

MEMORANDUM

DEPARTMENT OF PUBLIC WORKS
County of Placer

TO: BOARD OF SUPERVISORS

DATE: February 26, 2013

FROM: KEN GREHM/BOB COSTA

SUBJECT: LAKE TAHOE POLLUTANT LOAD REDUCTION PLAN

ACTION REQUESTED / RECOMMENDATION

1. Approve the County of Placer Lake Tahoe Pollutant Load Reduction Plan for submittal to the Lahontan Regional Water Quality Control Board. The County cost for administration, monitoring and inspections for the five-year permit term is estimated to be \$750,000 (approximately \$150,000/year). There is no new net general fund cost in the current fiscal year.

BACKGROUND

In 1992, the first National Pollutant Discharge Elimination System (NPDES) Phase 1 municipal storm water discharge permit was issued in the Tahoe basin. Placer County, El Dorado County, and the City of South Lake Tahoe are co-permittees under a single NPDES Phase 1 permit issued by the Lahontan Regional Water Quality Control Board (Lahontan). The permit requires compliance with numeric water quality discharge standards established in Lahontan's regional Water Quality Control Plan (Basin Plan).

In anticipation of Lahontan's update of the Basin Plan and its incorporation of Total Maximum Daily Load (TMDL) requirements for Lake Tahoe, our Department of Public Works (DPW) consulted with the US Army Corps of Engineers to develop a TMDL compliance strategy. The TMDL is basically a pollutant loading allowance, or budget, set at levels intended to improve water clarity conditions in the lake. Lahontan completed their update of the Basin Plan in 2010, with load limits established for fine sediment, phosphorus, and nitrogen, along with an implementation schedule that specifies incremental load reduction milestones over the next 65 years. The County's Stormwater TMDL Strategy Technical Report (Strategy Report) was completed in 2011, aligning with requirements of Lahontan's newly adopted Basin Plan.

Implementation of the TMDL, for California jurisdictions, has been incorporated into the December, 2011 update of the NPDES Phase 1 permit. The permit requires development and implementation of a jurisdictional pollutant load reduction plan to reduce fine sediment discharges by 10%, total phosphorus by 7%, and total nitrogen by 8% within the five year permit term, ending in 2016. Load reductions are based on 2004 baseline load conditions in each jurisdiction; these were estimated for Placer County in the Strategy Report. Load reduction credits are established and tracked on an annual basis, and are based on specific load reduction actions, such as water quality project construction, enhanced facilities maintenance, and private property retrofits.

In addition to estimating baseline load conditions, the Strategy Report also considered various actions that the County could implement to meet the TMDL load reduction requirements. Eleven water quality improvement projects constructed between 2004 and 2010, once modeled and registered in Lahontan's tracking system, are expected to reduce pollutant loads by about 3%. Seven additional projects, in various stages of planning, design or construction, are expected to reduce loads by another 5%, for a total project-related load reduction of 8%. Additional load reductions from use of different winter traction abrasives (sand) and enhanced sweeping should

result in achievement of the five-year, 10%, load reduction requirements. Meeting future load reduction requirements, identified in the Basin Plan as 11% in the next NPDES Permit term, will be more challenging, likely involving efforts to improve private property best management practices (BMP) retrofits.

The NPDES Phase 1 permit requires that each jurisdiction submit to Lahontan a Pollutant Load Reduction Plan (PLRP) by March 15, 2013. Drawing from the Strategy Report prepared for Placer County, DPW has prepared a PLRP incorporating the recommended load reduction actions. The PLRP includes registration of completed and pending water quality improvement projects, including the pending King's Beach Commercial Core Improvement Project, within the five year NPDES permit term. In addition, the plan includes changes to traction abrasive materials to improve material hardness and reduce fine particles. Enhanced sweeping, using higher efficiency sweepers and more frequent sweeping will be considered as needed to meet load reduction requirements. Your Board is requested to approve the County of Placer Lake Tahoe Pollutant Load Reduction Plan for submittal to Lahontan, in accordance with NPDES Phase 1 Permit requirements. Failure to submit a PLRP would be considered a violation of the NPDES permit, possibly subjecting the County to enforcement actions and penalties.

Estimated costs to implement TMDL load reductions for the first five years, exclusive of water quality projects funded and completed between 2004 and 2010, are \$38 million, with other NPDES permit requirements such as monitoring, inspections, and reporting estimated at \$800,000. A portion of the estimated capital costs, approximately \$35 million, may be available through state and federal grant sources, though this is not assured. Traditional State grant sources for water quality projects are funded by voter-approved bond measures, and funding for Lake Tahoe from the last voter-approved bond has been fully expended or fully allocated; there is approximately \$2,000,000 for capital storm water efforts currently available to the three California jurisdictions from the California Tahoe Conservancy. There is no certainty of any future State bond measures dedicating funding for Lake Tahoe TMDL efforts. The Lake Tahoe Restoration Act represents the primary program for federal funding of stormwater improvement projects in Lake Tahoe. Funding from that program has also been fully utilized or allocated, with approximately \$9,000,000 remaining for future projects basin wide. Basin officials continue to emphasize the need for greater local funding contributions with less reliance on state and federal programs. DPW continues to pursue non-traditional funding sources for capital projects with good success; however, this revenue is not considered sustainable or reliable for the long-term. The PLRP has been written with flexibility to include both capital project and enhanced operation and maintenance (O&M) efforts that tend to be less costly to meet the TMDL 10% reduction target. Nonetheless, having adequate and sustainable O&M funding will be a continuing challenge.

