DEICER REPORT

California Department of Transportation

Fiscal Year 2012/2013

California Department of Transportation
District 3
703 B Street
Marysville, CA 95901

National Pollutant Discharge Elimination System
California Department of Transportation
Order No. 99-06-DWQ
NPDES No. CAS000003

DEICER REPORT

For Fiscal Year 2012/2013

September 1, 2013

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is true, accurate, and complete to the best of my knowledge and belief. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. [40 CFR 122.22(d)]

Jody Jones

Date: 8/29/13

JODY JONES
District Director

California Department of Transportation

DISTRICT 3
DEICER REPORT

Fiscal Year
2012/2013

SEPTEMBER 1, 2013

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EXECUTIVE SUMMARY

The California Department of Transportation (Department) continuously evaluates the effectiveness of Best Management Practices (BMPs) used to recover abrasive and deicing materials, and evaluates the impacts of abrasive and deicing materials on surface waters within the Lake Tahoe Hydrologic Unit (HU). This report describes the use of abrasive and deicing materials within the Lake Tahoe HU. Also contained in this report are the results of abrasive and deicing materials chemical and physical analyses, and annual results of the abrasive recovery program activities within the Lake Tahoe HU.

INTRODUCTION

Pursuant to the Federal Water Pollution Control Act (Clean Water Act) section 402(p), stormwater permits are required for discharges from a municipal separate storm sewer system (MS4) serving a population of 100,000 or more. USEPA defines an MS4 as a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) owned or operated by a State (40 CFR 122.26(b)(8)).

The California Department of Transportation (Caltrans) is responsible for the design, construction, management, and maintenance of the State highway system, including freeways, bridges, tunnels, Caltrans' facilities, and related properties. Caltrans' discharges consist of stormwater and non-stormwater discharges from State owned right-of-ways.

Before July 1999, stormwater discharges from Caltrans' stormwater systems were regulated by individual NPDES permits issued by the Regional Water Boards. On July 15, 1999, the State Water Board issued a statewide permit (Order No. 99-06-DWQ) which regulated all stormwater discharges from Department owned MS4s, maintenance facilities and construction activities. The 1999 permit has been revised, and the new permit (Order No, 2012-0011-DWQ) was adopted on September 19, 2012 by the State Water Resources Control Board. The new permit had an effective date of July 1, 2013.

Provision L.10.a of the 1999 permit required a monitoring program proposal to evaluate the effectiveness of BMPs used to recover abrasives and deicing materials and their impacts on surface waters within the Lake Tahoe Hydrologic Unit. The Department submitted a Load Assessment Report on November 23, 1999.

Provision L.10.b of the Permit required submittal of an annual Deicer Report for the Tahoe Basin that describes the results of the abrasive and deicing materials analyses. The Permit required the Deicer Report to be submitted with the Annual Report. However, April 1 of each year is too early of a reporting date for the Department to report the deicing activities during the reporting period. The Lahontan Regional Water Quality Control Board (RWQCB) agreed to accept the report by October 1 of each year. However, as this will be the final Deicer Report to be submitted in a compressed time frame to the State Board under the 1999 permit, Caltrans has committed to a September 1, 2013 submittal date to Lahontan RWQCB.

The report provides a summary of the Department's portion of the Capital Improvement Program (CIP) activities within the Tahoe Basin. In April of 2001, the Tahoe Regional Planning Agency (TRPA) adopted the Environmental Improvement Program (EIP). The intent of the EIP is to achieve the environmental goals for the Lake Tahoe Basin. The CIP has been absorbed by the EIP.

Future reporting requirements will change under the new MS4 permit and the Lake Tahoe Total Maximum Daily Load (TMDL) for Clarity which was fully adopted by the United States Environmental Protection Agency on August 16, 2011.

MONITORING PROGRAMS RELATING TO SURFACE WATER IMPACTS

Abrasives

Until August, 2013, the District required that traction sand be clean washed, free from clay and organic material and must conform to the following grading as measured by Caltrans Test Method (CTM) 202:

SIEVE SIZE	% PASSING
1/4"	100%
#8	40% - 80%
#16	15% - 70%
#50	0% - 20%
#200	0% - 3%

Traction sand must also meet the following requirements:

TEST	METHOD	VALUE
Sand Equivalent (SE)	CTM 217	75 min
Durability Fine (DF)	CTM 229	55 min

During the 2010/11 fiscal year, the Department completed the Particle Analysis of Abrasives Study (October 2010) on products from various commercial sources for use as traction abrasives in the Lake Tahoe area. The purpose of the study was to identify abrasives that met the Department's requirements and show potential to reduce the load of ultrafine particles (<16 μm) in highway runoff. Samples of twenty-two abrasives products were obtained from suppliers within approximately a 100-mile radius of Truckee and South Lake Tahoe. Each product was divided into two subsamples, and one subsample was pulverized to simulate the effects of traffic on roadways. The original product and pulverized samples were then analyzed for ultrafine particle and nutrient content.

