



# Integrating EPA Programs and Hazard Mitigation Planning

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# FEMA

October 30, 2019



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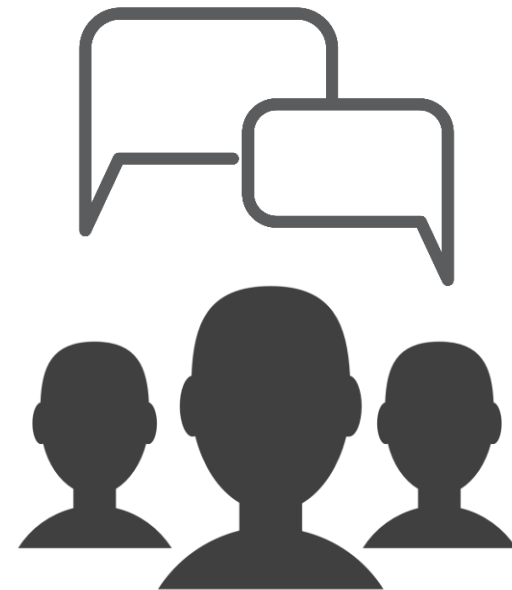
# Webinar Housekeeping

- Attendees **are currently muted** to reduce background noise.
  - Please do NOT put your phone on “hold”, it plays the hold music for everyone else on this call.
  - If you have to step away, please hang up and rejoin the call later.
- Use “Chat” panel **to all** to ask questions.
  - The chat will be open for 10 minutes following the presentation.
- **The PowerPoint slides will be emailed to participants afterwards.**
- **You may be eligible for Professional Credits:**
  - American Institute of Certified Planners (AICP) Certification Maintenance Credit.
  - Association of State Floodplain Managers (ASFPM) Certified Floodplain Manager (CFM) Continuing Education Credit.
  - Participation certificates and agendas will be sent by request to all participants who attend the whole session and participate in the polls.



# Welcome and Overview

- **Presentation**
- **Next Steps**
  - Future Coffee Break Webinars
  - Receiving professional credits
- **Wrap-Up and Q&A**



# Polling Question 1

**What is your experience with hazard mitigation planning and green infrastructure?**

- A. I have no experience with hazard mitigation planning and green infrastructure.**
- B. I have some experience with hazard mitigation planning and green infrastructure.**
- C. I have extensive experience with hazard mitigation planning and green infrastructure.**



# Ken Hendrickson, MLA

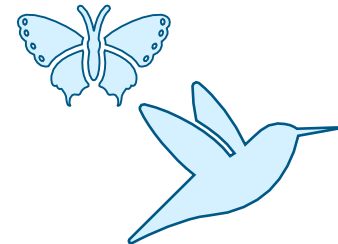
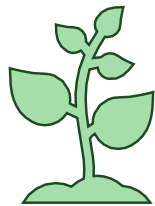
Green Infrastructure Lead, EPA Region III



# Integrating Water Planning & Hazard Mitigation Planning

## Why focus on plan integration?

- Coordinate activities
- Build support
- Address multiple concerns (multi-functional infrastructure)
- Leverage additional funding



# Integrating Water Planning & Hazard Mitigation Planning

## Programs and Plans to Consider:

- Stormwater Management
- Clean Water Act Section 319 Nonpoint Source watershed based plans
- Source Water Protection
- Water Infrastructure Risk and Resilience Assessments
- Green Streets / Green Communities
- Green Infrastructure
- Parks, Recreation, Trails Programs





# What is Green Infrastructure?



# Is this Green Infrastructure?



Image from "Local Green Infrastructure" <http://www.landscapeinstitute.org/PDF/Contribute/LIGIDiagram1.pdf>





# Is this Green Infrastructure?



Friends Center green roof (Photo by Nancy Arazan)



SALA parking lot PSU





# Is this Green Infrastructure?



# Philadelphia Soak It Up



Image from: "Greening the Grid" Winner - Philadelphia Soak It Up - Design Competition



# H.R.7279 - Water Infrastructure Improvement Act



The term ‘green infrastructure’ means the range of measures that use plant or soil systems, permeable pavement or other permeable surfaces or substrates, stormwater harvest and reuse, or landscaping to store, infiltrate, or evapotranspire stormwater and reduce flows to sewer systems or to surface waters.





