Lessons Learned on Integrating Water Quality and Nature-based Approaches into Hazard Mitigation Plans

Webcast sponsored by EPA's Watershed Academy

Thursday, March 14, 2019, 1:00pm – 3:00pm Eastern

Speakers:

- **Myra Schwartz**, EPA Region 1, Assistance & Pollution Prevention Office
- **Carrie Robinette**, Hazard Mitigation Specialist, Federal Emergency Management Agency (FEMA)
- **Josh Bruce**, Director, Oregon Partnership for Disaster Resilience
- **Chris Chiles**, Executive Director, Region 2 Planning and Development Council

Webcast Logistics

- **To Ask a Question** – Type your question in the "Questions" tool box on the right side of your screen and click "Send."
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- **Slides & Recording** – The slides are posted and a recording will be available within 2-3 weeks. https://www.epa.gov/watershedacademy/lessons-learned-integrating-water-quality-and-nature-based-approaches-hazard
- **Certificate of Attendance** – a certificate of attendance will be available at the end of the webcast. We will provide directions to retrieve this at the end of the webcast.

Speakers

- **Myra Schwartz**, EPA Region 1, Assistance & Pollution Prevention Office
- **Carrie Robinette**, Hazard Mitigation Specialist, Federal Emergency Management Agency (FEMA)
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Lessons Learned on Integrating Water Quality and Nature-based Approaches into Hazard Mitigation Plans

Water Quality and Natural Hazards

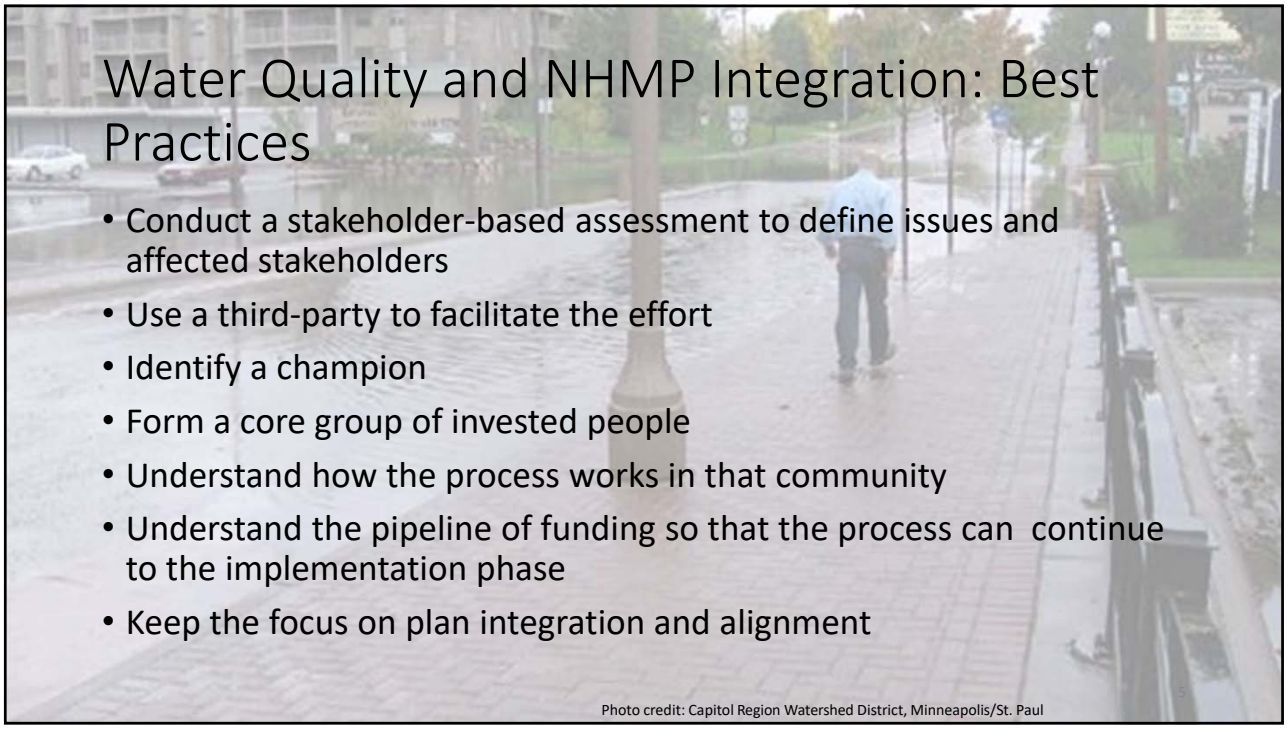
- Nonpoint Source pollution is exacerbated by many natural hazards
  - **Drought + Wildfires + Landslides + Flooding = increased scour/sediment, erosion, ash, etc. increased pollutant contact and loads in receiving waters**
- Restoration of natural hydrology can improve water quality while reducing flood risks –wetlands, riparian areas, floodplains
- Nature-based infrastructure can help reduce impact of storms
- States can leverage resources by integrating into HMP water quality projects that also reduce risks from natural hazards
- Water quality programs can play an important role in shaping these projects

Incorporating Water Quality into Natural Hazard Mitigation Plans (NHMP)

- **Project Goals:**
  - Expand the range of tools used to mitigate hazards
  - Institutionalize water quality planning into NHMP
  - Enable FEMA funds to be directed to projects benefitting water quality
  - Integrate Green Infrastructure strategies as NHMP action items to reduce natural hazard risk and achieve co-benefits
  - Improve water quality, climate mitigation, habitat protection, air quality, and quality of life

EPA/FEMA Proof-of-Concept Pilots

- **Goal**: Find out how to integrate LID/GI/Watershed Planning into hazard mitigation plans by providing technical assistance to willing communities, ultimately reducing hazards while improving water quality
- **Approach**: Modest funding for regional EPA and FEMA teams to engage with local community or state.
- **Project locations**: Ashland, Oregon; Huntington, WV; State of Massachusetts; Albany, NY; State of Kentucky; Lower Meramec Valley, MO; and Denton, TX
- **Status**: Ashland, Huntington, Albany, and State of Massachusetts – complete.



