Abstracts and Speakers
2019 Wetland Restoration Section Annual Symposium
Closing the Permitting -Mitigation- Monitoring (PMM) Loop: A Focus on the Mid-Atlantic USA
Baltimore, MD

Stormwater to Stream Flow through Surface Storage and Hyporheic Flow

Joe Berg, Biohabitats

Bergen County, New Jersey is undertaking improvements to the Teaneck Creek Park. Historically, this area was a tidal freshwater marsh, but a tidal gate downstream of the site eliminated the site's tidal hydrology. Subsequent development and landfilling on the margins of the site has further degraded conditions. The surrounding development was designed and constructed to drain to the remaining undeveloped land. The purpose of the proposed project, is to improve wetland, riparian and stream habitat. The project includes re-grading the topography to intercept and create surface storage wetland features at multiple stormwater discharges to the Park from surrounding development. A regenerative stormwater conveyance (RSC) system will be constructed in the largest drainage locally known as the 'stormwater canyon'. Using the RSC approach, including elements of sand seepage wetland design, stormwater inputs will be held in wetland depressional features and soak into the ground and constructed seepage zones. Larger storms will flow overland, spreading across the site increasing contact area, reducing its velocity and increasing contact time, and be safely conveyed to Teaneck Creek. Stormwater becomes the hydrologic foundation for integrated stream and wetland systems that slow the flow of the stormwater, converting the high frequency storm events into hyporheic seepage flow capable of restoring and enhancing wetland and stream hydrology. This approach will reduce peak discharges, increase the time of concentration, and infiltrate stormwater pulses into a hyporheic lens that will slowly deliver seepage to the constructed streams and ultimately to Teaneck Creek. By improving the site hydrology, water quality will be improved, with an overall effect of improving riparian wetlands and establishing conditions for a diversity of native plant and wildlife species. This project will showcase the benefits of green infrastructure in managing stormwater inputs within a highly urbanized setting.

Mitigation Performance Standards- Taking Succession into Consideration A DOTs Perspective

Bill Buettner

The Maryland Department of Transportation- State Highway Administration has been performing mitigation for nearly 30 years. Performance standards for mitigation over that time have varied from qualitative to quantitative and since the 2008 Mitigation Rule have included standards for vegetation such as dominance, aerial cover, species richness, and density. In Maryland, performance standards for measuring the success of compensatory wetland mitigation have changed numerous times since the enactment of the 2008 Mitigation Rule. Standards for hydrology and soils have generally followed technical standards established by regulatory authorities or government agencies. On the other hand, standards for vegetation, beyond the required dominance of FAC or wetter to meet the regulatory wetland definition, are discretional and can be counter to natural succession and the role it plays in the long term outcome of the site. Standards that are counter to natural processes can lead to over management. We will explore how succession plays role in the wetland mitigation process and how succession should be considered when developing standards and evaluating the success of a site. Since obtainment of compliance with such performance standards is essential to site acceptance, several design and land management

considerations should be explored. Drawing from decades of observation and monitoring we will discuss how utilizing successional processes can create functional and resilient wetlands.

Non-traditional Mitigation Strategies – A Maryland Perspective

Emily Dolbin, Scott Lowe

Beyond the usual wetland and stream creation or restoration strategies, we'll discuss non-traditional forms to mitigation that have been implemented in Maryland, and look for feedback on how to focus more on function based mitigation strategies. From ghost crab pot removal, reef balls, stormwater management treatment, and preservation of natural systems, we'll discuss mitigation projects that highlight an overall gain in aquatic function. We'll discuss how to open the doors to more creative and holistic mitigation strategies, the potential of investigating ecosystem services, and look for feedback from other practitioners.

