LAKE CLARITY CREDITING PROGRAM HANDBOOK

For Lake Tahoe TMDL Implementation

Version 2.0
August 2015

Motivating Effective Action To Improve Lake Tahoe Clarity

A program of the Lahontan Regional Water Quality Control Board and Nevada Division of Environmental Protection, in cooperation with the Tahoe Regional Planning Agency and U.S. Environmental Protection Agency.
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CHAPTER I: LAKE CLARITY CREDITING PROGRAM
INTRODUCTION
INTRODUCTION

The Lake Clarity Crediting Program (Crediting Program) motivates effective actions to improve Lake Tahoe clarity by establishing a load reduction accounting system that connects on-the-ground actions to achieving the milestones set by the Lake Tahoe Total Maximum Daily Load (TMDL). The Crediting Program quantifies and tracks pollutant controls implemented to reduce the load of fine sediment particles, nitrogen and phosphorus from urban stormwater.

Effective implementation of pollutant controls requires ongoing maintenance. Initiating actions by designing and constructing a water quality improvement project or developing a road maintenance plan creates the potential to reduce pollutant loading to the lake. However, to realize that load reduction potential, best management practices (BMPs) must be effectively maintained, management techniques must result in observably clean roads, and municipal programs must engage citizens to change their practices. Thus, the Crediting Program awards credits annually given evidence that pollutant controls are effectively implemented during that year.

TMDL Program Managers from the California Water Quality Control Board - Lahontan Region (Lahontan Water Board) and Nevada Division of Environmental Protection (NDEP) administer the Crediting Program. TMDL Program Managers review load reduction calculations, award credits and report results.

Urban Implementers from seven jurisdictions implement pollutant controls to reduce pollutant loading from urban areas and document accomplishments through the Crediting Program. These jurisdictions include El Dorado, Placer, Washoe and Douglas counties; the City of South Lake Tahoe; California Department of Transportation (Caltrans); and Nevada Department of Transportation (NDOT).

HANDBOOK USE & ORGANIZATION

The Lake Clarity Crediting Program Handbook (Crediting Program Handbook) describes the purpose of the Crediting Program and defines the standardized processes that facilitate consistent quantification, tracking and reporting of pollutant load reductions (load reductions). The Crediting Program Handbook is the guide for Urban Implementers to earn credit through pollutant control measure implementation and defines the points of engagement between Urban Implementers and TMDL Program Managers and serves as a reference document for stakeholders.

The handbook is organized into two chapters and one appendix:

**Chapter I: Lake Clarity Crediting Program Introduction** – provides an overview of the Crediting Program and the associated processes, tools and roles to document and report expected load reductions.

**Chapter II: The Crediting Program Process** – describes the four steps of the Crediting Program process and the associated processes, tools and roles to document and report expected load reductions.

**Appendix A: Policy Guidance** – provides a detailed understanding of Crediting Program policy. The guidance describes specific policies and associated rationale used to guide the Crediting Program processes, including credit calculations.

Additionally, the **CAP Technical Guidance Document** is written for those individuals charged with implementing the Crediting Program. It provides recommended steps to develop the necessary inputs to register water quality improvement actions within the Crediting Accounting Platform (CAP).
CHANGES FROM VERSION 1.0 TO VERSION 2.0

The Lake Clarity Crediting Program Handbook has been revised to enable stakeholders to more easily understand the overall Crediting Program process, streamline and enhance the user friendliness of this reference manual, and reflect updated policies, protocols and stormwater tools.

The Tools and Templates section of Version 1.0 was no longer relevant, as the Credit Accounting Platform (CAP) provides an online mechanism to register pollutant controls, enter inspection results and declare credits. Detailed descriptions of how to implement the Crediting Program using the approved stormwater tools are located in CAP Technical Guidance Document.

Load Reduction registration from road operations are separated from all other pollutant controls, enabling a single registration of all roads within a jurisdiction. The inspection frequency and number of locations has been revised and is specified in Appendix A, Section 10: Road Condition Inspections.

A parcel BMP tracking and assessment method has been incorporated to ensure regular verification of this load reduction strategy.

Crediting Program adaptive management, governance and reporting is no longer described in the Handbook, as the overall process for managing the Lake Tahoe Total Maximum Daily Load (TMDL) is included in the Lake Tahoe TMDL Management System Handbook (available on the Tahoe TMDL Online interface). Pollutant controls other than those estimated and tracked through existing tools and alternative load estimation or condition assessment methods would be considered under the TMDL Management System program improvements process.
Lake Tahoe is famous for its extraordinary water clarity; however, over the past half-century Lake Tahoe's historic clarity has declined. This clarity decline is attributable to increased inputs of fine sediment particles 16 microns or less in diameter (FSP), and free floating algae fed by the nutrients nitrogen and phosphorus. Fine sediment particles scatter light, while algae absorb light. As pollutant inputs increase and light is increasingly scattered or absorbed, it is unable to penetrate deep into the water column and clarity declines.

The Lake Tahoe TMDL is a science-based restoration plan to halt Lake Tahoe’s clarity decline and restore historic clarity. The TMDL establishes a broad implementation plan to reduce the pollutants causing clarity loss and sets concrete targets to assess progress toward attainment of the TMDL numeric target of 97.4 feet by 2076. The Clarity Challenge is an interim milestone of 78 feet of clarity to be achieved by 2026.

The Lake Tahoe TMDL pollutant load baseline reflects pollutant loading conditions as of the 2004 water year (October 1, 2003 – September 30, 2004). To achieve the Clarity Challenge, the Lake Tahoe TMDL sets load reduction targets for fine sediment particles, nitrogen and phosphorus from each of four source categories: Urban Upland (urban stormwater runoff), Forest Upland (forest stormwater runoff), Stream Channel Erosion and Atmospheric Deposition.

![Figure 1](image.png)

**Figure 1: Lake Tahoe TMDL Baseline Loads & Clarity Challenge Load Reduction Requirements** - Light blue bars represent fine sediment particle baseline loads, and dark blue bars represent the maximum pollutant loading allowed if the Clarity Challenge is to be met. Gray circles show the percent load reduction from baseline required from each source category to achieve the Clarity Challenge.

The research informing the Lake Tahoe TMDL finds that FSPs cause a greater impact on clarity than the algae fed by elevated nutrient concentrations. Thus, while each of the three pollutants of concern is tracked, FSP load reductions are the focus for progress reporting. Figure 1 shows the Lake Tahoe TMDL annual FSP load reductions needed for each source category to meet the Clarity Challenge.
Figure 1 also shows that urban stormwater runoff accounts for the majority of the FSP loading to the lake, and the load reduction requirements from urban runoff are several times greater load reduction than the other three sources combined. Therefore, the Credit Program focuses reporting on urban stormwater FSP load reductions while load reduction actions taken in forest lands and stream channels are tracked by other processes.

**TRACKING POLLUTION LOAD REductions WITH CREDITS**

The Credit Program uses Lake Clarity Credits (credits) to track and report load reductions from effective implementation of pollutant controls in the Urban Upland source category. A credit enables load reductions of multiple pollutants to be combined into a single metric for tracking and reporting.

The general definition of a credit includes factors for FSP, total phosphorus, and total nitrogen. As shown in Equation 1, below, the relative weight each pollutant contributes to the credit calculation is determined by a multiplier. The multipliers are set by Lahontan Water Board and NDEP based on an understanding of the unique impact of each pollutant on lake clarity and can be changed through a TMDL Program adjustment. This flexible credit definition anticipates that new science or changes to lake characteristics may increase the relative importance of nutrients to lake clarity in the future, which would warrant an increased weighting for nutrients in the credit calculation.

**Equation 1: General Lake Clarity Credit Definition**

\[
\text{Lake Clarity Credit} = FSP_{LR} \times FSP_{multiplier} + TN_{LR} \times N_{multiplier} + TP_{LR} \times P_{multiplier}
\]

**Where**

- \(FSP_{LR}\) Fine sediment particle load reduction is expressed in \(1.0 \times 10^{16}\) fine sediment particles with diameter smaller than 16 \(\mu m\)
- \(TN_{LR}\) Total nitrogen load reduction is expressed in lb
- \(TP_{LR}\) Total phosphorus load reduction is expressed in lb
- \(FSP_{multiplier}\) Fine sediment particle multiplier is a number between 0 and 1 credit / \(1.0 \times 10^{16}\) fine sediment particles with a diameter smaller than 16 \(\mu m\)
- \(N_{multiplier}\) Nitrogen multiplier is a number between 0 and 1 credit / 1 lb of TN
- \(P_{multiplier}\) Phosphorus multiplier is a number between 0 and 1 credit / 1 lb of TP

The current credit definition focuses solely on FSP based on 1) the TMDL research finding that FSP are the primary driver of lake clarity decline, and 2) the understanding that nutrient reductions, particularly phosphorus, are inherently related to FSP reductions. The current credit definition sets the FSP multiplier in Equation 1 to 1, and the nitrogen and phosphorus multipliers to 0. Thus, one Lake Clarity Credit is equivalent to \(1.0 \times 10^{16}\) FSP (Equation 2).

**Equation 2: Current Lake Clarity Credit Definition**

\[
1 \text{ Credit} = 1.0 \times 10^{16} \text{ fine sediment particles with diameter smaller than 16 } \mu\text{m (FSP)}
\]
Crediting Program tools estimate pollutant loads in terms of mass. Because one pound of FSP is approximately equivalent to 5.0x10^{13} particles, one credit translates to roughly 200 pounds of FSP load reduction.

**Setting Credit Targets**
To meet the Clarity Challenge the Lake Tahoe TMDL established five-year load reduction milestones expressed as a percent load reduction from baseline conditions for each pollutant within each source category. The five-year load reduction milestones and associated credit targets\(^1\) established for Urban Implementers are codified in National Pollution Discharge Elimination System (NPDES) permits and Interlocal Agreements (ILAs). For FSP, the Lake Tahoe TMDL sets five-year load reduction milestones of 10 percent by the end of the 2016 water year, 21 percent by 2021 and 34 percent by 2026 to meet the Clarity Challenge.

To translate five-year load reduction milestones into credit targets, each Urban Implementer has developed an average annual baseline pollutant load estimate for runoff from urban lands within its respective jurisdictional boundaries. The resulting baseline loading estimate for each Urban Implementer is multiplied by the percent load reduction milestone to determine five-year load reduction credit targets. For example, an Urban Implementer with a baseline FSP load estimate of 2,500 x 10^{16} must reduce this loading by 10 percent, equivalent to 250 x 10^{16} FSP, by the end of 2016. Using the current definition of a credit, 250 x 10^{16} fine sediment particles is equivalent to 250 credits.

The credit accounting period is a water year, October 1 through September 30. Credits are tracked and reported annually. NPDES permits and ILAs establish the number of credits each Urban Implementer must achieve to meet the five-year TMDL milestones and may establish credit targets for interim years as well.

Figure 2 shows the relationship between TMDL milestones, annual credit targets, and actual credits generated by a hypothetical Urban Implementer with a baseline load of 2,500 x 10^{16} fine sediment particles. In this example, the Urban Implementer must reduce pollutant loading by 250 credits by 2016, 525 credits by 2021 and 850 credits by 2026 to meet TMDL milestones (shown as red lines). The actual number of credits generated each year by the Urban Implementer is shown as light blue bars. Annual incremental credit targets, which may be set by an Urban Implementer’s permit or ILA, are represented as dark blue dots. In this example, the Urban Implementer generates more credits than necessary to meet the annual credit target in some years and occasionally generates fewer credits than the target.

---

\(^1\) California NPDES permits refer to credit requirements to meet Lake Tahoe TMDL milestones. For shorthand, this Handbook uses the term credit targets to refer to both credit targets and credit requirements.
Figure 2: TMDL Milestones, Annual Credit Targets and Credits Generated for a Sample Urban Jurisdiction - Red lines are five-year Lake Tahoe TMDL milestones. Blue dots represent annual credit targets which may be set in the NPDES permit or ILA. Each light blue bar represents the actual credits generated by the Urban Implementer. Lahontan Water Board and NDEP compare the total number of credits generated to the credit target to determine an Urban Implementer’s consistency with its NPDES permit or ILA.
CREDITING PROGRAM IMPLEMENTATION

The Crediting Program motivates effective action to improve Lake Tahoe clarity by encouraging prioritization, cooperation, and innovation. By quantifying load reductions based on local land use and meteorological conditions, the Crediting Program rewards actions that target areas with the greatest potential to achieve load reductions. Further, by observing the actual conditions present during each year instead of rote adherence to static maintenance plans, the Crediting Program enables stormwater managers and maintenance personnel the ability to determine when and how to maintain the condition of treatment BMPs and roads in the most cost-effective manner possible. This respects the professional judgment of stormwater managers while ensuring that the most important pollutant controls are effectively maintained given limited resources.

The Crediting Program encourages cooperation by enabling credit distribution or trade between Urban Implementers. This flexibility facilitates sharing of equipment and expertise to more efficiently reach the common goal of improving lake clarity. Credit distribution, trading, or sharing agreements are between participating Urban Implementers only.

CREDITING PROGRAM PROCESS

The Crediting Program defines a process to quantitatively estimate the load reduction associated with implementing pollutant controls (See Figure 3). The Crediting Program relies on a standard set of tools that enable Urban Implementers to 1) consistently estimate expected load reductions, 2) register or document the pollutant controls and conditions that are expected to result in the estimated load reductions, 3) inspect on-the-ground conditions to verify the conditions used to estimate load reductions are being maintained, and 4) declare the credits to demonstrate compliance with permits and agreements (See Figure 4). The annual process defined by the Crediting Program results in clear reporting of progress toward achieving credit targets.

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<td><strong>Pollutant Control:</strong> actions implemented to reduce urban stormwater pollutant loads to Lake Tahoe. Road operations are pollutant controls that reduce the source of pollutants on roads and adjacent impervious surfaces. BMPs include all other pollutant controls including treatment BMPs (e.g. wet basins), and parcel BMPs (e.g. roof dripline vegetation).</td>
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*Figure 3: Defining Expected Load Reductions* - Expected load reduction is the difference between the baseline load and the expected load. An Urban Jurisdiction declares the full number of credits expected when actual on-the-ground conditions approximately meet or exceed expected conditions.
Figure 4: Steps in the Crediting Program Process - Rectangles represent the four major steps Urban Implementers complete as part of the Crediting Program process.