# Integrating Green Infrastructure in Local Hazard Mitigation Planning

## Lessons from Huntington, West Virginia

Huntington,  
West Virginia

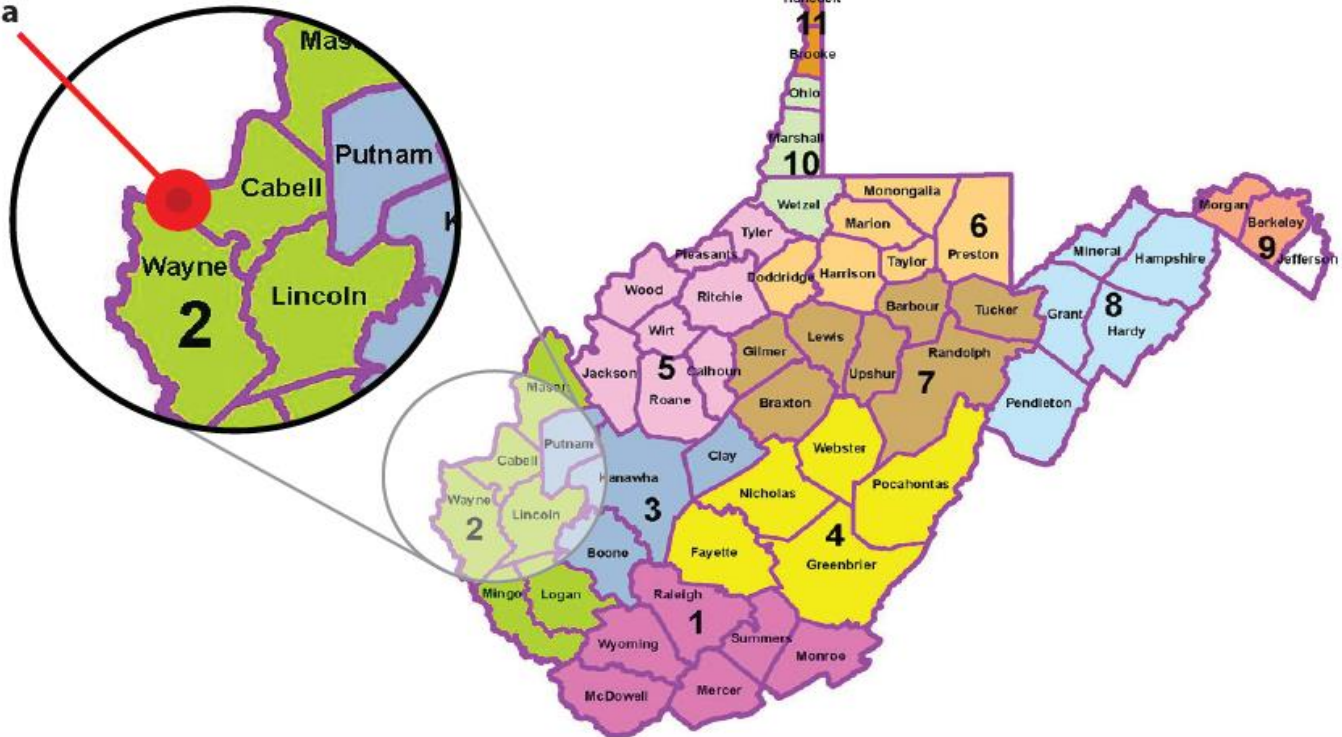


Figure 1: Map of West Virginia Regional Planning and Development Areas.



# Partners

- West Virginia Region 2 Planning & Development Council
- KYOVA Interstate Planning Commission
- Huntington Stormwater Utility
- FEMA Region 3
- USACE – Huntington District
- EPA Region 3
- West Virginia Department of Environmental Protection



FEMA





# Huntington, West Virginia



Figure 4: Localized flooding at railway underpasses impacts traffic movement in the City of Huntington. Photo credit: Sherry Wilkins, HSU

- Localized flooding impacts to transportation
- Interest in revitalization and green infrastructure
- Previous planning efforts

- Timing - LHMP update scheduled
- Willing local, state, and federal partners
- Local momentum for change



Figure 8: Flooding in the City of Huntington. Photo credit: Chris Chiles, WV Region 2 Planning & Development Council



# Huntington Pilot - Process & Outcomes

- Planning meetings with local, state, and federal partners
- Community workshops
- Silver Jackets Project – GIS Analysis Tools
- Developed a crosswalk between HMP Tasks and green infrastructure actions
- Storm Smart Cities Guide
- Follow up Green Street Community Design Charrette

Task (per FEMA Local Mitigation Planning Handbook)	Suggestion(s) for Including Green Infrastructure in the Hazard Mitigation Plan	Examples from Region 2 Process
Task 6: Develop a Mitigation Strategy	Engage green infrastructure subject matter experts for reviewing flood risk areas and potential project ideas	<ul style="list-style-type: none"> <li>• Include green infrastructure expertise on all mitigation planning teams</li> <li>• Create a plan review step where natural resources and stormwater staff are engaged in initial planning and final selection of flood mitigation projects</li> </ul>
	Add green infrastructure projects, where appropriate, to the mitigation project list (e.g., bioretention areas, bioswales, floodplain restoration, green streets, increasing natural or constructed features to slow and infiltrate stormwater, open space preservation, permeable pavement, restoration of upland forests, retention ponds, stream buggers, etc.)	<ul style="list-style-type: none"> <li>• Action plan narrative includes completed green infrastructure projects and describes their benefits</li> <li>• Narrative lists individual mitigation projects by jurisdiction, along with coordinating agencies and potential funding sources (to include non-FEMA funding sources)</li> <li>• Action plan includes a short series of regional mitigation projects (either coordinated by the Region 2 Planning &amp; Development Council or those that affect/impact/benefit a large area of the region)</li> <li>• Project narratives identify potential supporting partners on a project-by-project basis</li> </ul>
	Describe how green infrastructure projects will lessen or eliminate flood losses (as a result of those projects)	<ul style="list-style-type: none"> <li>• Green infrastructure projects in the action plan refer to specific listings of nuisance flooding and associated loss estimates in the flooding profile</li> </ul>
	Include a history of relevant projects, describe their status and the benefits that have been realized from them	<ul style="list-style-type: none"> <li>• Narrative includes a list of previously-completed mitigation projects, including TMDL history, 319 grant/project history, USDA/NRCS water resource grant/projects history, etc.</li> <li>• Action plan narrative includes general stormwater management planning projects at the jurisdictional level</li> </ul>



# Community Assessment – Understanding Your Capacity

Will the use of green infrastructure for flood hazard mitigation require new approaches to get practices in the ground?

Can existing approaches to stormwater management or flood mitigation be modified or expanded?

