Urban Stormwater Workgroup Meeting

OCTOBER 17, 2023

The Run-down

1. Protocol 3 Revisions – Comments and Path Forward

2. Coagulant Enhanced Ponds – Revised Proposal Overview and Comment Period

Protocol 3 Revisions

COMMENTS AND RESPONSES

Background

- Protocol 3 Memo approved by WQGIT in October 2020
- Early last year, issue was identified by group members
- Series of 4 calls and many emails to discuss potential solution
- Draft memo produced with a proposed solution

Background (cont.)

Establish the volume of sediment delivered to the site.

- The fix would use CAST to establish the sediment load delivered to the project site, divided by the average bulk density of floodplain sediments from the CDFN sites, 55 lb/cf.

Establish the sediment storage capacity of the floodplain.

- The floodplain storage capacity is based on the mean vertical accretion rate from McMillan and Noe (2017) of 0.33 in/year. This depth is multiplied by the restored floodplain acreage to determine the storage capacity.

Determine the pollutant removal credit using the floodplain storage efficiency.

- The volume of sediment storage capacity divided by the volume of sediment volume delivered to the site. Floodplain soil nutrient concentration data is used to determine the TN and TP load reductions.

Comments Received

MDE – Provided a detailed comment memo on Sept. 19, 2023

Comments Provided on 3 General Topics:

- Sediment Accretion Rates
- Sediment Nutrient Concentrations
- General Comments

Call between CSN/USWG Leadership and MDE staff on 10/4

Proposed Path Forward

- Recognition that there is limited data available to support a robust, Bay-wide sediment accretion rate and soil nutrient concentration rate for floodplain-accumulated sediment.
- Use a more conservative accretion rate of 0.102 inches per year, with a statement that a revised rate can be submitted for review on a case by case basis that uses site-specific monitoring acceptable to the regulatory agency.
- Use the sediment nutrient concentrations provided by the expert panel report for planning purposes only, and require site-specific data for determining the final credit that will be submitted.

Comments Received

DOEE – Our only concern is that there is a cap on the treatment based on predicted CAST load for a site. Would the expert panel consider relaxing the cap on load in the event that a jurisdiction was able to show that in reality there was a higher load being delivered to the site? The requirement would have to be on the locality to provide the data if they would want the additional credit. We raise the issue because some watersheds are likely being capped improperly because the modeled load is not accurate (lower than reality) based on our experience in the District.

Proposed Solution:

- Shift to more conservative baseline rate
- More emphasis on site-specific monitoring, which will be reviewed on a case-by-case basis with the jurisdiction.

What would change

Memo would be revised to reflect the USWG decision regarding:

- Statement on USWG decision to use more conservative accretion rate, including justification regarding lack of sediment accretion data
- Added clause on case by case evaluation of site-specific monitoring data to increase sediment accretion rates, as determined to be acceptable to the regulatory agency.
- Revise section on soil nutrient concentration to include table summarizing supporting data, and statement mirroring Protocol 1 on requiring site-specific data
- Updated example calculations to reflect more conservative rates.

Next Steps

USWG to review MDE memo and consider proposed alternative.

Updated version of memo will be provided to USWG by November 3rd

Formal decision requested at November 21st meeting

If approved, CSN will revise existing Stream Restoration Memos and Unified Guide to Reflect Final Protocol 3 revisions and ensure re-posting on CSN and CBPO Websites

Coagulant-Enhanced Stormwater Ponds

Coagulant Proposal Background

- April 2023 presentation from Hampton, VA on use of Coagulants to enhance pond performance
- Seeking increased removal rates for total phosphorus (TP), total nitrogen (TN), and total suspended solids (TSS), via an adjustment to the existing method for stormwater retrofits
- Draft white paper developed
- USWG Voted to Proceed with BMP Interpretation of a Retrofit