Water Quality and NHMP Integration: Best Practices

- Conduct a stakeholder-based assessment to define issues and affected stakeholders
- Use a third-party to facilitate the effort
- Identify a champion
- Form a core group of invested people
- Understand how the process works in that community
- Understand the pipeline of funding so that the process can continue to the implementation phase
- Keep the focus on plan integration and alignment

Photo credit: Capitol Region Watershed District, Minneapolis/St. Paul

Thinking Mitigation…

Using Mitigation Planning to Implement Broad Based Approaches to Risk Reduction…

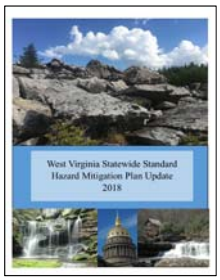
Carrie Robinette, Lead Emergency Management Specialist
FEMA Region III, WV FIT
March 14, 2019

Hazard Mitigation Defined…

Long-term; sustainable actions reducing the loss of life and damage to property due to disasters…

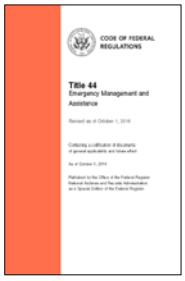
Mitigation Starts With…

Planning!

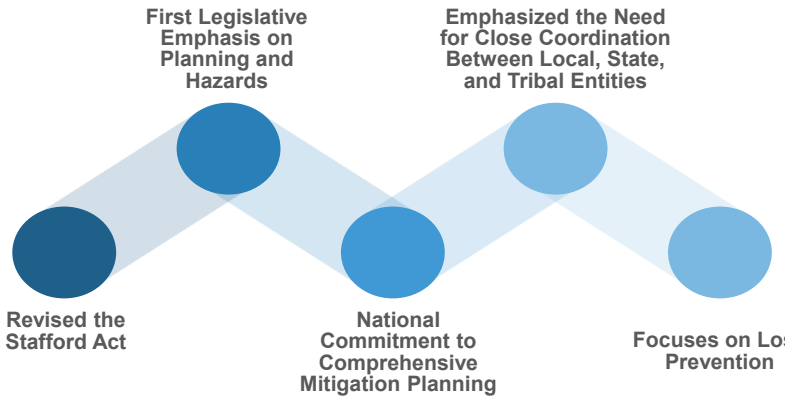


Legislative Authority

- Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended
- Title 44 Code of Federal Regulations Section 201 (44 CFR 201)
  - Required in order for a community to be eligible for FEMA mitigation funding
  - Must be updated every five years to be compliant.
- Disaster Mitigation Act of 2000



Disaster Mitigation Act of 2000



Mitigation Planning Steps...

Mitigation really starts with your communities planning process…

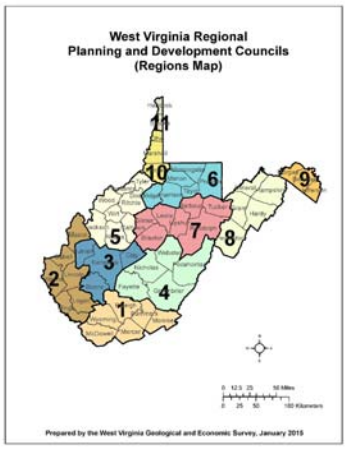
- Opportunity for communities/counties to identify partners that can help them achieve their goals and objectives.
- Partners can be:
  - Elected officials,
  - Emergency Management Officials,
  - Utilities/Co-Ops
  - Local Planning and Permitting Offices,
  - Community action groups representing private citizens,
  - Private Non-Profits,
  - State Agencies,
  - Federal Agencies

Whole Community Approach to Hazard Mitigation…

Whole Community is a means by which residents, emergency management practitioners, organizational and community leaders, and government officials can collectively understand and assess the needs of their respective communities and determine the best ways to organize and strengthen their assets, capacities, and interests.

Planning in West Virginia…an opportunity…

Counties and communities participate in Local Mitigation Plans through one of eleven Planning and Development Councils…



Unique opportunity for WV…

- PDC's update and monitor Local Mitigation Plans
- PDC's have assisted communities in developing project applications
- PDC's can assist communities to pull together resources from mitigation partners and even multiple communities to achieve mitigation success!

Answers two overarching questions…

1) What hazards is my community susceptible to?
2) What is vulnerable in my community to those hazards?
   - Population
   - Infrastructure
   - Critical Facilities

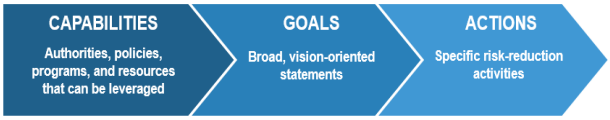
Most common disaster across the United States?

Flooding!

Mitigation Strategy…

Answers two guiding questions…

1) What are your communities goals and objectives to be achieved through mitigation?
2) What steps or actions is your community going to implement to achieve these goals and objectives?



Common Mitigation Measures for Flooding…

- Acquisition
- Elevation
- Reconstruction
- Flood-proofing

MITIGATION: Elevated Home by the River

MITIGATION: Property Acquisition

Lets Talk About Flooding…

- 98% of communities across the United States have been impacted by flooding events.

- Does not recognize community, county, state or even floodplain boundaries.