ENVIRONMENTAL CLEARANCE

This proposed action is not a project as defined in Section 15378 of the California Environmental Quality Act (CEQA) and is exempt from CEQA requirements.

FISCAL IMPACT

The estimated cost of PLRP implementation over the five-year permit term is as follows:

Capital Improvement Projects	\$35,000,000
Modified Road Operations (Sanding/Sweeping)	\$ 750,000
Administration, Monitoring, Inspections	<u>\$ 2,250,000</u>
Total	\$38,000,000

The funding for NPDES permit implementation has historically come from County Road Fund and General Fund sources, though some funding has come from outside sources for limited

monitoring, maintenance, and equipment purchases. State and Federal grants have been the primary funding source for capital improvement projects and some water quality monitoring efforts. County Road Fund has historically funded on-going operations and maintenance of capital water quality projects as well as roadway and storm drainage infrastructure. As new projects are constructed, and more technologically advanced water quality treatment practices deployed, maintenance and operational costs will continue to rise, placing ever-increasing demand on limited Road Funds.

Attachment: Placer County Lake Tahoe Pollutant Load Reduction Plan

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County of Placer



Lake Tahoe Pollutant Reduction Plan

March 2013

Prepared for:

Lahontan Regional Water Quality Board

Prepared by:

Placer County Department of Public Works

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LIST OF ACRONYMS

BMP	Best Management Practices, e.g. stormwater control measures
County	County of Placer
FSP	Fine Sediment Particles
GIS	Geographic Information System
Lahontan	Lahontan Region Water Quality Control Board
MS4	Municipal Separate Storm Sewer System
NDEP	Nevada Department of Environmental Protection
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
PLRM	pollutant Load Reduction Model
PLRP	Pollutant load reduction plan
ROW	Right of Way
SEZ	Stream environment zone
TMDL	Total maximum daily load
TN	Total nitrogen
TP	Total phosphorus
TRPA	Tahoe Regional Planning Agency
UPC	Urban planning catchment
WQIP	Water quality improvement project

1.0 BACKGROUND

The California Regional Water Quality Control Board-Lahontan Region (Lahontan) incorporated Total Maximum Daily Load (TMDL) pollutant load reduction requirements into the updated Lake Tahoe Municipal National Pollutant Discharge Elimination System (NPDES) Permit. This permit (Board Order R6T-2011-0101, NPDES Permit Number CAG616001) regulates stormwater discharges from each of the three California Lake Tahoe Basin jurisdictions (El Dorado County, Placer County and the City of South Lake Tahoe).

The municipal separate storm sewer system (MS4) infrastructure in Placer County consists of collection, conveyance, and treatment facilities. Federal rules require operators of MS4 systems to implement programs to control pollution in stormwater runoff. California regulates MS4s through municipal NPDES permits, and for this document, Lahontan Board Order R6T-2011-0101 is referred to as the MS4 permit.

The MS4 permit requires the County of Placer (County) to prepare a Pollutant Load Reduction Plan (PLRP) by March 15, 2013 detailing the County's approach for meeting pollutant load reduction requirements promulgated by the TMDL. In summary, the TMDL requires reducing fine sediment (less than 16 microns in size) discharge from the Lake Tahoe Basin portion of Placer County by a minimum of 10 percent (expressed by weight and no. of particles) by September, 2016.

This document presents Placer County's PLRP, which includes the following:

- 1) Four selected strategies for achieving the required load reduction;
 - a. Registration of catchments associated with completed water quality improvement projects
 - b. Improved sweeper technology implementation
 - c. Enhanced operations & maintenance (O&M) management
 - d. Credit for private best management practices (BMPs) from commercial/mixed use development/redevelopment projects
- 2) Estimated load reductions based on proposed strategies;
- 3) Estimated annual timeline for load reductions; and,
- 4) Annual adaptive management process.

1.1 BASELINE LOAD ESTIMATE

In 2011, Lahontan issued an *Order to Submit Technical Reports in Accordance with California Water Code – Lake Tahoe Urban Stormwater Implementation* (13267 Order) to the County and the other Tahoe Basin MS4 permittees (El Dorado County and City of South Lake Tahoe). The 13267 Order required Placer County to estimate a baseline pollutant load discharged to Lake Tahoe for fine sediment particles (FSP), total phosphorus (TP), and total nitrogen (TN). The period of time from October 1, 2003 to May 1, 2004 is defined by the 13267 Order, and the MS4 permit, as the **Baseline Condition** and the point of reference for estimating baseline pollutant loading.