The BMP Interpretation Policy - Process

- CSN convened a team to review the white paper that was developed by the proposers
  - The goal was to catch any issues, request any additional information or clarifications, and make sure the recommendations reflect best available science.
  - Convened over two calls to answer questions and provide comments on the draft white paper

Table A-1. Review Team	
Name	Affiliation (role)
Kate Harris	City of Boise, ID
Mark Heidecker	City of Tallahassee, FL
David Vlasin	Ramsey Washington Metro Watershed District, MN
Eric Korte	Ramsey Washington Metro Watershed District, MN
Andy Erickson	University of Minnesota
KC Filippino	Hampton Roads Planning District Commission (USWG Representative)
Norm Goulet	Northern Virginia Regional Commission (USWG Chair)
David Wood	Chesapeake Stormwater Network (USWG Coordinator)

Proposal Overview

Definition:

Coagulant Enhanced Treatment (CET) includes adding a common flocculent to stormwater/surface water which forms precipitates which trap total phosphorus (TP), total nitrogen (TN), bacteria, total suspended solids (TSS), metals, and other pollutants. CET can be added to an existing wet pond or can be constructed as a new BMP.

- Wet pond permanent pool volume is sized to allow sufficient detention time for the precipitates to settle to the bottom of the pond (prior to pond discharge) at the peak design water flow rate
- Designed to handle water-quality sized storm events (1-2”)
- Detention time and coagulant concentrations based on jar testing

Key Qualifying Criteria

- Minimum settling pond pool volume residence time for floc settling shall be based on jar testing times plus a safety factor of two - 3 hours minimum.
- Additional settling pond PPV shall be provided for consolidated floc storage
- Aluminum coagulants shall be used and must be produced by a reputable company with minimal impurities and be NSF/ANSI/CAN 60 certified for use in potable water treatment.
- Laboratory Jar testing is required to establish aluminum coagulant dosing, time for floc settling, raw and treated water lab results for contaminants of concern
- Automated operation of the system to maintain design coagulant dosing over full range of flows

Key Qualifying Criteria (cont)

- Automated shutoff of coagulant feed when flow exceeds peak design flow rate
- Mandatory safeguards (alarms and automated shutoffs) based on factors including coagulant metering, discharge, pH, and pump health
- Special procedures or shut down for cold weather operations
- Consolidated floc removal prior to reaching the design floc volume. Must have dewatering plan for trucking, reuse or disposal.

Pollutant Removal Credit

Table 6. Summary of CET Average Annual Pollutant Removal Based on Rain Event Depth Treated			
Design Rain Event Depth (inches)	TP Removal (%)	TN Removal (%)	TSS Removal (%)
1.0	75	40	79
1.25	79	42	84
1.5	81	43	86
2.0	83	44	88
2.5	85	45	90

Represents approx. 20% increase in TP, 5% increase in TN, and 10% increase in TSS over standard stormwater pond

Maintenance and Verification

Weekly operation and maintenance are essential to maintain the performance of CET retrofits over time. Specific maintenance tasks for CET retrofits depend on the design, project components, and operations.

Regular monitoring, parts replacement, and periodic floc removal are required to ensure proper function of the systems

Potential for Unintended Consequences

- Systems that use acidic or alkaline coagulants that can affect water pH. System monitoring and automated safeguards are part of the qualifying criteria to mitigate the potential for downstream impacts.
- The CET system should be evaluated to determine if a particular chemical could have an unintended consequence in downstream waters. For example, the Boise River (Dixie Drain) system has seen inordinately high rates of mercury methylation in the reservoirs. Additional research has indicated that sulfur could be contributing to that high rate. Alum contains sulfate.
- Floc testing per state requirements (similar to stormwater sediments) along with coordination with the receivers/end users is recommended to confirm there are no obstacles to the desired floc disposal approach. None have been observed to date.

Review and Decision

USWG provide review and comments by November 7th.

Pending scope of comments received, decision will be requested on November 21st.