Changing Approaches to Mitigation…

- Green Infrastructure
- Aquifer Storage and Recovery
- Floodwater Diversion, Storage and Recovery
- Floodplain and Stream Restoration
- Resilient Infrastructure

Broad based approaches to address flooding issues experienced by your community!

Green Infrastructure

- Sustainable approach to natural landscape preservation, water resources, and stormwater management
  - Allows more stormwater to infiltrate ground and re-charge groundwater supplies
  - Attenuates stormwater peak flow to reduce inundation of stormwater system
- Most effective for higher frequency, lower impact events
- Can be scaled based on community need/site conditions

Aquifer Storage and Recovery

- Subsurface storage of surface water runoff and groundwater in natural aquifer
  - Takes advantage of seasonal variations in surface water runoff and periods of high precipitation leading to more surface and ground water availability
  - Storage underground protects water from pollutants, evaporation, and extreme weather events
- Risk Reduction
  - Can provide flood hazard reduction by reducing peak discharges and discharge volumes from reservoirs or storm water retention/detention systems
  - Harvest excess storm/surface water for later use in dry periods (e.g. drought)

Flood Diversion and Storage

- Diverting storm or floodwaters into lakes, channels, floodplains, irrigation canals, wetlands, or other natural or manmade green infrastructure surface storage (e.g. bio-swales, bio-retention, bio-detention basins)
- Attenuate peak flood flows in adjacent and downstream communities
  - Directs flood waters away from property to bio-retention or bio-detention basin
- Floodwater is detained and released slowly to facilitate ground infiltration/seepage
  - Recharge groundwater supply/water table using green infrastructure methods
  - Recharge wells can be used to resupply an aquifer, especially unconfined
- Harvest excess storm/surface water for later use in dry periods (e.g. drought) for drinking water or irrigation

Floodplain and Stream Restoration

- Restores the structure and function of floodplains and their ecosystems as close to natural condition as possible.
  - Restore or increase connectivity and storage capacity
  - Restore or increase the physical stability, hydrology, and biological functions of aversely affected stream and river banks to restore a natural stable riparian system
  - Can be beneficial for recharging both surface water and groundwater supplies
  - Provide erosion mitigation to stabilize banks, avoid bank collapse

Next Steps…Implementation…

Funding and Implementation…

FEMA Funding for Mitigation Projects…

HMGP
HAZARD MITIGATION GRANT PROGRAM

PDM
PRE-DISASTER MITIGATION

FMA
FLOOD MITIGATION ASSISTANCE

Who Can Apply?

Table 1: Eligible Subapplicants

Entity	HMGP	PDM	FMA
State agencies	✓	✓	✓
Federally-recognized tribes	✓	✓	✓
Local governments/communities[1]	✓	✓	✓
Private nonprofit organizations (PNPs)	✓		

[1] Local governments/community may include non-federally recognized tribes, or consistent with definition of local government at 44 CFR 201.2, may include any Indian tribe or authorized tribal organization, or Alaska Native village or organization that is not federally recognized per 25 U.S.C. 479a et seq.

2018-2022 Strategic Plan...

FEMA's Commitment to Mitigation -

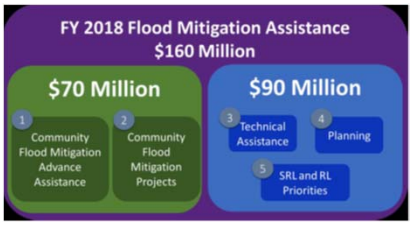
FY-2018 Pre-Disaster Mitigation Funding…

- $235.2 million in mitigation funding allocated by Congress
  - Up to $4 million for mitigation projects per sub-application
  - Up to $10 million for resilient infrastructure projects per sub-application
- Annually Allocated
- Competitive…*however*…

All 50 States, the District of Columbia, and U.S. territories are eligible to receive an allocation of 1% of the appropriation, or $575,000, in accordance with Section 203(f)(1) of the Stafford Act!

FY-2018 Flood Mitigation Assistance Funding

- $70 million for community flood mitigation projects
  - $100,000 for Advanced Assistance
  - $10 million for community flood mitigation projects
- Remaining $90 million for other FMA priorities
  - $50,000 for State Planning projects
  - $25,000 for local mitigation planning projects



Mitigation Plans can be a conduit for funding through other grant or capital improvement programs.

Funding Opportunities from Mitigation Partners…

- Environmental Protection Agency (EPA)
- U.S. Department of Housing and Urban Development (HUD)
- U.S. Army Corps of Engineers (USACE)
- Economic Development Administration (EDA)
- State or Local; non-federal funding sources such as planning or development councils, waterway commissions

Take Aways…

- Planning is a tool that communities can use to maximize resources available.
- Mitigation partners are an invaluable resource to communities in implementing mitigation measures to achieve goals and objectives.

Additional Resources

- For further information about mitigation planning:
  - https://www.fema.gov/multi-hazard-mitigation-planning
- For further information about planning guidance:
  - https://www.fema.gov/media-library/assets/documents/31598
- For mitigation plan resources:
  - https://www.fema.gov/hazard-mitigation-planning-resources
- For information about implementing a mitigation plan:
  - https://www.fema.gov/media-library/assets/documents/30627
- For information on mitigation funding:
  - https://www.fema.gov/hazard-mitigation-assistance

Questions?