Placer County contracted with the US Army Corps of Engineers for the development of the *Placer County Stormwater TMDL Strategy Technical Report*, dated July 12, 2011 (Strategy Report, 2011). Based on the assessment methods summarized in this report, Placer County's baseline load estimate was computed (Section 2, page 10), and is shown in Table 1.1, below.

Table 1.1 – Placer County Baseline Pollutant Load Estimate

Urban Area (acres)	Surface Runoff (acre-feet/year)	Pollutant Loading			
		FSP	TP	TN	Units
5,738	1,491	516,000	2,450	10,220	lb/year
		234,053	1111	4635	Kg/year
		2.6E+19	n/a	n/a	# particles/year ¹

¹ One kg FSP = 1.1×10^{14} particles FSP (Lahontan and NDEP 2011, Equation: 0.3)

This baseline load estimate for Placer County is considered accurate unless during the permit period, new information becomes available to justify refining the estimate.

1.2 LOAD REDUCTION REQUIREMENTS

Through the Lake Tahoe TMDL, Lahontan established five-year load reduction targets to assess each California jurisdiction's progress towards meeting overall load reduction goals (Lahontan 2010: p. 10-4). Load reduction targets for FSP, TP, and TN have been established based on attainment of California's Lake Tahoe transparency standard (roughly a clarity depth of 97 feet) over an estimated 65-year implementation period.

The MS4 permit requires a 10 percent FSP reduction, 7 percent TP reduction, and an 8 percent TN reduction from baseline pollutant loading which must be earned by September 30, 2016 and maintained for subsequent water years.

Lahontan has developed the Lake Clarity Crediting Program to support the Lake Tahoe TMDL. This crediting program specifies the process to connect implementation of water quality improvement actions to corresponding estimated pollutant load reductions (Lahontan and NDEP 2011). Through this program, Lake Clarity Credits have been defined as a mechanism to provide flexibility for regulated jurisdictions to achieve required load reductions. Lahontan intends to use the Lake Clarity Crediting Program as an accounting system for Lake Clarity Credits to track compliance with stormwater regulatory measures.

Table 1.2 displays Placer County's load reduction requirements for this MS4 permit term. In terms of crediting and tracking, Placer County is expected to obtain 260 Lake Clarity Credits. One Lake Clarity Credit = 1.0×10^{16} particles FSP (Lahontan and NDEP 2011, Equation: 0.2).

Table 1.2 – 2016 Load Reduction Requirements

Parameter	Baseline Load (kg/year)	Required Percent Reduction	Required Load Reduction (kg/year)	Allowable Load (kg/year)
Fine Sediment Particles (mass)	234,053	10%	23,405	210,648
Fine Sediment Particles (# of particles)	2.6E+19	10%	2.6E+18	2.34E+19
Total Phosphorus	1,111	7%	78	1,033
Total Nitrogen	4,635	8%	371	4,264

1.3 SUPPORTING INFORMATION

The Placer County Strategy Report identified potentially feasible and cost effective actions to meet anticipated TMDL reductions and to inform the load reduction planning process.

The Strategy Report categorized and analyzed water quality improvement actions as three primary load reduction methodologies:

1. Road maintenance operations for water quality;
2. Public water quality improvement projects (WQIPs); and
3. Private parcel BMPs implemented through retrofit or redevelopment

The Strategy Report completed an existing conditions assessment that estimated load reductions Placer County could achieve by registering, or calculating Lake Clarity Credits from completed WQIPs since 2004 (baseline) and those WQIPs scheduled for completion by 2016. Load reduction estimates for these projects were developed using the Pollutant Load Reduction Model (PLRM), which is the same modeling tool used to estimate the baseline pollutant load. The PLRM is a publicly available long-term continuous simulation model used to evaluate and compare alternatives for storm water quality improvement projects in the Tahoe Basin. The PLRM links urban stormwater hydrology and site specific land use conditions to estimate average annual pollutant loading from urban drainage catchments under varying scenarios (NHC et al. 2009).

While the Strategy Report contains the supporting analysis and assumptions that informed the estimated load reductions of this PLRP, the listed WQIPs and associated load reduction estimates are being updated in the PLRP. The load reduction numbers, calculated in 2010, require updating based on actual project implementation to date. Specifically, projects were omitted from the Strategy Report (Homewood Phase 1 and 1A, Snow Creek Restoration, Griff Creek SEZ, and Kings Beach WQIP) and these are/will be completed by 2016, offering opportunities for additional lake clarity credits. Page 4.8 of the Strategy Report specifies that the percent FSP reduction as a result of project implementation can be estimated based on similarities to modeled WQIPs and on best professional judgment. This technique was employed to update the load reduction estimates for projects not included in the Strategy Report, to reflect current 2013 project conditions.

After calculating the 2004 baseline conditions and estimating the pollutant load reduction as a result

of WQIPs, the Strategy Report assessed two additional load reduction methodologies (road maintenance operations and private parcel BMP implementation), which included varying levels of execution. The results identified potential load reduction approaches Placer County could consider in meeting load reduction requirements. At least one strategy, specifically single-family private parcel BMP implementation (particularly those properties not hydraulically connected) was not considered cost-effective, as a large investment of resources would yield minimal results toward load reduction targets. Based on these analyses, Placer County will focus on capturing clarity credit for private property BMPs where they are implemented as part of larger, commercial or mixed-use developments or redevelopment projects.