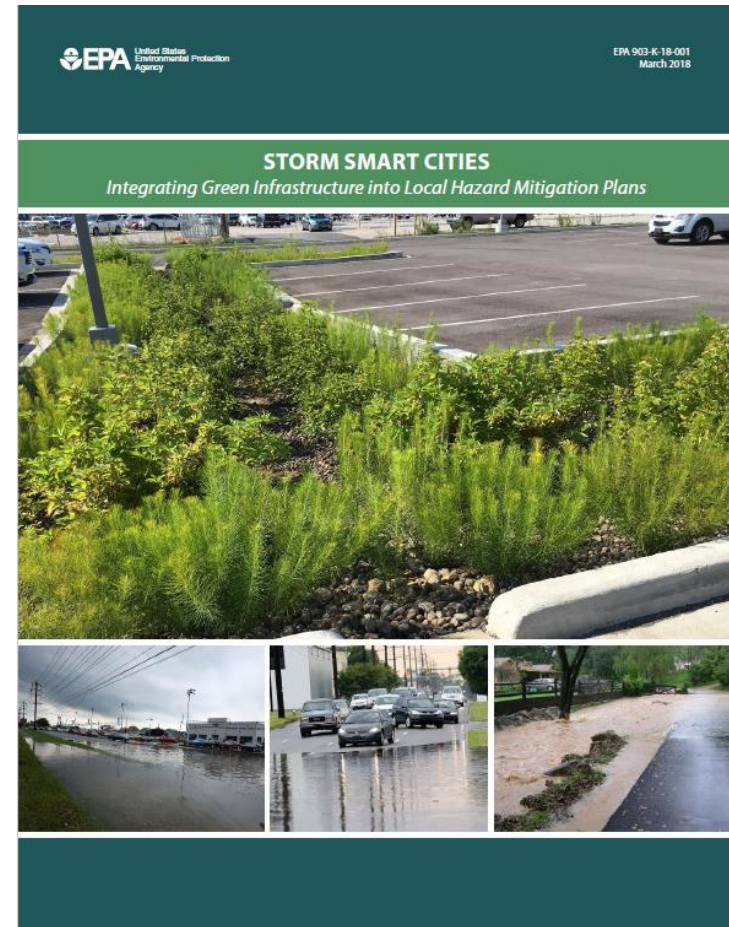
What is the capacity of existing organizations to take on these new approaches?

Will new or different organizations need to be engaged in order add capacity?



# Huntington Pilot - Lessons Learned

- Form a coalition of stakeholders
- Identify local champions
- Build on previous successes
- Understand the local experience and capacity for green infrastructure



[https://www.epa.gov/sites/production/files/2018-04/documents/storm\\_smart\\_cities\\_508\\_final\\_document\\_3\\_26\\_18.pdf](https://www.epa.gov/sites/production/files/2018-04/documents/storm_smart_cities_508_final_document_3_26_18.pdf)



# Matt Konfirst, Ph.D.

Physical Scientist, EPA Region III





# EnviroAtlas

- Human health and well-being are closely tied to the environment, which provides benefits such as clean water, clean air, and protection from natural hazards
- Chemical and non-chemical stressors can impact the environment's ability to provide these benefits, also known as ecosystem goods and services.
- **EnviroAtlas** provides geospatial data, easy-to-use tools, and other resources related to ecosystem services, their stressors, and human health.
- **EnviroAtlas** allows users to understand the implications of planning and policy decisions and their impact on our fragile ecosystems.



# EnviroAtlas Data



- **Spatial Extents** - Data layers are developed for the contiguous U.S. and at higher resolution for selected communities.
- **Data Organization** - Data in the Interactive Map are organized by type and topics of interest.
- **Dynamic Data Matrix** - Search and sort all 300+ data layers and access their fact sheets.
- **EnviroAtlas Communities** - Find out which EnviroAtlas communities have been completed and which ones are in progress.
- **Data Approach** - EnviroAtlas uses an indicator and index approach to investigating and analyzing ecosystem services.



# Live Demo

The screenshot displays the EnviroAtlas Interactive Map interface. The main map shows the Philadelphia region with various environmental data layers overlaid. The interface includes a search bar at the top, a layer list on the right, and a detailed layer control panel on the left. The layer control panel lists various data layers such as Carbon Storage, Crop Productivity, Ecosystem Markets, Energy Potential, Engagement with Outdoors, Health and Economic Outcomes, and Land Cover: Near-Water. The Land Cover: Near-Water section includes layers like Area in square meters of estimated floodplain classified as water, Area of estimated floodplain classified as land (m2), Average width of stream buffers downstream from agriculture (meters), Estimated tree cover in stream and lake buffer (percent), Estimated vegetated cover in stream and lake buffer (percent), Percent forest and woody wetlands in stream buffer, Percent forest land in stream buffer, Percent impervious area in stream and lake buffer, Percent land area in stream and lake buffer, and Percent natural land cover in stream buffer. The layer list on the right shows that 'EnviroAtlas Community Boundaries' and 'Estimated tree cover in 15m stream and lake buffer (percent)' are currently selected.

<https://enviroatlas.epa.gov/enviroatlas/interactivemap/>





## Polling Question 2

What other EnvrioAtlas features would you be interested in learning more about?

