

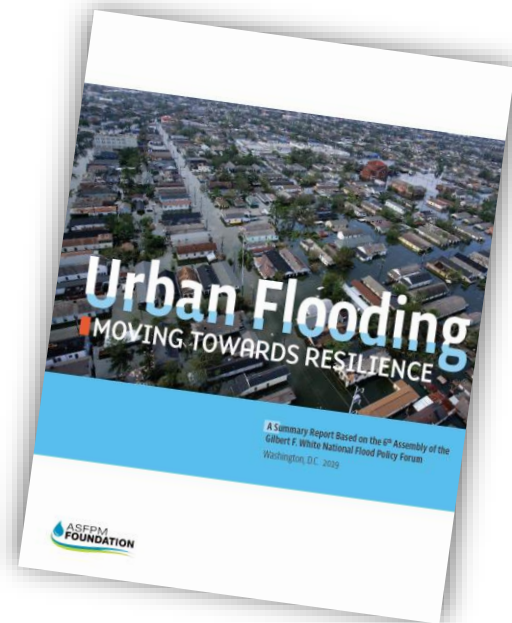


Urban Flooding: Moving Toward Resilience

***A report of the ASFPM Foundation's
Gilbert F. White Flood Policy Forum***

*Molly J. O'Toole, P.E., D.WRE, CFM
Trustee, ASFPM Foundation*

IAFSM 2020, Tinley Park





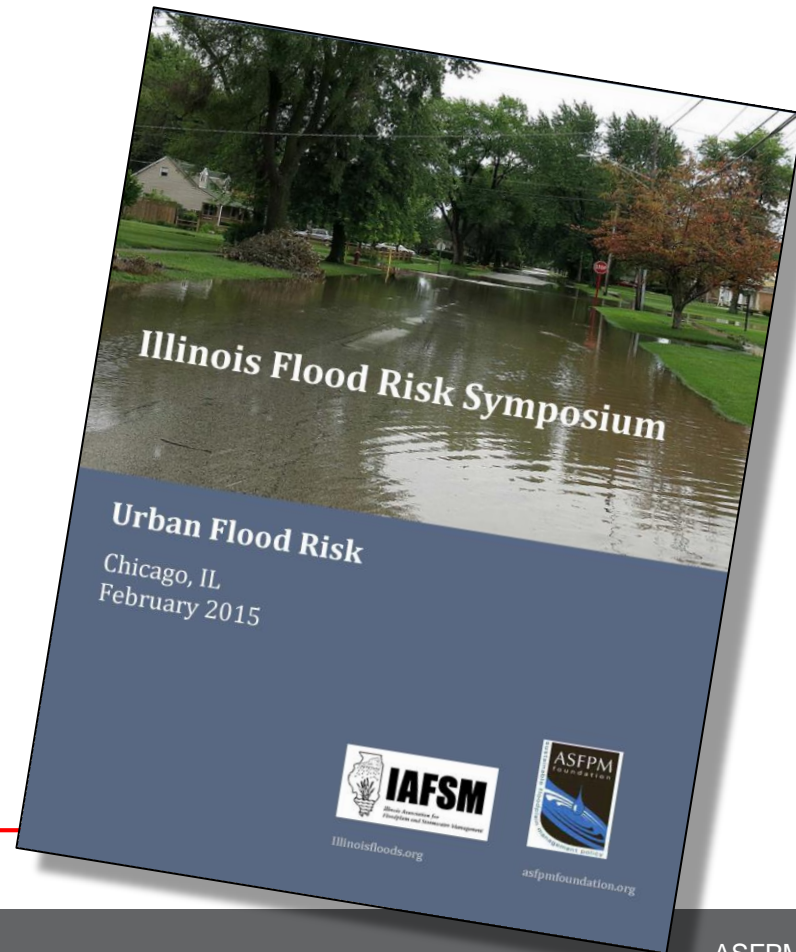
- Independent, charitable arm of ASFPM
- Events - important to the floodplain management community
 - Larry Larson Speaker Series
 - State Symposia (Illinois Urban Flooding in 2015)



- 2015
- Illinois



- Illinois Flood Risk Symposium





The Gilbert F. White Flood Policy Forum

- Signature Foundation event
- Named after Gilbert F. White
- Selected topic for each forum
- Forward looking by design
- Assembly of 100 invited participants experts in their fields
- Reports to capture the engagement of participants at the event

The Gilbert F. White Flood Policy Forum

- Most recent Forum topic -- *Urban Flooding*



The Gilbert F. White Forum



Why This Topic

- Climactic projections
- Observational trends
- Recognition of dramatic change in risk profile
- View of Practitioners
 - Third Report
 - National Academy of Sciences
 - Texas A&M and University of Maryland

Game Changer!