Products had varying concentrations of ultrafine particles, total phosphorus, and total nitrogen. In general, pulverized samples had higher numbers of ultrafine particles per gram. Total phosphorus concentrations were similar before and after pulverization for most products. Many products had no detectable concentration of total nitrogen. No relationships between particle and nutrient concentrations were observed.

The products were then ranked based on the ultrafine particle and nutrient concentrations observed in the sample results. The two products currently used by the Department in the Lake Tahoe Basin had higher ultrafine particle and total phosphorus concentrations than most of the products tested. However; the currently used products do have among the lowest concentrations of total nitrogen.

Use of different products may decrease ultrafine particle loads in runoff while keeping the total phosphorus content at a similar level. The lower ultrafine particle content could help meet Lake Tahoe TMDL requirements, however; the products with low ultrafine particle contents may have higher total nitrogen concentrations.

During the 2011/12 and 2012/13 fiscal years, the Department continued (and will continue) efforts to analyze chemical and physical properties of abrasives used on highways in the Tahoe Basin. The Sampling and Analysis of Abrasives Study is building on the results of the 2010 study to further evaluate alternative traction abrasives for fine sediment particle content and for the potential in reducing fine sediment particle loads in highway stormwater runoff.

For the 2013/14 fiscal year, the following traction sand specification has been developed for use out of the Tahoe City, South Lake Tahoe and Echo Summit sand houses:

SIEVE SIZE	% PASSING
1/4"	100%
#8	40% - 60%
#16	15% - 30%
#50	0% - 5%
#200	0% - 1%

Traction sand must also meet the following requirements:

TEST	METHOD	VALUE
Sand Equivalent (SE)	CTM 217	80 min
Durability Fine (DF)	CTM 229	55 min

Additionally, a field testing method will be developed to use turbidity measurements to characterize the fine sediment particle content samples of traction abrasive materials. The turbidity test may be added to the abrasives specifications in the future to guide procurement of traction abrasives with lower fine sediment particle content than the materials currently in use.

High Efficiency Sweeping

Improvements to street sweeping technologies and practices have been identified as a promising approach to address load reduction goals for fine particles (less than 16 micrometers) associated with the Lake Tahoe TMDL. The use of high-efficiency (vacuum or regenerative air) street sweepers is being strongly encouraged by regulating agencies as a highly cost-effective source control to remove fine particles from roadways before they are entrained by stormwater runoff and transported to Lake Tahoe.

Capital, operations & maintenance, staffing and other costs of sweeping activities are significant and additional considerations including dust, green house gas emissions, traffic and noise impacts and others should be evaluated prior to purchasing a fleet of sweepers. There is a need to evaluate and confirm the cost-effectiveness of high efficiency sweepers. Studies have shown the sweepers are effective in removing the bulk of roadway abrasives but may also be pulverizing the material and detaching cemented fines and then leaving a residual layer of fines that actually is a water quality detriment (Vaze and Chiew, 2002 and El Dorado County, 2010).

Operational protocols are needed to optimize the performance of these maintenance activities. Multiple passes using various types of sweepers or operational modes (with and without brooms, water spray, etc.) have been shown to affect performance. The development of procedures for the accurate documentation of sweeping locations and quantities are also critical for appropriate TMDL crediting from regulatory agencies.

The Department has received a federal grant for the purchase or lease of one high efficiency sweeper for use in the Tahoe Basin. The benefits of high efficiency sweepers over the conventional mechanical type sweepers must be quantified to demonstrate the value to the granting agency (USFS).

The Pollutant Load Reduction Model (PLRM) includes assumptions, such as pre and post sweeping runoff event mean concentrations (EMC's), for the calculation of TMDL load reduction credits. There is a need to evaluate and confirm these assumptions through field testing and monitoring.

Lake Tahoe TMDL Implementation Requirements

Lake Tahoe Total Maximum Daily Load (TMDL) Implementation Requirements in the new NPDES Permit (Order #2012-0011-DWQ) require that Caltrans submit a Stormwater Monitoring Plan to the Regional Board by July 15, 2013 and implement the approved plan.