Nature-Based Solutions to Hazard Mitigation Planning

Josh Bruce

EPA United States Environmental Protection Agency

FEMA

UNIVERSITY OF OREGON | School of Planning, Public Policy and Management | Institute for Policy Research and Engagement

1. Ashland, OR: Pilot Project

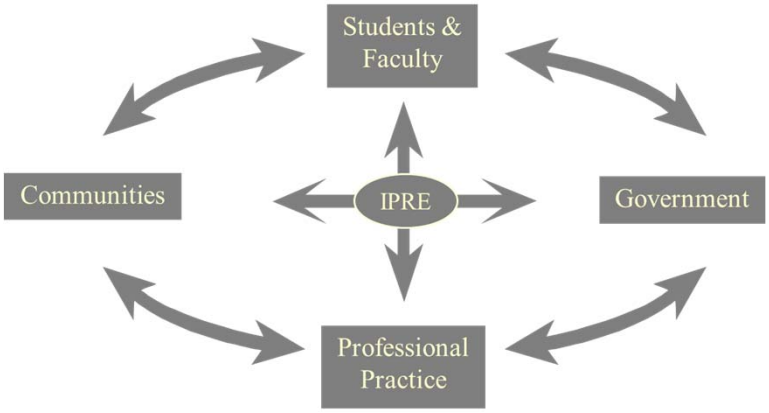
EPA United States Environmental Protection Agency

FEMA

CSC Community Service Center

UO Service Learning Model

The **Institute for Policy Research and Engagement** links the energy, expertise, and innovation of the UO with the planning and public policy needs of Oregon communities.



IPRE Focus Areas:

- Agile Strategy Development
- Strategic DoingTM
- **Natural Resources**
- Social Planning
- Community and Economic Development
- Energy
- Food Systems
- Housing
- Transportation
- Parks & Recreation Planning
- **Natural Hazards and Community Resilience**

Image Source: UO Community Service Center

IPRE Delivery models

Campus Based

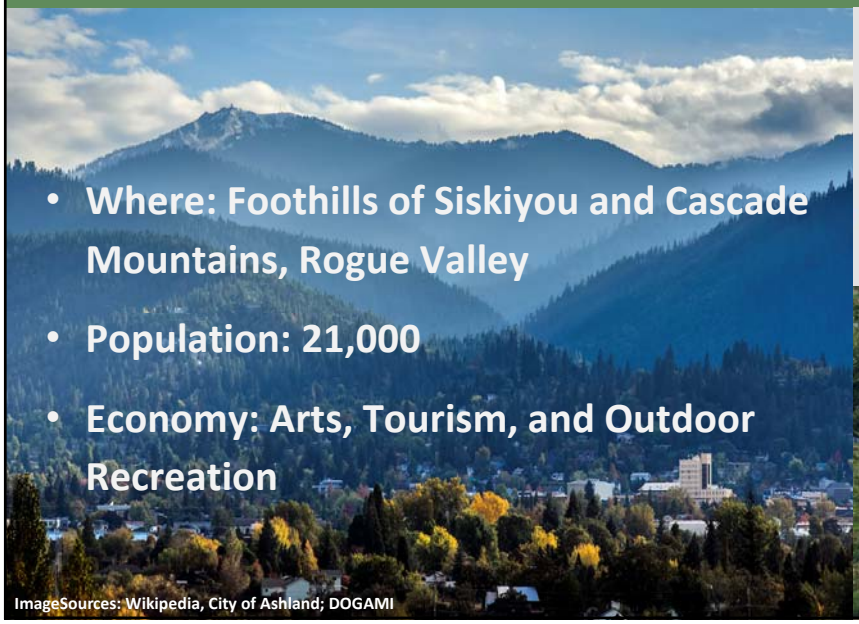
- Classes
- Graduate student employees
- Interns
- $5K to $500K; 3-months to 3-years

Field Based

- Dedicated AmeriCorps service member
- 11 months; 1,700 hours
- $22,000 cash match

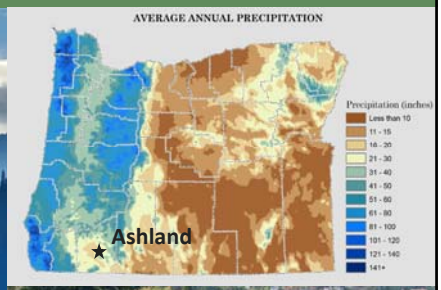
Image Source: UO Community Service Center

Pilot Project: Ashland, Oregon



- Where: Foothills of Siskiyou and Cascade Mountains, Rogue Valley
- Population: 21,000
- Economy: Arts, Tourism, and Outdoor Recreation

ImageSources: Wikipedia, City of Ashland; DOGAMI



Key Project Partners

Federal Emergency Management Agency (FEMA)

Brett Holt, FEMA Region 10 Mitigation Planning Program Manager

Environmental Protection Agency (EPA)

Krista Mendelman, EPA Region 10 Green Infrastructure Coordinator

Lisa Hair, EPA Headquarters Office of Water

City of Ashland, OR

Mike Fought, Public Works Director

Ciara Marshall, Water Resource Technician

Chris Chambers, Fire and Rescue Forestry Division Chief

Brandon Goldman, Senior Planner

Mark Schexnayder, Planner

Jason Wegner, GIS Manager

Juilie Smitherman, Water Conservation Specialist

Stephanie Danyi, Water Conservation Assistant

Jason Ribystelli, Wastewater Collections Supervisor

Avram Biondo, Street Division Supervisor

Steve Burkhalter, Streets Utility Technician

Technical Advisory Team

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Chris Bayham, DEQ Clean Water State Revolving Fund Circuit Rider