The Estimate and Register steps establish the potential for pollutant controls to achieve expected pollutant load reductions. To realize the expected load reduction potential, the pollutant controls must be maintained near-to or better than the conditions assumed in the load reduction estimate. Typically, the Estimate and Register steps are taken once every two to 15 years, but may be taken more frequently with approval from the appropriate TMDL Program Manager.

Annual condition assessment inspections determine actual treatment BMP and road conditions and provide the basis for understanding whether maintenance is required to maintain near-to or better-than expected conditions. The actual condition of pollutant controls are compared to expected conditions to calculate the number of credits generated. Based on this comparison, Urban Implementers declare the number of credits generated from the pollutant controls and may justify an amount of credit that differs from the amount calculated by CAP.

TMDL Program Manager and Urban Implementer Points of Interaction

TMDL Program Managers interact with Urban Implementers at three points during the Crediting Program process:

- Once an Urban Implementer initially estimates expected load reductions during the Estimate step, they are encouraged to consult with their appropriate TMDL Program Manager to discuss any concerns related to the load reduction estimate or expected pollutant control conditions to help streamline review and verification.
- To complete the Register step, a TMDL Program Manager reviews the modeling assumptions used to define the expected load reductions and verifies the Urban Implementer’s submitted registration.
- TMDL Program Managers also consider each annual credit declaration submitted by an Urban Implementer and either award credits or initiate a discussion with the Urban Implementer to address questions or inconsistencies. At a minimum TMDL Program Managers review Urban Implementer’s inspection information prior to awarding credits, and may also draw from independent inspection information to assess the condition of registered pollutant controls.

Road Operations Tracked Separately from Other BMPs

The Crediting Program defines and tracks load reductions from road operations separately from all other pollutant controls. The process of estimating load reductions, registering credits, inspecting actual conditions and declaring credits for roads is parallel to other BMPs, but is performed at a different spatial scale.

Urban Implementers estimate load reductions and register road operations at a jurisdiction-wide scale. In contrast, treatment and parcel BMPs are registered within individual urban catchments. Appendix A, Section 1: Urban Catchments and Section 3: Expected Load Reduction Estimates describes the process for estimating load reductions associated with road operations and with BMPs.
Other Pollutant Controls
Effective implementation of any pollutant control can generate credits, provided that it is (1) expected to result in real load reductions to Lake Tahoe, (2) supported by a reasonable load reduction estimate, and (3) effectively implemented, inspected and maintained over time. Other pollutant controls include all pollutant controls that cannot be described as road operations, a treatment BMP or a parcel BMP, but that are expected to change on-the-ground conditions in the urban catchment from baseline conditions. An inventory of other pollutant controls must clearly describe pollutant control strategies and define field observations that can be compared to baseline conditions to determine if the pollutant control strategy is functioning as expected.

Urban Implementers must use Lake Tahoe TMDL Management System processes to submit proposals that clearly describe methods for estimating load reductions and conducting inspections for other pollutant control strategies.

REPORTING PROGRESS
TMDL Program Managers use CAP to track and report credits generated in relation to credit targets for each Urban Implementer, and cumulatively for the Urban Upland basin-wide. TMDL Program Managers also track jurisdiction-specific and basin-wide total nitrogen and total phosphorus load reductions and report their findings in an annual Lake Tahoe TMDL Program Performance Report and on a publicly available website, the TMDL Online Interface. Systematic tracking and reporting TMDL implementation actions and accomplishments allows TMDL Program Managers and stakeholders to assess progress toward meeting the Clarity Challenge. Public reporting also enables transparency and provides accountability for the expenditure of public money on pollutant controls.

CREDITING PROGRAM TOOLS
The Crediting Program relies on four approved stormwater tools to estimate pollutant load reductions, document expected conditions used in making load reduction estimates and inspect actual conditions relative to expected conditions.

- The Pollutant Load Reduction Model (PLRM) is the standard load reduction estimation tool. Urban Implementers use PLRM to estimate the average annual amount of stormwater pollution contributed to Lake Tahoe from urban catchments under baseline and expected conditions. The outputs of PLRM estimate expected load reductions.
- Best Management Practice Maintenance Rapid Assessment Methodology (BMP RAM), Road Rapid Assessment Methodology (Road RAM) and the Tahoe Regional Planning Agency (TRPA)’s Parcel Map Tool (Parcel Map Tool) are the standard condition inspection tools used to define expected conditions and to conduct inspections to determine actual conditions. Urban Implementers populate BMP RAM, Road RAM and Parcel Map Tool with pollutant control inventory information to document expected conditions used in the load reduction estimate during the Define step. Urban Implementers use BMP RAM, Road RAM and the Parcel Map Tool to conduct annual inspection during the Inspect step.

PLRM, BMP RAM, Road RAM and the Parcel Map Tool are adopted for use with the Crediting Program and are accompanied by user guidance documents. The Crediting Program uses these tools to ensure efficiency of reviews and consistency and comparability of results. However, Urban Implementers may propose alternative methods that would be considered for adoption under the TMDL Management System program improvements process.
Credit Accounting Platform
The Credit Accounting Platform (CAP) integrates data generated by each of the stormwater tools. Urban Implementers register road and BMP load reduction estimates and enters inspection information throughout the water year. The CAP relates expected condition to actual condition and calculates the amount of credit generated from pollutant controls within each registered area. Urban Implementers review the amount of credit generated from each registered area and declare the appropriate amount of credit. The respective regulatory agency verifies the registration and awards credits after reviewing inspection information.

Figure 5 shows which stormwater tools are used during each of the steps in the Crediting Program process and highlights the steps during which an Urban Implementer enters information into CAP.

![Diagram showing the Crediting Program process]

Figure 5: Crediting Program tools and the Crediting Program process – The green circles show which of the Crediting Program tools are used at each step of the Crediting Program process.

**BOX 3 | IMPROVING CREDITING PROGRAM TOOLS OVER TIME**

Although Crediting Program tools may be improved over time, Urban Implementers will not be required to adjust load reduction estimates for changes to tools. Once an Urban Implementer registers an urban catchment or road operations, the tools used to calculate the estimated load reductions endure for the length of the registration period (typically 2 to 15 years). At the end of this period the load reduction estimates must be updated using the versions of the stormwater tools approved at that time. This predictability enables Urban Implementers to innovate and invest resources confidently – knowing that changes to load reduction estimation methods will not lead to near-term regulatory compliance issues. The Lake Tahoe TMDL Management System Handbook (available on the [TMDL Online Interface](#)) defines the process for making program adjustments – including to the Crediting Program – through a transparent decision making process.
CHAPTER II: THE CREDITING PROGRAM PROCESS
The Crediting Program defines a process to estimate, document, and verify load reductions from implementation of pollutant controls. Urban Implementers report the number of credits generated compared to TMDL milestones in Annual Stormwater Reports. TMDL Program Managers report the results to stakeholders in the annual TMDL Performance Report and on the TMDL Online Interface.

This chapter provides an overview of the steps Urban Implementer and TMDL Program Managers perform to complete the Crediting Program process (see Figure 6), including:

1. **Estimate** expected load reductions
2. **Register** the estimated load reduction and expected on-the-ground conditions
3. **Inspect** road and BMP conditions to determine whether they are functioning as expected
4. **Declare** the number of credits generated


**Figure 6: Steps and sub-steps in the Crediting Program Process** - Primary steps are broken into sub-steps. Blue steps are primarily implemented by Urban Implementers and green formatted steps are primarily implemented by TMDL Program Managers.

The **Estimate** and **Register** steps are typically completed by an Urban Implementer once every two to 15 years. Registration may be completed as soon as pollutant controls are implemented, understanding that credits are only generated for the period after the pollutant controls are registered. The **Inspect** and **Declare** steps are completed by an Urban Implementer annually, during the appropriate seasons depending on the type of pollutant control. Figure 7 provides an overview of the typical timeframe for completing each step within a water year.
Figure 7: Overview of the Crediting Program Process Timeline - Urban Implementers estimate load reductions and register expected credits at any point throughout the year, understanding that only a portion of credits are available on the year of registration depending on when it is registered. Inspections of road surface conditions and BMPs are conducted during specified portions of the year. Urban Implementers declare credits and develop annual stormwater reports for a water year at the beginning of the following water year.

**BOX 4 | LOAD REDUCTION PLANS**

Urban Implementers develop and update load reduction plans to: (1) prioritize and target cost-effective pollutant controls in locations where the greatest benefits may be achieved; and (2) demonstrate the ability to meet credit targets contained in permits or agreements. The load reduction plans provide a roadmap for pollutant control implementation and associated tracking and inspection work. Urban Implementers typically perform only a rough load reduction analyses during the planning effort. Prior to registration, these load reduction analyses should be updated to incorporate more detailed information regarding data inputs obtained during the implementation planning process, or to reflect changes to pollutant control plans that occurred as a result of unanticipated conditions encountered during project implementation.
**1. ESTIMATE EXPECTED LOAD REDUCTION**

Urban Implementers estimate the expected load reduction resulting from implementing pollutant controls within their jurisdiction by completing the following sub-steps:

1.1 Delineate urban catchments
1.2 Estimate baseline loads
1.3 Estimate expected load reductions resulting from implementing pollutant controls
1.4 Inventory pollutant controls, including defining the expected on-the-ground conditions that are assumed when modeling the expected load reduction
1.5 Check the planned pollutant controls and expected load reductions with the appropriate TMDL Program Manager

Urban catchments identify the location and boundaries for modeling and tracking load reductions. For each urban catchment, Urban Implementers use a single PLRM Project to estimate pollutant loading under three scenarios. Each scenario is a unique modeling simulation associated with a specific set of conditions within an urban catchment. The three scenarios used are:

1. **Baseline Scenario** - a modeling simulation for an urban catchment based on specified baseline conditions that are consistent for all jurisdictions
2. **Road Operations Scenario** - developed by adjusting the Baseline Scenario for an urban catchment to estimate load reductions from modifying road conditions resulting from road operations pollutant controls only
3. **BMP Scenario** – developed by adjusting the Road Operations Scenario for an urban catchment to estimate load reductions from implementation of treatment and parcel BMPs

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**BOX 5 | KEY TERMS DEFINED**

**Pollutant Controls** - All actions implemented to reduce pollutant loading from urban stormwater runoff. Road operations are pollutant controls that reduce source of pollutants on roads and adjacent impervious surfaces. BMPs include all other pollutant controls including stormwater treatment facilities, parcel retrofits and road shoulder improvements.

**Urban Catchment** - One or more drainage areas within a single PLRM Project with a geographically consistent set of load estimates. All drainage areas included in a single urban catchment must have the same catchment connectivity to surface waters. Urban catchments are the foundation for modeling and tracking load reductions.

**Baseline** is defined as the conditions present during 2004 Water Year (October 1, 2003 – September 30, 2004). This is the period used to establish TMDL baseline loads. Typical basin-wide conditions and practices as of this period are used in baseline loading estimates.

**Catchment Connectivity** - The percentage of pollutant loading from an urban catchment that reaches surface waters.

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The Crediting Program tracks load reductions resulting from implementation of road operations separately from load reductions resulting from implementation of parcel and treatment BMPs (See Figure 8). First, the load reductions from road operations are calculated by subtracting the Road Operations Scenario load from the Baseline Scenario load. All urban catchments generating credits from road operations are registered in one batch process. Second, the load reductions from treatment and parcel BMPs are calculated by subtracting the BMP Scenario load from the Road Operations Scenario load. If no credits are generated from road operations within a specific urban catchment, the Road Operations Scenario is equivalent to the Baseline Scenario. Each urban catchment generating credits from treatment
or parcel BMPs is registered individually. This process enables roads to be registered jurisdiction-wide without double counting load reductions.

Figure 8: Estimating Expected Load Reductions from Road Operations and BMPs - load reductions for each urban catchment are calculated by first comparing the baseline load to the load after implementing road operations to determine the load reduction from road operations. Second, the load reduction from BMP implementation is calculated by comparing the load after implementing road operations to the load after implementing both road operations and BMPs. The total load reduction for the urban catchment is calculated by comparing the Baseline Scenario and BMP Scenario loadings.

1.1 DELINEATE URBAN CATCHMENTS

Urban Implementers develop or update Catchment Delineation Maps that define the location and boundaries of each urban catchment within their urban jurisdiction. Each urban catchment is associated with a single PLRM Project and all drainage areas within an urban catchment are unique and must have the same catchment connectivity. Any changes to urban catchment boundaries require an update to the Catchment Delineation Map and all load estimates related to the modified catchments.

Reference Materials

- Appendix A, Section 1: Urban Catchments provides a definition and more detailed information regarding the delineation of an urban catchment.

1.2 ESTIMATE BASELINE LOADS

Urban Implementers use PLRM to develop a Baseline Scenario for each urban catchment generating credits. To estimate the baseline loading associated with each urban catchment, the Urban Implementer must enter information about features within the urban catchment, including runoff points and outlets, total acreage, and connectivity to Lake Tahoe. PLRM includes an internal, geospatially-referenced-data-processing tool that automatically populates much of the information, typical of the 2004 Water Year, needed to calculate baseline loading.
Site-specific treatment BMPs in place as of October 1, 2004 are considered part of the baseline condition. For roads and parcels, typical basin-wide conditions and practices as established in Appendix A, Section 2: *Baseline Load Estimate* are used to calculate baseline load estimates for each urban catchment.

The baseline loading estimates completed during this step are likely different than the estimates from initial load reduction plans completed in 2013 or 2014. Urban Implementers should engage their appropriate TMDL Program Manager to assess the need for updating jurisdiction-wide average annual baseline load estimates.

**Reference Materials**
- Appendix A, Section 1: *Urban Catchments* provides a definition and more detailed information regarding the delineation of an urban catchment.
- Appendix A, Section 2: *Baseline Load Estimates* describes the assumptions informing baseline.
- Appendix A, Section 4: *Catchment Connectivity* describes a process for estimating percent connectivity to surface waters.
- *CAP Technical Guidance Document*.