- A. **Eco-Health Relationship Browser** – an interactive tool to explore linkages between human health and the environment
- B. **Datasets** – a deeper dive into the available datasets
- C. **The Raindrop Tool** – select a location and see a general raindrop flow path and distance to the nearest water feature
- D. **HUC Navigation** – identify upstream or downstream 12-digit HUCs within a stream network from any point in the US
- E. **Elevation Profile** – view the elevation profile of a selected line segment



# William A. Drew Parker, CFM, GISP

Geographer, EPA Region IV



# Integrating Natural and Nature-Based Infrastructure into Hazard Mitigation Plans

## WHY PLAN?

**Developing hazard mitigation plans enables state, tribal, and local governments to:**

- Increase education and awareness
- Build partnerships that support risk reduction
- Identify risk reduction strategies
- Align risk reduction with other policy objectives
- Focus resource allocation to meet greatest need
- Communicate priorities to potential sources of funding



# EPA Region 4 Pilot Project Background

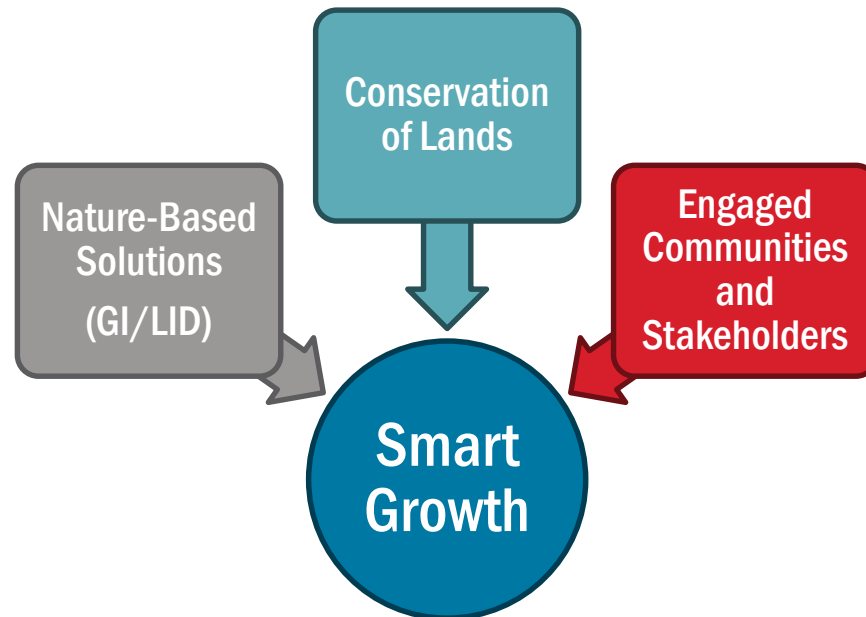
- EPA Region 4 received funding for a pilot project from the Non-point Source Program at EPA HQ
- The Commonwealth of Kentucky expressed interest for recommendations to support a potential addendum to the 2018 Kentucky State Hazard Mitigation Plan (SHMP) that includes:
  - Nature-based methods for flood hazard mitigation to achieve reduction of water quantity and improvements to water quality and stream health.



# Commonwealth of Kentucky's 2018 SHMP Update

## Three major takeaways:

1. Identified stormwater and urban flooding as a specific concern
2. Need for innovative approaches to mitigation
3. Opportunity to institutionalize natural and nature-based solutions



# EPA Region 4 Pilot Project Goals

- 1. Integrate and institutionalize Green Infrastructure/Low Impact Development (GI/LID) into the state hazard mitigation planning process**
- 2. Conduct environmental risk assessments to identify areas where implementation of mitigation actions will address water quality, water quantity, and public health issues**
- 3. Promote and educate local communities on the co-benefits of GI/LID**



# Goal 1: Planning Integration

## POOR OR NO COMMUNITY PLANNING

- **Development affects both the quantity and quality of water by changing the natural flow of stormwater runoff in a watershed**
  - Increased runoff erodes stream channels and destabilizes banks
  - Increased pollutant loading in water ways

## CONDUCT A THOROUGH ANALYSIS OF...

- City Codes
- State Policies
- Development ordinances
- Building Codes
- Zoning Codes
- **Identify integration points where GI/LID language would be appropriate to include into the SHMP**



# Exploring Integration of EPA and FEMA Programs



Water Quality Planning		CRS Program Activity	Hazard Mitigation Planning	
CRS Activity Can Provide Valuable Information for Water Quality Planning	Information in Water Quality Planning Could Inform Achievement of the CRS Activity		CRS Activity Can Provide Valuable Information for the Mitigation Plan	Information in the Mitigation Plan Could Inform Achievement of the CRS Activity
		310 Elevation Certificates		•
•	•	320 Map Information Service	•	
		330 Outreach Projects	•	•
	•	340 Hazard Disclosure	•	
		350 Flood Protection Information	•	
		360 Flood Protection Assistance		•
		370 Flood Insurance Promotion		
•	•	410 Flood Hazard Mapping	•	•
	•	420 Open Space Preservation	•	•
	•	430 Higher Regulatory Standards	•	
•	•	440 Flood Data Maintenance	•	
•	•	450 Stormwater Management	•	•
•	•	510 Floodplain Management Planning	•	•
•	•	520 Acquisition and Relocation	•	
•	•	530 Flood Protection	•	
•	•	540 Drainage System Maintenance		
•		610 Flood Warning and Response	•	
•	•	620 Levees		•
•	•	630 Dams		•





# Steps Towards Creating a More Resilient Community through Planning

- Update and integrate land use plans, non-point source management plans, and watershed plans with hazard mitigation plans
- Amend existing policies, regulations, and budgets or create new ones to help achieve the communities flood resilience goals
- Conserve land and discourage development in vulnerable areas



## Flood Resilience Checklist

Is your community prepared for a possible flood? Completing this flood resilience checklist can help you begin to answer that question. This checklist was developed as part of the U.S. Environmental Protection Agency's Smart Growth Implementation Assistance project in the state of Vermont. More information about the project can be found by reading the full report, *Planning for Flood Recovery and Long-Term Resilience in Vermont*, found online at [www.epa.gov/smartgrowth/siga\\_communities.html#rec1](http://www.epa.gov/smartgrowth/siga_communities.html#rec1).

