
Site	ID	Date	Time	NO3/NO2-N (ppb)	SRP-P (ppb)	DP-P (ppb)	TP-P (ppb)	TKN (ppb)	TSS (mg/L)	Cond (µs/cm)	Turbidity (ntu)	
Patsy's	HV-C2	7/19/2018	13:05	17			21	112	3.0		1.46	
Parking	HV-C4	7/19/2018	12:15	134			408	409	42.0		21.4	
Prop Line	HV-C3	7/19/2018	11:35	8			20	82	2.5		1.26	
Hidden	HV-H5	7/19/2018	10:30	10			23	90	3.0		0.97	
Sky	HV-C1	7/19/2018	13:20	20			20	73	2.5		1.37	
ED Above	HV-E1	7/19/2018	14:45	4	12	23	65	166	10.5	101.7	11.7	
ED Below	HV-E2	7/19/2018	14:20	93	10	22	33	147	4.5	126.2	6.18	





8/30/2018

Cardno  
PO Box 1533  
Zephyr Cove, NV 89448  
Attn: Michelle Hochrein

OrderID: 1808601

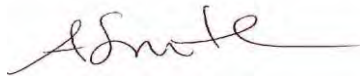
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Sincerely,



Andy Smith  
QA Manager

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fax (702) 622-2868  
EPA LAB ID: NV00932

# Western Environmental Testing Laboratory

## Report Comments

---

Cardno - 1808601

---

### Specific Report Comments

None

### Report Legend

- B -- Blank contamination; Analyte detected above the method reporting limit in an associated blank
- D -- Due to the sample matrix dilution was required in order to properly detect and report the analyte. The reporting limit has been adjusted accordingly.
- HT -- Sample analyzed beyond the accepted holding time
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- M -- The matrix spike/matrix spike duplicate (MS/MSD) values for the analysis of this parameter were outside acceptance criteria due to probable matrix interference. The reported result should be considered an estimate.
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- S -- Surrogate recovery was outside of laboratory acceptance limits due to matrix interference. The associated blank and LCS surrogate recovery was within acceptance limits
- SC -- Spike recovery not calculated. Sample concentration >4X the spike amount; therefore, the spike could not be adequately recovered
- U -- The analyte was analyzed for, but was not detected above the level of the reported sample reporting/quantitation limit

### General Lab Comments

Per method recommendation (section 4.4), Samples analyzed by methods EPA 300.0 and EPA 300.1 have been filtered prior to analysis.

The following is an interpretation of the results from EPA method 9223B:

A result of zero (0) indicates absence for both coliform and Escherichia coli meaning the water meets the microbiological requirements of the U.S. EPA Safe Drinking Water Act (SDWA). A result of one (1) for either test indicates presence and the water does not meet the SDWA requirements. Waters with positive tests should be disinfected by a certified water treatment operator and retested.

Per federal regulation the holding time for the following parameters in aqueous/water samples is 15 minutes: Residual Chlorine, pH, Dissolved Oxygen, Sulfite.

---

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EPA LAB ID: NV00925 - ELAP No: 2523

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EPA LAB ID: NV00926

#### **LAS VEGAS**

3230 Polaris Ave. Suite 4  
Las Vegas, Nevada 89102  
tel (702) 475-8899  
fax (702) 622-2868  
EPA LAB ID: NV00932

# Western Environmental Testing Laboratory

## Analytical Report

**Cardno**  
**PO Box 1533**  
**Zephyr Cove, NV 89448**  
**Attn: Michelle Hochrein**  
**Phone: (775) 588-9069 Fax: (775) 588-9219**  
**PO\Project: E318100700**

**Date Printed: 8/30/2018**  
**OrderID: 1808601**

**Customer Sample ID: 20180816 43HDVC-5** **Collect Date/Time: 8/16/2018 11:05**  
**WETLAB Sample ID: 1808601-001** **Receive Date: 8/17/2018 09:45**

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
<u>Anions by Ion Chromatography</u>							
Chloride	EPA 300.0	0.20	mg/L	1	0.10	8/20/2018	NV00925

**Customer Sample ID: 20180816 43HVC-3** **Collect Date/Time: 8/16/2018 12:25**  
**WETLAB Sample ID: 1808601-002** **Receive Date: 8/17/2018 09:45**

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
<u>Anions by Ion Chromatography</u>							
Chloride	EPA 300.0	0.51	mg/L	1	0.10	8/20/2018	NV00925

**Customer Sample ID: 20180816 43BPC-4** **Collect Date/Time: 8/16/2018 13:05**  
**WETLAB Sample ID: 1808601-003** **Receive Date: 8/17/2018 09:45**

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
<u>Anions by Ion Chromatography</u>							
Chloride	EPA 300.0	26	mg/L	1	0.10	8/20/2018	NV00925

**Customer Sample ID: 20180816 43HVC-2** **Collect Date/Time: 8/16/2018 13:00**  
**WETLAB Sample ID: 1808601-004** **Receive Date: 8/17/2018 09:45**

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
<u>Anions by Ion Chromatography</u>							
Chloride	EPA 300.0	0.49	mg/L	1	0.10	8/20/2018	NV00925

**Customer Sample ID: 20180816 43HVC-1A** **Collect Date/Time: 8/16/2018 14:05**  
**WETLAB Sample ID: 1808601-005** **Receive Date: 8/17/2018 09:45**

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
<u>Anions by Ion Chromatography</u>							
Chloride	EPA 300.0	0.28	mg/L	1	0.10	8/20/2018	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Page 3 of 4

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 EPA LAB ID: NV00926

### LAS VEGAS

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 Las Vegas, Nevada 89102  
 tel (702) 475-8899  
 fax (702) 622-2868  
 EPA LAB ID: NV00932

## Western Environmental Testing Laboratory QC Report

QCBatchID	QCType	Parameter	Method	Result	Actual	% Rec	Units
QC18080780	Blank 1	Chloride	EPA 300.0	ND			mg/L

QCBatchID	QCType	Parameter	Method	Result	Actual	% Rec	Units
QC18080780	LCS 1	Chloride	EPA 300.0	10.2	10.0	102	mg/L

QCBatchID	QCType	Parameter	Method	Spike Sample	Sample Result	MS Result	MSD Result	Spike Value	Units	MS %Rec	MSD %Rec	RPD %
QC18080780	MS 1	Chloride	EPA 300.0	1808601-002	0.514	1.86	1.90	1.25	mg/L	108	111	2

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3230 Polaris Ave., Suite 4 | Las Vegas, Nevada 89102

tel (702) 475-8899 | fax (702) 776-6152

WETLAB Order ID. 1808601

Sparks Control # \_\_\_\_\_

Elko Control # \_\_\_\_\_

LV Control # \_\_\_\_\_

Report Due Date \_\_\_\_\_

Page \_\_\_\_\_ of \_\_\_\_\_

Client Cardno

Address 5496 Reno Corporate Drive

City, State & Zip Reno NV 89511

Contact Michelle Hochrein

Phone 775-828-4362 Collector's Name PJ, MH

Fax \_\_\_\_\_ PWS/Project Name \_\_\_\_\_

P.O. Number \_\_\_\_\_ PWS/Project Number E318100700

Email michelle.hochrein@cardno.com

Billing Address (if different than Client Address) \_\_\_\_\_

Company \_\_\_\_\_  
Address \_\_\_\_\_  
City, State & Zip \_\_\_\_\_  
Contact \_\_\_\_\_  
Phone \_\_\_\_\_ Fax \_\_\_\_\_  
Email \_\_\_\_\_

**Turnaround Time Requirements**

Standard  \_\_\_\_\_  
 5 Day\* (25%) \_\_\_\_\_ 72 Hour\* (50%) \_\_\_\_\_  
 48 Hour\* (100%) \_\_\_\_\_ 24 Hour\* (200%) \_\_\_\_\_  
 \*Surcharges Will Apply

**Samples Collected From Which State?**  
 NV \_\_\_\_\_ CA  \_\_\_\_\_  
 Other \_\_\_\_\_

**Compliance Monitoring?**  
 Yes \_\_\_\_\_ No \_\_\_\_\_

**Report to Regulatory Agency?**  
 Yes \_\_\_\_\_ No \_\_\_\_\_

**Report Results Via**  
 PDF \_\_\_\_\_ EDD \_\_\_\_\_  
 Other \_\_\_\_\_

**Standard QC Required?**  
 Yes \_\_\_\_\_ No \_\_\_\_\_

SAMPLE ID/LOCATION	DATE	TIME	PRES-TYPE	SAMPLE TYPE	NO. OF CONTAINERS	Analysis Requested	Spl. No.
20180816 43HDVC-5	8/6/18	11:05	1	SW	1	X	
20180816 43HVC-3	8/6/18	12:25	1		1	X	
20180816 43BPC-4	8/6/18	1:05	1		1	X	
20180816 43HVC-2	8/6/18	1:50	1		1	X	
20180816 43HVC-1A	8/6/18	2:05	1		1	X	

Instructions/Comments/Special Requirements: \_\_\_\_\_

Sample Matrix Key\*\* DW = Drinking Water WW = Wastewater SW = Surface Water MW = Monitoring Well SD = Solid/Sludge SO = Soil HW = Hazardous Waste OTHER: \_\_\_\_\_

\*SAMPLE PRESERVATIVES: 1=Unpreserved 2=H2SO4 3=NaOH 4=HCl 5=HNO3 6=Na2S2O3 7=ZnOAc+NaOH 8=HCl/VOA Vial

Temp	Custody Seal	# of Containers	DATE	TIME	Samples Relinquished By	Samples Received By
80°C	Y N None	5	8-17-18	9:45	<i>[Signature]</i>	<i>[Signature]</i>
°C	Y N None					
°C	Y N None					
°C	Y N None					

WETLAB'S Standard Terms and Conditions apply unless written agreements specify otherwise. Payment terms are Net 30.

Client/Collector attests to the validity and authenticity of this (these) sample(s) and, is (are) aware that tampering with or intentionally mislabeling the sample(s) location, date or time of collection may be considered fraud and subject to legal action (NAC445.0636). *[Signature]* initial

To the maximum extent permitted by law, the Client agrees to limit the liability of WETLAB for the Client's damages to the total compensation received, unless other agreements are made in writing. This limitation shall apply regardless of the cause of action or legal theory pled or asserted. *[Signature]* initial

WETLAB will dispose of samples 90 days from sample receipt. Client may request a longer sample storage time for an additional fee. *[Signature]* initial

Please contact your Project Manager for details. *[Signature]* initial



<b>ANALYSIS REPORT</b>												
<b>Client:</b>	Cardno - Heavenly Water Quality Sampling						<b>Lab:</b>	High Sierra Water Lab				
	295 Highway 50, Suite 1							Collin Strassenburgh				
	PO Box 1533							PO Box 843				
	Zephyr Cove, NV 89448							Tahoe City, CA 96145				
	(208) 272-9178							Phone 530 584 2438				
	E-mail: chris.donley@cardno.com							Fax 530 584 2439				
								E-mail: collin@highsierrawaterlab.com				
<b>Report Date: 8/28/18 (file name: HV082818.xls)</b>												
Site	ID	Date	Time	NO3/NO2-N (ppb)	SRP-P (ppb)	DP-P (ppb)	TP-P (ppb)	TKN (ppb)	TSS (mg/L)	Cond (µs/cm)	Turbidity (ntu)	
Patsy's	HV-C2	8/16/2018	13:50	18			17	104	3.0		2.0	
Parking	HV-C4	8/16/2018	13:05	151			137	256	6.0		23.6	
Prop Line	HV-C3	8/16/2018	12:25	10			16	72	2.0		1.13	
Hidden	HV-H5	8/16/2018	11:05	16			18	74	1.5		0.69	
Sky	HV-C1	8/16/2018	14:05	18			13	66	2.0		1.54	
ED Above	HV-E1	8/16/2018	14:50	4	12	16	184	285	34.0	118.4	33.3	
ED Below	HV-E2	8/16/2018	14:30	82	14	18	36	290	6.0	135.8	8.19	





9/26/2018

Cardno  
PO Box 1533  
Zephyr Cove, NV 89448  
Attn: Michelle Hochrein

OrderID: 18090448

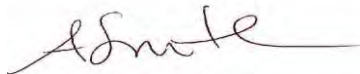
Dear: Michelle Hochrein

This is to transmit the attached analytical report. The analytical data and information contained therein was generated using specified or selected methods contained in references, such as Standard Methods for the Examination of Water and Wastewater, online edition, Methods for Determination of Organic Compounds in Drinking Water, EPA-600/4-79-020, and Test Methods for Evaluation of Solid Waste, Physical/Chemical Methods (SW846) Third Edition.

The samples were received by WETLAB-Western Environmental Testing Laboratory in good condition on 9/13/2018. Additional comments are located on page 2 of this report.

If you should have any questions or comments regarding this report, please do not hesitate to call.

Sincerely,



Andy Smith  
QA Manager

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**LAS VEGAS**

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fax (702) 622-2868  
EPA LAB ID: NV00932

# Western Environmental Testing Laboratory

## Report Comments

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Cardno - 18090448

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### Specific Report Comments

None

### Report Legend

- B -- Blank contamination; Analyte detected above the method reporting limit in an associated blank
- D -- Due to the sample matrix dilution was required in order to properly detect and report the analyte. The reporting limit has been adjusted accordingly.
- HT -- Sample analyzed beyond the accepted holding time
- J -- The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit
- M -- The matrix spike/matrix spike duplicate (MS/MSD) values for the analysis of this parameter were outside acceptance criteria due to probable matrix interference. The reported result should be considered an estimate.
- N -- There was insufficient sample available to perform a spike and/or duplicate on this analytical batch.
- NC -- Not calculated due to matrix interference
- QD -- The sample duplicate or matrix spike duplicate analysis demonstrated sample imprecision. The reported result should be considered an estimate.
- QL -- The result for the laboratory control sample (LCS) was outside WETLAB acceptance criteria and reanalysis was not possible. The reported data should be considered an estimate.
- S -- Surrogate recovery was outside of laboratory acceptance limits due to matrix interference. The associated blank and LCS surrogate recovery was within acceptance limits
- SC -- Spike recovery not calculated. Sample concentration >4X the spike amount; therefore, the spike could not be adequately recovered
- U -- The analyte was analyzed for, but was not detected above the level of the reported sample reporting/quantitation limit

### General Lab Comments

Per method recommendation (section 4.4), Samples analyzed by methods EPA 300.0 and EPA 300.1 have been filtered prior to analysis.

The following is an interpretation of the results from EPA method 9223B:

A result of zero (0) indicates absence for both coliform and Escherichia coli meaning the water meets the microbiological requirements of the U.S. EPA Safe Drinking Water Act (SDWA). A result of one (1) for either test indicates presence and the water does not meet the SDWA requirements. Waters with positive tests should be disinfected by a certified water treatment operator and retested.

Per federal regulation the holding time for the following parameters in aqueous/water samples is 15 minutes: Residual Chlorine, pH, Dissolved Oxygen, Sulfite.

---

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fax (702) 622-2868  
EPA LAB ID: NV00926

# Western Environmental Testing Laboratory

## Analytical Report

**Cardno**  
**PO Box 1533**  
**Zephyr Cove, NV 89448**  
**Attn: Michelle Hochrein**  
**Phone: (775) 588-9069 Fax: (775) 588-9219**  
**PO\Project: E318100700**

**Date Printed: 9/26/2018**  
**OrderID: 18090448**

**Customer Sample ID: 20180912-43HDVC-5** **Collect Date/Time: 9/12/2018 11:00**  
**WETLAB Sample ID: 18090448-001** **Receive Date: 9/13/2018 08:03**

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
<u>Anions by Ion Chromatography</u>							
Chloride	EPA 300.0	0.22	mg/L	1	0.10	9/14/2018	NV00925

**Customer Sample ID: 20180912-43HVC-3** **Collect Date/Time: 9/12/2018 12:25**  
**WETLAB Sample ID: 18090448-002** **Receive Date: 9/13/2018 08:03**

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
<u>Anions by Ion Chromatography</u>							
Chloride	EPA 300.0	0.57	mg/L	1	0.10	9/14/2018	NV00925

**Customer Sample ID: 20180912-43HVC-2** **Collect Date/Time: 9/12/2018 13:35**  
**WETLAB Sample ID: 18090448-003** **Receive Date: 9/13/2018 08:03**

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
<u>Anions by Ion Chromatography</u>							
Chloride	EPA 300.0	0.54	mg/L	1	0.10	9/14/2018	NV00925

**Customer Sample ID: 20180912-43HVC-1A** **Collect Date/Time: 9/12/2018 14:00**  
**WETLAB Sample ID: 18090448-004** **Receive Date: 9/13/2018 08:03**

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
<u>Anions by Ion Chromatography</u>							
Chloride	EPA 300.0	0.30	mg/L	1	0.10	9/14/2018	NV00925

**Customer Sample ID: 20180912-43BPC-4** **Collect Date/Time: 9/12/2018 16:00**  
**WETLAB Sample ID: 18090448-005** **Receive Date: 9/13/2018 08:03**

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
<u>Anions by Ion Chromatography</u>							
Chloride	EPA 300.0	27	mg/L	1	0.10	9/14/2018	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Page 3 of 4

### SPARKS

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 EPA LAB ID: NV00926

### LAS VEGAS

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 Las Vegas, Nevada 89102  
 tel (702) 475-8899  
 fax (702) 622-2868  
 EPA LAB ID: NV00932

## Western Environmental Testing Laboratory QC Report

QCBatchID	QCType	Parameter	Method	Result	Actual	% Rec	Units
QC18090524	Blank 1	Chloride	EPA 300.0	ND			mg/L

QCBatchID	QCType	Parameter	Method	Result	Actual	% Rec	Units
QC18090524	LCS 1	Chloride	EPA 300.0	10.3	10.0	103	mg/L

QCBatchID	QCType	Parameter	Method	Spike Sample	Sample Result	MS Result	MSD Result	Spike Value	Units	MS %Rec	MSD %Rec	RPD %
QC18090524	MS 1	Chloride	EPA 300.0	18090448-00	0.542	1.91	1.94	1.25	mg/L	109	112	2

**SPARKS**

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tel (702) 475-8899 | fax (702) 776-6152

WETLAB Order ID. 18090448

Sparks Control # \_\_\_\_\_

Elko Control # \_\_\_\_\_

LV Control # \_\_\_\_\_

Report Due Date \_\_\_\_\_

Page \_\_\_\_\_ of \_\_\_\_\_

Client Cardno

Address 5496 Reno Corporate Drive

City, State & Zip Reno NV 89511

Contact Michelle Hochrein

Phone 775-828-4362 Collector's Name MH, RE

Fax \_\_\_\_\_ PWS/Project Name \_\_\_\_\_

P.O. Number \_\_\_\_\_ PWS/Project Number E318100700

Email michelle.hochrein@cardno.com

Billing Address (if different than Client Address)

Company \_\_\_\_\_  
Address \_\_\_\_\_  
City, State & Zip \_\_\_\_\_  
Contact \_\_\_\_\_  
Phone \_\_\_\_\_ Fax \_\_\_\_\_  
Email \_\_\_\_\_

**SAMPLE ID/LOCATION**      **DATE**      **TIME**      **RES TYPE**

SAMPLE ID/LOCATION	DATE	TIME	RES TYPE	NO. OF CONTAINERS	SAMPLE TYPE
20180912-43HDVC-5	9/12/18	11:00	1 SW	1	X
20180912-43HVC-3	↓	12:25	1	1	X
20180912-43HVC-2	↓	1:35	1	1	X
20180912-43HVC-1A	↓	2:00	1	1	X
20180912-43BPC-4	↓	4:00	1	1	X

Instructions/Comments/Special Requirements:

Sample Matrix Key\*\* DW = Drinking Water WW = Wastewater SW = Surface Water MW = Monitoring Well SD = Solid/Sludge SO = Soil HW = Hazardous Waste OTHER: \_\_\_\_\_

\*SAMPLE PRESERVATIVES: 1=Unpreserved 2=H2SO4 3=NaOH 4=HCl 5=HNO3 6=Na2S2O3 7=ZnOAc+NaOH 8=HCl/VOA Vial

Temp	Custody Seal	# of Containers	DATE	TIME	Samples Relinquished By	Samples Received By
3.0 °C	Y N <u>None</u>	5	9/13/18	0803	<u>[Signature]</u>	<u>[Signature]</u>
°C	Y N None					
°C	Y N None					
°C	Y N None					

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Client/Collector attests to the validity and authenticity of this (these) sample(s) and, is (are) aware that tampering with or intentionally mislabeling the sample(s) location, date or time of collection may be considered fraud and subject to legal action (NAC445.0636). [Signature] initial  
To the maximum extent permitted by law, the Client agrees to limit the liability of WETLAB for the Client's damages to the total compensation received, unless other agreements are made in writing. This limitation shall apply regardless of the cause of action or legal theory pled or asserted. [Signature] initial  
WETLAB will dispose of samples 90 days from sample receipt. Client may request a longer sample storage time for an additional fee. [Signature] initial  
Please contact your Project Manager for details. [Signature] initial



<b>ANALYSIS REPORT</b>												
<b>Client:</b>	Cardno - Heavenly Water Quality Sampling						<b>Lab:</b>	High Sierra Water Lab				
	295 Highway 50, Suite 1							Collin Strassenburgh				
	PO Box 1533							PO Box 843				
	Zephyr Cove, NV 89448							Tahoe City, CA 96145				
	(208) 272-9178							Phone 530 584 2438				
	E-mail: chris.donley@cardno.com							Fax 530 584 2439				
								E-mail: collin@highsierrawaterlab.com				
<b>Report Date: 9/29/18 (file name: HV092918.xls)</b>												
Site	ID	Date	Time	NO3/NO2-N (ppb)	SRP-P (ppb)	DP-P (ppb)	TP-P (ppb)	TKN (ppb)	TSS (mg/L)	Cond (µs/cm)	Turbidity (ntu)	
Patsy's	HV-C2	9/12/2018	13:35	17			22	84	1.0		2.0	
Parking	HV-C4	9/12/2018	16:00	150			131	246	8.5		27.6	
Prop Line	HV-C3	9/12/2018	12:25	7			22	53	1.0		0.63	
Hidden	HV-H5	9/12/2018	11:00	17			27	68	1.0		1.09	
Sky	HV-C1	9/12/2018	14:00	16			19	60	2.5		1.52	
ED Below	HV-E2	9/12/2018	13:05	46	6	19	26	123	2.0	134.4	4.53	





Heavenly Mountain Resort  
Water Year 2018

APPENDIX

B

RAW WATER QUALITY  
CONSTITUENTS, CA FILTER  
VAULTS, WATER YEAR 2018



## Appendix B

# Raw Water Quality Constituents, CA Filter Vaults, Water Year 2018

---

**B.1      43HVP-1a - CA Parking Lot Filter Vault Northern Influent Sampling  
Location Water Quality Data**

**B.2      43HVP-1b - CA Parking Lot Filter Vault Southern Influent Sampling  
Location Water Quality Data**

**B.3      43HVP-2 - CA Parking Lot Filter Vault Effluent Sampling Location Water  
Quality Data**

**B.4      WetLab Vault Analysis**



California Parking Lot - StormFitter  
Influent (43HVP-1a)

Table C-1		Heavenly Mountain Resort water year 2018 water quality monitoring data from influent station 43HVP-1a (North), California Parking Lot Filter Vault influent point one. This station is located within the CA parking lot.								
Date	Notes <sup>1</sup>	Time	Turbidity (NTU)	Total Phosphorus (mg/L)	Nitrate Nitrogen (mg/L)	Nitrite Nitrogen (mg/L) <sup>3</sup>	Total Kjeldahl Nitrogen (mg/L)	Total Nitrogen Calc. (mg/L)	Chloride (mg/L)	Oil & Grease (mg/L)
<b>Lahontan Standards</b>			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>First Quarter WY 2017-2018</b>										
11/15/2017	<sup>2</sup>	12:02	37	0.053	0.072	0.012	0.49	0.57	23	ND
<b>Second Quarter WY 2017-2018</b>										
No Samples were collected during the Second Quarter of water year 2017-2018.										
<b>Third Quarter WY 2017-2018</b>										
5/24/2018	<sup>3,4</sup>	14:02	70	0.061	0.31	0.012	0.92	1.2	54	3.4
<b>Fourth Quarter WY 2017-2018</b>										
7/22/2018		18:53	130	0.093	0.17	ND	2.3	2.5	59	2.1

<sup>1</sup> Reported values analyzed by WetLAB in Reno, NV.

<sup>2</sup> Due to laboratory equipment issues, Nitrate and Nitrite Nitrogen levels were analyzed beyond the acceptable holding times. The reported values should be considered an estimate.

<sup>3</sup> The matrix spike/matrix spike duplicate (MS/MSD) values for TKN and TP were outside acceptance criteria due to probable matrix interference. The reported results should be considered an estimate.

<sup>4</sup> There was insufficient sample available to perform a spike and/or duplicate on the oil and grease analytical batch.

California Parking Lot - StormFiltrer  
Influent (43HVP-1b)

Table C-2		Heavenly Mountain Resort water year 2018 water quality monitoring data from influent station 43HVP-1b (South), California Parking Lot Filter Vault influent point two. This station is located within the CA parking lot.								
Date	Notes <sup>1</sup>	Time	Turbidity (NTU)	Total Phosphorus (mg/L)	Nitrate Nitrogen (mg/L)	Nitrite Nitrogen (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Total Nitrogen Calc. (mg/L)	Chloride (mg/L)	Oil & Grease (mg/L)
<b>Lahontan Standards</b>			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>First Quarter WY 2017-2018</b>										
11/15/2017	<sup>2,3</sup>	12:03	40	0.046	0.097	0.013	0.41	0.52	5.7	ND
<b>Second Quarter WY 2017-2018</b>										
No Samples were collected during the Second Quarter of water year 2017-2018.										
<b>Third Quarter WY 2017-2018</b>										
5/24/2018	<sup>4</sup>	13:51	140	0.11	0.13	ND	0.92	1.1	19	3.8
<b>Fourth Quarter WY 2017-2018</b>										
7/22/2018		18:38	180	0.13	0.059	0.053	2.9	3.0	20	2.8

<sup>1</sup> Reported values analyzed by WetLAB in Reno, NV.

<sup>2</sup> Due to laboratory equipment issues, Nitrate and Nitrite Nitrogen levels were analyzed beyond the acceptable holding times. The reported values should be considered an estimate.

<sup>3</sup> The matrix spike/matrix spike duplicate (MS/MSD) values for total Phosphorous were outside acceptance criteria due to probable matrix interference. The reported result should be considered an estimate.

<sup>4</sup> There was insufficient sample available to perform a spike and/or duplicate on the oil and grease analytical batch.

California Parking Lot - StormFitter  
Effluent (43HVP-2)

Table C-3		Heavenly Mountain Resort water year 2018 water quality monitoring data from effluent station 43HVP-2, California Parking Lot Filter Vault effluent point. This station is located within the CA parking lot.								
Date	Notes <sup>2</sup>	Time	Turbidity (NTU)	Total Phosphorus (mg/L)	Nitrate Nitrogen (mg/L)	Nitrite Nitrogen (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Total Nitrogen Calc. (mg/L)	Chloride (mg/L)	Oil & Grease (mg/L)
Lahontan Standards <sup>1</sup>			20.0	0.10	N/A	N/A	N/A	0.5	N/A	2.0
<b>First Quarter WY 2017-2018</b>										
11/15/2017	<sup>3</sup>	12:52	6.7	0.070	0.049	0.014	0.43	0.49	14	ND
<b>Second Quarter WY 2017-2018</b>										
No Samples were collected during the Second Quarter of water year 2017-2018.										
<b>Third Quarter WY 2017-2018</b>										
5/24/2018	<sup>4,5</sup>	14:02	91	0.043	0.22	0.011	0.76	0.99	33	3.3
<b>Fourth Quarter WY 2017-2018</b>										
7/22/2018	<sup>6</sup>	19:18	100	0.089	0.21	ND	1.9	2.2	36	3.3
Annual Summary		Min	6.7	0.043	0.049	0.011	0.43	0.49	14.0	ND
		Max	100	0.09	0.22	0.014	1.9	2.2	36	3.3
		# of Samples	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
# of Noncompliance Samples			2.0	0.0	-	-	-	2.0	-	2.0
% of Noncompliance Samples			67%	0%	-	-	-	67%	-	67%

<sup>1</sup> Standards are maximum concentration for discharge to surface waters not to exceed, effective November 30, 2008.

<sup>2</sup> Reported values analyzed by WetLAB in Reno, NV.

<sup>3</sup> Due to laboratory equipment issues, Nitrate and Nitrite Nitrogen levels were analyzed beyond the acceptable holding times. The reported values should be considered an estimate.

<sup>4</sup> The matrix spike/matrix spike duplicate (MS/MSD) values for total Phosphorous were outside acceptance criteria due to probable matrix interference. The reported result should be considered an estimate.

<sup>5</sup> There was insufficient sample available to perform a spike and/or duplicate on the oil and grease analytical batch.

<sup>6</sup> The matrix spike/matrix spike duplicate (MS/MSD) values for Oil & Grease were outside acceptance criteria due to probable matrix interference. The reported result should be considered an estimate.





8/6/2018

Cardno  
PO Box 1533  
Zephyr Cove, NV 89448  
Attn: Shaun Buckman

OrderID: 1807742

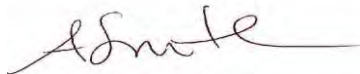
Dear: Shaun Buckman

This is to transmit the attached analytical report. The analytical data and information contained therein was generated using specified or selected methods contained in references, such as Standard Methods for the Examination of Water and Wastewater, online edition, Methods for Determination of Organic Compounds in Drinking Water, EPA-600/4-79-020, and Test Methods for Evaluation of Solid Waste, Physical/Chemical Methods (SW846) Third Edition.

The samples were received by WETLAB-Western Environmental Testing Laboratory in good condition on 7/23/2018. Additional comments are located on page 2 of this report.

If you should have any questions or comments regarding this report, please do not hesitate to call.

Sincerely,



Andy Smith  
QA Manager

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fax (702) 622-2868  
EPA LAB ID: NV00932

# Western Environmental Testing Laboratory

## Report Comments

---

Cardno - 1807742

---

### Specific Report Comments

None

### Report Legend

- B -- Blank contamination; Analyte detected above the method reporting limit in an associated blank
- D -- Due to the sample matrix dilution was required in order to properly detect and report the analyte. The reporting limit has been adjusted accordingly.
- HT -- Sample analyzed beyond the accepted holding time
- J -- The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit
- M -- The matrix spike/matrix spike duplicate (MS/MSD) values for the analysis of this parameter were outside acceptance criteria due to probable matrix interference. The reported result should be considered an estimate.
- N -- There was insufficient sample available to perform a spike and/or duplicate on this analytical batch.
- NC -- Not calculated due to matrix interference
- QD -- The sample duplicate or matrix spike duplicate analysis demonstrated sample imprecision. The reported result should be considered an estimate.
- QL -- The result for the laboratory control sample (LCS) was outside WETLAB acceptance criteria and reanalysis was not possible. The reported data should be considered an estimate.
- S -- Surrogate recovery was outside of laboratory acceptance limits due to matrix interference. The associated blank and LCS surrogate recovery was within acceptance limits
- SC -- Spike recovery not calculated. Sample concentration >4X the spike amount; therefore, the spike could not be adequately recovered
- U -- The analyte was analyzed for, but was not detected above the level of the reported sample reporting/quantitation limit

### General Lab Comments

Per method recommendation (section 4.4), Samples analyzed by methods EPA 300.0 and EPA 300.1 have been filtered prior to analysis.

The following is an interpretation of the results from EPA method 9223B:

A result of zero (0) indicates absence for both coliform and Escherichia coli meaning the water meets the microbiological requirements of the U.S. EPA Safe Drinking Water Act (SDWA). A result of one (1) for either test indicates presence and the water does not meet the SDWA requirements. Waters with positive tests should be disinfected by a certified water treatment operator and retested.

Per federal regulation the holding time for the following parameters in aqueous/water samples is 15 minutes: Residual Chlorine, pH, Dissolved Oxygen, Sulfite.

---

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EPA LAB ID: NV00926

# Western Environmental Testing Laboratory

## Analytical Report

**Cardno**  
**PO Box 1533**  
**Zephyr Cove, NV 89448**  
**Attn: Shaun Buckman**  
**Phone: (775) 588-9069 Fax: (775) 588-9219**  
**PO\Project: Heavenly**

**Date Printed: 8/6/2018**  
**OrderID: 1807742**

**Customer Sample ID: HVP-1A (North)**

**Collect Date/Time: 7/22/2018 18:53**

**WETLAB Sample ID: 1807742-001**

**Receive Date: 7/23/2018 17:45**

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
<b><u>General Chemistry</u></b>							
Total Phosphorous as P	SM 4500-P E	0.093	mg/L	1	0.010	7/25/2018	NV00925
Total Suspended Solids (TSS)	SM 2540D	120	mg/L	1	1.0	7/24/2018	NV00925
Total Nitrogen	Calc.	2.5	mg/L	1	0.22	7/30/2018	NV00925
Turbidity (Nephelometric)	EPA 180.1	130	NTU	10	1.0	7/24/2018	NV00925
Oil & Grease (HEM)	EPA 1664	2.1	mg/L	1	1.0	8/2/2018	NV00925
Oil & Grease (SGT-HEM)	EPA 1664	ND	mg/L	1	2.0	8/3/2018	NV00925
<b><u>Anions by Ion Chromatography</u></b>							
Chloride	EPA 300.0	59	mg/L	1	0.10	7/24/2018	NV00925
Nitrate Nitrogen	EPA 300.0	0.17	mg/L	1	0.010	7/24/2018	NV00925
Nitrite Nitrogen	EPA 300.0	ND	mg/L	1	0.010	7/24/2018	NV00925
<b><u>Flow Injection Analyses</u></b>							
Total Kjeldahl Nitrogen	EPA 351.2	2.3	mg/L	0.5	0.20	7/30/2018	NV00925

**Customer Sample ID: HVP-1B (South)**

**Collect Date/Time: 7/22/2018 18:38**

**WETLAB Sample ID: 1807742-002**

**Receive Date: 7/23/2018 17:45**

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
<b><u>General Chemistry</u></b>							
Total Phosphorous as P	SM 4500-P E	0.13	mg/L	1	0.010	7/25/2018	NV00925
Total Suspended Solids (TSS)	SM 2540D	210	mg/L	1	1.0	7/24/2018	NV00925
Total Nitrogen	Calc.	3.0	mg/L	1	0.22	7/30/2018	NV00925
Turbidity (Nephelometric)	EPA 180.1	180	NTU	10	1.0	7/24/2018	NV00925
Oil & Grease (HEM)	EPA 1664	2.8	mg/L	1	1.0	8/2/2018	NV00925
Oil & Grease (SGT-HEM)	EPA 1664	ND	mg/L	1	2.0	8/3/2018	NV00925
<b><u>Anions by Ion Chromatography</u></b>							
Chloride	EPA 300.0	20	mg/L	1	0.10	7/24/2018	NV00925
Nitrate Nitrogen	EPA 300.0	0.059	mg/L	1	0.010	7/24/2018	NV00925
Nitrite Nitrogen	EPA 300.0	0.053	mg/L	1	0.010	7/24/2018	NV00925
<b><u>Flow Injection Analyses</u></b>							
Total Kjeldahl Nitrogen	EPA 351.2	2.9	mg/L	0.5	0.20	7/30/2018	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Page 3 of 5

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### LAS VEGAS

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 Las Vegas, Nevada 89102  
 tel (702) 475-8899  
 fax (702) 622-2868  
 EPA LAB ID: NV00926

Customer Sample ID: HVP-2 (Outlet)

Collect Date/Time: 7/22/2018 19:18

WETLAB Sample ID: 1807742-003

Receive Date: 7/23/2018 17:45

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
<b>General Chemistry</b>							
Total Phosphorous as P	SM 4500-P E	0.089	mg/L	1	0.010	7/25/2018	NV00925
Total Suspended Solids (TSS)	SM 2540D	94	mg/L	1	1.0	7/24/2018	NV00925
Total Nitrogen	Calc.	2.2	mg/L	1	0.22	7/30/2018	NV00925
Turbidity (Nephelometric)	EPA 180.1	100	NTU	10	1.0	7/24/2018	NV00925
Oil & Grease (HEM)	EPA 1664	3.3	M mg/L	1	1.0	8/2/2018	NV00925
Oil & Grease (SGT-HEM)	EPA 1664	ND	M mg/L	1	2.0	8/3/2018	NV00925
<b>Anions by Ion Chromatography</b>							
Chloride	EPA 300.0	36	mg/L	1	0.10	7/24/2018	NV00925
Nitrate Nitrogen	EPA 300.0	0.21	mg/L	1	0.010	7/24/2018	NV00925
Nitrite Nitrogen	EPA 300.0	ND	mg/L	1	0.010	7/24/2018	NV00925
<b>Flow Injection Analyses</b>							
Total Kjeldahl Nitrogen	EPA 351.2	1.9	mg/L	0.5	0.20	7/30/2018	NV00925

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 EPA LAB ID: NV00926

## Western Environmental Testing Laboratory QC Report

QCBatchID	QCType	Parameter	Method	Result	Actual	% Rec	Units
QC18070902	Blank 1	Turbidity (Nephelometric)	EPA 180.1	ND			NTU
QC18070910	Blank 1	Total Phosphorous as P	SM 4500-P E	ND			mg/L
QC18070924	Blank 1	Total Suspended Solids (TSS)	SM 2540D	ND			mg/L
QC18070929	Blank 1	Chloride	EPA 300.0	ND			mg/L
		Nitrate Nitrogen	EPA 300.0	ND			mg/L
		Nitrite Nitrogen	EPA 300.0	ND			mg/L
QC18071046	Blank 1	Total Kjeldahl Nitrogen	EPA 351.2	ND			mg/L
QC18080138	Blank 1	Oil & Grease (HEM)	EPA 1664	ND			mg/L
QC18080139	Blank 1	Oil & Grease (SGT-HEM)	EPA 1664	ND			mg/L

QCBatchID	QCType	Parameter	Method	Result	Actual	% Rec	Units
QC18070902	LCS 1	Turbidity (Nephelometric)	EPA 180.1	5.28	5.00	106	NTU
QC18070910	LCS 1	Total Phosphorous as P	SM 4500-P E	0.250	0.250	100	mg/L
QC18070924	LCS 1	Total Suspended Solids (TSS)	SM 2540D	196	200	98	mg/L
QC18070924	LCS 2	Total Suspended Solids (TSS)	SM 2540D	197	200	99	mg/L
QC18070929	LCS 1	Chloride	EPA 300.0	10.2	10.0	102	mg/L
		Nitrate Nitrogen	EPA 300.0	0.510	0.500	102	mg/L
		Nitrite Nitrogen	EPA 300.0	0.485	0.500	97	mg/L
QC18071046	LCS 1	Total Kjeldahl Nitrogen	EPA 351.2	0.960	1.00	96	mg/L
QC18080138	LCS 1	Oil & Grease (HEM)	EPA 1664	21.0	20.0	105	mg/L
QC18080139	LCS 1	Oil & Grease (SGT-HEM)	EPA 1664	10.5	10.0	105	mg/L

QCBatchID	QCType	Parameter	Method	Duplicate Sample	Sample Result	Duplicate Result	Units	RPD
QC18070902	Duplicate 1	Turbidity (Nephelometric)	EPA 180.1	1807742-001	133	131	NTU	1 %
QC18070924	Duplicate 1	Total Suspended Solids (TSS)	SM 2540D	1807719-001	240	212	mg/L	QD 12 %
QC18070924	Duplicate 2	Total Suspended Solids (TSS)	SM 2540D	1807757-003	190	182	mg/L	4 %

QCBatchID	QCType	Parameter	Method	Spike Sample	Sample Result	MS Result	MSD Result	Spike Value	Units	MS %Rec	MSD %Rec	RPD %
QC18070910	MS 1	Total Phosphorous as P	SM 4500-P E	1807712-001	0.057	0.325	0.335	0.25	mg/L	107	111	3
QC18070910	MS 2	Total Phosphorous as P	SM 4500-P E	1807712-004	0.037	0.298	0.301	0.25	mg/L	104	106	1
QC18070929	MS 1	Chloride	EPA 300.0	1807742-003	36.1	37.2	37.1	1.25	mg/L	89	78	<1
		Nitrate Nitrogen	EPA 300.0	1807742-003	0.213	0.787	0.778	0.5	mg/L	115	113	1
		Nitrite Nitrogen	EPA 300.0	1807742-003	ND	0.129	0.127	0.125	mg/L	97	95	2
QC18071046	MS 1	Total Kjeldahl Nitrogen	EPA 351.2	1807476-001	0.223	M 0.650	0.680	0.5	mg/L	NC	NC	NC
QC18071046	MS 2	Total Kjeldahl Nitrogen	EPA 351.2	1807704-006	ND	0.515	0.492	0.5	mg/L	103	98	5
QC18080138	MS 1	Oil & Grease (HEM)	EPA 1664	1807742-003	3.26	M 10.7	0	10	mg/L	NC	NA	NA
QC18080138	MS 2	Oil & Grease (HEM)	EPA 1664	1807768-002	ND	M 6.84	0	10	mg/L	NC	NA	NA
QC18080139	MS 1	Oil & Grease (SGT-HEM)	EPA 1664	1807742-003	ND	M 3.47	0	10	mg/L	NC	NA	NA

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or &lt;RL

Page 5 of 5

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# WETLAB

WESTERN ENVIRONMENTAL TESTING LABORATORY

Specializing in Soil, Hazardous Waste and Water Analysis.

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 tel (775) 777-9933 | fax (775) 777-9933  
 3230 Polaris Ave., Suite 4 | Las Vegas, Nevada 89102  
 tel (702) 475-8899 | fax (702) 776-6152

WETLAB Order ID. **18077x2**  
 Sparks Control # \_\_\_\_\_  
 Elko Control # \_\_\_\_\_  
 LV Control # \_\_\_\_\_  
 Report Due Date \_\_\_\_\_  
 Page \_\_\_\_\_ of \_\_\_\_\_

**Client Cardno**  
 Address **295 Hwy 50, Suite #1**  
 City, State & Zip **Zephyr Cove, NV 89448**  
 Contact **Shaun Buckman**  
 Phone **775.588.9069** Collector's Name **Frank P.**  
 Fax \_\_\_\_\_ PWS/Project Name **Heavenly**  
 P.O. Number \_\_\_\_\_ PWS/Project Number \_\_\_\_\_

**Turnaround Time Requirements**  
 Standard   
 5 Day\* (25%)  72 Hour (50%)   
 48 Hour\* (100%)  24 Hour\* (200%)   
 \*Surcharges Will Apply

**Samples Collected From Which State?**  
 NV  CA  Other

**Report Results Via**  
 PDF  EDD

**Compliance Monitoring?**  
 Yes  No  Other \_\_\_\_\_

**Report to Regulatory Agency?** Yes  No   
**Standard QC Required?** Yes  No

Email **shaun.buckman@cardno.com**  
**Billing Address (if different than Client Address)**  
 Company \_\_\_\_\_  
 Address \_\_\_\_\_  
 City, State & Zip \_\_\_\_\_  
 Contact \_\_\_\_\_  
 Phone \_\_\_\_\_ Fax \_\_\_\_\_  
 Email **shaun.buckman@cardno.com**

SAMPLE ID/LOCATION	DATE	TIME	PRES TYPE	S A M P L E T Y P E *	NO. OF C O N T A I N E R S	Analyses Requested										Spl. No.	
						Oil and Grease w/ Silica Gel	Total Phosphorus	Chloride	Nitrate as Nitrogen	Nitrite as Nitrogen	TKN (Kjeldahl)	Total Nitrogen	Turbidity	TSS			
HVP-1A (North)	7/22/18	1257-D 1853	SW	4	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
HVP-1B (South)	7/22/18	1744-D 1838	SW	4	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2
HVP-2 (Outlet)	7/22/18	1823-D 1918	SW	6	6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	3

Instructions/Comments/Special Requirements: **Oil and Grease - Amber bottles 2 Each for inlets (North and South)**  
**4 Amber bottles for the Outlet (add acid).. 1 Pink Bottle (add acid) and 1 White Bottle (General) for each of the 3 locations.**

Sample Matrix Key\*\* DW = Drinking Water WW = Wastewater SW = Surface Water MW = Monitoring Well SD = Solid/Sludge SO = Soil HW = Hazardous Waste OTHER: SW

\*SAMPLE PRESERVATIVES: 1=Unpreserved 2=H2SO4 3=NaOH 4=HCl 5=HNO3 6=Na2S2O3 7=ZnOAc+NaOH 8=HCl/OA Vial

Temp	Custody Seal	# of Containers	DATE	TIME	Samples Relinquished By	Samples Received By
°C	Y N None		7/23/18	1745	<i>[Signature]</i>	<i>[Signature]</i>
°C	Y N None					
°C	Y N None					
°C	Y N None					

WETLAB'S Standard Terms and Conditions apply unless written agreements specify otherwise. Payment terms are Net 30.

Client/Collector attests to the validity and authenticity of this (these) sample(s) and, is (are) aware that tampering with or intentionally mislabeling the sample(s) location, date or time of collection may be considered fraud and subject to legal action (NAC445.0636). <sup>ss</sup> Initial  
 To the maximum extent permitted by law, the Client agrees to limit the liability of WETLAB for the Client's damages to the total compensation received, unless other agreements are made in writing. This limitation shall apply regardless of the cause of action or legal theory pled or asserted. <sup>ss</sup> Initial  
 WETLAB will dispose of samples 90 days from sample receipt. Client may request a longer sample storage time for an additional fee. 301.2E  
 Please contact your Project Manager for details. <sup>ss</sup> Initial

Heavenly Mountain Resort  
Water Year 2018

APPENDIX

C

CALIFORNIA VAULT  
INSPECTION REPORTS





## Appendix C

### California Vault Inspection Reports

---

- C.1 Pacific Stormwater Inspection Report – Units 3,4 & 9 (June 2018)**
- C.2 Pacific Stormwater Inspection Report – Units 5, 10 & 11 (June 2018)**
- C.3 Pacific Stormwater Inspection Report – Wildwood Vaults (June 2018)**
- C.4 Pacific Stormwater Maintenance Report – CA Vaults (September 2018)**



## **Heavenly Ski Resort Main Lodge Units 3,4 and 9**

### **REPORT CONTENTS**

This report contains information regarding the results off the BMP(s) maintenance performed at the Heavenly Ski site.

The following information is provided for each BMP:

**Inspection Date**  
**Inspector Information**  
**Weather Conditions**  
**BMP Location**  
**BMP Designation, Type and Configuration**  
**Sediment, Water, and Hydrocarbon Levels if present**  
**BMP overall Condition**  
**BMP Components Condition**  
**Additional Comments and Observations**  
**Inspection Photos**  
**Any further recommended Action**

### **INSPECTION SUMMARY**

Based on the results of an inspection of BMP(s), the following action was completed:

- All inspected BMPs are operating within manufacturer's established specifications. Next inspection to take place
- Repairs to one or more off the inspected BMPs is required.
- Full service maintenance of one or more of the inspected BMPs requires maintenance. See report specifics for details.

# Pacific Stormwater BMP Solutions

## Stormwater Inspection Report

### PROJECT INFORMATION

Name Heavenly Main Lodge Unit # 11  
Address 1504 Wildwood Dr, South Lake Tahoe, Ca.

### INSPECTION DETAILS

Field Manager Gordon Clem System ID .03  
Date 6/15/2018 GPS Coordinates

Weather Dry

SYSTEM TYPE StormFilter SF  
CONFIGURATION Manhole  
SIZE

MEDIA TYPE Phoso  
CARTRIDGE# 7

Sediment Depth - inlet bay N/A

Pronounced Scum Line? Yes

Sediment Depth - Cartridge Bay 4"

Excessive Hydrocarbons? No

Sediment Depth - Annular N/A

Water Level - Static 21"

Physical Condition of Unit: Unit appears to be in good working condition.