### 1.3 ESTIMATE EXPECTED LOAD REDUCTIONS

Urban Implementers first identify whether they are estimating load reductions from road operations or from treatment and/or parcel BMPs, and follow the process in the reference materials below. If applicable, Urban Implementers must estimate expected load reductions from road operations first, prior to defining expected load reductions from treatment and parcel BMPs within any urban catchment. This is due to the fact that the Crediting Program registers and tracks loads from road operations separately from load reductions from treatment and parcel BMPs. Load reductions from road operations and BMPs are both calculated for each urban catchment. If an Urban Implementer changes the road operations within a catchment, the BMP load reduction estimate must be updated based on the revised Road Operations Scenario.

**Road Operations**

Urban Implementers develop and submit a Road Operations Plan that defines the expected road conditions resulting from maintaining roads in a condition that is better than baseline. Road Operations Plans include a Roads Class Map that identifies the road class for each road within any urban catchment generating credits from road operations.

Urban Implementers create Road Operations Scenarios within PLRM for each urban catchment by adjusting the urban catchment’s Baseline Scenario to reflect the road conditions expected within the urban catchment to match the Roads Class Map. Treatment and parcel BMPs are not included in the Road Operations Scenario. The load reduction from road operations is calculated by subtracting the Road Operations Scenario load from the Baseline Scenario load.

**Key Terms Defined**

Road Class refers to a group of road segments on which the implementation of consistent operational practices should result in a similar Road Condition Score.

Road Condition Score is the relative risk to downslope water quality as a result of pollutant generation on the impervious road surface, as defined on a relative 0-5 scale. Road Condition Scores are determined in the field using the Road Rapid Assessment Methodology (Road RAM).

Road Operations Plans identify planned road operations pollutant controls, and the expected road conditions for each road. Road classes are used to categorize road segments with similar expected conditions.
1.4 INVENTORY POLLUTANT CONTROLS

**Reference Materials**

- Appendix A, Section 3: *Expected Load Reduction Estimates* describes the approach for summing load reductions from roads throughout an urban jurisdiction.
- Appendix A, Section 6: *Road Operations Plan* describes the components of a Road Operations Plan.
- Road RAM provides guidance for defining road classes in Road Operations Plans.

**BMPs**

Urban Implementers estimate load reductions from treatment and/or parcel BMPs by creating a BMP Scenario for urban catchments that includes treatment or parcel BMPs. The load reduction from road operations is calculated by subtracting the BMP Scenario load from the Road Operations Scenario load. If no credits are generated from road operations within a specific urban catchment, the Road Operations Scenario is equivalent to the Baseline Scenario. All road class definitions must be the same in the Road Operations and BMP Scenarios for an urban catchment.

**Reference Materials**

- Appendix A, Section 3: *Expected Load Reduction Estimates* describes the approach for defining expected load reductions from non-road operations pollutant controls.

### 1.4 INVENTORY POLLUTANT CONTROLS

Pollutant controls within an urban catchment are divided into four categories: 1) road operations pollutant controls, 2) treatment BMPs, 3) parcel BMPs and 4) other pollutant controls. A pollutant control inventory establishes what pollutant controls are implemented, and defines the expected conditions of each of pollutant control consistent with the assumptions used to model loading estimates. Urban Implementers must develop inventories of each pollutant control used in PLRM to estimate load reductions. General guidance is provided for the three main types of pollutant controls. Other pollutant controls inventory information must be defined uniquely by the Urban Implementer.

**Road Operations**

Urban Implementers use Road RAM to inventory all roads within their respective jurisdictions, consistent with the Road Operations Plan and Road Operations Scenarios.

**Reference Materials**

- Road RAM Step 1.A.3: Complete Road Class Designation provides guidance for entering road class and associated information into Road RAM.

**Treatment BMPs**

Urban Implementers use BMP RAM to develop treatment BMP inventories and document details about each treatment BMP expected to generate credits. The information needed includes the location and type of the treatment BMP, field observations that can be used to determine if the treatment BMP is performing as anticipated, and the parameters used in PLRM to determine the expected load reductions each treatment BMP generates. BMP RAM guides Urban Implementers through the process to define expected conditions, ensuring conditions can be realistically maintained, as opposed to using design parameters that are unlikely to be maintained on average over its useful life.
Reference Materials

- BMP RAM provides guidance for completing the treatment BMP inventory.

Parcel BMPs
Load reductions are calculated based on the overall percentage of the urban catchment area with parcel BMP or source control certificates. Urban Implementers develop parcel BMP inventories by documenting the percentage, by area, of single family residential (SFR), multi-family residential (MFR) and commercial/institutional/communications/utilities (CICU) parcels expected to have implemented and appropriately maintained BMPs.

Parcel BMP information is entered into CAP, consistent with the assumptions used in developing the BMP Scenario for each urban catchment. Any differences between the current status of implementation and the assumptions used in developing BMP Scenarios must be explained during registration and as part of reporting annual inspection results.

Reference Materials

1.5 CHECK LOAD REDUCTION EXPECTATIONS WITH TMDL PROGRAM MANAGERS

Checking expected conditions and load reduction expectations with the appropriate TMDL Program Manager saves time by aligning expectations and allowing them to identify potential concerns that can be addressed before an Urban Implementer develops inventories and registers urban catchments.

Urban Implementers should engage the appropriate TMDL Program Manager to review their Road Operations Plan, load reduction estimates and inventory information. Urban Implementers should contact the appropriate TMDL Program Manager to determine whether an email exchange, telephone call or in-person meeting is most appropriate. Urban Implementers should email updated Catchment Delineation Maps to the appropriate TMDL Program Manager at this time.
2. REGISTER EXPECTED CREDITS

Urban Implementers register road operations and BMPs using CAP and submit the registration to their TMDL Program Manager for verification. The appropriate TMDL Program Manager reviews all information and verifies the registration or requests a meeting to resolve questions and issues.

Credit schedule duration establishes the length of time that the Urban Implementer commits to maintain pollutant controls near-to or better than expected conditions to generate the expected number of credits identified in the registration. Road operations and BMP registrations are valid for the duration defined at the time of registration, unless the Urban Implementer requests to update a registration to make adjustments to the pollutant controls and associated load reduction expectations. Pollutant controls registered within a water year receive a portion of the possible expected credits for that year. Appendix A, Section 7: Credit Schedule Duration provides considerations for setting the appropriate credit schedule duration for road operations and BMP registrations.

2.1 REGISTER POLLUTANT CONTROLS

Urban Implementers log in to CAP using their unique jurisdictional login and select Register from the home menu. The registration page allows Urban Implementers to either select a previously entered registration or add a new road or BMP registration.

Road Operations Registration
Because road classes may span multiple urban catchments, the road registration process is conducted once at the jurisdictional scale. Urban Implementers follow the steps defined in CAP to upload PLRM Road Operations Scenario files. Most information is automatically associated with the registration through the uploaded Road Operations Scenario files and the Road RAM inventory. Urban Implementers enter the percent catchment connectivity for each urban catchment and confirm that the load reductions and credits imported from PLRM are accurate.

Urban Implementers define the duration for the registration and establishment date, and, if applicable, distribute credits to any other applicable Urban Implementers. Road registrations may be up to five years in duration. Agreements to share credits are completely the domain of the Urban Implementers.

After checking the completeness and accuracy of the information in CAP, the Urban Implementer electronically submits registration to the appropriate TMDL Program Manager. CAP generates an email that is sent to the appropriate TMDL Program Manager. Once submitted, the registration cannot be changed unless permission is granted by the TMDL Program Manager.

Reference Materials
- Appendix A, Section 4: Catchment Connectivity describes a process for estimating percent connectivity to surface waters.
- Appendix A, Section 7: Credit Schedule Duration provides considerations for selecting an appropriate credit schedule duration.
**BMP Registration**

BMP registration is completed separately for each urban catchment. Urban Implementers follow the steps defined in CAP to upload a single BMP Scenario file. Most information is automatically associated with the registration through the uploaded files and pulled from the BMP RAM inventory. Urban Implementers select the treatment BMPs in the registered urban catchment from the list imported from BMP RAM and determine if each treatment BMP is a key or essential pollutant control.

Urban Implementers define the duration for the registration and establishment date, and, if applicable, distribute the credits to appropriate urban jurisdictions. BMP registrations can be up to 15 years in duration. Agreements to share credits are completely the domain of the Urban Implementers.

After checking the completeness and accuracy of the information in CAP, the Urban Implementer electronically submits registration to the appropriate TMDL Program Manager. CAP generates an email that is sent to the appropriate TMDL Program Manager. Once submitted, the registration cannot be changed unless permission is granted by the TMDL Program Manager.

**Reference Materials**

- Appendix A, Section 4: *Catchment Connectivity* describes a process for estimating percent connectivity to surface waters.
- Appendix A, Section 5: *Water Quality Importance* defines the difference between supporting, key and essential BMPs.
- Appendix A, Section 7: *Credit Schedule Duration* provides considerations for setting the appropriate credit schedule duration for road and BMP registrations.

**BOX 7 | WATER QUALITY IMPORTANCE**

An Urban Implementer must define the water quality importance of each treatment BMP, parcel BMPs (as a collective group) and of other pollutant controls (as a collective group). The water quality importance of each type of pollutant control is defined as essential, key or supporting based on the number of credits the pollutant control is estimated to generate. Only “essential” and “key” pollutant controls must be inspected to calculate actual credits generated. Appendix A, Section 5: *Water Quality Importance* provides a complete discussion of how to determine the water quality importance of each pollutant control.

**2.2 VERIFY REGISTRATION (TMDL PROGRAM MANAGER)**

The appropriate TMDL Program Manager is notified as soon as a road operations or BMP registration is submitted by an Urban Implementer. The TMDL Program Manager reviews all submitted information and either verifies the registration or requests a meeting to address questions and resolve identified issues. If changes are required, the TMDL Program Manager enables the registration to be adjusted in CAP by the Urban Implementer. Once the registration is verified it is valid until the end of the credit schedule duration or the Urban Implementer requests to change the registration and the TMDL Program Manager agrees to enable changes.

**Reference Materials**

- Appendix A, Section 9: *Registration Verification* identifies the information TMDL Program Managers routinely review before verifying a registration, however, TMDL Program Managers may review all information provided and may request additional information if more information is necessary to understand the rationale for the proposed load reductions.
3. INSPECT ACTUAL CONDITIONS

Urban Implementers inspect road surfaces, treatment BMPs and parcel BMPs to verify that actual conditions are consistent with the conditions used to estimate load reductions, and justify the award of the expected amount of credit for each urban catchment. As long as inspection results demonstrate that near-to or better than expected conditions are achieved, the full amount of credits can be declared. The Crediting Program encourages Urban Implementers to identify roads and pollutant controls that are in less-than expected condition prior to the inspection reporting deadline so that the conditions of the road or pollutant control can be improved prior to submitting inspection results.

Reference Materials
- Appendix A, Section 14: Calculation of Credits Generated defines the rules for calculating credits from urban catchments.
- The Road RAM and BMP RAM Tools and Technical Documents describe the methods for performing observations and calculating condition scores.

3.1 PERFORM INSPECTIONS & MAINTENANCE

Urban Implementers inspect the condition of roads, treatment BMPs, and verify the status of parcel BMPs using approved inspection methods. Urban Implementers may perform an initial inspection, conduct needed maintenance to improve the condition of pollutant controls, and then re-inspect in one site visit. Alternatively, Urban Implementers may inspect, schedule needed maintenance to improve the condition of pollutant controls, and then re-inspect prior to runoff occurring.

TMDL Program Managers and other stakeholders may perform independent validation inspections to determine the actual conditions of pollutant controls prior to runoff events. These results can be compared to Urban Implementer’s inspection results as a quality assurance check. Moreover, Urban Jurisdictions may choose to coordinate with TMDL Program Managers and perform inspections when they are in attendance.

Roads
Road RAM is the standard inspection method for determining road conditions. Road inspections are completed on a representative sample of each road class throughout the urban jurisdiction at least four times throughout defined seasonal periods of the year. Road inspection results are averaged throughout the year for each road class to determine the average road condition score. To ensure roads in the same class are being maintained in similar condition, the standard deviation of a road class condition score must be 0.5 or less. Average road condition scores must be no less than 0.5 below the expected condition score to be deemed performing at near-to expected conditions. For example, a road class with expected condition score of 3.3 is considered performing if the average inspection score is 2.8 or higher.

The intent is to encourage maintaining roads at or better than expected conditions whenever possible before runoff events to ensure pollutants are not available to be mobilized during runoff events. Inspection periods are important opportunities to ensure that a) Road Operations Plans are being effectively implemented, b) maintenance staff receives feedback on how their actions influence condition scores, and c) actions are resulting in expected conditions throughout the year. In general, Urban Implementers should maintain roads at near-to or better than expected conditions whenever several days of dry weather with above freezing conditions precede a runoff event.

While Urban Implementers need only to perform road inspections at four periods during the water year, TMDL Program Managers and other stakeholders may perform validation inspections to determine the actual conditions of any road segment before runoff events. These results, which are not limited to four
observations, can be compared to Urban Implementer’s Road Operations Plan and inspection results as a quality assurance check.

Reference Materials
- Appendix A, Section 10: Road Condition Inspections provides guidance for planning and performing road inspections.
- The Road RAM Tool and associated user guide describe the methods for performing inspections and calculating condition scores.

Treatment BMPs
The Crediting Program requires inspection of key and essential treatment BMPs. BMP RAM is the standard inspection method for determining their condition. While the Crediting Program does not require inspection results to be reported for conveyance infrastructure, the BMP RAM requires evidence that flow is reaching treatment BMPs. Separate inspection and maintenance of conveyance infrastructure is necessary to prevent flooding and may be required through other regulatory requirements.

Urban Implementers inspect key and essential treatment BMPs in the late spring or summer to determine their condition following spring runoff. This provides Urban Implementers the opportunity to identify and improve the condition of any treatment BMPs that require maintenance during the dry season, so that the treatment BMPs are functioning near-to or better-than expected before the period of significant runoff. This does not preclude the need or ability of the Urban Implementer to perform needed inspections and maintenance in response to severe climatic events.