**What is the Flood Resilience Checklist?**

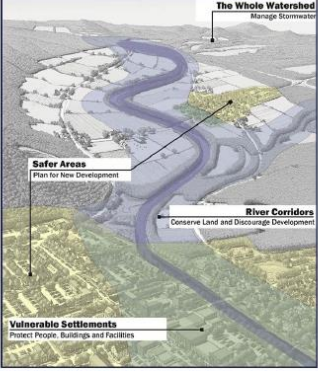
This checklist includes overall strategies to improve flood resilience as well as specific strategies to conserve land and discourage development in river corridors; to protect people, businesses, and facilities in vulnerable settlements; to direct development to safer areas; and to implement and coordinate stormwater management practices throughout the whole watershed.

**Who should use it?**

This checklist can help communities identify opportunities to improve their resilience to future floods through policy and regulatory tools, including comprehensive plans, Hazard Mitigation Plans, local land use codes and regulations, and non-regulatory programs implemented at the local level. Local government departments such as community planning, public works, and emergency services; elected and appointed local officials; and other community organizations and nonprofits can use the checklist to assess their community's readiness to prepare for, deal with, and recover from floods.

**Why is it important?**

Completing this checklist is the first step in assessing how well a community is positioned to avoid and/or reduce flood damage and to recover from floods. If a community is not yet using some of the strategies listed in the checklist and would like to, the policy options and resources listed in the *Planning for Flood Recovery and Long-Term Resilience in Vermont* report can provide ideas for how to begin implementing these approaches.



This graphic illustrates the four categories of approaches to enhance resilience to future floods. Credit: Vermont Agency of Commerce and Community Development.

1 July 2014

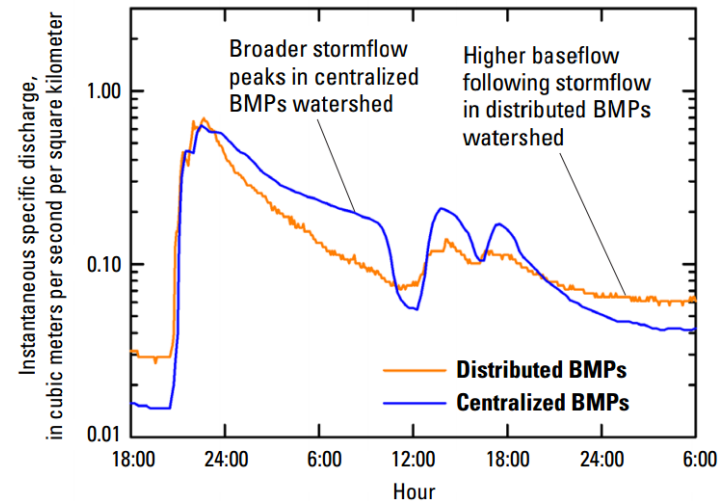
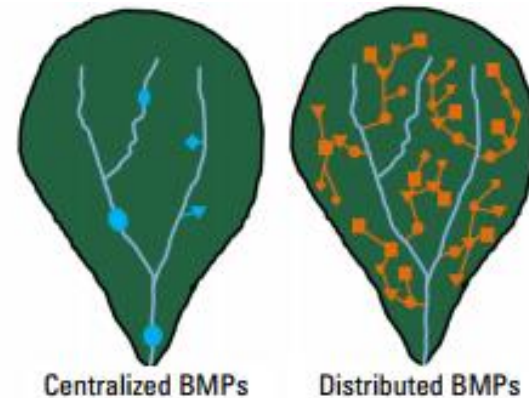
Online Checklist can be found at: <https://www.epa.gov/smartgrowth/flood-resilience-checklist>



# Goal 2: Targeted Water Resource Management Strategies

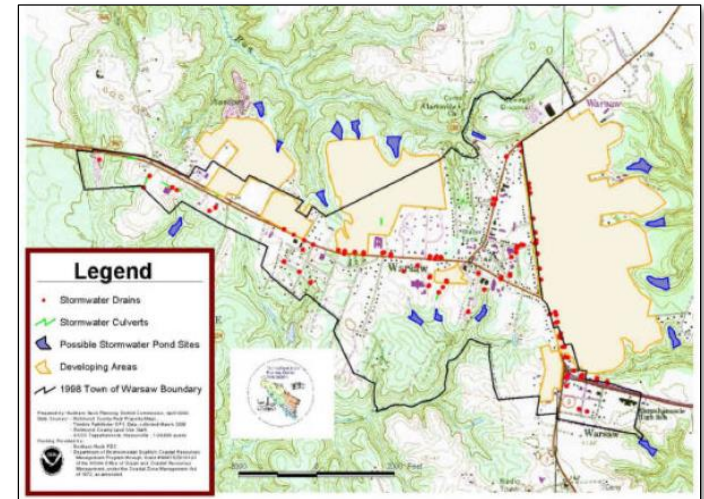
## CENTRALIZED VS. DISTRIBUTED

- Centralized Best Management Practices (BMPs) are often located in the stream channel or directly adjacent
- Distributed BMPs are dispersed throughout the watershed and can provide stormwater treatment in series
- Broader stormflow peaks with centralized network
- Higher base flow following stormflow in distributed network
- Combination of green and gray infrastructure strategies



