

STORMWATER TOOLS IMPROVEMENT PROJECT ACCOMPLISHMENTS MEMO

13 November 2015

BACKGROUND AND PURPOSE

The following memorandum documents and summarizes the accomplishments of the Lake Clarity Crediting Program Stormwater Tools Improvement Project (Project). This memo highlights key project accomplishments, stormwater tool improvements, and associated Project deliverables. Appendix A contains the Project's final Prioritized Action Plan, which lists: 1) improvements completed through the Project; and 2) potential tool improvements that were identified during the Project but were not ranked high enough to be addressed within the limitations of available Project resources. The Project deliverables were developed to be compatible with the Crediting Program Handbook Version 2, which was a separate effort that streamlined and improved the processes and protocols of the Lake Clarity Crediting Program.

SUMMARY OF ACCOMPLISHMENTS

Stakeholder Input and Prioritized Action Plan

NHC organized and conducted a workshop in June 2013 to solicit feedback from the Lake Tahoe stormwater community to identify priorities for stormwater tool improvements. Using the comments received from the workshop, NHC developed an initial ranking of potential improvements among the stormwater tools. Next, NHC conducted meetings with urban jurisdictions and Stormwater Quality Improvement Committee (SWQIC) to explore individual perspectives and priorities for stormwater tool improvements. A ranking system was developed for jurisdictions and regulators to vote on priorities. The final ranking of improvements was negotiated between representatives from the urban jurisdictions and the regulators.

Appendix A includes the final rankings, which comprise the Prioritized Action Plan for the Project. Tiers of improvements are defined as follows:

1. **Tier 1** – essential advancements completed within the Project
2. **Tier 2** – highly desirable improvements (tasks likely completed depending on resources available after completion of Tier 1 improvements)
3. **Tier 3** – important refinements to be completed as part of a future effort

Project Advisory Committee (PAC) Coordination

NHC organized a Project Advisory Committee (PAC) that met monthly during the course of the Project to review and provide input on policy and technical implications of proposed stormwater tool

improvements. NHC conducted the PAC meetings and drafted meeting notes. The PAC included representatives from Nevada Division of Environmental Protection (NDEP), Lahontan Regional Water Quality Control Board (Water Board), Nevada Department of Transportation (NDOT - state highway representative), El Dorado County and the City of South Lake Tahoe (local urban jurisdiction representatives), Nevada Tahoe Conservation District (NTCD), and Tahoe Resource Conservation District (TRCD).

Technical Improvements

Appendix A lists the details of the technical improvements completed. The following summarizes the key actions completed for each stormwater tool.

Pollutant Load Reduction Model (PLRM)

The project updated the Pollutant Load Reduction Model (PLRM) to version 2. Key model improvements focused on streamlining the use of the tool:

- Improved File Management System – PLRM project files can now be more readily shared and transferred between users.
- GIS Processing Tool – model inputs can now be generated for multiple drainage catchments using a non-proprietary GIS processing tool.
- Updated Lake Tahoe TMDL Land Use Layer. The 2004 Lake Tahoe TMDL land use layer was updated as part of the project to include the newer and more accurate impervious area delineation associated with 2011 LiDAR data acquisition led by TRPA. This new layer runs with the new GIS Processing Tool.
- Direct Entry of Road Condition Scores – PLRM road methodology algorithms were rebuilt to allow users to directly enter road condition scores.
- More Intuitive User Forms – inputs forms for PLRM, in particular the Drainage Conditions Editor, were rebuilt to be easier to use and more intuitive for users.
- Increased Model Stability – the program code was refined, which markedly reduced program crashes or unexpected errors.
- Updated Program Output – PLRM output reports were refined to provide two levels of information: 1) simple output focusing on load reductions for the primary pollutants of concern; and 2) detailed output including load estimates by urban land use.
- Increased Compatibility with the Credit Accounting Platform (CAP) – PLRM now generates files during a simulation that can be directly imported into the CAP to provide key PLRM inputs.

Road RAM

The project updated the Road Rapid Assessment Methodology (RAM) to version 2. Key improvements to the tool included:

- Manual Entry of Road RAM Scores – Users may now specify their own Road RAM score (0-5 range) directly into the tool and skip the standard protocol entry procedures.
- Improved User Experience and Tool Layout - the tool layout and data entry forms were updated to be more similar to BMP RAM, tablet compatible, and to improve the user’s understanding of work flow.
- Jurisdictional Road Registration – the tool was refined and revised to allow jurisdictional registration of road operations, which is an associated CAP improvement.
- Increased Compatibility with the CAP – User login information was better integrated so urban jurisdiction information is directly shared between Road RAM and CAP using a single group code.

BMP RAM

The project updated the BMP Rapid Assessment Methodology (RAM) to version 2. Key improvements to the tool included:

- Refined Step-Wise Guidance and Procedures – the workflow of the tool was improved and made more intuitive.
- Simplified Vegetation Classification Protocol – the procedure for defining vegetation with stormwater treatment basins was simplified.
- Expanded BMP RAM ID – the number of characters for BMP RAM IDs was increased.
- Increased Tool Stability - the program code was refined to reduce unexpected errors.
- Increased Compatibility with the CAP – User login information was better integrated so urban jurisdiction information is directly shared between BMP RAM and CAP using a single group code.