Alyssa Mucken, Oregon Department of Water Resources Program Coordinator

Don Boucher, USFS Stewardship Coordinator

Christine Shirley, DLCD NFIP Coordinator

Greg Stabach, RVCOG Natural Resources Manager

Jennie Morgan, RVSS Stormwater Permit Coordinator

Angie Lane, OEM State Hazard Mitigation Officer

Joseph Murray, OEM Hazard Mitigation Planner

Jed Roberts, DOGAMI Geologic Survey and Services Program Manager

Gustavo Monteverde, DOGAMI Geohazards Analyst

Bill Burns, DOGAMI Engineering Geologist

Stacey Detwiler., Rogue Riverkeeper Conservation Director

Michelle McMullin, NOAA Fisheries West Coast Region

UO Community Service Center Team

Josh Bruce, OPDR Director and Project Director

Ethan Lockwood, Project Manager

Emily Fenster, Student Consultant

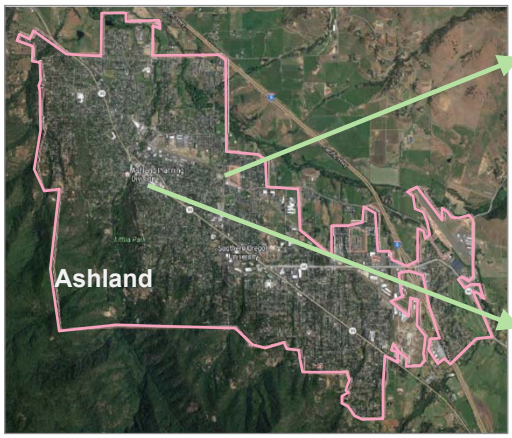
Emily Hajarizadeh, Student Consultant

Michael Johnduff, Student Consultant

Kristen Sabo, Student Consultant

Ashland's Existing GI/LID Leadership

- **40 LID Stormwater projects as of 2010**
- **Multiple Action Items in NHMP with GI/LID overlap**
  - Community education
  - Evaluate land use in high risk areas



Falcon Heights Subdivision; Dry detention

North Mountain Park: Sediment basin, vegetated swales, constructed wetland

Image Source: Google Maps; City of Ashland

Environmental and Community Co-Benefits

GI and LID Example Best Management Practices	Natural Hazard Mitigation			Co-Benefits	
	Flood	Fire	Landslide	Water Quality	Community Benefits
Minimize Impervious Area					
Limit Disturbance of Undeveloped Land					
Prevent Runoff from Landscape and Hardscape Areas					
Protect Land and Ecosystems					

Source: Best Management Practice from Low Impact Development in Western Oregon: A Practical Guide for Watershed Health with CSC additions. **Co-Benefit scoring from CSC research and should be interpreted as opportunities for further investigation.**

Economic Co-benefits

Natural Hazard Mitigation Saves!

"[S]ociety saves $6 for every $1 spent through mitigation grants funded through select federal agencies . . ."

The National Institute of Building Sciences, Multihazard Mitigation Council

Source: Natural Hazard Mitigation Saves - 2017 Interim Report

Hazards: Flooding

Jackson County NHMP

Table 3-8 Flood Summary

Hazard	Flood (Riverine)
Type	Climatic
Speed of Onset	Slow to moderate
Location	Mapped flood zones, floodplain
Extent	Moderate to severe
Prior Occurrence	17 significant events since 1964
Probability	~34% overall; 1% annual within SFHA

Sources: Oregon NHMP, DOGAMI, FEMA, analysis by OPDR

- **Ashland flood probability is HIGH (One event likely in a 10-35 year period)**
- **Ashland flood vulnerability is MODERATE (higher than county)**

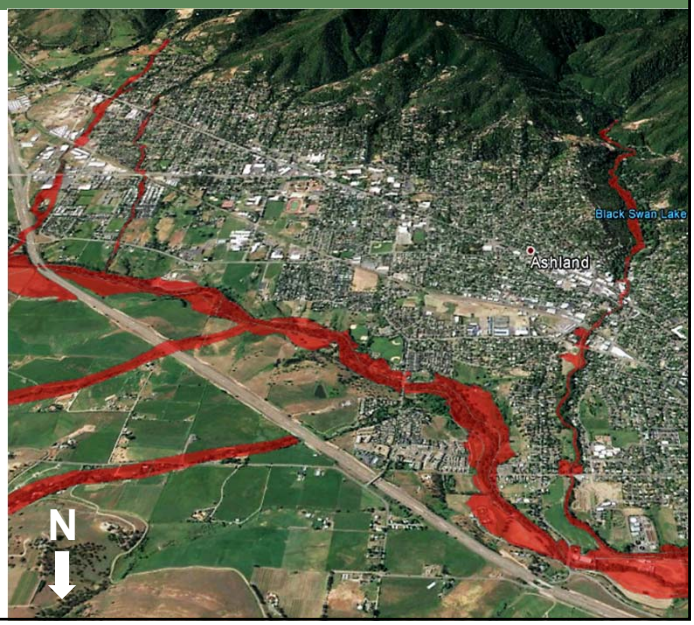
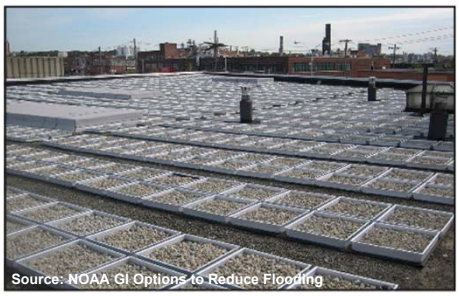