“Urban Flooding”

- How to explain urban flooding
- Pluvial flooding “Flooding where you stand”
- How to explain who it impacts

What do we mean by “urban” flooding?

Urban flooding, put simply, is flooding that occurs in a densely populated area. Whatever the specific cause(s) of inundation—cloudburst, hurricane, groundwater seepage, river overflow, infrastructure failure—stormwater systems are overwhelmed, and water accumulates in the paved-over, built up urban environment with nowhere to go.

An individual urban flooding event may be a heavy rain rather than a disaster. But even a minor flood has major effects, particularly in low- to middle-income neighborhoods.

Chronic or extreme, disruptive or catastrophic, the flooding is particularly problematic because it affects a dense interconnected web of people, homes, businesses,

Urban flooding is becoming more frequent and persistent, with increasingly serious physical, economic and social impacts.

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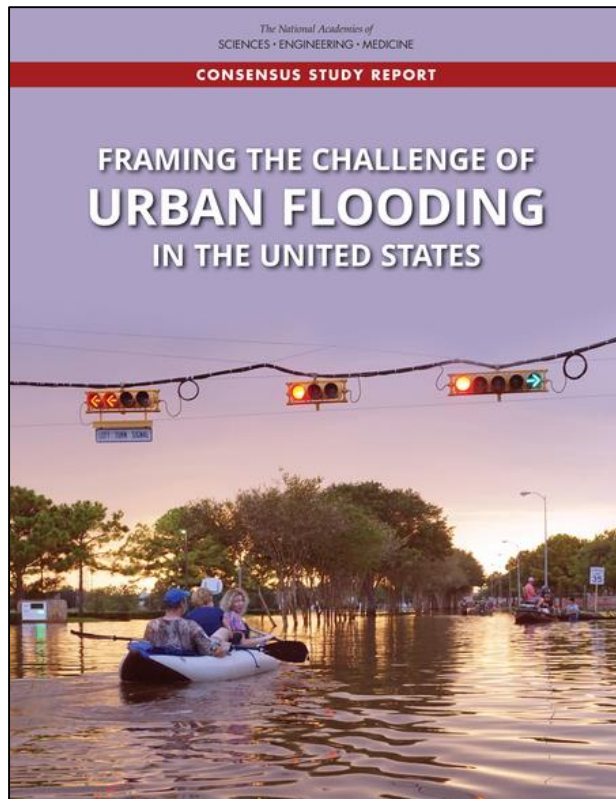
Building Resilience: Starting With a Fuller Picture of the Problem

We need to better understand urban flooding: where, how and why it is taking place, and the social, environmental, economic and cultural impacts. Detailed data and strong visualizations can help.

