## MEMORANDUM FOR THE RECORD

**SUBJECT:** Lower Susquehanna River Watershed Assessment

Quarterly Meeting, January 16, 2014

1. On January 16, 2014 agency team members met to discuss ongoing and completed activities for the Lower Susquehanna River Watershed Assessment (LSRWA). The meeting was hosted by the Maryland Department of the Environment (MDE) in their Terra Conference Room at the Montgomery Park Building in Baltimore, Maryland. The meeting started at 10:00 am and continued through 1:00 pm. The meeting attendees are listed in the table below.

The meeting agenda is provided as enclosure 1 to this memorandum.

Action Items from August 15, 2013 Quarterly Meeting –

1. Chris Spaur will provide information summarizing the 2010/2011 LSRWA nutrient scoping to anyone that is interested, as well as copies of Jordan and others (2008) and a link to MGS report. This info also could be placed on the LSRWA website. Chris will also prepare a write-up on phosphorus biogeochemistry in the Bay for the LSRWA report. *Status: Completed.*
2. Claire O’Neill will provide to the group all of the factsheets/ back-up documentation to show how costs were developed for each representative sediment management alternative. *Status: Completed.*
3. Matt Rowe will look into Stancills quarry and their existing permits to see if they have any constraints or concerns with groundwater contamination. This may need to be marked as a limitation for this potential placement site. *Completed.*
4. Bruce Michael will be providing a write-up that lays out this watershed sediment management scenario in more detail in September. *Completed.*
5. Mike Langland will provide data to the group related to grain size and nutrients based on his analysis of the sediment core data. *Completed.*
6. Steve Scott will alter his graphs to depict areas of concern in red. *Completed.*
7. Carl Cerco will look into the suspended sediment and nutrient loads that Michael Helfrich has provided to determine if the loads need to be revised for his CBEMP modeling runs*. Completed.*
8. Anna Compton will work with the modelers to develop a summary table compiling all sediment management modeling scenarios and results. *Status: Mostly complete only updates required are Linker/stoplight numbers.*
9. Anna Compton will draft up notes for the group’s review and then post to the project website. *Status Complete.*
10. Claire O’Neill will set up a doodle poll to determine the date for next quarterly meeting which will be sometime in November. *Status: Completed. Quarterly meeting scheduled for 16 January 2014.*

3. Introductions - After a brief introduction of the meeting attendees, Claire O’Neill welcomed the LSRWA agency group and noted that the purpose of the meeting was to provide updates on recent activities within the LSRWA. She noted that this is the last planned Quarterly meeting since the study is wrapping up.

4. Funding Update – Claire O’Neill noted that this study is not in the FY14 federal budget that was just passed. However there is potential for some federal funding to be reprogrammed to the study but that won’t be known for one to two more months. There is available federal funding to get through March. If the study does not receive any federal funds there is also non-federal funding available. There should not be any funding problems to complete the assessment unless there are major scope changes.

5. Update on Conowingo Relicensing – Bruce Michael informed the group that FERC has granted one more extension for filing comments to Exelon’s application for a license of Conowingo dam. Comments are now due on January 31, 2014. Bruce noted sediment still remains as the state’s number one concern. Exelon has until January 31, 2014 to submit a 401 water quality certification (WQC) request to MDE. MDE has up to one year to issue/evaluate the 401 WQC request which will include a public notice. FERC is expected to complete an EIS and this process is anticipated to take 10-12 months. The EIS process includes public review. Agencies have requested that FERC include Muddy Run pump facility and York Haven in the EIS to evaluate impacts of these three facilities as a system instead of on an individual basis. The anticipated timeline is that a FERC license for Conowingo will be issued in early 2015.

6. Stoplight Plot/TMDL Analysis – Lewis Linker provided a presentation on his dissolved oxygen (DO) Water Quality Standard Attainment Analysis of the estimated influence of Conowingo infill on Chesapeake DO using linked watershed model, ADH and water quality and sediment transport model simulations. His presentation is included as Enclosure 2 to this memorandum.

Lew noted that this was a time and space assessment to determine what impacts Conowingo has on attainment of TMDL’s. He noted that episodic (storm scouring) exceedances are allowed and accounted for in achievement of TMDL’s. Attainment is evaluated on a Bay segment by segment curve basis (curve includes variances and decision rules to determine whether a segment is in attainment or not and there are allowable exceedances in space and/or time for nonattainment). In general, decision makers aren't interested in particular time and space attainment they want to know if a segment is in attainment or not. Some segments have different habitat types such as deep water, deep channel, open water, and shallow water. Each of these habitat types have different water quality needs and are key for protection of living resources.

Lew noted that nonattainment of 1% is above allowable criteria and the overall analysis procedure includes 1% uncertainty. Lew discussed the results of the 9 scenarios he and his team ran including sediment management scenarios and scenarios showing no action.

There was a lot of discussion on Lew’s work and that some of the concepts and language were difficult to grasp. There was a comment that Lew should present his numbers with at least one significant figure to show variance in results. Also there was a lot of discussion on the hydrologic periods that Lew used to evaluate findings and that he should be sure to explain in his report differences in time periods he used and why. Additionally, it was recommended that the existing condition scenario (LSRWA-4) should show results of all segments that have nonattainment. One last recommendation was to be sure include attainment numbers in report of a scouring event in summer and fall. Right now we know a storm event has more detrimental effects in summer than fall than winter but Lew only provides attainment numbers for a winter event which is the best case scenario and provides the least impact to meeting water quality criteria.