In summary, Placer County intends to meet the TMDL requirements in this permit term through registration of WQIP catchments, implementing pollutant control management measures in road maintenance operations, and quantifying clarity credits from completed private development and redevelopment projects located in registered catchments.

2.0 CATCHMENT REGISTRATION

This section summarizes the County's list of project catchments that will be registered, per the Clarity Crediting Program, and the expected sediment load reduction achieved for each. The catchments are divided into completed projects from the baseline year 2004 through the 2012 construction season, and those projects in the design stage for anticipated completion by 2016.

2.1 COMPLETED PROJECT CATCHMENTS

To date, the County's approach for reducing stormwater pollutant loads has focused on implementation of public Rights-of-Way (ROW) Water Quality Improvement Projects (WQIPs) in accordance with TRPA's Environmental Improvement Program.

Since the Lake Tahoe TMDL 2004 baseline period, Placer County has completed fifteen WQIPs. Performance estimates for the completed WQIPs were previously computed in the Strategy Report, and are presented in Table 2.1. Pollutant load reduction estimates are derived from PLRM modeling of three Placer County WQIPs: Tahoe Estates, Dollar Point and Tahoe Pines Area C, then through extrapolation of watershed characteristics and best professional judgment.

The following are standard input assumptions used for Placer County WQIP catchment estimates utilizing PLRM modeling:

- Street sweeping is conducted on a regular basis, with a minimum frequency of 1-2 times per year.
- Sweeping maintenance, using a mechanical broom sweeper for all secondary roads.
- Private property BMP implementation percentages are based on BMP data supplied to Placer County by TRPA.

Should significant private property projects be completed during the permit term, such as commercial and/or mixed use development or redevelopment projects, additional lake clarity credits may be pursued as these projects can typically be shown to have a high impact to improving stormwater within a catchment. Additional credits will be justified by changing the appropriate private property completion percentage input parameters in the PLRM.

Table 2.1 – Completed WQIP Catchment Credit Estimates

Water Quality Improvement Project	Year Completed	Load Reduction Estimates (Pounds/Year)	Lake Clarity Credits
		FSP	
Dollar Point	2008	3,241	16.2
Lake Forest Meadow	2009-2010	2,184	11
Timberland	2004	551	3
Upper Cutthroat	2005	398	2
Lake Tahoe Park	2004	804	4
Tahoe Pines – Area A	2007	1,195	6
Tahoe Pines – Area B	2009	43	.25
Tahoe Pines – Area C	2011	1,704	9
Tahoe Estates	2009	3,112	16
West Sunnyside Phase I	2008	1,305	7
Fox Clean Water Pipe	2010	400	2
Tahoe City Residential	2011	969	5
Brockway	2012	2,022	10
Homewood Phase 1 & 1A	2012	3,800	19
Beaver Street Retrofit	2007	928	5
Lake Forest Highlands	2012	1,000	5
Totals:		22,919	120
Percentage of Required Credits:		120/260	46.2%

Note: 1 Lake Clarity Credit = 200.42 pounds of FSP

Once these project areas are individually modeled using PLRM, the actual load reductions and credits may be different from the extrapolated estimates shown in Table 2.1.

2.2 PROPOSED PROJECT CATCHMENTS

Placer County anticipates completion of six WQIPs in various stages of planning and design. These additional WQIPs are intended to be constructed within the permit term (by September 2016). The six WQIPs include:

Table 2.2 – Proposed WQIP Catchment Credit Estimates

Water Quality Improvement Project	Year Completed	Load Reduction Estimates (Pounds/Year)	Lake Clarity Credits
		FSP	
Lake Forest Panorama	2014-2015	6,040	30
West Sunnyside Phase II	2015	1,414	7
Snow Creek Restoration	2013	1,800	9
Kings Beach CCIP	2013-2016	10,508	52
Griff Creek	2014	900	4.5
Kings Beach WIP ¹	2014-2016	3,000	15
Totals:		20,659	117
Percentage of Required Credits:		117/260	45.0%

¹ Kings Beach WIP includes two subwatershed projects within the Kings Beach planning area.

The proposed WQIPs include addressing pollutant runoff from the densest urban area in Placer County within the Tahoe Basin (Kings Beach) and also a major project addressing the runoff from a dense commercial land use area (Lake Forest Panorama) with integrated SEZ restoration and outfall reconstruction components. These two projects treat areas within intervening zone watersheds that discharge stormwater directly to Lake Tahoe or streams flowing to Lake Tahoe. Consequently, the WQIPs are predicted to provide a large percentage of the overall fine sediment load reduction at the end of the permit term in 2016.

Pollutant reduction estimates in Table 2.2 are derived from preliminary project PLRM models that typically reflect the preferred alternative for project design, and based on the extrapolated amount of sediment removal that has been computed from similar projects. Additional refinement and quality assurance of these PLRM models will occur after project construction to ensure the models appropriately represent the functions of the constructed water quality improvements. Final load reduction numbers registered with the Lake Clarity Crediting Program may differ from the estimates presented in Table 2.2.