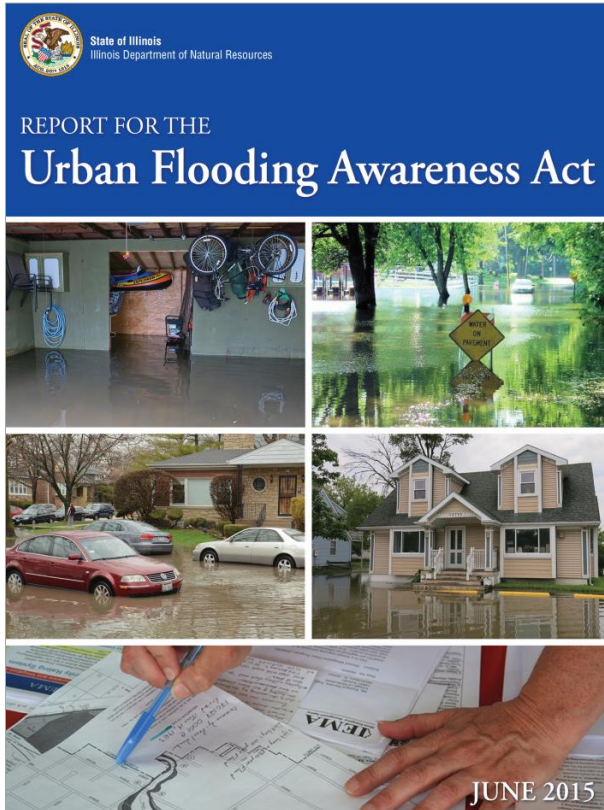


Addressing Social Vulnerability and Inequity

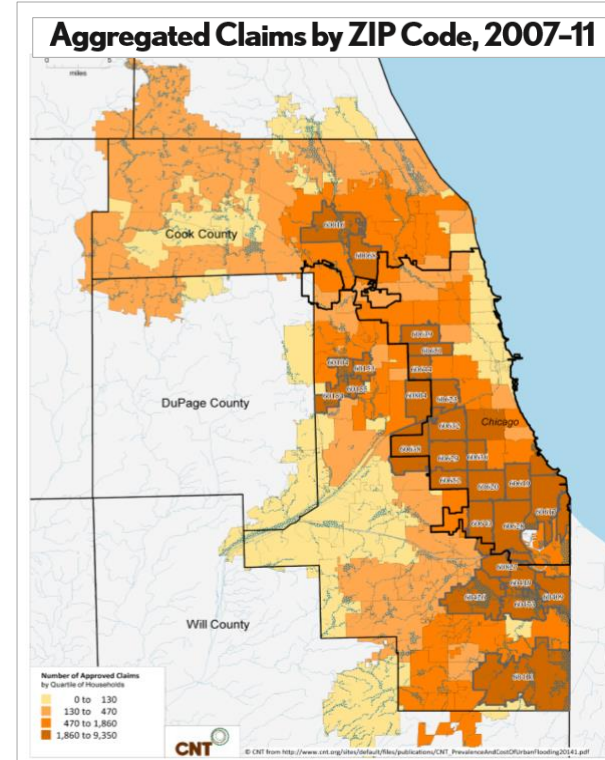
In many cities, affluent neighborhoods are largely flood-free, while lower income areas and their residents face surface and basement flooding, job losses, health issues and devastating losses in extreme events—and displacement once problems are addressed.



State Concern in Illinois



Widely distributed flood damage across city



Source: Center for Neighborhood Technology



Making Future-Informed Decisions

Many urban areas are realizing that they must plan now for future conditions that could look very different from today's. For some, the work is already well underway.



Taking a Fresh Look at Funding, Financing and Insurance

While new approaches to federal funding are needed, there are also new options available for local and regional financing and insurance.

...community-based and parametric insurance options.



Commit

Think globally. Plan regional ownership and

Elements of an Urban Flooding Toolbox

- Recommendations for integrated planning processes
- Locally driven approaches to modeling, mapping, visualization
- Guidance on design standards for resilience
- Examples of successful adaptive building practices
- Approaches to risk awareness and risk mitigation communications
- Federal and state programs to draw from
- Funding sources and grants available
- Incentives to spur responsible development

Synthesis of Recommendations

Make having a clear picture of urban flood risk and impacts a local to national priority.

Collect, visualize and share data locally; enable information gathering through grants; share data; conduct research to better understand changes in precipitation and public health impacts; develop a national assessment of urban flooding.

Prioritize local and regional coordination to find comprehensive solutions for flooding and rainwater.

Create special task forces and watershed level coalitions to deal with problems; develop partnerships with the private sector; provide association, state, and federal support for such efforts.

Enable and incentivize dedicated authorities for stormwater management.

Explore local or regional authorities; provide state level legislation, if needed, to overcome barriers to their formation; offer federal training.

Refresh the Unified National Program for Floodplain Management.

Bring together agencies and stakeholders; address urban flooding and stormwater issues; develop a plan and deliver on it.

Consider inclusiveness, social equity and public health impacts in valuing projects.

Include representatives of vulnerable populations in planning; place value on social benefits in justifying funding; move beyond over-reliance on property-based cost-benefit calculations; make the business case from a broad city- and region-wide perspective.

Consider climate change and urban flood realities in setting standards.

For urban areas, institute stronger standards that exceed the 100-year flood standard for critical infrastructure; also recognize that much urban flooding occurs outside of federally designated Special Flood Hazard Areas; develop long-term goals for resilience based on social, cultural, economic and technical considerations.

Take the long view.

At the local to regional level, develop a vision and long-term goals for resilience, taking into account anticipated changes in climate, population, urbanization and land use, as well as social, cultural, economic and technical considerations.

Take advantage of financing options and insure against financial risk.

Look at a mix of options to enable adaptation and lessen flood risk; educate the public about the realities of flood risk; broaden insurance coverage.

Jump-start needed change with an Urban Flooding Summit and tools for communities.