Wetland Restoration Fundamentals: A Global Perspective

Andy Herb

In 2021 the wetland community will celebrate the 50th anniversary of the Ramsar Convention on Wetlands. The Convention was a response to increasing concerns about global wetland losses and the participants agreed to "stem the loss and degradation of wetlands now and in the future." Among other things, they committed to the designation and management of Wetlands of International Importance, a.k.a "Ramsar Sites." The Convention now has 170 national government members that have designated over 2,000 of these sites, covering over 2 million km2. While this scale of interest in wetlands and the ecosystem services they provide is impressive, the designation and careful management of these sites is not the endpoint. Most Ramsar Sites and other wetlands around the globe have been degraded by various anthropogenic activities and would benefit from targeted wetland restoration efforts (and many have). But, are restoration projects restoring the original ecosystem services of these sites or are novel ecosystems being reinforced? Is reinforcing novel ecosystems a problem? In this presentation I will discuss some of the global trends in this regard and how they relate to wetland restoration in the mid-Atlantic, USA. I will briefly discuss the importance of: 1) accurate pre-restoration assessments, 2) setting clear restoration goals and expectations, and 3) understanding how resource needs and watershed management strategies affect restoration opportunities.

Integrating Science with Mitigation Policy in Maryland – A Regulator's Perspective

Kelly Neff, Maryland Department of the Environment

The Maryland Department of the Environment (MDE) is responsible for permitting unavoidable wetland impacts and overseeing the associated mitigation projects within Maryland. Although our hope is that when approved by MDE mitigation projects will replace lost functions, we find that some of these mitigation projects do not always fully replace all functions lost from the permitted impacts. MDE continuously works to improve mitigation project success through policy updates, including through updated design guidelines, monitoring protocol, and performance standards. However, MDE has few resources to dedicate to sponsoring scientific work; thus, it is important for MDE to stay abreast of the latest science being completed by practitioners and academia. This science is a critical element in MDE's ongoing effort to close the permitting-mitigation-monitoring loop and improve mitigation success.

MDOT SHA Hollyneck Compensatory Wetland Mitigation Site Monitoring – Lessons Learned

Greg O'Hare, Bill Buettner

The Maryland Department of Transportation State Highway Administration (MDOT SHA) Hollyneck Compensatory Wetland Mitigation Site (B-11) is a Palustrine Forested Wetland (PFO)/vernal pool/upland forest complex creation and preservation site located in Essex, Maryland. This site provides 20 acres of

compensatory mitigation for forested wetland impacts associated with the construction of the MD 43 from US 40 to MD 150 Extension Project. The primary goals of the mitigation project were replacement of wetland functions impacted within the MD 43 construction corridor including production export, wildlife habitat including vernal pools for amphibian breeding, runoff filtration, erosion reduction, floodwater storage, and groundwater discharge and recharge. MDOT SHA completed construction and limited planting of approximately 10 acres of forested wetland creation within abandoned agricultural fields at the Hollyneck site in 2005 and 2006, with the remaining mitigation requirement being met through preservation of existing PFO/vernal pool/upland forest complex on-site. The wetland creation portions of the site were monitored for five years (2007-2011) post-construction to ensure that wetland performance standards were met and functions and values were replaced in accordance with regulatory requirements.
This presentation will describe lessons learned regarding innovative design and construction approaches, permitting, and post-construction monitoring efforts including:

- Designing the site to sub-grade and assigning a designated specialist that was responsible for final wetland grading by the Contractor
- Designing and sustaining vernal pool creation including proper pool depth, adequate hydroperiod, and maintaining an open water type habitat
- Salvaging wetland topsoil from the MD 43 roadway construction alignment for use in the wetland creation cells
- Natural regeneration as the primary re-vegetation method, with limited post-construction planting
- Challenges associated with monitoring and final regulatory approval for the mosaic of wetland/upland habitat created on site

Navigating the Permitting Process to Implement a Mitigation Project in New Jersey

Mary Paist-Goldman, P.E., Princeton Hydro

Since the launch of the Clean Water Act in 1972, New Jersey has been at the forefront of environmental regulations. In addition to typical regulations for floodplains, coastal regions, and freshwater wetlands, many of the regulations in New Jersey serve to protect special resources like the New Jersey Pinelands, Meadowlands, and Highlands. When the regulations were initially developed, the focus was to regulate construction projects when New Jersey underwent rapid development and growth in the 1980s and 1990s. As a result, restoration projects were forced to comply with cumbersome regulations that they did not fit into. In the last several years, NJDEP has made a significant effort to reduce the confusion and better align the regulations for restoration projects through revisions to the Flood Hazard Area Control Act and the Freshwater Wetlands Rules.