3.0 POLLUTANT CONTROL MANAGEMENT MEASURES

Management controls proposed to meet the sediment load reduction include the following measures;

- Utilizing an abrasive supply with negligible FSP and high hardness content in the source material.
- Improved sediment recovery through an increase in the frequency of sweeping operations in targeted, registered catchment project areas.
- Purchasing a new, high-efficiency vacuum assist sweeper to improve the overall efficiency of sweeping operations.

3.1 CHANGE ABRASIVE SOURCE MATERIAL

Preliminary results from a recent Caltrans study (Caltrans, 2010) indicates that considerations in the abrasive material supplier can result in an overall decrease in the amount of FSP mobilized during winter traction operations.

The Caltrans study indicates that the abrasive material previously used by Placer County through the 2011-2012 winter season (#002 in Caltrans study) has comparably high amounts of FSP relative to other available sources. The deicing sand (#022 in Caltrans study) has approximately 0.01 percent FSP, compared to the (average) 0.3 percent FSP contained in previous abrasive sources that Placer County utilized, as shown in Table 3.1, below. Placer County has recently changed to the low-FSP content abrasive source (#022 in Caltrans Study) for 2012-2013 winter operations.

As part of the pollution load reduction plan, Placer County will need to determine the appropriate method for registering the change in road abrasive supply as a jurisdiction-wide action. On-going studies currently being conducted by Caltrans will help to quantify this management control measure in terms of Lake Clarity Credit.

The small percentages of FSP within an abrasive supply can become a relatively significant load when calculating total abrasives applied Countywide. By simply switching to an abrasive supply (#022) with a lower percentage of FSP, the total seasonal amount of FSP applied to Placer County roads will be reduced by approximately 4,817 pounds per year (Table 3.1). The actual load reduction in the County's baseline load from this action would be less than 4,817 pounds of FSP if fate and transport of material applied to County roads is considered. However, using this estimated reduced amount of FSP in the abrasives applied to Placer County secondary roads per annual year, the Lake Clarity Credit would translate to approximately 24 credits, or account for about 9 % (24/260) of the required load reduction annually.

Table 3.1 – Estimated FSP Applied to Placer County Roads from Winter Abrasives

Abrasive Supply	FSP Count (particle count / kg abrasive) ¹	FSP Mass (kg FSP / kg abrasive) ²	FSP Percentage by Mass in Abrasive Supply	Average Annual County Abrasives Applied (kg)	FSP Applied (kg/year)	FSP Applied Difference From Baseline (lb/year)	Lake Clarity Credit (Year)
Typical Baseline Source #002	3.68E+11	0.0030	0.30%	754,500	2,260	4,817	24
Deicing Sand – Source #022	6.94E+09	0.0001	0.01%	754,500	75		

¹ Caltrans 2010: p. 4-1

² One kg FSP = 1.1×10^{14} particles FSP (Lahontan and NDEP 2011: Equation 0.3)

This pollutant control management measure is already in-place. For the 2012-2013 winter season Placer County changed its abrasive supply to the deicing sand identified in the Caltrans study as source #022.

The load reduction benefit that may be realized from this action is not proposed for registration with this PLRP term, unless circumstances in 2016 require Placer County to take credit for this action to meet load reduction requirements. A consistent methodology among the jurisdictions should be developed to adequately capture the reduction in sediment loading by discriminating and assessing the fines percentage in an abrasives supply source. The County intends to take credit for this action, perhaps as part of a future PLRP, once the following programmatic steps are completed:

- The methods and associated level of effort for registering and tracking the performance of jurisdictional management actions with the Lake Clarity Crediting Program are better defined.
- Updates to the PLRM Road Methodology to assess abrasive type are completed.
- Additional research, some of which is currently being conducted by Caltrans and El Dorado County, to assess the load reduction benefit of various road abrasive materials in terms of resistance to pulverization (hardness component) into FSP.

3.2 INCREASE FREQUENCY OF SWEEPING

Various sweeping scenarios evaluated the Strategy Report suggest augmentation of current sweeping operations could be a viable pollutant load reduction action. More frequent and targeted sweeping activities during the current permit term should help Placer County achieve pollutant load reductions.

Specifically, Placer County is proposing to increase sweeping from a minimal 1-2 times during spring and summer months to twice during winter months (November through April) in addition to 1-2 times during the spring and summer months. The secondary roads that will be targeted will be those streets within the 15 completed project catchments (listed in Table 2.1).

As noted in PLRP Section 2, the Strategy Report baseline assumptions for estimating the pollutant load reductions in Placer County assume a sweeping frequency of 1-2 per year. By increasing the sweeping frequency from this baseline to twice monthly during the winter months (defined as November through April) in addition to 1-2 times during the spring/summer months, Placer County could capture a conservative estimate of approximately 10 % more FSP. Based on the 15 registered catchment sediment load reduction total, 20,659 pounds/year, an additional 10% (2,066) translates to about 12 Lake Clarity credits or $12/260 = 4.6\%$ of the total permit term load reduction. The additional Lake Clarity credits will simply be computed by changing the PLRM Road Conditions editor to reflect the new sweeping program. The computed delta, or change in load reduction will be requested during annual reporting and catchment registration with Lahontan.