The Implementers' Monitoring Program (IMP) is a partnership between:

California Department of Transportation
Tahoe Resource Conservation District
El Dorado County
Placer County
City of South Lake Tahoe
Douglas County, NV
Washoe County, NV
Nevada Tahoe Conservation District
Nevada Department of Transportation

Tahoe Resource Conservation District (TRCD) will work on behalf of the jurisdictions to implement monitoring requirements necessary for meeting NPDES permit needs. In addition to having in-house administrative and stormwater monitoring expertise, TRCD can also contract across jurisdictional and state lines, making it an ideal agency to coordinate and collaborate with both California and Nevada agency representatives. Functioning as one cohesive unit, the IMP partners will support the "one lake, one plan" ideal, as well as promote cost savings gained through economies of scale.

BEST MANAGEMENT PRACTICE EFFECTIVENESS

The Department uses snowplows and motor graders to clear snow from the road surface. Deicing salt is the primary agent for ice melting and breaking the bond between the snow pack and the pavement. An abrasive, such as sand, is spread in order to provide better vehicle tire traction. The primary strategy for minimizing the impacts of sand, salt and brine usage is through the implementation of the following Best Management Practices (BMPs):

1. Communications

    a. Winter Operation Information and Live Traffic Cameras on the Internet at:
    http://www.dot.ca.gov/dist3/departments/mtce/controlmp.htm
    http://video.dot.ca.gov/
    b. Highway Advisory Radios (HAR)
    c. Changeable Message Signs (CMS)

2. Weather Forecasting

    a. Road Weather Information Systems (RWIS)

3. Chain Control Restrictions

SNOW AND ICE CONTROL PROCEDURES

Because salt, deicing chemicals, and abrasives could pollute stormwater runoff, the Department uses the minimum necessary amount of these materials for effective snow and ice control. This report includes information on the Department's Snow and Ice Control Best Management Practices (BMPs), and information on storm management procedures unique to the Lake Tahoe Basin.

The BMPs for snow and ice control are intended to minimize the discharge of pollutants generated during snow and ice control. Snow removal and ice control practices include all work in connection with snow removal, drift prevention, installation and maintenance of snow fences, and snow pole installation and removal. The use or nonuse of deicing agents is based on driver safety, traffic delay, geographic location, weather and total cost. Other activities include:

- Opening of drains covered by snow and ice to prevent flooding and freezing

- Mechanical spreading of abrasive and deicing agents (In areas of the Tahoe Basin where significant amounts of an abrasive are required, the Department increased the sweeping frequency to remove the accumulated abrasive, as allowed by availability of equipment and personnel.)

- Mechanical removal of snow and abrasives from the travel way

Proper implementation of these practices will reduce the discharge of deicing agents and sediment to storm water drainage systems or watercourses.

BMP Implementation

These bulleted BMPs provide guidance to maintenance personnel who are involved in snow and ice removal activities. See "Snow Removal and Deicing Agents" (Section 2.27 of the *Statewide Storm Water Quality Practices Guidelines, May 2003*) at:
http://www.dot.ca.gov/hq/env/stormwater/special/newsetup/_pdfs/management_ar_rwp/CTSW-RT-02-009.pdf

- Inspect snow and ice control vehicles and equipment for fuel or oil leaks prior to using.
- Where necessary, sweep after storms to remove sand.
- Routinely calibrate spreader to avoid the over application of deicing agents or abrasive. Use no more than is necessary for effective snow and ice control. Consider using alternative deicing agents where runoff from roads discharges directly to sensitive watercourses.
- Maintain accurate records of the locations of salt application and the quantities of salt used.
- Store deicing agents (e.g. salt) in appropriate areas, bunkers, or storage buildings. Do not store deicing agents where they will come into contact with stormwater runoff.
- Abrasive agents (e.g. sand) can be stored in bunkers or storage buildings. Abrasive agents stored outdoors must be managed in accordance with the requirements of the Stockpile Management BMP.
- Use only road abrasive agents that have been washed, screened or graded to reduce silt and clay to insignificant levels.
- Avoid blowing, pushing or dumping snow into a watercourse.

Storm Management Procedures in the Lake Tahoe Basin

Snow removal and storm management procedures in the Lake Tahoe Basin differ somewhat between the North and South shores due to geography, Annual Daily Traffic (ADT), population density (urbanization), and the availability of supplemental forces from nearby Maintenance facilities. The general snow removal practices common to both shores are presented first, with location specific details following to clarify the differences between the two shores.