Image Source: Jackson County RISK Flood Map KML in Google Earth

Flood Mitigation Examples

Green Roof

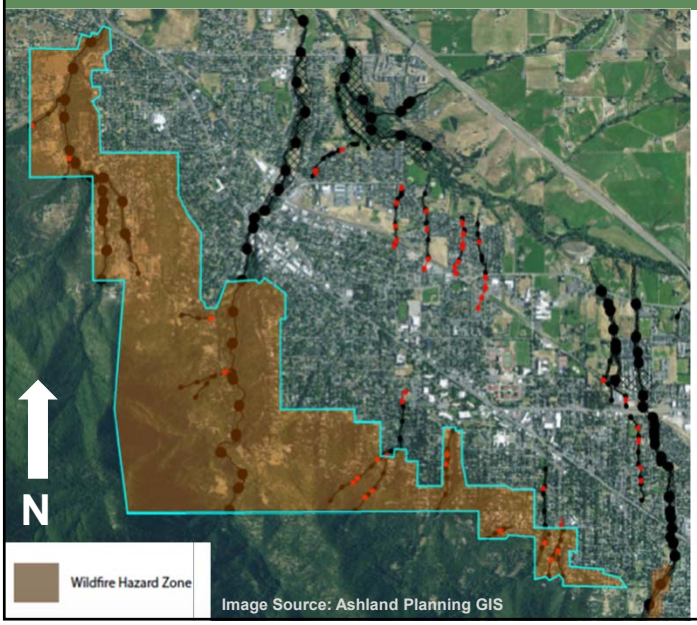
Bioswales



Blue Roof

Restored Wetlands

Hazards: Wildfire



Jackson County NHMP

Table 3-18 Wildfire Summary

Hazard	Wildfire
Type	Climatic, Human Caused
Speed of Onset	Moderate to rapid
Location	Countywide, Wildland Urban Interface
Extent	Minor to extreme
Prior Occurrence	6 major events from 2012-2017
Probability	100% for minor-moderate events, 70-80% for extreme events

Sources: Oregon NHMP, Rogue Valley Integrated Community Wildfire Protection Plan (2017), analysis by OPDR

- **Probability of wildfire in Ashland is HIGH.**
- **Vulnerability is also HIGH; 1,400 homes in and around Ashland are inside the Wildland Urban Interface (WUI) boundary.**

Wildfire Mitigation Examples

Indigenous wildflowers and native plants can be drought tolerant and fire resistant.

Green lawns and other irrigated areas can serve as fire breaks.

Careful spacing and trimming of trees and shrubs can reduce fire risk.

Deciduous trees can be spaced to mitigate risk within the home ignition zone.

Images Source: Bennet, Max. Landscaping with Fire-Resistant Plants. OSU Extension Service

Hazards: Landslide/Earthquake

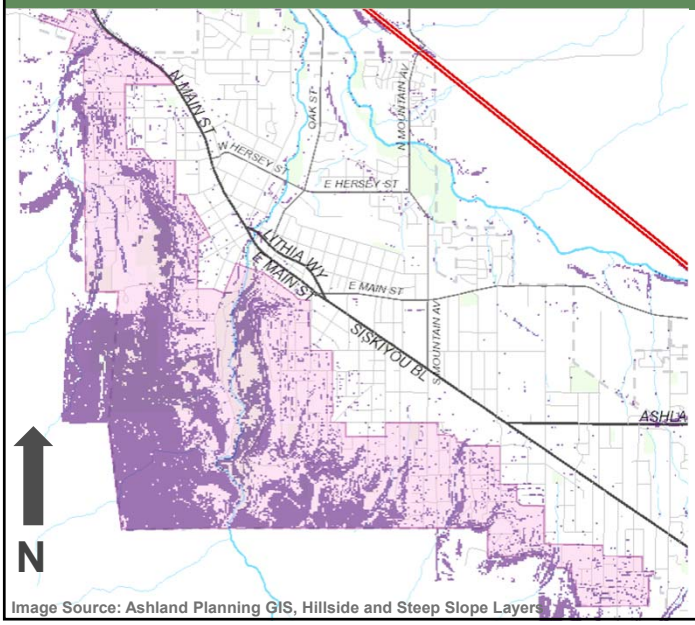


Image Source: Ashland Planning GIS, Hillside and Steep Slope Layers

Jackson County NHMP

Table 3-10 Landslide Summary

Hazard	Landslide
Type	Climatic/Geologic
Speed of Onset	Slow to rapid
Location	Steep slopes, weak geology
Extent	Minor to severe, most highly concentrated in southeastern, central, and centraleastern portions of the county including areas east of I-5 and along the North Fork Little Butte Creek
Prior Occurrence	10 significant events since 1974
Probability	~24% overall

Sources: Oregon NHMP, DOGAMI, analysis by OPDR

- **Probability of landside in Ashland is HIGH.**
- **Probability of earthquake in Jackson County is MEDIUM.**

Landslide/Earthquake Mitigation Examples

Image Source: Polster Environmental Services Ltd

Apply soil stabilization measures, such as planting soil- stabilizing vegetation on steep, slopes to mitigate landslides.

NOTE: Highlights *potential* conflicts between wildfire and landslide GI/LID mitigation options.

Ashland Pilot Overview

Integrate GI/LID strategies as NHMP action items to reduce natural hazard risk and achieve co-benefits in Ashland.

- **Ordinance Review**
- **Ecosystem Service Evaluation**
- **GIS Assessment**
- **NHMP Actions Review and Recommendations**

Image Source: City of Ashland 1997 Flood, Downtown

2. Ashland, OR: Developing NHMP Action Items

EPA United States Environmental Protection Agency

FEMA

CSC Community Service Center

Existing NHMP Action Review

- Seven existing NHMP actions with GI/LID overlap
- Examples:
  - Water Treatment Plant Relocation:
    Construct and place into service a water treatment plant in a new location that is not prone to landslides.
  - Ashland Forest Resiliency Project:
    Identify funding to complete the implementation of the current Ashland Forest Resiliency Stewardship Project (AFR).
  - Ashland Firewise Communities:
    The Firewise program is Ashland's primary tool for residential vegetation management and public education of fire resistant landscaping and construction.