This proposed sweeping frequency is not the highest sweeping frequency interval that can be modeled by the PLRM. The proposed frequency still allows Placer County a future option of increasing sweeping frequency to what is currently the highest aim: sweeping after every winter abrasive application. Due to limited resources at this time, Placer County cannot commit to that standard. However, if PLRM computations show that the proposed level of increased sweeping will not be sufficient to capture enough lake clarity credits from the completed water quality improvement projects, than a program of strategic sweeping after every winter abrasive application may be pursued.

Another option currently under consideration, likely for subsequent permit terms, would be the purchase and installation of EPOKE, or similar, abrasives spreaders on County trucks. These spreaders would be used as a management tool to limit the amount of abrasives applied to secondary roads, and strategically limit FSP from this source. Again, a consistent methodology would need to be developed to train County personnel in this application technique and to track the load reduction between jurisdictions to allow for Lake Clarity Credit to be computed.

3.3 PURCHASE NEW HIGH-EFFICIENCY SWEEPER

Placer County determined that limited capital equipment funds in this permit term would be judiciously spent with the purchase of at least one new sweeper. Placer County has ordered a 2013 Elgin Eagle high-efficiency model, equipped with a vacuum assist. This model meets the definition of a high-efficiency sweeper (Sutherland 2011: p. 4). This is the highest order-type sweeper that can be modeled using the PLRM estimation techniques.

A second, high-efficiency sweeper may be purchased prior to the end of the permit term in 2016. Purchasing a second sweeper would be dependent upon the utilization rate of the sweeper, maintenance requirements and on personnel.

The sediment load reduction estimates computed in the Placer County Strategy Report were based on sweeping with a mechanical broom sweeper. With the addition of the Elgin Eagle to the County fleet, the streets within the registered catchments will be swept with the County's new sweeper a minimum of twice per month in the winter months (November through April), as road and weather conditions allow, and once or twice during spring/summer months.

By utilizing a high-efficiency sweeper, Placer County will model sweeper performance in PLRM from this action using the "High-Efficiency Vacuum-Assisted Dry Sweeper" option. Load reduction estimates from PLRM simulations for the 15 registered catchments utilizing the high-efficiency sweeper as opposed to the mechanical broom modeled in the PLRM estimates from the Strategy Report will result in an estimated difference of 15 Lake Clarity Credits or $15/260 = 5.8\%$ of the total permit term load reduction. The additional Lake Clarity credits will simply be computed by changing the PLRM Road Conditions editor to reflect the different sweeper. The computed delta, or change in load reduction will be requested during annual reporting and catchment registration with Lahontan.

3.4 MANAGEMENT MEASURES PERFORMANCE SUMMARY

Using Lake Clarity Credits as the defining performance metric, the PLRM analysis estimates that the County can obtain 27 (10.4 %) Lake Clarity Credits through pollutant load reducing management measures, which does not include potential credits determined for changing abrasive type. As previously noted, a methodology needs to be developed to earn credits from this management measure. While the County will likely obtain the majority of the required Clarity Credits (89.6 %) through the implementation and registration of WQIPs, the estimates for Lake Clarity Credits were only based on employing pollutant control management measures within the 15 existing completed WQIPs. If necessary, Placer County will explore registering additional catchments where enhanced management measures are deployed to earn additional credits.

Due to the uncertainty of future individual WQIP performance and construction scheduling, estimates based on preliminary PLRM models, which in some cases reflect the preferred alternative for project design, the actual computed Clarity Credits may vary. The selected pollutant control management measures will offer flexibility if needed, and the County can adjust these practices. Additionally, Lake Clarity Credits could be reduced if County operations and maintenance activities are unable to sustain load reductions at the levels estimated by the supporting assumptions. This approach allows flexible and adaptable load reduction measures to be deployed as necessary to meet the MS4 permit requirements during the permit term.

Table 3.2 summarizes the estimated load reductions and associated Lake Clarity Credits the County anticipates achieving with pollutant control management measures.

To reiterate, there is flexibility and adaptability constructed into these measures. Note that the change in abrasive type, while included in the summary table below, is not part of the total Lake Clarity Credits estimated for this permit term. Additionally, any development or redevelopment private property BMPs that would be required through Placer County approvals (such as redevelopment projects in the Kings Beach commercial core or JMA Ventures Homewood Mountain Resort) and which result in measurable reduced pollutant loading are also not part of the total Lake Clarity Credits estimated for this permit term. However, credits associated with those actions may be available to be incorporated during the permit term.

Table 3.2 – Pollutant Control Management Measures Summary

Action	Load Reduction Estimates (lbs/year)	Lake Clarity Credits
	FSP	
Change Abrasive Type	3,234	16
Increase Frequency of Sweeping	2,405	12
Utilize New High-Efficiency Sweeper	3,006	15
Management Measures Total ¹	5,411	27
Percentage of Required Credits	27/260	10.4%

¹Does not include changing abrasive type as it is assumed a credit methodology will not be developed within the current permit term.