Bring together the major organizations dealing with the issues and opportunities, together with key stakeholders, to set the agenda for change; as a first step, explore a multi-partner approach to leadership in planning and conducting the summit and provide tools and support for community efforts.

Don't wait; begin today.

Don't wait for disaster to act; own the problem at the community level; educate the public; break down the siloes; start now to move towards resilience.

Major Findings

- Flooding is flooding irrespective of source
- It is chronic AND extreme
- The risk to the Nation is concentrated in metro areas, but we can not ignore lesser populated urban-like areas
- Socially vulnerable populations add to the complexity
- the public health implications are profound

THE CHALLENGE OF URBAN FLOODING

What do we mean by "urban" flooding?

Urban flooding, put simply, is flooding that occurs in a densely populated area. Whatever the specific cause(s) of inundation—cloudburst, hurricane, groundwater seepage, river overflow, infrastructure failure—stormwater systems are overwhelmed, and water accumulates in the paved-over, built up urban environment with nowhere to go.

An individual urban flooding event may be a heavy rain rather than a disaster. But even a minor flood has major effects, particularly in low- to middle-income neighborhoods.

Chronic or extreme, disruptive or catastrophic, the flooding is particularly problematic because it affects a dense interconnected web of people, homes, businesses, jobs, civic institutions and the lifelines that support them. There was a time when much flooding could be dealt with through "retreat"—preserving natural functions, moving buildings out of harm's way. Now, for many urban zones, retreat is no longer possible. You can't just move Chicago. Urban flooding demands solutions that span a wide spectrum of technical, social, economic and cultural domains.

Grade assigned to the nation's wastewater and stormwater systems in an American Society of Civil Engineers 2017 Infrastructure report card.

\$ 171 BILLION Capital investment needs for wastewater conveyance and treatment facilities, combined sewer overflow correction and stormwater management over a 20-year period.

\$ TRILLIONS Total estimated reconstruction and maintenance costs across dams, levees, aqueducts, sewers, and water and wastewater treatment systems.

(Source: Fourth National Climate Assessment, 2018, Ch. 3 p. 7 and p. 10)

Infrastructure under stress

Inadequate, aging or deteriorating dams, levees, aqueducts, water treatment systems and the various elements of the stormwater infrastructure or "sewershed" create particular problems for urban areas.

Urban areas have grown. Water control infrastructure has not. In older cities, some stormwater infrastructure dates back centuries, and most stormwater, water supply and wastewater systems were designed decades ago. The rainfall calculations and design standards no longer fit today's hydrology, or the ever more complex human ecosystem that expands out from the historic core. Systems are undersized and overworked.

Heavier rainfall and higher tides further add to system stress. The Northeast and Midwest, in particular, are experiencing more days with heavy rainfall. Nine of the top 10 years for extreme one-day precipitation have come since 1990 (EPA 2017). Tidal events are increasing in frequency, pushing seawater into drainage systems and causing pump failures.

Deferred maintenance is contributing to system failure. Adding injury to insult, many stormwater systems have been poorly maintained over the years. Drain blockage, pipe collapse, or restrictions in capacity can cause urban flooding.



When storm waters overwhelm pipes and sewers, water seeks other paths. Sandbags are a final line of defense.



Floodwaters are a health hazard. The water itself can be toxic.

Major Findings

- Solutions must be locally driven
- This problem touches essentially every cabinet level agency
- This will require an adjustment in the insurance paradigm
- The 1 percent annual chance standard for larger floods is too low in urban areas
- Urban flooding is more multi-disciplinary and stakeholder driven

Responding to the challenge

The 2013 Gilbert F. White Policy Forum examined both the problem and ways to move towards resilience through policy and programming.

Urban flooding remains primarily a local issue. Forum participants shared multiple examples of innovative and successful efforts, neighborhood level to watershed-wide. You'll find case examples throughout the report.

State and federal governments and the private sector have important roles to play. Local action alone is not enough. Resilience requires coordinated action across multiple domains and multiple levels of government. The Forum's suggestions for policy changes and new partnerships guided the report's organization and recommendations.

“Resilience: The capacity of individuals, communities, institutions, businesses and systems within a city to survive, adapt and grow no matter what kinds of chronic stresses and acute shocks they experience.”

(Source: 100ResilientCities.org)

“Resilience: The ability to anticipate, prepare for and adapt to changing conditions; and withstand, respond to and recover from disruptions. Principles of resilience are summarized as Prepare, Absorb, Recover and Adapt (PARA).”