# Environmental Risk Analysis Opportunities

- **Impaired Waters- TMDL Management**  
Goals, Nutrient Reduction, Nonpoint Source Pollution, Water Quality Standards
- **Agriculture Lands-** Retention of soil moisture, sequester carbon, increase farmer profit
- **Wetland Restoration Potential-** USEPA's Watershed Index Online (WSIO), Recovery Potential Tool (RPT), EnviroAtlas
- **Combined Sewer Overflow (CSO) Areas-** Eligible for consideration for funding to prevent NFIP losses (i.e. sewerage in basements)



# Potentially Restorable Wetlands on Agricultural Land

## EnviroAtlas Dataset Factsheet:

- Groundwater Recharge
- Nutrient and toxics filtration
- Carbon sequestration
- Flood water storage
- Improved water quality



EnviroAtlas  
people • health • nature • economy

Fact Sheet  
www.epa.gov/enviroatlas

### Potentially Restorable Wetlands on Agricultural Land

This EnviroAtlas map depicts potentially restorable wetlands, defined as agricultural areas that naturally accumulate water and contain some proportion of poorly-drained soils. The EnviroAtlas Team produced this dataset by combining three data layers—land cover, digital elevation, and soil drainage information.

#### Why are potentially restorable wetlands important?

EnviroAtlas provides information about the benefits provided by wetland ecosystems for clean and plentiful water. Although wetlands contain intrinsic and aesthetic values, they also offer more tangible ecosystem services such as wildlife habitat, biological diversity, soil loss reduction, [groundwater recharge](#), nutrient and toxics filtration, [carbon sequestration](#), and flood water storage.<sup>1</sup>

Major regional wetland losses have occurred across the conterminous U.S. over the last 200+ years with expanding coastal development, agricultural land conversion, and urbanization. For example, California and the five top agricultural Midwestern states have lost over 80% of their historical wetland area.<sup>2</sup> Wetland mitigation programs have not been able to significantly offset or reverse continued wetland losses.<sup>2,3</sup> Recently, working groups have formed to regain lost wetland area through a more comprehensive effort; they promote and coordinate research to quantify the benefits of wetlands and wetland restoration. For example, a model developed to simulate wetland water storage in a sub-basin of the Red River of the North (a system that floods frequently) showed that restoring 25% of drained wetlands would increase water storage by 27–32% basin-wide to help alleviate flooding.<sup>4</sup>

Wetlands also have the ability to store atmospheric carbon (carbon sequestration). Potentially restorable wetlands, by banking additional stored carbon, can make a significant contribution to climate change mitigation. Cultivated wetlands lose their stored soil organic carbon to the atmosphere, but soil organic carbon is rapidly restored when wetland function is restored.<sup>5</sup> A study in the Prairie Pothole region estimated that the 12.2 million acres of potentially restorable wetlands in that area have the potential to sequester 122.6 million tons of soil organic carbon over a 10-year



and locate areas with the greatest potential to restore wetland benefits in a cost-effective manner.

#### How can I use this information?

This map identifies agricultural lands in the U.S. with wetland restoration potential. This dataset may be overlaid with other data such as National Wetland Inventory (NWI) wetlands, ecoregions, or protected areas (PADUS) data. Information on wetland distribution and protection is useful to compare with areas of high wetland conversions in planning for optimal areas for restoration.

The potentially restorable wetlands layer overlaid with EPA assessed and impaired waters data may assist in planning to maximize wetland filtration and flood mitigation capabilities when implementing [Total Maximum Daily Loads](#) in streams. Wetlands restored alongside or upstream of impaired stream segments may help reduce sediment and nutrient loads to streams as well as runoff flow volume. Multiple wetland functions may be ranked in importance depending on local needs for water quality improvement, wildlife habitat, flood protection, nutrient filtration, or groundwater recharge. Another metric developed from this data, Percent Potentially Restorable Wetlands on Agricultural Land, is summarized by 12-digit hydrologic unit (HUC). Once high-ranking areas of

<https://enviroatlas.epa.gov/enviroatlas/DataFactSheets/pdf/Supplemental/PotentiallyRestorableWetlandsonAgriculturalLand.pdf>



# EPA's National Stormwater Calculator



<https://www.epa.gov/water-research/national-stormwater-calculator>

\*New Version released 4/10/2019





# Goal 3: Promote and Educate Co-Benefits of GI/LID

**Consolidate and share materials on Green Infrastructure and Low Impact Development to local communities at Kentucky Association of Mitigation Managers (KAMM) Regional Trainings**

- Improved water quality
- Source Water Protection
- Flood risk reduction
- Quality of life