4.0 CATCHMENT REGISTRATION SCHEDULE

Placer County intends to register all the water quality improvement projects completed from 2004 listed in Table 2.1, and those projects currently in the design stages listed in Table 2.2.

Table 4.1 below summarizes the catchment registration schedule for the water quality improvement projects.

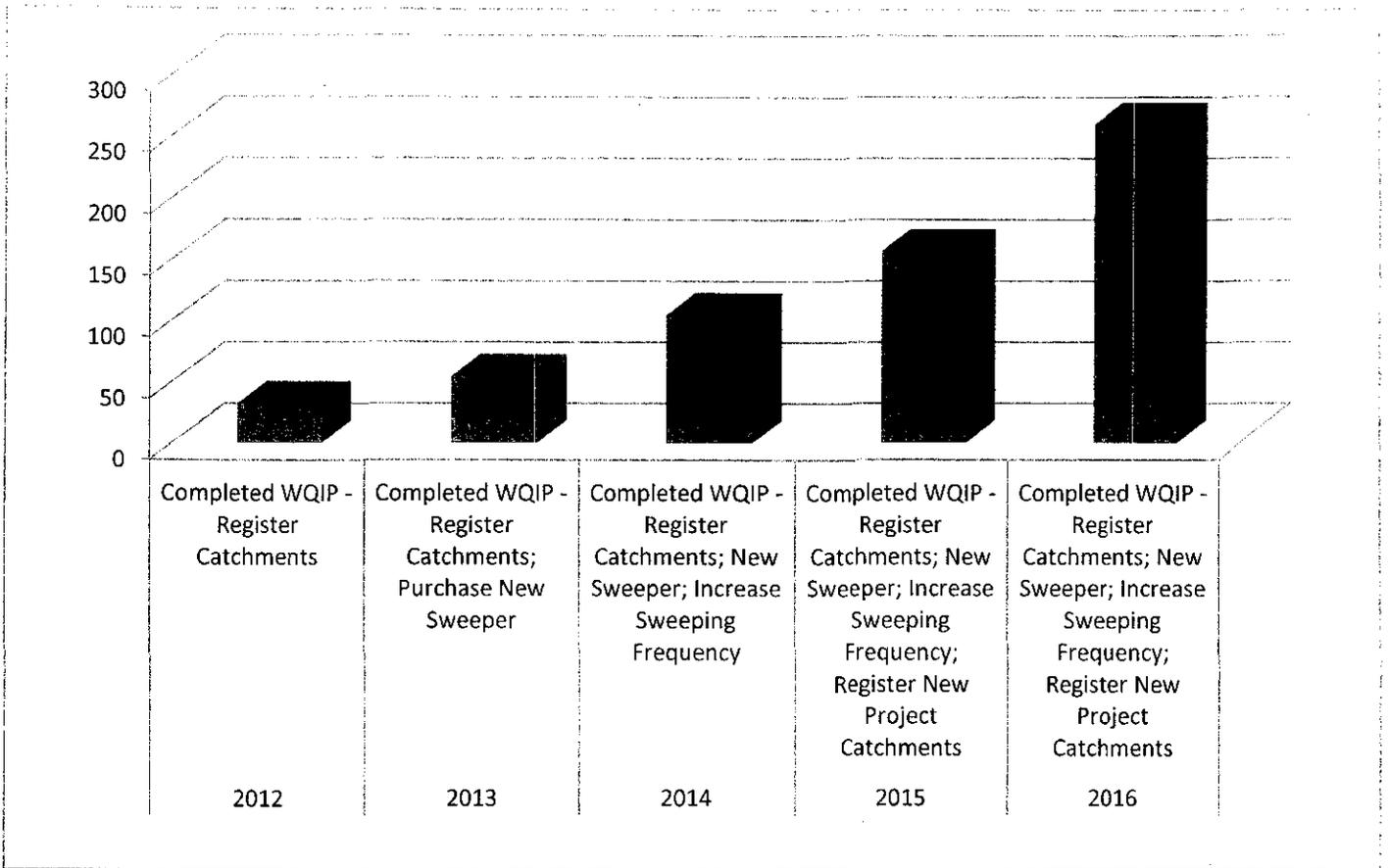
Table 4.1 – Catchment Registration Schedule

Catchment Registration Year	Associated Project:
2012	Dollar Point
	Tahoe Estates
2013	Timberland & Lake Tahoe Park
	Upper Cutthroat
	Tahoe Pines – Area A
	Tahoe Pines – Area B
2014	Tahoe Pines – Area C
	West Sunnyside Phase I
	Beaver Street Retrofit
	Fox Clean Water Pipe
2015	Lake Forest Meadow
	Tahoe City Residential
	Brockway
	Homewood Phase 1 and 1A
	Lake Forest Highlands
	Snow Creek Restoration
2016	Griff Creek
	Lake Forest Panorama
	West Sunnyside Phase II
	Kings Beach CCIP
	Kings Beach WIP