The condition of all treatment BMPs must be shown to meet a 2.5 or higher BMP RAM score during the May through September period for the Urban Implementer to declare all expected credits. Only the most recent inspection result is used to determine whether a treatment BMP is performing as expected. For example, if an inspection in June shows a treatment BMP receives a 2.0 score, then maintenance on the treatment BMP is performed in July such that its inspection score is improved to a 4.8, only the 4.8 result is used to determine the credits generated from the urban catchment.

TMDL Program Managers and other stakeholders may perform validation inspections to determine the actual conditions of any key or essential treatment BMP in a registered urban catchment before fall runoff events. These validation inspection results may be compared to an Urban Implementer’s inspection results as a quality assurance check.

Reference Materials
- The BMP RAM Tool and associated user guide describe the methods for performing inspections and calculating condition scores.
- Appendix A, Section 5: Water Quality Importance defines the difference between supporting, key and essential treatment BMPs.

BOX 8 | VALIDATION INSPECTIONS

Urban Implementers are responsible for inspecting registered roads and each of their key and essential pollutant controls, but TMDL Program Managers, and potentially other stakeholders trained to use standard inspection methods may also perform inspections of roads and of key and essential pollutant controls. TMDL Program Managers compare the results of validation inspections to the inspection results reported by an Urban Implementer. If there is a significant discrepancy between an Urban Implementer’s inspection results and those of the validation inspection, TMDL Program Managers may consider awarding a lesser amount of credits than declared by an Urban Implementer. Additional details regarding validation inspections, cases of discrepancy and associated credit adjustments are included in Appendix A, Section 13: Validation Inspections.
Parcel BMPs
As a part of their Parcel BMP Retrofit Program, the Tahoe Regional Planning Agency (TRPA) implements a BMP Maintenance Program that provides information on proper inspection and maintenance practices for BMPs implemented on SFR, MFR, and CICU parcels. Within registered catchments, TRPA contacts properties with BMP and/or source control certificates more than five years old to remind them of maintenance requirements; develops customized maintenance logs for CICU and MFR properties; verifies that BMPs have been maintained in conformance with the maintenance logs; and upon maintenance verification, updates parcel certification status to the current year in the BMP database.

Urban Implementers assess the status of parcel BMPs any time between October 1 and December 31 and report the previous water year conditions in CAP. This process involves downloading the status of parcels for an urban catchment using the Parcel Map Tool and calculating the percent by area of parcels with BMP and/or source control certifications. The full percent by area is included for CICU and MFR certifications that are five years or newer while the percent by area of certifications older than five years is multiplied by a factor of 0.5. The calculation of condition is not dependent on the SFR land use; full value is currently provided for SFR parcel certifications with BMP or source control certificates regardless of the certification date.

Reference Materials
- Appendix A, Section 12: Parcel BMP Condition Assessment provides an overview of the process to determine parcel BMP actual conditions within an urban catchment

3.2 RECORD INSPECTION RESULTS
Urban Implementers enter inspection results into Road RAM, BMP RAM, and directly into the CAP for parcel BMPs. The CAP aggregates information from all tools and enables Urban Implementers to review inspection progress to determine if inspection results are complete. Urban Implementers are encouraged to record inspection results throughout the year to ensure any errors in data collection or needs for maintenance and re-inspection are identified and addressed before the end of the water year. All required inspection results must be entered before CAP can calculate credits reflective of actual conditions.
4. DECLARE CREDITS

Urban Implementers review the credits calculated in the CAP and declare what they believe to be an appropriate amount of credit reflective of actual load reductions achieved from road operations and BMPs within each urban catchment. TMDL Program Managers review all information and award credits, potentially requesting a meeting to discuss identified issues or plans for the new water year.

Urban Implementers must declare credits by January 15. TMDL Program Managers confirm credit declaration by February 15 so that Urban Implementers have adequate time to report this information in Annual Stormwater Reports that are due by March 15 each year.

4.1 REVIEW CREDIT CALCULATIONS & DECLARE CREDITS

Urban Implementers log in to CAP, go to the Declare page and select the relevant year. Urban Implementers select road operations and urban catchments individually and complete the following steps for each:

Declare Credits – Review the inspection results related to the relevant road or BMP registration and the amount of credit calculated by CAP. Declare the percent of the expected credit deemed appropriate given the inspection information. If the percent credit is different than that calculated by CAP the Urban Implementer must justify the reasons in a written statement when submitting their declared credits.

Distribute Credits – Confirm or adjust the distribution of declared credits to other Urban Implementers.

Submit Credit Declarations – Acknowledge that all information contained within the credit declaration is complete and appropriate. If desired, draft a message to the appropriate TMDL Program Manager reviewing the credit declaration submission, including any justification for declaring an amount of credit different than that calculated by the CAP. Once submitted, the credit declaration cannot be changed unless permission is granted by the TMDL Program Manager.

Urban Implementers declare credits after the end of the water year by January 15.

Reference Materials
- Appendix A, Section 14: Calculation of Credits Generated defines the rules for calculating credits.

4.2 AWARD CREDITS (TMDL PROGRAM MANAGER)

TMDL Program Managers review all credit declarations by February 15 of each year and either award the number of credits declared or communicates any issues by email or by requesting a verbal discussion. The TMDL Program Manager and Urban Implementer resolve any issues and the TMDL Program Manager provides access for the Urban Implementer to change the credit declaration amount, if appropriate.

Reference Materials
- Appendix A, Section 15: Credit Award provides guidance to TMDL Program Managers to facilitate the review and award of credits.
4.3 COMPLETE ANNUAL STORMWATER REPORTS

By March 15 each year, Urban Implementers develop Annual Stormwater Reports addressing all requirements set out by their permit or agreement. Urban Implementers go to the report page on CAP and download a summary file with credit award and load reduction information for each road and BMP registration for the previous water year. This information can be used to develop the tables and results for the Annual Stormwater Report.

Reference Materials
- Appendix A, Section 16: *Annual Stormwater Report – Credit Declaration and Award Section* provides suggested Annual Stormwater Report content.
APPENDIX A
POLICY GUIDANCE
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The Policy Appendix compiles individual topics that define and clarify specific aspects of the Lake Clarity Crediting Program (Crediting Program). Each section is intended to be used as a stand-alone document downloadable from the appropriate portion of the Credit Accounting Platform (CAP).

For Urban Implementers, guidance focuses on accurately implementing the four steps of the Crediting Program process: 1) Estimate expected load reductions, 2) Register expected credits, 3) Inspect actual conditions and 4) Declare credits generated. For TMDL Program Managers, guidance focuses on verifying and awarding credits and validating inspections. Urban Implementers are advised to become acquainted with TMDL Program Manager’s guidance to ensure their submitted registration and declaration materials align with TMDL Program Managers’ expectations.

Acronyms are not defined in these appendices. The reader is assumed to have a working knowledge of the Crediting Program and related tools. Please see the main body of the Lake Clarity Crediting Program Handbook for a general description of the Crediting Program and the Crediting Program process.
1. URBAN CATCHMENTS

Urban catchments are the foundation for modeling and tracking load reductions. An urban catchment is a geographic area in the Urban Uplands source category defined and used by an Urban Implementer to estimate pollutant loads, and to estimate and register load reductions achieved from implementation of pollutant controls. Urban Implementers define urban catchments within their jurisdiction to meet their planning and tracking purposes with the following restrictions:

- Each urban catchment must be modeled with a single PLRM Project file.
- All drainage areas included in a single urban catchment must have the same catchment connectivity to surface waters.
- Any portion of land may only be included in a single urban catchment.

An urban catchment may include multiple smaller drainage areas and drainage outlets within its boundaries. Urban catchments should typically be between 10 and 100 acres to ensure modeling accuracy.

Urban Implementers assign each urban catchment a unique identification number that begins with the initial of the primary reporting Urban Implementer. Urban catchment is synonymous with “Project” in PLRM, and also with the concept of “urban planning catchments.”

![Figure 1.1: Urban catchments are the building blocks for estimating and tracking load reductions. Urban catchments are used to estimate and register load reductions achieved by the implementation and maintenance of pollutant controls.](image)

ACCOUNTING FOR NON URBAN RUNOFF

When delineating urban catchments, an Urban Implementer should only include land area from within the Urban Uplands source category. The Urban Uplands are defined by the urban land use categories in the Lake Tahoe TMDL Land Use Layer. Non-urban land uses are not included in the delineation of an urban catchment because the TMDL Program independently tracks loading and accomplishments from urban and non-urban source categories. The Crediting Program approach of excluding land from within other source categories when delineating urban catchments is consistent with typical project designs which bypass flows from forest uplands. It may be necessary to use other hydraulic modeling methods to estimate the amount of runoff delivered from non-urban lands when sizing project infrastructure so that it can sufficiently drain the additional runoff volume from the forested upland or other contributing source.

SHARED URBAN CATCHMENTS

In certain areas, Urban Implementers may desire to define an urban catchment that extends across jurisdictional boundaries to preserve obvious drainage connectivity of the area. For example, runoff from a state highway may mingle with runoff from a commercial area within a county or city. Urban catchments that cross jurisdictional boundaries are called shared urban catchments.
Registering Loads from Shared Urban Catchments

In instances that two jurisdictions share an urban catchment, the primary Urban Implementer registering the urban catchment should contact the other Urban Implementer to discuss how to appropriately define expected load reductions from the urban catchment for registration purposes. Ideally, Urban Implementers with a shared urban catchment coordinate to most effectively reduce the combined loading from the shared urban catchment. The Urban Implementers may cooperate to implement a joint project that shares the cost of treating runoff, or simply allow the primary Urban Implementer to implement pollutant controls appropriate to reduce loading from all urban runoff. The partnering Urban Implementers should determine what portion of the credit generated from the shared urban catchment can be claimed by each Urban Implementer. See the guidance in Section 11: Credit Distribution for considerations that inform distribution of credits generated within an urban catchment that includes one or more shared urban catchments. Agreements outlining the distribution of credit may be provided to the appropriate agency (NDEP or Lahontan Water Board) as supporting material when credits are declared.

ADJUSTING URBAN CATCHMENT BOUNDARIES

Urban Implementers may adjust the boundaries of any existing urban catchment, provided the adjustment does not result in an overlap of one urban catchment with another. Urban Implementers must coordinate with the appropriate TMDL Program Manager whenever the boundaries of previously registered urban catchments are adjusted. Urban Implementers must update the load estimates for each adjusted urban catchment, and update the registration for any adjusted urban catchments that have been previously registered. Adjusting the boundaries of an urban catchment does not, however, necessitate that an Urban Implementer recalculate its jurisdiction-specific average annual baseline pollutant load estimate as long as all urban catchments within the jurisdiction comprise the same total area after alteration of any urban catchment boundary.

CAP Relationships
This section is relevant to

- Registration Home Page
- BMP Registration Step 1. Upload BMP Registration Boundary
- Road Registration Step1. Upload PLRM Load Reductions
2. BASELINE LOAD ESTIMATES

Baseline is defined as typical conditions during the 2004 water year: October 1, 2003 to September 31, 2004. This is the period used to inform the Lake Tahoe TMDL findings and is the timeframe when much of the scientific information supporting the Lake Tahoe TMDL was produced.

BASELINE SCENARIO

Site-specific treatment BMPs in place as of October 1, 2004 are considered part of the baseline condition. For road surface conditions and private parcels, typical basin-wide conditions and practices are used to calculate baseline load estimates for each urban catchment.

Roads and Parcels

Urban Implementer use the standard baseline values defined in Table 2.1 when calculating baseline loads. These values represent the estimated typical conditions in the Lake Tahoe Basin during the baseline period. For other parameters not listed in Table 2.1, an Urban Implementer should use a best estimate of 2004 conditions to define modeling parameters such as land use, road shoulder condition, and directly connected impervious area.

PLRM Version 2.1 provides a default baseline road condition shapefile for use in the development of Baseline Scenarios. Table 2.1 shows the linkage of the baseline road condition scores to the Road Risk methodology used in previous PLRM versions; and the baseline parcel BMP implementation percentages for the various land use types. Urban Implementers may consult with the appropriate TMDL Program Manager and revise the definition of baseline road conditions for specific roads if they determine that the default shapefile provided with PLRM 2.1 is not representative of the conditions present during the baseline period.

Table 2.1: Standard Baseline Modeling Parameters

<table>
<thead>
<tr>
<th>PLRM USER INPUTS</th>
<th>STANDARD BASELINE CATEGORIES</th>
<th>VALUES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road Condition Score</td>
<td>Primary High Risk Roads</td>
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<tr>
<td></td>
<td>Primary Moderate Risk Roads</td>
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<tr>
<td></td>
<td>Primary Low Risk and Secondary High Risk Roads</td>
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<tr>
<td></td>
<td>Secondary Moderate Risk Roads</td>
<td>2.3</td>
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<tr>
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<td>Secondary Low Risk Roads</td>
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<tr>
<td>Parcel BMP Implementation</td>
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</tr>
<tr>
<td></td>
<td>Multi-Family Residential</td>
<td>19% BMP Certification</td>
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<tr>
<td></td>
<td>Commercial/Institutional/Communications/Utilities</td>
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<tr>
<td></td>
<td>Vegetated Turf</td>
<td>100% Source Control Certification</td>
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<tr>
<td></td>
<td>all other land uses</td>
<td>0% Source Control Certification</td>
</tr>
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</table>

The values in Table 2.1 represent an informed best professional judgment of standard conditions during the baseline period, which may not reflect the actual practices in place in specific urban catchments or jurisdictions during this period. However, this is appropriate for the following reasons:

1. The baseline loading estimate referred to in the Lake Tahoe TMDL report did not reflect catchment-specific conditions, and thus each jurisdiction’s baseline loading and load reduction requirements are based on basin-wide average conditions.
2. Normalizing across jurisdictions creates a level playing field for all Urban Implementers that does not penalize those Urban Implementers with better-than-average practices in place during the baseline loading period.
It is possible that baseline condition assumptions are better than the expected conditions in an urban catchment. This has been noted with regard to parcel BMP implementation in particular. Although this situation can result in negative load reductions, it reflects that the urban catchment lags behind the Lake Tahoe basin average and provides an incentive to make necessary improvements to achieve credit targets.