#### Field Managers Comments:

Inspection completed and system is treating runoff as designed. Maintenance is recommended due to high static water above top of filters.

Maintenance Required? Yes

Repairs Required? No

### MAINTENANCE AUTHENTICITY

This hereby certifies that the information contained in this report is accurate and was obtained using accepted industry practices.

By: Gordon Clem

Company: Pacific Stormwater Solutions

Signature: 

Date: 6/26/18

Title: Maintenance Manager

# Pacific Stormwater BMP Solutions

## Stormwater Inspection Report

### PROJECT INFORMATION

Name Heavenly Main Lodge Unit# 10  
Address 1504 Wildwood Dr, South Lake Tahoe, Ca.

### INSPECTION DETAILS

Inspector Gordon Clem System ID .09  
Date 6/15/2018 GPS Coordinates

Weather Dry

SYSTEM TYPE StormFilter SF  
CONFIGURATION Manhole  
SIZE

MEDIA TYPE Phoso  
CARTRIDGE# 7

Sediment Depth - inlet bay N/A

Pronounced Scum Line? No

Sediment Depth - Cartridge Bay 1"

Excessive Hydrocarbons? No

Sediment Depth - Annular N/A

Water Level - Static 10"

Physical Condition of Unit: Unit appears to be in good working condition.

#### Inspector Comments:

Inspection completed and system is treating runoff as designed. Maintenance is recommended due to static water level.

Maintenance Required? Yes

Repairs Required? No

### AUTHENTICITY

This hereby certifies that the information contained in this report is accurate and was obtained using accepted industry practices.

By: Gordon Clem

Company: Pacific Stormwater Solutions

Signature: 

Date: 6/26/18

Title: Maintenance Manager

# Pacific Stormwater BMP Solutions

## Stormwater Inspection Report

### PROJECT INFORMATION

Name Heavenly Main Lodge Unit # 5  
Address 1504 Wildwood Dr, South Lake Tahoe, Ca.

### INSPECTION DETAILS

Inspector Gordon Clem System ID .04  
Date 6/15/2018 GPS Coordinates

Weather Dry

SYSTEM TYPE StormFilter SF  
CONFIGURATION Vault  
SIZE 11x34

MEDIA TYPE ZPG  
CARTRIDGE# 93

Sediment Depth - inlet bay 3"

Pronounced Scum Line? Yes

Sediment Depth - Cartridge Bay 1"

Excessive Hydrocarbons? No

Sediment Depth - Annular N/A

Water Level - Static 1"

Physical Condition of Unit: Unit appears to be in good working condition.

#### Inspector Comments:

Inspection completed and system is treating runoff as designed. Maintenance is not recommended.

Maintenance Required? No

Repairs Required? No

### AUTHENTICITY

This hereby certifies that the information contained in this report is accurate and was obtained using accepted industry practices.

By: Gordon Clem

Company: Pacific Stormwater Solutions

Signature: 

Date: 6/26/18

Title: Maintenance Manager

# Pacific Stormwater BMP Solutions

## Stormwater Inspection Report

### INSPECTION PHOTOS



Unit #3



Cartridge bay

Maintenance is being recommended on unit #3



Unit #9



Cartridge bay

Loose clean media

Maintenance is being recommended on unit #9



Unit #4



Cartridge bay



Loose clean media

Recommend sediment removal only. No filter replacement needed.

# STORMWATER TREATMENT UNIT INSPECTION COMPLIANCE 2018

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Heavenly Main Lodge  
1504 Wildwood Ave  
South Lake Tahoe, Ca.

Let it be known that on June 15th, 2018 Three CONTECH stormwater Media Filter systems were inspected by a qualified professional at a frequency and in a manner consistent with the manufacturer's guidelines for general inspection and maintenance. All systems are operating as designed. Maintenance is recommended on units #3 & #9. Sediment removal only on unit #4

Therefore, based on these activities and by signed authorization below, this hereby certifies that the StormFilter Stormwater treatment systems at the above referenced location are currently performing as designed.

## CERTIFICATE AUTHORIZATION

A handwritten signature in black ink, appearing to read "Gordon Clem".

Gordon Clem  
Maintenance Manager  
Pacific Stormwater BMP Solutions  
6/26/18



## **Heavenly Ski Resort Main Lodge Units 5, 10, 11**

### **REPORT CONTENTS**

This report contains information regarding the results off the BMP(s) maintenance performed at the Heavenly Ski site.

The following information is provided for each BMP:

**Inspection Date**  
**Inspector Information**  
**Weather Conditions**  
**BMP Location**  
**BMP Designation, Type and Configuration**  
**Sediment, Water, and Hydrocarbon Levels if present**  
**BMP overall Condition**  
**BMP Components Condition**  
**Additional Comments and Observations**  
**Inspection Photos**  
**Any further recommended Action**

### **INSPECTION SUMMARY**

Based on the results of an inspection of BMP(s), the following action was completed:

- All inspected BMPs are operating within manufacturer's established specifications. Next inspection to take place
- Repairs to one or more off the inspected BMPs is required.
- Full service maintenance of one or more of the inspected BMPs requires maintenance. See report specifics for details.

# Pacific Stormwater BMP Solutions

## Stormwater Inspection Report

### PROJECT INFORMATION

Name Heavenly Main Lodge Unit # 11  
Address 1504 Wildwood Dr, South Lake Tahoe, Ca.

### INSPECTION DETAILS

Field Manager Gordon Clem System ID .11  
Date 6/15/2018 GPS Coordinates

Weather Dry

SYSTEM TYPE StormFilter SF  
CONFIGURATION Vault  
SIZE 11x34

MEDIA TYPE ZPG  
CARTRIDGE# 114

Sediment Depth - inlet bay 5"

Pronounced Scum Line? Yes

Sediment Depth - Cartridge Bay 2"

Excessive Hydrocarbons? No

Sediment Depth - Annular N/A

Water Level - Static 1"

Physical Condition of Unit: Unit appears to be in good working condition.

#### Field Managers Comments:

Inspection completed and system is treating runoff as designed. Maintenance is recommended due to high scum line over top of filters and condition of media.

Maintenance Required? Yes


Repairs Required? No

### MAINTENANCE AUTHENTICITY

This hereby certifies that the information contained in this report is accurate and was obtained using accepted industry practices.

By: Gordon Clem

Company: Pacific Stormwater Solutions

Signature: 

Date: 6/26/18

Title: Maintenance Manager

# Pacific Stormwater BMP Solutions

## Stormwater Inspection Report

### PROJECT INFORMATION

Name Heavenly Main Lodge Unit# 10  
Address 1504 Wildwood Dr, South Lake Tahoe, Ca.

### INSPECTION DETAILS

Inspector Gordon Clem System ID .10  
Date 6/15/2018 GPS Coordinates

Weather Dry

SYSTEM TYPE StormFilter SF  
CONFIGURATION Vault  
SIZE 11x34

MEDIA TYPE ZPG  
CARTRIDGE# 93

Sediment Depth - inlet bay 3"

Pronounced Scum Line? Yes

Sediment Depth - Cartridge Bay 1"

Excessive Hydrocarbons? No

Sediment Depth - Annular N/A

Water Level - Static 1"

Physical Condition of Unit: Unit appears to be in good working condition.

#### Inspector Comments:

Inspection completed and system is treating runoff as designed. Maintenance is not recommended.

Maintenance Required? No

Repairs Required? No

### AUTHENTICITY

This hereby certifies that the information contained in this report is accurate and was obtained using accepted industry practices.

By: Gordon Clem

Company: Pacific Stormwater Solutions

Signature: 

Date: 6/26/18

Title: Maintenance Manager

# Pacific Stormwater BMP Solutions

## Stormwater Inspection Report

### PROJECT INFORMATION

Name Heavenly Main Lodge Unit # 5  
Address 1504 Wildwood Dr, South Lake Tahoe, Ca.

### INSPECTION DETAILS

Inspector Gordon Clem System ID .05  
Date 6/15/2018 GPS Coordinates

Weather Dry

SYSTEM TYPE StormFilter SF  
CONFIGURATION Vault  
SIZE 11x34

MEDIA TYPE ZPG  
CARTRIDGE# 114

Sediment Depth - inlet bay 4"

Pronounced Scum Line? Yes

Sediment Depth - Cartridge Bay 1"

Excessive Hydrocarbons? No

Sediment Depth - Annular N/A

Water Level - Static 1"

Physical Condition of Unit: Unit appears to be in good working condition.

#### Inspector Comments:

Inspection completed and system is treating runoff as designed. Maintenance is not recommended.

Maintenance Required? No


Repairs Required? No

### AUTHENTICITY

This hereby certifies that the information contained in this report is accurate and was obtained using accepted industry practices.

By: Gordon Clem

Company: Pacific Stormwater Solutions

Signature: 

Date: 6/26/18

Title: Maintenance Manager

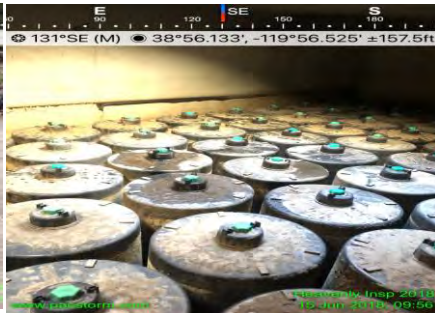
# Pacific Stormwater BMP Solutions

## Stormwater Inspection Report

### INSPECTION PHOTOS



Unit #11



Cartridge bay



Spent media

Maintenance is being recommended on unit #11



Unit #10



Cartridge bay

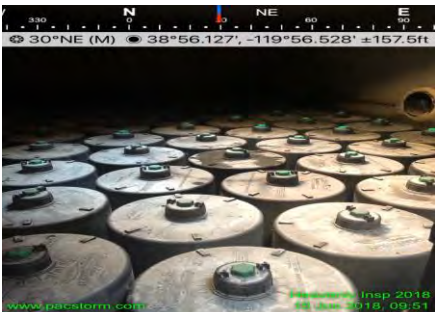


Loose clean media

Recommend sediment removal only. No filter replacement needed.



Unit #5



Cartridge bay



Loose clean media

Recommend sediment removal only. No filter replacement needed.

# STORMWATER TREATMENT UNIT INSPECTION COMPLIANCE 2018

---



Heavenly Main Lodge  
1504 Wildwood Ave  
South Lake Tahoe, Ca.

Let it be known that on June 15th, 2018 Three CONTECH stormwater Media Filter systems were inspected by a qualified professional at a frequency and in a manner consistent with the manufacturer's guidelines for general inspection and maintenance. All systems are operating as designed. Maintenance is recommended on unit #11. Sediment removal only on unit #5 and Unit #10

Therefore, based on these activities and by signed authorization below, this hereby certifies that the StormFilter Stormwater treatment systems at the above referenced location are currently performing as designed.

## CERTIFICATE AUTHORIZATION

A handwritten signature in black ink that reads "Gordon Clem".

Gordon Clem  
Maintenance Manager  
Pacific Stormwater BMP Solutions  
6/26/18

## **Heavenly Ski Resort Main Lodge Wildwood Ave**

### **REPORT CONTENTS**

This report contains information regarding the results off the BMP(s) maintenance performed at the Heavenly Ski site.

The following information is provided for each BMP:

**Inspection Date**  
**Inspector Information**  
**Weather Conditions**  
**BMP Location**  
**BMP Designation, Type and Configuration**  
**Sediment, Water, and Hydrocarbon Levels if present**  
**BMP overall Condition**  
**BMP Components Condition**  
**Additional Comments and Observations**  
**Inspection Photos**  
**Any further recommended Action**

### **INSPECTION SUMMARY**

Based on the results of an inspection of BMP(s), the following action was completed:

- All inspected BMPs are operating within manufacturer's established specifications. Next inspection to take place
- Repairs to one or more off the inspected BMPs is required.
- Full service maintenance of one or more of the inspected BMPs requires maintenance. See report specifics for details.



# Pacific Stormwater BMP Solutions

## Stormwater Inspection Report

### PROJECT INFORMATION

Name Heavenly Main Lodge Unit # 11  
Address Wildwood Ave, South Lake Tahoe, Ca.

### INSPECTION DETAILS - WILDWOOD AVE Unit

Field Manager Gordon Clem System ID  
Date 6/15/2018 GPS Coordinates Wildwood Ave

Weather Dry

SYSTEM TYPE StormFilter SF  
CONFIGURATION Vault  
SIZE

MEDIA TYPE ZPG  
CARTRIDGE# 27

Sediment Depth - inlet bay N/A

Pronounced Scum Line? Yes

Sediment Depth - Cartridge Bay 3"

Excessive Hydrocarbons? No

Sediment Depth - Annular N/A

Water Level - Static 14"

Physical Condition of Unit: Unit appears to be in good working condition.

#### Field Managers Comments:

Inspection completed and system is treating runoff as designed. Maintenance is recommended due to high static water over top of filters.

Maintenance Required? Yes

Repairs Required? No

### MAINTENANCE AUTHENTICITY

This hereby certifies that the information contained in this report is accurate and was obtained using accepted industry practices.

By: Gordon Clem

Company: Pacific Stormwater Solutions

Signature: 

Date: 6/26/18

Title: Maintenance Manager



# Pacific Stormwater BMP Solutions

## Stormwater Inspection Report

### PROJECT INFORMATION

Name Heavenly Main Lodge Unit# 10  
Address Wildwood Ave, South Lake Tahoe, Ca.

### INSPECTION DETAILS - CDS Unit

Inspector Gordon Clem System ID  
Date 6/15/2018 GPS Coordinates

Weather Dry

SYSTEM TYPE Hydro-Dynamic Separator HDS MEDIA TYPE  
CONFIGURATION Manhole CARTRIDGE#  
SIZE

Sediment Depth - inlet bay N/A Pronounced Scum Line? Yes  
Sediment Depth - Sump 12" Excessive Hydrocarbons? No  
Sediment Depth - Annular N/A  
Water Level - Static 25"

Physical Condition of Unit: Unit appears to be in good working condition.

#### Inspector Comments:

Inspection completed and system is treating runoff as designed. Maintenance is borderline.

Maintenance Required? No

Repairs Required? No

### AUTHENTICITY

This hereby certifies that the information contained in this report is accurate and was obtained using accepted industry practices.

By: Gordon Clem

Company: Pacific Stormwater Solutions

Signature: 

Date: 6/26/18

Title: Maintenance Manager

# Pacific Stormwater BMP Solutions

## Stormwater Inspection Report

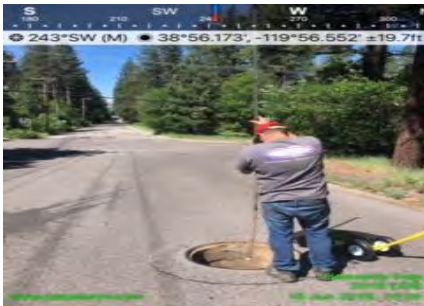
### INSPECTION PHOTOS



Wildwood Unit

Cartridge bay

Maintenance is being recommended due to high static water.



CDS Unit

Cartridge bay

Recommend sediment removal only.

# STORMWATER TREATMENT UNIT INSPECTION COMPLIANCE 2018

---



Heavenly Main Lodge  
1504 Wildwood Ave  
South Lake Tahoe, Ca.

Let it be known that on June 15th, 2018 Two CONTECH stormwater systems were inspected by a qualified professional at a frequency and in a manner consistent with the manufacturer's guidelines for general inspection and maintenance. All systems are operating as designed. Maintenance is recommended on both units.

Therefore, based on these activities and by signed authorization below, this hereby certifies that the StormFilter Stormwater treatment systems at the above referenced location are currently performing as designed.

## CERTIFICATE AUTHORIZATION

A handwritten signature in black ink, appearing to read "Gordon Clem".

Gordon Clem  
Maintenance Manager  
Pacific Stormwater BMP Solutions  
6/26/18



# **Pacific Stormwater BMP Solutions**

**Stormwater Maintenance Report 2018**

## **Heavenly Ski Resort - Base Lodge**

**Pacific Stormwater BMP Solutions**  
PO Box 12246  
Santa Rosa, Ca. 95406  
Phone 707.544.5012  
[www.pacstorm.com](http://www.pacstorm.com)

### **REPORT CONTENTS**

This report contains information regarding the results off the BMP(s) maintenance performed at the Heavenly Ski Resort site.

The following information is provided for each BMP:

**Maintenance Date**  
**Maintenance Information**  
**Weather Conditions**  
**BMP Location**  
**BMP Designation, Type and Configuration**  
**Sediment, Water, and Hydrocarbon Levels if present**  
**BMP overall Condition**  
**BMP Components Condition**  
**Additional Comments and Observations**  
**Maintenance Photos**  
**Any further recommended Action**

### **MAINTENANCE SUMMARY**

Based on the results of an inspection of BMP(s), the following action was completed:

- All inspected BMPs are operating within manufacturer's established specifications. Inspection to take place Spring 2019.
- Repairs to one or more off the inspected BMPs is required. See report specifics for details.
- Full service maintenance of one or more of the inspected BMPs was completed. See report specifics for details.

# Pacific Stormwater BMP Solutions

## Stormwater Maintenance Report

### PROJECT INFORMATION

Name Heavenly Ski Resort Project#  
Address Wildwood Ave, South Lake Tahoe, Ca

### MAINTENANCE DETAILS

Field Manager Gordon Clem System ID .03  
Date 9/11/2018 GPS Coordinates See photos

Weather Dry

SYSTEM TYPE StormFilter SF  
CONFIGURATION Manhole  
SIZE 60"

MEDIA TYPE Phoso  
CARTRIDGE# 7

Sediment Depth - Sump \_\_\_\_\_

Pronounced Scum Line? No

Sediment Depth - Cartridge Bay 3"

Excessive Hydrocarbons? No

Sediment Depth - Annular N/A

Water Level - Static 15"

Physical Condition of Unit: Unit appears to be in good working condition.

#### Field Managers Comments:

Sacrificial Seven (7) cartridge manhole units #3. Sediment and static water and all spent filters removed and disposed of at approved landfill. Seven (7) filters in Sacrificial manhole unit replaced with OEM Phosphorous cartridge filters. Maintenance completed and system appears to be in good working order.

Maintenance Completed? Yes

Repairs Required? No

### MAINTENANCE AUTHENTICITY

This hereby certifies that the information contained in this report is accurate and was obtained using accepted industry practices.

By: Gordon Clem

Company: Pacific Stormwater Solutions

Signature: 

Date: 9/18/18

Title: Maintenance Manager

# Pacific Stormwater BMP Solutions

## Stormwater Maintenance Report

### PROJECT INFORMATION

Name Heavenly Ski Resort Project#  
Address Wildwood Ave, South Lake Tahoe, Ca

### MAINTENANCE DETAILS

Field Manager Gordon Clem System ID .09  
Date 9/11/2018 GPS Coordinates See photos

Weather Dry

SYSTEM TYPE StormFilter SF  
CONFIGURATION Manhole  
SIZE 60"

MEDIA TYPE Phoso  
CARTRIDGE# 7

Sediment Depth - Sump \_\_\_\_\_

Pronounced Scum Line? No

Sediment Depth - Cartridge Bay 7"

Excessive Hydrocarbons? No

Sediment Depth - Annular N/A

Water Level - Static 17"

Physical Condition of Unit: Unit appears to be in good working condition.

#### Field Managers Comments:

Sacrificial Seven (7) cartridge manhole units #9. Sediment and static water and all spent filters removed and disposed of at approved landfill. Seven (7) filters in Sacrificial manhole unit replaced with OEM Phosphorous cartridge filters. Maintenance completed and system appears to be in good working order.

Maintenance Completed? Yes


Repairs Required? No

### MAINTENANCE AUTHENTICITY

This hereby certifies that the information contained in this report is accurate and was obtained using accepted industry practices.

By: Gordon Clem

Company: Pacific Stormwater Solutions

Signature: 

Date: 9/18/18

Title: Maintenance Manager

# Pacific Stormwater BMP Solutions

## Stormwater Maintenance Report

### PROJECT INFORMATION

Name Heavenly Ski Resort Project# 0  
Address Wildwood Ave, South Lake Tahoe, Ca

### MAINTENANCE DETAILS

Inspector Gordon Clem System ID .11  
Date 9/11/2018 GPS Coordinates

Weather Dry

SYSTEM TYPE StormFilter SF MEDIA TYPE ZPG  
CONFIGURATION Vault CARTRIDGE# 114  
SIZE

Sediment Depth - Sump \_\_\_\_\_ Pronounced Scum Line? Yes

Sediment Depth - Cartridge Bay 3" Excessive Hydrocarbons? No

Sediment Depth - Annular N/A

Water Level - Static 2"

Physical Condition of Unit: Unit appears to be in good working condition.

#### Inspector Comments:

Unit #11 Stormfilter with 114 ZPG 27" filter cartridges maintained. Sediment, static water and spent filters removed and disposed of at approved landfill. Filters replaced with OEM ZPG 27" cartridge filters. Maintenance completed.

Maintenance Completed? Yes Repairs required? No

### AUTHENTICITY

This hereby certifies that the information contained in this report is accurate and was obtained using accepted industry practices.

By: Gordon Clem

Company: Pacific Stormwater Solutions

Signature: 

Date: 9/18/18

Title: Maintenance Manager



# Pacific Stormwater BMP Solutions

## Stormwater Maintenance Report

### PROJECT INFORMATION

Name Heavenly Ski Resort Project# 0  
Address Wildwood Ave, South Lake Tahoe, Ca

### MAINTENANCE DETAILS

Inspector Gordon Clem System ID  
Date 9/12/2018 GPS Coordinates

Weather Dry

SYSTEM TYPE StormFilter SF MEDIA TYPE ZPG  
CONFIGURATION Vault CARTRIDGE# 28  
SIZE

Sediment Depth - Sump 8" Pronounced Scum Line? Yes

Sediment Depth - Cartridge Bay 0" Excessive Hydrocarbons? No

Sediment Depth - Annular N/A

Water Level - Static 2'

Physical Condition of Unit: Unit appears to be in good working condition.

#### Inspector Comments:

Wildwood/Saddle unit Stormfilter with 28 ZPG 27" filter cartridges maintained. Sediment, static water and spent filters removed and disposed of at approved landfill. Filters replaced with OEM ZPG 27" cartridge filters. Maintenance completed.

Maintenance Completed? Yes Repairs required? No

### AUTHENTICITY

This hereby certifies that the information contained in this report is accurate and was obtained using accepted industry practices.

By: Gordon Clem

Company: Pacific Stormwater Solutions

Signature: 

Date: 9/18/18

Title: Maintenance Manager

# Pacific Stormwater BMP Solutions

## Stormwater Maintenance Report

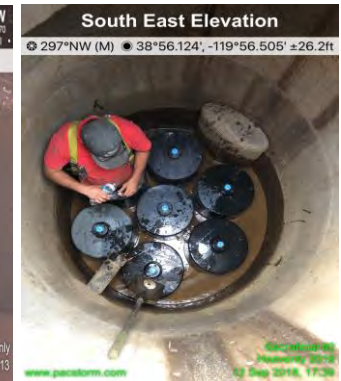
### Maintenance Photos



Unit #3 location



During maintenance



Maintenance completed



Unit #9 location



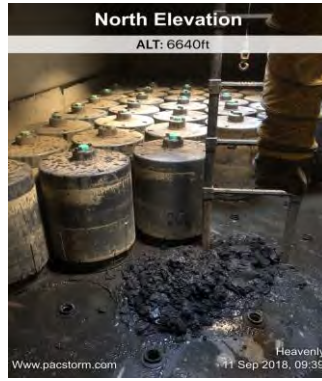
During Maintenance



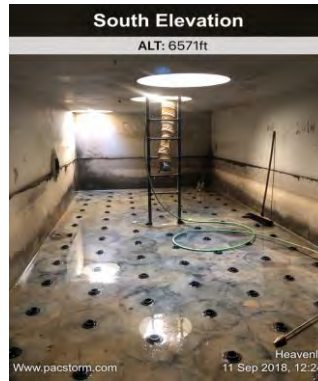
Maintenance completed



Unit #11



During maintenance



Maintenance completed

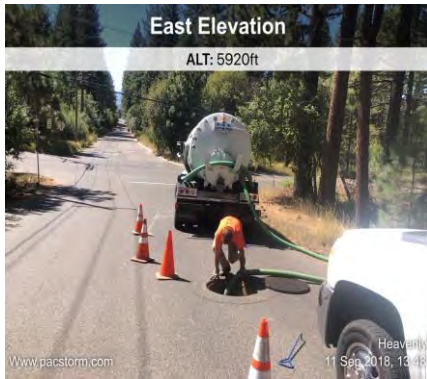




# Pacific Stormwater BMP Solutions

## Stormwater Maintenance Report

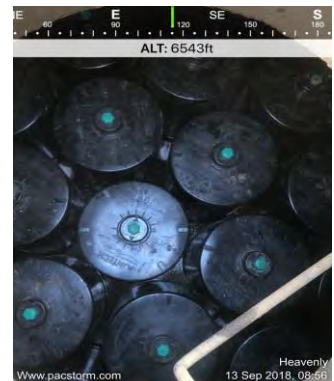
### Maintenance Photos



CDS location

During maintenance

Maintenance completed



Wildwood Vault

Sediment removed

28 new filters installed



Sediment removed

Filters not replaced

# STORMWATER TREATMENT UNIT MAINTENANCE COMPLIANCE 2018

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Heavenly Ski Resort Base Lodge

South Lake Tahoe, Ca.

Let it be known that on September 11th and 12th, 2018 Three CONTECH StormFilter systems and one CDS HDS system were maintained by a qualified professional at a frequency and in a manner consistent with the manufacturer's guidelines. Sediment was removed. System internal components were inspected and OEM manufacturer supplied replacement filters were installed. Units 4,5 and 10 were powerwashed and sediment removed. No filters were replaced on these three units due to loose media.

Therefore, based on these activities and by signed authorization below, this hereby certifies that the stormwater treatment systems at the above referenced location have met the requirements for maintenance compliance as specified by the manufacturer until Spring 2019 at which time an inspection should occur.

## CERTIFICATE AUTHORIZATION



Gordon Clem  
Maintenance Manager  
Pacific Stormwater BMP Solutions  
9/18/18

Heavenly Mountain Resort  
Water Year 2018

APPENDIX

D

FACILITIES MAINTENANCE  
MONITORING REPORTS (4<sup>TH</sup>  
QUARTER)



## Appendix D

### Facilities Maintenance Monitoring Reports (4<sup>th</sup> Quarter)

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- D.1 July Monthly Maintenance Inspection Logs**
- D.2 August Monthly Maintenance Inspection Logs**
- D.3 September Monthly Maintenance Inspection Logs**
- D.4 March 2018 South Tahoe Refuse Recovery Weight Ticket**
- D.5 April 2018 South Tahoe Refuse Recovery Weight Ticket**
- D.6 Fourth Quarter Salt Application Letter**
- D.7 April 2018 Fuel Spill Record**
- D.8 March 2018 El Dorado County Deicer Abrasives Analysis**





**HEAVENLY SKI RESORT  
 DEICERS and ABRASIVES RECOVERY  
 (MONITORING AND REPORTING PROGRAM) BOARD ORDER NO. R6T-2015-0021  
 WDID 6A090033000  
 WASTE DISCHARGE REQUIREMENTS  
 DAILY LOG**

MONTH/YEAR: Jul-18

LOCATION NAME Heavenly Upper Lot (15 min, bus drop, tram)

For abrasives or ice control agents that Heavenly Ski Resort (discharger) **removed** from parking lots and roadways, Heavenly Personnel shall record the following in a daily log for weekly submittal to supervisors and monthly submittal to Frank Papandrea for input into Quarterly reporting to LRWQCB:

**Location Codes:**

- H/UL – Cal Base Upper Lot
- H/LL – Cal Base Lower Lot
- H/W – Entrance Road (Wildwood above SS - Sand
- C/WN CSLT – Wildwood – Needle Peak
- C/SR CSLT - Ski Run
- C/K CSLT – Keller
- C/S CSLT- Sherman Way
- C/R CSLT - Regina

Other – **Describe:**

**Material Codes**

- DG - Spec H Sand
- NaCl - Salt
- Other – **Describe:**  
 Road debris  
 loosened by  
 snow removal

**Equipment/Method Used:** (first three loads from drainage improvement.  
 Mechanical Sweeper: Desert Commercial Sweeping

<b>Date</b>	<b>Type of Material</b>	<b>Quantity (lbs)</b>
7/16/2018	DG / Road Debris	39,140

**Total Monthly RECOVERY Heavenly (lbs?)**      39,140 Sand                      0 salt

**Total Monthly RECOVERY in CSLT (lbs?)**                      0 Sand                      0 salt

**Submit Monthly to Supervisor.**    Time period covered      7/1/2018    to      7/31/2018

**Ryan Smith**

**Employee Signature**

**Supervisor Signature**

**HEAVENLY SKI RESORT**  
**DEICERS and ABARSIVES APPLICATION and RECOVERY**

**Monthly Summary Report**

**(MONITORING AND REPORTING PROGRAM) BOARD ORDER NO. R6T-2015-0021**  
**WDID 6A090033000**  
**WASTE DISCHARGE REQUIREMENTS**

**Quantity of ice control agents and abrasives used on Heavenly property and on CSLT streets. When the Dischargers apply deicers and/or abrasives on parking lots, base facilities, private roads, or City of South Lake Tahoe roads to the California Base area, the Dischargers shall keep a daily log and report a monthly summary of the following to Frank Papandrea for Quarterly reporting to LRWQCB:**

**Month and Year:** Jul-18                      **Reporter:** Ryan Smith

**Location Name:** Heavenly California Base and City of South Lake Tahoe Roads  
Total Monthly Application: 0 lbs  
Total Monthly Recovery: 39,140 lbs

Location of Disposal Facilities: Carson Landfill (by Tahoe Refuse)

Ryan Smith  
Employee Signature



**HEAVENLY SKI RESORT  
CALIFORNIA PARKING LOT, LODGE and ROADS  
MONITORING CHECKLIST**

**(MONITORING AND REPORTING PROGRAM NO.R6T-2015-0021)**

Date: Jul-18 Inspector: Ryan Smith

Complete the following inspection at the **CA Parking Lot, CA Base Lodge, and associated roads, at least once monthly** and **after significant storm events**. Turn in Checklists to Supervisor for submittal to Frank Papandrea for input into Quarterly reports to LRWQCB.

Were any of the following Observed?

**a. Drop Inlets (CA parking Lot and Roads)**

- 1) Clogged by Debris, ice, or sediment?
- 2) Runoff movement into the infiltration gallery?
- 3) Damaged by vehicles or snow plow?

**b. Drainage Collection System (Ca Parking Lot, Roads)**

- 1) Clogged by debris, ic, or sediment?
- 2) Movement of water through pipes, cahnnels,
- 3) Drainage collection system damages?
- 4) Inadequate energy dissipation?

**c. Sediment Traps and Vaults (CA Prkng Lot & Roads)**

- 1) sediment accumulated in each chamber of trap vaults, or galleries? If Yes, estimate depth and
- 2) Traps and Vaults recently cleaned? List date of last cleaning
- 3) Presence of sheen, foam trash or scum?

**d. Erosion Control (CA parking Lot, Lodges, and Maintenance Shops)**

- 1) Vegetation appears unhealthy?
- 2) Gully or rill erosion on slopes?
- 3) Sediment buildup at toes of slopes?
- 4) Vegetation damages by vehicles or heavy foot

**c. Culvert Outlet (west of Wildwood Ave)**

- 1) Inadequate energy dissipation

Yes	No	Comments
Describe Problems, Locations and Corrective Actions		
	X	
X		
	X	
Describe Problems, Locations and Corrective Actions		
	X	
	X	
	X	
	X	
Describe Problem and Corrective Actions		
	X	
	X	
	X	
Please Note Locations and Corrective Actions		
	X	
	X	
	X	Sweeping scheduled for July
	X	
Please Note Locations and Corrective Actions		
	x	

2) Trash or debris needs to be removed from  
**d. Upstream Drainage Diversion (Located on First Ride Run)**

	X	
Please Note Locations and Corrective Actions		
	X	
	X	
	X	
	X	Swept 7/16
	X	

- 1) Inadequate energy dissipation
- 2) Trash or debris needs to be removed from drainage way?
  - f. Spilled Chemicals, Paints, Fuels, Sealants, Oils,
  - g. Sediment/Sand Buildup in CA parking Lot?
  - h. Grease Interceptor Not Operating Properly? (CA Base Lodge)

Describe any problems / activities, dates and times of problems/activities and the personnel to which problems were reported:

See attached.

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Documentation of resulting actions and dates problems corrected:

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**INSPECTION PURPOSE AND GOALS:**

The purpose of the inspection is to identify actual or potential erosion and surface runoff on the project site and to identify BMP maintenance needs so that corrective measures may be immediately undertaken.

Any erosion, surface runoff problems, wastewater disposal problems, or other adverse conditions, which are found on the subject property, shall be clearly described and the corrective measures proposed by the Dischargers (Heavenly) shall be included in the quarterly monitoring report. **In the event that no such problems are found on the property, a statement certifying this condition must be included for each monthly inspection.**

**PLEASE ADD ADDITIONAL INFORMATION IF NECESSARY AND ATTACH PHOTO DOCUMENTATION**



HEAVENLY SKI RESORT  
 SNOW CONDITIONING and SNOW  
 ENHANCEMENT  
 Water Year 2015

**(MONITORING AND  
 REPORTING  
 PROGRAM) BOARD  
 ORDER NO. R6T-2015-  
 0021  
 WDID 6A090033000  
 WASTE DISCHARGE  
 REQUIREMENTS**

If snow-conditioning or snowmaking enhancement chemicals or other additives are used on ski slopes (including tubing runs, half-pipes, jumps, other terrain parks, and ski race areas), a **daily log** of the following information shall be kept and reported to supervisors on a **weekly** basis and to the USDA Forest Service on a **monthly** basis for input into Quarterly reporting to LRWQCB:

LOCATION: <u>Heavenly Ski Resort</u>		California Main Lodge	
Department : <b>Base Operations</b>			Type of Materials Applied <u>“traction melt ci”</u>
Reporter: <u>Ryan Smith</u>			Approximate Acreage: <u>1 ACRE</u>
Date	Pounds used	ACRES	
7/1/2018	0.00		0.00
7/2/2018	0.00		0.00
7/3/2018	0.00		0.00
7/4/2018	0.00		0.00
7/5/2018	0.00		0.00
7/6/2018	0.00		0.00
7/7/2018	0.00		0.00
7/8/2018	0.00		0.00
7/9/2018	0.00		0.00
7/10/2018	0.00		0.00
7/11/2018	0.00		0.00
7/12/2018	0.00		0.00
7/13/2018	0.00		0.00
7/14/2018	0.00		0.00
7/15/2018	0.00		0.00
7/16/2018	0.00		0.00
7/17/2018	0.00		0.00
7/18/2018	0.00		0.00
7/19/2018	0.00		0.00
7/20/2018	0.00		0.00
7/21/2018	0.00		0.00
7/22/2018	0.00		0.00
7/23/2018	0.00		0.00
7/24/2018	0.00		0.00
7/25/2018	0.00		0.00
7/26/2018	0.00		0.00
7/27/2018	0.00		0.00
7/28/2018	0.00		0.00
7/29/2018	0.00		0.00
7/30/2018	0.00		0.00
7/31/2018			
Total	0.00		0.00
Employee sign off, Ryan Smith			

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# STATEMENT

2140 Ruth Avenue, South Lake Tahoe, CA 96150

Office Hours:  
8:00 a.m. - 5:00 p.m.  
Office Phone: (530) 541-4353

Statement Date	Account Number	Service Address		
08/01/2018	50400424	CALIF LODGE		
Current	31 - 60 Days	61 - 90 Days	Over 90 Days	Total Due
\$604.17	\$0.00	\$0.00	\$0.00	\$604.17

Post Date	Description	Charges	Credits
	Previous Balance	\$689.00	
	Payments & Credits	\$-1,384.83	07/27/2018
	New Activity	\$1,300.00	
	Total Due	\$604.17	
07/03/2018	Drop Box - 40Y REFERENCE: 369752	\$0.00	
07/03/2018	Drop Box Rent - 40Y REFERENCE: 369752	\$390.00	
07/03/2018	C & D MIXED (2.69 TONS) (5,380.00 LBS)	\$0.00	
07/11/2018	Drop Box - 10Y - Special REFERENCE: 370692	\$455.00	
07/13/2018	Drop Box - 10Y - Special REFERENCE: 371084	\$0.00	
07/13/2018	CONCRETE/DIRT/ASPHALT (11.56 TONS) (23,120.00 LBS)	\$0.00	
07/18/2018	Drop Box - 10Y - Special REFERENCE: 371656	\$455.00	
07/20/2018	Drop Box - 10Y - Special REFERENCE: 372120	\$0.00	
07/20/2018	CONCRETE/DIRT/ASPHALT (8.01 TONS) (16,020.00 LBS)	\$0.00	
<b>Your Statement Number is: 1824667</b>			

**Messages:**

Email statements are available. Please update your account number and contact information including your email address. Please also visit our website for current information or contact [info@southtahoerefuse.com](mailto:info@southtahoerefuse.com).

*Please detach and return bottom portion with your payment.*

Tahoe Basin Container Service  
2140 Ruth Avenue  
South Lake Tahoe, CA 96150

Account Number	Statement Date
50400424	08/01/2018
Due Date	Amount Due
08/25/2018	\$604.17

SERVICE ADDRESS: CALIF LODGE

**ADDRESSEE:**

Please check box if address is incorrect or information has changed and indicate change(s) on reverse side.

**REMIT TO:**

HEAVENLY VALLEY  
C/O ENGIE INSIGHT  
PO BOX 2410  
SPOKANE, WA 99210-2410

Tahoe Basin Container Service  
2140 Ruth Avenue  
South Lake Tahoe, CA 96150



**HEAVENLY SKI RESORT  
 DEICERS and ABRASIVES RECOVERY  
 (MONITORING AND REPORTING PROGRAM) BOARD ORDER NO. R6T-2015-0021  
 WDID 6A090033000  
 WASTE DISCHARGE REQUIREMENTS  
 DAILY LOG**

MONTH/YEAR: Aug-18

LOCATION NAME Heavenly Upper Lot (15 min, bus drop, tram)

For abrasives or ice control agents that Heavenly Ski Resort (discharger) **removed** from parking lots and roadways, Heavenly Personnel shall record the following in a daily log for weekly submittal to supervisors and monthly submittal to Frank Papandrea for input into Quarterly reporting to LRWQCB:

**Location Codes:**

- H/UL – Cal Base Upper Lot
- H/LL – Cal Base Lower Lot
- H/W – Entrance Road (Wildwood above SS - Sand
- C/WN CSLT – Wildwood – Needle Peak
- C/SR CSLT - Ski Run
- C/K CSLT – Keller
- C/S CSLT- Sherman Way
- C/R CSLT - Regina

Other – **Describe:**

**Equipment/Method Used:** (first three loads from drainage improvement.  
 Mechanical Sweeper: Desert Commercial Sweeping

**Material Codes**

- DG - Spec H Sand
- NaCl - Salt
- Other – **Describe:**  
 Road debris  
 loosened by  
 snow removal

<b>Date</b>	<b>Type of Material</b>	<b>Quantity (lbs)</b>
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<b>Total Monthly RECOVERY Heavenly (lbs?)</b>	0 Sand	0 salt
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<b>Total Monthly RECOVERY in CSLT (lbs?)</b>	0 Sand	0 salt
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**Submit Monthly to Supervisor.** Time period covered 8/1/2018 to 8/31/2018

**Ryan Smith**

**Employee Signature**

**Supervisor Signature**

**HEAVENLY SKI RESORT**  
**DEICERS and ABARSIVES APPLICATION and RECOVERY**

**Monthly Summary Report**

**(MONITORING AND REPORTING PROGRAM) BOARD ORDER NO. R6T-2015-0021**  
**WDID 6A090033000**  
**WASTE DISCHARGE REQUIREMENTS**

**Quantity of ice control agents and abrasives used on Heavenly property and on CSLT streets. When the Dischargers apply deicers and/or abrasives on parking lots, base facilities, private roads, or City of South Lake Tahoe roads to the California Base area, the Dischargers shall keep a daily log and report a monthly summary of the following to Frank Papandrea for Quarterly reporting to LRWQCB:**

**Month and Year:** Aug-18                      **Reporter:** Ryan Smith

**Location Name:** Heavenly California Base and City of South Lake Tahoe Roads  
Total Monthly Application: 0 lbs  
Total Monthly Recovery: 0 lbs

Location of Disposal Facilities: Carson Landfill (by Tahoe Refuse)

Ryan Smith  
Employee Signature



**HEAVENLY SKI RESORT  
CALIFORNIA PARKING LOT, LODGE and ROADS  
MONITORING CHECKLIST**

**(MONITORING AND REPORTING PROGRAM NO.R6T-2015-0021)**

Date: Aug-18 Inspector: Ryan Smith

Complete the following inspection at the **CA Parking Lot, CA Base Lodge, and associated roads, at least once monthly** and **after significant storm events**. Turn in Checklists to Supervisor for submittal to Frank Papandrea for input into Quarterly reports to LRWQCB.

Were any of the following Observed?

**a. Drop Inlets (CA parking Lot and Roads)**

- 1) Clogged by Debris, ice, or sediment?
- 2) Runoff movement into the infiltration gallery?
- 3) Damaged by vehicles or snow plow?

**b. Drainage Collection System (Ca Parking Lot, Roads)**

- 1) Clogged by debris, ic, or sediment?
- 2) Movement of water through pipes, cahnnels,
- 3) Drainage collection system damages?
- 4) Inadequate energy dissipation?

**c. Sediment Traps and Vaults (CA Prkng Lot & Roads)**

- 1) sediment accumulated in each chamber of trap vaults, or galleries? If Yes, estimate depth and
- 2) Traps and Vaults recently cleaned? List date of last cleaning
- 3) Presence of sheen, foam trash or scum?

**d. Erosion Control (CA parking Lot, Lodges, and Maintenance Shops)**

- 1) Vegetation appears unhealthy?
- 2) Gully or rill erosion on slopes?
- 3) Sediment buildup at toes of slopes?
- 4) Vegetation damages by vehicles or heavy foot

Yes	No	Comments
Describe Problems, Locations and Corrective Actions		
	X	
	X	
	X	
Describe Problems, Locations and Corrective Actions		
	X	
	X	
	X	
	X	
Describe Problem and Corrective Actions		
	X	18"
X		13-Aug
	X	
Please Note Locations and Corrective Actions		
	X	
	X	
	X	
	X	

**c. Culvert Outlet (west of Wildwood Ave)**

- 1) Inadequate energy dissipation
- 2) Trash or debris needs to be removed from

**d. Upstream Drainage Diversion (Located on First Ride Run)**

- 1) Inadequate energy dissipation
- 2) Trash or debris needs to be removed from drainage way?
  - t. Spilled Chemicals, Paints, Fuels, Sealants, Oils,
  - g. Sediment/Sand Buildup in CA parking Lot?
  - h. Grease Interceptor Not Operating Properly? (CA Base Lodge)

Please Note Locations and Corrective Actions		
	X	
	X	
Please Note Locations and Corrective Actions		
	X	
	X	
	X	
	X	Swept 7/16
	X	

Describe any problems / activities, dates and times of problems/activities and the personnel to which problems were reported:

See attached.

All vaults cleaned by Clean Harbors 8/13-8/20

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Documentation of resulting actions and dates problems corrected:

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**INSPECTION PURPOSE AND GOALS:**

The purpose of the inspection is to identify actual or potential erosion and surface runoff on the project site and to identify BMP maintenance needs so that corrective measures may be immediately undertaken.

Any erosion, surface runoff problems, wastewater disposal problems, or other adverse conditions, which are found on the subject property, shall be clearly described and the corrective measures proposed by the Dischargers (Heavenly) shall be included in the quarterly monitoring report. **In the event that no such problems are found on the property, a statement certifying this condition must be included for each monthly inspection.**

**PLEASE ADD ADDITIONAL INFORMATION IF NECESSARY AND ATTACH PHOTO DOCUMENTATION**





HEAVENLY SKI RESORT  
 SNOW CONDITIONING and SNOW  
 ENHANCEMENT  
 Water Year 2015

**(MONITORING AND  
 REPORTING  
 PROGRAM) BOARD  
 ORDER NO. R6T-2015-  
 0021  
 WDID 6A090033000  
 WASTE DISCHARGE  
 REQUIREMENTS**

If snow-conditioning or snowmaking enhancement chemicals or other additives are used on ski slopes (including tubing runs, half-pipes, jumps, other terrain parks, and ski race areas), a **daily log** of the following information shall be kept and reported to supervisors on a **weekly** basis and to the USDA Forest Service on a **monthly** basis for input into Quarterly reporting to LRWQCB:

LOCATION: <u>Heavenly Ski Resort</u>		California Main Lodge	
Department : <b>Base Operations</b>			Type of Materials Applied " <u>traction melt ci</u> "
Reporter: <u>Ryan Smith</u>			Approximate Acreage: 1 <u>ACRE</u>
Date	Pounds used	ACRES	
8/1/2018	0.00		0.00
8/2/2018	0.00		0.00
8/3/2018	0.00		0.00
8/4/2018	0.00		0.00
8/5/2018	0.00		0.00
8/6/2018	0.00		0.00
8/7/2018	0.00		0.00
8/8/2018	0.00		0.00
8/9/2018	0.00		0.00
8/10/2018	0.00		0.00
8/11/2018	0.00		0.00
8/12/2018	0.00		0.00
8/13/2018	0.00		0.00
8/14/2018	0.00		0.00
8/15/2018	0.00		0.00
8/16/2018	0.00		0.00
8/17/2018	0.00		0.00
8/18/2018	0.00		0.00
8/19/2018	0.00		0.00
8/20/2018	0.00		0.00
8/21/2018	0.00		0.00
8/22/2018	0.00		0.00
8/23/2018	0.00		0.00
8/24/2018	0.00		0.00
8/25/2018	0.00		0.00
8/26/2018	0.00		0.00
8/27/2018	0.00		0.00
8/28/2018	0.00		0.00
8/29/2018	0.00		0.00
8/30/2018	0.00		0.00
8/31/2018			
Total	0.00		0.00
Employee sign off, Ryan Smith			

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**HEAVENLY SKI RESORT**  
**DEICERS and ABARSIVES APPLICATION and RECOVERY**

**Monthly Summary Report**

**(MONITORING AND REPORTING PROGRAM) BOARD ORDER NO. R6T-2015-0021**  
**WDID 6A090033000**  
**WASTE DISCHARGE REQUIREMENTS**

**Quantity of ice control agents and abrasives used on Heavenly property and on CSLT streets. When the Dischargers apply deicers and/or abrasives on parking lots, base facilities, private roads, or City of South Lake Tahoe roads to the California Base area, the Dischargers shall keep a daily log and report a monthly summary of the following to Frank Papandrea for Quarterly reporting to LRWQCB:**

**Month and Year:** Sep-18                      **Reporter:** Ryan Smith

**Location Name:** Heavenly California Base and City of South Lake Tahoe Roads  
Total Monthly Application: 0 lbs  
Total Monthly Recovery: 0 lbs

Location of Disposal Facilities: Carson Landfill (by Tahoe Refuse)

Ryan Smith  
Employee Signature

**HEAVENLY SKI RESORT  
 DEICERS and ABRASIVES RECOVERY  
 (MONITORING AND REPORTING PROGRAM) BOARD ORDER NO. R6T-2015-0021  
 WDID 6A090033000  
 WASTE DISCHARGE REQUIREMENTS  
 DAILY LOG**

MONTH/YEAR: Sep-18

LOCATION NAME Heavenly Upper Lot (15 min, bus drop, tram)

For abrasives or ice control agents that Heavenly Ski Resort (discharger) **removed** from parking lots and roadways, Heavenly Personnel shall record the following in a daily log for weekly submittal to supervisors and monthly submittal to Frank Papandrea for input into Quarterly reporting to LRWQCB:

- |   |                          |
|---|--------------------------|
| <b>Location Codes:</b>                        | <b>Material Codes</b>    |
| H/UL – Cal Base Upper Lot                     | DG - Spec H Sand         |
| H/LL – Cal Base Lower Lot                     | NaCl - Salt              |
| H/W – Entrance Road (Wildwood above SS - Sand | Other – <b>Describe:</b> |
| C/WN CSLT – Wildwood – Needle Peak            | Road debris              |
| C/SR CSLT - Ski Run                           | loosened by              |
| C/K CSLT – Keller                             | snow removal             |
| C/S CSLT- Sherman Way                         |                          |
| C/R CSLT - Regina                             |                          |
| Other – <b>Describe:</b>                      |                          |

**Equipment/Method Used:** (first three loads from drainage improvement.  
 Mechanical Sweeper: Desert Commercial Sweeping

<b>Date</b>	<b>Type of Material</b>	<b>Quantity (lbs)</b>
-------------	-------------------------	-----------------------

<b>Total Monthly RECOVERY Heavenly (lbs?)</b>	0 Sand	0 salt
<b>Total Monthly RECOVERY in CSLT (lbs?)</b>	0 Sand	0 salt
<b>Submit Monthly to Supervisor.</b>	Time period covered	9/1/2018 to 9/30/2018

Ryan Smith  
 Employee Signature

Supervisor Signature



**HEAVENLY SKI RESORT  
CALIFORNIA PARKING LOT, LODGE and ROADS  
MONITORING CHECKLIST**

**(MONITORING AND REPORTING PROGRAM NO.R6T-2015-0021)**

Date:   Sep-18        Inspector:   Ryan Smith  

Complete the following inspection at the **CA Parking Lot, CA Base Lodge, and associated roads, at least once monthly** and **after significant storm events**. Turn in Checklists to Supervisor for submittal to Frank Papandrea for input into Quarterly reports to LRWQCB.