5.0 LOAD REDUCTION SCHEDULE

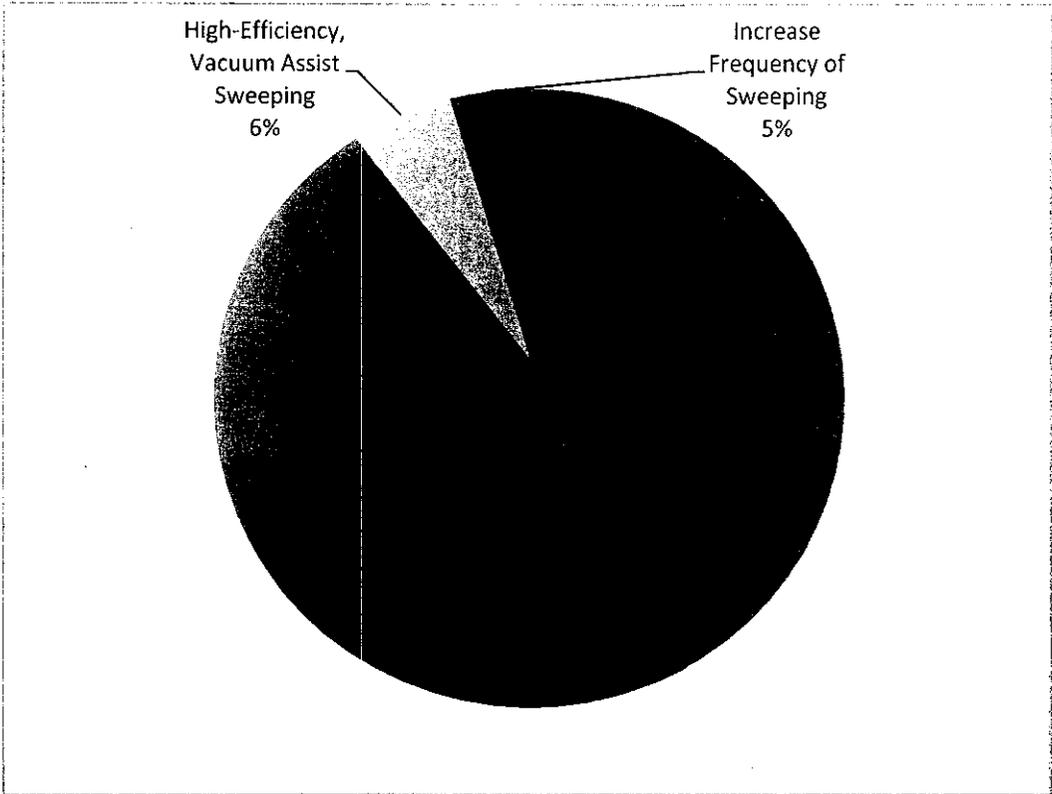
The County's catchment registration schedule will attain at least 260 Lake Clarity Credits by the end of the MS4 permit term in 2016. Load reduction performance estimates, which are used to estimate anticipated Lake Clarity Credits, are based on the PLRM results and estimates presented in previous sections of this report. Figure 5.1 presents estimated Lake Clarity Credits categorized based on the timing of water quality improvement actions.

Figure 5.1 – Placer County Pollutant Load Reduction Schedule



As shown in Figure 5.2, the majority of Lake Clarity Credits Placer County anticipates during the permit term are associated with completed WQIPs and WQIPs that are currently in design and that will complete construction in the summer of 2016.

Figure 5.2 – Estimated Credits Categorized by Action



6.0 ADAPTIVE MANAGEMENT

Since 2009, the County has been mapping storm water improvements with a geographic information system (GIS) tool that allows County staff to review and assess its stormwater infrastructure and treatment systems. The County will continue to track abrasive applications and materials recovered by sweeping and vactoring, which helps identify areas with high pollutant loading. County staff and consultants will continue to inspect facilities during large runoff events, to determine whether constructed source control, conveyance, and treatment measures are functioning as designed. County staff will also complete annual storm water system, construction and commercial, industrial, and municipal site inspections required in the MS4 permit. With a stormwater ordinance in place, the County has the ability to control pollutant and fine sediment discharges generated within our jurisdiction.

These existing tools and processes form the foundation of the County's internal approach to assess its stormwater management activities. The tools can also support assessments and reporting of load reduction progress during the implementation of this PLRP.

If PLRM computations for subsequent catchment registration show that the proposed level of increased sweeping will not be sufficient to capture enough lake clarity credits from the completed water quality improvement projects, than a program of strategic sweeping after every winter abrasive application may be pursued.

As mentioned in previous sections of this PLRP, a number of the estimated load reductions are based on preliminary PLRM models that will require additional refinement and quality assurance prior to registration with the Lake Clarity Crediting Program. In addition, if water quality maintenance activities in response to field inspection assessments are not sufficient to maintain the Lake Clarity Credits estimated by the stormwater modeling, awarded Lake Clarity Credits may be reduced.

The County will update its load reduction schedule annually, after catchment registration activities are completed, to track and assess progress towards obtainment of the required load reductions by 2016.

7.0 REFERENCES

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