**Treatment BMPs**

The baseline load reduction estimate assumes treatment BMPs installed before October 2004 were maintained at a relatively poor condition, reflective of a BMP RAM score of 2 for the treatment BMP. When developing Baseline Scenarios, Urban Implementers use parameters representative of the threshold conditions defined in BMP RAM. When developing BMP Scenarios, Urban Implementers use improved conditions, representative of a BMP RAM score of 3, for all treatment BMPs constructed before the end of 2004 that are still functioning, inspected and maintained. This approach enables Urban Implementers to generate some amount of credit from maintaining treatment BMPs installed before October of 2004.

Urban Implementers may have significant opportunities to improve the load reduction potential of existing treatment BMPs by re-engineering treatment BMPs to increase their effectiveness. The opportunity to improve the effectiveness of existing treatment BMPs may provide low-cost load reductions and credits by minimizing the need to acquire land and may not require construction permits for changes with minimal soil disturbance. Increasing the capacity or infiltration rate of a treatment BMP can significantly increase the load reduction effectiveness of treatment BMPs.

**JURISDICTIONAL BASELINE ESTIMATES**

Individual pollutant load estimates from urban catchments within a jurisdiction are the building blocks that determine an Urban Implementer’s jurisdiction-specific average annual baseline pollutant load estimate. To calculate baseline pollutant loading at the jurisdiction scale, the baseline load modeled for each urban catchment within the jurisdiction is summed.

Notably, adjusting the boundaries of urban catchments does not necessitate that an Urban Implementer recalculate its jurisdiction-specific average annual baseline pollutant load estimate. The jurisdiction-specific average annual baseline pollutant load estimate should be approximately conserved provided all urban catchments within the urban jurisdiction comprise the same total area after alternation of any urban catchment boundary.

**Updating Jurisdictional Baseline Load Estimates**

Urban Implementers completed a baseline loading estimate using PLRM version 1. Since that time PLRM version 2.1 has been developed to better integrate with the Crediting Program, condition assessments, and CAP. The process for calculating load reductions from road conditions in PLRM 2.1 has changed to better align with road condition assessments. Consequently, the pollutant loads predicted by PLRM will be different. Urban Implementers do not need to update jurisdiction-wide baseline load estimate as a condition for meeting their 2016 load reduction milestone. However, Lahontan Water Board and NDEP strongly recommended that Urban Implementers revise their baseline load estimate using PLRM 2.1 during permit and ILA updates. Furthermore, updated baseline load estimates will only be approved by Lahontan Water Board and NDEP if all urban catchments within a jurisdiction are modeled using PLRM 2.1; extrapolations of baselines loads will not be accepted.

**CAP Relationships**

This section is relevant to:

- Road Registration Step 1. Upload PLRM Load Reductions
- BMP Registration Step 3. Upload PLRM Load Reductions
3. EXPECTED LOAD REDUCTION ESTIMATES

Urban catchments are the foundation for estimating load reductions from both road operations and BMPs. The Crediting Program tracks load reductions from road operations separately from parcel and treatment BMP implementation. The term “road operations” is used to describe pollutant controls implemented on road and adjacent impervious surfaces. The term BMP is used to describe all other pollutant controls (including treatment and parcel BMPs).

Urban Implementers should estimate load reductions from road operations prior to estimating load reductions from BMPs to avoid double counting expected load reductions. The guidance below suggests the process for estimating 1) load reductions from improving road surface conditions above baseline; and 2) load reductions from BMP implementation.

LOAD REDUCTIONS ASSOCIATED WITH ROAD OPERATIONS

Since roads are a significant pollutant source, road operations are likely to be an important component of an Urban Implementer’s jurisdiction-wide load reduction strategy. Different combinations of road operations (e.g. road abrasive application strategy, sweeping plan and other source control plans) may be implemented to achieve better than baseline conditions on road and adjacent impervious surfaces, which results in load reductions.

The following outlines the process for estimating the jurisdiction-wide expected load reduction from improving road conditions:

1.1 Identify urban catchments intersected by roads where credits are being generated (Figure 3.1).

1.2 Estimate the baseline loading for each identified urban catchment by developing a Baseline Scenario in PLRM. Note: PLRM Version 2.1 and later provides default baseline road condition shapefiles consistent with the definitions for baseline.

1.3 Develop a Road Operations Scenario for each identified urban catchment by adjusting the road condition scores to reflect expectations. Adjust only road condition scores and changes to land use designations during this analysis. The Road Operations Scenario estimates the expected loading from achieving expected road conditions.

1.4 Subtract expected loading from baseline loading to define the expected load reduction from each identified urban catchment for roadway operations.

1.5 After completing steps 1.2 through 1.4 for each urban catchment intersected by roads planned for registration, use CAP to add a roads registration. CAP instructs users to upload all relevant PLRM Project files and define the catchment connectivity of each urban catchment. CAP sums the load reductions to determine the total expected load reduction for the road registration.

Figure 3.1: Example of urban catchments selected for road registration.
ESTIMATING LOAD REDUCTIONS ASSOCIATED WITH BMPS

BMPs may include, but are not limited to, parcel BMP retrofits; source control BMPs (such as road shoulder stabilization and disconnecting impervious surfaces); and treatment BMPs (such as infiltration basins, wet basins, or stormwater filtration devices).

Credits generated by BMP implementation are independently registered, calculated and tracked for each urban catchment. The process for estimating the expected load reduction associated with BMP implementation within an urban catchment is outlined below.

2.1 Identify urban catchment(s) that encompass the pollutant controls planned for the BMP registration and first define the following (see Figure 3.2):

   a. **BMP Registration #1** is within an urban catchment NOT registered for road operations. Use the **Baseline Scenario** to develop the **BMP Scenario**.

   b. **BMP Registration #2** is within an urban catchment included in the road operations registration. Use the **Road Operations Scenario** to develop the **BMP Scenario**.

2.2 The **BMP Scenario** estimates the expected loading from BMP implementation and all other pollutant controls. Develop a **BMP Scenario** for the identified urban catchment by adjusting all relevant parameters except for road conditions.

2.3 Use CAP to add a BMP registration. CAP instructs the Urban Implementer to upload the relevant PLRM Project file and subtracts the expected loading from the implementation of BMPs from the expected loading from implementation of either the **Road Operations Scenario** in the case of BMP Registration #2, or from **Baseline Scenario** in the case of BMP Registration #1.

![Figure 3.2: Example of two urban catchments selected for two separate BMP registrations.](image)

CAP Relationships

This section is relevant to

- Road Registration Step 1. Upload PLRM Load Reductions
- BMP Registration Step 3. Upload PLRM Load Reductions
4. CATCHMENT CONNECTIVITY

In situations where an outlet delivers stormwater to a meadow or other conveyance, only a fraction of the pollutant load may reach a surface waterbody and the lake. In these cases the Crediting Program requires an Urban Implementer designate a catchment connectivity to that reflects the estimated percent of flow from the urban catchment expected to reach surface waters. For each urban catchment registered in CAP, connectivity is expressed as a percentage and is used as a multiplier to yield the fraction of the load calculated by PLRM that reaches surface waters.

Each Urban Implementer may develop a practical approach to defining connectivity for an urban catchment, and must have the approach approved, in writing, by NDEP or Lahontan Water Board (as appropriate). To be approved, an approach should adhere to the following principles:

1. Practicality is essential, thus, a desk-based method is all that is necessary. It is sufficient to provide a few rough categorizations of connectivity, such as 0%, 25%, 50%, 75% and 100%-connected.
2. Consider the runoff volume that will travel along the flow path, as calculated from the appropriate PLRM Scenario.
3. Incorporate the length of the flow path to surface water. Longer flow paths may provide more opportunity for infiltration or potential channel erosion.
4. Consider the type of flow path, particularly with regard to the treatment processes that may occur along the flow path.
5. Flow paths including steep or eroding slopes may require additional analysis to identify possible load additions through erosion.

The estimated connectivity of an urban catchment may change between the Baseline, Road Operations and BMP Scenarios, as implementation of pollutant controls or other alterations to the landscape may modify the flow path between the urban catchment and the receiving water. As an example, consider runoff from an outflow at the bottom of an urban catchment that is captured, pumped up gradient and released to a meadow. In such cases, the same approach should be used to determine the urban catchment’s post-implementation connectivity. Assumptions related to changes to catchment connectivity between scenarios are subject to scrutiny during the registration verification process (Step 2.2: Verify Registration (TMDL Program Managers)).

CAP Relationships
This section is relevant to

- Road Registration Step 2. Calculate Road Operation Credits
- BMP Registration Step 7B. Credit Calculations
5. WATER QUALITY IMPORTANCE

The water quality importance of each pollutant control type is defined as essential, key or supporting based on the estimated number of credits the pollutant control generates. “Essential” and “key” pollutant controls must be inspected to calculate actual credits generated.

CAP allows includes four types of pollutant controls within an urban catchment: 1) road operations, 2) treatment BMPs, 3) parcel BMPs and 4) other pollutant controls. The water quality importance determination for each pollutant control category is specified in the Table 5.1 below.

<table>
<thead>
<tr>
<th>POLLUTANT CONTROL CATEGORY</th>
<th>DESCRIPTION</th>
<th>LAKE CLARITY CREDIT ESTIMATION FOR WATER QUALITY IMPORTANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROADS OPERATIONS</td>
<td>Each road class is considered essential. This designation is automatically associated to each individual road class by CAP during registration.</td>
<td>Each road class</td>
</tr>
<tr>
<td>TREATMENT BMPS</td>
<td>Urban Implementers select the water quality importance of each treatment BMP as essential, key or supporting based on the number of credits the treatment BMP is estimated to generate.</td>
<td>10+ Credits 3-9 Credits 2 or Less Credits</td>
</tr>
<tr>
<td>PARCEL BMPS</td>
<td>Urban Implementers select the water quality importance of all parcel BMPs within an urban catchment collectively as essential, key or supporting based on the number of credits the parcel BMPs within that urban catchment are estimated to generate.</td>
<td>10+ Credits 3-9 Credits 2 or Less Credits</td>
</tr>
<tr>
<td>OTHER POLLUTANT CONTROLS</td>
<td>Urban Implementers select the water quality importance of each other pollutant control strategy within an urban catchment as essential, key or supporting based on the number of credits each other pollutant control is estimated to generate.</td>
<td>10+ Credits 3-9 Credits 2 or Less Credits</td>
</tr>
</tbody>
</table>

Figure 5.1 provides a conceptual framework to help guide best professional judgment and discussions regarding the assignment of water quality importance for specific treatment BMPs. This figure should not be used to determine the water quality importance of a treatment BMP, but is a reference point for determining the likely water quality importance of each treatment BMP. Technical guidance for calculating the credits each treatment BMP may provide is described in CAP Technical Guidance Document.
Figure 5.1: Conceptual water quality importance of treatment BMPs implemented in typical urban catchments – Load reduction is the product of concentration and flow reductions and is represented as the distance from the origin. This figure is intended as a conceptual framework for reference during discussions of treatment BMP importance. It is not intended to provide quantitative guidance for developing load estimations, nor are the ranges necessarily appropriate for all situations.

CAP Relationships
This section is relevant to

- Road Registration Step 6. Complete Road Inventory
- BMP Registration Step 4B. Treatment BMP Inventory
- BMP Registration Step 5. Parcel BMP Inventory
6. ROAD OPERATIONS PLAN

A Road Operations Plan enables TMDL Program Managers to have an informed conversation with an Urban Implementer about refinements or adjustments to the plan prior to completion of road registration. Urban Implementers submit Road Operations Plans during the road registration process. A Road Operations Plan communicates and identifies where pollutant controls on all roads within the jurisdiction will be implemented, the expected road conditions that will be achieved from those pollutant controls, and the location and frequency of planned inspections.

A typical Road Operations Plan includes the following information:

1. An urban catchment Delineation map that illustrates all the urban catchments selected for road registration.
2. A Roads Class Map that illustrates: network of roads planned for registration; the road class for each road segment associated with the road registration; and the road condition score Urban Implementer plans to maintain for each road class.
3. Description of the pollutant controls (e.g. road abrasive application strategy, sweeping plan and other source control plans) the Urban Implementer expects to implement to achieve the road conditions defined in the previous step, such as defining the equipment used and the situations when sweeping is expected to occur.
4. Definition of the expected road condition score for each road class that is related to the pollutant controls implemented.
5. A brief description of the inspection plan including:
   a. The road condition assessment method that will be used (e.g. Road RAM or another assessment protocol)
   b. Inspection frequency per road class and number of inspection locations
   c. A map showing the planned inspection locations (i.e. selected Road Segments)

The following definitions are critical to the road registration process:

Road Class refers to a group of road segments on which the implementation of consistent operational practices should result in a similar Road Condition Score.

Road Condition Score is the relative risk to downslope water quality as result of pollutant generation on the impervious road surface, as defined on a relative 0-5 scale. Road Condition Scores are determined in the field using the Road Rapid Assessment Methodology (Road RAM).

Road Operations Plans identify planned road operations pollutant controls, and the expected road conditions for each road. Road classes are used to categorize road segments with similar expected conditions.

CAP Relationships
This section is relevant to

- Road Registration Step 4. Upload Road Operations Plan
7. CREDIT SCHEDULE DURATION

The credit schedule duration refers to the length of time an Urban Implementer commits to maintain pollutant controls at near-to or better than expected conditions in order to generate the expected number of credits identified in the road or BMP registration. Each road and BMP registration is associated with a credit schedule that is agreed upon by both the Urban Implementer and the appropriate regulatory agency prior to verifying registration.

ESTABLISHING THE APPROPRIATE DURATION

The credit schedule sets expectations for the length of time that will pass until the Urban Implementer re-registers. There is no minimum credit schedule requirement, though TMDL Program Managers recommend pursuing registration for a minimum two-year period. The maximum credit schedule duration is 15 years. When proposing a credit schedule, an Urban Implementer should balance the following considerations:

1. Longer credit schedules reduce the level of effort invested in developing and reviewing registration documentation.
2. Longer credit schedules provide regulatory stability for Urban Implementers and provide an incentive to attempt innovative practices that may result in improved ability to achieve load reductions.
3. When a credit schedule is extended, the Urban Implementer must update load estimation calculations using the most recently approved load estimation methods. Because updated methods will generally provide more accurate load estimations than previous methods, shorter credit schedules may result in generated credits that more accurately reflect the actual average annual load to the lake.