Snow removal and storm management procedures fall under two different chronological headings: "Beginning and During Storm" and "End of Storm". The procedures used are as follows:

Beginning and During Storm

1. Anti-Icing (application of salt or other deicing agents)
2. Plowing and Sanding (removal of snow accumulation and increase tire traction)
3. Grading (removal of snow pack and push back shoulders and turnouts)

4. Rotary Blowing (clear turnouts and shoulders to promote drainage and maintain travel way width)

End of Storm

1. Grading (removal of snow pack and push back shoulders and turnouts)

2. Rotary Blowing (clear travel way, turnouts and shoulders to promote drainage and maintain travel way width)

3. Snow Hauling

During the winter season, the Department has snow removal crews on duty seven days a week, 24 hours per day. These snow removal crews are deployed when snow is forecast, and the anti-icing activity starts as soon as snow begins to fall. Plowing and sanding operations start once snow begins to accumulate on the pavement, and graders are used to remove developed snow pack. Rotary blowers are utilized to clear the travel way, turnouts, and shoulders.

Snow haul is used only within urban areas, and takes place only after the snowfall stops. All snow that can be collected and removed is hauled away, unless another storm requires postponement of snow haul.

Snow haul is generally employed when there are berms present in the center turn lanes of urban areas, such as the City of South Lake Tahoe, Kings Beach and Tahoe City. The snow haul commences when all gutters are pulled (cleaned); turn pockets are cleared, and ready to load into trucks. For light storms, Department Maintenance personnel perform the snow haul operations once the snowfall ceases. For heavy storms, commercial contract personnel and equipment are utilized during storms.

In the South Shore area, snow haul operations are conducted according to the following protocol:

- State Route 50 (SR 50) from Meyers to Stateline must be cleared first.

- Snow must first be moved to the center lane of the downtown area, and the drainages must be cleared. This is an ongoing activity throughout the snow event. Snow haul will be scheduled to start as soon as practical to expedite the removal of all of the accumulated snow.

- It is preferred to conduct snow haul operations in a manner that does not cause traffic congestion. Snow haul operations will begin as soon as necessary to mitigate the accumulation of snow in the urban area of SR 50.

- State Route 89 (SR 89) is a secondary route and will be cleared from the SR 50/SR 89 intersection to Luther Pass.

The snow haul operation is preferred at night to minimize traffic congestion. Snow blowers operate at a specific removal rate and speed. The efficiency and effectiveness of these machines decreases in stop-and-go traffic. Additionally, the trucks hauling the snow to the snow storage areas are delayed in the traffic. There is also a safety consideration involved. Snow blowers and large trucks can be a nuisance to motorists during periods of heavy traffic. Snow blowers pick up whatever is present in the snow, including bottles, cans, rocks, tire chains, and other debris. This debris may damage the blower,

causing it to stop in traffic. The potential for disrupting daytime traffic is a factor that must be considered when conducting snow haul operations during the day.

In the North Shore area, snow haul takes place in the Kings Beach and Tahoe City areas. This activity is normally accomplished using Department equipment. Personnel and equipment may be borrowed from the Kingvale Maintenance Station (on Interstate 80) or contracted to supplement snow removal operations.

Occasionally, snow removal operations are impacted by uncontrollable variables. These include weather patterns, equipment failure, traffic congestion, and limits on available personnel. Changes in practices and resources implemented to reduce these impacts include:

- Discontinued practice of slushing (rapid snow-pack melting from vehicular traffic)
- Implementation of the Road Weather Information System (RWIS)
- Added equipment and personnel dedicated to the Tahoe Basin
- Use of brine solution as a deicing agent
- Installation of air and surface temperature sensors on sand trucks
- Comprehensive retrofit of the Department's drainage systems in the Lake Tahoe Basin to enhance the ability to collect, treat, and convey storm water runoff

The Department continues to also investigate further options to make Snow and Ice Control operations more effective.

ENVIRONMENTAL IMPROVEMENT PROGRAM (EIP)

On July 26, 1997, President Bill Clinton issued Executive Order 13057 and declared the Lake Tahoe Region an "area of national concern." That order created a federal partnership involving five cabinet-level agencies, and called for a Memorandum of Agreement between the Federal Partnership, the States of California and Nevada, the Tahoe Regional Planning Agency (TRPA) and the Washoe Tribal Government. The following year TRPA, adopted the 1,000-project Environmental Improvement Program (EIP) for the Lake Tahoe Basin (then estimated at $908 million) designed at protecting this valuable treasure. Since state highways ring Lake Tahoe's shores, roadside projects aimed at improving water quality are an important component of this comprehensive effort.