Were any of the following Observed?

**a. Drop Inlets (CA parking Lot and Roads)**

- 1) Clogged by Debris, ice, or sediment?
- 2) Runoff movement into the infiltration gallery?

- 3) Damaged by vehicles or snow plow?

**b. Drainage Collection System (Ca Parking Lot, Roads)**

- 1) Clogged by debris, ic, or sediment?
- 2) Movement of water through pipes, cahnnels,
- 3) Drainage collection system damages?
- 4) Inadequate energy dissipation?

**c. Sediment Traps and Vaults (CA Prkng Lot & Roads)**

- 1) sediment accumulated in each chamber of trap vaults, or galleries? If Yes, estimate depth and
- 2) Traps and Vaults recently cleaned? List date of last cleaning

- 3) Presence of sheen, foam trash or scum?

**d. Erosion Control (CA parking Lot, Lodges, and Maintenance Shops)**

- 1) Vegetation appears unhealthy?
- 2) Gully or rill erosion on slopes?
- 3) Sediment buildup at toes of slopes?
- 4) Vegetation damages by vehicles or heavy foot traffic?

Yes	No	Comments
Describe Problems, Locations and Corrective Actions		
	X	
	X	
X		Not by snowplow but by Clean Harbors. Will be repaired before season starts. Functioning properly, just can't drive over.
Describe Problems, Locations and Corrective Actions		
	X	
	X	
	X	
	X	
Describe Problem and Corrective Actions		
	X	
X		13-Aug
	X	
Please Note Locations and Corrective Actions		
	X	
	X	
	X	
	X	

**c. Culvert Outlet (west of Wildwood Ave)**

- 1) Inadequate energy dissipation
- 2) Trash or debris needs to be removed from

**d. Upstream Drainage Diversion (Located on First Ride Run)**

- 1) Inadequate energy dissipation
- 2) Trash or debris needs to be removed from drainage way?

**e. Spilled Chemicals, Paints, Fuels, Sealants, Oils,**

**f. Sediment/Sand Buildup in CA parking Lot?**

**g. Grease Interceptor Not Operating Properly? (CA Base Lodge)**

Please Note Locations and Corrective Actions		
	X	
	X	
Please Note Locations and Corrective Actions		
	X	
	X	
	X	
	X	Swept 7/16, and swept for striping 10/24
	X	

Describe any problems / activities, dates and times of problems/activities and the personnel to which problems were reported:

See attached.

Swept, sealed and striped Upper Lot and entrance road 9/24-9/28

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Documentation of resulting actions and dates problems corrected:

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**INSPECTION PURPOSE AND GOALS:**

The purpose of the inspection is to identify actual or potential erosion and surface runoff on the project site and to identify BMP maintenance needs so that corrective measures may be immediately undertaken.

Any erosion, surface runoff problems, wastewater disposal problems, or other adverse conditions, which are found on the subject property, shall be clearly described and the corrective measures proposed by the Dischargers (Heavenly) shall be included in the quarterly monitoring report. **In the event that no such problems are found on the property, a statement certifying this condition must be included for each monthly inspection.**

**PLEASE ADD ADDITIONAL INFORMATION IF NECESSARY AND ATTACH PHOTO DOCUMENTATION**





HEAVENLY SKI RESORT  
 SNOW CONDITIONING and SNOW  
 ENHANCEMENT  
 Water Year 2015

**(MONITORING AND  
 REPORTING  
 PROGRAM) BOARD  
 ORDER NO. R6T-2015-  
 0021  
 WDID 6A090033000  
 WASTE DISCHARGE  
 REQUIREMENTS**

If snow-conditioning or snowmaking enhancement chemicals or other additives are used on ski slopes (including tubing runs, half-pipes, jumps, other terrain parks, and ski race areas), a **daily log** of the following information shall be kept and reported to supervisors on a **weekly** basis and to the USDA Forest Service on a **monthly** basis for input into Quarterly reporting to LRWQCB:

LOCATION: <u>Heavenly Ski Resort</u>		California Main Lodge	
Department : <b>Base Operations</b>			Type of Materials Applied <u>“traction melt ci”</u>
Reporter: <u>Ryan Smith</u>			Approximate Acreage: <u>1 ACRE</u>
Date	Pounds used	ACRES	
9/1/2018	0.00		0.00
9/2/2018	0.00		0.00
9/3/2018	0.00		0.00
9/4/2018	0.00		0.00
9/5/2018	0.00		0.00
9/6/2018	0.00		0.00
9/7/2018	0.00		0.00
9/8/2018	0.00		0.00
9/9/2018	0.00		0.00
9/10/2018	0.00		0.00
9/11/2018	0.00		0.00
9/12/2018	0.00		0.00
9/13/2018	0.00		0.00
9/14/2018	0.00		0.00
9/15/2018	0.00		0.00
9/16/2018	0.00		0.00
9/17/2018	0.00		0.00
9/18/2018	0.00		0.00
9/19/2018	0.00		0.00
9/20/2018	0.00		0.00
9/21/2018	0.00		0.00
9/22/2018	0.00		0.00
9/23/2018	0.00		0.00
9/24/2018	0.00		0.00
9/25/2018	0.00		0.00
9/26/2018	0.00		0.00
9/27/2018	0.00		0.00
9/28/2018	0.00		0.00
9/29/2018	0.00		0.00
9/30/2018	0.00		0.00
Total	0.00		0.00
Employee sign off, Ryan Smith			

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# STATEMENT

2140 Ruth Avenue, South Lake Tahoe, CA 96150

Office Hours:  
8:00 a.m. - 5:00 p.m.  
Office Phone: (530) 541-4353

Statement Date	Account Number	Service Address		
04/01/2018	50400424	CALIF LODGE		
Current	31 - 60 Days	61 - 90 Days	Over 90 Days	Total Due
\$1,674.00	\$0.00	\$0.00	\$0.00	\$1,674.00

Post Date	Description	Charges	Credits
	Previous Balance	\$781.78	
	Payments & Credits	\$-781.78	01/31/2018
	New Activity	\$1,674.00	
	Total Due	\$1,674.00	
03/21/2018	Drop Box - 10Y - Special REFERENCE: 357604	\$418.50	
03/27/2018	Drop Box - 10Y - Special REFERENCE: 358107	\$418.50	
03/27/2018	CONCRETE/DIRT/ASPHALT (6.40 TONS) (12,800.00 LBS)	\$0.00	
03/27/2018	Drop Box - 10Y - Special REFERENCE: 358108	\$418.50	
03/30/2018	Drop Box - 10Y - Special REFERENCE: 358646	\$418.50	
03/30/2018	CONCRETE/DIRT/ASPHALT (9.74 TONS) (19,480.00 LBS)	\$0.00	
<b>Your Statement Number is: 1773980</b>			

**Messages:**

Email statements are available. Please update your account number and contact information including your email address. Please also visit our website for current information.

*Please detach and return bottom portion with your payment.*

Tahoe Basin Container Service  
2140 Ruth Avenue  
South Lake Tahoe, CA 96150

Account Number	Statement Date
50400424	04/01/2018
Due Date	Amount Due
04/25/2018	\$1,674.00

SERVICE ADDRESS: CALIF LODGE

**ADDRESSEE:**

Please check box if address is incorrect or information has changed and indicate change(s) on reverse side.

**REMIT TO:**

HEAVENLY VALLEY  
C/O ENGIE INSIGHT  
1313 N ATLANTIC ST STE  
5000  
SPOKANE, WA 99201-2330

Tahoe Basin Container Service  
2140 Ruth Avenue  
South Lake Tahoe, CA 96150



# STATEMENT

2140 Ruth Avenue, South Lake Tahoe, CA 96150

Office Hours:  
8:00 a.m. - 5:00 p.m.  
Office Phone: (530) 541-4353

Statement Date	Account Number	Service Address		
05/01/2018	50400424	CALIF LODGE		
Current	31 - 60 Days	61 - 90 Days	Over 90 Days	Total Due
\$455.00	\$0.00	\$0.00	\$0.00	\$455.00

Post Date	Description	Charges	Credits
	Previous Balance	\$1,674.00	
	Payments & Credits	\$-1,674.00	04/27/2018
	New Activity	\$455.00	
	Total Due	\$455.00	
04/03/2018	Drop Box - 10Y - Special REFERENCE: 358861	\$0.00	
04/03/2018	CONCRETE/DIRT/ASPHALT (12.27 TONS) (24,540.00 LBS)	\$0.00	
04/03/2018	Drop Box - 10Y - Special REFERENCE: 358863	\$0.00	
04/03/2018	CONCRETE/DIRT/ASPHALT (8.67 TONS) (17,340.00 LBS)	\$0.00	
04/20/2018	Drop Box - 10Y - Special REFERENCE: 360657	\$455.00	
04/30/2018	Drop Box - 10Y - Special REFERENCE: 361557	\$0.00	
04/30/2018	CONCRETE/DIRT/ASPHALT (6.94 TONS) (13,880.00 LBS)	\$0.00	
<b>Your Statement Number is: 1782481</b>			

**Messages:**

Email statements are available. Please update your account number and contact information including your email address. Please also visit our website for current information or contact us at [info@southtahoerefuse.com](mailto:info@southtahoerefuse.com).

*Please detach and return bottom portion with your payment.*

Tahoe Basin Container Service  
2140 Ruth Avenue  
South Lake Tahoe, CA 96150

Account Number	Statement Date
50400424	05/01/2018
Due Date	Amount Due
05/25/2018	\$455.00

SERVICE ADDRESS: CALIF LODGE

**ADDRESSEE:**

Please check box if address is incorrect or information has changed and indicate change(s) on reverse side.

**REMIT TO:**

HEAVENLY VALLEY  
C/O ENGIE INSIGHT  
1313 N ATLANTIC ST STE  
5000  
SPOKANE, WA 99201-2330

Tahoe Basin Container Service  
2140 Ruth Avenue  
South Lake Tahoe, CA 96150



January 15, 2019

Liz van Diepen  
Engineering Geologist  
Lahontan Regional Water Quality Control Board  
2501 Lake Tahoe Boulevard  
South Lake Tahoe, CA 96150

Re: Heavenly Mountain Resort 2018 Water Year Fourth Quarter Snow Conditioning and Snowmaking Enhancement Monitoring.

Dear Ms. van Diepen:

Pursuant to the Monitoring and Reporting Program Order R6T-2015-0021 Waste Discharge Requirements, Heavenly is required to submit monthly snow conditioning and snow enhancement monitoring logs. Instead of providing a number of zero reported usage forms for huck salt application on the mountain during the fourth quarter of Water Year 2018, this letter and the table below summarize the usage over the past three months (July, August, September 2018) at the following sites: Top of the Gondola Lift Station, World Cup Race Course, Terrain Park(s), and Adventure Peak/Tubing Hill. Three additional sites were added during the second quarter of water year 2017, due to increased snowfall and unsafe conditions at the following locations: Tamarack Lodge Deck, Tram Base Deck and the areas around the World Cup Foundation/Mt. Operations Building. The Environmental Monitoring Program Quarterly Report provides a water year to date summary of the amount of huck salt applied for the 2018 Water Year.

**Table 1-1 The Location and the Application Amount of Huck Salt**

Month/Year	Top of the Gondola (lbs.)	World Cup Race Course (lbs.)	Terrain Park (lbs.)	Adventure Peak – Tubing Area (lbs.)	Tamarack Lodge Deck (lbs.)	Tram Base Deck (lbs.)	World Cup Foundation Building (lbs.)
July 2018	0	0	0	0	0	0	0
August 2018	0	0	0	0	0	0	0
September 2018	0	0	0	0	0	0	0
Totals	0 lbs.	0 lbs.	0 lbs.	0 lbs.	0 lbs.	0 lbs.	0 lbs.

Should you require additional information or have any questions regarding this report and its contents, please contact Frank Papandrea at 775-586-2315.

Sincerely,

Frank Papandrea  
Heavenly Environmental Sustainability Manager

PO. Box 2180  
Stateline, NV 89449  
775/586-7000  
www.skiheavenly.com

**VAIL RESORTS**  
EXTRAORDINARY RESORTS  
EXCEPTIONAL EXPERIENCES



Heavenly Mountain Resort: Tahoe Transportation District Diesel Fuel Release (Estimated 10-15 gallons) from Contracted Skier Shuttle Transit Bus on 4/7/18

**April 7<sup>th</sup>, 2018:**

- 8:15am - Discovered that TTD Shuttle 3313 was leaking fuel up Ski Run Blvd, Needle Peak, Wildwood, and into the bus loop.
- 8:30am - Booms and absorbent mats put in place at storm drains on upper lot.
- 9:05am - Booms and absorbent mats placed on wildwood and entrance.
- 9:15am - TTD mechanic arrived.
- 9:45am. - TTD Spill kit arrived.
- 9:55am - TTD Spill Team left.
- 10:15am - TTD Fleet Manager arrived.
- 10:27 - Fire Department contacted by TTD Fleet Manager.
- 10:45 - Fire Department arrived
- 11:16 - Clean Harbors contacted by TTD Fleet Manager.
- 12:03 - Frank Papandrea contacts Curtis Kiesel with El Dorado County CUPA Via cell phone and reports spill, and he recommended contacting Mark Moss, and CA OES ASAP.
- 12:14 - Frank Papandrea contacts Mark Moss with El Dorado County CUPA Via Cell and leaves a voicemail for Mark about spill.
- 1415 - Clean Harbors arrived to Heavenly CA Base Area
- 1430 - Clean Harbors/Environmental Manager/Base Ops Manager discuss plan for Drop Inlets Boom and Pad Management over the phone.
- 1430-1630 - Clean Harbors begins mitigation work including inspection of DI's & Stormfilter systems. Existing booms in DI Boxes are replaced, and pads are deployed where needed. Bijou Park Creek headwaters are inspected, and 2" booms across the channel are replaced with 4" booms. No residual hydrocarbons are observed in creek.

Heavenly Mountain Resort: Tahoe Transportation District Diesel Fuel Release (Estimated 10-15 gallons) from Contracted Skier Shuttle Transit Bus on 4/7/18

- Clean Harbors determined amount of diesel Hydrocarbons found in the Drop Inlets was minimal, and no diesel left Heavenly Property. Clean Harbors walked Bijou Park Creek and found no traces of diesel fuel in the creek, down to Ski Run Blvd.
- 1505: Ryan hears back from TTD on affected bus that was filled with 25 gallons of diesel, once the bus was repaired. Bus traveled approx. 22 miles, burning 6 gallons of fuel in transit. Bus leaked a total of 19 gallons, and it is estimated that 10-15 gallons were released on Heavenly Property, mostly in the upper parking lot/bus turnaround area.
- 1512: Frank Papandrea contacts CA OES to report incident. CA OES indicates that: (The EL Dorado County Sheriff's office had already reported the spill of no more than 25 gallons at 11:09am today. Greg Almos reported the incident, and the control #18-22-80)

#### **April 8<sup>th</sup>, 2018:**

- 1638: Frank Papandrea receives call from Lahontan Water Board (Jeff Brooks) asking about the incident. Frank explained what occurred, and will share spill report with Lahontan once complete.

#### **April 10-26, 2018:**

- Clean Harbors sends report to Heavenly about incident response and report of clean-up actions and efforts
- Heavenly completing Spill Report for regulating agencies.
- Processing Clean Harbors Invoice, Hazardous Waste disposal coordination, and tracking
- Clean Harbors is scheduled to haul 4 drums of hazardous waste from Heavenly property from this incident during the week of 4/23/2018.
- Materials used by Heavenly for the TTD Bus Release on 4/7/2018:

From New Pig: Oil-Only Absorbent Mat Pads 1 cs. \$79.00 / Oil-Only Absorbent Boom 9 ea. \$294.00



Heavenly Mountain Resort: Tahoe Transportation District Diesel Fuel Release (Estimated 10-15 gallons) from Contracted Skier Shuttle Transit Bus on 4/7/18

**Diesel Sheen in Upper parking lot on 4/7/2018**



Heavenly Mountain Resort: Tahoe Transportation District Diesel Fuel Release (Estimated 10-15 gallons) from Contracted Skier Shuttle Transit Bus on 4/7/18

**Absorbant Booms deployed at storm drains Upper CML Parking Lot.**



To: Frank Papandrea

From Russell Wigart

Subject: Spec H Traction Sand

El Dorado County and Heavenly both utilize the same spec H aggregate used for traction control. In March 2018, El Dorado County staff took representative samples of traction control sand from the California Base Lodge Sand Storage Barn in South Lake Tahoe, CA to compare to the same material used in El Dorado County. The Spec H material is supplied by cinderlite and is intended to meet both the California DOT and El Dorado County traction sand specification. The County performed turbidity tests on the traction sand material and well as some settling tests using imhoff cones to understand the relative settling of Wet vs Dry material. The results of the sampled gradation were as follows.



**COUNTY OF EL DORADO**

COMMUNITY DEVELOPMENT SERVICES: DEPARTMENT OF TRANSPORTATION

**Aggregate Sample Gradation**

SAMPLE NO: <u>Heavenly Spec H RW</u>	CONTRACT NO: <u>99230</u>	MATERIAL: <u>Traction Abrasive</u>
PROJECT: <u>Lake Tahoe Basin NPDES</u>	DATE TESTED: <u>3/23/2018</u>	PLANT: <u>N/A</u>
DATE SAMPLED: <u>3/19/2018</u>	TESTED BY: <u>FO</u>	SAMPLED FROM: <u>N/A</u>
ROAD: _____	STATION: <u>N/A</u>	SAMPLED BY: <u>R. Wigart</u>

Sieve Size	mm	Wt. Retained	% Retained	% Passing	Spec. Limit Lower	Spec. Limit Upper	Sand Equivalent	
2"	50	0	0	100			Sand	Clay
1.5"	38	0	0	100				
1"	25	0	0	100				
3/4"	19	0	0	100				
1/2"	12.5	0	0	100			Average:	
3/8"	9.5	0	0	100			Spec.:	
#4	4.75	167	10	90				
Wash		485	% Passing (Fine Sample)	***			Fine Dur.:	
#8	2.36	236	51	46	40	80	Coarse Dur.:	
#16	1.18	361	26	23	15	70		
#30	0.6	424	13	12			Total Coarse:	167
#50	0.3	456	6	5	0	20	Total Fine:	1532
#100	0.15	472	3	3			Total Sample Weight:	1699
#200	0.075	478	1	0.9	0	3		

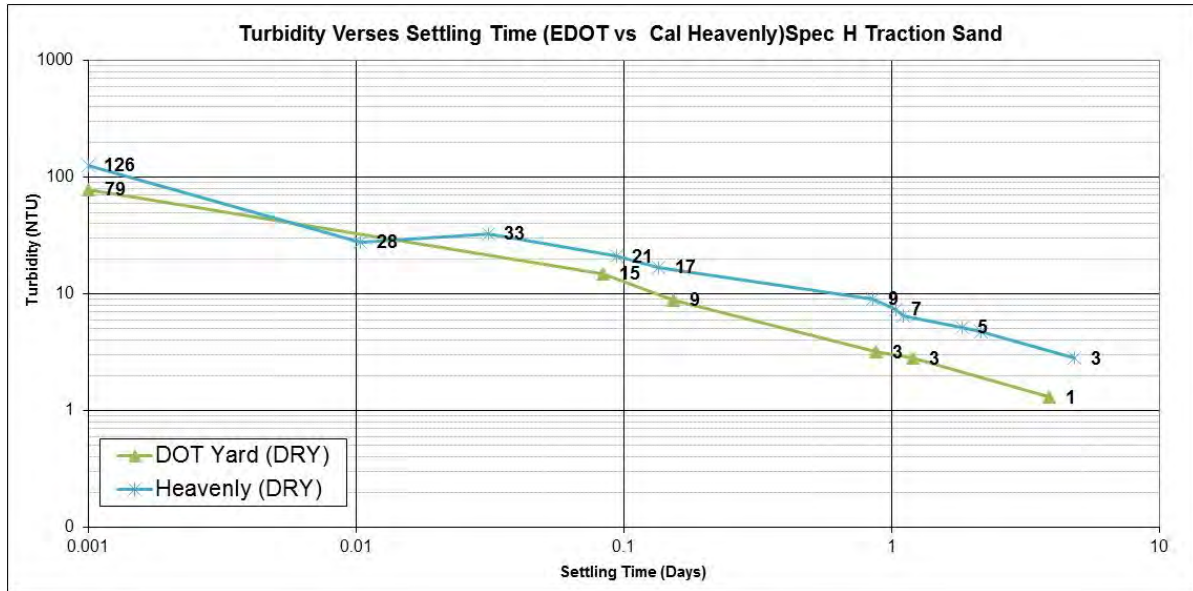
Comment: Material collected from Heavenly California Base Lodge Sand Storage Barn

**Results**

The moisture content of the material was 4.3% Meeting the spec H requirement of 5%. The Turbidity of the dry material using the developed County method was 109 NTU falling to 35 NTU within 45 minutes. This was very encouraging as the turbidity specification for spec H requires the material to be less than



150 NTU. Several other tests were then performed on the analysis of Wet vs Dry material. The results varied based on the moisture content of the analyzed material. As a comparison below are the results of Heavenly Sand compared to El Dorado County.



Date and Time	Elapsed Days	DOT Yard (DRY)	DOT Yard (WET)	Heavenly (DRY)	Heavenly (WET)
3/28/18 12:10 PM	0.001	115	279	126	372
3/28/18 12:25 PM	0.01	55	181	28	190
3/28/18 12:55 PM	0.03	42	146	33	165
3/28/18 2:25 PM	0.09	40	87	21	155
3/28/18 3:25 PM	0.14	25	94	17	147
3/29/18 8:30 AM	0.85	9	52	9	80
3/29/18 1:00 PM	1.03	8	45	7	73
3/29/18 2:40 PM	1.10	7	42	7	71
3/30/18 8:00 AM	1.83	5	33	5	57
3/30/18 3:45 PM	2.15	4	27	5	50
4/2/18 8:00 AM	4.83	3	12	3	28

### Discussion

The County along with its local partners will continue to refine this specification in the interest of the environment and public safety. To date the modification to this management practice has resulted in large fine sediment load reductions when compared to previously used traction control materials. Future research on this may include decomposed vs crushed granite aggregates as well as analysis of moisture content and resistance to pulverization. For now this material meets required specifications meeting both environmental as well as public safety requirements.

Heavenly Mountain Resort  
Water Year 2018

APPENDIX

E

2018 ROADS MONITORING



## Appendix E

# 2018 Roads Monitoring

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- E.1      March 2015 – Signed Road Agreement**
- E.2      2018 – Heavenly Road Maintenance Report**





# FOREST ROAD MAINTENANCE AND REPORTING AGREEMENT

BETWEEN THE

U.S. DEPARTMENT OF AGRICULTURE

FOREST SERVICE LAKE TAHOE BASIN MANAGEMENT UNIT

AND

HEAVENLY MOUNTAIN RESORT

Parties to Agreement: This agreement, made and entered into this the 23<sup>rd</sup> day of MARCH 2015, by and between the Forest Service, Pacific Southwest Region, Lake Tahoe Basin Management Unit, hereinafter referred to as the "U.S. Forest Service." and Heavenly Mountain Resort (HMR) hereinafter called the "cooperator."

Purpose of Agreement: The purpose of this agreement is to set forth the general terms and conditions, acceptable to the parties hereto, for the cooperative planning, survey, design, construction, reconstruction, improvement, and maintenance of the National Forest System Roads in Douglas County, NV, Alpine County, CA and Eldorado County, CA, pursuant to the regulations issued by the Secretary of Agriculture.

1. Intent to Cooperate. It is the intention of the parties under this agreement to cooperate as follows:
  - A. Agree that the road system to access Heavenly Mountain Resort is managed under special use permit to HMR.
  - B. Agree on the extent of HMR's responsibility to maintain and inspect the road system. Spur roads that dead end to service lifts and other resort facilities are HMR's responsibility. All roads are listed and shown in Schedule A.
  - C. Agree on the extent of the LTBMU's jurisdiction and the responsibility for inspection and coordination. The arterial road system consists of roads that join spurs and that connects to other roads. The arterial roads are the jurisdiction of the Forest Service. The arterial road system is generally maintained to a higher standard and receives more traffic than the local system and has more requirements for maintenance and inspection.
  - D. Provide for a formal meeting at the beginning of each spring/summer season (before June 1st) and ongoing informal consultation as needed on a regular basis to discuss and agree on the specific opening Scope of Work with respect to the road system.

- E. Provide for regular and adequate maintenance of the road system, including the assignment of maintenance responsibilities.
- F. Provide for defining Scope of Work beyond yearly opening and maintenance when improvements or changes to the road system have been identified.
2. Identification of Roads. The road system which meet the criteria set forth in item 1b is agreed upon and is marked "Schedule A" and attached as part of this agreement. Schedule A may be modified from time to time by agreement between the cooperator and Forest Service, by adding or removing roads or road segments, or by altering the description of a road or road segments, to give it proper identity. Each such modification shall be indicated by a revised Schedule A bearing the signatures of the parties or their authorized representatives and the effective date of the revision.
3. Maintenance Plans. At the annual meeting provided for in item 5, plans for maintaining the road system listed in Schedule A shall be agreed upon. In addition, such "plans" shall include assignment of responsibility for maintenance or particular elements of maintenance (such as tree clearing, tread repair, drainage cleaning, etc) to the cooperator or US Forest Service for the road system listed in Schedule A. To the extent practical, and subject to availability of funds, responsibility for maintenance shall be agreed upon between both parties.

Maintenance shall include preserving and keeping the road system, including structures and related facilities as nearly as possible in the conditions established by the Road Management Objectives and Forest Service standards to provide satisfactory and safe service recognizing the unique site conditions and other constraints

Project agreements may change the roads maintenance schedule while the project is implemented and it will revert back to the regular schedule when the project is done.

### **Road Standards**

Local standards are developed by a combination of Forest Service manual direction (FSM 7700), Road Management Objectives, and local knowledge of the road and site conditions (traffic type, traffic volume, soil type, slopes, precipitation, etc.). The following general standards are useful as guidelines when planning for new road establishment or rerouting of existing routes requiring high maintenance or that have unacceptable impacts to the surrounding forest ecology such as erosion and sedimentation that can be demonstrated to adversely affect water quality:

- Typical road grades of 7%
- Drainage spacing of 150'
- Aggregate or other surfacing for road sections exceeding 10%
- Maximum grades of 15% for 300'
- Minimize number of stream crossings
- Avoid alignments that parallel drainages within 300' of drainages

### **Annual Maintenance**

Roads require annual maintenance each year to protect both the road and the ecosystem. Annual maintenance activities include, berm removal, drainage maintenance, rolling dip maintenance, culvert cleaning, surface armoring, ditch cleaning, sign repair, dust control, etc (see Schedule B). Annual maintenance is required to be reported in the Forest Service Infra database each year before September 30 by the Forest Service. Heavenly will submit a list of roads and the maintenance activities performed on them that occurred by Sept 1 each year. Priorities for road maintenance will be established in an annual meeting between the Forest Service and HMR. Annual maintenance is covered under this Road Maintenance Agreement between the Forest Service and HMR.

### **New Construction and Reconstruction**

A project level agreement is required for new construction, re-route or reconstruction of road segments.

**Triggers and Mitigation** - The following triggers are identified which may require corrective actions to prevent or mitigate impacts:

- Sedimentation of surface waters exceeding forest thresholds.
- Observation of chronic erosional sources generated by road storm water runoff impacting forest ecosystem health.
- Existing roads not meeting standards that are identified as chronic erosion features.
- Roads that do not meet access needs for the resort.
- Roads located in areas of sensitive habitat that are identified as negatively impacting biological resources.
- Changes to existing road use.

### **Actions:**

- Additional monitoring to assess impacts.
- Development of proposals to address negative impacts and approval through annual meeting process and project or maintenance agreements.
- Road widening and additional pullouts to meet road service level needs.
- Installation of route marker identification at road intersections.
- Installation of informational or regulatory signage (i.e. speed limit for dust control, 4 wheel drive for surface protection, etc.) for resort personnel or public.
- Temporary or seasonal closures of roads.
- Identification of changes to maintenance frequency or actions to address impacts.
- Additional drainage structures.
- Increased maintenance frequency.
- Upsizing stream crossings (culverts or bridges).
- Other road Best Management Practices (National Best Management Practices for Water Quality Management on National Forest System Lands, USFS National BMP Handbook, 2012) .

- Upgrade of road maintenance level to meet changing service needs and/or to protect forest resources.
- Identification of reconstruction including reroutes to protect resources and reduce long term maintenance costs.

4. Project Agreements. When the Scope of Work for improvement or construction of the road system exceeds the annual "routine maintenance" of road opening, road maintenance tasks listed in Schedule B, and is to be financed in whole or in part from funds or resources provided by the party not having jurisdiction or responsibility, the parties shall enter into a project agreement providing for performing the improvement work and its financing. Project agreements shall be supplemental to this general agreement and subject to the provisions, and conditions herein contained.

- a. A project agreement shall be entered into prior to beginning of improvement or construction work for which a project agreement is required.
- b. The project agreement shall include the following elements:
  - (1) Identification of the road segment to be improved or constructed.
  - (2) Plans and specifications for the project or provision for their development and subsequent agreement thereon.
  - (3) Schedule of construction or improvement work and designation of the party or parties to perform the work.
  - (4) Estimates of cost of improvement or construction.
  - (5) Agreement as to how cost of work is to be borne including arrangements to share in the work or to deposit funds with the performing party for a share of the costs.

c. If funds are provided by the cooperator on an advance basis for work to be performed by the Forest Service, they shall be deposited in the Treasury of the United States to the credit of cooperative work, Forest Service. Any unused balance of cooperative funds for the purposes outlined in the project agreement shall be returned to the cooperator after completion of the work performed or upon agreement with the the Forest Service. If the cooperative funds are made available on a reimbursement basis as the work progresses or upon its completion, the Forest Service shall submit to the cooperator periodic billings, but not more often than monthly, or a final billing as the case may be. The amount of cooperative funds as set forth in the project agreement shall be the maximum commitment of the cooperator to the project unless changed by a modification of the project agreement.

- d. If funds are provided by the Forest Service for work to be performed by the cooperator the arrangements shall be set forth in the project agreement. Payments to the cooperator shall be made as provided for in the project agreement. If it appears that the project cost may exceed the estimate and additional funds may be needed, no obligation shall arise against the Federal government with respect to the increased cost except by modification of the project agreement prior to incurring any commitment.

5. Annual Meeting and Continuing Consultation. The cooperator and Forest Service shall meet at least once each year following the close of Winter operations to review matters covered by this agreement and to identify and agree on actions to implement this agreement including, but not limited to, (1) approval of changes in the listing of roads on schedule A; (2) finalization of the annual road opening Scope of Work and maintenance plan; (3) approval of project agreements for construction or reconstruction; and (4) approval of transfer of jurisdiction of particular roads by easement conveyance. It is also the intent of the parties to arrange for continuing consultation between their representatives with the objective of reaching prompt agreement by the parties on all matters of mutual concern which are covered by this agreement. The Forest Supervisor of the Lake Tahoe Basin Management Unit for the Forest Service, and the designated agent for the cooperator shall be responsible for making the arrangements for formal meetings and continuing consultation.

6. Modification and Termination

- a. This agreement may be modified by mutual consent.
- b. This agreement may be terminated by either party upon at least 60 days prior written notice, except that such termination shall in no way affect or change any commitment made authorizing the use of roads or rights-of-way for purposes for which Federal funds were expended, or any operation in progress at time of notice, and provided that such termination shall in no way affect the agreement of the parties hereto with respect to any obligations incurred under the agreement until a full settlement has been made.

7. Miscellaneous

- a. It is understood that any default by a permittee or other authorized road user creates no liability on the part of the Forest Service.
- b. Nothing herein contained shall be construed to obligate the Forest Service or the cooperator beyond the extent of available funds allocated or programed for this work, or contrary to applicable laws, rules, and regulations.

- c. No Member of, or Delegate to, the Congress, or Resident Commissioner, shall be admitted to any share or part of this agreement or to any benefits that may arise therefrom, unless it is made with a corporation for its general benefit.
- d. Where applicable, any contract, agreement, or understanding entered into pursuant to this agreement providing for work to be performed shall include the requirements of Federal laws, Executive orders, and Regulations.

This agreement shall be effective as of the date herein written and shall supersede all prior existing agreements, if any, for the same roads.

Heavenly Valley Limited Partnership, a  
Nevada limited partnership By  
VR Heavenly I, Inc.,  
Its General Partner

USDA FOREST SERVICE

---

PETER SONNTAG  
VICE PRESIDENT and COO



---

JEFF MARSOLAIS  
FOREST SUPERVISOR



## Schedule A - Road Inventory

### Roads at Heavenly

Route Number	Length - miles	Length - feet
12N40	5.32	28109.11
12N40.1	0.05	267.41
12N40.2A	0.05	243.62
12N40.2B	0.38	1999.53
12N40.3	0.06	301.37
12N40.3A	0.03	150.11
12N40.4	0.06	320.55
12N40.5	0.33	1747.98
12N40A	0.58	3062.30
12N40B	0.10	518.42
12N40C	0.45	2383.42
12N40D	0.46	2420.72
12N40E	0.18	943.43
12N40F	0.17	878.09
12N41	0.52	2769.53
12N41.1	0.79	4173.38
12N41A	0.13	691.72
12N41B	0.17	897.80
13N52	4.97	26243.68
13N52.10	0.09	459.27
13N52.11	0.08	418.58
13N52.2	0.09	465.93
13N52.6	0.50	2627.61
13N52.7	0.06	306.89
13N52.8	0.21	1128.64
13N52.8A	0.04	188.26
13N52.8B	0.06	294.39
13N52.9	0.33	1717.52
13N52A	0.06	324.14
13N52B	0.35	1842.44
13N52D	0.13	676.45
13N52F	0.26	1389.53
13N52H	0.62	3256.20
13N52I	0.14	765.57
13N53	2.12	11197.57
13N53.2	0.06	298.78

13N53.3	0.06	318.89
13N53.4	0.06	318.89
13N53.5	0.06	318.89
13N53.6	0.06	318.89
13N53.7	0.06	318.89
13N53.8	0.06	318.89
13N53.9	0.06	318.89
13N54	0.06	318.89
13N54.1	0.06	318.89
13N54.2	0.06	318.89
13N54.3	0.06	318.89
13N54.4	0.06	318.89
13N54.5	0.06	318.89
13N54.6	0.06	318.89
13N54.7	0.06	318.89
13N54.8	0.06	318.89
13N54.9	0.06	318.89
13N55	0.06	318.89
13N55.1	0.06	318.89
13N55.2	0.06	318.89
13N55.3	0.06	318.89
13N55.4	0.06	318.89
13N55.5	0.06	318.89
13N55.6	0.06	318.89
13N55.7	0.06	318.89
13N55.8	0.06	318.89
13N55.9	0.06	318.89
13N56	0.06	318.89
13N56.1	0.06	318.89
13N56.2	0.06	318.89
13N56.3	0.06	318.89
13N56.4	0.06	318.89
13N56.5	0.06	318.89
13N56.6	0.06	318.89
13N56.7	0.06	318.89
13N56.8	0.06	318.89
13N56.9	0.06	318.89
13N57	0.06	318.89
13N57.1	0.06	318.89
13N57.2	0.06	318.89
13N57.3	0.06	318.89
13N57.4	0.06	318.89
13N57.5	0.06	318.89
13N57.6	0.06	318.89
13N57.7	0.06	318.89
13N57.8	0.06	318.89
13N57.9	0.06	318.89
13N58	0.06	318.89
13N58.1	0.06	318.89
13N58.2	0.06	318.89
13N58.3	0.06	318.89
13N58.4	0.06	318.89
13N58.5	0.06	318.89
13N58.6	0.06	318.89
13N58.7	0.06	318.89
13N58.8	0.06	318.89
13N58.9	0.06	318.89
13N59	0.06	318.89
13N59.1	0.06	318.89
13N59.2	0.06	318.89
13N59.3	0.06	318.89
13N59.4	0.06	318.89
13N59.5	0.06	318.89
13N59.6	0.06	318.89
13N59.7	0.06	318.89
13N59.8	0.06	318.89
13N59.9	0.06	318.89
13N60	0.06	318.89
13N60.1	0.06	318.89
13N60.2	0.06	318.89
13N60.3	0.06	318.89
13N60.4	0.06	318.89
13N60.5	0.06	318.89
13N60.6	0.06	318.89
13N60.7	0.06	318.89
13N60.8	0.06	318.89
13N60.9	0.06	318.89
13N61	0.06	318.89
13N61.1	0.06	318.89
13N61.2	0.06	318.89
13N61.3	0.06	318.89
13N61.4	0.06	318.89
13N61.5	0.06	318.89
13N61.6	0.06	318.89
13N61.7	0.06	318.89
13N61.8	0.06	318.89
13N61.9	0.06	318.89
13N62	0.06	318.89
13N62.1	0.06	318.89
13N62.2	0.06	318.89
13N62.3	0.06	318.89
13N62.4	0.06	318.89
13N62.5	0.06	318.89
13N62.6	0.06	318.89
13N62.7	0.06	318.89
13N62.8	0.06	318.89
13N62.9	0.06	318.89
13N63	0.06	318.89
13N63.1	0.06	318.89
13N63.2	0.06	318.89
13N63.3	0.06	318.89
13N63.4	0.06	318.89
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13N82.		

13N53.2A	0.07	351.09
13N53.3	0.20	1032.82
13N53.5	0.15	805.93
13N53A	0.22	1152.87
13N53B	0.10	552.30
13N53C	0.31	1647.14
13N53D	0.71	3766.66
13N53D.1	0.06	331.46
13N53E	0.93	4897.03
13N53E.1	0.61	3227.51
13N53E.1A	0.10	531.17
13N54	1.86	9827.12
13N54.1	0.36	1889.03
13N54.1A	0.20	1033.38
13N54.1A1	0.04	230.67
13N54.2	0.36	1887.78
13N54.2A	0.17	889.60
13N54.3	0.10	502.76
13N54A	0.31	1627.85
13N55	0.32	1698.02
13N55.1	0.09	460.02

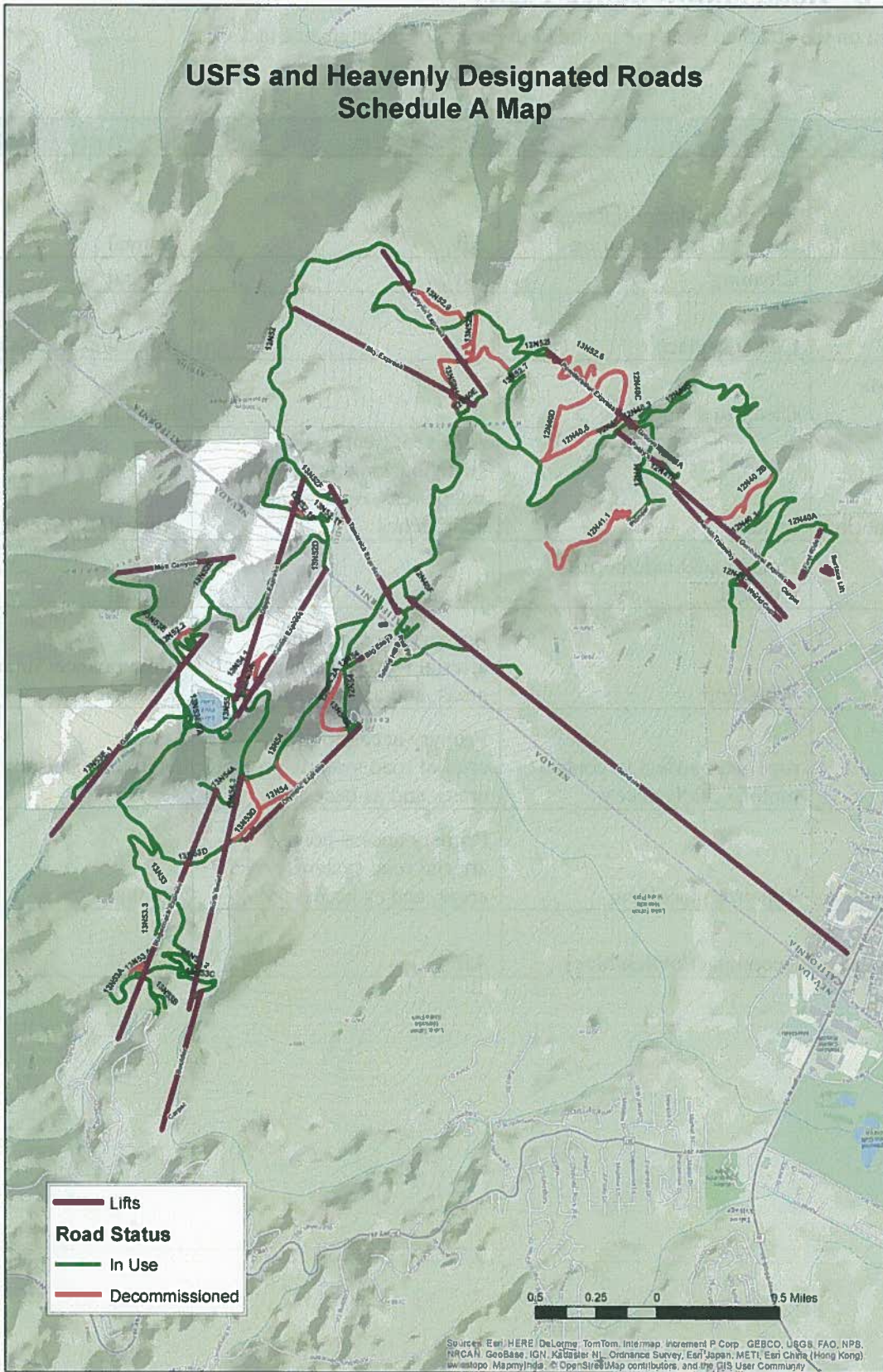
Roads of Heavenly

Schedule A - Road Inventory

Route Number	Length - miles	Length - feet
13N40	0.00	0.00
13N40.1	0.08	421.41
13N40.2A	0.05	247.82
13N40.2B	0.28	1399.83
13N40.3	0.00	0.00
13N40.3A	0.00	0.00
13N40.4	0.00	0.00
13N40.5	0.00	0.00
13N40.6	0.00	0.00
13N40.7	0.00	0.00
13N40.8	0.00	0.00
13N40.9	0.00	0.00
13N41	0.00	0.00
13N41.1	0.00	0.00
13N41.2	0.00	0.00
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13N41.4	0.00	0.00
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13N41.8	0.00	0.00
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13N42.2	0.00	0.00
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13N43.5	0.00	0.00
13N43.6	0.00	0.00
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13N43.9	0.00	0.00
13N44	0.00	0.00
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13N45.5	0.00	0.00
13N45.6	0.00	0.00
13N45.7	0.00	0.00
13N45.8	0.00	0.00
13N45.9	0.00	0.00



# USFS and Heavenly Designated Roads Schedule A Map



**Lifts**

**Road Status**

- In Use
- Decommissioned

0.5 0.25 0 0.5 Miles

Sources: Esri, HERE, DeLorme, TomTom, Intermap, InCREMENT P, Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri, Japan, METI, Esri, China (Hong Kong), Swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

## Schedule B - Road Maintenance Tasks

Roads shown on the attached table are included in the list of maintenance tasks.

Item	Task	Road System	Frequency
Road Opening	logout/brushing/limbing/rock removal - road clearing	All	Annual
Drainage Ditch	Cleaning	All	Annual
Culverts	Clean/Replace	All	Annual/as necessary
Rolling Grade Dips	Clean/Reshape/New	All	Annual/as necessary
Surface Armoring	Install	All - spot treat on switchbacks, drainages, steep areas, riparian area approaches	Annual/as necessary
Surface Maintenance	Grade/backblade/berm removal	All	Annual
Dust Control	Watering	Primary access points, arterial road system, project areas, and as necessary	Maintenance/Summer season
Vehicular controls	ropeline/barriers to control motor vehicle access	Primary access points, arterial road system, project areas, and as necessary	Maintenance/summer season
Sign Maintenance	Repair/replace/new	Primary access points, arterial road system, project areas, and as necessary	Annual
Road Narrowing	Decompact/mulch/block	All	Annual



## Schedule C – Yearly Maintenance Plan/Schedule

### ROAD MAINTENANCE

#### 1. Initial Spring Maintenance

The Spring maintenance and repair program begins as soon as road segments are accessible during the melting of snow pack.

- Drainage maintenance
- Culvert and rock line ditch clean out
- Road surface maintenance
- Rolling dip maintenance

Equipment: Backhoe, loader, grader, water truck, hand work

#### 2. Annual Maintenance

As part of Heavenly's annual maintenance plan select road segments are armoured with Road Base. These are maintained each year as part of ongoing maintenance and additional road sections are added.

- Increases the total mileage of armour road every year.
- Those sections close to water courses and steep climbs are first priority for armoring.

Equipment: Loader, Grader, Water Truck

#### 3. Dust Control

Dust control is done in three phases (see map)

- Daily – Am and Pm watering on main access roads and hiking trails.
- Weekly or as needed – secondary roads are on an “as needed” basis depending on traffic associated with projects or additional road maintenance on specific sections.
- Projects – any special projects (construction) that increases construction traffic are maintained daily during the project.