Lew’s work concludes that if the WIPs are in effect and there is a storm event in the winter with all dams at a dynamic equilibrium (“full”) there are three upper bay segments that will still be in non-attainment.

There was a question about how long nonattainment would last. Lew noted that this depends on things like future rain events, etc., but ultimately effects diminish over time so typically it would last 1-2 years.

Lew noted that sediment management strategies like dredging shows some attainment improvement but strategies like bypassing hurt attainment because of nutrient recycling.

Lew noted that outside of LSRWA effort the Chesapeake Bay Program is looking at scouring events of smaller magnitude (down to 150,000 cfs) as predicted by Hirsch (2012) analysis. LSRWA work focused on scouring events larger 400,000 cfs.

7. Report Discussion – Anna Compton provided a presentation on LSRWA recent and upcoming tasks which is included as Enclosure 3 to this memorandum.

Anna noted that the draft report is under development. Since August the team has wrapped up modeling scenarios and all four modeling reports have been drafted and reviewed by the LSRWA team. The team plans to release a consolidated draft report for the quarterly agency group to review, targeting the end of February. Anna emphasized that this draft report is preliminary and subject to change. The report needs to go through required technical, policy and legal review before official public release but the LSRWA team wanted to get a version out to the quarterly agency group for early feedback on preliminary findings. This draft version of the report will not be put on the LSRWA public website but instead will be put on an FTP site. Access instructions will be out via email to the quarterly group once the draft report is ready for distribution to the group. There will be a main report summarizing all the technical work with multiple appendices providing more details on technical work.

Anna discussed some of the big picture preliminary findings that have come out of the LSRWA efforts thus far. Regarding the current and future state of the reservoirs modeling results have shown that all reservoirs including Conowingo have limited trapping capacity that is greatly reduced from historical trapping and are at a “dynamic equilibrium” state in which the net change in sedimentation (deposition during low flows and scour during floods) will remain relatively constant in the future.

Regarding effects to Chesapeake Bay from the current state of the reservoirs it appears that WIP implementation has a larger influence on the Bay meeting water quality standards in comparison to the influence of the trapping capacity and dynamics of the reservoirs and during storm events the majority of sediments entering the Bay originate from the watershed. However the trapping capacity and dynamics of the reservoirs do influence water quality and it is estimated that with full implementation of WIPs, three regions of the Bay (segments) will NOT be in water quality attainment (i.e., meet standards) for dissolved oxygen due to increased nutrients when the most current state of the reservoir system is taken into account and there is a scour event. Finally the solids from a scour event appear to settle quickly but DO impacts from scour could persist for multiple seasons with diminishing magnitude due to nutrient storage in the scoured bed sediments remaining and recycling between bed sediments and the water column. Nutrients appear to be the most detrimental factor from scour to water quality and need to be further monitored and analyzed.

In regards to solutions (i.e. nutrient and sediment management strategies) bypassing strategies appear to be lower in costs but have high environmental/water quality impacts and additional watershed measures for controllable sediment mitigation beyond the WIPs appear to be higher in cost and ultimately a low influence on reducing amount of sediment available for a storm event.

Increasing or recovering storage volume of reservoirs via dredging or other means appears the most feasible as there are upland sites available with large capacity to place sediments to reduce sediments available for scour during a storm. It appears that when sediment is strategically removed from the reservoirs there is an observed influence on scour load (reduction) and deposition (increase) and an observed reduction in impacts on water quality for a future similar storm event. However any removal would most likely be required annually to achieve influence on Bay water quality and this influence is minimized due to loads from the watershed during a scour event (i.e., must remove a lot and often to observe an influence).

The estimated cost range for suite of sediment management alternatives evaluated was $5-89/cubic yard; $15 - $267 million annually. This is for removal of 3 million cubic yards (approximate estimate of what is entering system on an annual basis) and includes alternatives like bypassing which as stated earlier are low cost but would most likely not be acceptable due to estimated water quality impacts.

In regards to the modeling tools Anna noted that any mathematical models applied to simulate complex physical processes, will have uncertainties. The team believes that the tools used for this effort represent the best tools currently available for evaluating sediment and nutrient dynamics and management strategies in the lower Susquehanna River watershed and Bay as a system and informing management decisions. The Bay watershed model and the Bay water quality model are the same peer-reviewed models as were used to set the Bay-wide TMDL requirements. Additionally all model documentation will be going through many iterations of review. One final thought about modeling is that major scour events are infrequent and each has unique characteristics. Application of these models to multiple events is desirable and would reduce uncertainty. However, the availability of complete data sets describing additional scour events is limited.

Lastly Anna went over the final section of the report which is intended to layout future needs of the watershed (i.e. recommendations.) This section of the report has not been developed yet. Recommendations could entail additional monitoring, enhanced assessment on nutrient contribution and Bay impacts, or actual implementation recommendations. Developing recommendations and a path forward will be challenging since potential solutions are high cost and long-term, sediments and nutrients originate throughout the watershed and entities that have the resources, abilities, purview to implement will need to be assessed.

8. Wrap Up – Claire O’Neill noted that this is the last LSRWA quarterly agency meeting since study efforts are wrapping up. There will be a public meeting once the draft report is ready for public review and this group would be notified of details of that meeting (once planned). She also noted that she is retired and Kim Gross would be taking over as USACE project manager for the remainder of the effort. Lastly, Anna will draft up notes for the group’s review. Following this, the notes and presentations will be posted to the project website.

Anna Compton,

Study Manager/Biologist

Enclosures: 1. Meeting Agenda

 2. Stoplight analysis-Lewis Linker Presentation

9. LSRWA Update-Anna Compton Presentation