The costs of past, present and future California Department of Transportation construction projects in the Tahoe Basin are estimated in excess of $366 million. These estimated costs and data in the following summary were current as of August 22, 2013 and are subject to change.

TAHOE BASIN PROJECT SUMMARY

EA	CO	RTE	FROM PM	TO PM	DESCRIPTION	EST. CAPITAL COST	EST. CONST. START (MS500)	EST. CONST. END (MS700)
29090	PLA	028	10.2	11.0	Kings Beach to State Line Water Quality Improvements	$ 2,651,000	05/04/2007	10/30/2009
0C930	PLA	028	9.2	10.3	Kings Beach Commercial Core Improvement Project	$ 31,302,000	03/01/2014	11/30/2016
0E800	ED	050	52.3	70.2	ED-50 Plant Establishment and Protection	$ 500,000	04/01/2006	01/15/2013
0E810	ED	089	0.0	8.6	ED-89 Plant Establishment and Protection	$ 500,000	05/01/2006	01/15/2015
0E830	PLA	267	3.8	9.9	Northstar to Route 28 Plant Establishment and Protection	$ 500,000	06/15/2009	12/01/2013
0E990	PLA	267	4.9	6.7	Northstar Slope Stabilization Plant Establishment and Protection	$ 4,331,000	12/08/2010	10/01/2013
1A731	ED	050	67.6	72.9	Gateway to the Tahoe Basin Water Quality Improvements	$ 9,190,000	09/01/2013	01/15/2016
1A732	ED	050	73.7	75.4	Airport to Y Junction Water Quality Improvements	$ 5,142,000	03/02/2013	01/02/2015
1A73U	ED	050	77.3	79.3	Trout Creek to Ski Run Water Quality Improvements	$ 23,500,000	03/01/2011	12/15/2014
1A734	ED	050	79.3	80.4	Ski Run to State Line Water Quality Improvements	$ 3,550,000	07/01/2012	12/01/2014
1A841	ED	089	0.0	8.6	Alpine Co to Route 50 Water Quality Improvements	$ 25,856,000	07/01/2009	02/01/2013
1A842	ED	089	8.6	13.8	Route 50 to Cascade Rd Water Quality Improvements	$ 15,731,000	07/15/2014	12/01/2016
1A843	ED	089	13.8	18.0	Cascade Rd to Eagle Falls Viaduct Water Quality Improvements	$ 13,391,000	12/15/2014	12/15/2017
1A844	ED	089	18.0	24.9	Eagle Falls Viaduct to Meeks Creek Water Quality Improvements	$ 15,500,000	06/15/2013	10/01/2017
1A845	ED	089	24.9	27.4	Meeks Creek to Placer Co. Water Quality Improvements	$ 8,401,000	09/15/2014	12/15/2018
1C111	PLA	089	8.6	10.8	Route 28 Tahoe Basin Traffic Operation System	$ 4,073,000	5/15/2008	07/15/2012
1C971	PLA	267	8.7	9.9	Stewart Way to Route 28 Water Quality Improvements	$ 8,683,000	04/06/2009	06/15/2016
1C972	PLA	267	7.4	8.1	Hold-and-Release Detention Basin Pilot	$ 2,728,000	04/03/2007	07/15/2012
1E14U	ED	050	66.6	67.8	Echo Summit Rockwall Stormwater Mitigation	$ 3,615,000	02/24/2011	09/15/2012
1E330	ED	050	79.8	80.4	Realign US 50 @ Stateline	$ 27,303,000	09/17/2016	06/17/2019
2A920	PLA	089	0.0	8.6	ED Co Line to Route 28 Drainage Improvements	$ 49,773,000	04/27/2012	10/14/2016
2A921	PLA	089	8.6	13.7	Route 28 to Squaw Valley	$ 15,201,000	02/06/2008	12/01/2012
2A940	PLA	028	0.8	11.0	Tahoe City to Kings Beach Drainage Improvements	$ 48,936,000	06/05/2008	12/01/2012
2C930	ED	050	75.4	75.4	Modify Intersection	$ 1,181,000		
3A760	PLA	089	7.5	9.4	Operational Improvements Realignment; Bike/Ped. Improvements	$ 20,300,000	12/01/2015	12/01/2019
3C380	ED	050	75.4	77.3	U.S. 50 Phase 2 Water Quality Improvement	$ 22,692,000	01/15/2014	12/01/2017
3E360	ED	089	17.5	17.6	Emerald Bay Rock Slide Repair	$ 240,000	12/28/2007	01/19/2010
4C250	ED	089	16.6	16.7	Emerald Bay Barrier Wall	$ 1,459,000	12/07/2006	03/04/2009