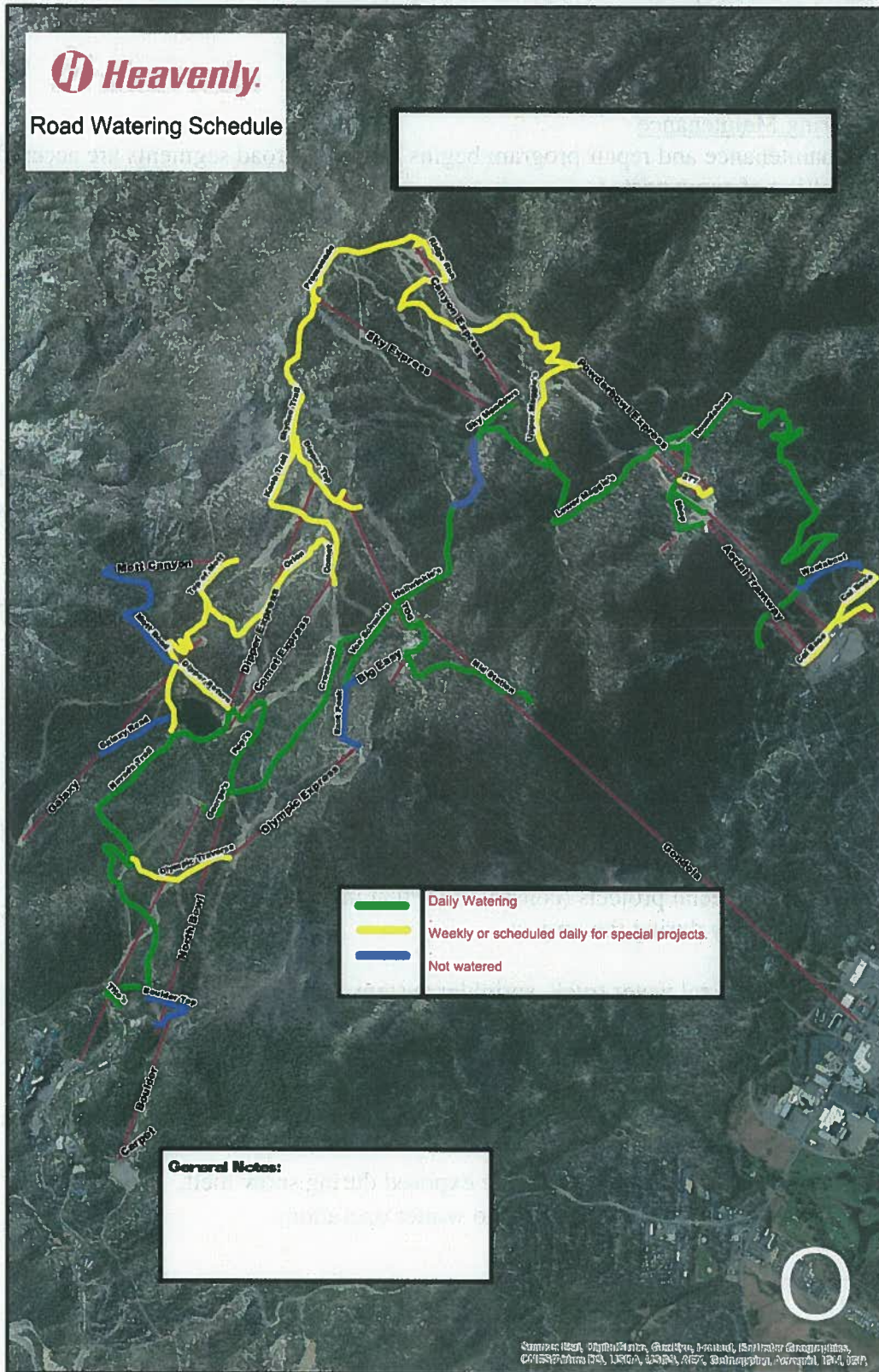
Equipment: 2000 gal water truck, sprinkler system, and fire hose for specific job sights. All water comes from the established snow making system.

#### 4. Road Corridor Identification

Portions of the road system are identified by posts and rope corridors to identify travel routes, pull outs, and parking areas.

- Staked and roped in spring as roads are exposed during snow melt.
- Removed at the end of summer, prior to winter operations.

# Map of Dust Control Schedule





## HEAVENLY 2018 ROAD MAINTENANCE TRACKING

**Table 1-1 2018 Heavenly Road Maintenance Tracking**

Forest Service Road #	Distance (Miles)	Description of Work
13N53B	0.1	Added road base and drain rock, improved / re-built waterbars on the section of road between the NV gate and Titos.
13N53.5	0.2	Added road base and drain rock, improved / re-built waterbars on the section of road along Titos.
13N53	0.4	Added road base and drain rock, improved / re-built waterbars on the section of road between the Chute to Midway Switchbacks.
13N53C	0.3	Regraded and added road base in wet areas, improved / re-built waterbars near the Stage switchbacks.
13N53	0.6	Regraded and added road base in wet areas on the section of road between Titos and the base of NB.
13N53	0.8	Conducted miscellaneous maintenance on the section of road between NV Trail Stage to East Peak.
13N54	0.5	Added road base and improved / re-built waterbars on the section of road between Pepis/Comet to the base EP and the top of East Peak.
13N54	0.2	Conducted miscellaneous maintenance on T7 Road.
13N54	0.9	Regraded and compacted the section of road between Steve's and Crossover.
13N53A	0.4	Regraded the section of road near Power Station Road and conducted roadside tree removal.
13N53E.1	1.2	Conducted a major road overhaul near Galaxy, including grading, compaction, and installation of 300 yards of road base.
12N41	0.6	Regraded, added road base, improved / rebuilt waterbars, conducted repair and maintenance on ditches between Groove Road and the Upper Shop.
12N41	0.9	Regraded and repaired and maintained BMPs on the section of road between Maggie's Creek to CDam.
12N40	0.3	Regraded and repaired and maintained BMPs on the section of road between CD to Sky Deck.
12N40	0.4	Repaired and maintained BMPs on Hellwinkle's steeps.
12N40	1.3	Regraded and applied material to cover utilities on the section of road between LCT to VS/TOG.
12N40.5	0.2	Regraded and compacted the section of road between TOG Tam to Coaster.
12N40	0.7	Regraded, added road base, and improved / re-built waterbars on Roundabout between Top WC and Pistol.
12N40	1.1	Regraded, added road base, and improved / re-built waterbars on Roundabout between Pistol and Cut.
12N40	0.5	Regraded, added road base, improved / re-built waterbars, and conducted repair and maintenance on ditches on Roundabout between Cut and Creek.

**Table 2-1 2018 Heavenly Road Maintenance Level Tracking**

Reporting Category	Maintenance Level (1-5) in miles*				
	ML-1	ML-2	ML-3	ML-4	ML-5
Roads Improved	0	0	0	2.2	0
Roads Maintained	0	0	0	9.4	0
Roads Decommissioned	0	0	0	0	0
<b>Totals</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>11.6</b>	<b>0</b>

\* Notes:

Roads Improved: Unless rerouted, changed the surface type, or opened a closed road.

Roads maintained: Drainage improvements, blading, ditch cleaning, culvert replacement, etc.

Roads decommissioned: Any road, managed or not, decommissioned.

ML-1 are roads closed or in long term storage until they are upgraded to ML-2 roads.

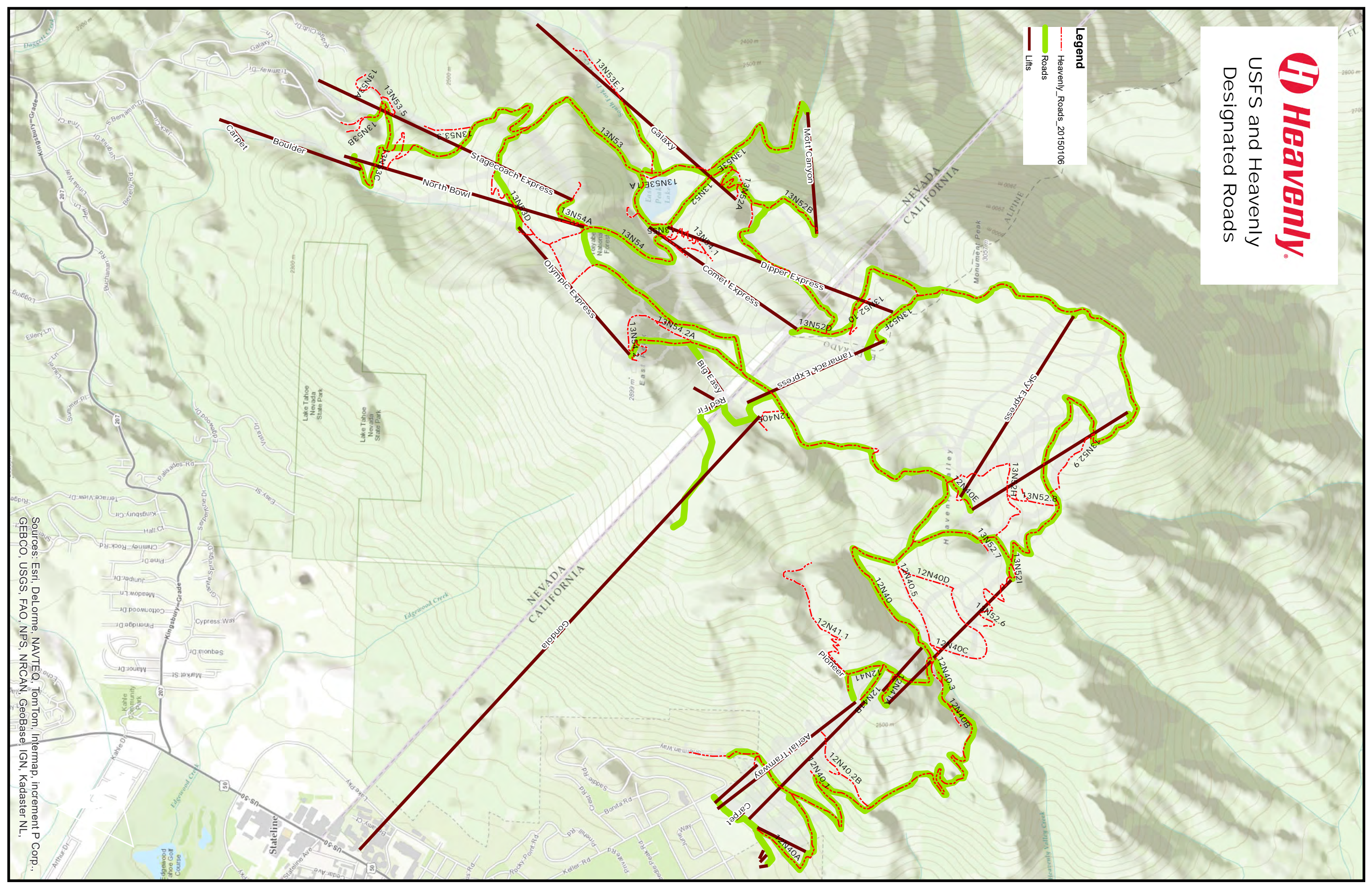




USFS and Heavenly  
Designated Roads

**Legend**

- Heavenly\_Roads\_20150106
- Roads
- Lifts



Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, Geobase, IGN, Kadaster NL.







Heavenly Mountain Resort  
Water Year 2018

APPENDIX

F

FACILITIES WATERSHED  
AWARENESS TRAINING



## Appendix F

# Facilities Watershed Awareness Training

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- F.1      June 2018 – BMP Breakfast Workshop Sign-In Sheets**
- F.2      June 2018 – BMP Breakfast Workshop Presentation**





June 28, 2018

Ms. Liz vanDiepen  
Engineering Geologist  
State of California Regional Water Control Board Lahontan Region  
2501 Lake Tahoe Blvd  
South Lake Tahoe, CA 96150

Dear Ms. vanDiepen:

HEAVENLY SKI RESORT UPDATED WASTE DISCHARGE REQUIREMENTS  
BOARD ORDER NO. R6T-2015-0021, WDID NO. 6A090033000  
VERIFICATION OF FACILITIES AND WATERSHED AWARENESS TRAINING

This letter verifies the 2018 Facilities and Watershed Awareness training which was held at Heavenly Mountain Resort on June 18, 2018. A copy of the agenda and attendance list is attached.

Thank you for attending the meeting and representing your organization. Please contact me at (775) 586-2313 if you have any further questions or comments.

Sincerely,

A handwritten signature in black ink that reads 'Andrew Strain'.

Andrew Strain  
Vice President of Planning & Governmental Affairs

Enclosures

cc: Stephanie Heller, USDA Forest Service Lake Tahoe Basin Management Unit  
Julie Roll, Tahoe Regional Planning Agency



## 6/18/18-BMP's/Facilities and Watershed Training

	<u>FIRST NAME -</u> <small>PLEASE PRINT CLEARLY</small>	<u>LAST NAME -</u> <small>PLEASE PRINT CLEARLY</small>	<u>Employee ID/Company</u>	<u>Contact- Cell or E-mail</u>
1	Jeff	Reid	129026	
2	Pat	Hoggen	171754	
3	W. RAYNE	AND VEA	128648	6965
4	Charley	Henneter	128600	2331
5	BRYAN	Hickman	142876	x6999
6	Marc	Bugg	128604	x6966
7	Janis	Brower	130289	Janis Brown
8	Derrick	Ley	229949	
9	Brett	Zidgar	148559	2330
10	ERIC	BATES	130290	6946
11	DAVID	Manser	235302	x4431
12	MARK	WAZZA	246931	8215
13	Ben	Grafton	249071	" "
14	Oliver	Cacay	219112	
15	Martina	Schambra	269471	
16	Steve	Kremer	129876	X6940
17	Glen	Reed	195512	
18	Kurt	HODGSON	141939	X4433
19	Ben	Shokti	278956	
20	Shawn	Buckman		Shawn.Buckman@cedba.com
21	Preston	COCHRAN	PERSONAL CONSULTANTS	presten@vc1-nv.com
22	Corey	Harburt	Clean Harbors	775-848-5725
23	Parker	Johnson	Cardno	530-588-9374
24	Jen	Mader	190176	530-263-0194
25	Liz	van Diepm	LRWQCB	





## 6/18/18-BMP's/Facilities and Watershed Training

	<b>FIRST NAME -</b> <small>PLEASE PRINT CLEARLY</small>	<b>LAST NAME -</b> <small>PLEASE PRINT CLEARLY</small>	<u>Employee ID/Company</u>	<u>Contact- Cell or E-mail</u>
1	André Villaret	Villaret	126595	
2	Phil	Doman	175256	
3	Dustin	Vineyard	148342	
4	MIKE	FORSTEE		
5	Charlie	Pitcock	202726	
6	KEVIN	HIGGINS	128598	
7	Luke	Watejka	Doppelmayr USA	970-389-7483
8	David	Vincent	175456	
9	JEFF	ELLSWORTH	DYER Corp.	
10	Lupic	Barricatos	Mitacops	775-588-1810
11	Jeff	Carls	NVLM/31753	
12	KEA	M'NOON	120254	
13	John	Fongetti	193625	M.OPS
14	Frank	Duarte	203837	
15	Gordon	Vizenor	212516	
16	<del>MAKISS</del> HEIDI	MARINEAU	212519	5307213129
17	Paul	Erdmann	214619	
18	Kevin	Cleland	192049	
19	RS	M. Schen	208281	626533-0962
20	Hunter	Mari		775-225-9913
21				
22				
23				
24				
25				



## 6/18/18-BMP's/Facilities and Watershed Training

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2	PAUL	GULBRU	TAHOE AMATEUR RADIO ASSN	530-957-7599
3	Vickor	Gubierre 2	156012	530-307-3766
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5	Travis	Mcloy	203391	
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10	BERT	BLEDSE	282071	organicbert@gmail.com
11	Kory	Martin	209382	775-450-3423
12	Stefan	Glander	Dyer Corp	530-448-1865
13	Byron	Steele	181239	824-703-8139
14	BRAD	Leight	130222	VEHICLES 6944
15	DAN	Schembri	179885	IS.M 4430
16	Chris	Cadmus	245498	B.M.
17	VINCO	ARTAU	189035	BASO OPS
18				
19				
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## 6/18/18-BMP's/Facilities and Watershed Training

	FIRST NAME - PLEASE PRINT CLEARLY	LAST NAME - PLEASE PRINT CLEARLY	Employee ID/Company	Contact- Cell or E-mail
1	Toni	Powell	NV Energy	775-834-7585
2	Jim	Clancy	<del>Heavenly</del> 139288	805-550-2844
3	Kelli	Renzi	128597	EXT 6970
4	Tiffany	Greenson	doppelmayr	775-220-8064
5	Chanel	Walker	HN 194842	530-542-5178
6	GREG	FREDRICKSON	NVLM	GFREDRICKSON@VAILRESORTS.COM
7	Colton I	TEERY	129624	CTTEERY@VAIL
8	Aric	Smiley	284166	530 721 3302
9	David	Hager	200421	dhager@vailresorts.com
10	Gregory	Grimalds	243946	530 721-5242
11	TYLER	LEHMAN	166415	Tlehman@vailresorts.com
12	John	Tarmey	152041	Tarmeyjp@gmail.com
13	Jake	Burt	237455	jburt12@vailresorts.com
14	Kristin	Roaldson	RCI	kristin@rci-nv.com
15	Matthew	Cabrera	NVLM	949-370-5774
16	Amy	Hurford	F&B	ahurford@vailresorts.com
17	Eric	Cambria	FSWHSF	530-318-8151
18	Chris	Hansa	148370	x6955
19				
20				
21				
22				
23				
24				
25				



## 6/18/18-BMP's/Facilities and Watershed Training

	<b>FIRST NAME -</b> <small>PLEASE PRINT CLEARLY</small>	<b>LAST NAME -</b> <small>PLEASE PRINT CLEARLY</small>	<u>Employee ID/Company</u>	<u>Contact- Cell or E-mail</u>
1	KENENT	VALDES	135335	
2	Kyle	Nelson	257694	
3	Matt	Hummel	148726	
4	Hunt	Healy	LA Perks	775-358-4407
5	CURTIS	Kezich	128566	775-450-2298
6	TROY	Beagle	128569	530-548-8688
7	HUNT	wildron	_____	_____
8	James	wilson	20/290	_____
9	Jan	Clark	175145	
10	Ryan	Albertson	161603	
11	David	Bammer	273849	775-901-3234
12	Steve	Mesvick	128573	6958
13	ERIC	William	194938	
14	Kory	Fitzgerald	226497	
15	Jake	Azevedo		775-409-0240
16	Bill	BROWN	235234	530559-9999
17				
18				
19				
20				
21				
22				
23				
24				
25				





# 2018 BMP's, Facilities & Watershed Awareness Training

June 18th, 2018 7am-8am



# Purpose/Agenda

- Review Heavenly's Watershed Protection Commitment, BMP's & Your Role
- Review the Summer Rules of the Road
- Meet Our Agency Partners
- Provide Contractor Awareness
- What to do when weather is expected





# Our Commitment

- USDA Forest Service: Our partner in outdoor recreation & resource management
- Tahoe Regional Planning Agency: The Master Plan, Mitigation & Monitoring, Project Permit Conditions
- State of California Regional Water Quality Control Board, Lahontan Region: Waste Discharge Requirements (WDRs)
- Ourselves: – Do Right and Do Good



## Agency Partners

- TRPA-Taylor Currier (BMP's) and Julie Roll (Associate Planner)
- Lahontan- Liz vanDiepen (Engineering Geologist)
- Consultant- Kristen Roaldson & Jake Azevedo (BMP's 3<sup>rd</sup> Party Inspector, w/ RCI)
- LTBMU – Stephanie Heller, Hydrologist US Forest Service





# Major Erosion Control & BMP Project Locations

## • Sky Meadows Erosion Hotspots

- Hellwinkel's Road Maintenance, Galaxy Road Improvements— more frequent watering with new watering truck

## • Adventure Peak/Summer Activities

Coaster Re-Build, Soil stabilization on existing paths and trails at TOG. "Stalok"

## • Water Bars/Stabilization & Drainage Improvements

- Maintain effectiveness of ski run BMP's, including maintaining water bars and re-vegetation/cover. Dig out Maggie's Drop Pits of excess sediment. New Culvert at bottom of Groove Chair.





# Hellwinkel's - Low & Slow!







# Handgrenade Restoration 2017-







## More BMP and Maintenance Projects:

- Galaxy Road Improvements: Re-Route and improve existing summer maintenance road to the bottom of Lift terminal. Surface Treatment, and possible Drainage improvement's.
- Mechanically remove sediment build-up at Maggie's Rock Lined ditches and pits.
- Bottom of Ridge Bowl stabilization and restoration





## Maggie's Pits Vacuumed out in October 2014

After picture highlights the improvement in sediment capacity







# Wattles

Straw wattle with silt fence

Pine Needle Wattle







Implemented and effective?







Implemented and effective?







- BMP's Pics from On Mountain







# CML Storm Filters

107 filters replaced in Fall  
2017

Full cartridge replacement of  
all 456 filter since installation  
in 2008, completed in 2014







# CML Storm Filters continued

~15+ cubic yards of spend filter media and sediment removed in October 2017

Sacrificial filters being replaced annually with 14 new phosphorus filter media, which is showing some positive improvements in WQ, year 4 of use. Met all WQ standards on November 15<sup>th</sup> 2017 Storm!







# Tahoe Draba

Interpretive Signage at Top of  
Tamarack Express

Photo of a plant from Heavenly







# Protect Tahoe Draba Populations

Full grown plants

Draba like to grow in disturbed areas, under drip lines of rocks







Invasive Weeds are known to exist on top of Heavenly Mountain. Siting and treatments by the USFS have occurred the last few summers. Top of Tamarack Lift

**Tall Whitetop Identification:** Tall whitetop (also called perennial pepperweed) has many stems. It reproduces from rhizomes (root-like under-ground stems) and from seed. In Truckee, this species is common in many of the round-abouts, as well as, low, wet areas.



**Tall Whitetop** showing root connection



**Tall Whitetop** in flower

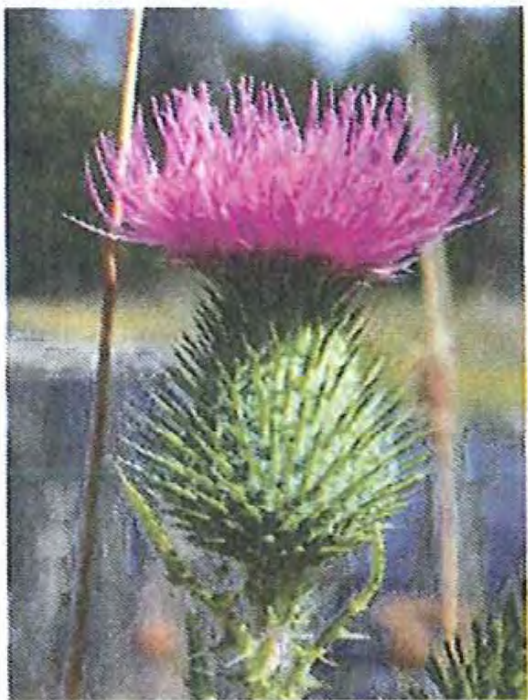




**Bull Thistle**



**Canada Thistle**



**Bull Thistle flower**



**Canada Thistle** flowers are smaller than most other thistle flowers





# Pine Needle Wattles

Manufacturing by trails crew began in 2013! Now in Year 6!

On mountain use for erosion control, in 2017 over 800 Ft built







## Important takeaways for you to ponder, with regard to BMP's:

- Is it working? (rather than “are we in trouble?”)
- Source control – we’re trying to stop the “bleeding” at the source rather than chasing it downstream.
- Water flow – its all connected, “Think like a water droplet.” Look uphill of problem areas to determine if there is a root cause of the erosion issue...
- Prioritization – address the highest risk spot first (e/g/ nearest to creek, most erosive, problem spots, etc)



Keep Your Eyes Open During & Immediately After Rain and Thunderstorms (Listen to specific instructions from Dispatch on Radio, that might impacts operations, work sites, etc.)  
These Are the “Events” That Can Cause Environmental Damage  
If You See Damage Occurring Call Dispatch on the Radio  
Immediately  
This includes the Base Areas, particularly Cal Base.







# Summer Rules of the Road

- Drive on the Designated Roads only
- Park only within Roped Designated Parking Areas
- If you feel that you can't do your job because of this, tell your supervisor FIRST before driving into any closed areas
- If you see someone not complying, tell them about it – "IT IS UP TO US"
- Just because you drive an ATV/Rhino does not mean you can drive, onto a ski slope or onto a decommissioned road or Ski Trail. This will create disturbance and cause erosion.
- When accessing the mountain all vehicles MUST be in 4WD to prevent erosion on the roads, and stay at or below 20 mph. Be especially aware of Fugitive Dust



# More Summer Rules of the Road

- Stay out of erosion control projects & stream zone restoration sites.
- Report anything that looks like an obvious erosion, Water Quality issue, or sediment problem to your supervisor.
- All outside contractors and vendors must have a Mountain Access Permit issued by the Central Dispatch Dept., except utilities.
- Prior to accessing the mountain roads anyone from outside of the Tahoe Basin will need to spray the bottom of their vehicle to prevent the spread of invasive weeds.
- If you don't see a mountain access permit, stop them & ask to see their permit. Even if you see Utility trucks Like SW Gas or Liberty, ask them if they need any guidance or direction.





# Steve's Road - Von Schmitt's

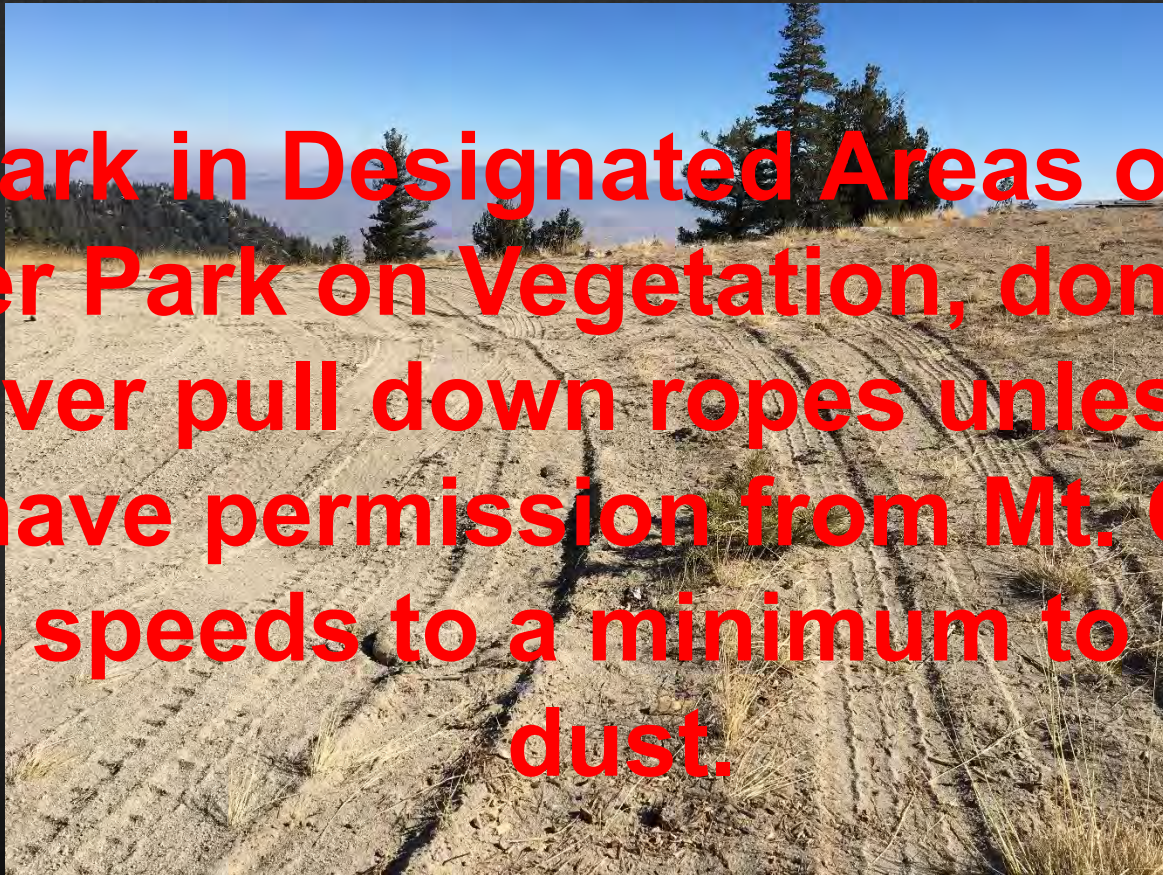






## Summer Rules of the Road

- **Park in Designated Areas only**
- **Never Park on Vegetation, don't Idle!**
- **Never pull down ropes unless you have permission from Mt. Ops.**
- **Keep speeds to a minimum to reduce dust.**







# Water Quality Program

- Best Practice initiative that is company wide
- Implemented now at all Major Vail Resorts. Ongoing here for many years.
- Sharepoint, Arc GIS Collector App.
- CA Resorts do a great job of managing storm water and implementing BMP's
- CO is using CA as a template to initiate their ongoing program
- Rain Shut Down Process, Be mindful of the weather, especially with grading projects.



## Rain Shut Down Process Information:

- Weather Forecast and Construction Activity Guidelines
- The weather forecast should be checked daily on the NOAA forecast:
- [www.noaa.gov](http://www.noaa.gov) (South Lake Tahoe, CA)
- Days with 10% - 49% Chance of Rain or a Chance of Thunderstorms – Tier 1, Be prepared to Shut-Down active construction sites w/in 1 Hour
- Days with 50% or More Chance of Rain – Tier 2, Be prepared to Shut-Down Site immediately.





# Construction Rain Shut Down Process

- Know the Weather Forecast
- Listen closely to the radio
- Grading Operations and Exposed Soils—Pay attention to your work sites. Button up sites at end of each shift
- Stockpile BMP's supplies-KGID, Stagecoach, Boulder
- Vehicle Access-open and closed roads
- BMP Inspections – Pre & Post Storm—Take Pictures!



## Resort Excavation Authorization

Any projects that disturb the ground in any form and utilize equipment for the process are required to submit this form to James Grant for approval prior to construction.

Project Name:	Date:
Project Manager:	Project Location:
Approx. Area of Disturbance (sq. ft.):	Approx. Quantity of Excavation (cu. ft.):
Project Start and Completion Date:	Utilities Located (Y/N):
Sensitive Resources onsite (Stream, Wetlands):	Tree Removal (Y/N):

**Construction Plan:** Schedule, Staging, Site Access, Construction Plan, BMPs, Restoration/Revegetation

**Required Steps:**

1. Mark out the excavation area with white paint or flagging.
2. Inform the following departments to inspect and approve buried infrastructure and clearance for proximity to property:
 

• Lift Maintenance/Electrical	Lift Maintenance Director	_____
• Snowmaking	Snowmaking Manager	_____
• Information Technology	IT Manager	_____
• Building Maintenance	Building Maint Manager	_____
• USA DIGS to mark the area to excavate 1-800-227-2600		_____
• Snow Surfaces/Trails/BMP's	Sr. Manager of Snow Surfaces	_____
• Environmental	Environmental Manager	_____
3. Proceed only when all signoffs have been completed. Electronic approval is acceptable and preferred. Attach electronic signatures/approval to completed form. Return completed form to Bryan Hickman.
4. If the scope or area of excavation enlarges or changes, repeat steps above.

**Third Party Excavations :**

- Heavenly staff member must oversee the excavation.
- Must complete all steps above.
- Third party to communicate daily on their excavation plan by e-mail.

**Approval signature below must be obtained before starting work:**

James Grant: \_\_\_\_\_ Date: \_\_\_\_\_

Construction Plan Revision Approval Date (as applicable): \_\_\_\_\_







## USFS Wildlife Trash Management and Education Program:

- As a condition of the approved EIS for the Epic Discovery Program a wildlife trash management and education plan will be implemented annually and reviewed by Heavenly and the US Forest Service LTBMU. The Heavenly Mountain Resort Master Redevelopment Plan (2015) includes a number of Operations and Maintenance Measures as part of the Mitigation and Monitoring Plan. 7.5-21 BIO 8: Wildlife Trash Management and Education Program.
- A number of the activities at Heavenly Mountain Resort are located at the Top of The Gondola region and are known as Adventure Peak. As part of the Epic Discovery Project implementation the resort shall create and implement a trash management and education program. The goal of this program is for timely removal of refuse from deposit points, education of our guests and staff about proper waste management, and to keep any interactions between humans and wildlife to a minimum.
- Deposit points where animal proof receptacles are now implemented.



# Heavenly Hot Work Permit

Required for any hot work outside of a designated weld shop.

Know the PAL code for the day.

Issued by James Grant, Bryan Hickman, & Curtis Kezich.

Must be posted on site.

**VAIL RESORTS**  
HEALTH & SAFETY  
**HOT WORK PERMIT**

THIS PERMIT IS REQUIRED TO BE POSTED AND VISIBLE IN ANY UNDESIGNATED HOT WORK AREA BEING USED FOR WELDING AND CUTTING OPERATIONS

LOCATION: \_\_\_\_\_

DATE OF ISSUE: \_\_\_\_\_

TIME OF ISSUE: \_\_\_\_\_

TYPE OF WORK

Welding, Cutting, Grinding

Other Heat, Flame, Spark Producing Tool(s)

Other \_\_\_\_\_

**GENERAL PRECAUTIONS**

Is site free of combustible and/or flammable materials?  
35 foot clear zone - floor, walls, work materials, radiant/ conductive heat transfer?

Are surrounding combustible materials properly shielded/guarded?  
Flame-proof covers where needed? Non-combustible screens in shared spaces?

Is mechanical ventilation required?  
Space less than 10,000 cubic feet - Room with ceiling height less than 16' - Cross-ventilation obstructed

Could atmosphere be flammable/explosive?  
If "YES" atmosphere must be tested.

Fire-fighting equipment inspected and ready for use?  
Extinguishers on-site? Charged? Proper type?

Means of contacting fire department in an emergency?

Is proper PPE available and in use?  
Gloves, Leathers, Shields, Eye Protection, Respiratory protection, etc.

\*If any shaded boxes are checked, action must be taken prior to beginning work

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**FIRE WATCH**

A TRAINED FIRE WATCH MUST BE EMPLOYED IF OPERATIONS OCCUR WITHIN 35' OF COMBUSTIBLE MATERIAL

**FIRE WATCH REQUIREMENTS:**  
Fire suppression equipment on site  
Current (annual) training with suppression equipment  
Current (annual) training in emergency procedures  
Remain on site for 1/2 hour after operations conclude

Is a trained fire watch in position?

**CONFINED SPACE?**

If "yes", this is a Permit-Required Confined Space Entry  
**Hot Work Permit must be displayed with Confined Space Entry Permit!**

**Precautions for Hot Work in Permit-Required Confined Spaces**

Mandatory Forced-Air Ventilation

Continuous Air-Quality Monitoring  OR

Historical Monitoring Data can be provided  
(data must have been collected during similar Hot Work activities)

Gas Cylinders outside of Space & secured

Cylinders OFF & hoses CLEARED during breaks

The area of operations has been examined and all appropriate precautions have been taken.

Work authorized by: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_ Time: \_\_\_\_\_

This permit is valid for a single shift up to a 12-hour duration

Sep-10





# Absolutely NO SMOKING

- Due to EXTREME wild fire danger, smoking is prohibited anywhere on the mountain at any time.
- This includes NO Smoking at any time in any company or 3<sup>rd</sup> Party vehicles.



# Wildland Fire Awareness







# Questions, Comments?





Heavenly Mountain Resort  
Water Year 2018

APPENDIX

G

ON-MOUNTAIN MONITORING  
(4<sup>TH</sup> QUARTER)





## Appendix G

### On-Mountain Monitoring (4th Quarter)

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**G.1 2018 Fourth Quarter Erosion Control and Facilities Monitoring  
Inspection Log**

**G.2 2018 Fourth Quarter Erosion and Facilities Monitoring Photographs**



**Heavenly Mountain Resort**  
**Erosion Control and Facilities Maintenance Monitoring**  
**Inspection Log, by:**  
**Frank G. Papandrea**

Quarter Fourth Year 2018

Location*	Date Inspected	Inspector's Name	Notes/Observations/ Any Problems Identified	Corrective Measures Taken	Schedule for Completion of Corrective Measures
a	9-25-18	Frank P.	Handgrenade Corner on Roundabout restoration looks great	Sprinkler use greatly reduced on the Mountain due to changed management practice, and water reduction practices. Only irrigating the grassy field in front of Tamarack Lodge & Handgrenade Corner and a few other key areas. No significant moisture in May or June to note.	
b	9-25-18	Frank P.	All 12", 24", and 36" culverts inspected clear and free of any obstructions.	None	

Location*	Date Inspected	Inspector's Name	Notes/Observations/ Any Problems Identified	Corrective Measures Taken	Schedule for Completion of Corrective Measures
c.	9-25-18	Frank P.	Designated roadways are being used by employee vehicles and 3 <sup>rd</sup> party vendors.	Roads maintenance with Trails Crew ongoing, tracked, and shared with USFS. 11.6+ Miles improved/ maintained in 2018.	
d.	9-25-18	Frank P.	Rope closures in place. Irrigation equipment in use at TOG (Tamarack), and Hand grenade at RB.	N/A	
e.	9-25-18	Frank P.	Energy dissipater condition acceptable. Numerous Maggie's Pits maintained and cleaned out 7/2018, and maintenance completed after storm events.	N/A	

Location*	Date Inspected	Inspector's Name	Notes/Observations/ Any Problems Identified	Corrective Measures Taken	Schedule for Completion of Corrective Measures
f	9-25-18	Frank P.	Sediment Basins have adequate capacity in most areas.	N/A	
g.	9-25-18	Frank P.	Rock Lined channels are in decent shape. Rock Lined ditch at Groove chair in need of Maintenance or a different BMP Installation to be determined in the field	N/A	
h	9-25-18	Frank P.	Rip Rap at various locations on the mountain in great shape. No failures to speak of.	N/A	

Location*	Date Inspected	Inspector's Name	Notes/Observations/ Any Problems Identified	Corrective Measures Taken	Schedule for Completion of Corrective Measures
i.	9-25-18	Frank P.	No water bar failures observed on the CA side of the mountain. NV Side appears stable.	N/A	Next month or two
j.	9-25-18	Frank P	All Infrastructure lines on the mountain performing properly. Sewer line camera being utilized by Building Maintenance Department to observe current condition of sewer lines and culverts when needed	N/A	



k.	9-25-18	Frank P.	Stockpiles of soils or road base materials observed on the mountain have proper BMP's.	N/A	
l.	9-25-18	Frank P.	Infiltration trenches functioning properly	N/A	
m.	9-25-18	Frank P.	Gullies and rills on slopes and roadways not an issue at this time. After any major rain events our Trails Maintenance Crew address any problems right away, especially on the roads and drainage features.	N/A	
n.	9-25-18	Frank P.	Storm vaults filter replacements with Pacific Stormwater solutions scheduled for September, 2018	Scheduled 3 <sup>rd</sup> party to conduct routine maintenance at the Drop Inlets in CML and Boulder in August with Clean Harbors and the storm vaults filter replacement. Over 140 Filters at Contech Filter Stytems replace in September 2018.	Fall 2018 maintenance scheduled and completed with 3 <sup>rd</sup> party vendors.

A. Re-vegetated Areas

- B. Culverts and Drainage Crossing (all culverts > 36" should be inspected annually at a minimum)
- C. Designated Roadways
- D. Closures and use controls on closed roadways
- E. Energy Dissipaters on culverts
- F. Sediment basins/irrigation ponds
- G. Rock-Lined Channels
- H. Mechanical stabilization measures (i.e. Riprap and gabions)
- I. Water Bars
- J. Water Supply, sewer, snowmaking, and irrigation water line and holding tanks
- K. Unprotected soil piles
- L. Infiltration trenches
- M. Gully/Rill erosion on slopes
- N. Other erosion control and storm water runoff facilities

**Water Year 2018 4<sup>th</sup> Quarter (July, August, September) Erosion and Facility Inspection – By Frank P.**

Hand Grenade/Roundabout: Year 2 after restoration site is stable, and vegetation is growing (below right) as of September 2018:

Before ↓



After ↓





Trail Crew restored the Upper Shop Road rock line ditch – photo taken 9-25-18:





On Mountain Culverts 9-25-18:



Ridge Bowl Ski Trail Restoration:





Pavement Surface Improvements California Base Area, ~80,000 Square Feet of Rotomilling, and new pavement installed:

Before:



After:





CA Maggies Roadside Drainage Maintenance (Manual and Mechanical removl of sediment) :





CA Base Storm Drain Maintenance with Clean Harbors August 2018:



CA Base Storm Drain Annual Maintenance with Clean Harbors August 2018:





Heavenly Mountain Resort  
Mitigation and Monitoring Plan Annual Report  
(October 2017 – September 2018)

APPENDIX



2018 WATERSHED MAINTENANCE  
RESTORATION PROGRAM (WMRP)  
WORK LIST



**HEAVENLY MOUNTAIN RESORT  
2018 ANNUAL SUMMER WORK LIST  
Completed Status November 2018**

Proj#	Source*	Location	Treatment	Status
<b>Watershed: CA-1 Heavenly Valley Creek</b>				
1	P	Magic Carpet Ski School Lift	Install Adventure Peak Magic Carpet with drip line infiltration trenches. Remove Red Fir towers and restore disturbed areas.	On-Hold
2	M	Upper Shop	Maintain existing waterbars, ditches and culverts. Reduce mud in shop yard (method to be determined).	Completed
3	M/RM	Groove Chair Base	Improve conveyance from Base of Groove Chair to the base of the Powderbowl basin. Drop inlet not used due existing utilities located in road.	Completed
4	RM	Heavenly Valley Creek Culvert	Repair existing gate valve.	Completed
5	EH-CA	Ridge Bowl	Stabilize gully in Ridge Bowl above Canyon Express Lift, remove and replace degraded geotextile fabric, place rock check dams or riprap.	Completed
6	EH-CA	Ridge Run above test plots	Hotspot #7: Repair, loosen and restore gully above and below summer road near snowmaking vault.	Completed
7	EH-CA	Maggie's Sediment Basins	Hotspot #25: Maintain and clean out sediment build up in Maggie's road shoulder sediment basins.	Completed
8	RM	Top of Gondola	Complete drainage improvements to manage snowmelt runoff including swales, shallow basins, and piping.	On-Hold
9	RM	Top of Gondola Snowmaking/Electrical Infrastructure	Upgrade water metering capability in existing snowmaking valve vault known as "Malcolm's Vault". Repair and replace existing underground snowmaking line in the Von Schmidt's area to loop the line to allow for equal water pressure. Replace and repair existing underground electrical conduit in the same trench.	Completed vault installation; snowmaking and electrical infrastructure on-hold.
<b>Watershed: CA-6 Bijou Creek</b>				
10	EH-CA	World Cup	Stabilize gully on World Cup Run and protect existing drop inlets.	Completed

*Source Codes	
M	BMP Maintenance
P	Master Plan Implementation Project
RM	Resort Maintenance Project
EH-CA	Erosion Hotspot Inventory California
EH-NV	Erosion Hotspot Inventory Nevada

11	EH-CA	First Ride	Stabilize gully on First Ride Run, reestablish waterbar and manage sediment moving towards lift terminal.	Completed
<b>Watershed: CA-7 Unnamed Creek - Gondola</b>				
		NONE		
<b>Watershed: NV-1 Mott Canyon Creek</b>				
		NONE		
<b>Watershed: NV-3 Edgewood Creek</b>				
		NONE		
<b>Watershed: NV-2 + 5 Daggett Creek</b>				
12	P	Galaxy	Replace existing Galaxy Lift in its current alignment. Improve specific summer road segments to allow lift construction and ongoing maintenance access. Daggett Creek realignment and stabilization.	Completed Final SWPP inspections 2019
13	P	Olympic Downhill	Replace 3000' of 8" water line and Way Home snowmaking vault. Stabilize disturbed areas following construction.	Completed
14	M	Big Dipper Run Waterbar Maintenance	Maintenance to waterbars, ditches and culverts.	On-going to be completed in 2019

**Resort-Wide Annual Maintenance**

Remove marked hazardous trees.
Water quality inspections, install summer BMPs.
Apply road base to summer roads after spring inspections.
Snowmaking systems repair and maintenance. Repairs to hydrants.
Repair and replace signage damaged by storm events.

*Source Codes	
M	BMP Maintenance
P	Master Plan Implementation Project
RM	Resort Maintenance Project
EH-CA	Erosion Hotspot Inventory California
EH-NV	Erosion Hotspot Inventory Nevada



Heavenly Mountain Resort  
Mitigation and Monitoring Plan Annual Report  
(October 2017 – September 2018)

APPENDIX

IV

USFS WILDLIFE  
TRASH MANAGEMENT AND  
EDUCATION PROGRAM





### **USFS Wildlife Trash Management and Education Program:**

As a condition of the approved 2015 EIS for the Epic Discovery Program a wildlife trash management and education plan will be implemented annually and reviewed by Heavenly and the US Forest Service LTBMU. The Heavenly Mountain Resort Master Development Plan (2015) includes a number of Operations and Maintenance Measures as part of the Mitigation and Monitoring Plan. 7.5-21 BIO 8: Wildlife Trash Management and Education Program.

A number of summer activities at Heavenly Mountain Resort are located at the Top of The Gondola, known as Adventure Peak. As part of the Epic Discovery Project implementation the resort shall create and implement the trash management and education program. The goal of this program is for timely removal of refuse from deposit points, education of our guests and staff about proper waste management, and to keep any interactions between humans and wildlife to a minimum.

Deposit points where animal proof receptacles will be implemented at the following locations:

1. Bottom of the Gondola steps/Interpretive Welcome Center(1)
2. Base of Tamarack Express lift (1)
3. Top of the Blue Streak Zip Line/ Top of Tamarack Chair (1 )
4. The Bottom of the Big Easy Chair area, gear on area near cowboy fence (1)
5. The Bottom of the Coaster (1)
6. The Base of the Rock Climbing Wall (1)
7. The Base of the Tubing Lift viewing area (1)
8. NW side of Tamarack Lodge (1)
9. Viewing area of the Bear Cave Challenge Course (1)
10. Kiddy Zip area (1)
11. Mid-Station Observation Deck of the Gondola (Existing), + 2 additional Dual Bear Boxes

Wildlife Proof receptacles in and around Adventure Peak will be serviced each day of operations. All garbage and recycling from the remote receptacles will be consolidated to the Tamarack Lodge loading dock or to the Top of the Gondola for transport down to the Heavenly Village Trash Compactor. This will be handled by the Adventure Peak Staff, and/or Lift Operations personnel. All refuse is to be kept inside of the Tamarack Lodge loading dock facility, or consolidated to the Top of Gondola wheeled grey carts. Daily refuse removal by the Food and Beverage Warehouse staff will continue for the Tamarack Lodge waste. Daily servicing of all refuse is necessary for the success of this program. All food service garbage, kitchen food waste recycling, and recyclables are taken to the California Main Lodge lower parking lot where

dedicated bear proof dumpsters are located. There are dumpsters clearly labeled for blue bag recycling, food waste recycling, and landfill waste. All dumpsters at this location are animal proof with locking lids, and doors. Dumpsters are serviced by South Tahoe Refuse and Recycling Services and are monitored by the Heavenly sustainability management and the Food and Beverage management staff closely for frequency of service. Since 2013 all CA Base dumpsters transitioned to animal proof containers which has significantly reduced any wildlife incidents.

Bear Bins will be deployed before summer operations and activities begin at Adventure Peak. These bins will be relocated from winter storage for summer implementation. They were stored at the Eask Peak Canopy Tour gear up deck after the 2018 summer operating season concluded.

Future Expansion into Sky Meadows and East Peak Lake/Lodge to be developed as these regions are built out.

Heavenly Mountain Resort  
Mitigation and Monitoring Plan Annual Report  
(October 2017 – September 2018)

APPENDIX

V

2018 WATER USE BALANCE REPORT



# Heavenly Mountain Resort

## Water Use Report, 2017-18 Operating Year



Heavenly Mountain Resort is furnishing this report on water usage during the 2017-18 Operating Year (9/1/2017 to 8/31/2018).

### Snowmaking Water Usage

The Heavenly Mountain Resort snowmaking system consumed a total of 152 million gallons of water during the 2017-8 operating year to cover a total of 322 acres of terrain. The distribution of water sources and water consumption is described below:

Total Snowmaking Water Use--California	80.27	million gallons
Total Snowmaking Water Use--Nevada	71.71	million gallons
Net Total Snowmaking Water Use	151.98	million gallons
Water Supplied in California	59.42	million gallons
Water Used in California	80.27	million gallons
Net Surplus (flow out of California)	-20.85	million gallons
Water Supplied in Nevada	92.56	million gallons
Water Used in Nevada	71.71	million gallons
Net Deficit (Flow into Nevada)	20.85	million gallons
Water Supplied In Basin	59.42	million gallons
Water Used in Basin	88.44	million gallons
Difference (flow out of Basin)	-29.03	million gallons
Water Supplied Out of Basin	92.56	million gallons
Water Used Out of Basin	63.54	million gallons
Difference (flow into Basin)	29.03	million gallons
Water Purchased--STPUD	52.16	million gallons
Water Purchased--KGID	12.48	million gallons
TOTAL WATER PURCHASED	64.64	million gallons

Table 1 provides a breakdown of water usage between California and Nevada, along with the net transfer of water between the States.