It is not appropriate to frequently update credit schedules. However, an Urban Implementer may be allowed to update a credit schedule when pollutant control implementation strategies change. Urban Implementers should have a strong rationale for changing a credit schedule.

REGISTRATION ESTABLISHMENT SUMMARY

Pollutant controls registered within a water year may only generate a portion of the possible expected credits for that year. The following guidance pertains to determining the portion of the possible expected credit that may be generated when a pollutant control is registered within a water year.

1. Establishment Date
   The credit schedule establishment date is the date the road or BMP registration is verified by the Lahontan Water Board or NDEP.

2. First Year Credit Potential
   Table 7.1 defines the expected credit amount for the year the registration is submitted according to the establishment date.

<table>
<thead>
<tr>
<th>Table 7.1: Establishment month credit potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>MONTH</td>
</tr>
<tr>
<td>% OF CREDIT AWARD</td>
</tr>
</tbody>
</table>

POLICY APPENDICES
If an Urban Implementer receives more than 50 percent of the credit award amount in the year the credit schedule is established, the establishment year is considered the first year of the credit schedule. If less than 50 percent of credit is received in the year the credit schedule is established, the following year is considered the first year of the credit schedule. Credit is given for the entire month when the catchment is registered even if the submittal is the final day of the month. This is based on the presumption that the treatment BMPs and implementation plans are effective before the registration date.

3. Credit Schedule Final Year
The final year and month of the credit schedule is based on the credit schedule duration, the establishment date and whether the Urban Implementer received more than 50 percent of the credit award in the year the credit schedule was established. The following two examples illustrate how this guidance is applied.

- BMP #1 is registered on June 28, 2011, with a credit schedule amount of 50 credits and duration of 15 years. The Urban Implementer receives 4 percent of the credit, or two credits in 2011. This is less than 50 percent of the credit schedule amount, so the first year of the credit schedule is defined as 2012, and the credit schedule is effective through September 31, 2026.

- BMP #2 is registered on January 5, 2014, with a credit schedule amount of 100 credits and duration of five years. The Urban Implementer receives 84 percent of the credit, or 84 credits in 2014. This is greater than 50 percent of the credit schedule amount, so the first year of the credit schedule is 2014, and the credit schedule is effective through September 31, 2018.

CAP Relationships
This section is relevant to:

- Road Registration Step 7B. Credit Schedule
- BMP Registration Step 7C. Credit Schedule
8. CREDIT DISTRIBUTION

The Crediting Program encourages cooperation among Urban Implementers by enabling credits to be distributed. Credits generated in any one urban catchment in a year can be distributed to any Urban Implementer in the Lake Tahoe Basin as determined appropriate by the Urban Implementers in consultation with the appropriate regulatory authority. The intention of allowing credits to be distributed is to incentivize Urban Implementers to combine capital, maintenance personnel and equipment resources to prioritize and implement the most practical and effective pollutant controls. The following approach is recommended to inform the distribution of credit between Urban Implementers cooperating to implement pollutant controls or otherwise sharing credit.

1. Communicate early and thoroughly when delineating an urban catchment from which credits may be distributed. Estimate load reductions to ensure that the number of credits at stake is worth the effort to distribute credit.
2. Develop a written agreement to clarify responsibilities for planning, design, administration and ongoing maintenance. Agreements should consider how credits are distributed in the event that less than full credit is awarded in a year due to actual conditions underperforming expected conditions.
3. Consider the potential for future changes in the urban catchment, such as land ownership land or water quality project implementation. Define what potential changes should result in redefining the catchment and document these considerations to inform the appropriate TMDL Program Manager of the possible future changes.

CAP Relationships
This section is relevant to:

- Road Registration Step 7B. Credit Schedule
- BMP Registration Step 7C. Credit Schedule
9. REGISTRATION VERIFICATION

TMDL Program Managers check the assumptions and calculations for each submitted road and BMP registration. The following guidance for TMDL Program Managers is used to determine whether the submitted registration materials are consistent with Crediting Program requirements and reflect defensible assumptions. This list is divided into checks that are considered critical for quality assurance of the Crediting Program, important checks that could catch less likely errors or may not be applicable in all situations, and additional checks that can be done if time permits or broad QA concerns exist. This guidance is written with the assumption that the reader is familiar with PLRM. Regulators are encouraged to adjust this list as they see trends in the information submitted.

Urban Implementers can expect these items will be checked, but other items may also trigger further discussions with TMDL Program Managers if issues arise. This checklist is available to Urban Implementers in the hope that they will check these items and address them before initial registration.

1. Critical Checks
   - Check the PLRM Recommended Range Report. If parameters are outside of ranges they must be justified in CAP documentation.
   - Confirm use of appropriate baseline condition parameters specified in Appendix A, Chapter 1, Section 2, Baseline Load Estimates Procedures & Protocols.

2. Important Checks
   - Confirm a percent connectivity value is used when urban catchment outfalls are not directly connected to a water body. Carefully check the rationale behind any change in percent connectivity between baseline and expected conditions.
   - Skim the PLRM schematic window to familiarize yourself with how the Scenarios are plumbed. Note the number of catchments, number of SWTs, routing, etc.
   - Skim land use distributions within catchments to understand the dominant land uses - e.g., SFR, CICU, lots of roads in one catchment, etc. Be careful that catchment areas for each land use (and total area) haven’t changed between baseline and expected conditions. If catchment areas have changed, the analysis can be misleading. However, in some cases catchment areas can change because delineations need to be redone in PLRM when SWTs are implemented in the expected condition. Ensure that the necessary changes in neighboring catchments have been made.
   - Check the percent surface runoff value in Baseline and Expected Scenario Reports to see if it is reasonably comparable with the typical values listed below. If DCIA is very high or low these typical cases may not be appropriate.
     - 1% is forested.
     - 5-10% is minimal development (westshore residential).
     - 10-20% fairly dense SFR (Sierra tract, Al Tahoe).
     - 20-40% is urban core (casinos).
   - Check SWT % Capture Ratios in expected condition scenario report (and potentially baseline if SWTs present).
     - Be wary of 100% capture. This could be due to wasting money massively oversizing, beyond the 20yr-1hr storm. This could also be due to using an excessively high treatment flow in a vault that isn’t realistic for removal of pollutants of concern. Very occasionally this is due to missing peak flow in a super small watershed.
       - 90-95% capture ratio is typical capture ratio for something designed for 20yr-1hr storm on east shore.
       - 85% is typical capture ratio for something designed for 20yr-1hr storm on west shore.
• Check that Treatment Volume and Load Removed values are reasonable for each SWT using the Scenario Reports feature (i.e. Will that treatment vault really retain and have that many lbs of FSP/year vectored out of it?).

• For urban catchments where large load reductions are attributed to PSCs or HSCs, check the Land Use Conditions Editor and Drainage Conditions editor for those catchments to decipher what has caused the large change. Does this seem reasonable?

3. Additional Checks

• In the Drainage Conditions Editor look for small volume infiltration devices that have default infiltration rate (0.5) this is too high in many cases, such as sediment traps, forebays etc.

• Compare volume vs. sediment reductions between baseline and expected conditions for catchments. Check if load reductions are consistent with runoff volume. This comparison assesses the significance of PSCs and HSCs on load reductions. In some cases errors may become obvious. To do this advanced check:
  ◦ Open .prpt text files from each PLRM scenario folder and paste the CSV numbers into excel. Compare changes between baseline and expected in each catchment.
  ◦ Use changes in hydrology or loads to see which catchments have reductions/increases in runoff volumes and/or reductions/increases in pollutant loading.

• An advanced check for data quality of DCIA inputs is done by looking at the SWMM input files using Notepad++. The necessary files are in each scenario folder as PLRM.inp.
  ◦ “_tout” is to catchment outlet: be wary of 50% DCIA - this may mean the modeler didn’t modify DCIA because the PLRM default is 50%.
  ◦ “_toinf” is to infiltration facility: by default PLRM sets this routing to 100% DCIA.
  ◦ Be wary of 50% DCIA - this may mean the modeler didn't think about DCIA because the PLRM default is 50%.
  ◦ Check DCIAs recalling that SWMM inputs are 1-% given as input parameters - for example "0" is actually 100% DCIA.

CAP Relationships
This section is relevant to:

• BMP & Road Registration Step 9. Submit Registration to Regulator
10. ROAD CONDITION INSPECTIONS

A road registration requires road condition inspections over time. Inspections verify that modeled estimates of road condition are as good, or better, than actual road conditions. More importantly, road inspections create a quality control check that supports communications between stormwater managers and maintenance staff. Inspections provide the information needed to understand if equipment is functioning and being used properly, producing the expected conditions described in the Road Operations Plans. Further, road inspections serve as training opportunities, enabling maintenance crews to develop an “eye for quality” such that they can visually estimate road conditions and the need for additional maintenance on a day-to-day basis.

For each registered road class, road condition inspections are required as described below.

INSPECTION METHOD

Road RAM facilitates road segment inspections and the spatial extrapolation of discrete observations to many miles of a road network by road class. Road RAM provides a complete and consistent field evaluation and data management tool for jurisdictions to determine and track the condition of roads over time.

The Crediting Program refers to the Road RAM Technical Document to describe specific procedures to:

- Use field observations to determine the actual condition of road segments and express them with road segment scores.
- Obtain, track and analyze Road RAM scores.

Road condition scores are related to the pollutant loading potential from individual road segments. A condition score of 5 indicates a cleaner road and a score of 0 indicates a dirtier road. Similar to treatment BMPs, the Crediting Program uses road condition scores to define expected conditions used in expected loading estimates and actual conditions used as the basis for annual credit awards. However, there is a difference in the way expected values are chosen.

For treatment BMPs, a RAM score of 3 is the expected condition that is based on an achievable level of a BMP observation that can be measured in the field. For roads, the expected condition for each road class can be any 0-5 value selected by the Urban Implementer based on what is expected to be maintained. This difference exists because BMP RAM develops a unique condition scoring equation for each treatment BMP while the Road RAM defines a consistent scale from 0 to 5 for all roads.

PLRM uses expected road conditions to calculate expected load reductions using a relationship between condition score and runoff concentration.

INSPECTION FREQUENCY

Road condition inspections are required for every registered road class and are repeated each year the road registration is active. At a minimum, four (4) sets of road condition inspections are required within the observation periods, shown below in Table 10.1. Inspections should be spaced a minimum of two weeks apart. Table 10.1 also displays the relative weighting each inspection has on the CAP annual road condition calculation.
Table 10.1. Required frequency of road condition inspections (Each Registered Road Class)

<table>
<thead>
<tr>
<th>OBSERVATION PERIOD WHEN INSPECTION OCCURS</th>
<th>NUMBER OF INSPECTIONS</th>
<th>% OF ANNUAL ROAD CONDITION SCORE CALCULATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall/Winter (Oct – Jan)</td>
<td>1</td>
<td>20%</td>
</tr>
<tr>
<td>Spring (Feb – May)</td>
<td>2</td>
<td>60%</td>
</tr>
<tr>
<td>Summer (Jun – Sep)</td>
<td>1</td>
<td>20%</td>
</tr>
</tbody>
</table>

INSPECTION LOCATIONS

The number of required inspection locations increases with the amount of registered road impervious area (Table 10.2). The specific inspection locations are selected by the Urban Implementer and documented in the Road Operations Plan. Inspection locations should be evenly distributed throughout the road network comprising a registered road class. CAP calculates the number of required inspection locations automatically and displays the progress of jurisdictions in meeting inspection requirements over the course of the year. This includes identifying when the standard deviation for inspections for a road class is higher than the allowed 0.5 RAM score, thus requiring additional inspections.

Table 10.2. Required Number of Inspection Locations for Each Registered Road Class

<table>
<thead>
<tr>
<th>RANGE OF IMPERVIOUS ROAD AREA (ACRES)</th>
<th>REQUIRED NUMBER OF INSPECTION LOCATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 acres</td>
<td>0</td>
</tr>
<tr>
<td>0.1 – 8 acres</td>
<td>4</td>
</tr>
<tr>
<td>8.1 – 17 acres</td>
<td>8</td>
</tr>
<tr>
<td>17.1 – 42 acres</td>
<td>12</td>
</tr>
<tr>
<td>42.1 – 85 acres</td>
<td>16</td>
</tr>
<tr>
<td>85.1+ acres</td>
<td>20</td>
</tr>
</tbody>
</table>

CAP Relationships

This section is relevant to:

- Road Registration Step 4. Upload Road Operations Plan
- Road Registration Step 6. Complete Road Inventory
- Inspections, View Current WY Progress for Roads
11. TREATMENT BMP INSPECTIONS

The BMP Maintenance Rapid Assessment Methodology (BMP RAM) defines protocols to determine the condition of treatment BMPs. The BMP RAM Technical Document and User’s Manual describe the specific procedures to:

- Determine the applicable observations for different types of treatment BMPs.
- Determine benchmark values that represent the best achievable observation values.
- Select threshold values that represent the point at which a treatment BMP is no longer functioning acceptably.
- Determine the relative weighting of individual observation results to arrive at a treatment BMP RAM score for each treatment BMP type.

The remainder of this section describes how the Crediting Program uses inspection results to inform expected loading estimates and how inspection results are used to determine actual conditions in a year.

EXPECTED CONDITIONS

Stormwater managers determine the expected values for treatment BMPs in relationship to benchmark and threshold values. The following describes the operations to determine expected values:

- As described in the BMP RAM, benchmark values are generally determined by performing observations immediately following the installation or maintenance of a treatment BMP. Benchmark values are intended to be the best achievable or otherwise acceptable observation values and define the observation score of 5.
- The expected condition is the lowest expected average condition score for a treatment BMP and is used as the basis for selecting modeling parameters for treatment BMPs when calculating the expected loading estimate. The Crediting Program defines the expected condition of a treatment BMP with an observation value equivalent to an observation score of 3.
- Threshold values are selected by stormwater managers on the basis of desired maintenance frequency and desired load reduction for the treatment BMP. BMP RAM provides default values for thresholds, however, threshold values may be changed by the user. Threshold values are intended to be the point at which the treatment BMP is no longer in acceptable condition; this defines the observation score of 2.