Credit Accounting Platform (CAP)

The project developed the Credit Accounting Platform (CAP) version 1. Key improvements to the tool include:

- Jurisdictional Road Registration – the tool was rebuilt to allow jurisdictional registration of road operations.
- Increased Compatibility with other Tools – the coding within the tool was refined to directly import files from PLRM and to more readily integrate with the Road RAM and BMP RAM databases using a single jurisdictional group code.
- Inspection and Reporting Improvements – input forms for tracking the status of inspections and reporting registration status were streamlined and improved.
- Integration with Crediting Program Guidance – on-demand hyperlinks to updated Crediting Program Guidance were added into the CAP.

Updated User Manuals

Manuals for version 2 of the PLRM, Road RAM, and BMP RAM were completed. Additionally, a technical guidance document for developing CAP inputs was produced.

Availability of Stormwater Tools and Manuals

The tools and manuals are available on the [Lake Tahoe TMDL Online Interface](#).

Appendix A – Prioritized Action Plan Accomplishments

Tier	Tool	Task Description	Average Ranking of Imps/Regs	Negotiated Ranking	Status at Close Out	Notes
1	Road RAM	Allow user to manually enter Road RAM scores	3.00		Complete	
1	PLRM	Rebuild PLRM algorithms to better align with output of road condition assessments	2.96		Complete	
1	PLRM	Create GIS pre-processing and import tool (GIS to XML)	2.18	Tier 1	Complete	
1	CAP	Increase functionality and integration with other tools	2.93		Complete	
1	PLRM	Standardize GIS data	2.54		Complete	Provided beta versions for baseline. Original scope proved too complex for expected condition as multiple jurisdictions had made multiple and incompatible adjustments to shapefiles to meet their needs.
1	BMP RAM	Refine step-wise guidance and procedures	2.54		Complete	
1	PLRM	Provide consistent methods and guidance for modeling transportation corridors	2.50		Addressed	Satisfied through updated land use layer and PLRM GIS processing tools. Will be much easier to develop and model multiple catchments for road corridors.
1	BMP RAM	Rework vegetation classification procedure	2.14	Tier 1	Complete	
1	BMP RAM	Increase number of characters in BMP RAM ID	1.57	Tier 1	Complete	

Tier	Tool	Task Description	Average Ranking of Imps/Regs	Negotiated Ranking	Status at Close Out	Notes
1	BMP RAM	Improve relationship between PLRM and BMP RAM user inputs	2.50		Addressed	Smaller distributed treatment BMPs in BMP RAM (infiltration features, pervious pavement, etc.) aren't modelled as individual stormwater treatment facilities in PLRM. So not all treatment BMPs can have direct links between the two tools.
1	Road RAM	Simplify upload procedures	2.50		Complete	
1	Road RAM	Improve or automate workflow paths for creating inputs	2.50		Complete	
1	BMP RAM	Continue beta testing and improve usability	2.46		Complete	
1	PLRM	Increase model stability	2.39		Complete	
2	Road RAM	Allow registration of road operations by jurisdiction	2.64	Tier 2	Complete	
2	PLRM	Improve file management structure	2.29		Complete	
2	PLRM	Link FSP loading rates to estimates of maintenance intervals	2.21			
2	PLRM	Create output identifying primary elements providing load reduction	2.18			
2	PLRM	Display pollutant generation output by urban land use within each catchment	1.64	Tier 2	Complete	
2	CAP	Add option to enter load reduction associated with "Other Pollutant Control" strategies directly in the CAP		Tier2		PAC requested this improvement after the Prioritized Action Plan was completed.

Tier	Tool	Task Description	Average Ranking of Imps/Regs	Negotiated Ranking	Status at Close Out	Notes
3	PLRM	Improve ICIA representation	2.14			
3	PLRM	Ensure all BMPs in BMP RAM can be modeled in PLRM	2.11			
3	PLRM	Improve road shoulder infiltration algorithms and guidance	2.00			
3	PLRM	Improve approach for defining impervious connectivity and drainage conditions	1.93		Complete	PLRM development process evolved and it became cost-effective and efficient to complete this improvement with other PLRM Tier 1 improvements.
3	Road RAM	Modify current tool layout	1.93		Addressed	BMP RAM refinements were made to most forms, this code was then available to be brought into Road RAM. So this improvement became cost-effective and efficient to complete with other Road RAM Tier 1 improvements.
3	TIST	Create a single user manual	1.93			
3	PLRM	Update CECs and treatment algorithms	1.86			
3	TIST	Add hints and suggestions for common errors and procedures	1.71			
3	Road RAM	Complete initial setup steps for each jurisdiction	2.39	Tier 3		
3	PLRM	Add cut slope erosion algorithms	1.68			
3	Road RAM	Improve user setup functions	2.21	Tier 3		
3	BMP RAM	Measured draw-down rates replacing CHP measurements	1.64		Addressed	Added option for a user-defined infiltration rate in BMP RAM. Satisfies objective of this improvement.

Tier	Tool	Task Description	Average Ranking of Imps/Regs	Negotiated Ranking	Status at Close Out	Notes
3	PLRM	Develop catchment connectivity algorithms	1.54			
3	PLRM	Rebuild flexible volume-discharge relationships for SWTs	1.54			
3	Road RAM	Align Road RAM manual and online Road RAM tool	1.54		Addressed	Hyperlinks to relevant User Manual sections included
3	PLRM	Improve model structure to assist with calibration to measured data	1.46			
3	PLRM	Add unpaved road algorithms	1.14			