Table 1...2016-17 Water Usage Summary--Inter State Transfers					
Pumping Region	MG used	In California		In Nevada	
		% of acre-ft	Water (MG)	% of acre-ft	Water (MG)
Cal Base	38.4	100%	38.4	0%	0.0
Cal Dam	27.6	100%	27.6	0.0%	0.0
E. Peak	86.0	16.6%	14.2	83.4%	71.7
<b>Total</b>	<b>152.0</b>		<b>80.3</b>		<b>71.7</b>
<b>Water Supply- (Purchased + Recharge)</b>			<b>59.4</b>		<b>92.6</b>
<b>InterState Water Transfer</b>			<b>20.9</b>		<b>-20.9</b>

Table 2a provides a breakdown of water usage between in-basin and out of basin regions, along with the net inter-basin transfer of water.

Table 2a...2016-17 Water Usage Summary--Inter Basin					
Pumping Region	MG used	In Basin		Out of Basin	
		% of acre-ft	Water (MG)	% of acre-ft	Water (MG)
Cal Base	38.4	100%	38.4	0%	0.0
Cal Dam	27.6	100.0%	27.6	0.0%	0.0
E. Peak--CA	14.2	10.6%	1.5	89.4%	12.7
<b>Total California</b>	<b>80.3</b>		<b>67.5</b>		<b>12.7</b>
E. Peak--NV	71.7	29.2%	20.9	70.8%	50.8
<b>Total Nevada</b>	<b>71.7</b>		<b>20.9</b>		<b>50.8</b>
<b>TOTAL SNOWMAKING</b>	<b>152.0</b>		<b>88.4</b>		<b>63.5</b>
<b>Water Supply</b>			<b>59.4</b>		<b>92.6</b>
<b>Inter Basin Water Transfer</b>			<b>29.0</b>		<b>-29.0</b>

Table 2b further breaks down the Nevada water use within 4 water right quadrants as listed below:

Table 2b...2016-17 Water Usage Summary--Inter Basin					
Pumping Region	MG used	In Basin		Out of Basin	
		% of acre-ft	Water (MG)	% of acre-ft	Water (MG)
Cal Base	38.4	100%	38.4	0%	0.0
Cal Dam	27.6	100%	27.6	0%	0.0
E. Peak--CA	14.2	11%	1.5	89%	12.7
<b>Total California</b>	<b>80.3</b>		<b>67.5</b>		<b>12.7</b>
Quadrant A	8.6	12.0%	8.6		
Quadrant B	41.6			58%	41.6
Quadrant C	9.0			13%	9.0
Quadrant D	12.6	18%	12.6		
<b>Total Nevada</b>	<b>71.7</b>		<b>21.2</b>		<b>50.5</b>
<b>TOTAL SNOWMAKING</b>	<b>152.0</b>		<b>88.7</b>		<b>63.3</b>
<b>Water Supply</b>			<b>59.4</b>		<b>92.6</b>
<b>Inter Basin Water Transfer</b>			<b>29.3</b>		<b>-29.3</b>

Quadrants:

A - Within Tahoe Basin and south of the southern boundary of section 25, 26, 27 T. 13 N. R 18 E. and section 30 T. 13. N., R. 19 E.

B - Outside of Tahoe Basin and south of the southern boundary of section 25, 26, 27 T. 13 N. R 18 E. and section 30 T. 13. N., R. 19 E.

C - Outside of Tahoe Basin and North of the southern boundary of section 25, 26, 27 T. 13 N. R 18 E. and section 30 T. 13. N., R. 19 E.

D - Within Tahoe Basin and North of the southern boundary of section 25, 26, 27 T. 13 N. R 18 E. and section 30 T. 13. N., R. 19 E.

The following attachments provide documentation and calculations procedures used in determining these values:

Attachment 1....Map of Existing Meter Locations

Attachment 2....Schematic of Water Transfers

Attachment 3....California Snowmaking Trails

Attachment 4....Nevada Snowmaking Trails and Water Right Quadrants

### Calculation Procedures

Water allocation calculations for Heavenly Mountain Resort are complicated by the fact that snowmaking occurs in both Nevada and California, as well as inside and outside the TRPA boundary. While the snowmaking piping distribution system for the entire resort is interlinked, there are 3 basic sub-regions:

1. Cal Base This region consists of the acreage on the California side falling below Cal Dam. This entire region falls within the State of California and within the Tahoe Basin.
2. Cal Dam This region consists of acreage on the California side that is above Cal Dam. This entire region falls within the State of California and within the Tahoe Basin.
3. East Peak This region consists of acreage above and below East Peak Lake. The region is predominantly in Nevada, though some trails serviced at the top fall inside California. A majority of this terrain is out of the Tahoe Basin, but 25% lies inside the Basin.

Attachment 2 provides a schematic of pumping operations, meter readings, and the calculation procedure for interstate water transfers. These calculations consist of performing a water balance between the STPUD and KGID supplies, water entering and exiting reservoirs, and a flowmeter installed on the existing transfer line between the Cal Dam and East Peak systems.

The methodology used this analysis to track inter-basin water usage involves calculating the total water usage within the 3 major sub-regions (Lower Cal, Cal Dam, and East Peak) and then allocating water

proportionally based on snowmaking terrain within that region that falls inside and outside the Tahoe basin. Since different trails require different design depths of snow, the allocation is based on the trail acreage x design depth for each trail, as detailed in Attachments 3 and 4. The same methodology is used to allocate East Peak water between California and Nevada. No changes have been made in the metering locations, configuration, or calculation procedure from the previous year.

The trail data provided in Attachment 4 indicates that 16.6% of the East Peak design acre-ft of snow coverage occurs in California. Therefore, 16.6% of the total 86 MG used for snowmaking in the East Peak sub-region is calculated to fall in California (14.2 MG) while 83.4% is calculated to fall in Nevada (71.7 MG)<sup>1</sup>. Of this 71.7 MG of East Peak water that is used in Nevada, 29.5% of the design acre-ft of snow production occurs within the Tahoe Basin. Therefore 29.5% of the 71.7 million gallons of water used in this sub-region are calculated to be used within the Basin (20.9 MG) while 70.5% are calculated to be used outside the basin (50.8 MG)<sup>2</sup>.

### **Revised Operating Procedures**

The calculations indicate that a net of 29 million gallons of water was transferred into the basin during 2017-18 snowmaking season, while 21 MG was transferred from California to Nevada. Future net transfers will be minimized by further balancing water supplies during the season and managing summer irrigation practices.

Respectfully Submitted,

A handwritten signature in black ink, appearing to read "Scott Barthold". The signature is fluid and cursive, with the first name "Scott" and last name "Barthold" clearly distinguishable.

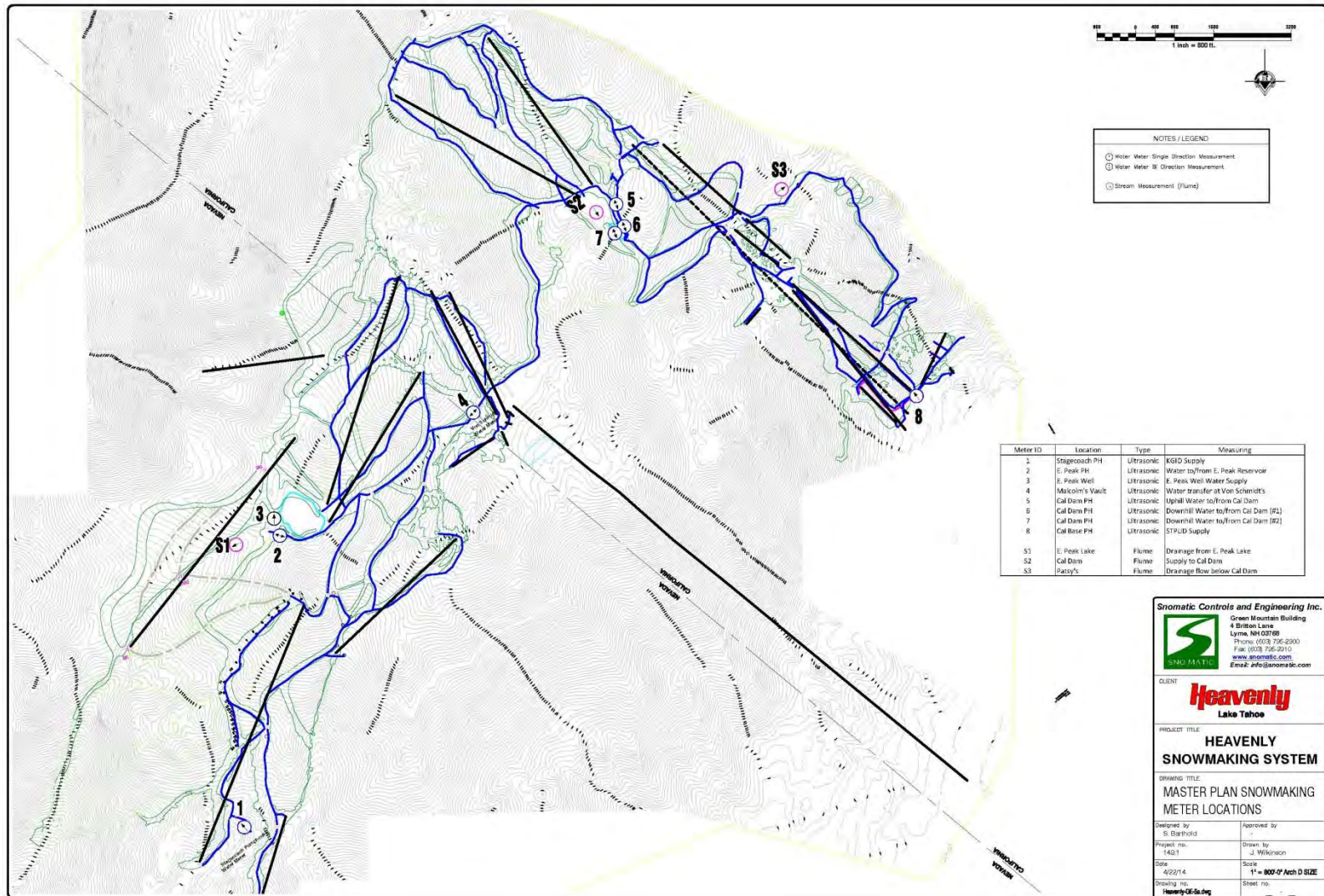
Scott Barthold, PE  
Sno.matic Controls and Engineering, Inc.

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<sup>1</sup> Refer to Table 1 for calculation

<sup>2</sup> Refer to Table 2a/b for calculation

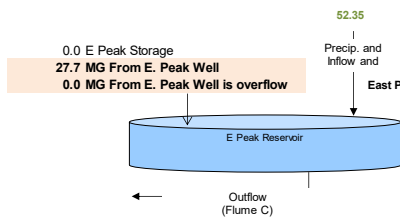
Attachment 1...Existing meter locations



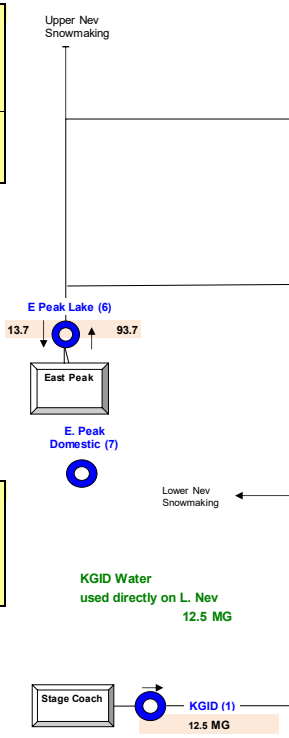
# Attachment 2---Schematic

## Attachment 2

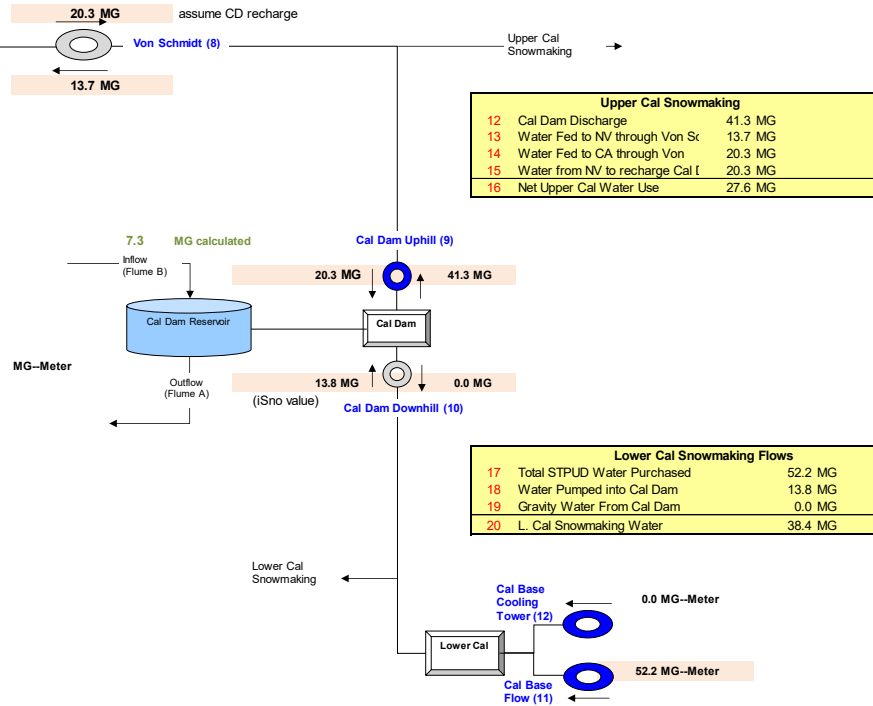
Nevada Snowmaking Water		
1	Water Pumped by E Peak pumps	93.7 MG
2	Water Sent to Cal Dam via Von Schm	20.3 MG
3	KGID Water used directly for SM	12.5 MG
4 Total Nevada Snowmaking Water		86.0 MG
5	STPUD Water transferred to Nevada	13.7 MG
6	KGID and Inflow water used in NV	72.3 MG



Lower Nevada Snowmaking Water		
7	KGID Purchase	12.5 MG
8	Water Entering E Peak	13.7 MG
9	Water entering E Peak through VS	13.7 MG
10	Water to E. Peak from Stagecoach	0.0 MG
11	KGID water used directly for snowmakir	12.5 MG



## Heavenly Mountain Resort Snowmaking Water Usage 2017-18 Water Transfers Snowmaking Year (9/1/17 to 8/31/18)



Upper Cal Snowmaking		
12	Cal Dam Discharge	41.3 MG
13	Water Fed to NV through Von Sc	13.7 MG
14	Water Fed to CA through Von	20.3 MG
15	Water from NV to recharge Cal l	20.3 MG
16 Net Upper Cal Water Use		27.6 MG

Lower Cal Snowmaking Flows		
17	Total STPUD Water Purchased	52.2 MG
18	Water Pumped into Cal Dam	13.8 MG
19	Gravity Water From Cal Dam	0.0 MG
20 L. Cal Snowmaking Water		38.4 MG

### Calculation Notes

- |    |   |    |   |
|----|---|----|---|
| 1  | From E. Peak Meter  | 12 | Read from Cal Dam uphill meter  |
| 2  | Based on Cal Dam meter reading (entering pond)  | 13 | From Equation 5   |
| 3  | Calculated by Equation 11   | 14 | Cal Dam Uphill meter reading (reverse flow)   |
| 4  | Water Pumped by E. Peak - water sent to CA + KGID water used directly for snowmaking = Nevada SM water                    | 15 | Cal Dam Uphill meter reading (reverse flow)   |
| 5  | Water entering E. Peak -(Water Pumped via KGID - KGID water used directly on L. Nevada)                                   | 16 | (Water Pumped from Cal Dam - water transferred to NV) + (Water pumped from E Peak into CA - water entering Cal Dam) |
| 6  | Total Nevada water - transfer to Cal Dam = KGID and Inflow water used in NV   |    |   |
| 7  | Provided by KGID flowmeter reading  | 17 | From Cal Base Flowmeter   |
| 8  | Based on E. Peak Meter Reading  | 18 | From Cal Dam downhill meter   |
| 9  | From Equation 5   | 19 | From Cal Dam Downhill Meter   |
| 10 | Total Water into E. Peak (from meter) - water transferred to E. Peak from Von Shmidt = water transferred from Stage coach | 20 | Water Pumped from L Cal - Water delivered to Cal Dam + gravity water running back down to lower Cal                 |
| 11 | Water purchased from KGID - water transferred from KGID to E. Peak = KGID water used directly for snowmaking              |    |   |

**ATTACHMENT 3---CALIFORNIA SNOWMAKING ACREAGE**

2007		2007		2007		2007	
Master Plan Amendment	Trail Name	Master Plan Amendment	Acres	Acres	Acres	Acres	Sub Region
Trail #		Snowmaking Action (1)	(1)	(2)	(3)		
<b>California In Basin.... 'pod' trails</b>							
B1	EAST BOWL -THE FACE	EXISTING	16.3	5	81.3		Cal Base
B2	GUNBARREL	EXISTING	8.2	5	40.8		Cal Base
D1	WORLD CUP	EXISTING	6.0	2.7	16.1		Cal Base
E1	PATSY'S	EXISTING	7.9	2.7	21.4		Cal Dam
G1	MAGGIES	EXISTING	8.4	2.7	22.7		Cal Dam
G2	CAT TRACK	EXISTING	1.0	2.7	2.7		Cal Dam
G5	MOMBO MEADOWS	EXISTING	4.1	2.7	11.1		Cal Dam
G6	MOMBO	EXISTING	1.0	2.7	2.6		Cal Dam
G7	LOWER MOMBO	EXISTING	2.5	2.7	6.7		Cal Dam
H9	CANYON - SKY CANYON	EXISTING	6.1	2.7	16.5		Cal Dam
H10	JACKPOT (RUSUTSU)	EXISTING	4.3	2.7	11.6		Cal Dam
H11	HIGH ROLLER (STEAMBOAT)	EXISTING	3.3	2.7	8.9		Cal Dam
I1	LIZ'S	EXISTING	9.6	2.7	25.9		Cal Dam
I3	UPPER ELLIE'S / ELLIE'S	check of power at top	EXISTING	12.4	2.7	33.5	Cal Dam
K1	PERFECT RIDE (WEST BOWL)		EXISTING	8.7	2.7	23.4	Cal Base
*L1	LOWER SKI SCHOOL	DMZ	EXISTING	2.3	2.7	6.2	Cal Base
M1	CHILDRENS SKI CENTER	Enchanted Forestr	EXISTING	0.9	2.7	2.4	Cal Base
N1	PIONEER PLATTER PULL		EXISTING	2.4	2.7	6.5	Cal Dam
O1	LEARN TO SKI CENTER		EXISTING	1.4	2.7	3.7	Cal Dam
*GG1	(UPR.) CALIFORNIA TRAIL		EXISTING	7.4	2.7	20.0	E. Peak
**GG2	SAM'S DREAM	EXISTING - UNBUILT	4.3	4	17.1		E. Peak
*GG3	TAMARACK RETURN	EXISTING	0.7	2.7	2.0		E. Peak
*GG6	CASCADE	EXISTING	8.0	2.7	21.7		E. Peak
*HH1	EASY STREET (1/2)	EXISTING	3.4	2.7	9.2		E. Peak
HH2	EASY STREET II (1/2)	EXISTING	2.1	2.7	5.6		E. Peak
B3	PISTOL	REMOVE	0.0	5	0.0		
B4	WEST BOWL	REMOVE	0.0	5	0.0		
E2	GROOVE	EXISTING	3.8	2.7	10.2		Cal Dam
G3	SWING TRAIL	NO ACTION	0.0	0	0.0		
G4	WATERFALL	RETAIN	3.5	5	17.4		
G8	POWDERBOWL	RETAIN	3.5	4	14.1		
G9	NEW - POWDERBOWL 2 (Gladed)	NEW	1.9	2.7	5.1		
H1	WOODS TRAIL	NO ACTION	0.0	0	0.0		
H2	BETTY'S SWING	NO ACTION	0.0	0	0.0		
H3	RIDGE BOWL	NO ACTION	0.0	0	0.0		
H4	RIDGE CHUTE	NO ACTION	0.0	0	0.0		
H5	HIGH ROLLER (BETTY'S RUN)	RETAIN	12.7	5	63.4		
H6	DOUBLE DOWN (BETTY'S BOWL)	RETAIN	0.0	0	0.0		
H7	LOWER BETTY'S	Soldiers	RETAIN	0.0	0	0.0	
H8	BETTY'S CUTOFF	NO ACTION	0.0	0	0.0		
H12	NEW - BETTY'S CUTOFF	NO ACTION	0.0	0	0.0		
H13	NEW - BETTY'S ESCAPE	NO ACTION	0.0	0	0.0		
I2	ELLIE'S SWING - EXTENSION	RETAIN	3.4	2.7	9.2		
I4	NEW - SKIWAYS 1 (GLADED)	NO ACTION	0.0	0	0.0		
I5	NEW - SKIWAYS 2 (GLADED)	NO ACTION	0.0	0	0.0		
GG5	49ER	RETAIN	1.6	4	6.3		
<b>California In-Basin...non 'pod' transport trails</b>							
1	ROUND-A-BOU	EXISTING	15.6	2.7	42.1		Cal Base
2	RIDGE RUN	EXISTING	1.7	2.7	4.5		Cal Dam
3	LOWER RIDGE RUN	EXISTING	15.9	2.7	42.9		Cal Dam
5	CALIFORNIA TRAIL	EXISTING	5.5	2.7	14.9		Cal Dam
5A	NEW- CAL. TRAIL ALTERNATIVE	NEW	1.7	2.7	4.5		
10	VON SCHMIDT'S (1/4)	RETAIN	1.2	2.7	3.3		
**11	VON SCHMIDT'S - MEADOW	RETAIN	4.1	2.7	11.1		
1	ROUND-A-BOU - REALIGNMENT	NEW	1.6	2.7	4.2		
4	SKYLINE TRAIL	RETAIN	2.8	2.7	7.6		
12	NEW - MAGGIES CANYON (GLADED)	NO ACTION	0.0	0	0.0		
<b>In Basin Total--Master Plan</b>			<b>212.8</b>		<b>680.1</b>		
<b>In Basin Total--Cal Base Existing</b>			<b>57.9</b>		<b>212.4</b>		
<b>In Basin Total--Cal Dam Existing</b>			<b>91.2</b>		<b>246.2</b>		
<b>In Basin Total--E. Peak Existing</b>			<b>170.7</b>	<b>21.6</b>	<b>58.4</b>		
<b>California Out of Basin 'pod' trails</b>							
V4	BIG DIPPER (1/5)	EXISTING	3.7	2.7	10.0		E. Peak
V8	ORIONS (1/2)	EXISTING	8.4	2.7	22.6		E. Peak
*V10	METEOR (1/2) - (GLADED)	EXISTING - UNBUILT	2.9	2.7	7.8		
**V11	METEOR II (1/3) - (GLADED)	REMOVE	0.0	2.7	0.0		
V7	DIPPER BOWL (1/2)	NO ACTION	0.0	2.7	0.0		
GG4	SAND DUNES	RETAIN	3.0	2.7	8.0		
V1	MILKY WAY BOWL (2/3)	NO ACTION	0.0	0	0.0		
V3	DIPPER KNOB	The Road	RETAIN	1.2	2.7	3.2	
<b>Out of Basin Total--Master Plan</b>			<b>19.1</b>		<b>51.6</b>		
<b>Out of Basin Total--Cal Base Existing</b>			<b>0.0</b>		<b>0.0</b>		
<b>Out of Basin Total--Cal Dam Existing</b>			<b>0.0</b>		<b>0.0</b>		
<b>Out of Basin Total--E. Peak Existing</b>			<b>12.1</b>		<b>32.6</b>		
<b>California Total--Master Plan</b>			<b>231.9</b>		<b>731.8</b>		
<b>California Total--Existing</b>			<b>182.8</b>		<b>549.6</b>		
<b>Cal Base Total Existing</b>			<b>57.9</b>		<b>212.4</b>		
<b>Cal Dam Total Existing</b>			<b>91.2</b>		<b>246.2</b>		
<b>E Peak Total Existing</b>			<b>33.7</b>		<b>91.0</b>		
<b>Cal Base Existing---% In Basin</b>			<b>100%</b>		<b>100%</b>		
<b>Cal Dam Existing---% In of Basin</b>			<b>100%</b>		<b>100%</b>		
<b>E Peak Existing---% In Basin</b>			<b>64%</b>		<b>64%</b>		

Notes:  
(1) Action proposed: EXISTING = currently exists, RETAIN = approved in MP (96) - retain in MPA (04), REMOVE = approved in MP (96) - remove in MPA (04), NEW = not considered in MP (96) - proposed in MP  
(2) Acre feet of water needed per acre of ski run to achieve complete snow coverage. 2.7 indicates a ski run will require 2.7 acre feet of water per ski run acre per year to achieve snow coverage of ground cover. case for a ski season.  
(3) Total acre feet of water required for complete snow coverage of the ski run for a ski season. This number is calculated by multiplying the Snowmaking Acreage by the Acre ft/Acre column.  
(4) Change from Master Plan (1996) Approved to Master Plan Amendment (2007) Proposed build out.  
(5) Additional water requirements of Master Plan Amendment (2007) from Master Plan (1996).  
\* All or partially implemented since adoption of the Master Plan in 1996.  
\*\* Approved to be implemented but not yet constructed.



**ATTACHMENT 4--NEVADA SNOWMAKING ACREAGE**

2007 Master Plan Amended Facilities - Snowmaking at Buildout						
2007 Master Plan Amendment Trail #	Trail Name		2007 Master Plan Amendment Snowmaking Action (1)	Acreage (acres)	Acre ft. / Acre (2)	Acre ft. (3)
<b>Nevada In Basin 'pod' trails</b>						
Q1	BOULDER (EDGEWOOD) BOWL		EXISTING	17.2	4	68.9
S1	OLYMPIC DOWNHILL (3/5)		EXISTING	15.5	2.7	41.8
X1	BOULDER SKI SCHOOL		EXISTING	2.8	2.7	7.6
*HH1	EASY STREET (1/2)	Assume this is Big Easy	EXISTING	3.4	2.7	9.2
S2	BOULDER CHUTE (O75)		RETAIN	2.7	4	11.0
S3	NORTH BOWL		RETAIN	7.8	5	38.9
S4	UPPER NORTH BOWL		EXISTING	4.2	5	21.0
S8	NEW - NORTH BOWL 2	Cloud Nine	NEW	5.1	2.7	13.8
S9	NEW - NORTH BOWL 3 (Gladed)	Pines	NEW	8.1	2.7	22.0
S10	NEW - NORTH BOWL 4 (Gladed)	Bohemian Grove	NEW	7.8	2.7	21.2
HH2	EASY STREET II (1/2)	Tubing Hill	EXISTING	2.1	5	10.3
(wasn't on snowmaking plan)						
<b>Nevada In Basin non 'pod' transport trails</b>						
9	STEVE'S		EXISTING	0.5	2.7	1.4
10	VON SCHMIDT'S (1/4)		RETAIN	1.2	2.7	3.3
<b>NV In Basin Total--Master Plan</b>				<b>78.5</b>		<b>270.3</b>
<b>NV In Basin Existing Total (all E. Peak)</b>				<b>45.7</b>		<b>160.1</b>
<b>Nevada Out of Basin 'pod' trails</b>						
R2	(UPPER) STAGECOACH	Lower Downhill	EXISTING	4.2	4	16.6
S1	OLYMPIC DOWNHILL (2/5)		EXISTING	10.3	2.7	27.9
S5	CROSSOVER		EXISTING	6.7	2.7	18.1
V4	BIG DIPPER (4/5)		EXISTING	14.8	2.7	40.0
V6	ORION'S BELT		EXISTING - NOT EX 2017	1.1	2.7	2.9
V8	ORION'S (1/2)		EXISTING	8.4	2.7	22.6
V9	LOWER ORION'S		EXISTING	2.9	2.7	7.8
*V10	METEOR (1/2) - (GLADED)		EXISTING - UNBUILT	2.9	2.7	7.8
W3	LITTLE DIPPER		EXISTING	10.4	5	52.2
W4	COMET		EXISTING	14.2	2.7	38.3
Z1	NEW - WELLS FARGO 1		NEW	5.4	2.7	14.5
Z2	NEW - WELLS FARGO 2		RETAIN	8.3	2.7	22.4
Z3	NEW - WELLS FARGO 3		NEW	11.4	2.7	30.7
Z4	NEW - WELLS FARGO 4		RETAIN	12.8	2.7	34.6
Z5	NEW - WELLS FARGO 5		NEW	2.8	2.7	7.5
Z7	NEW - WELLS FARGO 7		NEW	6.9	2.7	18.7
R1	STAGECOACH		EXISTING	12.4	4	49.6
R3	NEW - STAGECOACH 2		NO ACTION	7.1	5	35.6
R4	NEW - STAGECOACH 3		NO ACTION	0.0	5	0.0
R5						
S6	PONDEROSA (BONANZA BOWL)	Bonanza	RETAIN	4.0	4	15.9
S7	EAST PEAK	Ponderosa	RETAIN	3.9	4	15.8
U1	PERIMETER		RETAIN	13.5	2.7	36.4
U2	GALAXY		RETAIN	10.1	2.7	27.3
U3	NEW - GALAXY 1		NEW	8.7	2.7	23.4
U4	NEW - GALAXY 2		NEW	2.7	2.7	7.3
V5	LOWER BIG DIPPER	Connection to Galaxy	RETAIN	3.7	2.7	9.9
V12	NEW - ORION'S II	Nova	NEW	3.4	2.7	9.3
W1	ARIES		RETAIN	1.3	2.7	3.4
W2	JACK'S		NEW	3.0	2.7	8.0
*HH3	SILVER SPUR		NO ACTION	0.5	2.7	1.4
<b>Nevada Out of Basin Non 'pod' transport trails</b>						
7	LOWER WAY HOME		EXISTING	5.2	2.7	14.1
8	PEPT'S		EXISTING	4.0	2.7	10.8
10	VON SCHMIDT'S (1/2)		EXISTING - NOT EX 2017	2.4	2.7	6.5
14	NEW - GALAXY ACCESS		NEW	6.4	2.7	17.3
15	NEW - SCORPION		NEW	6.3	2.7	17.1
6	NEW - NEVADA TRAIL (WAY HOME)		NEW	5.9	2.7	16.0
16	NEW - FARGO TO GALAXY	Fargo to Stagecoach	NEW	1.1	2.7	2.9
<b>NV-Out of Basin Total MP</b>				<b>229.1</b>		<b>690.8</b>
<b>NV Out of Basin Existing Total (all E. Peak)</b>				<b>93.5</b>		<b>298.1</b>
				<b>Acreage total by Quadrant</b>		
				<b>% of Total Acreage</b>		
<b>Nevada Total--Master Plan</b>				<b>307.6</b>		<b>961.1</b>
<b>Nevada Total--Existing</b>				<b>139.2</b>		<b>458.2</b>
<b>% In Basin--Existing</b>				<b>33%</b>		<b>35%</b>
<b>% Out of Basin</b>				<b>67%</b>		<b>65%</b>
<b>Grand Total--2007 Master Plan</b>				<b>539.6</b>		<b>1,692.8</b>
				<b>Cal Base Total</b>	<b>57.9</b>	<b>212.4</b>
				% in CA	<b>100%</b>	<b>100%</b>
				% In Basin	<b>100%</b>	<b>100%</b>
				<b>Cal DamTotal</b>	<b>91.2</b>	<b>246.2</b>
				% in CA	<b>100%</b>	<b>100%</b>
				% in Basin	<b>100%</b>	<b>100%</b>
				<b>E. Peak Total</b>	<b>172.9</b>	<b>549.2</b>
				% in CA	<b>19.5%</b>	<b>16.6%</b>
				E. Peak in CA	<b>33.7</b>	<b>91.0</b>
				% of E. Peak in CA-in Basin	<b>42.5%</b>	<b>10.6%</b>
				E. Peak in NV	<b>139.2</b>	<b>458.2</b>
				% of E. Peak in NV-in Basin	<b>26%</b>	<b>29%</b>
				% E. Peak in Nevada	<b>80.5%</b>	<b>83.4%</b>
				% of E. Peak in CA-out	<b>7.0%</b>	<b>5.9%</b>
				% of E. Peak in NV-out	<b>54.1%</b>	<b>54.3%</b>



Heavenly Mountain Resort  
Mitigation and Monitoring Plan Annual Report  
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APPENDIX

VI

DAGGETT CREEK MEMORANDUM





April 16, 2019

Via: Email & USPS

Mr. James Grant  
HEAVENLY MOUNTAIN RESORT  
P.O. Box 2180  
Stateline, Nevada 89449

**Re: *Water Year 2018 Daggett Creek Flow Monitoring***

Dear Mr. Grant:

Resource Concepts, Inc. (RCI) has assisted with monitoring flows on the South Fork of Daggett Creek downstream of East Peak Lake since 2004. The Daggett Creek stream gauge has been used to support compliance monitoring for Heavenly's water rights since it was installed. Graphs generated from the data collected at the stream gauge help demonstrate that flows in Daggett Creek are maintained without impacting downstream water rights. The following discussion is offered for Water Year 2018 (WY2018): October 1<sup>st</sup>, 2017 through September 30<sup>th</sup>, 2018.

Field activities during WY2018 included the installation of new data logger equipment in July 2017, recovery of information from the data logger in Daggett creek, and periodic in-stream manual flow measurements.

- The new data logger provides more accurate data collection and software analysis for possible discrepancies. Water depth is calculated by the software from water pressure, barometric pressure, and water temperature. The probe data logger has been set to log continuously at 15-minute intervals.
- Installation and calibration of the new gauge is providing reliable high-quality data. However, there were two periods of missing data in WY2018: May 14 to June 12 and from August 31 to September 30. During these two periods, barometric pressure correction data was not transferred from the datalogger. RCI believes the issue was related to information transfer between the datalogger and the software, which we anticipate has been resolved.
- RCI conducts routine site visits during accessible months for data collection and general maintenance. General maintenance includes checking for probe functionality, checking for possible biofouling. Battery replacement is needed every four to five years and requires probe removal and return to the manufacturer. During WY2018, RCI made multiple in-stream measurements for a range of flow conditions to correlate Daggett Creek discharge to data collected from the new equipment. In WY2019, RCI will continue to make in-stream flow measurements during site visits to further refine the calibration curve for the new data logger equipment.

**CARSON CITY**  
340 North Minnesota St.  
Carson City, NV 89703-4152  
(775) 883-1600 • fax: (775) 883-1656

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**LAKE TAHOE**  
276 Kingsbury Grade, Ste. 206, Stateline, NV  
PO Box 11796, Zephyr Cove, NV 89448-3796  
(775) 588-7500 • fax: (775) 589-6333

Mr. James Grant  
April 16, 2019  
Page 2

Results of the WY2018 for Daggett Creek discharge are shown in Figure 1 (attached) in cubic feet per second. Elevated runoff from record precipitation during the winter WY2017 carried into the beginning of WY2018. This is reflected in the relatively high creek flows through November 2017 compared to previous monitoring data. Flows normalized over the winter and into the spring of 2018.

Please feel free to contact me with any comments or questions.

Sincerely,

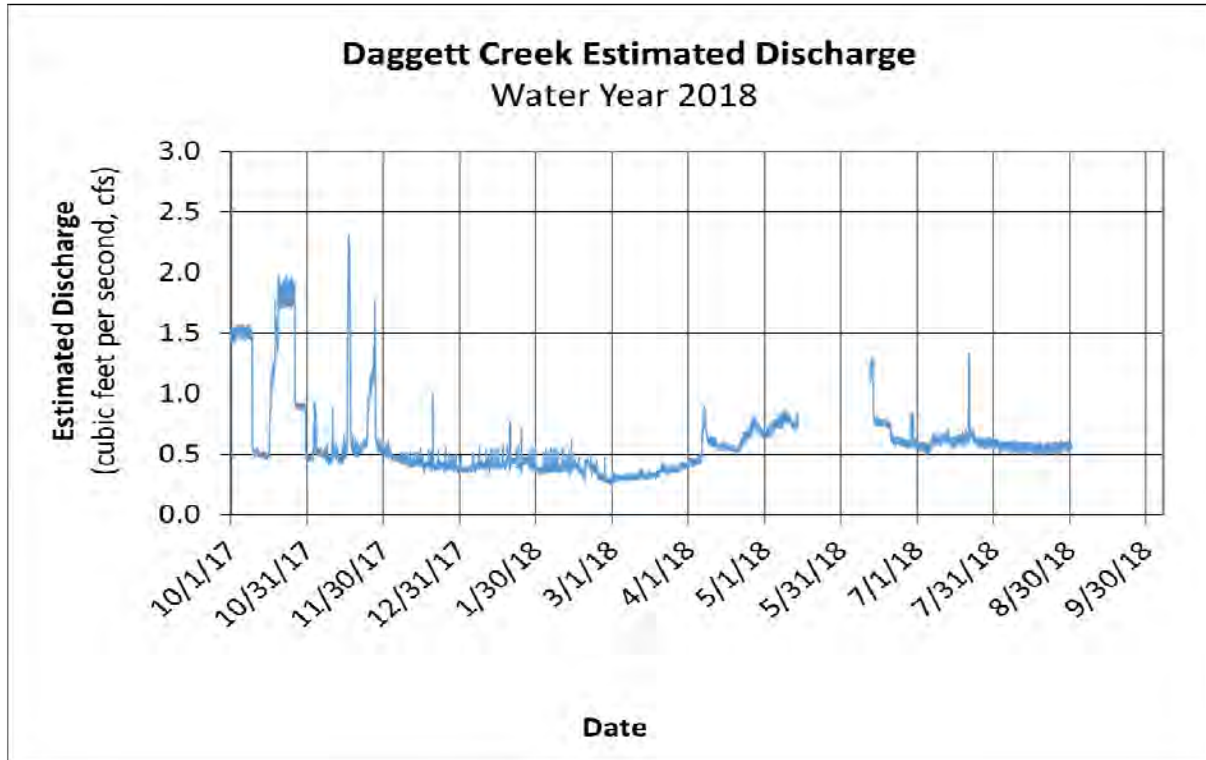


Jill Sutherland, P.E.  
Project Manager

JLS/jm

attachment

**Figure 1. Daggett Creek Estimated Discharge**  
Water Year 2018



Heavenly Mountain Resort  
Mitigation and Monitoring Plan Annual Report  
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APPENDIX

VII

2019 WATERSHED MAINTENANCE  
RESTORATION PROGRAM (WMRP)  
WORK LIST





**HEAVENLY MOUNTAIN RESORT  
2019 ANNUAL SUMMER WORK LIST  
Final 4/15/2019**

Proj#	Source*	Location	Treatment	Status
<b>Watershed: CA-1 Heavenly Valley Creek</b>				
1	M	Upper Shop	Maintain existing waterbars, ditches and culverts. Reduce mud in shop yard.	Complete in spring and after storm events
2	M	Groove Chair Base	Maintain rocklined ditches at Base of Groove Chair to basin at Base of Powderbowl.	Complete in spring and after storm events
3	M	Maggie's Sediment Basins	Maintain and clean out sediment build up in Maggie's road shoulder sediment basins.	Complete in spring and after storm events
4	M	Hellwinkel's Sediment Basins	Maintain and clean out sediment build up in Hellwinkel's road shoulder sediment basins.	Complete in spring and after storm events
5	P/RM	Cal Dam Snowmaking Pond	Remove sediment and place at low point/former location of wind fence at Liz's/Ridge Run.	New 2019 Project
6	RM	Top of Gondola	Install drainage improvements to manage snowmelt runoff including swales, shallow basins, and piping.	From 2018 List
7	RM	Crossover Waterline Replacement	Replacement of 3000 feet of 6-inch waterline on Crossover in existing roadway.	New 2019 Project
8	P	American Tower Company Cell Tower & Fiber Optic Line Replacement	Third party project to install cable, several monopine towers, and small buildings at lodges and at the Top of the Gondola.	New 2019 Project
<b>Watershed: CA-6 Bijou Creek</b>				
9	EH-CA	Top of Tram	Stabilize gully on slope between Tram Top Station and Lakeview Lodge.	New 2019 Project
<b>Watershed: CA-7 Unnamed Creek - Gondola</b>				
		NONE		
<b>Watershed: NV-1 Mott Canyon Creek</b>				
10	P/EH-NV	Galaxy	Conduct final SWPPP inspection. Maintain and clean out sediment in Galaxy road shoulder sediment basins.	Completed 2018 Project
<b>Watershed: NV-3 Edgewood Creek</b>				

*Source Codes	
M	BMP Maintenance
P	Master Plan Implementation Project
RM	Resort Maintenance Project
EH-CA	Erosion Hotspot California
EH-NV	Erosion Hotspot Nevada

11	RM	Boulder Parking Lot	Continue phased approach to repair pavement in coordination with Heavenly Base Ops.	Multiyear phased project
<b>Watershed: NV-2 + 5 Daggett Creek</b>				
10 cont.	P/EH-NV	Galaxy	Conduct final SWPPP inspection. Maintain and clean out sediment in Galaxy road shoulder sediment basins.	Completed 2018 Project
12	RM	East Peak Dam Liner Replacement	Expose and repair existing liner of dam face.	New 2019 Project
13	M	Big Dipper Run Waterbar Maintenance	Maintenance to waterbars, ditches and culverts and existing snowmaking hydrants. Replace outdated "can hydrants" with standard hydrants on skiers left of run.	Continued from 2018 List

**Resort-Wide Annual Maintenance**

Installation of rope fencing along roadways and along sensitive areas.
Water quality inspections.
Inspect and maintain roads, apply road base as needed after inspections.
Snowmaking systems repair and maintenance. Repairs to hydrants.
Repair and replace signage damaged by storm events.
Remove marked hazardous trees.

*Source Codes	
M	BMP Maintenance
P	Master Plan Implementation Project
RM	Resort Maintenance Project
EH-CA	Erosion Hotspot Inventory California
EH-NV	Erosion Hotspot Inventory Nevada

Heavenly Mountain Resort  
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APPENDIX

VIII

2018 BIOLOGICAL & NESTING  
SURVEY RESULTS





**SIERRA ECOTONE SOLUTIONS**

530.416.2440 • PO Box 1297 Zephyr Cove, NV 89448 • [SierraEcotoneSolutions.com](http://SierraEcotoneSolutions.com)

---

9 June 2018

Mr. Andrew Strain  
Heavenly Mountain Resort  
PO Box 2180  
Stateline, NV 89449  
-via e-mail-

**SUBJECT: 2017-2018 GALAXY LIFT REPLACEMENT – DAGGETT CREEK  
SIERRA NEVADA YELLOW-LEGGED FROG SURVEY RESULTS**

Mr. Strain:

Visual Encounter Surveys (USFS VES protocol dated 2005) were performed along Daggett Creek during the summer of 2017 and the spring of 2018. A total of four site visits to the project area were conducted on 24 August 2017, 12 September 2017, 16 May 2018 and 8 June 2018.

Daggett Creek was surveyed from the area immediately below the East Peak Dam to the bottom of the Galaxy lift where the creek daylights from the culvert. No sensitive amphibian species were observed during the surveys. Sierran treefrogs (*Pseudacris sierra*) were observed in the mitigation wetland area located below the Galaxy Lift. Datasheets are attached herewith for your records.

Please feel free to contact me with any questions.