RELATING OBSERVATION VALUES TO MODELING PARAMETERS

The expected values are used to determine the appropriate modeling parameters to include in expected loading estimates. By using expected values, the expected loading estimate is intended to reflect the expected load reduction from a treatment BMP at baseline condition. In contrast, the use of design or optimal values would reflect better-than-expected actual conditions and would likely result in overestimation of actual load reductions.

The benchmark, threshold and expected observation values, as well as the related modeling parameters, are documented in BMP RAM and associated to a registered urban catchment by CAP. The relationship between observation values and modeling parameters requires professional judgment on the part of the Urban Implementers. TMDL Program Managers review modeling parameters to ensure reasonable estimates are used.
DETERMINING ACTUAL CONDITIONS

The Crediting Program assumes that, in general, the late spring condition of a treatment BMP is representative of the actual condition for the year unless maintenance is performed later in the year. The BMP RAM recommends performing field observations in the late spring, which provides the Urban Implementer time to schedule and perform necessary maintenance before fall weather events complicate maintenance procedures. Degradation of a treatment BMP generally indicates that it is effectively capturing pollutants, thus some degradation is an expected and even desirable result of treating runoff. In some situations, site conditions or particular types of summer and fall runoff events may result in more rapid condition changes and necessitate more frequent inspections. These situations can be identified in the notes related to a specific registered urban catchment, and an appropriate inspection and averaging method can be agreed upon by the Urban Implementer and TMDL Program Manager.

If maintenance is performed, the treatment BMP is re-inspected and second condition scores is used to determine the actual condition score for the year. This approach provides an incentive for TMDL Implementers to perform maintenance to maintain treatment BMPs at near-to or better-than expected conditions.

CAP Relationships
This section is relevant to:

- BMP Registration Step 4A and B. Complete Treatment BMP Inventory
12. PARCEL BMP CONDITION ASSESSMENT

Parcel BMP performance is determined by comparing the actual percent area of parcel BMP implementation to the expected percent implementation registered in CAP. Calculating the actual parcel BMP percent implementation is a desktop exercise performed after the end of the water year. The Tahoe Regional Planning Agency (TRPA) Parcel Map Tool provides the information to calculate the percent area by land use with parcel BMP or source control certification (parcel certification), and provides the information to determine the maintenance status of BMPs. *CAP Technical Guidance Document* provides step-by-step instructions for using the TRPA Parcel Map Tool and calculating the percent area of parcel BMPs, including determining the portion of BMPs with certifications within the most recent five years.

The area calculation is adjusted depending on the parcel certification status on commercial/institutional/communications/utilities (CICU) and multi-family residential (MFR) parcels. CICU and MFR parcels with certification status that are five years or newer receive full value. CICU and MFR parcels with certification status older than five years receive 50 percent value. Recertification of CICU and MFR parcels is performed by the TRPA outside of this process, and the Parcel Map Tool is updated by TRPA annually.

Parcel BMP performance for any urban catchment is determined by comparing the actual percent of certified parcels to the expected percent of certified parcels. Actual percent and expected percent are expressed as percentages of area within the catchment containing BMP and source control certifications. Urban Implementers follow the detailed instructions contained in *CAP Technical Guidance Document* to calculate the actual percentage of parcel source control and BMP certifications in the catchment and enter the results in CAP. Summing the CICU and MFR land use area percentages, CAP uses Equation 12.1 to calculate a Parcel BMP Condition Score for the urban catchment.

Analogous to the stormwater treatment BMP condition scoring approach, the expected condition of parcel BMP implementation is set at 3.

**Equation 12.1: Parcel BMP Condition Score Equation**

\[
Parcel Land Use Type BMP Condition Score = 3 \times \frac{Actual\%}{Expected\%}
\]

Load reduction planning exercises indicate that SFR parcels are not likely to serve as a primary load reduction strategy. Therefore, the calculation of performance is not dependent on the SFR land use, and full value is currently provided for SFR parcel certifications regardless of the certification date. The SFR land use percent area with BMPs may be reviewed during the credit award step, and may be included in the calculation of parcel BMP performance in the future.

**CAP Relationships**

This section is relevant to:

- Inspect, Parcel BMP Program Annual Inspections
- BMP Registration Step 5. Parcel BMP Inventory
13. VALIDATION INSPECTIONS

Urban Implementers are responsible for inspecting each key and essential pollutant control. TMDL Program Managers and other stakeholders trained to use standard assessment methods may also perform validation inspections of these pollutant controls. Validation inspectors follow the guidance below to perform inspections.

CONDUCTING VALIDATION INSPECTIONS

Following are the steps to be performed in conducting validation inspections.

1. Select Validation Inspection Points & Gather Materials
Validation inspectors gather the necessary materials and inspection forms before going into the field to perform inspections.

Validation inspectors use each road and BMP registration to find inventory tables and maps that identify the location and expected conditions for treatment BMPs, roads and other pollutant control strategies within urban catchments that have active credit schedules.

2. Perform Validation Inspections
The validation inspector assesses conditions according to the appropriate condition assessment methodology. Inspection timing is critical to ensure validation inspection results are comparable to self-inspection results.

Treatment BMP Validation-Inspection Timing

For treatment BMPs, validation inspections can be compared to self-inspections as long as they are not separated by maintenance activities or significant runoff events that would change the treatment BMP condition. Because most treatment BMP maintenance is likely to occur during favorable summer conditions, validation inspections should generally be performed in the spring or fall. Spring validation inspections can be compared to self-inspection results to confirm maintenance priorities. Fall validation inspections can still be compared to spring self-inspections, but greater variability should be expected. Early fall validation inspections are valuable to check conditions before the runoff events of the fall, winter and spring. Individual agencies determine appropriate validation inspection schedules and priorities.

Roads Validation-Inspection Timing

Road conditions are expected to change rapidly in the winter and may also change following significant runoff events. Validation inspectors should consult Road Operations Plans to determine the level of maintenance committed to in the credit schedule and the resulting expected conditions.

Validation inspections should be conducted a reasonable amount of time following a precipitation event to provide the Urban Implementer sufficient time to perform planned maintenance.

3. Record & Submit Inspection Results
The TMDL Program Manager records validation inspection results and enters the resulting condition scores in CAP. The results are compared to Urban Implementer self-inspection results when the TMDL Program Manager reviews the Urban Implementer’s declared credits.
**DISCREPANCIES BETWEEN SELF-INSPECTION RESULTS AND VALIDATION INSPECTIONS**

The TMDL Program Manager and Urban Implementer discuss results when self-inspection results are higher than validation inspection results for more than ten percent of comparable inspections, or when self-inspection results are more than one condition score higher than validation inspection results for essential pollutant controls.

**Corrective Actions**

Unless the TMDL Program Manager has evidence to the contrary, the first instances of significant discrepancies between self-inspection and validation-inspection results should be assumed to be the result of variability in the assessment methods and training. While multiple types of corrective actions are possible, Table 13.1 outlines a potential sequence of corrective actions. The corrective actions in Table 13.1 should be seen as suggestions only, and are not intended to define a corrective actions policy for the Crediting Program. The TMDL Program Manager determines the appropriate corrective action in consultation with the Urban Implementer.

**CAP Relationships**

This section is relevant to:

- Inspect Home Page
<table>
<thead>
<tr>
<th>FREQUENCY</th>
<th>MAGNITUDE</th>
<th>CREDIT AWARD ADJUSTMENT</th>
<th>INSPECTION PRACTICE CHANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>First year</td>
<td>10% - 25% of self-inspection results more than 1 condition score greater than validation inspection results</td>
<td>No adjustment necessary</td>
<td>Conduct a day-long inspection and operations training involving Urban Implementer inspectors, maintenance staff as well as TMDL Program Managers and other validation inspectors</td>
</tr>
<tr>
<td>First year</td>
<td>25%+ of self-inspection results more than 1 condition score greater than validation inspection results</td>
<td>Consider adjusting credit awards assuming that the validation inspections are correct and that the discrepancy is uniform across all self-inspection results</td>
<td>1) The Urban Implementer performs an analysis and develops a report of inspection and operational issues, focusing on staff practices and accuracy of inspection results; 2) Conduct a multi-day training with inspection and maintenance staff, involving the TMDL Program Manager and validation inspector in at least one day of training</td>
</tr>
<tr>
<td>Multiple Years</td>
<td>10% - 25% of self-inspection results more than 1 condition score greater than validation inspection results</td>
<td>See above</td>
<td>See above</td>
</tr>
<tr>
<td>Multiple Years</td>
<td>25%+ of self-inspection results more than 1 condition score greater than validation inspection results</td>
<td>Consider adjusting credit awards, assuming all self-inspection results are high by a consistent amount and using the calculated credit as the credit award; And The TMDL Program Manager considers if enforcement action for misreporting is required</td>
<td>1) Overhaul inspection plans and training. Develop a strategy to address issues and submit plans, including how all catchment credit schedules should be adjusted for the coming year(s) 2) The Urban Implementer and TMDL Program Manager define implementation plan adjustments and training requirements necessary to resolve problems</td>
</tr>
</tbody>
</table>
14. **CALCULATION OF CREDITS GENERATED**

This section defines criteria for determining performance of individual pollutant controls and the rules for calculating credits generated from registered urban catchments and road operations.

**DETERMINING INDIVIDUAL POLLUTANT CONTROL PERFORMANCE**

An individual pollutant control is considered performing when the actual condition in a year is greater than or equal to the expected condition minus 0.5. Therefore, any treatment BMP with expected condition of 3.0 is considered performing when the actual condition is greater than or equal to 2.5. As described above, the expected condition score for a road class is between 0.0 and 5.0 as defined by the Urban Implementer in the Road Operations Plan. A road class is considered performing each year the actual condition is greater than or equal to the expected condition minus 0.5. Equation 14.1 is the formal definition of performing and non-performing pollutant controls.

**EQUATION 14.1: Definition of Individual Pollutant Control Performance and Non-Performance**

\[ \text{Performing: Actual Condition } \geq \text{ Expected Condition } - 0.5 \]

The CAP uses inspection results to perform the comparison between expected and actual conditions and determines if a pollutant control is performing each year.

**DETERMINING CREDITS GENERATED**

The credit determination method uses individual pollutant control performance as measured by condition assessment to determine the overall credit award for a registered urban catchment or road operations. The maximum credit award is 100 percent of the credit potential amount defined by the registration, and the minimum amount of credit award for a catchment is 0 percent.

The Urban Implementer identifies essential and key pollutant controls during registration on the basis of the magnitude of load reduction expected from individual pollutant controls (See Section 5: Water Quality Importance for a description of essential, key and supporting pollutant controls).

Pollutant controls identified as essential are considered first. If any essential pollutant control is non-performing the credit award for the catchment is 0. This reflects the importance of maintaining essential pollutant controls at near-to or better-than expected conditions. When all essential pollutant controls are performing, the percent of key pollutant controls performing is used to determine the credit award. Equation 14.2 defines the percent key pollutant controls performing. Table 14.1 defines the percent of the credit potential amount awarded using the percent key pollutant controls performing. CAP performs these calculations to determine the catchment credit generation percent for each registered urban catchment and road registration.

**EQUATION 14.2: Percent Key Pollutant Controls Performing Within a Catchment**

\[ \% \text{ performing} = \frac{\# \text{of key pollutant controls performing}}{\text{Total} \# \text{of key pollutant controls}} \]
**TABLE 14.1**: Credit determination amount – based on the percent of key pollutant controls performing within a catchment, when all essential pollutant controls are performing.

<table>
<thead>
<tr>
<th>KEY POLLUTANT CONTROL PERFORMANCE (%)</th>
<th>100%</th>
<th>90% - 99%</th>
<th>75% - 89%</th>
<th>50% - 74%</th>
<th>&lt;50%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credit Award (%)</td>
<td>100%</td>
<td>75%</td>
<td>50%</td>
<td>25%</td>
<td>0%</td>
</tr>
</tbody>
</table>

The conditions of supporting pollutant controls and conveyance infrastructure are not directly used in the credit award method; however, the importance of proper conveyance is recognized by the need to observe and document conveyance conditions for all treatment BMPs using BMP RAM.

**CAP Relationships**

This section is relevant to:

- Inspect Home
- Declare, Step 1: Declare Credits
15. CREDIT AWARD

TMDL Program Managers check the assumptions, calculations and rationale associated with each credit declaration to quality assure potential credit awards. TMDL Program Managers use the following guidance to determine whether to award an Urban Implementer the full amount of credits the Urban Implementer has declared. TMDL Implementers can expect that TMDL Program Managers will, at a minimum, check the items in this list, however, TMDL Program Managers may check additional items, at their discretion. This checklist is available to Urban Implementers in the hope that they will check these items before declaration. Check data entry in CAP. This guidance assumes a working familiarity with the Crediting Program and CAP but is not a guide to using CAP.

1. Some major scientific or policy adjustments may occur during the adaptive management cycle. Confirm details relevant to credit awards such as the credit equation coefficients, particle conversion factors and jurisdiction credit allocations are correct in the Define and Allocate portion of CAP. These changes are expected to be infrequent.

2. Ensure there is adequate justification for the percent of expected credits that are awarded within the information uploaded to CAP.
   - Confirm the Urban Implementer completed the necessary number of road and BMP inspections by confirming them against expectations in the Validate Section of CAP. If they have not, look for rationale provided in CAP and determine if discussion or action is needed.
   - If the credits an Urban Implementer declares differ from the credits calculated by CAP, confirm the rationale provided by the Urban Implementer.

3. Compare results of any validation inspections with Urban Implementer inspections and determine if any discussion or actions are needed.

4. Confirm that road-based load reductions were calculated before BMP-based load reductions and that the total load reduction for each BMP registered is a sum of these parts. This is done by checking which PLRM scenario was used as the reference for load reductions. The baseline scenario is the reference for the road calculation while the road scenario is the reference for BMP calculation.

CAP Relationships
This section is relevant to:
- Inspect Home Page
16. **ANNUAL STORMWATER REPORT – CREDIT DECLARATION & AWARD SECTION**

The following guidance describes the minimum content that each Urban Implementer should include in the Credit Declaration & Award Section of their Annual Stormwater Report.