Recommendation 1: Floodwater Storage

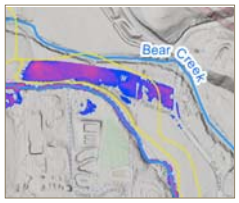
Increase floodwater storage by restoring wetlands and improving floodplain functionality at specific sites

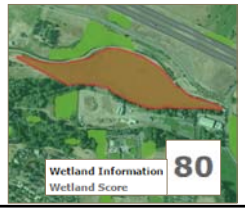
Image Sources: City of Ashland

Recommendation 1: Floodwater Storage

Analysis Steps

1. ID Impervious Surface and Floodplain
2. Compare with updated flood depth grids
3. ID wetland restoration potential (team used Oregon Explorer Wetland Restoration tool)





Project Site Analysis: Ashland Wastewater Treatment Plant

Hazard Exposure
- Located in 100 year flood plain
- Severe (>35%) Steep slopes
- Impervious surfaces; heat

Environmental Impact:
- Sited between protected wetland area and City Park
- Next to agricultural area
- Next to Ashland Creek

Low Impact Development
- Pervious pavement; stormwater conveyance; bioswale catchment and infiltration located next to impervious areas.

Green Infrasrtucture
- Wetland restoration; soil remediation for sediment retention and increased infiltration.

Recommendation 2: Green Streets Expansion

City-led implementation of green streets in high impervious surface drainages and near floodplains

Image Sources: Philadelphia Water Department Green Streets Design Manual; Corvallis, Oregon "Healthy Streets, Healthy Streams Program"

Recommendation 2: Green Streets Expansion

Use pervious streets, planting strips, minimizing street widths, water retention along impervious surfaces on drainages with over 8% impervious surfaces

- Co-Benefits:
  - Improve water quality
  - Reduce water quantity
  - Reduce risk of flooding and sedimentation
  - Aquifer recharge

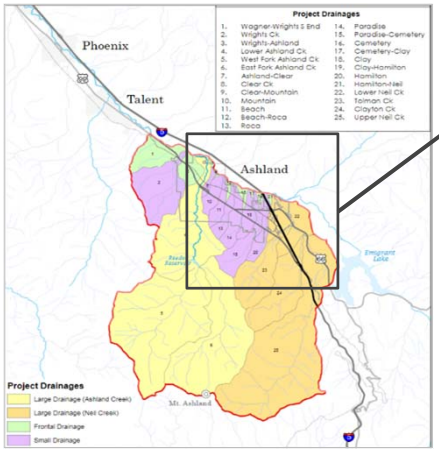
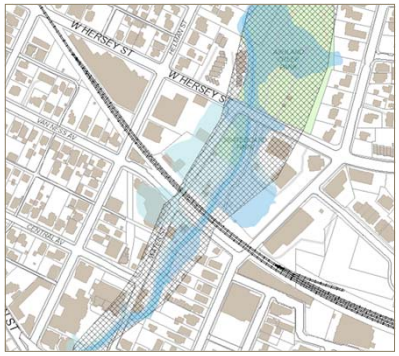


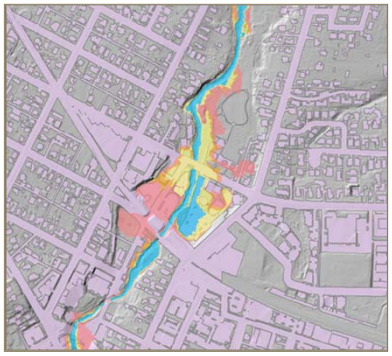
Image Sources: Ashland Inter-City Drainage from 2007 Bear Creek Watershed Assessment; Philadelphia Water Department Green Streets Design Manual

Recommendation 3: LID Retrofit Incentives

GI/LID Retrofit Incentives: Create incentive programs for private landowners to reduce impervious surface.



Ashland FEMA 2009 Floodmap with Ashland Modified Floodplain



Impervious Surface and Floodplain

Pavement Removal i.e. “Depave”

Image Sources: DOGAMI, City of Ashland GIS Maps, DEPAVE’s How to Depave: Guide to Freeing Your Soil

Recommendation 3: LID Retrofit Incentives

GI/LID Retrofit Incentives: Create incentive programs for private landowners to reduce impervious surface.

Select sites with high impermeability and use pervious streets, depavement to reduce runoff locally and downstream by offering rebates or stormwater credits for future improvement projects minimizing impervious surface.

- Co-Benefits:
  - Improve water quality
  - Reduce water quantity
  - Reduce risk of flooding and sedimentation

Image Source: Ashland Lawn Replacement Rebate Program

Rate Recommendations

FEMA STAPLEE Feasibility Review Criteria

Social – Socially acceptable? Equitable?

Technical – Feasible? Achievable?

Administrative – Staff, funding, time capability?

Political – Politically acceptable? Public support?

Legal – Compliance? Authority? Likely challenged?

Economic – Reasonable? Do benefits outweigh costs?

Environmental – Positive or negative affects?

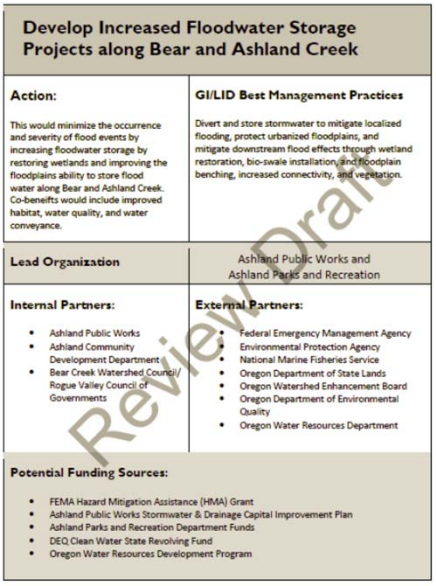
Workshop participant evaluation and scoring

STAPLEE Criteria	Workshop Feasibility Score Average (0-2)
Recommendation 1: Increased Floodwater Storage Initiative	
Technical	1.3
Administrative	0.8
Political	1.2
Economic	0.3