Regards,

Garth Alling  
Principal Biologist

CC: Stephanie Coppeto, LTBMU  
James Grant, Heavenly Mountain Resort  
Chris Donley, Cardno

Attachments

# Visual Encounter Survey Data Form

Bullfrog Survey

VISIT #1

Site Name: <u>HEAVENLY DAGGOTT CREEK</u>	Date: <u>24 AUG 2017</u>	OccurrenceID: _____
Observers: <u>G. ALLING (SES)</u>	GPS File: _____	
Start Time: <u>0950</u>	End Time: <u>1617</u>	Survey Time (Min): <u>387</u>

Zone: <u>11</u>	UTM Starting Point: N <u>4314229.7</u>	E <u>249267.2</u>	Elevation (m): <u>8600</u>	Only take UTM's if this is a new survey location
Zone: <u>11</u>	UTM Ending Point: N <u>4315045.2</u>	E <u>250266.8</u>	Elevation (m): <u>7870</u>	
Water Temp In (°C): <u>56</u>	Water Temp Out (°C): <u>59</u>			
Air Temp In (°C): <u>54</u>	Air Temp Out (°C): <u>72</u>			
Type of Survey (circle one): <u>DAY</u> NIGHT	Site (circle one): BREEDING NON-BREEDING			
Survey Number (circle one): <u>1</u> 2	Moon phase (night surveys only): _____			
Cloud Cover (%): Start: <u>20</u> End: <u>20</u>	Clear Overcast <u>Partly Cloudy</u>			
Wind (Moving):	Calm <u>Light</u> Strong			
Precipitation (current):	<u>None</u> Drizzling Sprinkling Raining Snowing			
Precipitation (last 48 hours):	<u>None</u> Drizzling Sprinkling Raining Snowing			
Watershed Condition:	Natural Urbane Grazed Logging Burned Other: <u>SKI RESORT / PARTIAL DEVELOPMENT</u>			
Habitat:	<u>Stream</u> <u>Wetland</u> <sup>ARTIFICIAL</sup> Meadow Pond Lake			
Predominant Vegetation (ex. GF/NO/CF): <u>GF/SH/CF</u>	% Aquatic Vegetation: <u>15</u>			
Predominate Substrate:	Meadow Silt Sand Pebble Cobble <u>Boulder</u> Bedrock			
Water Source:	Meadow (H <sub>2</sub> O present) Lentic (standing) <u>Lotic (flowing)</u> Dry (No H <sub>2</sub> O)			
Water Turbidity:	<u>(Clear)</u> <u>1</u> 2 3 4 5 (Turbid)			
Fish Presence:	<u>No</u> Yes If Yes, Species Code: _____ Density: Low Med High			
	Species Code: _____ Density: Low Med High			





Visual Encounter Survey Data Form

Bullfrog Survey

VISIT #2

Site Name: DAGGETT CR. HEAVENLY STN. RESORT Date: 12 SEP 18 OccurrenceID: \_\_\_\_\_  
 Observers: G. ALLING (SOTERA PHOTO SOLUTIONS) GPS File: \_\_\_\_\_  
 Start Time: 1022 End Time: 1621 Survey Time (Min): 359

Zone: 11 UTM Starting Point: N 4314229 E 249267 Elevation (m): 8600  
 Zone: 11 UTM Ending Point: N 4315045 E 250267 Elevation (m): 7870 Only take UTM's if this is a new survey location  
 Water Temp In (°C): 55 Water Temp Out (°C): 56  
 Air Temp In (°C): 60° Air Temp Out (°C): 58°  
 Type of Survey (circle one): DAY NIGHT Site (circle one): BREEDING NON-BREEDING  
 Survey Number (circle one): 1 (2) Moon phase (night surveys only): \_\_\_\_\_  
 Cloud Cover (%): Start: 10% End: 80% Clear Overcast Partly Cloudy  
 Wind (Moving): Calm Light Strong  
 Precipitation (current): None Drizzling Sprinkling Raining Snowing T-STORM @ 1430  
 Precipitation (last 48 hours): None Drizzling Sprinkling Raining Snowing T-STORM  
 Watershed Condition: Natural Urbane Grazed Logging Burned Other: \_\_\_\_\_  
 Habitat: Stream Wetland Meadow Pond Lake  
 Predominant Vegetation (ex. GF/NO/CF): GF/SH/CF % Aquatic Vegetation: 15  
 Predominate Substrate: Meadow Silt Sand Pebble Cobble Boulder Bedrock  
 Water Source: Meadow (H<sub>2</sub>O present) Lentic (standing) Lotic (flowing) Dry (No H<sub>2</sub>O)  
 Water Turbidity: (Clear) 1 2 3 4 5 (Turbid)  
 Fish Presence: No Yes If Yes, Species Code: \_\_\_\_\_ Density: Low Med High  
 Species Code: \_\_\_\_\_ Density: Low Med High



Visual Encounter Survey Data Form

Bullfrog Survey

VISIT #3

Site Name: HEAVENLY DARGOTT CK. Date: 16 MAY 2018 OccurrenceID: \_\_\_\_\_  
 Observers: G. ALLING (SCS) GPS File: \_\_\_\_\_  
 Start Time: 0945 End Time: 1407 Survey Time (Min): 262

Zone: 11 UTM Starting Point: N 4314229 E 249267.2 Elevation (m): 8000 Only take UTM's if this is a new survey location  
 Zone: 11 UTM Ending Point: N 4315045 E 250266.8 Elevation (m): 7870  
 Water Temp In (°C): 46 Water Temp Out (°C): 46  
 Air Temp In (°C): 50 Air Temp Out (°C): 54  
 Type of Survey (circle one): DAY NIGHT Site (circle one): BREEDING NON-BREEDING  
 Survey Number (circle one): 1 2 3 Moon phase (night surveys only): \_\_\_\_\_  
 Cloud Cover (%): Start: 30 End: 35 Clear Overcast Partly Cloudy  
 Wind (Moving): Calm Light Strong  
 Precipitation (current): None Drizzling Sprinkling Raining Snowing  
 Precipitation (last 48 hours): None Drizzling Sprinkling Raining Snowing  
 Watershed Condition: Natural Urbane Grazed Logging Burned Other: SKI RESORT PARTIAL DEVELOPMENT COUBERT PORTAL  
 Habitat: Stream Wetland Meadow Pond Lake  
 Predominant Vegetation (ex. GF/NO/CF): GF / SH / CF % Aquatic Vegetation: 15  
 Predominate Substrate: Meadow Silt Sand Pebble Cobble Boulder Bedrock  
 Water Source: Meadow (H<sub>2</sub>O present) Lentic (standing) Lotic (flowing) Dry (No H<sub>2</sub>O)  
 Water Turbidity: (Clear) 1 2 3 4 5 (Turbid)  
 Fish Presence: No Yes If Yes, Species Code: \_\_\_\_\_ Density: Low Med High  
 Species Code: \_\_\_\_\_ Density: Low Med High



Visual Encounter Survey Data Form

Bullfrog Survey

VISIT #3.1

Site Name: HEAVENLY DAGGETT CK Date: 8 JUNE 2018 OccurrenceID: \_\_\_\_\_  
 Observers: B. ALLING (SES) GPS File: \_\_\_\_\_  
 Start Time: 1002 End Time: 1436 Survey Time (Min): 274

Zone: 11 UTM Starting Point: N 4314229 E 249267.2 Elevation (m): 4605 Only take UTM's if this is a new survey location  
 Zone: 11 UTM Ending Point: N 4315045 E 250266.8 Elevation (m): 74570  
 Water Temp In (°C): 49°F Water Temp Out (°C): 51°F  
 Air Temp In (°C): 61°F Air Temp Out (°C): 67°F  
 Type of Survey (circle one): DAY NIGHT Site (circle one): BREEDING NON-BREEDING  
 Survey Number (circle one): 1 2 3 Moon phase (night surveys only): \_\_\_\_\_  
 Cloud Cover (%): Start: 10% End: 10% Clear Overcast Partly Cloudy  
 Wind (Moving): Calm Light Strong  
 Precipitation (current): None Drizzling Sprinkling Raining Snowing  
 Precipitation (last 48 hours): None Drizzling Sprinkling Raining Snowing  
 Watershed Condition: Natural Urbane Grazed Logging Burned Other: SKI RESORT PARTIAL DEVELOPMENT  
 Habitat: Stream Wetland Meadow Pond Lake  
 Predominant Vegetation (ex. GF/NO/CF): GF/SH/CF % Aquatic Vegetation: 15  
 Predominate Substrate: Meadow Silt Sand Pebble Cobble Boulder Bedrock  
 Water Source: Meadow (H<sub>2</sub>O present) Lentic (standing) Lotic (flowing) Dry (No H<sub>2</sub>O)  
 Water Turbidity: (Clear) 1 2 3 4 5 (Turbid)  
 Fish Presence: No Yes If Yes, Species Code: \_\_\_\_\_ Density: Low Med High  
 Species Code: \_\_\_\_\_ Density: Low Med High







5 July 2018

Mr. Andrew Strain  
Heavenly Mountain Resort  
PO Box 2180  
Stateline, NV 89449  
-via e-mail-

**SUBJECT: 2018 GALAXY LIFT REPLACEMENT PROJECT PRECONSTRUCTION  
BIOLOGICAL SURVEYS RESULTS**

Mr. Strain:

This memorandum is to inform you of the completion of preconstruction surveys for nesting bird species, marten den sites and bat roost surveys. The Galaxy Lift Replacement Project area was surveyed for the presence of the above wildlife species/types. These areas were surveyed for marten den locations, the presence of bat roost sites and for nesting birds in accordance with the Wildlife Design Features outlined in Section 2.3.5 of the Epic Discovery EIS and incorporated through the issuance of the Decision Notice, Finding of No Significant Effect dated May 2010. The subject area was surveyed on 22, 23, 24 June and 2 July 2018.

**Bat Roost Survey:** The project areas were surveyed for the presence of bat roosts in rock crevices, snags and within dense trees. No evidence of bat roosts was observed during the surveys.

**Marten Den Site Survey:** The project area was surveyed for the presence of marten den sites during the above dates. No evidence of marten was observed in the project area.

**Nesting Bird Survey:** The project area was surveyed for nesting birds on all of the above dates. No active nests were observed within the immediate vicinity of the proposed project. It should be noted a few snags exist within the project area that contain cavities (none of which were active) that are suitable nesting locations for a variety of bird species present. Efforts should be made to retain these snags within the project area where feasible in order to maintain suitable nesting locations for cavity nesters.

Species observed:

Avian species: song sparrow (*Melospiza melodia*), chipping sparrow (*Spizella passerina*), white-crowned sparrow (*Zonotrichia leucophrys*), fox sparrow (*Passerella iliaca*),



American robin (*Turdus migratorius*), brown creeper (*Certhia americana*), brewer's blackbird (*Euphagus cyanocephalus*), Cassin's finch (*Haemorhous cassinii*), Clark's nutcracker (*Nucifraga columbiana*), Cooper's hawk (*Accipiter cooperii*) common raven (*Corvus corax*), dark-eyed junco (*Junco hyemalis*), downy woodpecker (*Picoides pubescens*), hairy woodpecker (*Leuconotopicus villosus*), hermit warbler (*Setophaga occidentalis*), mountain bluebird (*Sialia currucoides*), mountain chickadee (*Poecile gambeli*), Nashville warbler (*Leiothlypis ruficapilla*), northern flicker (*Colaptes auratus*), pine siskin (*Carduelis pinus*), pygmy nuthatch (*Sitta pygmaea*), red-breasted nuthatch (*Sitta canadensis*), Stellar's Jay (*Cyanocitta stelleri*), Townsend's solitaire (*Myadestes townsendi*), western tanager (*Piranga ludoviciana*), western wood pewee (*Contopus sordidulus*), white-breasted nuthatch (*Sitta carolinensis*), Williamson's sapsucker (*Sphyrapicus thyroideus*) and yellow-rumped warbler (*Setophaga coronata*),

Mammals: Douglas squirrel (*Tamiasciurus douglasii*), least chipmunk (*Tamias minimus*) and black bear (*Ursus americanus*) mule deer (*Odocoileus hemionus*).

Regards,

A handwritten signature in black ink, appearing to read 'Garth Alling', written over a light gray rectangular background.

Garth Alling  
Principal Biologist

CC: Robert Rodman, LTBMU  
Stephanie Coppeto, LTBMU



**SIERRA ECOTONE SOLUTIONS**

530.416.2440 • PO Box 1297 Zephyr Cove, NV 89448 • [SierraEcotoneSolutions.com](http://SierraEcotoneSolutions.com)

11 June 2018

Mr. Andrew Strain  
Heavenly Mountain Resort  
PO Box 2180  
Stateline, NV 89449  
-via e-mail-

**SUBJECT: 2018 SUMMER ACTIVITIES NESTING BIRD SURVEY RESULTS**

Mr. Strain:

A nesting bird survey was performed on 7, 8, 10, and 11 June 2018 for summer activities located at the top of the Gondola and surrounding areas. The project areas were surveyed for nesting birds in accordance with the design features identified in the Biological Evaluation and the Epic Discovery EIR/EIS/EIS. The following project areas were surveyed for nesting birds: Skyway Canopy Tour, Silver Rush Canopy Tour, Hot Shot Zip Line, Blue Streak Zip Line, Red Tail Zip Line and all ropes courses.

Nesting Bird Survey: The project areas were surveyed for nesting birds on the above dates and project areas. No active nests were observed on the project facilities or within the immediate vicinity that would result in impacts. As noted in previous surveys, a few snags exist within the project areas that contain cavities (none of which were active) that are suitable nesting locations for a variety of bird species present within the project area. Efforts should be made to retain these snags within the project area where feasible in order to maintain suitable nesting locations for cavity nesters.

Species observed:

Avian species: American robin (*Turdus migratorius*), American white pelican (*Pelecanus erythrorhynchos*), brown creeper (*Certhia americana*), brewer's blackbird (*Euphagus cyanocephalus*), Cassin's finch (*Haemorhous cassinii*), Clark's nutcracker (*Nucifraga columbiana*), Cooper's hawk (*Accipiter cooperii*), common raven (*Corvus corax*), dark-eyed junco (*Junco hyemalis*), downy woodpecker (*Picoides pubescens*), hairy woodpecker (*Leuconotopicus villosus*), hermit warbler (*Setophaga occidentalis*), mountain bluebird (*Sialia currucoides*), mountain chickadee (*Poecile gambeli*), Nashville warbler (northern flicker (*Colaptes auratus*), pine siskin (*Carduelis pinus*), pygmy nuthatch (*Sitta pygmaea*), red-breasted nuthatch (*Sitta canadensis*), Stellar's Jay (*Cyanocitta stelleri*), Townsend's solitaire (*Myadestes townsendi*), western tanager

(*Piranga ludoviciana*), western wood pewee (*Contopus sordidulus*), white-breasted nuthatch (*Sitta carolinensis*), Williamson's sapsucker (*Sphyrapicus thyroideus*) and yellow-rumped warbler (*Setophaga coronata*),

Mammals: Douglas squirrel (*Tamiasciurus douglasii*), least chipmunk (*Tamias minimus*) and black bear (*Ursus americanus*).

Regards,

A handwritten signature in black ink, appearing to read 'Garth Alling', written over a light gray rectangular background.

Garth Alling  
Principal Biologist

CC: Stephanie Coppeto, LTBMU  
James Grant, Heavenly Mountain Resort  
Chris Donley, Cardno

**BOTANICAL FIELD RECONNAISSANCE REPORT**  
**Lake Tahoe Basin Management Unit**

**Project:** Heavenly Mountain Resort – Galaxy Lift Replacement and NV Energy Upgrades

**Location:** T12N R18E S1  $\frac{1}{4}$ NW  $\frac{1}{4}$ NW **UTM:**

**Survey Date:** 5 and 13 July 2018 **Surveyor/s:** A. Stanton, G. Alling

**Directions to Site:** Heavenly Mountain Resort, NV Side, Galaxy Lift Replacement in lift corridor, top station and bottom station, NV Energy Upgrades (see attached map).

**USGS Quad Name:** South Lake Tahoe

**Survey type:** Complete

**Describe survey route taken:** Follow Galaxy lift corridor from top station to bottom station. Survey area as noted on attached map for NV Energy Project.

**Project description:** Replace Galaxy Lift with fixed grip triple. NV Energy electrical upgrades along existing lines...

**Describe habitat/s:** Type, Plant series, plant associations, unique features, etc:

*Pinus albicaulis* and *Pinus contorta* to *Aibes concolor* and *Aibes magnifica*, low species diversity. Understory absent or sparse (*Arctostaphylos nevadensis*). Occasional semi-woody to herbaceous species. Existing ski trail (Galaxy/Perimeter) previously seeded.

**Dbh** (Give the range for dominant tree types): 6" – 32"

**Slope/s (range):** 20-25% **Aspect/s (range):** NE **Elevation (range):** 9,000 – 7,800

**Seral Stage:** mid - late **Soil/Bedrock:** Granitic sandy gravely loam

**Disturbance** (type and intensity visible in area):

Ski trails previously graded, summer dirt roadways, and ski lifts exist within the area surveyed or immediately adjacent to the survey area.

**Are there historical populations in the area of this project?** No

**Were listed species found for this survey?** No

**Noxious Weeds found in Area:** No

**Recommendations/Additional Comments:**

None

Include a complete species list and a map with route surveyed with recon form.

On July 10 and 13<sup>th</sup>, 2018, I conducted botanical surveys at the Heavenly Resort for the Galaxy Chair Lift replacement project and the NV Energy Galaxy-Mott line. No sensitive plant species or noxious weeds were found within the project areas. Table 1 includes the list of tree, shrub, and herbaceous vascular plants that were observed. Plant phenology on the site was optimal, with most species in flower and/or fruit.

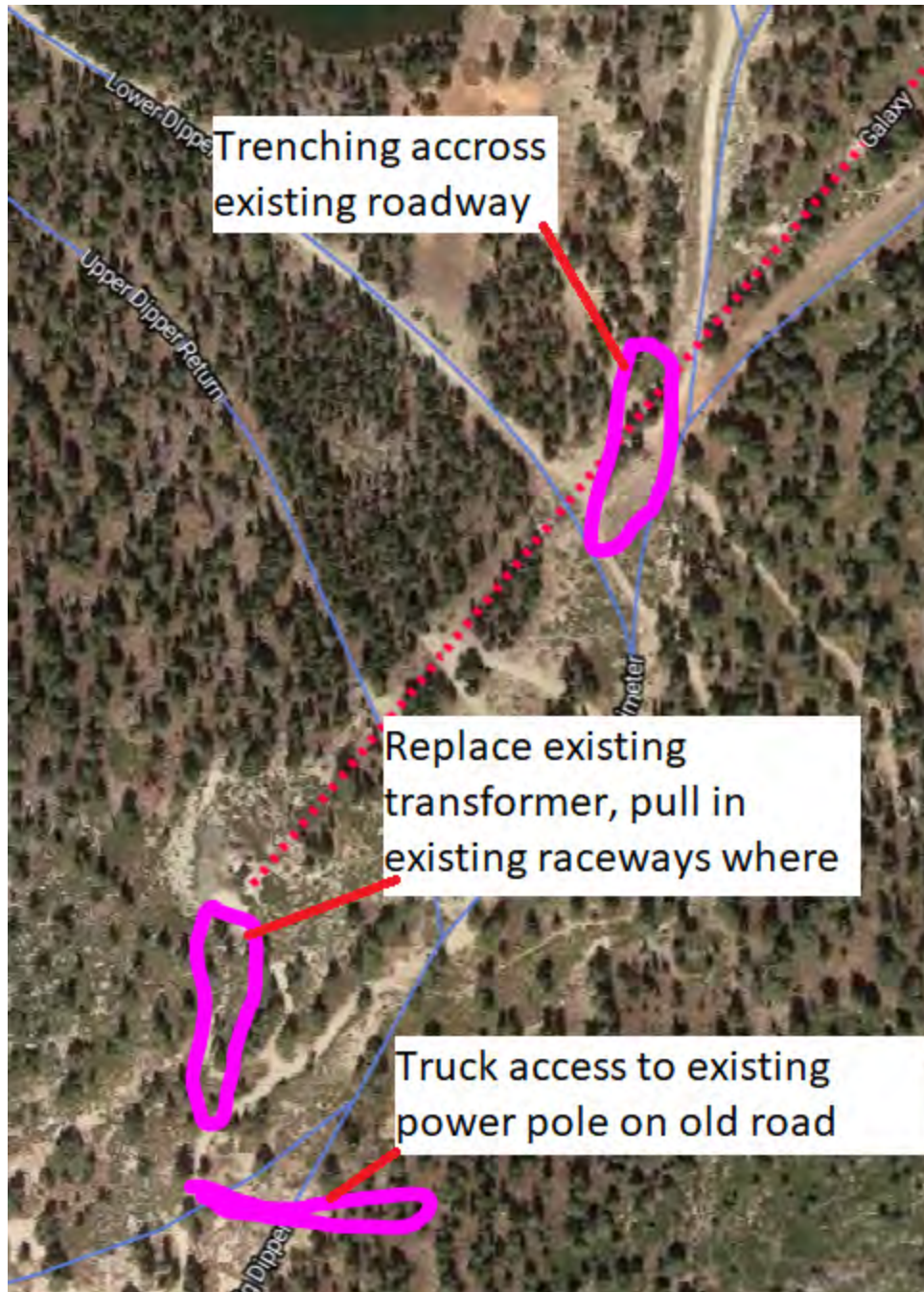
Table 1. Vascular plant species found at Heavenly Resort. Species names in parenthesis are former names.

Scientific name	Common name	Family
<b>Trees</b>		
<i>Abies magnifica</i>	red fir	Pinaceae
<i>Abies concolor</i>	white fir	Pinaceae
<i>Pinus contorta</i>	lodgepole pine	Pinaceae
<i>Pinus jeffreyi</i>	Jeffrey pine	Pinaceae
<i>Pinus monticola</i>	western white pine	Pinaceae
<b>Shrubs</b>		
<i>Artemisia tridentata</i>	big sagebrush	Asteraceae
<i>Arctostaphylos nevadensis</i>	pinemat manzanita	Ericaceae
<i>Ceanothus velutinus</i>	tobacco bush	Rhamnaceae
<i>Cercocarpus ledifolius</i>	mountain mahogany	Rosaceae
<i>Chrysothamnus nauseosus</i>	rabbitbrush	Asteraceae
<i>Ribes nevadense</i>	Sierra currant	Grossulariaceae
<b>Forbs</b>		
<i>Allium validum</i>	swamp onion	Liliaceae
<i>Arnica longifolia</i>	Seep spring arnica	Asteraceae
<i>Arnica mollis</i>	Soft arnica	Asteraceae
<i>Boechera davidsonii</i> ( <i>Arabis lemmonii</i> )	Davidson's rockcress	Brassicaceae
<i>Boechera lemmonii</i> ( <i>Arabis lemmonii</i> )	Lemon's rockcress	Brassicaceae
<i>Boechera platysperma</i> ( <i>Arabis platysperma</i> )	pioneer rockcress	Brassicaceae
<i>Calyptrium umbellatum</i>	pussypaws	Portulacaceae
<b>Scientific name</b>	<b>Common name</b>	<b>Family</b>
<b>Forbs</b>		
<i>Chamerion angustifolium</i> subsp. <i>circumvagum</i> ( <i>Epilobium angustifolium</i> ssp. <i>circumvagum</i> )	fireweed	Onagraceae
<i>Descurainia incana</i>	mountain tansy mustard	Brassicaceae
<i>Drymocallis glandulosa</i> ( <i>Potentilla glandulosa</i> )	sticky cinquefoil	Rosaceae
<i>Epilobium ciliatum</i> subsp. <i>ciliatum</i>	sticky willow herb	Onagraceae
<i>Epilobium ciliatum</i> subsp. <i>glandulosum</i>	sticky willow herb	Onagraceae
<i>Eremogone kingii</i> ( <i>Arenaria kingii</i> )	King's sandwort	Caryophyllaceae
<i>Eriogonum marifolium</i>	marum-leaved buckwheat	Polygonaceae
<i>Eriogonum spergulinum</i>	Spurrey buckwheat	Polygonaceae
<i>Eriogonum umbellatum</i>	Sulfur buckwheat	Polygonaceae

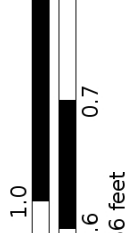
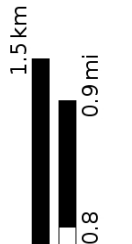
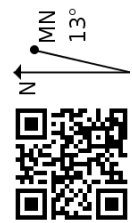
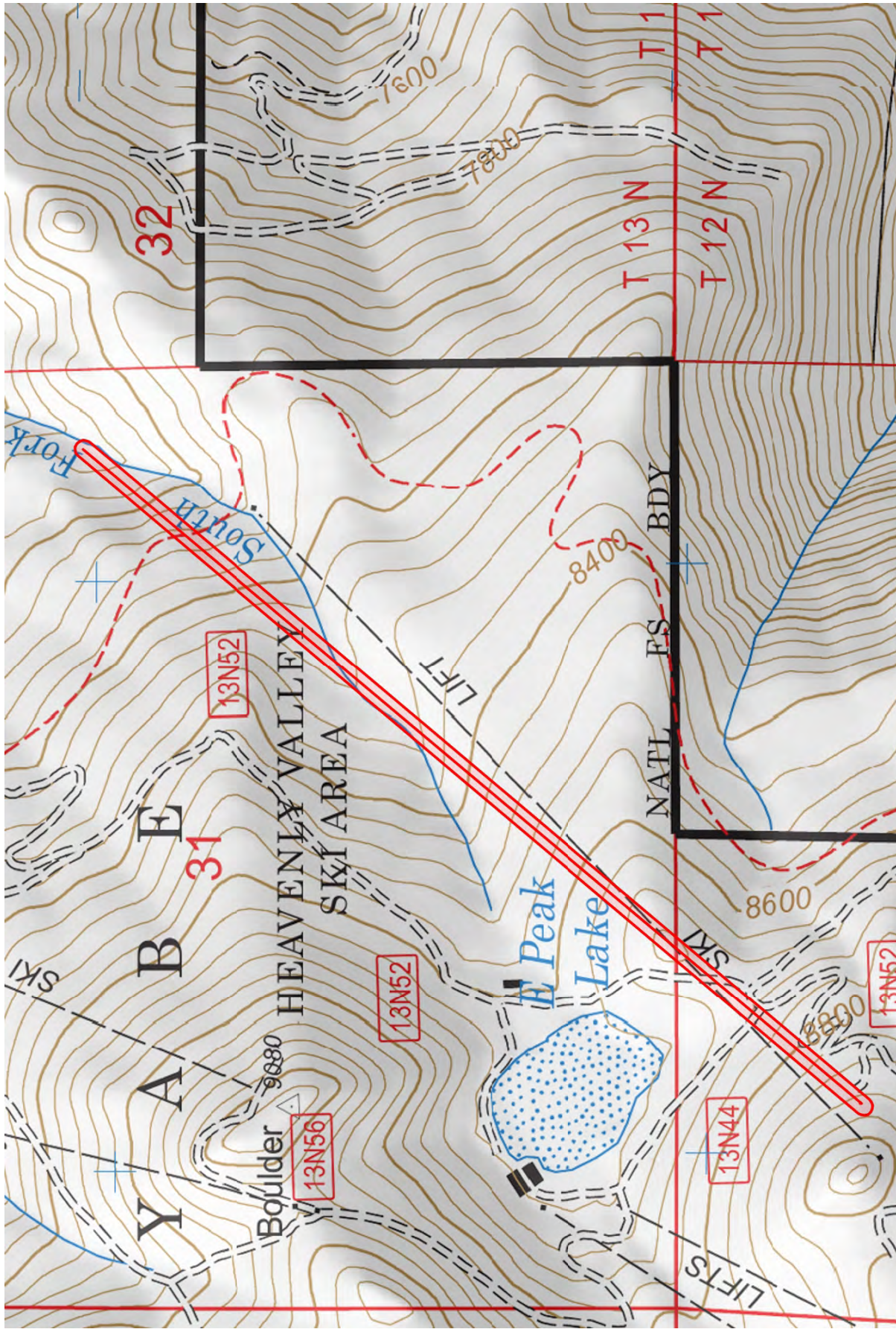
Gayophytum diffusum	spreading groundsmoke	Onagraceae
Leptosiphon ciliatus (Linanthus ciliatus)	whisker brush	Polemoniaceae
Leptosiphon nuttallii (Linanthus nuttallii)	Nuttall's linanthus	Polemoniaceae
Lilium parvum	tiger lily	Liliaceae
Linanthus pungens (Leptodactylon pungens)	granite gilia	Polemoniaceae
Lupinus arbustus	crest lupine	Fabaceae
Mertensia ciliata	mountain bluebells	Boraginaceae
Mimulus guttatus	seep monkeyflower	Phrymaceae
Oreostemma alpigenum (Aster alpigenus)	alpine aster	Asteraceae
Orthilia secunda	Sidebells	Ericaceae
Pedicularis semibarbata	Pinewoods lousewort	Orobanchaceae
Penstemon gracilentus	slender penstemon	Plantaginaceae
Penstemon heterodoxus	Sierra penstemon	Plantaginaceae
Penstemon newberryi	mountain pride	Plantaginaceae
Phacelia hastata ssp. compacta	timberline phacelia	Hydrophyllaceae
Phacelia hydrophyloides	ballhead phacelia	Hydrophyllaceae
Phlox diffusa	spreading phlox	Polemoniaceae
Plantanthera dilitata var. leucostachys	rein orchid	Platantheraceae
Polemonium californicum	Jacob's ladder	Polemoniaceae
Polygonum bistortoides	Bistort	Polygonaceae
Potentilla flabellifolia	fan-leafed cinquefoil	Rosaceae
Pyrolia asarifolia	Bog wintergreen	Ericaceae
Senecio triangularis	arrowleaf groundsel	Asteraceae
Trifolium microcephalum	small headed clover	Fabaceae
Trifolium monanthum	mountain carpet clover	Fabaceae
Veratrum californica	corn lily	Melanthiaceae
Veronica americana	Brooklime	Plantaginaceae
Veronica serpyllifolia ssp. humifusa	thyme-leaved speedwell	Plantaginaceae
<b>Scientific name</b>	<b>Common name</b>	<b>Family</b>
<b>Grasses and grass-like plants</b>		
Carex arthrostachya	slender leaved sedge	Cyperaceae
Carex illota	sheep's sedge	Cyperaceae
Carex integra	smooth beak sedghe	
Carex lenticularis	lakeshore sedge	Cyperaceae
Carex nebrascensis	Nebraska sedge	Cyperaceae
Carex rossii	Ross' sedge	Cyperaceae
Deschampsia cespitosa	salt and pepper grass	Poaceae
Deschampsia elongata (Aira elongata)	slender hairgrass	Poaceae
Eleocharis acicularis	needle spikerush	Cyperaceae
Elymus elymoides	squirreltail	Poaceae
Elymus ponticus (Elytrigia pontica)	tall wheatgrass	Poaceae
Elymus trachycaulus	slender wheatgrass	Poaceae
Stipa occidentalis	western needlegrass	Poaceae

Juncus effusus	common rush	Juncaceae
Juncus ensifolius	swordleaf rush	Juncaceae
Juncus nevadensis	Sierra rush	Juncaceae
Juncus occidentalis	western rush	Juncaceae
Juncus tenuis	slender rush	Juncaceae
Luzula comosa	common wood rush	Cyperaceae
Poa wheeleri	Wheeler's poa	Poaceae

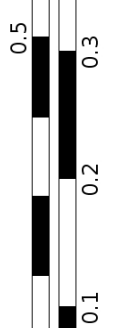








Scale 1:8836 1 inch = 736 feet



Galaxy Floristic Surveys  
 WGS84  
 USNG Zone 11SKD  
 CalTopo



14 January 2019

Ms. Brandy Thomson  
Heavenly Mountain Resort  
P.O. Box 2180  
Stateline, NV 89449

**SUBJECT: HEAVENLY MOUNTAIN RESORT 2018 BIOLOGICAL SURVEY RESULTS SUMMARY**

Dear Ms. Thomson,

In order to comply with US Forest Service LTBMU requirements and to allow for preparation of environmental documentation for future construction and implementation of projects, Sierra Ecotone Solutions LLC has performed wildlife and plant surveys in suitable habitat within the Special Use Permit Boundary in 2018. Surveys for both northern goshawk and California spotted owl were completed to protocol. The first year of the migratory bird habitat utilization surveys was set up and performed and will continue for the next 4 years. Additional surveys were performed for nesting bird species in the areas surrounding 2018 capital projects (Skyway Canopy Tour, Silver Rush Canopy Tour, Hot Shot Zip Line, Blue Streak Zip Line, Red Tail Zip Line and all ropes courses). Tahoe draba (*Draba asterophora asterophora*) surveys were performed for 2018 maintenance projects. A summary of each species surveys is provided below:

**Tahoe Draba**

Surveys for Tahoe draba were performed in the vicinity of the Galaxy Lift and NV Energy project located between Galaxy Lift and Mott Lift.

**California Spotted Owl**

Methods: Surveys were conducted and completed in potentially suitable habitat within and surrounding the project area. Surveys were conducted according to the United States Forest Service “Protocol for Surveying for Spotted Owls in Proposed Management Activity Areas and Habitat Conservation Areas” (March 12, 1991, Revised February 1993). The survey points used since the 2007 field season were utilized again in 2018 to provide continuity of data collected. Data sheets for 2018 surveys are attached to this letter.

Results: No auditory or visual detections of California spotted owls were documented within the survey area during 2018.

**Northern Goshawk**

Methods: Surveys were conducted and completed in suitable habitat within and adjacent to the project area for northern goshawk based on the updated habitat map generated by the US Forest Service for the environmental analysis of the Master Plan Amendment. In 2018, both dawn acoustical and broadcast survey methods were utilized and were completed to protocol. All surveys were conducted according

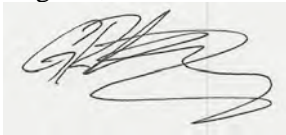
to “Survey Methodology for Northern Goshawks in the Pacific Southwest Region, U.S. Forest Service” (14 May 2002). Data sheets for 2018 dawn acoustical and broadcast surveys are submitted with this letter.

Results: No auditory or visual detections of northern goshawk were documented within the survey area in 2018.

The completion of the 2018 field surveys for northern goshawk and California spotted owl results in meeting the two-year protocol for these species. Based on Appendix A of the California spotted owl survey protocol, since no detections were documented, and the two year protocol was met, “the negative results may be considered accurate for two additional years without conducting additional surveys.” The two-year timeline starts on the last day of the last survey, which would be 26 June 2018. Therefore, if implementation of projects would commence prior to 26 June 2020, no further surveys for California spotted owl would be necessary. However, if construction does not commence prior to this date, two-year protocol surveys must be conducted. The northern goshawk protocol does not include any discussion as to validity of surveys for any duration of time after protocol has been met. Since northern goshawks have been detected in previous years, it is recommended surveys for northern goshawks are continued to determine if goshawks are nesting within the special use permit boundary.

If you should have any questions regarding the surveys performed for the 2018 season, please do not hesitate to contact me at (530) 416-2440.

Regards,

A handwritten signature in black ink, appearing to read 'Garth Alling', is written over a light gray rectangular background.

Garth Alling  
Principal Biologist

Enclosures

CC: Shay Zanetti , USFS LTBMU  
Chris Donley, Cardno



## California Spotted Owl Visit Form-USFS-Lake Tahoe Basin Management Unit

Route Name/Territory: HEAVENLY SOUTH LTB- \_\_\_\_\_ Visit# 1 Outing# 1 Date: 19 APR 18

Observers (and affiliation): G. ALLING

Type of Survey (spot calling SC, follow-up FO, additional visit AD): SC Sunset/Sunrise: 1938/0618 Quad: SCT

Weather: % cloud cover: 50% precip: 0 temp: start 38 °F end 30 °F Beaufort wind speed: start 2 end 2

**Summary of Survey Results and Comments:**

NO STOC DETECTIONS

CS #	Start/Finish	V, A or B- sex (M,F,U)	Dir.	Dis.(m)	UTMs		GPS	Comments (include legals and elevation for detections)
					Northing	Easting		
S15	1938-1948							<div style="font-size: 2em;">NR</div> <div style="font-size: 2em; margin-top: 50px;">↓</div> <div style="font-size: 1.5em; margin-top: 10px;">GHC 27° ± 200m →</div> <div style="font-size: 2em; margin-top: 10px;">NR</div> <div style="font-size: 2em; margin-top: 50px;">↓</div>
S17	2001-2011							
S15b	2102-2112							
S15a	2123-2133							
S13	2201-2211							
S12	2229-2239							
V57	2304-2314							
V5A	2320-2330							
V58	0017-0027							
V510	0039-0049							

Travel to Area    Survey of Area    Travel from Area    Totals

Beg Time	_____	_____	_____	_____
End Time	_____	_____	_____	_____
Total	_____	_____	_____	_____
Mil. Beg	_____	_____	_____	_____
Mil. End	_____	_____	_____	_____
Totals	_____	_____	_____	_____

Beaufort #	Wind Speed	Indicator of wind speed
0	0	smoke rises vertically.
1	1-3	wind dir. shown by smoke dir.
2	4-7	wind on face; leaves rustle
3	8-12	leaves, twigs in constant motion
4	13-18	dust and leaves move
5	19-24	small trees sway
6	25-31	large tree branches move

\*do not survey in wind conditions >4 Beaufort







## California Spotted Owl Visit Form-USFS-Lake Tahoe Basin Management Unit

Route Name/Territory: HEAVENLY SOUTH LTB- \_\_\_\_\_ Visit# 2 Outing# 1 Date: 7 MAY 2018

Observers (and affiliation): G. ALLING

Type of Survey (spot calling SC, follow-up FO, additional visit AD): SC Sunset/Sunrise: 1954/0556 Quad: SLT

Weather: % cloud cover: 25 precip: 0 temp: start 35 °F end 33 °F Beaufort wind speed: start 2 end 2

**Summary of Survey Results and Comments:**

NO RESPONSE

CS #	Start/Finish	V, A or B- sex (M,F,U)	Dir.	Dis.(m)	UTMs		GPS	Comments (include legals and elevation for detections)
					Northing	Easting		
S18	1954-2004							<div style="font-size: 2em;">NTZ</div>
S17	2015-2025							
S15b	2152-2142							
S15a	2155-2205							
S13	2300-2310							
S12	2322-2332							
NSA	0003-0013							
NS7	0019-0029							
NS10	0111-0121							
NS8	0136-0146							

Travel to Area    Survey of Area    Travel from Area    Totals

Beg. Time				
End Time				
Total				
Mil. Beg				
Mil. End				
Totals				

Beaufort #	Wind Speed	Indicator of wind speed
0	0	smoke rises vertically.
1	1-3	wind dir. shown by smoke dir.
2	4-7	wind on face; leaves rustle
3	8-12	leaves, twigs in constant motion
4	13-18	dust and leaves move
5	19-24	small trees sway
6	25-31	large tree branches move

\*do not survey in wind conditions >4 Beaufort

## California Spotted Owl Visit Form-USFS-Lake Tahoe Basin Management Unit

Route Name/Territory: HEAVENLY NORTH LTB- \_\_\_\_\_ Visit# 2 Outing# 1 Date: 14 MAY 18

Observers (and affiliation): G. ALLING

Type of Survey (spot calling SC, follow-up FO, additional visit AD): SC Sunset/Sunrise: 2000/0550 Quad: SCT

Weather: % cloud cover: 30% -precip: 0 temp: start 38 °F end 34 °F Beaufort wind speed: start 2 end 3

**Summary of Survey Results and Comments:**

NO RESPONSE

CS #	Start/Finish	V, A or B- sex (M,F,U)	Dir.	Dis.(m)	UTMs		GPS	Comments (include legals and elevation for detections)
					Northing	Easting		
VS1	2000-2011							<div style="font-size: 2em;">NR</div>
VS2	2023-2033							
VS4	2050-2100							
VS3	2115-2125							
VS5	2149-2200							
HN8	2317-2327							
HN7	2341-2351							
HN6	0009-0019							

Travel to Area    Survey of Area    Travel from Area    Totals

Beg. Time				
End Time				
Total				
Mil. Beg				
Mil. End				
Totals				

Beaufort #	Wind Speed	Indicator of wind speed
0	0	smoke rises vertically.
1	1-3	wind dir. shown by smoke dir.
2	4-7	wind on face; leaves rustle
3	8-12	leaves, twigs in constant motion
4	13-18	dust and leaves move
5	19-24	small trees sway
6	25-31	large tree branches move

\*do not survey in wind conditions >4 Beaufort







**California Spotted Owl Visit Form-USFS-Lake Tahoe Basin Management Unit**

Route Name/Territory: HEAVENLY SOUTH LTB- \_\_\_\_\_ Visit# 3 Outing# 1 Date: 25 JUN 2015

Observers (and affiliation): G. Aullin

Type of Survey (spot calling SC, follow-up FO, additional visit AD): SC Sunset/Sunrise: 2024/0538 Quad: SLT

Weather: % cloud cover: \_\_\_\_\_ precip: \_\_\_\_\_ temp: start \_\_\_\_\_ °F end \_\_\_\_\_ °F Beaufort wind speed: start \_\_\_\_\_ end \_\_\_\_\_

**Summary of Survey Results and Comments:**

*NO RESPONSE*

CS #	Start/Finish	V, A or B- sex (M,F,U)	Dir.	Dis.(m)	UTMs		GPS	Comments (include legals and elevation for detections)
					Northing	Easting		
S14	2024-2034							NR
S17	2040-2050							
S15c	2203-2213							
S15b	2227-2217							
S13	2317-2327							
S12	2350-0000							
V5A	0032-0042							
V57	0047-0057							
V58	0112-0122							
V510	0141-0151							

Travel to Area    Survey of Area    Travel from Area    Totals

Beg. Time \_\_\_\_\_  
 End Time \_\_\_\_\_  
 Total \_\_\_\_\_  
 Mil. Beg \_\_\_\_\_  
 Mil. End \_\_\_\_\_  
 Totals \_\_\_\_\_

Beaufort #	Wind Speed	Indicator of wind speed
0	0	smoke rises vertically.
1	1-3	wind dir. shown by smoke dir.
2	4-7	wind on face; leaves rustle
3	8-12	leaves, twigs in constant motion
4	13-18	dust and leaves move
5	19-24	small trees sway
6	25-31	large tree branches move

\*do not survey in wind conditions >4 Beaufort

**California Spotted Owl Visit Form-USFS-Lake Tahoe Basin Management Unit**

Route Name/Territory: HEAVENLY CORP LTB- \_\_\_\_\_ Visit# 3 Outing# 1 Date: 26 JUN 18

Observers (and affiliation): G ALLING

Type of Survey (spot calling SC, follow-up FO, additional visit AD): SC Sunset/Sunrise: 2024 / 0538 Quad: SCT

Weather: % cloud cover: 15% precip: 0 temp: start 40 °F end 34 °F Beaufort wind speed: start 2 end 3

**Summary of Survey Results and Comments:**

NO RESPONSE

CS #	Start/Finish	V, A or B- sex (M,F,U)	Dir.	Dis.(m)	UTMs		GPS	Comments (include legals and elevation for detections)
					Northing	Easting		
Hc1	2024-2034							
Hc2	2047-2057							
Hc3	2121-2131							
Hc4	2152-2202							
Hc5	2237-2247							
Hc6	2305-2315							
Hc7	0001-0011							
Hc8	0052-0102							
Hc9	0141-0151							
Hc10	0213-0223							
Hc11	0235-0245							

Travel to Area    Survey of Area    Travel from Area    Totals

Beg. Time \_\_\_\_\_  
 End Time \_\_\_\_\_  
 Total \_\_\_\_\_  
 Mil. Beg \_\_\_\_\_  
 Mil. End \_\_\_\_\_  
 Totals \_\_\_\_\_

Beaufort #	Wind Speed	Indicator of wind speed
0	0	smoke rises vertically.
1	1-3	wind dir. shown by smoke dir.
2	4-7	wind on face; leaves rustle
3	8-12	leaves, twigs in constant motion
4	13-18	dust and leaves move
5	19-24	small trees sway
6	25-31	large tree branches move

\* do not survey in wind conditions >4 Beaufort





































**Northern Goshawk Broadcast Survey Form- USFS-Lake Tahoe Basin Management Unit**

Site: DAHGOTT Surveyors: G. ALLING Date: JUL 18  
 Visit #: 1 Outing #: 1 Quad: SCT T 13N R 19E sec(s) 21  
 Quad: DINDEN T 13N R 19E sec(s) 296 / 32  
 Weather: % cloud cover: start 20% end 0 precip: start 0 end 0 temp: start 50°F end 72°F Beaufort wind speed: start 3 end 3

**SURVEY INFORMATION:** Start Time 0544 End Time 1421 Call point and route information on back.

**RESULTS:** NO DETECTIONS

Detection Number	Time	Detection Type	Bearing	Distance (m)	ZONE 10 UTM's		Latitude	Longitude	GPS
					Easting	Northing			

Detection Number	Comments

**Detection Type:** A= alarm call; W= wail call; J= juvenile beg; V= visual only; N= nest; PP= plucking post; F= feather; R= roost  
**Map:** Attach map and denote all call points (use O) and detections (use Δ)

	Travel To Site	Survey	Travel From Site
Start Time			
Stop Time			
Total Time			
Begin Mileage			
End Mileage			
Total Mileage			

Beaufort #	Wind Speed	Indicator of wind speed
0	0	Smoke rises vertically
1	1-3	wind dir. shown by smoke dir.
2	4-7	wind on face; leaves rustle
3	8-12	leaves, twigs in constant motion
4	13-18	dust and leaves move
5	19-24	small trees sway
6	25-31	large tree branches move

Total Time \_\_\_\_\_ Total Mileage \_\_\_\_\_





**Northern Goshawk Broadcast Survey Form- USFS-Lake Tahoe Basin Management Unit**

Site: LOWOR DAGGOTT Surveyors: G. ALLING Date: 13 JUL 18  
 Visit #: 1 Outing #: 1 Quad: MINDEN T 13N R 19E sec(s) 29  
 Quad: \_\_\_\_\_ T \_\_\_\_\_ R \_\_\_\_\_ sec(s) \_\_\_\_\_

Weather: % cloud cover: start 0 end 0 precip: start 0 end 0 temp: start 49 °F end 76 °F Beaufort wind speed: start 2 end 2

**SURVEY INFORMATION:** Start Time 0627 End Time 1342 Call point and route information on back.

**RESULTS:** NO DETECTIONS

Detection Number	Time	Detection Type	Bearing	Distance (m)	ZONE 10 UTM's		Latitude	Longitude	GPS
					Easting	Northing			

Detection Number	Comments

**Detection Type:** A= alarm call; W= wail call; J= juvenile beg; V= visual only; N= nest; PP= plucking post; F= feather; R= roost  
**Map:** Attach map and denote all call points (use O) and detections (use Δ)

	Travel To Site	Survey	Travel From Site
Start Time			
Stop Time			
Total Time			
Begin Mileage			
End Mileage			
Total Mileage			

Beaufort #	Wind Speed	Indicator of wind speed
0	0	Smoke rises vertically
1	1-3	wind dir. shown by smoke dir.
2	4-7	wind on face; leaves rustle
3	8-12	leaves, twigs in constant motion
4	13-18	dust and leaves move
5	19-24	small trees sway
6	25-31	large tree branches move

Total Time \_\_\_\_\_ Total Mileage \_\_\_\_\_











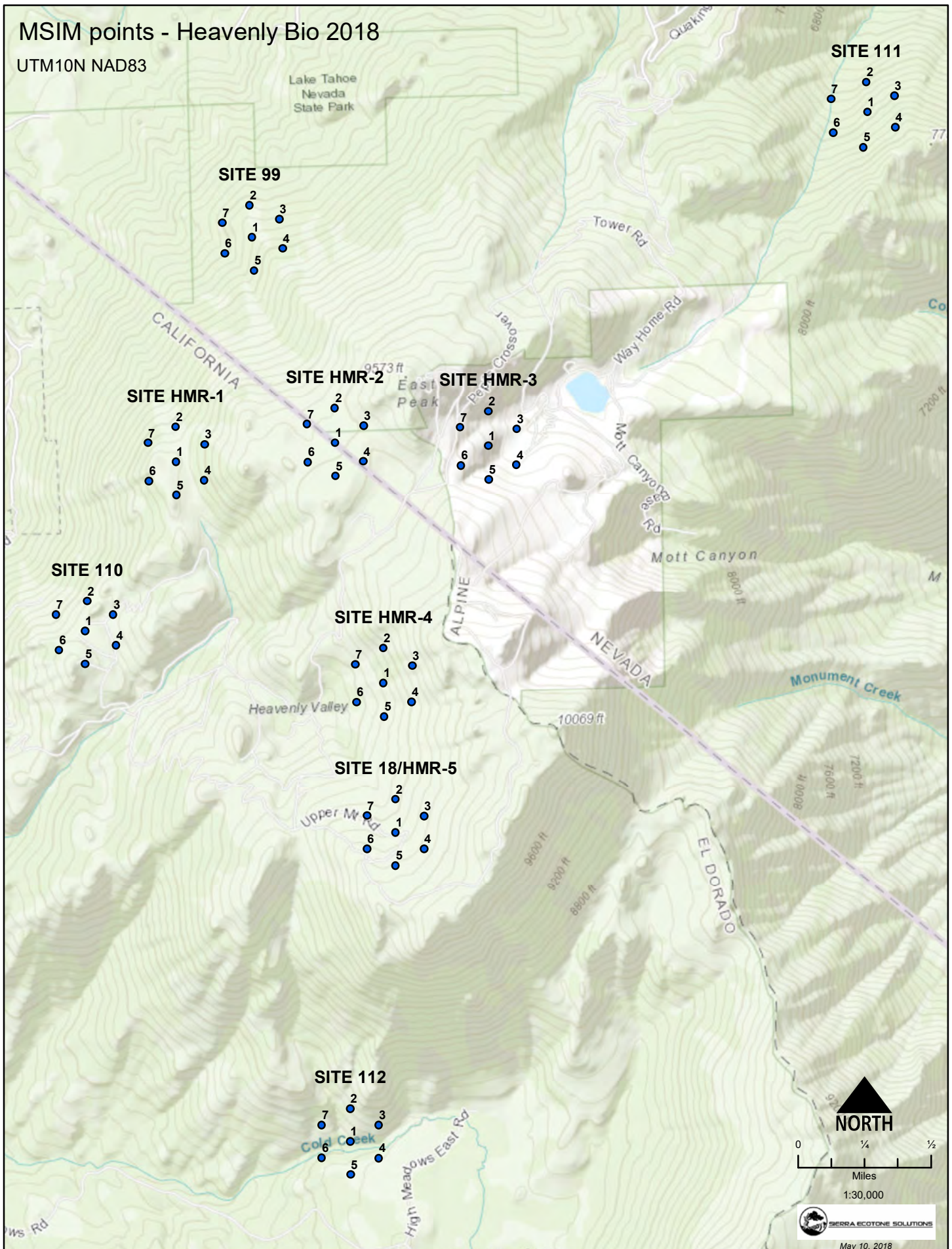




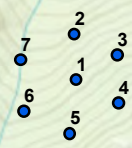


# MSIM points - Heavenly Bio 2018

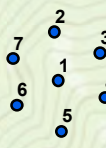
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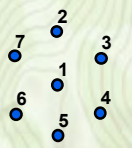
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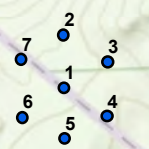
SITE 99



SITE HMR-1



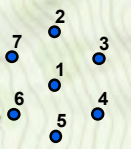
SITE HMR-2



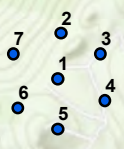
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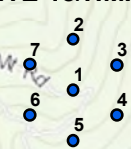
SITE HMR-4



SITE 110



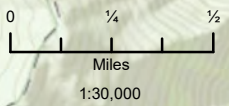
SITE 18/HMR-5



SITE 112



NORTH



May 10, 2018



Heavenly Mountain Resort  
Mitigation and Monitoring Plan Annual Report  
(October 2017 – September 2018)

APPENDIX

IX

2016 BOUNDARY MANAGEMENT  
PLAN



## **BOUNDARY MANAGEMENT**

A. In perimeter areas, where it is likely for the skiing public to ski out of the patrolled area, Heavenly may utilize a gated boundary system consisting of the following elements:

1. Gates located in areas that people have traditionally gone through in order to reach an area out-of-bounds.
2. Appropriate signage will be placed at the gates, informing users this is true backcountry access. Heavenly will place signs indicating that terrain is not patrolled or maintained beyond this point. Avalanche danger exists. You are responsible for your own safety and survival. Searches may or may not be conducted due to hazardous conditions. Skiers who enter the Backcountry areas will do so knowingly and will accept full responsibility for property loss, injury and/or death. Gate postings will also include the Back Country Checklist, the North American Public Avalanche Danger Scale, USDAFS Access Point Notice and other signage. They may also be cited by local authorities and charged for the cost of their rescue.
3. Gated entries will be a well identified vertical structures through which a skier must pass. A steel gate will hang horizontally from one post and be held against the other by a self-closing mechanism.