(Source: USACE ECB 2018-01)



CASE EXAMPLE

Turning vacant lots into stormwater lots to manage runoff



The New Orleans Redevelopment Authority (NORA) is finding new uses for abandoned properties it manages within the urban core. A series of detention basins now accept runoff from neighborhood streets. Each lot manages an average of 34,000 gallons of runoff water, while serving as green space and reducing localized flooding.

(Source: Dana Brown Associates)



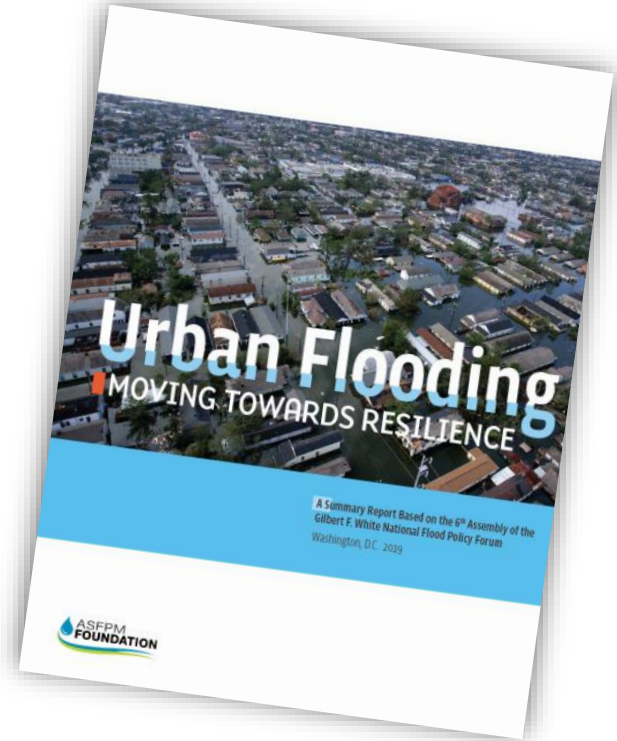
Early Areas of Focus

- National Assessment
- Refresh the Unified National Program for Floodplain Management
- Urban Flood Summit – “*Flooding In the Urban Environment*”
- Urban Flooding Toolkit



The Report

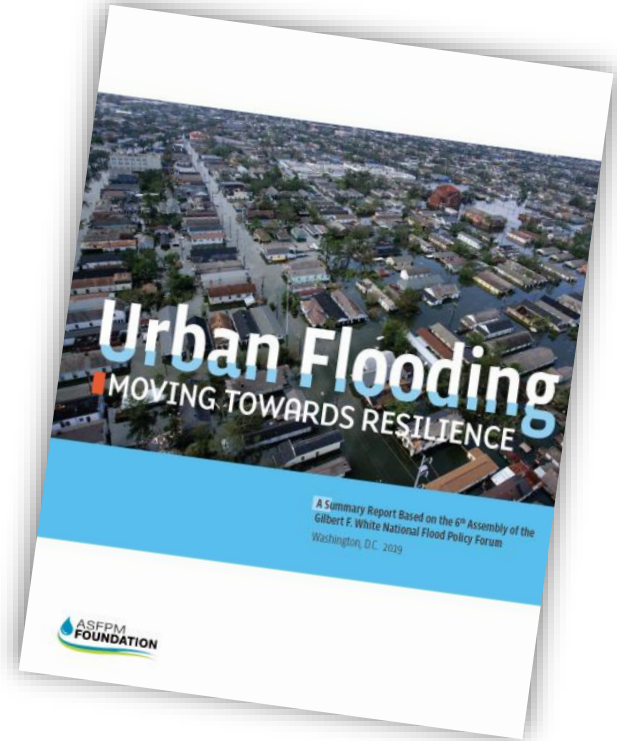
- Released early February 2020
- Digital copies available on ASFPM Foundation Website:
<http://www.asfpmfoundation.org/ace-images/UrbanFloodingReport.pdf>
- Limited number of print copies
- Follow Foundation on Twitter @ASFPMfoundation for announcement of Urban Flooding next steps



What You Can Do

- Read the report
<http://j.mp/ASFPMUrbanFloodingReport>
- Share the report
- Join the discussion
- Follow/promote the Urban Flooding Report findings on social media
- Tell us your ideas and experiences
- Give a presentation

“We want to hear from you!”