SAND USAGE

The Department Maintenance Manual states the following:

Abrasives will ordinarily be applied at 1,000 lbs. (454 kilograms) or less per lane mile (1.6 kilometers). Up to 2,000 lbs. (907 kilograms) per lane mile may be required on super elevations or under unusual conditions. Applications should be repeated as necessary.

In an effort to minimize impacts on Lake Tahoe and its tributaries, the Department has established a modified practice of applying traction sand at 600 lbs. per lane mile within the Tahoe Basin. Certain areas that have heavy traffic, super elevations, or steep grades may receive up to 1,000 lbs. per lane mile as required to maintain a safe roadway. The practice has resulted in a trend decrease in the amount of sand applied over the past 19 snow seasons.

The amount of sand applied in the Lake Tahoe HU by section of highway within the Tahoe Basin is presented in ***Table 1***.

Physical analyses for sand are found in ***Appendix A*** of this report.

Chemical analyses for abrasives and deicers have remained virtually unchanged over the years. Lahontan RWQCB and Caltrans NPDES staff determined that analysis of abrasives and deicers under new studies is a more productive use of resources.

SAND AND SEDIMENT RECOVERED

Once sand is applied to highways, the Department incorporates BMPs to recapture this traction sand. These BMPs include the following:

- Immediate sweeping of the traveled way and shoulders
- Annual cleaning of sand traps and catch basins including vactor operations at drainage facilities

In the Lake Tahoe HU, a total of 2,953 ton of sand was applied during the 2012/2013 snow season. During this season, 4,855 ton of sand and sediment was recovered. This represents a recapture rate of 164%.

Factors which may contribute to the high/low recovery spikes include:

- A dedicated stormwater maintenance crew and specialized equipment created in 2001/2002 and a second district stormwater maintenance crew was created in 2005/2006. (This is in addition to standard maintenance procedures for sand and sediment recovery.)
- Sand recovery information coincides with the fiscal year (July 1-June 30). Although sand recovery operations continue year-round, snow seasons with a high snowfall total late into spring delays recovery until the following fiscal year.
- Budgetary constraints frequently prevent specialized crews from traveling and/or performing annual operations.

The recapture rate includes recovered sediment from the sand traps and catch basins, which is depicted in ***Table 2.***

TABLE 1
SAND APPLIED PER SECTION OF HIGHWAY
IN THE TAHOE BASIN

Snow Season	PLA-28 PM 0.0 – 11.03 (Tons)	ED-50 PM 66.5 – 80.4 (Tons)	ED-89 PM 0.0 – 8.5 (Tons)	ED-89 PM 8.5 – 17.2 (Tons)	ED-89 PM 17.2 –27.4 (Tons)	PLA-89 PM 0.0 – 12.2 (Tons)	PLA-267 PM 6.6 – 9.9 (Tons)	Total Sand Applied (Tons)
12/13	214	1,207	366	275	101	163	627	**2,953**
11/12	191	820	384	214	77	200	457	**2,343**
10/11	401	1,286	487	329	188	329	845	**3,865**
09/10	366	1,861	786	583	288	453	649	**4,986**
08/09	244	1,301	511	378	203	301	485	**3,423**
07/08	646	1,845	775	495	351	589	560	**5,261**
06/07	488	1,518	611	399	292	581	367	**4,256**
05/06	946	3618	1298	893	681	1332	734	**9,502**
04/05	662	1,336	397	514	479	812	696	**4,896**
03/04	1,045	2,502	637	531	544	1,478	495	**7,232**
02/03	986	1,539	598	398	793	1,380	713	**6,407**
01/02	994	2,474	742	433	1,084	1,516	711	**7,954**
00/01	1,311	2,205	2,045			1,593	837	**7,991**
99/00	2,013	3,823	3,630			2,413	787	**12,666**
98/99	3,075	3,616	4,310			3,296	1,225	**15,465**
97/98	3,212	4,930	5,971			4,194	1,508	**19,815**
96/97	2,352	2,731	3,915			2,961	837	**12,796**
95/96	2,631	3,591	4,654			4,791	1,092	**16,759**
94/95	4,410	5,362	6,094			5,366	1,375	**22,678**
93/94	2,402	3,350	4,843			3,384	861	**14,840**