For someone to enter the area they must pull the gate in front of them as they pass through, the gate will automatically close behind them. The bar will be height adjustable to allow it to remain at waist-height for a normal adult. The intent in doing this is to require a physical action beyond merely going through the posts to enter the area.

4. Due to the fact that this experience would be the same as any other backcountry experience, Heavenly will rarely “close” access into the terrain. these gates would be closed when Heavenly staff is actively performing avalanche control with explosives in the adjacent permit area.

There are other rare instances where a back country gate may be closed by the operating ski resort in order to halt access to the terrain by none authorized individuals.

5. “Closed Ski Area Boundary, Exit Through Gates Only” signage will be placed along perimeter ropes. These signs are placed at appropriate intervals so that individuals have the opportunity to read the warning from inside the area perimeter ropes. The signage will indicate that some routes may access private property.

6. Heavenly will provide and maintain counters at each of the gates for the entire ski season. Gate use will be monitored and reported to Forest Service

7. Heavenly will assist county search and rescue efforts when possible. Back Country Access gates will be monitored throughout the winter season to ensure signage is in place, the gates are functioning properly, and that they are at the appropriate height. The gates are installed at the following locations:

1. Fire Break : This gate is located to the north of the top of Olympic Chair. It accesses north/northwest terrain locally termed “The Palisades” continuing down towards lower 207 Kingsbury grade (lake side).

2. Raley's Gulch: This gate is located off the California Trail at the perimeter rope of Maggie's Canyon. It accesses north/northwest terrain that continues down the front side of the mountain towards Lake Tahoe.
3. Fulstone Canyon: This gate is located above the existing Gate "A" of Killebrew Canyon. It accesses east/northeast terrain to the southeast of Killebrew Canyon and continues down to the Foothill side of 207 Kingsbury grade.
4. Stateline Gate: This gate is located at the top of Red Fir Handle tow lift above and behind Tamarack Lodge. This gate accesses north/northwest terrain that continues down the front side of the mountain and areas under the gondola.
5. The Beach: This gate is located off of the upper area of the Skyline Trail. It accesses east facing terrain that continues down to Monument Pass and the lower Fullstone terrain.
  
6. Broad Daylight: This gate is located at the end of "The Cut" on upper Roundabout trail. It accesses north/northwest terrain that continues down to the "Powerline Trail", Pioneer Trail, and upper Ski Run areas.

Heavenly Mountain Resort  
Mitigation and Monitoring Plan Annual Report  
(October 2017 – September 2018)

APPENDIX

X

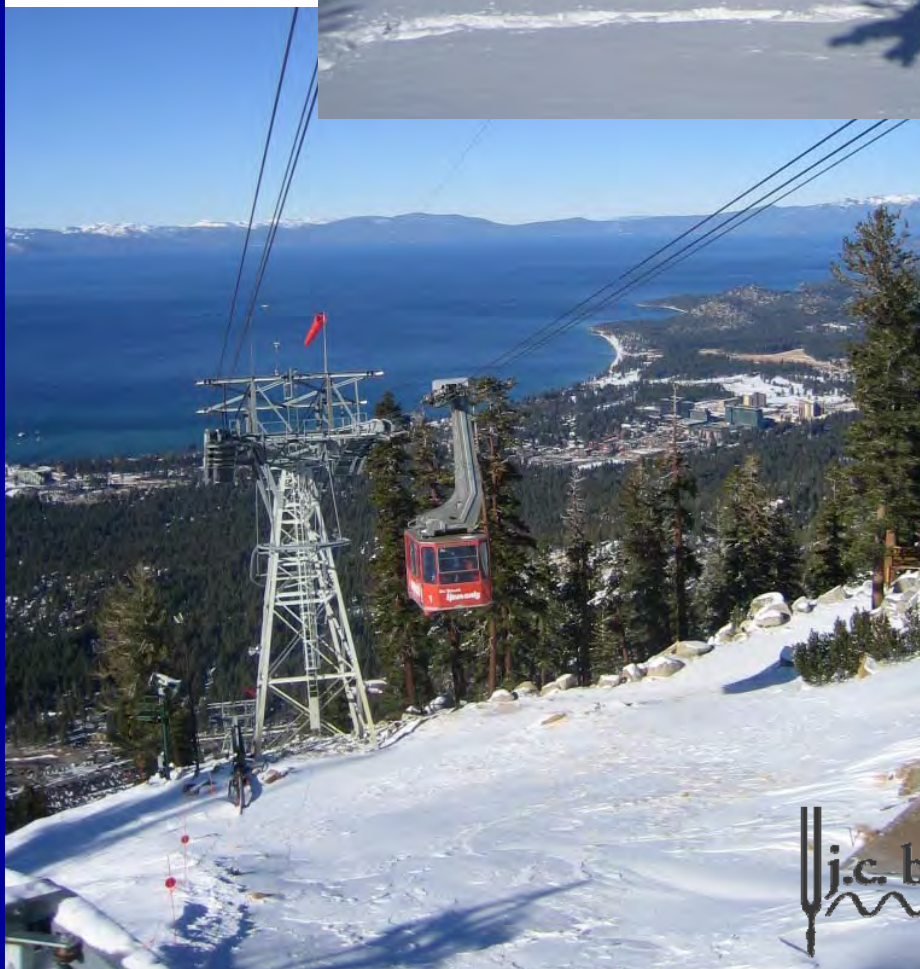
2018 ANNUAL NOISE MONITORING  
REPORT







# Heavenly Ski Resort Master Plan Noise Monitoring Survey 2017-2018 Ski Season



 **j.c. brennan & associates**  
*consultants in acoustics*



August 17, 2018

Mr. Chris Donley  
Senior Project Engineer  
Cardno  
250 Bobwhite Court, Suite 250  
Boise, Idaho 83706

**Subject:** Submittal of the Heavenly Ski Area Mitigation Monitoring Report for Noise - 2017/2018 Ski Season

Dear Mr. Donley:

The acoustical consulting firm of j.c. brennan & associates, Inc. is pleased to submit the results of the 2017/2018 Heavenly Ski Area Mitigation Monitoring Noise Report. The results of the report are very similar to previous years. Snowmaking noise levels at the California and Nevada base areas continue to show slight reductions in overall noise levels. Continued implementation of newer technology quiet snowmaking equipment on the mountain is expected to continue this trend.

Please feel free to call if you have questions.

Respectfully submitted,

j.c. brennan & associates, Inc.

Jim Brennan  
President  
Member: Institute of Noise Control Engineering

## I INTRODUCTION

j.c. brennan & associates, Inc. is providing a final report for the Heavenly Master Plan Noise Mitigation Monitoring Plan, and analysis of noise measurement data collected during the 2017/2018 snowmaking operations at Heavenly Ski Resort. The noise measurements and analysis of data are required as a condition of approval for the Heavenly Master Plan EIS/EIR. This is the nineteenth annual analysis of snowmaking operations noise levels.

j.c. brennan & associates, Inc. staff have been involved in conducting the annual snowmaking operations noise analyses since the 1996/1997 ski seasons. The previous twelve noise analyses for the 2004/2005 through the 2016/2017 ski seasons were prepared by j.c. brennan & associates, Inc.

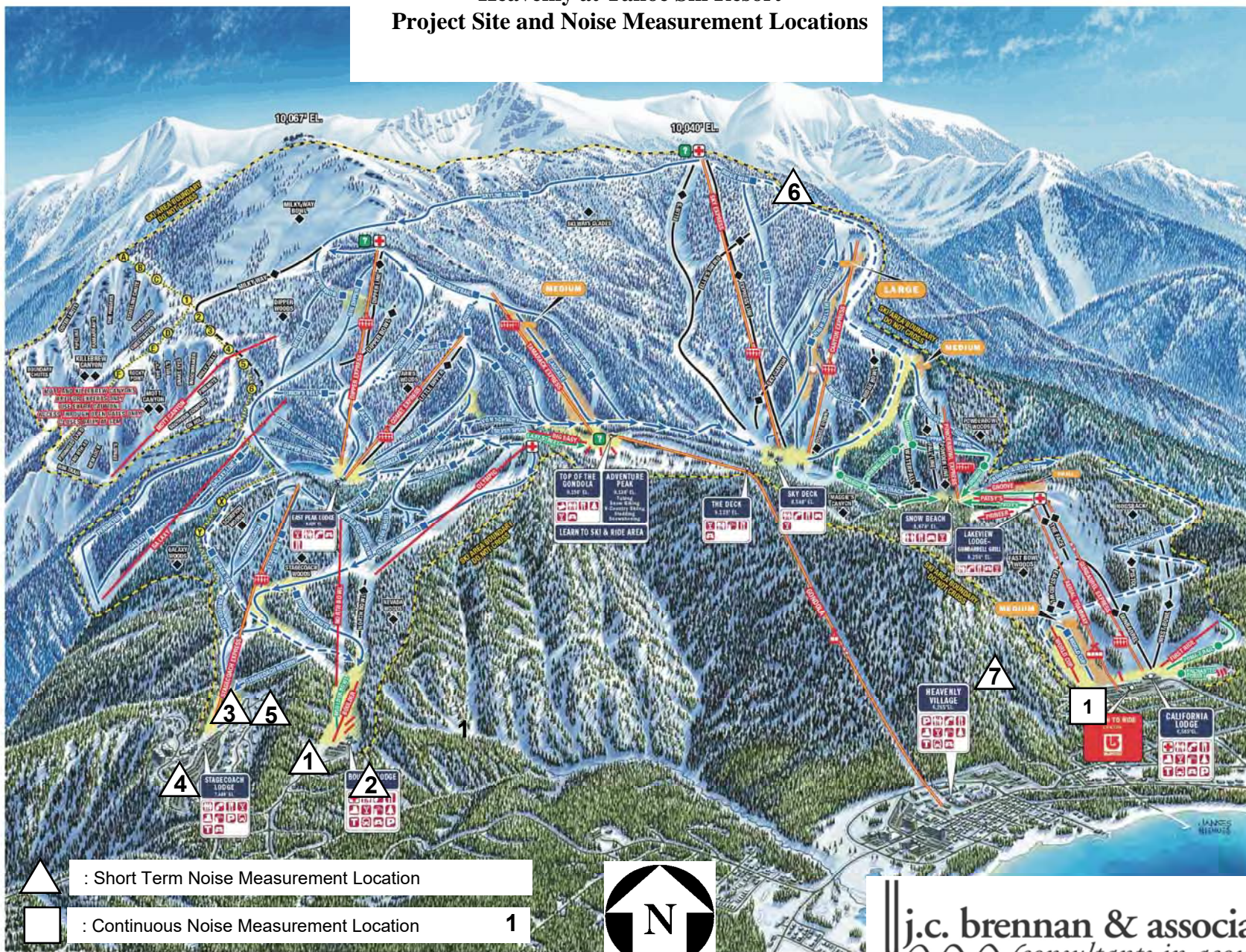
The conditions of approval for the Heavenly Master Plan EIS/EIR include instituting a comprehensive noise monitoring program, the replacement of older and louder air/ water nozzles with quiet model snowmaking equipment, sound control devices for snowmaking equipment, and participation with the snowmaking industry in the research and development of quiet snowmaking equipment and sound control devices for snowmaking equipment. The current technology considers quiet snowmaking equipment to include both fan guns and more efficient air/water nozzles (sometimes referred to as "stick guns"). Based upon noise measurement data collected for the various types of snowmaking equipment, fan guns are generally 10 or more dBA quieter than older model air/water nozzles. In recent years, significant reductions in noise have been realized from newer designs of some air/water nozzles. Generally, lower air pressure during the mixing process at the nozzle results in lower noise emissions.

Since the 1996/1997 ski season, Heavenly Ski Resort has committed to the installation of a permanent noise monitoring site at the base of the ski area near the California lodge, and to establishing the existing snowmaking noise levels at the Boulder Base and Stagecoach Base. Refer to Figure 1 for locations of noise monitoring sites.

According to the previous snowmaking noise reports, during the 1996/1997 ski season some quiet snowmaking equipment was installed and used at the California Base facilities. However, the use of quiet equipment was limited. During the 1997/1998 ski season, additional quiet snowmaking equipment was introduced into the fleet of snowmaking operations. During the 1998/1999 snowmaking operations, no additional quiet snowmaking equipment was implemented. Based upon review of the log of snowmaking activities provided by Heavenly, fan guns have been used in both the lower and upper locations of the California Base since the 1999/2000 ski season. Beginning with the 2008/2009 ski season, fan guns have been used extensively on the lower portion of the California Base area. Based upon the snowmaking logs, there has been limited use of air/water nozzles on the lower portion of the California side as an effort to reduce overall snowmaking noise levels.



**Figure 1**  
**Heavenly at Tahoe Ski Resort**  
**Project Site and Noise Measurement Locations**





## II PURPOSE AND NEED

The purpose and need for the Annual Noise Monitoring Report is to address the attainment of performance standards contained within the Heavenly Master Plan and to address progress toward attainment of the TRPA noise level criteria.

### TRPA Criteria

The Tahoe Regional Planning Agency (TRPA) has adopted Environmental Thresholds for the Lake Tahoe Region. The noise standards, or Thresholds as they are commonly referred to, are numerical Community Noise Equivalent Level (CNEL)<sup>1</sup> values for various land use categories and transportation corridors.

As a form of zoning, the TRPA has divided the Lake Tahoe Region into more than 175 separate Plan Areas. Boundaries for each of the Plan Areas have been established based upon similar land uses and the unique character of each geographic area. For each Plan Area, a Statement is made as to how that particular area should be regulated to achieve regional environmental and land use objectives. An outdoor CNEL standard is established based upon the Thresholds as a part of each Statement. Table 1 shows the existing CNEL standards for the Heavenly Plan Areas and adjacent Plan Areas.

Table 1 Plan Area Statement (PAS) CNEL Criteria		
PAS	Description	CNEL Criterion
087	Heavenly Valley California	55 dBA
085	Lakeview Heights ( Location of California Base noise monitoring location )	55 dBA
094	Glenwood	50 dBA
095	Trout/Cold Creek	50 dBA
086	Heavenly Valley Nevada	55 dBA
082	Upper Kingsbury	55 dBA
080	Kingsbury Drainage	50 dBA
088	Tahoe Village	55 dBA

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<sup>1</sup> For an explanation of these terms, see Appendix A: "Acoustical Terminology"

### **III COMPLIANCE REPORTING**

#### **III.1 Snow Grooming Noise**

##### **III.1a Master Plan Mitigation Methods**

The Master Plan mitigation methods for snow grooming operations are to maintain an 85 foot setback from Plan Area boundaries that are adjacent to Heavenly. Operations of snow grooming equipment would not exceed Plan Area noise standards with a minimum of 85 feet of separation.

##### **III.1.b Master Plan Milestone/Product**

Snow grooming machines are not operated within 85 feet of PAS boundaries. Portions of the fleet are replaced continually with newer technology equipment

##### **III.1c Responsible Party**

Heavenly is responsible for educating snow groomers to maintain the 85 foot setback.

##### **III.1d PAS Criteria**

PAS 080 – 50 dB CNEL

PAS 082, 085, 086, 087, 088 – 55 dB CNEL

PAS 095, PAS 121 – 45 dB CNEL

##### **III.1.e Results of Reporting and Determination of Compliance**

In previous years this measure was included in the Cardno compliance report.

#### **III.2 Snowmobile Noise**

##### **III.2.a Master Plan Mitigation Methods**

Replace all snowmobiles with 4-stroke technology. This would ensure that snowmobiles would comply with the 82 dBA single event noise level standard. Currently, Heavenly only uses 4-stroke engine snowmobiles.

##### **III.2.b Master Plan Milestone/Product**

Snowmobile equipment is maintained and operated within 85 feet of PAS boundaries. Portions of the fleet are replaced with newer technology equipment on an annual basis.

##### **III.2.c Responsible Party**

Heavenly is responsible for replacing the fleet of snowmobiles with 4-stroke technology machines.



### **III.2.d Criteria**

The TRPA single event noise level standard for snowmobiles is 82 dBA Lmax, at a distance of 50 feet.

### **III.2.e Results of Reporting and Determination of Compliance**

Heavenly staff reported in 2008 that all snowmobiles in the fleet are 4-stroke engine technology. Noise measurement data collected for the snowmobiles indicate that they comply with the noise level criterion of 82 dBA Lmax. Therefore, this is in compliance with the TRPA thresholds.

Since the Heavenly snowmobile fleet has been converted to 4-stroke technology and the technology continues to focus attention on quiet operations, the Heavenly snowmobile fleet is expected to continue to become quieter over time. It is acknowledged within this report that this mitigation measure has attained compliance and can be removed from the master plan mitigation measures.

## **III.3 Snow Removal Noise**

### **III.3.a Master Plan Mitigation Methods**

Mitigation methods for snow removal noise impacts are to minimize nighttime snow removal operations, and by constructing noise barriers along the perimeters of the parking lots. At the California Base area, the upper parking lot should be cleared first, and clearing of the lower parking lot should be conducted during the daytime and evening hours.

### **III.3.b Master Plan Milestone/Product**

Snow removal equipment is operated consistent with the measures listed above.

### **III.3.c Responsible Party**

Heavenly is responsible for operating snow removal equipment consistent with the measures listed above.

### **III.3.d Criteria**

PAS 080 – 50 dB CNEL

PAS 082, 085, 086, 087, 088 – 55 dB CNEL

PAS 095, PAS 121 – 45 dB CNEL

## **Results of Reporting and Determination of Compliance**

To be provided in Cardno compliance report.

### **III.4 Snowmaking California Base Area Noise**

#### **III.4.a Master Plan Mitigation Methods**

1. Use of fans in place of air/water nozzles or air/water guns which are low noise;
2. Re-direction of nozzles and fans to minimize noise exposures at PAS boundaries;
3. Reduction in the numbers of nozzles and/or fans;
4. Use of setbacks to reduce noise exposures at PAS boundaries;
5. Use of noise reduction housings for air/water nozzles;
6. Use of barriers at low-mounted air/water nozzles;
7. Reduction in snowmaking activities at nighttime;
8. Sponsor research into reducing noise produced by snowmaking. This may include support of industry-wide research activities, specific studies concerning nozzle design sponsored directly by Heavenly, and the study of alternatives in placement of guns and fans at Heavenly.

#### **III.4.b Master Plan Milestone/Product**

Heavenly has installed the long-term noise monitoring station at the California Base area. The annual noise monitoring occurs from approximately November 1<sup>st</sup>, and generally through March 31<sup>st</sup>, depending on the snowmaking activities. Heavenly has completely replaced the air-water snowmaking nozzles at the base of California with fan guns. Heavenly has not implemented items 4 through 6 listed above. However, Heavenly staff has closely monitored the snowpack produced through winter storms and snowmaking operations to determine the appropriate time for discontinuing snowmaking operations and reduce nighttime snowmaking noise levels. In addition, Heavenly continues to invest in conducting noise measurements of varying types of snowmaking equipment to determine the feasibility of introducing more quiet technology snowmaking equipment.

#### **III.4.c Responsible Party**

Heavenly is responsible for implementing the mitigation measures.

#### **III.4.d PAS Criteria**

PAS 080 – 50 dB CNEL  
PAS 082, 085, 086, 087, 088 – 55 dB CNEL  
PAS 095, PAS 121 – 45 dB CNEL

### **III.4.e Results of Reporting and Determination of Compliance**

#### ***1996/1997 - 2017/2018 Snowmaking Noise Levels Summary:***

Previous reports provide details on the analysis of past and present snowmaking seasons. Results of all noise monitoring surveys are provided in Tables 2 and 3.

#### ***2017/2018 Snowmaking Noise Levels Summary:***

The ski season during the 2017/2018 spanned a total of approximately 147 days. Snowmaking generally occurred between November 4, 2017 and March 1, 2018. Continuous noise level measurements were conducted between November 1, 2017 and March 31, 2018 at the permanent noise monitoring site, located on the USFS property located directly east of Heavenly Ski Area, and across Keller Road (PAS 085). The monitoring site is located on the southeast corner of the intersection of Keller Road and Saddle Road, with a direct line of sight to the California Base snowmaking operations. As mentioned in previous reports, the location of the noise monitor was at the northeast corner of Keller Road and Saddle Road, and adjacent to the Tahoe Seasons Resort. That monitoring location was reaching the limitations of its usefulness. Traffic noise from the intersection of Keller Road and Saddle Road was influencing the overall measured noise levels. The current location has sufficient setback to reduce the amount of noise associated with the traffic as it affected the overall measured noise levels and the noise levels associated with the snowmaking operations.

The equipment used for the noise level measurements was a Larson Davis Laboratories (LDL) Model 820 precision integrating sound level meter which was calibrated with an LDL Model CAL 200 acoustical calibrator. The sound level meter is powered by a solar panel with a deep cell battery back-up. The sound level meter was downloaded once per month, and was checked for calibration.

During the 2017/2018 ski season the Heavenly snowmaking staff continued the log of snowmaking operations, also noting the use and location of snowmaking equipment, during the hours of operation when snowmaking activity occurred. Upon review of the snowmaking activities log provided by Heavenly snowmaking personnel, the measured CNEL values during snowmaking activities was determined at the noise monitoring location. Noise associated with snowmaking activities was a function of the number and location of snowmaking nozzles and/or fans guns in operation. Table 2 summarizes the previous twenty years of snowmaking levels at the Tahoe Seasons Resort (PAS 085), as well as the 2016/2017 season.

**Table 2**  
**Summary of Measured Noise Levels at the Heavenly Base Area**  
**(Average Measured CNEL Values)**  
**Noise Monitoring Site GPS Coordinates (38° 56' 17.43" N - 119° 56' 18.43" W)**

Year	CNEL on Days with Snowmaking	CNEL on Days without Snowmaking	CNEL During Measurement Period	Total # of Monitoring Days	Total # of Snowmaking Days
1996/1997	74.1 dBA	61.7 dBA	71.6 dBA	--	--
1997/1998	73.5 dBA	61.8 dBA	70.2 dBA	--	--
1998/1999	73.0 dBA	62.0 dBA	69.5 dBA	--	--
1999/2000	74.3 dBA	62.0 dBA	73.0 dBA	141	101
*2000/2001	74.1 dBA	60.0 dBA	72.2 dBA	140	89
*2001/2002	73.9 dBA	60.3 dBA	72.1 dBA	145	93
*2002/2003	72.0 dBA	63.1 dBA	68.3 dBA	150	61
*2003/2004	67.4 dBA	62.3 dBA	65.7 dBA	104	56
*2004/2005	65.3 dBA	61.5 dBA	63.1 dBA	149	51
*2005/2006	61.0 dBA	60.9 dBA	61.4 dBA	151	41
*2006/2007	63.7 dBA	58.1 dBA	62.6 dBA	149	75
*2007/2008	62.4 dBA	58.2 dBA	61.6 dBA	140	62
*2008/2009	62.4 dBA	59.7 dBA	61.2 dBA	119	75
**2009/2010	59.8 dBA	55.5 dBA	58.1 dBA	150	72
**2010/2011	57.9 dBA	55.6 dBA	56.5 dBA	150	52
**2011/2012	59.3 dBA	55.5 dBA	58.1 dBA	148	86
**2012/2013	60.1 dBA	55.9 dBA	58.6 dBA	143	77
**2013/2014	57.9 dBA	55.2 dBA	56.7 dBA	136	62
**2014/2015	58.7 dBA	52.5 dBA	57.0 dBA	148	86
**2015/2016	57.8 dBA	53.6 dBA	57.1 dBA	152	61
**2016/2017	59.5 dBA	58.3 dBA	56.1 dBA	151	43
**2017/2018	58.9 dBA	55.7 dA	57.9 dBA	150	90

\*The 2000/2001 - 2008/2009 measurement site was moved to the ground level of the Tahoe Seasons Resort. Previously this site was located at the roof-top of the Tahoe Seasons Resort.

\*\* Noise measurement site located on USFS property @ northeast corner of Keller and Saddle.

**Year 2003-2004 Heavenly began Fan Gun Technology**

The average measured CNEL value at the monitoring site for the 2017/2018 season was 58.9 dBA when snowmaking operations occurred. This is consistent with the lowest measured CNEL values

since the reporting began. There continues to be significant progress in reducing snowmaking noise since the introduction of the Fan Technology and improved noise reduction associated with air/water guns. In addition, the measured CNEL values on days without snowmaking operations was 55.7 dBA, and was not in compliance with the 085 and 087 Plan Area CNEL standards. It was still noted that when snowmaking did not occur there was influence from roadway traffic, wind and individuals recreating on the USFS property where the sound level meter is located. Figures 2 through 6 graphically show the results of the noise monitoring, as they compare to the TRPA CNEL criterion of 55 dBA for PAS 085 and 087.

Snowmaking can occur over a significant portion of the California side of the mountain. In addition, the array of snowmaking at the California Base can include air/water nozzle and fan-gun type snowmaking equipment. The fan-guns have been found to produce noise levels which are a minimum of 10 dBA less than the traditional air-water nozzle guns. Table 3 summarizes the last twelve years of CNEL values for varying types of snowmaking operations.

**Table 3  
Summary of Measured Noise Levels at the Heavenly Base Area  
Based upon Varying Arrays of Snowmaking Operations at the California Base**

Year	Days with Lower Snowmaking Only	Days with Upper Snowmaking Only	Days with Lower Air/Water Nozzles Only	Days with Upper Air/Water Nozzles Only	Days with Lower Fan-Guns Only
	Logarithmic CNEL				
2001-2002	74.7 dBA	63.7 dBA	72.2 dBA	63.7 dBA	NA <sup>2</sup>
2002-2003	73.0 dBA	63.0 dBA	NA <sup>3</sup>	62.8 dBA	NA <sup>2</sup>
2003-2004	61.7 dBA	60.9 dBA	NA <sup>3</sup>	60.3 dBA	61.1 dBA
2004-2005	64.1 dBA	60.3 dBA	66.1 dBA	NA <sup>1</sup>	NA <sup>2</sup>
2005-2006	63.4 dBA	57.6 dBA	NA <sup>3</sup>	NA <sup>1</sup>	63.4 dBA
2006-2007	65.4 dBA	60.2 dBA	NA <sup>3</sup>	59.3 dBA	65.2 dBA
2007-2008	60.6 dBA	61.2 dBA	NA <sup>3</sup>	62.0 dBA	60.1 dBA
2008-2009	64.3 dBA	58.1 dBA	NA <sup>3</sup>	63.3 dBA	63.4 dBA
2009-2010	57.9 dBA	55.7 dBA	NA <sup>3</sup>	58.4 dBA	57.9 dBA
2010-2011	58.8 dBA	52.7 dBA	NA <sup>3</sup>	51.9 dBA	58.8 dBA
2011-2012	59.8 dBA	56.1 dBA	NA <sup>3</sup>	53.4 dBA	58.5 dBA
2012-2013	60.2 dBA	55.5 dBA	NA <sup>3</sup>	55.5 dBA	60.3 dBA
2013-2014	62.7 dBA	56.5 dBA	NA <sup>3</sup>	55.3 dBA	62.7 dBA
2014-2015	62.1 dBA	54.2 dBA	NA <sup>3</sup>	51.8 dBA	62.1 dBA
2015-2016	61.8 dBA	55.7 dBA	NA <sup>3</sup>	56.3 dBA	61.8 dBA
2016-2017	NA <sup>4</sup>	56.5 dBA	NA <sup>3</sup>	60.1 dBA	NA <sup>2</sup>
2017-2018	NA <sup>4</sup>	55.3 dBA	NA <sup>3</sup>	54.0 dBA	NA <sup>2</sup>

<sup>1</sup>NA - No snowmaking occurred with strictly Upper Air-Water Nozzles operating.  
<sup>2</sup>NA - No snowmaking occurred with strictly Fan Guns operating.  
<sup>3</sup>NA - No snowmaking occurred with strictly Lower Air-Water Nozzles Only  
<sup>4</sup>NA- No snowmaking occurred with only lower snowmaking occurred



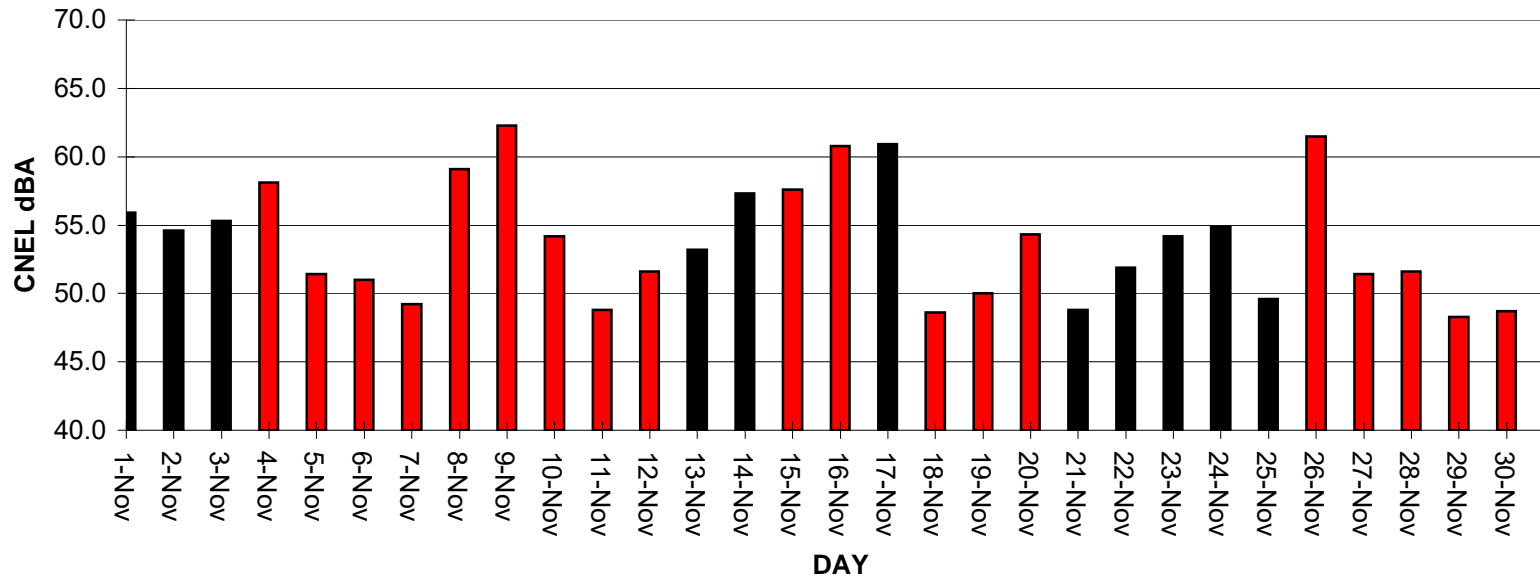
**Figure 2**

2017-101A

**Heavenly California Base Area Snowmaking Monitoring**

Annual Snowmaking Report  
Summary of CNEL  
November-17

**NOVEMBER 2017**



NO SNOWMAKING   
SNOWMAKING   
CNEL Criterion 55 dBA

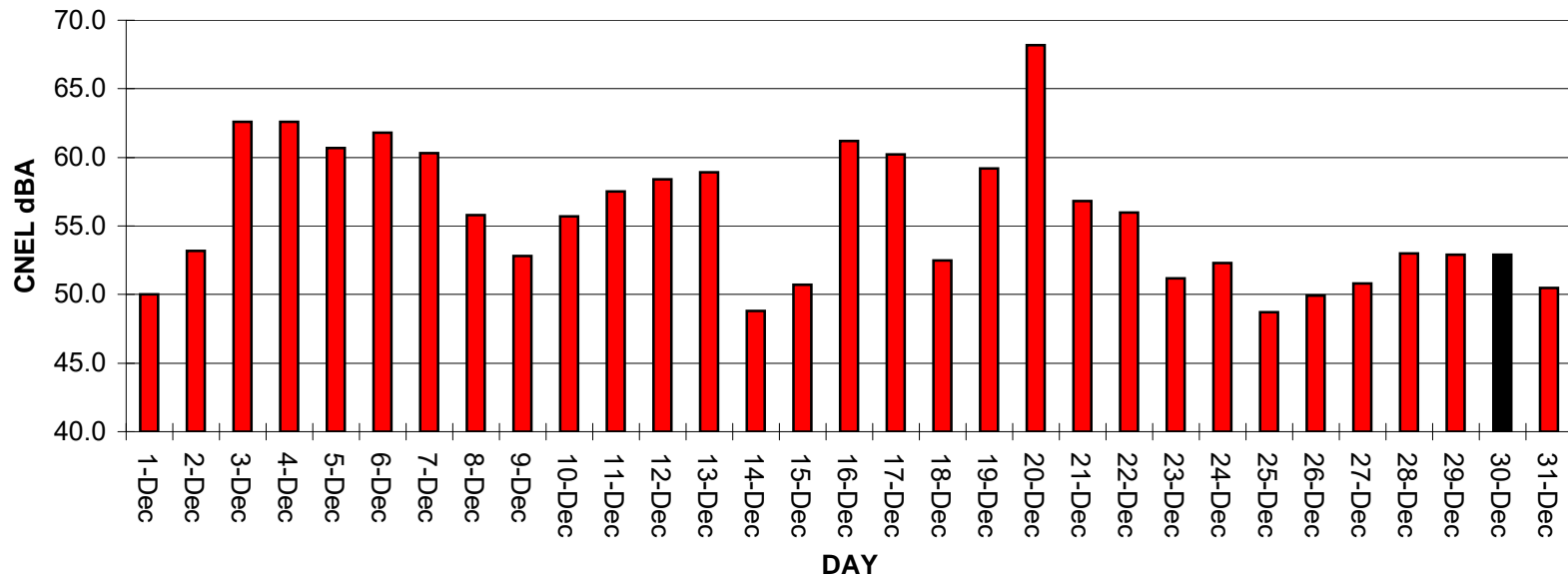
**Figure 3**

2017-101A

**California Base Area Heavenly Snowmaking Monitoring**

Annual Snowmaking Report  
Summary of CNEL  
December-17

**DECEMBER 2017**



NO SNOWMAKING   
SNOWMAKING   
CNEL Criterion 55 dBA

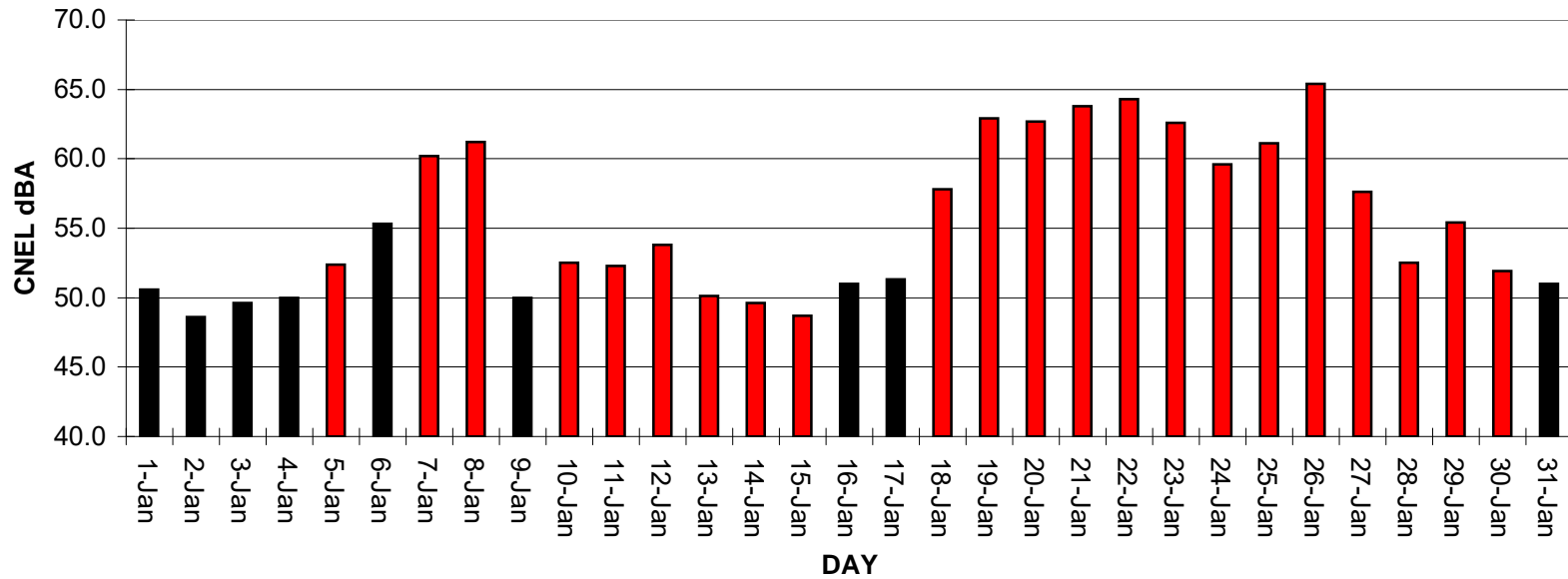
**Figure 4**

2017-101A

**California Base Area Heavenly Snowmaking Monitoring**

Annual Snowmaking Report  
Summary of CNEL  
January-18

**JANUARY 2018**



NO SNOWMAKING   
SNOWMAKING   
CNEL Criterion 55 dBA

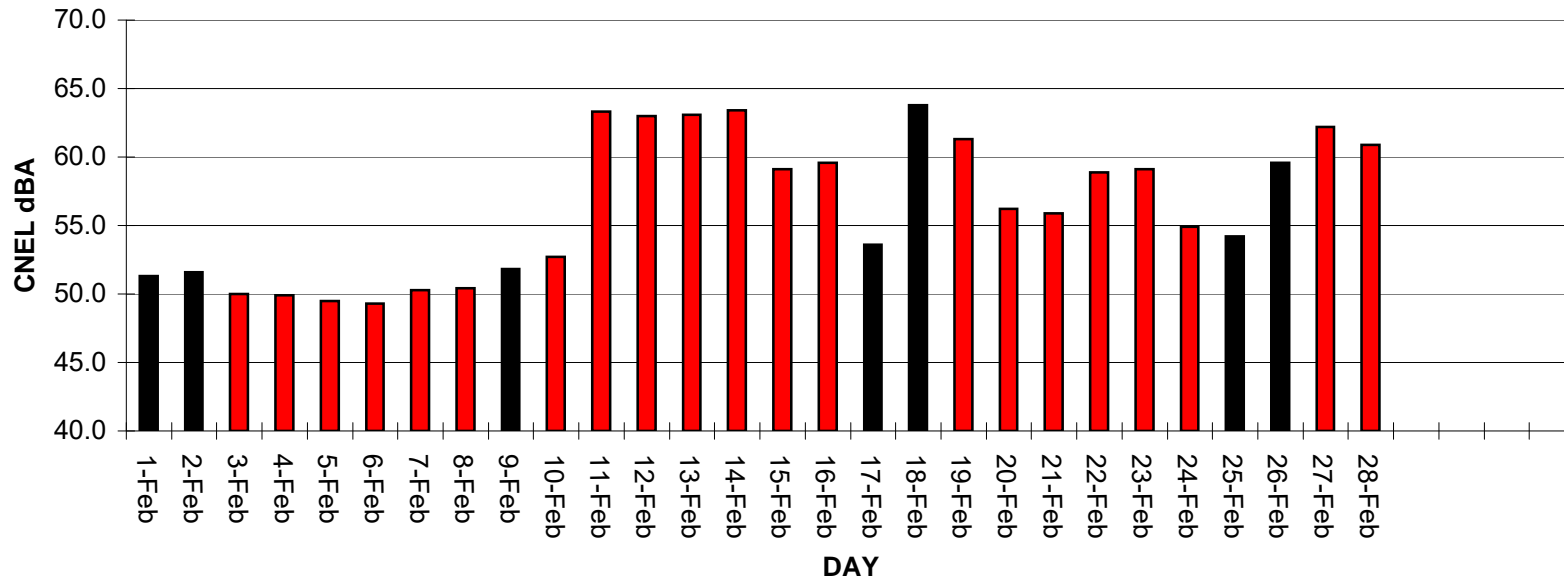
**Figure 5**

2017-101A

**California Base Area Heavenly Snowmaking Monitoring**

Annual Snowmaking Report  
Summary of CNEL  
February-18

**FEBRUARY 2018**



NO SNOWMAKING   
SNOWMAKING   
CNEL Criterion 55 dBA

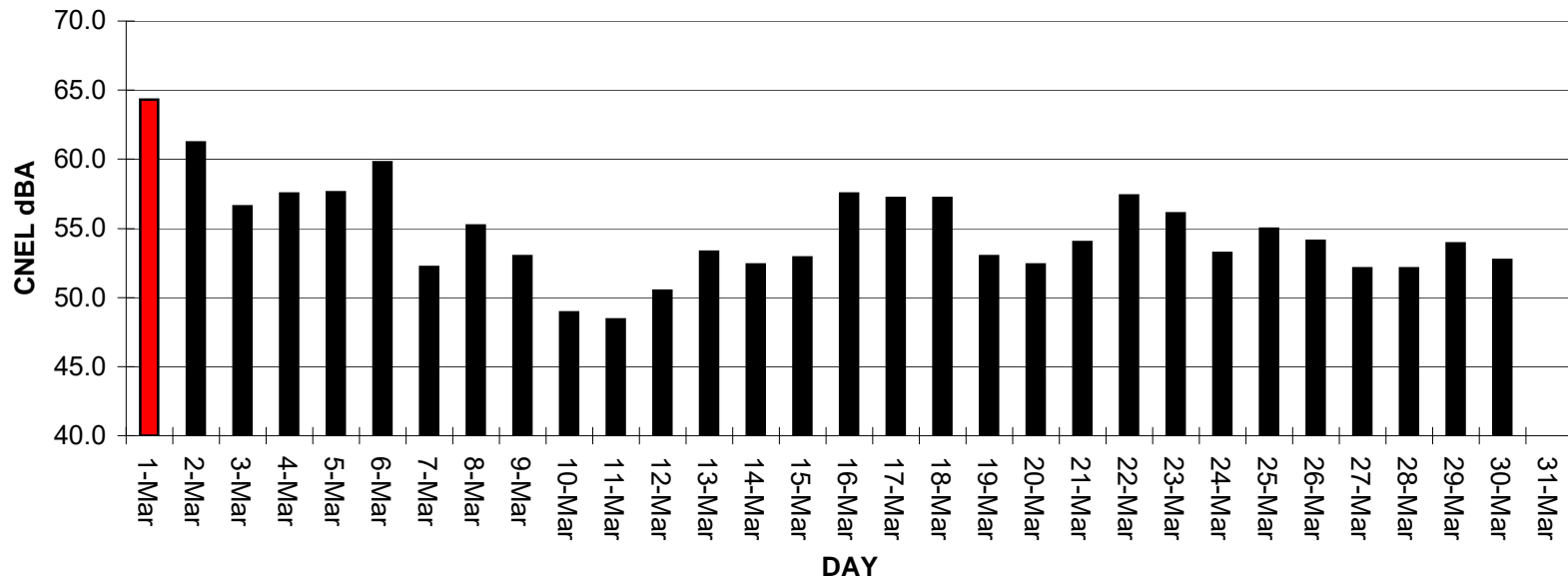
**Figure 6**

2017-101A

**California Base Area Heavenly Snowmaking Monitoring**

Annual Snowmaking Report  
Summary of CNEL  
March-18

**MARCH 2018**



NO SNOWMAKING   
SNOWMAKING   
CNEL Criterion 55 dBA

## **Fan Gun Noise Levels**

Heavenly has completed the process of converting the California Base snowmaking operations to the use of fan-guns. The lower mountain which includes the ski runs named Round About and Lower Gun Barrel. The types of fan guns which Heavenly is currently using include SMI Super Polecat and SMI Puma's. The air/water nozzle snowmaking guns are currently newer technology and produce lower noise levels than the older technology air/water nozzle snowmaking guns.

As Heavenly continues to introduce lower noise emission technology snowmaking equipment to the lower California snowmaking fleet, it is expected that a minimum noise level reduction of 3 dBA to 5 dBA can be achieved for all snowmaking operations. During the 2017/2018 ski season, Heavenly reported consistent use of fan guns for snowmaking at the lower portion of the California side. As the lower mountain converts to fan guns, it is expected that a reduction in snowmaking noise levels can be realized at the base areas.

The determining factors on overall noise from the snowmaking system include the types of snowmaking equipment, the number of air/water nozzles or fans operating at any time, and the total hours of operations. If fan gun technology is not capable of producing the amount of snow that the air/water nozzles produce, then snowmaking operations may require an increase in the number of fan guns operating at any one time and/or an increase in hours of operation.

### **III.5 Snowmaking at Boulder Base Area Noise**

#### **III.5.a Master Plan Mitigation Methods**

1. Use of fans in place of air/water nozzles or using air/water nozzles which are low noise;
2. Re-direction of nozzles and fans to minimize noise exposures at PAS boundaries;
3. Reduction in the numbers of nozzles and/or fans;
4. Use of setbacks to reduce noise exposures at PAS boundaries;
5. Use of noise reduction housings for air/water nozzles;
6. Use of barriers at low-mounted air/water nozzles;
7. Reduction in snowmaking activities at nighttime;
8. Sponsor research into reducing noise produced by snowmaking. This may include support of industry-wide research activities, specific studies concerning nozzle design sponsored directly by Heavenly, and the study of alternatives in placement of guns and fans at Heavenly.
9. At the Stagecoach and Boulder Bases, Heavenly has replaced the older style air/water nozzles with newer generation Low-E "stick guns" and depending upon technological changes, may include fans.



### **III.5.b Master Plan Milestone/Product**

During the 2017/2018 ski season, j.c. brennan & associates, Inc. has conducted short-term noise monitoring at the Boulder Base area. The noise monitoring occurs for short periods of time since the snowmaking only occurs for between 2 and 4 days per year. Heavenly anticipates replacing the air/water nozzles after complete replacement of nozzles with fan guns on the entire California face. Heavenly is investing in low noise technology fan gun and air/water nozzles and anticipates this is the next area for replacement of noisy air/water nozzles. Heavenly has not implemented any of the other mitigation measures listed above.

### **III.5.c Responsible Party**

Heavenly is responsible for implementing the mitigation measures.

### **III.5.d PAS Criteria**

PAS 080 – 50 dB CNEL  
PAS 082, 085, 086, 087, 088 – 55 dB CNEL  
PAS 095, PAS 121 – 45 dB CNEL

### **III.5.e Results of Reporting and Determination of Compliance**

Short-term noise level measurements of snowmaking operations were conducted during the 2017/2018 ski season at the Boulder Base on January 22, 2018. Measured noise levels at this location were approximately 66 dBA Leq during snowmaking operations. Measurements were also conducted at the corner of Jack Circle and Bonnie Court. The measured noise levels were approximately 63 dBA Leq. The results of the ambient noise measurements for the 2017/2018 ski season and previous ski seasons are shown in Table 4. The predicted CNEL value at the Boulder Base is 73 dBA. The predicted CNEL value at the Jacks Circle location is 70 dBA.