Acknowledgments

Planning and Development Team

Jerry Sparks, ASFP Foundation Board Secretary, Dewberry
Doug Plasencia, ASFP Foundation Board President, Moffatt & Nichol
Matthew J. Koch, ASFP Foundation Events Committee Chair, Atkins
Larry A. Larson, ASFP Foundation Treasurer, ASFP Sr. Policy Advisor
Bruce Bender, Bender Consulting Services, Inc.
Kamer Davis, Bender Consulting Services, Inc.
Jeff Sickles, ASFP Storm Water Management Committee, Enginuity
Jean Huang, ASFP Foundation Associate, Dewberry
George Riedel, ASFP Foundation Donor Coordinator
Gigi Trebatoski, ASFP Chapters and Foundation Coordinator

Speakers

State and Local Perspective Panel
Amy Knowles, Deputy Resilience Officer, City of Miami Beach, FL
Joe Kratzer, Managing Civil Engineer, Metropolitan Water Reclamation District of Greater Chicago
Sally Ann McConkey, Illinois State Water Survey, Prairie Research Institute, University of Illinois, Urbana-Champaign, IL
Christine Morris, Chief Resilience Officer, City of Norfolk, VA
National Perspective Panel
Chad Berginnis, Executive Director, Association of State Floodplain Managers, Inc.
Katharine Burgess, Vice President, Urban Resilience, Urban Land Institute
Allison Coffey Reilly, Ph.D., Assistant Professor, University of Maryland
David I. Maurstad, Deputy Associate Administrator for Insurance and Mitigation, FEMA HQ
Insurance Perspective Panel
Matt Chamberlain, Principal & Consulting Actuary, Milliman
Roger Grenier, Ph.D., Senior Vice President, AIR Worldwide
Samantha "Sam" Medlock, ASFP Foundation Trustee, Managing Director, Willis Towers Watson

Moderators

State and Local Perspective Panel
Jeff Sickles, ASFP Stormwater Management Committee, Enginuity
National Perspective Panel
Doug Plasencia, ASFP Foundation Board President, Moffatt & Nichol
Insurance Perspective Panel
Bruce Bender, ASFP Insurance Committee, Bender Consulting

Facilitators

Matthew J. Koch, ASFP Foundation Events Committee Chair, Atkins
Bradley A. Anderson, ASFP Foundation Projects Committee Chair, Anderson Consulting Engineers, Inc.
Jeffrey L. Sparrow, ASFP Foundation Fundraising Committee Chair, Moffatt & Nichol
Dale Lehman, ASFP Foundation Vice President, AECOM

Notetakers

Jean Huang, ASFP Foundation Associate, Dewberry
Maribel Marquez, ESP Associates, Inc.
Allison Westlund, ASFP Foundation Associate, Michael Baker International
Deborah Mills, ASFP Foundation Associate, Dewberry

Reporters

Chad Berginnis, Executive Director, Association of State Floodplain Managers, Inc.
Lynnette Cardoch, Ph.D., Moffatt & Nichol
Vince DiCamillo, ASFP Foundation Trustee, Stantec
Mike Graham, ASFP Foundation Trustee, Smart Vent
Molly O'Toole, ASFP Foundation Scholarships Committee Chair, Molly O'Toole & Associates, Ltd.

Report Production Team

Doug Plasencia, ASFP Foundation Board President, Moffatt & Nichol
Bruce Bender, Bender Consulting Services, Inc.
Kamer Davis, Lead Writer, Bender Consulting Services, Inc.
Christina Mehl, Design, ESP Associates, Inc.
Jerry Sparks, ASFP Foundation Board Secretary, Dewberry

Advisors

Doug Bellomo, Vice President, AECOM
Gerry Galloway, ASFP Foundation Fellow, University of Maryland
Allan Gear, Floodplain Management Australia
Maria Honeycutt, NOAA Office for Coastal Management
JoAnn Jay Howard, H2O Partners
Molly O'Toole, ASFP Foundation Scholarships Committee Chair, Molly O'Toole & Associates, Ltd.
Jamelyn Trucks, ASFP Stormwater Management Committee, Atkins North America
Jeff Sickles, ASFP Storm Water Management Committee, Enginuity
Jack Smith, Urban Land Institute, Nelson Mullins
Jeffrey L. Sparrow, ASFP Foundation Fundraising Committee Chair, Moffatt & Nichol

Sponsors:





For more information about giving to the Foundation:

George Riedel, CFM

ASFPM Foundation Donor Coordinator

Mobile: 703.447.3831

george@asfpmfoundation.org

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Report available at asfpmfoundation.org
"Events and Forums" Page