TABLE 2
SAND APPLIED VS. SAND AND SEDIMENT RECOVERED
IN THE TAHOE BASIN

Snow Season	Total Amount of Sand Applied (Tons)	Total Amount of Sand and Sediment Recovered (Tons)	Percent Sand and Sediment Recovered*
12/13	2,953	4,855	**164%**
11/12	2,343	4,511	**193%**
10/11	3,865	4,761	**123%**
09/10	4,986	6,197	**124%**
08/09	3,423	4,788	**140%**
07/08	5,261	5,124	**97%**
06/07	4,256	6,214	**146%**
05/06	9,502	5,053	**53%**
04/05	4,896	3,983	**81%**
03/04	7,232	6,623	**92%**
02/03	6,407	7,564	**118%**
01/02	7,954	6,821	**86%**
00/01	8,712	6,708	**77%**
99/00	12,666	7,741	**61%**
98/99	15,465	8,568	**55%**
97/98	19,815	8,604	**43%**
96/97	12,796	5,542	**43%**
95/96	16,759	4,535	**27%**

***Sand and sediment in the Tahoe Basin has been recaptured since approximately 1990; however, records were not kept before 1995.**

DEICING SALT USAGE

The Department applies deicing salt in one of two ways -- either granular or liquid form (brine). During the 2012/2013 snow season, 1,538 tons of granular sea salts were used in conjunction with sand and 166 tons were used to produce 166,025 gallons of brine. The use of brine application has allowed the Department to focus a direct application where needed. In past years, sand and granular salt was routinely mixed; however current practices utilize separate applications of brine and salt as conditions require.

The 2004/2005 season included 596 ton of the alternative deicing salt used in the test area along SR 50 from the intersection of SR 89 to the State Line in South Lake Tahoe. ***Table 3*** shows the historic use of salt in the Tahoe Basin for the past 20 snow seasons.

TABLE 3
SALT USAGE IN THE TAHOE BASIN

Snow Season	Total Salt Applied (Tons)
12/13	1,704
11/12	1,122
10/11	1,555
09/10	1,315
08/09	979
07/08	1,101
06/07	821
05/06	1,497
04/05	1,600
03/04	1,109
02/03	731
01/02	1,190
00/01	1,020
99/00	863
98/99	1,541
97/98	2,257
96/97	1,365
95/96	1,406
94/95	1,634
93/94	1,072

STORMWATER MAINTENANCE OPERATIONS

The Department's District 3 Maintenance Division has two Stormwater Crews. The first crew was created in the 2001/2002 fiscal year and is stationed at Furneaux Road south of Marysville. This crew is primarily responsible for the Caltrans geographic area known as Sutter-Sierra Region. The second crew, created in January 2006, is stationed at Rosin Court in the Northgate area of Sacramento. This crew is primarily responsible for the Caltrans geographic area known as Sunrise Region.

One of the major activities of these crews is to inspect and maintain the Best Management Practice (BMP) facilities throughout the District's eleven counties -- along the highways, at park and ride lots, rest areas, vista points, and material and equipment storage sites. The crews also conduct certain soil stabilization and erosion control measures. The data is input to

The Maintenance Stormwater Crews are annually scheduled to clean and inspect drains and drop inlets for each BMP location. Each crew records information as the work is conducted and submit the forms to the Maintenance Stormwater Coordinator. The data is transferred to a database for reporting and resource purposes.

Sweeper operations are conducted by local Maintenance crews. Their objectives are to remove litter and debris from the travel way and shoulder, to prevent the collection of materials in drain inlets, reduce the sediment loading of culverts, reduce traffic hazards and improve aesthetics. The personnel that conduct these sweeper operations record the information as the work is conducted and submit the forms to the Maintenance Stormwater Coordinator. The data is transferred to a database for reporting and resource purposes.

