9:00AM Opening Plenary

Welcome, News from ASFPM, Ingrid Wadsworth, Deputy Director ASFPM

10:30AM Concurrent Sessions

Evaluating Permeable Pavement Options
J. Scott Mathie, Spancrete

With the increased use of permeable pavement strategies being adopted by private and municipal clients, it is necessary that we understand how to assess the durability, performance, and maintenance required. The session on evaluating permeable pavement options will provide an overview of the categories of permeable pavement, study life cycle factors, and gain a better understanding of the products and materials typically used. Learn about key considerations of proper subbase performance, methods of infiltration, void ratios, product strength, and evaluating applications.

The Role of "Regenerative Stormwater Conveyance" for Stormwater and Flood Management in the Midwest
Adrienne Cizek, Stormwater Solutions Engineering

Regenerative stormwater conveyance (RSC) uses design principles from natural headwater streams to manage, treat, and convey stormwater in one BMP. RSCs are designed with a series of pools and riffles over a sand media bed. Runoff flow and velocities are reduced in each pool, allowing for infiltration into the sand media bed, as well as important treatment processes. Research has shown 75% TSS removal, and 30% removal of both TP and TN, along with reduction of peak flow and surface volume outflow to that of undeveloped conditions. Additionally, RSCs have demonstrated the ability to provide important ecosystem services beyond those observed in conventional stormwater practices. RSCs are a credited BMP and watershed mitigation tool in the Chesapeake Bay region at tidal inlets, headwater streams, and storm pipe outfalls. RSCs have similar potential applications in the coastal waters of the mid-west, especially with the implementation of TMDL strategies. This presentation will review demonstrated RSC stormwater mitigation performance on the east coast. A case study of RSC design and implementation on a residential site on the Rock River in Illinois will illustrate a use for RSCs in the Midwest.

Using 1D / 2D Modeling to Analyze Stormwater Flooding Issues in La Crosse
Michael Schwar, Montgomery Associates: Resource Solutions

The City of La Crosse is located on a flat terrace adjacent to the Mississippi River. Stormwater-driven flooding is a problem in the City due to its extremely flat topography and the runoff that comes into the City from the numerous “coulees” in the uplands to the east. Over time, the City has installed several flood relief channels and an extensive and interconnected storm sewer system. Stormwater-driven flooding is still a problem, however, and the flat topography means that overland runoff often discharges in a different direction than the storm sewer system during significant rainfall events. This condition makes conventional stormwater analysis using pre-defined “sewer sheds” difficult. The City has been exploring various approaches to reducing stormwater flooding, including evaluations of low impact development (LID) runoff-reduction practices.

The presentation will include a description of the process of assembling and running the models, some lessons learned for this modeling approach, the benefits of the alternatives analysis to the City of La Crosse infrastructure planning, examples and reasoning behind the implementation of both Green and

Grey infrastructure projects by the City based on these results, and the applicability beyond the City of La Crosse. Both City of La Crosse and MARS personnel will be involved in the presentation.

Hazard Creep at Wisconsin Dams
Chris Goodwin, Ayres Associates
Chapter NR333 of Wisconsin's Administrative Code requires all large dams to have a dam failure analysis performed. After approving a DFA, the WDNR works with the local zoning authority to zone the dam failure shadow as a floodplain. If the shadow is not zoned and development occurs below the dam, the public is at increased risk of failure-related flooding, and the dam owner's risk exposure also increases. In other words, communities and dam owners are exposed to "hazard creep" when regulations are not in place to restrict future development in the shadow. For the dam owner this can be costly: many existing dams have spillways adequate for a "low hazard" designation, which applies to dams with no existing development and future development prohibited in the shadow, but not for a "high hazard" designation, which applies to any dam with existing or potential development in the shadow. A reclassification to "high hazard" could potentially require reconstructing the spillway. Adopting the hydraulic shadow is important to protect the public in the event of a dam failure and to protect the dam owner from costly upgrades arising from a change in hazard classification.