During this presentation, several case studies will be explored as they relate to navigating restoration in a heavily regulated state like New Jersey. From large-scale restoration projects with many stakeholder groups and budgets to small-scale restoration in your own backyard. New restoration projects like the beneficial reuse of dredged material for salt marsh restoration, removal of berms for the restoration of wetlands, and floodplain reconnection and wetland creation in urban settings will all be explored.

As regulations and those enforcing them shift, new efforts to permit restoration activities are increasing. With the shift to allowing more fluid restoration monitoring requirements are being imposed as well. Monitoring for projects has included water quality, photo documentation, vegetative cover, velocity, and water depths in wetland cells among others.

Juxtaposition of Three Stream and Wetland Restoration Projects on a Single Restoration Site

Patrick Phillips, Vice President, GreenVest, LLC

GreenVest led the development of three stream and wetland restoration projects on the Spray Irrigation Field (SIF) Site located at the USDA Beltsville Agricultural Research Center (BARC) in Beltsville, Prince George's County, Maryland. The SIF site is a 25-acre field formerly used for the disposal of treated wastewater from the BARC facility wastewater treatment plant. The practice was discontinued in the 1980's and the SIF was unused until the implementation of the restoration projects in 2017.

Three (3) separate restoration projects consisting of wetland restoration and stream restoration were completed on the SIF. The projects were completed for the Maryland Department of the Environment and the Chesapeake Bay Trust (CBT-MDE) under the non-tidal wetland grant program, for Prince George's Department of Public Works and Transit (PG DPWT) as advanced mitigation, and for the State Highway Administration (SHA) as advanced mitigation. Each of the three projects are physically and hydrologically interconnected.

Each project underwent a separate permit and approval process resulting in separate permits and permit requirements. Construction of the CBT-MDE Restoration Project and the PG DPWT Advanced Mitigation Project was completed in 2017. Construction of the SHA Advanced Mitigation Project was completed in 2018. Maintenance and monitoring of all three sites is ongoing. This presentation compares and contrasts the differences in permit requirements and the impacts on construction and maintenance & monitoring.

Designing & Creating Resilient Vegetated Tidal Wetlands in Today's Regulated Environment

Gene Slear

A Living Shoreline is a tidal wetland created at the terrestrial aquatic interface to recreate the natural functions of a shoreline ecosystem. It is a specific approach to shoreline stabilization intended to maximize primary productivity – thereby improving water quality, enhancing habitat and sequestering carbon.

The hydrology of the tidal wetland is driven by the tides. The tidal wetland can be divided into three segments: 1) low marsh – typically submerged at high tide; (2) high marsh – flooded during spring tides, but sometimes free from tidal inundation for extended periods; and (3) upper border – above high marsh elevation, inundated only infrequently during the highest spring tides.

The highest margin of a tidal marsh is an important transition zone linking marshland with inland habitats. Around the Bay, this upland ecotone has been damaged by human changes to the landscape, some of which have been mandated by well-intentioned but uninformed regulators who have embraced a one-size-fits-all regulation, without regard to physiographic and watershed specific guidelines. In the past, a hardened shoreline was permitted. However, altering the landscape of the upper border to encourage landward migration of the tidal wetland was not permitted.

A managed upland border is necessary in order for the tidal marsh to thrive. Marshlands naturally expand and contract due to fluctuating sea levels and sedimentation rates. This expansion can occur only if there is a flexible landward edge. As sea levels rise and land subsides in the Chesapeake Bay watershed, the value of a natural buffer zone above the high marsh becomes more obvious.

Regulations must embrace vegetated tidal marsh designs that incorporate a high buffer, graded as necessary to permit landward expansion of the tidal wetland. Restoring the upland ecotone with a suite of native plants will build a seed supply so that tidal marshlands migrate inland in the future.

Permitting the natural expansion of the tidal marsh will improve water quality, enhance habitat and sequester carbon.

Wetlands Mitigation for the MD 331 Over the Choptank River Replacement Project

Kyle Spendiff

The presentation will primarily focus the construction of two wetland mitigation sites that serve as compensatory mitigation for the replacement of the Dover Bridge (MD 331) over the Choptank River on the Eastern Shore of Maryland, from the perspective of an Independent Environmental Inspector (IEM). The project was conducted by the Maryland State High Administration Environmental Programs Division. The IEM is a position that serves as the "eyes and ears" of the regulatory agencies, and is incorporated into projects that are in close proximity to important and vulnerable natural resources, as a permit condition by the Maryland Department of the Environment and United States Army Corps of Engineers. Focus will be on the construction techniques, planting, invasive species management, role of the IEM and environmental compliance. In addition to the wetlands mitigation other special features such as wildlife passage culverts, turtle exclusion fencing, critical area plantings,and some of the techniques used in the bridge construction will be discussed.