The CNEL calculations assume snowmaking operations occur continually for a 24-hour period.

<b>Table 4 Ambient Noise Level Measurements for the Boulder Base Area</b>				
Year	Date	Measured Sound Level, Leq		
		Boulder Base Site 1	Corner of Jack Cir. & Bonnie Ct. - Site 2	
			Measured	Measured for Master Plan
1999-2000	December 14, 1999	70 dBA	63 dBA	65 dBA
2000-2001	December 14, 2000	73 dBA	65 dBA	
2001-2002	NA <sup>1</sup>	NA <sup>1</sup>	NA	
2002-2003	February 4, 2003	71 dBA	53 dBA	
2003-2004	December 8, 2003	60 dBA	NA <sup>1</sup>	
2004-2005	December 3, 2004	66 dBA	58 dBA	
2005-2006	December 13, 2005	71 dBA	64 dBA	
2006-2007	December 28, 2006	68 dBA	63 dBA	
2007-2008	December 31, 2007	67 dBA	65 dBA	
2008-2009	December 24, 2008	67 dBA	65 dBA	
2009-2010	December 15, 2009	68 dBA	62 dBA	
2010-2011	December 15, 2010	67 dBA	64 dBA	
2011-2012	December 22, 2011	68 dBA	65 dBA	
2012-2013	December 17, 2012	67 dBA	63 dBA	
2013-2014	January 15, 2014	69 dBA	64 dBA	
2014-2015	December 18, 2014	68 dBA	62 dBA	
2015-2016	December 14, 2015	69 dBA	63 dBA	
2016-2017	December 18, 2016	67 dBA	62 dBA	
2017-2018	January 22, 2018	66 dBA	63 dBA	
<sup>1</sup> Snowmaking operations did not occur at this location during this season. <b>Boulder Base GPS Coordinates (38° 58.3' 3.98" N - 119° 53' 25.81" W)</b> <b>Jack Circle/Bonnie Ct. GPS Coordinates (38° 58' 5.14" N - 119° 53' 34.76" W)</b>				

Currently, the snowmaking operations are out of compliance with the TRPA criteria.

### III.6 Snowmaking at Stagecoach Base Area Noise

#### III.6.a Master Plan Mitigation Methods

1. Use of fans in place of air/water nozzles or air/water guns which are low noise;
2. Re-direction of nozzles and fans to minimize noise exposures at PAS boundaries;
3. Reduction in the numbers of nozzles and/or fans;
4. Use of setbacks to reduce noise exposures at PAS boundaries;
5. Use of noise reduction housings for air/water nozzles;
6. Use of barriers at low-mounted air/water nozzles;

7. Reduction in snowmaking activities at nighttime;
8. Sponsor research into reducing noise produced by snowmaking. This may include support of industry-wide research activities, specific studies concerning nozzle design sponsored directly by Heavenly, and the study of alternatives in placement of guns and fans at Heavenly.
9. At the Stagecoach and Boulder Bases, Heavenly will strive to replace all air/water nozzles with fans.

### **III.6.b Master Plan Milestone/Product**

During the 2017/2018 ski season, Heavenly has conducted short-term noise monitoring at the Stagecoach Base area. The noise monitoring occurs for short periods of time since the snowmaking only occurs for between 2 and 4 days per year. Heavenly anticipates replacing the air/water nozzles after complete replacement of nozzles with fan guns on the entire California face. Heavenly has not implemented any of the mitigation measures listed above.

### **III.6.c Responsible Party**

Heavenly is responsible for implementing the mitigation measures.

### **III.6.d PAS Criteria**

This area is located outside of the TRPA area of influence.

### **III.6.e Results of Reporting and Determination of Compliance**

During the 2017/2018 ski season, noise measurements were conducted at the Stagecoach Base area on November 28, 2017. The noise measurements were collected at three different locations as shown in Table 5. It is noted that the predicted CNEL values at each site would be 7 dBA higher than the measured hourly Leq, while assuming that the equipment operates 24-hours.

It is noted that the measurement at the Entrance to the Ridge was approximately 10 dBA to 13 dBA less than the typical measured noise levels. The reason was that Heavenly will typically run an old-style Ratnik sled gun at the lower pump house to produce the maximum amount of snow. During the measurement period, only Stick and Fan guns were running near the lower pump house. Ratnik air/water guns have been documented to produce much louder noise levels than the stick and fan guns.

<b>Table 5 Ambient Noise Level Measurements Stage Coach Base Area</b>					
Year	Date	Measured Sound Level, $L_{eq}$			
		460 Quaking Aspen Rd. Site 3		Entrance to The Ridge Site 4	Eagles Nest Site 5
		Measured	Measured for Master Plan		
1999-2000	December 4, 1999	87 dBA	82-92 dBA	62 dBA	78 dBA
2000-2001	December 11, 2000	86 dBA		56 dBA	72 dBA
2001-2002	November 30, 2001	57 dBA		55 dBA	59 dBA
2002-2003	February 2, 2003	83 dBA		--	70 dBA
2003-2004	December 8, 2003	87 dBA		58 dBA	74 dBA
2004-2005	November 30, 2004	81 dBA		58 dBA	68 dBA
2005-2006	December 5, 2005	81 dBA		63 dBA	73 dBA
2006-2007	December 18, 2006	88 dBA		62 dBA	72 dBA
2007-2008	December 20, 2007	82 dBA		60 dBA	68 dBA
2008-2009	December 17, 2008	78 dBA		55 dBA	65 dBA
2009-2010	December 8, 2009	78 dBA		56 dBA	62 dBA
2010-2011	November 29, 2010	78 dBA		58 dBA	65 dBA
2011-2012	December 9, 2011	75 dBA		57 dBA	62 dBA
2012-2013	December 14, 2012	78 dBA		57 dBA	60 dBA
2013-2014	December 9, 2013	77 dBA		56 dBA	60 dBA
2014-2015	December 14, 2014	77 dBA		55 dBA	61 dBA
2015-2016	November 25, 2015	76 dBA		58 dBA	61 dBA
2016-2017	--	--		--	--
2017-2018	November 28, 2017	77 dBA	45.2 dBA	61 dBA	
<b>Quaking Aspen GPS Coordinates (38° 57' 37.52" - 119° 53' 16.57" W)</b> <b>Entrance to Ridge GPS Coordinates (38°57' 46.68" N - 119° 56' 3.68" W)</b> <b>Eagles Nest GPS Coordinates (38° 57' 35.04" N - 119° 53' 23.63" W)</b>					

### III.7 Snowmaking Upper Mountain Noise

#### III.7.a Master Plan Mitigation Methods

In order to reduce overall snowmaking noise levels, Heavenly shall use fan guns or other similar noise reduction measures for all new snowmaking areas. In addition, where new snowmaking is placed adjacent to existing ski trails with snowmaking, Heavenly shall convert the existing air/water snowmaking nozzles with fan guns or use other similar noise reduction measures to maintain or reduce existing noise levels in that area.

### III.7.b Master Plan Milestone/Product

Snowmaking noise from the upper mountain areas is monitored and evaluated from the California Base Area permanent noise monitor, and through Remote Plan Area monitoring. The analysis to date indicates that upper mountain snowmaking does not exceed the ambient noise when snowmaking is not occurring. New snowmaking installations are fan guns.

### III.7.c Responsible Party

Heavenly is the responsible party.

### III.7.d PAS Criteria

PAS 080 – 50 dB CNEL  
PAS 082, 085, 086, 087, 088 – 55 dB CNEL  
PAS 095, PAS 121 – 45 dB CNEL

### III.7.e Results of Reporting and Determination of Compliance

See the reporting for the California Base Area. The following provides results of the Remote Plan Area Noise Measurements

j.c. brennan & associates, Inc., conducted noise level measurements of snowmaking operations at one remote Plan Area location on January 21, 2018. The noise measurement location, which is known as the area identified as “Party Rock” (Noise Measurement Site 7) is located within Plan Area 080. During this year, noise measurements were not conducted at the upper mountain remote area in Plan Area 095, which is generally located adjacent to the ski area boundary, and southeast of Liz’s and Canyon Runs (Noise Measurement Site 6). The noise level measurements at Party Rock (Site 7) were conducted to determine if snowmaking operations at the lower mountain and base areas (which included 7 fan guns and 4 air/water guns) would exceed the applicable standards.

The results of the noise measurements and field observations were that the snowmaking operations were audible and was approximately 39 dBA Leq.

GPS coordinates for the Remote Plan Area measurements sites are as follows:

**Party Rock** (38° 56’ 27.63” N - 119° 56’ 1.35” W);  
**Liz’s / Canyon Run** (38° 54’ 47.5” N - 119° 54’ 43” W).

### **III.8 Rock Busting Noise**

#### **III.8.a Master Plan Mitigation Methods**

Rock busting generally occurs through the use of explosives and blasting. Control the number, size and location of Rock Busting blasts.

#### **III.8.b Master Plan Milestone/Product**

None

#### **III.8.c Responsible Party**

Heavenly is the responsible party.

#### **III.8.d PAS Criteria**

PAS 080 – 50 dB CNEL

PAS 082, 085, 086, 087, 088 – 55 dB CNEL

PAS 095, PAS 121 – 45 dB CNEL

#### **III.8.e Results of Reporting and Determination of Compliance**

Heavenly has not contacted j.c. brennan & associates, Inc. to conduct noise measurements of blasting or rock busting. It is assumed that this activity has not occurred.

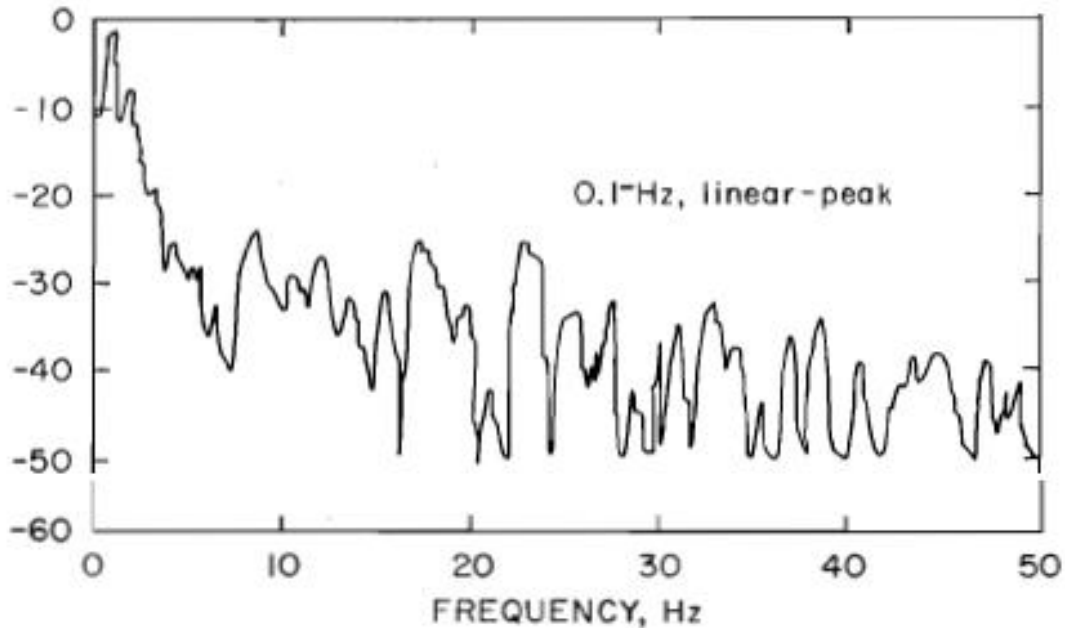
The process associated with rock busting includes setting explosive charges. The process includes drilling holes in the rock to set the charges. In general, blasting is controlled using micro delays between charges and by limiting charge size to minimize dispersal of the rock fragments, and to ensure the safety of the workers. Blasting is also controlled to prevent damage to nearby structures.

Airborne overpressures produced by blasting are typically measured in terms of the overall peak sound pressure level, without applying the A-weighting filter. The dominant frequencies of sound pressures associated with blasting lie in the very low frequency ranges of 2 Hz to 25 Hz, and the acoustical energy is concentrated below about 5 Hz. The figure below depicts a typical blast acoustical spectrum, which shows that the acoustical energy is concentrated well below 5 Hz.



## Typical Blast Acoustical Spectrum

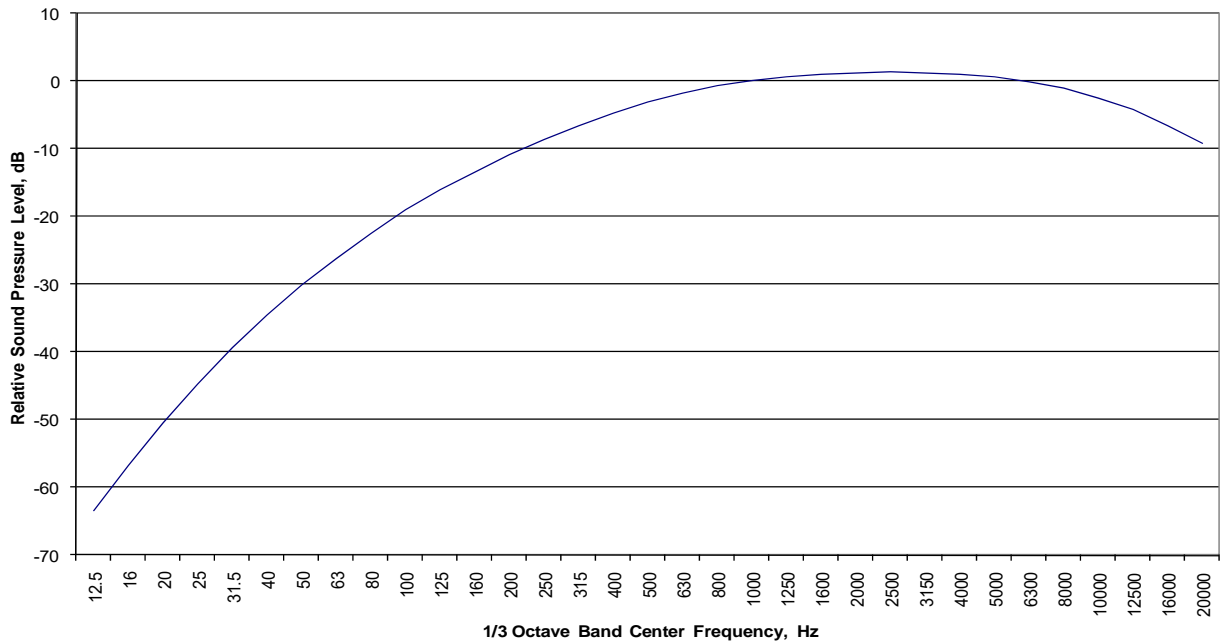
Relative Amplitude, dB



Source: "Airblast Instrumentation and Measurement Techniques for Surface Mine Blasting"  
U.S. Dept. of the Interior Report of Investigations 8508.

Audible sound, in contrast, is usually assumed to begin at 20 Hz, ranging up to 20,000 Hz. People hear best at frequencies in the range of 1,000 Hz to 4,000 Hz, and people hear poorly at the low frequencies associated with blast overpressures. As a result, the A-weighting curve is usually applied to other environmental noise measurements. The A-weighting curve is shown by Figure 7 below.

**Figure 7  
A-Weighting Filter Response**



The A-weighting adjustment factor for sound at 25 Hz (the upper limit of the dominant blast frequencies) is -44.7 dB. There are no published A-weighting correction factors below 12.5 Hz (where the A-weighting correction factor is -63.4 dB). These factors indicate that very high blast overpressures would be required to generate sound pressure levels that would be audible in an outdoor environment.

The audible sound associated with blasting is the result of escaping gases and falling (slumping) rock. Subjectively, audible blasting sound has been described as similar to the closing of a car trunk, or to rolling thunder. While these terms are subjective rather than quantitative, the described sounds are relatively benign. Audible noise due to blasting is not commonly considered to be a significant source of annoyance if blasting is controlled to meet safety standards on the project site.

Since rock busting is such an infrequent event, and is not considered to be a significant noise source, it is recommended that this mitigation monitoring measure is removed.

### **III.9 Amphitheater Operations Noise**

#### **III.9.a Master Plan Mitigation Methods**

Restrict hours of concert noise to the daytime and early evening hours. This is consistent with the hours of operations assumed for the amphitheater noise study. In addition, concerts should not extend more than 6 hours in duration.

#### **III.9.b Master Plan Milestone/Product**

Heavenly has conducted a concert simulation and amphitheater noise study.

#### **III.9.c Responsible Party**

Heavenly is the responsible party

#### **III.9.d PAS Criteria.**

PAS 080 – 50 dB CNEL

PAS 082, 085, 086, 087, 088 – 55 dB CNEL

PAS 095, PAS 121 – 45 dB CNEL

#### **III.9.e Results of Reporting and Determination of Compliance**

No concerts were monitored.

## Appendix A

### Acoustical Terminology

<b>Acoustics</b>	The science of sound.
<b>Ambient Noise</b>	The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.
<b>Attenuation</b>	The reduction of an acoustic signal.
<b>A-Weighting</b>	A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.
<b>Decibel or dB</b>	Fundamental unit of sound, A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.
<b>CNEL</b>	Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by a factor of three (+5 dB for TRPA calculations) and nighttime hours weighted by a factor of 10 (or +10 dB) prior to averaging.
<b>Frequency</b>	The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz.
<b>Ldn</b>	Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.
<b>Leq</b>	Equivalent or energy-averaged sound level.
<b>Lmax</b>	The highest root-mean-square (RMS) sound level measured over a given period of time.
<b>L(n)</b>	The sound level exceeded a described percentile over a measurement period. For instance, an hourly L50 is the sound level exceeded 50% of the time during the one hour period.
<b>Loudness</b>	A subjective term for the sensation of the magnitude of sound.
<b>Noise</b>	Unwanted sound.
<b>Peak Noise</b>	The level corresponding to the highest (not RMS) sound pressure measured over a given period of time. This term is often confused with the "Maximum" level, which is the highest RMS level.
<b>RT<sub>60</sub></b>	The time it takes reverberant sound to decay by 60 dB once the source has been removed.
<b>Sabin</b>	The unit of sound absorption. One square foot of material absorbing 100% of incident sound has an absorption of 1 sabin.
<b>Threshold of Hearing</b>	The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.
<b>Threshold of Pain</b>	Approximately 120 dB above the threshold of hearing.
<b>Impulsive</b>	Sound of short duration, usually less than one second, with an abrupt onset and rapid decay.
<b>Simple Tone</b>	Any sound which can be judged as audible as a single pitch or set of single pitches.

**Appendix B**

2017-101A

Heavenly Snowmaking Monitoring

Annual Snowmaking Report

Summary of CNEL

November-17

Day	CNEL dB	Snow	California				Nevada				York	CNEL Average		
			Upper		Lower		Upper		Lower	Base				
			A	F	A	F	A	F	A	F	F			
1-Nov	55.9	N											No Snowmaking	56.3
2-Nov	54.6	N											Snowmaking	55.8
3-Nov	55.3	N											Total	56.0
4-Nov	58.1	Y					18	6						
5-Nov	51.4	Y	14	8			26	8						
6-Nov	51.0	Y	14	1			37	9					# of No Snowmaking Days	12
7-Nov	49.2	Y	7	1			19	6					# of Snowmaking Days	18
8-Nov	59.1	Y	1	6			19	6					Total Days of Monitoring	30
9-Nov	62.3	Y												
10-Nov	54.2	Y		5				7						
11-Nov	48.8	Y	12	6			17	8						
12-Nov	51.6	Y	22	9			12	8						
13-Nov	53.2	N												
14-Nov	57.3	N												
15-Nov	57.6	Y	14	8			22	8						
16-Nov	60.8	N												
17-Nov	60.9	N												
18-Nov	48.6	Y	13	3			41	9						
19-Nov	50.0	Y	14	6			41	8						
20-Nov	54.3	Y	13	3			17	3						
21-Nov	48.8	N												
22-Nov	51.9	N												
23-Nov	54.2	N												
24-Nov	54.9	N												
25-Nov	49.6	N												
26-Nov	61.5	Y												
27-Nov	51.4	Y	15	5			37	8						
28-Nov	51.6	Y	13	6			45	11	11	1				
29-Nov	48.3	Y	13	2			37	7						
30-Nov	48.7	Y	17	5			45	7						

\* A- Air Nozzles

F- Fan Guns

No Snowmaking Log Available

Snowmaking

Meter Downtime/Incomplete Data



**Appendix B**

2017-101A

Heavenly Snowmaking Monitoring

Annual Snowmaking Report

Summary of CNEL

Dec-17

Day	CNEL dB	Snow	California				Nevada				York	CNEL Average		
			Upper	Lower	Upper	Lower	Base	Upper	Lower	Base				
1-Dec	50.0	Y	A	F	A	F	A	F	A	F	F		No Snowmaking	52.9
2-Dec	53.2	Y	1	7			37	8					Snowmaking	58.8
3-Dec	62.6	Y	17	15		9	40	8					Total	58.7
4-Dec	62.6	Y	15	5		11	25	8	10	1				
5-Dec	60.7	Y	13	3		10	30	5	10	1				
6-Dec	61.8	Y	18	4		9	22	4	10	1			# of No Snowmaking Days	1
7-Dec	60.3	Y	14	4		9	34	10					# of Snowmaking Days	30
8-Dec	55.8	Y	15			10	16	10					Total Days of Monitoring	31
9-Dec	52.8	Y	1	17			17	6						
10-Dec	55.7	Y	28			9								
11-Dec	57.5	Y	35			10	7	3						
12-Dec	58.4	Y	2	31		9	3	3						
13-Dec	58.9	Y	38	10		8	3	3						
14-Dec	48.8	Y	19				21	6						
15-Dec	50.7	Y	30	2										
16-Dec	61.2	Y	36	3			4	7						
17-Dec	60.2	Y	8			9	42	3						
18-Dec	52.5	Y	31	4		6		2						
19-Dec	59.2	Y	10	5			9	1						
20-Dec	68.2	Y	23	5		11	19	13						
21-Dec	56.8	Y	22	2		9	18	12						
22-Dec	56.0	Y	31	2		8	42	7						
23-Dec	51.2	Y	30				13	6						
24-Dec	52.3	Y	33				5	2						
25-Dec	48.7	Y	19											
26-Dec	49.9	Y	27				13	2						
27-Dec	50.8	Y	43	3			1	2						
28-Dec	53.0	Y	31			4								
29-Dec	52.9	Y	35											
30-Dec	52.9	N												
31-Dec	50.5	Y	36	2				8						

\* A- Air Nozzles

F- Fan Guns

No Snowmaking Log Available

Snowmaking

Meter Downtime/Incomplete Data



## Appendix B

2017-101A

Heavenly Snowmaking Monitoring

Annual Snowmaking Report

Summary of CNEL

January-18

Day	CNEL dB	Snow	California				Nevada					CNEL Average	
			Upper		Lower		Upper		Lower	Base	York		
			A	F	A	F	A	F	A	F	F		
1-Jan	50.6	N										No Snowmaking	54.5
2-Jan	48.6	N										Snowmaking	59.9
3-Jan	49.6	N										Total	58.7
4-Jan	50.0	N											
5-Jan	52.4	Y	15										
6-Jan	55.3	N										# of No Snowmaking Days	11
7-Jan	60.2	Y	33	1		11	11	17				# of Snowmaking Days	20
8-Jan	61.2	N										Total Days of Monitoring	31
9-Jan	50.0	N											
10-Jan	52.5	Y	27					4					
11-Jan	52.3	Y	29	3			10	20					
12-Jan	53.8	Y	41	3				2					
13-Jan	50.1	Y	12				4						
14-Jan	49.6	Y					21						
15-Jan	48.7	Y	32										
16-Jan	51.0	N											
17-Jan	51.3	N											
18-Jan	57.8	N											
19-Jan	62.9	Y					11	14					
20-Jan	62.7	Y	33	2	5		25	10	11	1			
21-Jan	63.8	Y	20	2	4		21	10	10				
22-Jan	64.3	Y	24	1	4		10	9	24	10			
23-Jan	62.6	Y	20		4			1	24	1			
24-Jan	59.6	Y	10										
25-Jan	61.1	Y	20		4				24	1			
26-Jan	65.4	Y	35		3			8	24	1			
27-Jan	57.6	Y	24		4		10	6	24	1			
28-Jan	52.5	Y	12										
29-Jan	55.4	Y	23										
30-Jan	51.9	Y	26				6						
31-Jan	51.0	N											

\* A- Air Nozzles

F- Fan Guns

No Snowmaking Log Available

Snowmaking

Meter Downtime/Incomplete Data

**Appendix B**

2017-101A

Heavenly Snowmaking Monitoring

Annual Snowmaking Report

Summary of CNEL

February-18

Day	CNEL dB	California				Nevada				York		
		Snow	Upper	Lower		Upper	Lower	Base				
			A	F	A	F	A	F	F			
1-Feb	51.3	N										
2-Feb	51.6	N										
3-Feb	50.0	Y	15				11					
4-Feb	49.9	Y	23									
5-Feb	49.5	Y	22									
6-Feb	49.3	Y	17				10					
7-Feb	50.3	Y	19				13	1				
8-Feb	50.4	Y	9				12	1				
9-Feb	51.8	N										
10-Feb	52.7	Y		2	7	11						
11-Feb	63.3	Y		2	4	11	20	7	11	1		
12-Feb	63.0	Y	20	1	5	9	17	4	8	1		
13-Feb	63.1	Y	38	1	6	10		5				
14-Feb	63.4	Y	16	1	5	10	26	2	12			
15-Feb	59.1	Y	27	1	2	2	7	6				
16-Feb	59.6	Y	36	2	2	2	18	6		1		
17-Feb	53.6	N										
18-Feb	63.8	N										
19-Feb	61.3	Y	31	1		4	11	4				
20-Feb	56.2	Y	22	14			17					
21-Feb	55.9	Y	22	15			19					
22-Feb	58.9	Y	8	14			4	12				
23-Feb	59.1	Y	6	14			4	6				
24-Feb	54.9	Y	11									
25-Feb	54.2	N										
26-Feb	59.6	N										
27-Feb	62.2	Y	10			7						
28-Feb	60.9	Y	10			7						
											<b>CNEL Average</b>	
											No Snowmaking	57.8
											Snowmaking	59.3
											Total	59.0
											# of No Snowmaking Days	7
											# of Snowmaking Days	21
											Total Days of Monitoring	28

\* A- Air Nozzles  
F- Fan Guns

No Snowmaking Log Available

Snowmaking

Meter Downtime/Incomplete Data

**Appendix B**

2016-101

Heavenly Snowmaking Monitoring

Annual Snowmaking Report

Summary of CNEL

March-17

Day	CNEL dB	California				Nevada				Base	York	CNEL Average	
		Snow	Upper		Lower		Upper		Lower				
			A	F	A	F	A	F	A	F	F		
1-Mar	64.3	Y		5		7						No Snowmaking	55.4
2-Mar	61.2	N										Snowmaking	64.3
3-Mar	56.6	N										Total	56.3
4-Mar	57.5	N											
5-Mar	57.6	N											
6-Mar	59.8	N										# of No Snowmaking Days	29
7-Mar	52.2	N										# of Snowmaking Days	1
8-Mar	55.2	N										Total Days of Monitoring	30
9-Mar	53.0	N											
10-Mar	48.9	N											
11-Mar	48.4	N											
12-Mar	50.5	N											
13-Mar	53.3	N											
14-Mar	52.4	N											
15-Mar	52.9	N											
16-Mar	57.5	N											
17-Mar	57.2	N											
18-Mar	57.2	N											
19-Mar	53.0	N											
20-Mar	52.4	N											
21-Mar	54.0	N											
22-Mar	57.4	N											
23-Mar	56.1	N											
24-Mar	53.2	N											
25-Mar	55.0	N											
26-Mar	54.1	N											
27-Mar	52.1	N											
28-Mar	52.1	N											
29-Mar	53.9	N											
30-Mar	52.7	N											
31-Mar													

\* A- Air Nozzles

F- Fan Guns

No Snowmaking Log Available

Snowmaking

Meter Downtime/Incomplete Data

Heavenly Mountain Resort  
Mitigation and Monitoring Plan Annual Report  
(October 2017 – September 2018)

APPENDIX

XI

SKI SHUTTLE & ROUTE SCHEDULE

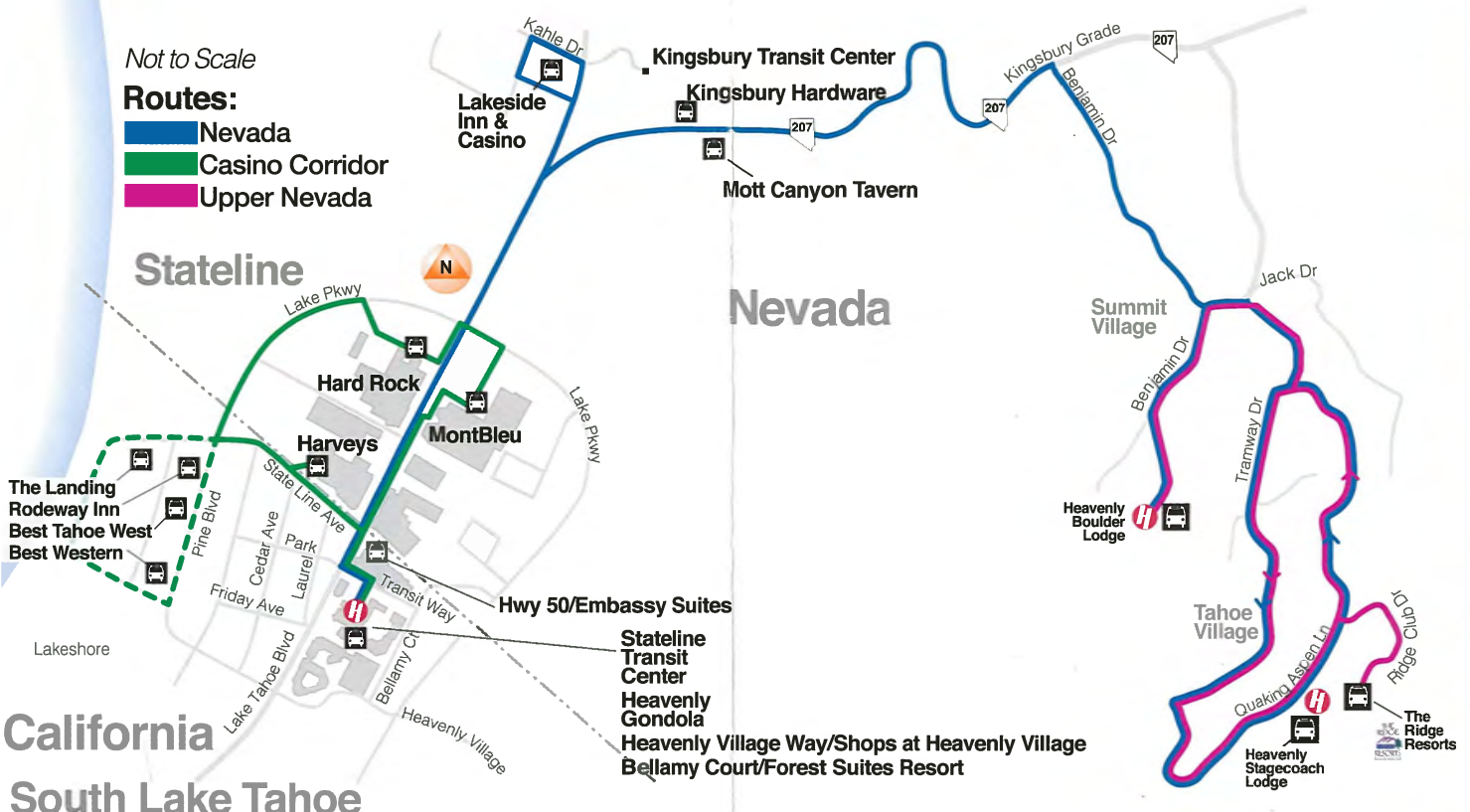


# Kingsbury Grade & Stateline Shuttle Routes

Not to Scale

## Routes:

- █ Nevada
- █ Casino Corridor
- █ Upper Nevada



## California South Lake Tahoe

### NEVADA: WEEKEND/HOLIDAY 8AM TO 6PM

Heavenly Gondola	Lakeside Inn & Casino	Mott Canyon Tavern	Heavenly Boulder Lodge	Heavenly Stagecoach Lodge	Kingsbury Hardware	Lakeside Inn & Casino	Heavenly Gondola
:00	:05	:07	:20	:35	:48	:50	:55
:20	:25	:27	:40	:55	:08	:10	:15
:40	:45	:47	:00	:15	:18	:30	:35

### NEVADA: WEEKDAY 8AM TO 6PM

Heavenly Gondola	Lakeside Inn & Casino	Mott Canyon Tavern	Heavenly Boulder Lodge	Heavenly Stagecoach Lodge	Kingsbury Hardware	Lakeside Inn & Casino	Heavenly Gondola
:00	:05	:07	:20	:35	:48	:50	:55
:30	:35	:37	:50	:05	:18	:20	:25

### CASINO CORRIDOR 8AM TO 2PM\*

Heavenly Gondola	Montbleu	Hard Rock	Rodeway Inn	Best Tahoe West Inn	Best Western & The Landing	Harvey's	Heavenly Gondola
:00	:08	:10	on request	on request	on request	:15	:18
:20	:28	:30	on request	on request	on request	:35	:38
:40	:48	:50	on request	on request	on request	:55	:58

### UPPER NEVADA: HOLIDAY/WEEKEND 8:15-11:15AM & 2:15-5:45PM

Heavenly Boulder Lodge	Heavenly Stagecoach Lodge	The Ridge Resorts Clubhouse*	Heavenly Stagecoach Lodge	Heavenly Boulder Lodge
:15	:25	:30	:35	:45
:30	:40	:45	:50	:00
:45	:55	:00	:05	:15
:00	:10	:15	:20	:30

### UPPER NEVADA: WEEKEND 11:15AM-2:15PM

### UPPER NEVADA: WEEKDAY 8AM TO 6PM

Heavenly Boulder Lodge	Heavenly Stagecoach Lodge	The Ridge Resorts Clubhouse*	Heavenly Stagecoach Lodge	Heavenly Boulder Lodge
:00	:10	:15	:20	:30
:30	:40	:45	:50	:00

\*Service to The Ridge Resorts begins at 8:15 a.m. Last Ridge Drop off at 5:45 p.m.



## WINTER SHUTTLE GUIDE



\*The time tables are in service from 8:00 a.m.-2:00 p.m. After 2:00 p.m. the shuttles make continuous loops from Stateline Transit Center to expedite guest return to their lodging properties until



(530) 541-7149 ext. 0



(775) 586-7000



Property	Rock House Rentals	Black Bear Inn	Ski Run & Pioneer Trail	Heavenly California Lodge	Heavenly Valley Lodge	Tahoe Beach & Ski	Lakeland Village	Lakeshore Lodge	Beach Retreat & Lodge	Inn By The Lake	Highway 50 Safeway	Knight's Inn	Lake Tahoe Vacation Resort
Time	:02	:04	:05	:10	:12	:15	:16	:17	:19	:21	:23	:25	:27
Time	:32	:34	:35	:40	:42	:45	:46	:47	:49	:51	:53	:55	:57

Service from 8:00 a.m. - 2:00 p.m. After 2:00 p.m. the shuttles make continuous loops from the California base lodge to expedite guest return to their lodging properties until approximately 6:00 p.m.

## North & South Shore Routes



Property	Heavenly Gondola	Tahoe Beach & Ski	Lakeland Village	Lakeshore Lodge & Spa	Beach Retreat & Lodge	Inn By The Lake	Safeway	Knight's Inn	Lake Tahoe Vacation Resort	Econo Lodge	Heavenly Goldola
Time	:00	:05	:06	:08	:10	:12	:14	:16	:20	:23	:25
Time	:30	:35	:36	:38	:40	:42	:44	:46	:50	:53	:55

NOTE: Service begins at 8:12AM at Inn By The Lake  
 \*The time tables are in service from 8:00 a.m. - 2:00 p.m. After 2:00 p.m. the shuttles make continuous loops from Stateline Transit Center to expedite guest return to their lodging properties until approximately 6:00 p.m.

### CALIFORNIA ROUTE 8AM TO 6PM

Property	Heavenly Gondola	Pioneer Tr 7-Eleven	Ski Run Blvd/Pioneer Trail	Heavenly CA Lodge	Ski Run/Heavenly Valley Lodge	Pioneer Tr Keller Ave.	Pioneer Tr Glen Road	Pioneer Tr 7-Eleven	Heavenly Goldola
Time	:00	:04	:08	:15	:19	:21	:23	:24	:27
Time	:10	:14	:18	:25	:29	:31	:33	:34	:37
Time	:20	:24	:28	:35	:39	:41	:43	:44	:47
Time	:30	:34	:38	:45	:49	:51	:53	:54	:57
Time	:40	:44	:48	:55	:59	:01	:03	:04	:07
Time	:50	:54	:58	:05	:09	:11	:13	:14	:17



FOR WINTER SKI SHUTTLE  
QUESTIONS CONTACT:

(530) 541-7149 ext. 0  
tahoetransportation.org

FOR MOUNTAIN RESORT  
INFORMATION CONTACT:

(775) 586-7000  
skiheavenly.com

Information updated as ski or weather conditions change.



Heavenly is operated under permit of the USDA Forest Service Lake Tahoe Basin Management Unit. The USDA prohibits discrimination in its programs on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, and marital status. (Not all prohibited bases apply to all programs.) To file a complaint, write the Secretary of Agriculture, U.S. Department of Agriculture, 1400 Independence Ave. SW, Washington, DC 20250 or call 1-866-632-9992. Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET center at 202-720-2600 (voice and TDD).

Heavenly Mountain Resort  
Mitigation and Monitoring Plan Annual Report  
(October 2017 – September 2018)

APPENDIX

XII

2017-2018 HEAVENLY EMPLOYEE  
SURVEY RESULTS



**Heavenly Employee Housing Occupancy Stats -  
WY 2018, 88 beds available in October 2017,  
reduced to 73 in November 2017  
(Located at 1100 Keller Rd, SLT 96150)**

<b>Month/Year</b>	<b>% Occupied</b>
Oct-17	18%
Nov-17	27%
Dec-17	51%
Jan-18	57%
Feb-18	53%
Mar-18	49%
Apr-18	37%
May-18	36%
Jun-18	76%
Jul-18	92%
Aug-18	81%
Sep-18	48%

Heavenly Mountain Resort  
Mitigation and Monitoring Plan Annual Report  
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APPENDIX

XIII

FOREST SERVICE OLD GROWTH  
COMPLETION LETTER







United States  
Department of  
Agriculture

Forest  
Service

Lake Tahoe Basin  
Management Unit

35 College Drive  
South Lake Tahoe, CA 96150  
530 543-2600

File Code:

Date: March 19, 2009

Andrew Strain  
Heavenly Mountain Resort  
PO Box 2180  
Stateline, NV 89449

Dear Andrew,

The High Meadows stand identified for hand thinning to improve long-term habitat conditions for northern Goshawk per the Heavenly Master Plan Amendment was treated in the fall of 2007. All contract work was completed and accepted per the contract requirements on December 6 2007. I will fax you the signed copies of the Certificate of Final Inspection and the Contract Release for this project for your records. If you have questions, please give me a call at (530) 543-2687.

Sincerely,

SCOTT PARSONS  
Contracting Officer's Representative



U.S. DEPARTMENT OF AGRICULTURE FOREST SERVICE  <b>CERTIFICATE OF FINAL INSPECTION</b> <i>(Reference FSH 6309.31)</i>	CONTRACT NUMBER <b>AG-9A63-C-08-0015</b>
	UNIT <b>LTBMU</b>
	PROJECT <b>South Shore hand Thin 2007</b>
TO:  <b>Matthew Gagnon</b> <b>CONTRACTING OFFICER</b>	NAME AND ADDRESS OF CONTRACTOR  <b>Central Valley Forestry</b> <b>18985C Road 256</b> <b>Exeter, CA 93221</b>

I hereby certify that the final inspection of the work under the above contract was made on 12-6-07.

The last day on which work was performed was 12-6-07 after which no calendar days should be charged against time. All materials have been furnished, all the work has been performed, and all the construction required by the contract in accordance with its terms has been completed.

A copy of the inspection report is enclosed.

Enclosure(s)

SIGNATURE  <b>Robert Guebard</b>	TITLE  <b>Contracting Officer's Representative</b>	DATE  <b>12-6-07</b>
--	--	----------------------------

*Matthew* 12-10-07

12/10/2007 14:37 FAX 530 543 2893

USDA FOREST SERVICE

005

FS-6300-18 (11/10)

USDA - Forest Service  <b>CONTRACT RELEASE</b> (Reference FSH 6309.11)	<b>CONTRACT NUMBER</b> AG-0A63-C-08-0015
	<b>UNIT</b> LTBMU
	<b>PROJECT</b> South Shore Hand Thin 2007
<b>TO:</b>  Matthew Gagnon <b>CONTRACTING OFFICER</b>	<b>NAME AND ADDRESS OF CONTRACTOR</b> Central Valley Forestry 18985C Road 258 Exeter, CA 93221

In consideration of the receipt of final payment in the amount of \$ 84,385.00 the undersigned hereby releases the United States of America from any and all obligations arising under this contract and any modifications thereof except as reserved below.

Reservations:

none

12/10/07  
 Date (mm/dd/yyyy)

Central Valley Forestry  
 Contractor

By [Signature]

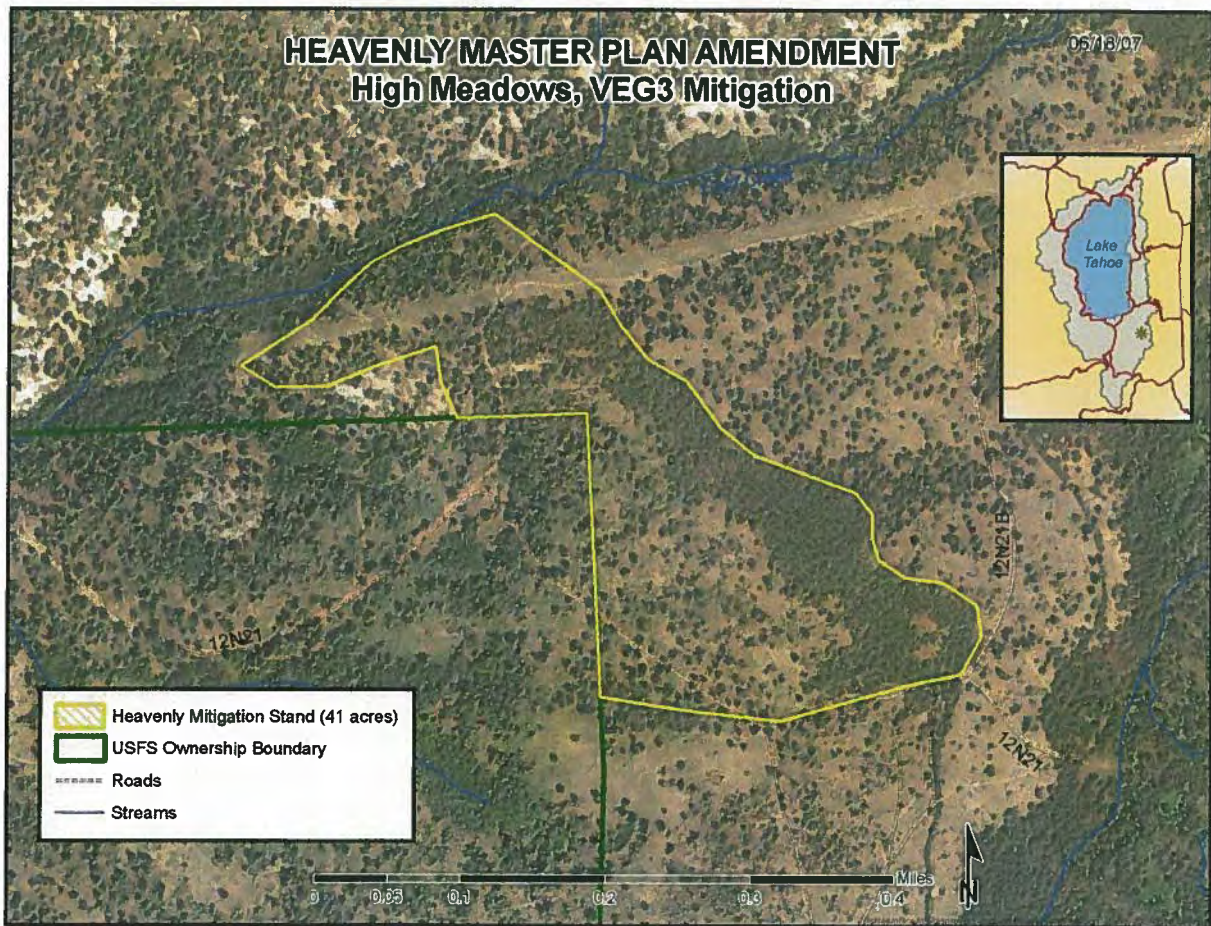
Title Owner

### 7.5-25 Late Seral/Old Growth Forest Enhancement

*To mitigate for any projects that involve the removal of late seral/old growth suitable habitat, Heavenly must enhance or restore twice the area to late seral/old growth characteristics.*

Heavenly enhanced/restored a stand of forest equal to twice the area proposed for removal in the Master Plan Amendment. The enhanced forest was restored during the fall of 2007 and is located in the High Meadows area and is undergoing monitoring by the Forest Service every five years for success. The next monitoring report will be conducted in 2012. The Forest Service documentation certifying of completion of this task is located in Appendix XIII. (Text copied from the 2011 report.)

On May 1<sup>st</sup> 2013, Forest Silviculturist Rita Mustatia and Assistant VUFF Staff Officer David Fournier visited the Heavenly Mitigation Stand (see map below).



Portions of the mitigation stand included high levels of tree mortality that posed a high risk of stand replacing fire and relatively large older trees that were susceptible to bark beetle mortality.



The objectives of the mitigation were three-fold: 1) To reduce the fire hazard to the older forest portion of the stand, and 2) to improve the resiliency of the old forest stand to fire and insects, and 3) to monitor natural regeneration of early seral portions of the stand.

The result of the site visit to monitor the completion of these objectives proved satisfactory. The high levels of lodgepole mortality (from Mountain Pine Beetle) were cut, piled and burned, reducing the risk of stand replacing fire. The understory in the older portions of the stand was thinned to levels that would effectively improve resiliency for the long-term. There was evidence of adequate stocking of naturally regenerating seedlings throughout the treated area of the stand.

The photos below highlight the result of these treatments:

Photo 1: Reduction of fuel hazard and follow-up prescribed burning





**Photo 2: Natural regeneration occurring within the stand.**



**Photo 3: Enhancement of older forest portion of the stand.**





Photo 4: Enhancement of older portion of the stand.



This report certifies that the treatment goals for the mitigation stand have been met. As a result of the monitoring conducted, there is no further need for monitoring.

*David P. Fournier*

David Fournier, Assistant Staff Officer

4/10/2014

*Rita Mustatia*

Rita Mustatia, Silviculturist

4/10/2014

## About Cardno

Cardno is an ASX-200 professional infrastructure and environmental services company, with expertise in the development and improvement of physical and social infrastructure for communities around the world. Cardno's team includes leading professionals who plan, design, manage, and deliver sustainable projects and community programs. Cardno is an international company listed on the Australian Securities Exchange [ASX:CDD].

## Cardno Zero Harm

*Cardno*  
**ZERO  
HARM**  
EVERY JOB. EVERY DAY.

At Cardno, our primary concern is to develop and maintain safe and healthy conditions for anyone involved at our project worksites. We require full compliance with our Health and Safety Policy Manual and established work procedures and expect the same protocol from our subcontractors. We are committed to achieving our Zero Harm goal by continually improving our safety systems, education, and vigilance at the workplace and in the field. Safety is a Cardno core value and through strong leadership and active employee participation, we seek to implement and reinforce these leading actions on every job, every day.

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