Increased Bluff Stability along the Lake Michigan Shoreline in Southeastern Wisconsin between 1976 and 2012
David M. Mickelson, Geo-Professional Consultants
We have analyzed 2012 USACE Lidar profiles of bluffs along the Lake Michigan shore. Of 175 profiles, 154 were in the same location as a profile that was measured in 1976, 1995, or in most cases, both. Factors of safety of 1.00 or over are considered relatively stable or stable with respect to deep-seated failures. In 1976, the mean lowest factor of safety of 113 profiles was 0.85. By 1995, the 148 profiles analyzed had a mean lowest factor of safety of 1.28. By 2012, this number had risen to an average of 1.47 for 154 profiles analyzed. In 1976, 82 of the 113 profiles analyzed, or 73%, had a lowest factor of safety less than 1.00. In 1995, 57 of the 148 profiles, or 38%, had a lowest factor of safety less than 1.00. In 2012, 21 of the 154 profiles, or only 14%, had a lowest factor of safety less than 1.00. Of the 148 profiles that were analyzed from 1995 and 2012, 102 increased their lowest factor of safety, thus becoming more stable. Of the 148 profiles, 41 became less stable. Slopes are more stable, have more gentle slopes, and have more sediment accumulated at the toe of the bluff than in the mid-1970s or mid-1990s.

11:30AM Lunch Plenary

Linda Reid, Executive Director, Southeastern Wisconsin Watersheds Trust
Awards Session: Presented by Dave Fowler and Gary Korb

1:00PM Concurrent Sessions

Lake Michigan-Waukesha Transfer Project, Status Update for EIS
Shaili Pfeiffer, DNR Water Use Section
The City of Waukesha, located in southeast Wisconsin 17 miles west of Lake Michigan, seeks an exception from the prohibition of diversions under the Great Lakes–St. Lawrence River Basin Water Resources Compact and Great Lakes– St. Lawrence River Basin Sustainable Water Resources

Agreement. The Compact prohibits diversions of Great Lakes water, with limited exceptions. One exception allows a “community within a straddling county,” such as Waukesha, to apply for a diversion of Great Lakes water.

The Wisconsin Department of Natural Resources (WDNR) has been reviewing the city’s diversion application since the city first applied in May 2010. The city submitted its latest revised Application for a Lake Michigan Diversion with Return Flow to the Wisconsin Department of Natural Resources in October 2013. The city asserts that it needs a new source of water to address water quantity and quality concerns.

In its application, the city proposes to divert an annual average of 10.1 million gallons per day and a daily maximum of 16.7 million gallons upon final water supply service area build-out for a population of 97,400 (approximately the year 2050).The WDNR released a draft technical review and draft Environmental Impact Statement on the City of Waukesha’s application in June 2015, with subsequent public hearing and public comment period. This presentation will provide an overview of the application and the status of the review process.

Oconomowoc Watershed Protection Program
Tom Steinbach, City of Oconomowoc

The City of Oconomowoc has embarked on an innovative program called Adaptive Management that will work to improve the water quality of the many lakes and rivers in the Oconomowoc River watershed. Over 30 partners signed on to the Oconomowoc project with Tall Pines Conservancy (a local Land Trust) being a major partner with the City. The City of Oconomowoc is coordinating the efforts of many of the partnering County, Village, and Town government agencies as well as private land owners, agricultural producers, Lake Management Districts, and non-profit organizations to improve the overall environmental health of the Watershed.

The project will encompass an area 89,000 acres in size, 49 miles in length, including 17 lakes and two Class 1 Trout Streams, three impaired tributary streams and three lakes which have pending impaired status. The City holds the only treatment plant WPDES Permit in the watershed and operates a 4.0 MGD Advanced Wastewater Treatment Facility for the City and surrounding communities and lake properties. The City has secured a Regional Conservation Partnership Program grant through the US Dept of Ag. This is an innovative project as it will provide for the City and the service area, the most efficient use of funds available for wastewater treatment for the long term benefit of the watershed.

State of Wisconsin: DNR and WEM, Rock River Flood Inundation Mapping Project
Roxanne Gray, Meg Galloway, Chris Olds, WDNR

With a total drainage area of 3,474 square miles, the Rock River has flooded extensively numerous times over the years. Many of the flooding events occurred between 1982 and 2010. In the past twenty-five years, flooding on the Rock River has resulted in Federal Disaster Declarations in 1990, 1992, 1993, 1998, 2000, 2004, 2007, and 2008. Historic flooding in 2008 caused the Rock River to hit “major” flood stage three separate times in that year alone: January, April, and June.