Appendix A

Physical Analysis for Sand

DATE SAMPLED	CALTRANS FACILITY	SOURCE	SIEVE SIZE								SAND SPECIFICATION	
			6.35 mm (1/4 ")	4.75 mm (#4)	2.36 mm (#8)	1.18 mm (#16)	0.600 mm (#30)	0.300 mm (#50)	0.150 mm (#100)	0.075 mm (#200)	SE*	DF**
	Operating Range (O.R.) % Passing		100	---	40-80	15-70	---	0-20	---	0-3	>75%	>55%
01/02/13	Echo	WNM	100	98	73	41	21	10	5	2.9	90	87
01/08/13	Echo	WNM	100	97	60	33	18	11	7	5.0	80	85
01/11/13	Echo	WNM	100	97	59	30	15	7	4	2.5	95	71
02/26/13	Echo	WNM	100	96	68	43	27	14	6	2.8	79	74
03/13/13	Echo	WNM	100	97	70	44	27	14	6	2.6	85	84
04/15/13	Echo	WNM	100	97	71	45	27	14	6	2.5	88	78
01/02/13	Meyers	WNM	100	97	62	34	19	9	5	3.3	90	73
01/03/13	Meyers	WNM	100	98	59	30	17	10	6	4.8	88	83
01/03/13	Meyers	WNM	100	98	67	35	19	9	5	3.1	87	81
01/08/13	Meyers	WNM	100	96	52	25	12	5	3	1.6	95	78
02/22/13	Meyers	WNM	100	96	67	43	26	14	6	2.9	80	78
03/15/13	Meyers	WNM	100	97	69	45	27	14	6	2.4	80	
11/14/12	Tahoe City	RT Donovan	100	100	87	45	18	6	2	1.7	91	85
11/15/12	Tahoe City	RT Donovan	100	100	88	45	18	6	2	1.5	90	76
11/16/12	Tahoe City	RT Donovan	100	97	55	24	7	2	1	0.6	87	90
11/26/12	Tahoe City	RT Donovan	100	100	85	40	14	5	2	1.4	90	77
11/27/12	Tahoe City	RT Donovan	100	97	56	42	7	2	1	0.8	98	88
01/02/13	Tahoe City	WNM	100	96	60	34	19	10	5	2.8	89	74
01/03/13	Tahoe City	WNM	100	98	61	32	17	9	5	3.5	89	80
02/07/13	Tahoe City	RT Donovan	100	96	53	18	5	1	0	0.2	95	87
11/15/12	Truckee	WNM	100	94	55	29	16	8	4	2.9	90	85
11/19/12	Truckee	WNM	100	96	60	33	17	8	4	2.2	91	71
12/10/12	Truckee	WNM	98	94	56	31	18	10	5	3.6	87	74
12/11/12	Truckee	WNM	100	98	65	39	21	11	5	2.3	89	84
12/13/12	Truckee	WNM	100	98	55	29	15	8	5	3.4	91	78
12/14/12	Truckee	WNM	100	98	60	32	17	9	4	2.6	93	73
12/17/12	Truckee	WNM	100	99	60	32	18	9	4	2.4	93	83
12/18/12	Truckee	WNM	100	98	58	32	18	9	4	2.7	91	81
12/20/12	Truckee	WNM	100	98	55	27	14	7	4	2.2	91	78
01/11/13	Truckee	WNM	100	96	51	25	11	5	2	1.2	92	78
01/14/13	Truckee	WNM	100	96	56	32	17	8	4	2.0	90	84
01/15/13	Truckee	WNM	100	96	59	33	17	8	4	2.0	92	81
01/16/13	Truckee	NWM	100	97	53	27	14	6	3	1.6	90	82
01/17/13	Truckee	WNM	100	96	51	27	14	7	3	2.2	92	74
01/23/13	Truckee	Gopher	100	96	63	35	18	10	5	2.9	92	80
01/24/13	Truckee	WNM	97	90	51	27	14	7	3	1.0	88	
01/29/13	Truckee	Trico	100	98	67	33	15	8	4	2.7	95	92
01/31/13	Truckee	Trico	100	97	63	31	14	7	4	2.5	98	89
02/11/13	Truckee	Gopher	100	97	57	29	15	8	5	2.9	95	91
02/15/13	Truckee	Gopher	100	98	56	25	12	7	4	2.8	91	95
02/18/13	Truckee	Gopher	100	98	55	26	12	7	4	2.9		84
02/21/13	Truckee	Gopher	100	96	46	18	9	5	4	2.8	91	89
02/22/13	Truckee	Gopher	100	98	54	24	11	6	4	2.5	94	87
03/11/13	Truckee	Gopher	100	98	57	28	14	7	4	2.5	91	85

* Sand Equivalent

** Durability Fine