## 5 design principles for LID

Conserve natural areas wherever possible

Minimize the development impact on hydrology

Maintain runoff rate and duration from the site

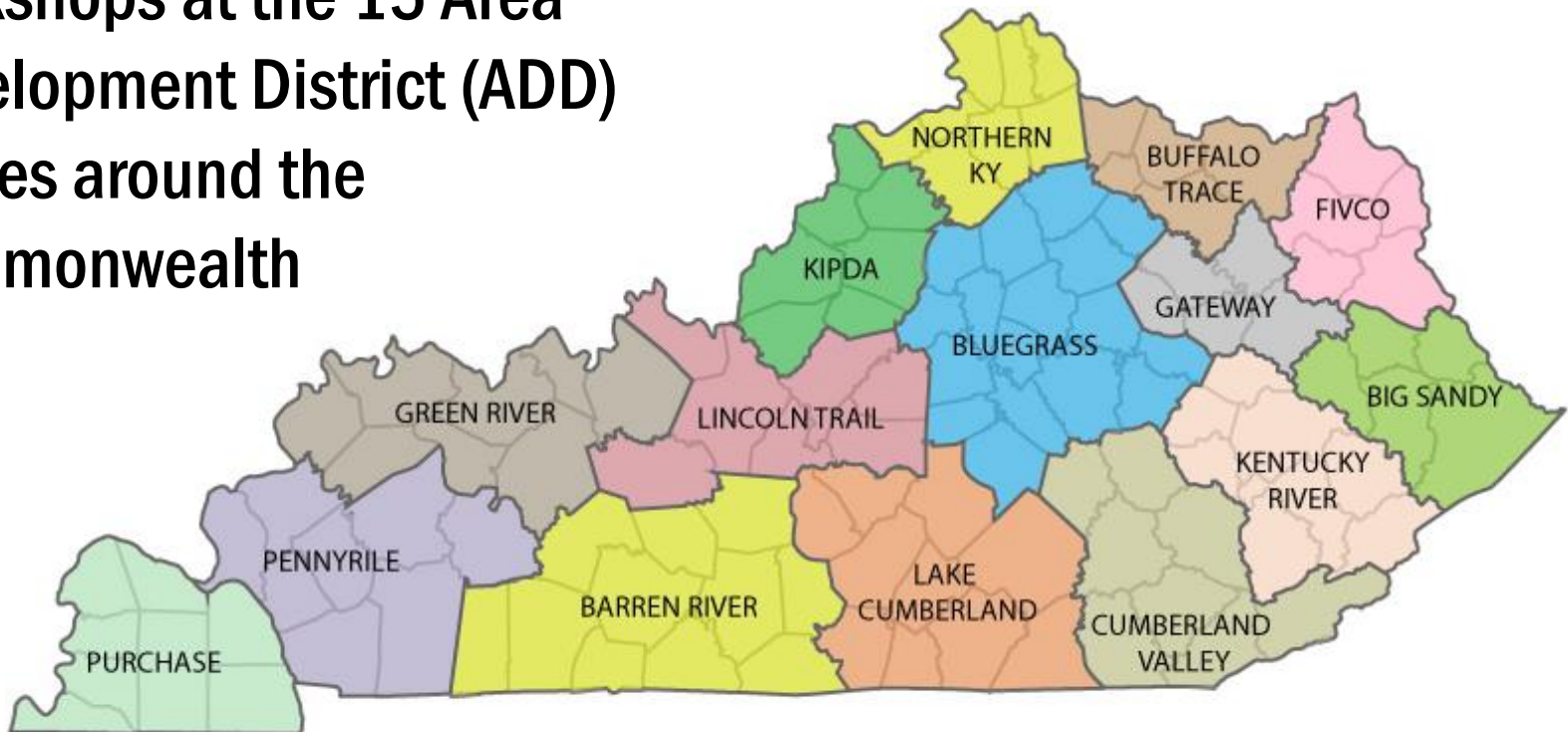
Scatter integrated management practices (IMPs) throughout your site

Implement pollution prevention, proper maintenance and public education programs



# Trainings and Workshops: Area Development Districts

Hold trainings and workshops at the 15 Area Development District (ADD) offices around the Commonwealth



# Sample Integration Workshop Exercise

Area of Mitigation Interest (AoMI) and  
Environmental Risk Analysis

Develop Problem Statements and Mitigation  
Actions

Identify potential Mitigation Projects that offer  
co-benefits of reduction of water quantity and  
improved water quality





# Overcoming Barriers to GI/LID Factsheet Series

## Barriers Confronting Municipalities

Local governments are in the best position to promote sustainable stormwater management on a larger scale. They also face some of the most complex challenges. Resources are limited, responsibilities are fragmented, and the tolerance for risk is generally low. These strategies should help municipalities overcome those challenges. See Also: [EPA's Barrier Buster Factsheet Series](#).



## Barriers Confronting Developers

Many developers are unaware of the potential for cost savings with green infrastructure. Even when developers are aware of the potential for cost savings, however, they may find it impossible to reconcile green infrastructure approaches with other codes and standards. Many of the strategies for overcoming these barriers require action by municipalities.



Factsheet and more information can be found at:

<https://www.epa.gov/green-infrastructure/overcoming-barriers-green-infrastructure>