The Rock River Flood Inundation Mapping project is being implemented through a partnership among the Wisconsin Department of Natural Resources, Wisconsin Emergency Management, USGS, National Weather Service, and the Corps of Engineers. By combining USGS stream gage data with hydraulic modeling and digital elevation data, a library of flood boundaries can be assembled for a series of incremental flood stages and overlaid on digital orthophotographs of pertinent areas to visualize areas of potential flooding. The project covers five reaches of the Rock River located in Jefferson, Dodge, and Rock Counties, WI. These five reaches encompass approximately 31.8 river miles. The flood inundation

maps are critical to flood emergency management planning and implementation; conveying flood risk to the public as the National Weather Service forecasts can be mapped and visualized for areas expected to flood well in advance of occurrence; and many other flood risk reduction and floodplain management initiatives and actions. This the first project of this type for Wisconsin. The maps were recently project is expected to be completed by late summer 2015, and the maps will be published on both the USGS and NWS websites. The product will be demonstrated during this session.

Integrating Climate Change into Oconto County Hazard Mitigation Planning
Julia Noordyk, UW Sea Grant Institute

Hazard mitigation plans typically use historical data to predict future risks to hazards. Climate change may make past trends unreliable sources for predicting future impacts, frequency, probability, and vulnerabilities. As part of an update to the Oconto County hazard mitigation plan, outreach specialists from Wisconsin and Minnesota Sea Grants collaborated with Bay-Lake Regional Planning Commission to apply the Community Self-Assessment to Address Climate Change Readiness tool to guide the creation of a natural hazards and climate change section of the plan. The tool was used discuss how hazards might change under predicted regional and local climate scenarios (source: Wisconsin Initiative on Climate Change Impacts), identify areas of vulnerability within the county, and explore possible impacts to the community based on those risks. In the future, local governments may be required to consider the impacts of climate change in their hazard mitigation plans in order to be approved by FEMA and be eligible for mitigation funding. The self-assessment is one tool to help communities start thinking about how to integrate future climate conditions into a planning process that they are already required to go through.

The Community Rating System (CRS): Preparing for a CRS Verification Visit
Lou Ann Patellaro, Insurance Services Office

The Community Rating System (CRS) is a Federal Emergency Management Agency (FEMA) program, administered by the Insurance Services Office (ISO), Inc. that recognizes communities for their floodplain management activities that go above and beyond the minimum NFIP standards. The CRS assigns credit points for each floodplain management activity a community performs and then correlates those points to classes and flood insurance premium discounts for homeowners in that community.

This session will discuss changes to activities in the 2013 Coordinator's Manual and how to prepare for a verification visit under the 2013 Manuals Credit Criteria. Other topics covered will be an explanation of what the CRS Program is how it works, how to apply to the CRS and what activities a community can earn credit for doing. There will be discussion of the best way to organize the CRS so your community can enjoy the full benefit of the Program.

2:30PM Concurrent Sessions

Flooding and Vulnerability in the Upper Fox River Basin
Angelina Hanson, Wisconsin Department of Health Services

Climate change projections show an increase in the incidence and intensity of precipitation events during the 21st century for the upper Midwest. Damages associated with flooding disasters are severe enough to warrant flood modeling to help plan for and mitigate flooding effects. This study focuses on the Upper Fox River Basin, an area in central-eastern Wisconsin covering approximately 2090 square miles across eight Wisconsin Counties (Adams, Calumet, Columbia, Fond du Lac, Green Lake, Marquette, Winnebago, and Waushara). The objective of this study is to evaluate the extent of flooding along the Fox River and

assess the social and economic vulnerability of the communities within the floodplain. The study will use HAZUS software to calculate damages to essential facilities integrate U.S. Census Bureau data (2010) to assess social and economic vulnerability, and geocode locations of facilities required to report hazardous and toxic chemicals for emergency preparedness planning. Final deliverables of the study include a map of the Upper Fox Valley, detailed instructions on using HAZUS, a literature review on the adverse health effects caused by flooding disasters, and a formal report to be given to the Wisconsin Department of Health Services and the UW-Madison GIS Certificate Program.