Role of the Regulator Community (and Lessons Learned) on Elevation Enhancement Restoration Projects Success and Improving Adaptive Management Strategy

Bartholomew Wilson P.G. Ph.D., Wenley Fergusn, Caitlin Chaffee, Al Rizzo, Alison Rogerson, Regina Poeske, Darlene Finch, Keith Hanson

As sea-level rise continue to affect the coastal natural resources of the Mid Atlantic, resource managers struggle to adapt to these changing realities and few options are available for larger scale ecosystem restoration. Building marsh elevation with locally dredged material is a current practice that has been shown promise as an adaptive measure. The practice requires approval by many Federal and State regulatory agencies; however, its effectiveness is not widely understood or accepted by regulators. Additionally, not all elevation enhancement projects are appropriate and application of the practice can be maladaptive. Enhancement restoration projects (including marsh creation and thin-layer application (TLP)) are planned and designed in accordance to restoration goals and objectives of a team or area. Likely the trust resources of each regulatory agency are not considered in how that will impact the project ability to be permitted or even viewed by the regulator community. Commonly the final as-built project does not completely match the intended design, and then a common issue then ensues as teams then try to force a project toward that original vision in spite of the changing condition. Adaptive management should be used to optimize the project results to match the evolving conditions of the site and restoration methods. This creates an unusual issue for the regulatory community that is overseeing the projects and continually weighting the ecological cost/bene t. Resource managers and regulators need to understand the current science and rationale behind adaptation approaches in order to assess the need and appropriateness of these practices. The results of a regulatory-focused workshop and several current completed and ongoing projects (in Delaware, Rhode Island, New Jersey, and Virginia) will be used to discuss the advancements

of elevation enhancement and adaptive management; and the role that a better informed regulatory community can have on improving project outcomes.

Improving restoration outcomes through University-Agency partnerships

Stephanie Yarwood

State and local agencies are often responsible for organizing and funding wetland restoration projects, but the linking between these agencies and scientists have traditionally been minimal. For example, only interacting when scientists approach them to use an existing restoration or conversations at meetings. This interaction is changing, however, to better incorporate experimental approaches. Agencies are increasingly eliciting the input and expertise of university scientists in the planning, implementing, and monitoring of restoration sites. This presentation will include examples in my own research where I am collaborating with Maryland State Highway Administration and Fairfax County Virginia. In both these cases the agencies are in the beginning stages of restoration and we have had the unique opportunity to discuss restoration strategies and make meaningful contributions in restoration improvement. In one example this has included establishing plots that include organic matter amendments with plans to samples over a longer timeframe, and in the second example, it includes pairing measures of microbial communities to an already rich dataset on nutrients and benthic invertebrates across numerous stream restorations that reconnect them to the flood plain. The value of these projects includes improved restoration outcomes and training of students in real world restoration scenarios.

Three Pilot Beneficial Use of Dredged Material Projects: Lessons Learned

Metthea Yepsen, Joel Pecchioli, Jill Aspinwall, Patty Doerr, Dave Fanz

In 2013, the New Jersey Department of Environmental Protection (NJDEP) and multiple partners initiated three pilot projects to evaluate the concept that the beneficial use of dredged material on existing, but stressed and vulnerable, salt marshes would improve their structure, ecological functions, and resiliency, thus helping them to persist into the future. The restoration team carefully documented what was done and developed an extensive list of “lessons learned” during project design, construction, and post-construction marsh recovery. In addition, a more comprehensive and longer- term monitoring program than those typically associated with voluntary marsh restoration and mitigation projects has been implemented. The restoration team met with the NJDEP regulatory program throughout the project design process to minimize and resolve potential issues. In addition, the restoration team and regulatory program have been discussing ways that the lessons learned from these projects and others can be communicated to develop more effective salt marsh mitigation and voluntary restoration requirements to improve project outcomes. Lessons learned from the pilot projects, and recommendations to better inform the State regulatory processes, will be presented.