**CONSISTENCY WITH TARGETS AND MILESTONES**

Summarize jurisdiction-wide consistency with the annual credit target and/or five year milestone for the reporting year. Table 16.1 provides an overview of a hypothetical jurisdiction’s consistency with targets and milestones. If progress was insufficient to meet targets or milestones, provide an explanation of causes or conditions for the shortfall.

Table 16.1: Jurisdiction-wide credits expected, declared and awarded

<table>
<thead>
<tr>
<th>Water Year</th>
<th>Annual Credit Target</th>
<th>2016 Five Year Milestone</th>
<th>Lake Clarity Credits Expected</th>
<th>Lake Clarity Credits Declared</th>
<th>Lake Clarity Credits Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sep 2015 - Oct 2016</td>
<td>180</td>
<td>180</td>
<td>200</td>
<td>198</td>
<td>198</td>
</tr>
</tbody>
</table>

**CREDIT DECLARATION AND AWARD TABLES AND DISCUSSION**

Include table(s) that describes lake clarity credits expected, declared and awarded for road registration and BMP registration. Provide an explanation for any discrepancy between 1) credits expected and credits declared and 2) credits declared and credits awarded. Tables 16.2 and 16.3 display the suggested format for describing credits associated with each road and BMP registration.

Table 16.2: Credits expected, declared and awarded due to road operations

<table>
<thead>
<tr>
<th>Road Registration Name</th>
<th>Primary Water Quality Improvement Actions</th>
<th>Declaration Date</th>
<th>Lake Clarity Credits Expected</th>
<th>Lake Clarity Credits Declared</th>
<th>Lake Clarity Credits Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Washoe 1</td>
<td>Road Operations &amp; Maintenance</td>
<td>August 2015</td>
<td>120</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td><strong>120</strong></td>
<td><strong>120</strong></td>
<td><strong>120</strong></td>
</tr>
</tbody>
</table>

Table 16.3: Credits expected, declared and awarded due to BMP implementation

<table>
<thead>
<tr>
<th>Catchment ID</th>
<th>Primary Water Quality Improvement Actions</th>
<th>Declaration Date</th>
<th>Lake Clarity Credits Expected</th>
<th>Lake Clarity Credits Declared</th>
<th>Lake Clarity Credits Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Schultz Phase 2 WQIP</td>
<td>August 2015</td>
<td>32</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>5</td>
<td>Rapto Neighborhood Phases 1 and 2 WQIPs</td>
<td>August 2015</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>7</td>
<td>Rapto Neighborhood Phases 3 &amp; 4 WQIPs</td>
<td>October 2015</td>
<td>18</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td><strong>60</strong></td>
<td><strong>58</strong></td>
<td><strong>58</strong></td>
</tr>
</tbody>
</table>
IMPLEMENTATION SUMMARY

Summarize implementation efforts related to maintaining conditions within registered roads and BMPs. Include a description of overall resources, and a discussion of successes and challenges.

BMPS

Describe activities related to implementing and maintaining treatment BMPs and parcel BMPs.

- Treatment BMPs - Summarize activities related to inspecting and maintaining treatment BMP conditions. Include an overview of inspection efforts, notable results, and how inspection results were used to direct treatment BMP maintenance actions and provide a summary of maintenance actions, including any notes related to specific treatment BMPs. Reference inspection results stored in the CAP and relate descriptions to individual urban catchments and associated credit schedules. Provide a summary of maintenance actions, including any notes related to specific treatment BMPs.

- Parcel BMPs - Summarize activities related to implementing the Urban Implementer’s private property BMP program. Include the results for private property BMP implementation from the past year and over time and provide a summary of private property BMP program implementation activities, including notes related to specific catchments. Relate descriptions to individual urban catchments and associate credit schedules.

Roads Operations

Describe activities related to maintaining and inspecting road conditions. Provide an overview of inspection and maintenance efforts, notable results, and how inspection results were used to direct roadway maintenance actions. Relate descriptions to individual road classes and segments, and to the road operations credit schedule.

ASSESSMENT AND PLANNING

Assess whether attainment of the upcoming credit target and/or milestone for the next reporting year is expected to be possible and describe any anticipated challenges. In general terms, describe actions planned to meet the next target or milestone. Include descriptions of any new pollutant control implementation work, including but not limited to capital improvements, new equipment procurement, programs and ordinance implementation, and any other efforts that are intended to reduce pollutant loading to Lake Tahoe.

New, Extended, Revised and Expiring Credit Schedules

Identify any catchment schedules established, extended or revised during this reporting year. Highlight any notable changes in overall implementation activities. Also, identify any credit schedules that expired during this year and what is being done to compensate for the resulting credit reduction.

Changes to Road Operations Plan

Describe any changes planned with respect to the Road Operations Plan and whether a new road operations plan is expected to be registered in the upcoming year.

CAP Relationships

This section is not relevant to any specific step in CAP but is a general reference to be used when needed.
17. **DISPUTE RESOLUTION**

The purpose of the [Issue Resolution Punchlist](#) (punchlist) is to clarify communication and increase efficiency when issues arise that cannot be resolved through informal communication. For example, in the event that a TMDL Program Manager and Urban Implementer are having difficulty resolving a specific registration issue, or if a TMDL Program Manager disputes the actual number of credits generated and declared, they should use the conflict resolution process described below. Note that the TMDL Management System Handbook provides a structure for addressing broader programmatic issues related to use and effectiveness of Crediting Program tools.

**CONFLICT RESOLUTION PROCESS**

This conflict resolution process is modeled after the Storm Water Quality Improvement Committee’s “Collaborative Storm Water Quality Project Delivery for the Lake Tahoe Basin” process with the following modifications:

- Use CAP to review an Urban Implementer’s proposed registration and declared credits
- Use the punchlist, and an associated memo if needed, to specify issues and document satisfactory resolution

Either the TMDL Program Manager or the Urban Implementer can initiate use of the punchlist. Punchlist Section A includes information identifying the registration being reviewed. Section B of the punchlist defines each unique question or issue to be addressed and resolved. Additional issues may be identified and added by either the TMDL Program Manager or Urban Implementer. Once all items are resolved and both the appropriate TMDL Program Manager and Urban Implementer have signed the punchlist, it is kept on file with both parties.

Guidance below pertains to using the [Issue Resolution Punchlist](#), available on the TMDL Online Interface.

**SECTION A: GENERAL INFORMATION**

1. **Relevant ID or Annual Stormwater Report**: Identify the specific item being reviewed.
2. **Brief Description of Situation**: Concisely identify the context for the situation. Identify whether the issue relates to a (1) new catchment or road registration, (2) a revision to an existing catchment or road registration, or (3) credit declaration. Provide a brief statement describing the general situation surrounding the issues and questions identified.
3. **Urban Implementer Contact Information**: Identify the responsible Urban Implementer, primary contact, and contact information.
4. **Agency Contact Information**: Identify the responsible regulatory agency, primary contact, and contact information.
5. **Initiation Date**: Record the date of the initial transmittal of the document in question.
6. **Statement of Resolution**: Once all issues have been resolved, provide signatures under the statement indicating that there are no remaining issues that must be addressed before proceeding.
SECTION B: ISSUE IDENTIFICATION & RESOLUTION

1. **Issue Number, Title and Type:** Provide a sequential issue number for each issue and a representative title for ease of reference. Indicate whether the issue is a(n) (1) question, (2) item to discuss, or (3) change request related to a specific field or statement.

2. **Issue Initially Identified By:** Indicate who initially identified the question.

3. **Question or Issue Description:** Clearly describe the question or issue. When referring to a document, identify the page number and paragraph. When referring to a calculation, identify the specific parameters or methods. Use the space provided or develop a memo to more completely describe the issue. If using a memo, reference the memo in the description and attach as a separate file or page.

4. **Question or Issue Resolution:** Give a brief description of the answer or resolution. Use the space provided or develop a memo to more completely describe the issue. If using a memo, reference the memo in the description and attach as a separate file or page.

5. **Resolution Sign-off:** Once the question has been addressed or the issue resolved to the degree necessary to proceed, the TMDL Program Manager and Urban Implementer each initial and date the punchlist. This indicates that the item does not need any further attention.

6. **Additional Issues:** Same descriptions as items B1 through B5.

CAP Relationships
This section is not relevant to any specific step in CAP but is a general reference to be used when needed.
The Lahontan Water Board and NDEP manage the Crediting Program according to a consistent set of adaptive management procedures codified in the *TMDL Program Management System Handbook* (available on the [TMDL Online Interface](#)). The TMDL Management System is executed on an annual cycle and is coordinated through a series of five elements, each corresponding to a chapter in Part II of the Management System Handbook. These elements are:

- Element A: Tracking & Reporting Performance
- Element B: Synthesizing Findings
- Element C: Recommending Adjustments
- Element D: Adopting & Implementing Adjustments
- Element E: Engaging Stakeholders

The TMDL Management System is designed to be transparent and inclusive. It provides opportunities for the Lahontan Water Board and NDEP to solicit and incorporate feedback from Urban Implementers, the Science Community and other engaged stakeholders. This feedback informs decisions about the need for TMDL Program adjustments, including potential changes to Crediting Program policies, protocols or tools.

TMDL Management System annual procedures are aligned with the Crediting Program. In accordance with California NPDES permits and Nevada ILA specifications, Urban Implementers submit their Annual Stormwater Reports to respective TMDL Program Managers by March 15 each year. This deadline initiates the TMDL Management System reporting and tracking process (Element A).

**CAP Relationships**
This section is not relevant to any specific step in CAP but is a general reference to be used when needed.
19. ALTERNATIVE METHODS AND OTHER POLLUTANT CONTROLS

Four stormwater tools are approved for use in the Crediting Program: a hydrologic and pollutant load generation modeling tool, the Pollutant Load Reduction Model (PLRM); two field observation and data management assessment tools, Best Management Practice Maintenance Rapid Assessment Methodology (BMP RAM) and the Road Rapid Assessment Methodology (Road RAM); and the TRPA’s Parcel Map Tool. The Crediting Program uses these tools to increase the efficiency of reviews and the consistency and comparability of results. However, Urban Implementers may propose alternative methods that could be considered the TMDL Management System program improvements process (See the Lake Tahoe TMDL Management System Handbook available on the TMDL Online Interface). Additional detail regarding the use and approval of alternative load estimation methods and pollutant control inspection methods is below.

ALTERNATIVE LOAD ESTIMATION METHODS

Load estimation methods refer to the load calculation approach, the associated data inputs, and assumptions. A consistent load estimation approach must be used for both the baseline and expected loading estimates. An alternative load estimation method may be approved when it meets the following minimum requirements:

1. Produce estimated average annual pollutant loads and load reductions for pollutants of concern.
2. Incorporate long-term hydrologic characteristics and a range of hydrologic conditions (rather than a single storm) using a long-term continuous model simulation that represents a sequence of hydrologic events and intervening dry periods.
3. Produce results based on the integration of stormwater actions in the drainage catchment and their relationships to each other, and not a simple sum of load reductions from each action. The types of actions and processes that should be represented include: hydrology and hydrologic source controls; pollutant generation and pollutant source controls; and stormwater treatment.
4. Be supported by documentation clearly stating the calculation methods, assumptions, and limitations.
5. Represent actions and drainage catchments at a scale and level of complexity that is deemed appropriate by TMDL Program Managers.
6. Be endorsed by a professional civil engineer or other qualified professional stating that load reduction calculations have been performed using professionally accepted methods, are specifically applicable to the Lake Tahoe stormwater setting, and appropriately represent expected average annual load reductions.

ALTERNATIVE INSPECTION METHODS

The Crediting Program encourages Urban Implementers to use BMP RAM and Road RAM to inventory and inspect relevant pollutant controls and expected conditions. Should an Urban Implementer consider using a different pollutant control inspection method, the Urban Implementer should first submit a proposal to the appropriate regulatory agency (Lahontan Water Board or NDEP). The initial submittal for alternative condition assessment methods need not contain all technical information of the proposed alternative methods, but must establish a schedule for fully developing and submitting details for approval. Additionally, the following requirements pertain:

- If the method is to be used in place of BMP RAM, the submittal must describe how 1) the Urban Implementer will demonstrate that the proposed equivalent method will effectively evaluate treatment facility condition based on treatment process (infiltration, particle settling,
media filtration, or nutrient cycling), 2) is capable of evaluating the condition of the BMP on a 0-5 scale, with 5 representing the highest functioning condition, and 3) produces repeatable results that are consistent with BMP RAM.

- If the method is to be used in place of Road RAM, the submittal must demonstrate that any proposed equivalent method 1) will effectively evaluate roadway condition based on field observations of sediment accumulation, 2) can demonstrably extrapolate results to other roadway areas, 3) is capable of evaluating the condition of representative roadway segments on a 0-5 scale, with 5 representing the cleanest condition, and 4) produces repeatable results consistent with the Road RAM. Alternative road assessment field protocols shall be validated by a minimum of 50 samples that are reasonably distributed across 5 categories of road condition scores (0-1, 1-2, 2-3, 3-4, and 4-5). At least 90% of the samples (45 out of 50) using the alternative protocols must be within 0.5 of a Road RAM score generated by the current protocols. If this threshold is not met through the validation process, then the work plan, proposed alternative field protocols, and criteria for demonstrating equivalency shall be reviewed and potentially revised in coordination with Lahontan and NDEP.

**OTHER POLLUTANT CONTROL STRATEGIES**

Currently, the implementation of pollutant control strategies other than treatment or parcel BMPs or road operations are not considered for credit. However, pollutant control strategies such as municipal programs, ordinances or educational campaigns; slope stabilization; or other actions may result in tangible load reductions and credit for such actions may be considered through the TMDL Management System provided the pollutant controls are: 1) expected to result in real load reductions to Lake Tahoe, 2) supported by a reasonable load reduction estimate, and 3) effectively implemented, maintained, and inspected over time. Urban implementers seeking credit for other pollutant control strategies should develop and submit a proposal to the appropriate TMDL Management Agency clearly describing the load reduction estimation and condition assessment methods. Each year, the Urban Implementer would be required to perform observations and calculate the actual condition score for each other pollutant control strategies. The information will be entered into the inspection section of CAP once it is updated to accept these results.

**CAP Relationships**

This section is not relevant to any specific step in CAP but is a general reference to be used when needed.