Improving Customer Service: A web based application for technical assistance requests
Meg Galloway, WDNR

An on-going challenge for any business or government agency is providing good customer service with limited staff. In response to this challenge, WDNR has developed a web based application for requesting technical assistance on dam or floodplain related questions. The purpose of the application is to allow technical assistance requests to be quickly directed to the appropriate staff member. It also includes the ability to add a map pinpointing the location of the property or dam associated with the request.

Pervious, Permeable, and Porous.....are they really the same?
Mark Walker, Kuert Concrete

Today, Low Impact Development (LID) regulations are pushing for advanced water management technology that will preserve environmental quality and mimic the pre-development watershed hydrology of the site. Additionally, since water management is the primary goal, members of the design community are searching for ways to produce cost-effective Green Stormwater Infrastructure (GSI), including their maintenance costs while maximizing developable land. Permeable, Pervious, and Porous pavers (the 3-P's) are "words that have been used interchangeably", without regard to their unique characteristics and for that reason, have somewhat confused the industry.

This presentation answers the questions pertaining to different paver applications and their relationship to storm water management. Key topics will include:

- Identifying the goal when considering stormwater runoff,
- Proper sub-base, base, and bedding materials when considering hydraulic conductivity,
- Why an engineered pipe-out overflow system is necessary,
- Defining the different characteristics of Pervious, Permeable, and Porous Pavers,
- How these different pavers relate to green stormwater infrastructure,
- Maintenance procedures when defining a BMP.

This topic is currently one of the most talked about within America today due to recent state, EPA, and legislative mandates.

Pike River Restoration Adaptive Design and Management: From Cabbages to Cordgrass
Alice Thompson, Thompson and Associates Wetland Services

The Pike River Restoration is a phased multi-year restoration of a degraded river in Southeast Wisconsin. The project aims to establish a newly constructed river channel and floodplain with a wetland and prairie corridor by establishing native vegetation, and reconnecting wildlife and fisheries to the river and urban green space. Using an adaptive phased approach, the detailed designs utilized in the Pike river restoration have evolved as each reach was restored and monitored. Techniques using coir logs, constructed fabric wrapped banks, fish structures, and native plantings have been integrated with the construction of an expanded floodplain bench and new channel meanders. The successes and challenges of this restoration include managing water quality and restoring river biota, creating fish habitat

in new channels, while establishing native vegetation and green space in an urban setting. Adaptive management includes evaluating the impact of restoration actions on the goods and services provided by the river corridor, while managing the river floodplain for ongoing disturbances. Prairie cord grass (Spartina pectinata) and sandbar willow (Salix exigua) have served as successful ecological tools that both provide cover for biota in the river while serving to block succession of non-native terrestrial plant species. However, the invasive species being monitored and managed include Phalaris arundinacea (reed canary grass), Glyceria maxima (reed manna grass) Dipsacus laciniatus (cut-leaved teasel), and Phragmites australis (giant reed grass). Our ability to control these species, including the recent expansion of Glyceria maxima into restored areas of the river, challenges the long-term stability of native vegetation.

Stormwater Innovation at Summerfest
Carrie Bristoll-Groll, Alyssa Schmitt, Stormwater Solutions Engineering
Summerfest and Milwaukee World Festival leads the world's largest music festival. Located on the shore of Lake Michigan, Summerfest proposed a new Administration building in 2014. The project is an adaptive reuse of an existing maintenance building into a new administrative office building for Milwaukee World Festival, Inc.'s full time staff of 40+ employees. The site soils are foundry sand and other undesirable landfilled materials, and was draining to the combined sewer. Stormwater Solutions Engineering, LLC assisted Summerfest in receiving $100k in grant dollars to install a green roof, bioswale and porous pavement, treating all the water that falls on the site and keeping the water out of the combined sewer.

3:45PM Closing Plenary

Panel presentation/discussion of the latest guidance issued by the DNR

- Pete Wood, Storm Water Engineer, Site soil loss and sediment discharge calculations
- Bill Sturtevant, State Dam Safety Official
- Chris Olds, Floodplain Engineer
- Kevin Kirsch, TMDL Water Resources Engineer