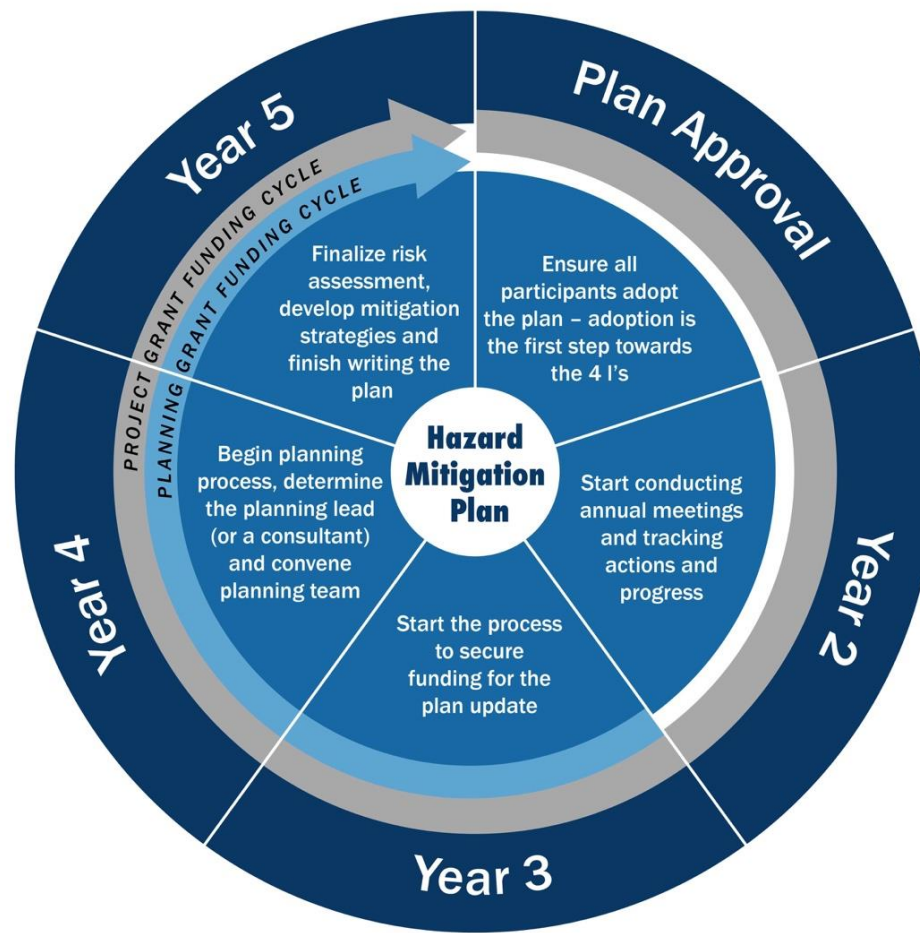
# Polling Question 3

**Are you interested in hearing more from other partners who might help to enhance hazard mitigation planning?**

- A. Yes, I am interested (please use the chat function to submit a partner you would like to hear from).**
- B. No, I am not interested.**



# Connecting to the Planning Cycle



# Region 3 2019 Coffee Break Webinar Schedule

**March**

Utilizing Universities as Partners in Hazard Mitigation Plan Drafting and Implementation

**May**

Floodplain Management and Hazard Mitigation Planning

**July**

Engaging the Arts in Mitigation & Planning

**September**

Revisiting Loss Avoidance and the Benefit Cost Analysis Process

**October**

Integrating EPA Programs and Hazard Mitigation Planning

**January**

Incorporating Historic and Cultural Resources in Your Hazard Mitigation Plan



# Upcoming FEMA Region III Coffee Break

**January 15, 2020**

## Incorporating Historic and Cultural Resources in Your Hazard Mitigation Plan

- To register, please follow the link\* to:

<https://femaregion3coffeebreaks.eventbrite.com>

- To sign up for additional FEMA Region III updates, please follow the link\* to:

<http://bit.ly/FEMA-Region-III>

*\*Please note, the links will be sent out after this presentation.*



# You May be Eligible for Professional Credits

Participation certificates and agendas will be sent to all participants who attend the whole session and participate in the polls.



American  
Institute  
of Certified  
Planners (AICP)  
Certification  
Maintenance

Credit course number:  
9188331



Association  
of State Floodplain  
Managers (ASFPM)  
Certified Floodplain  
Manager (CFM)  
Continuing Education  
Credit





# Resources

- [EnviroAtlas Fact Sheet](#)
- [EnviroAtlas Webpage](#)
- [Flood Resilience Checklist](#)
- [Local Mitigation Planning Handbook](#)
- [National Stormwater Calculator](#)
- [Overcoming Barriers to Green Infrastructure](#)
- [Storm Smart Cities: Integrating Green Infrastructure into Local Hazard Mitigation Plans](#)



## Potentially Restorable Wetlands on Agricultural Land

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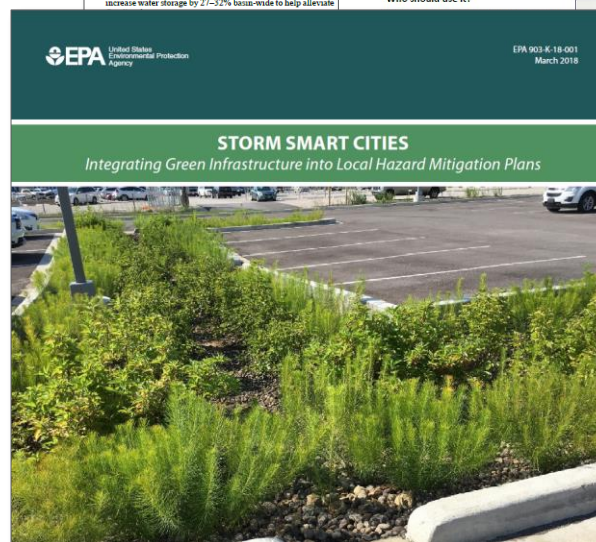
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The cover of the "Flood Resilience Checklist" document. At the top left is the EPA logo. At the top right is the "Smart Growth" logo. The title "Flood Resilience Checklist" is centered. Below the title is a question: "Is your community prepared for a possible flood? Completing this flood resilience checklist can help you begin to answer that question." This is followed by a paragraph of introductory text and a link to the full report. Below that is a section titled "What is the Flood Resilience Checklist?" with a paragraph of text. At the bottom left is the question "Who should use it?". On the right side of the document is a large map titled "The Whole Watershed" showing a river and surrounding areas. The map is divided into four categories: "Far Areas" (for long-term development), "River Corridors" (to conserve land and discourage development), "Vulnerable Settlements" (schools, buildings, and facilities), and "The Whole Watershed" (management). A caption below the map states: "This diagram illustrates the four categories of approaches to enhance resilience to future floods. Credit: Vermont Agency of Commerce and Economic Development." The date "July 2014" is printed at the bottom right of the document.



# Thank you for Participating Today!



We hope to see you all at the next Coffee Break!





# Questions?

Please type your question in the chat!





# FEMA