Recommendation 2: Green Streets City-wide Expansion Program	
Technical	1.0
Administrative	0.8
Political	1.0
Economic	0.5

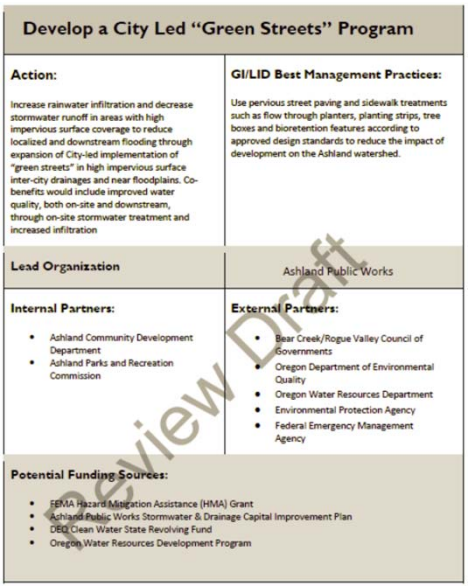
Recommendation 3: Targeted Low Impact Development Retrofit Incentive Program	
Technical	0.8
Administrative	0.8
Political	0.8
Economic	0.7

Final NHMP recommendations



Develop Increased Floodwater Storage Projects along Bear and Ashland Creek

Action:	**GI/LID Best Management Practices**
This would minimize the occurrence and severity of flood events by increasing floodwater storage by restoring wetlands and improving the floodplains ability to store flood water along Bear and Ashland Creek. Co-benefits would include improved habitat, water quality, and water conveyance.	Divert and store stormwater to mitigate localized flooding, protect urbanized floodplains, and mitigate downstream flood effects through wetland restoration, bio-swale installation, and floodplain benching, increased connectivity, and vegetation.
Lead Organization	Ashland Public Works and Ashland Parks and Recreation
Internal Partners: • Ashland Public Works • Ashland Community Development Department • Bear Creek Watershed Council/ Rogue Valley Council of Governments	**External Partners:** • Federal Emergency Management Agency • Environmental Protection Agency • National Marine Fisheries Service • Oregon Department of State Lands • Oregon Watershed Enhancement Board • Oregon Department of Environmental Quality • Oregon Water Resources Department
Potential Funding Sources: • FEMA Hazard Mitigation Assistance (HMA) Grant • Ashland Public Works Stormwater & Drainage Capital Improvement Plan • Ashland Parks and Recreation Department Funds • DEQ Clean Water State Revolving Fund • Oregon Water Resources Development Program	



Develop a City Led "Green Streets" Program

Action:	**GI/LID Best Management Practices:**
Increase rainwater infiltration and decrease stormwater runoff in areas with high impervious surface coverage to reduce localized and downstream flooding through expansion of City-led implementation of "green streets" in high impervious surface inter-city drainages and near floodplains. Co-benefits would include improved water quality, both on-site and downstream, through on-site stormwater treatment and increased infiltration	Use pervious street paving and sidewalk treatments such as flow through planters, planting strips, tree boxes and bioretention features according to approved design standards to reduce the impact of development on the Ashland watershed.
Lead Organization	Ashland Public Works
Internal Partners: • Ashland Community Development Department • Ashland Parks and Recreation Commission	**External Partners:** • Bear Creek/Rogue Valley Council of Governments • Oregon Department of Environmental Quality • Oregon Water Resources Department • Environmental Protection Agency • Federal Emergency Management Agency
Potential Funding Sources: • FEMA Hazard Mitigation Assistance (HMA) Grant • Ashland Public Works Stormwater & Drainage Capital Improvement Plan • DEQ Clean Water State Revolving Fund • Oregon Water Resources Development Program	

3. Ashland, OR: Pilot Project Lessons Learned

EPA United States Environmental Protection Agency

FEMA

CSC Community Service Center

Lessons Learned – What Worked

Expanded Stakeholder Participation

- DEQ, Oregon Water Resources Department, NGOs

Collaboration with Department of Geology and Mineral Industries

- FEMA Risk MAP CTP – expanded impact
- Existing mapping protocol

Increased potential funding options

- DEQ, EPA, State Water Resources Fund

Lessons Learned – Stakeholder Engagement

Issue	Challenge	Impact
Participation	Funding lag contributed to lack of local capacity and buy-in at project kickoff	Limited local buy in and participation
Participation	Challenge getting the "right" people in the room	Workshops not as affective as they could have been
Participation	Engineering feasibility of specific interventions questioned	Conversation about potential strategies got sidetracked at times
Participation	Engineering disciplines not well represented	It was hard to address specific questions about GI/LID project feasibility
Participation	Limited private sector involvement	Public sector reluctant to consider private sector interventions.
Language	Lack of common language between GI/LID and NHMP audiences	Level of information was at times basic for some and advanced for others. Challenging to see shared benefits at times.
Language	Discussing GI/LID economic benefits appeared to resonate better than social, environmental, or hazard risk reduction benefits	Conversation tended to focus on short-term costs and benefits

Lessons Learned – Process

Issue	Challenge	Impact
GIS Assessment Timing	GIS outputs not available until late in the project	Limited ability to incorporate GIS into GI/LID opportunity assessment prior to stakeholder engagement
Communication	Not enough focus on community benefits	Limited local buy-in
Local Champion	No clear champion or local leader until late in the project	Limited local buy-in
Marketing	Hard to identify language that resonated with professionals from across the spectrum.	Didn't always have the "right" people in the room
Marketing	Using the NHMP to solicit engagement didn't always resonate with stakeholders.	Didn't always have the "right" people in the room

Lessons Learned – Organizational Structure

Issue	Challenge	Impact
Jurisdictional boundaries	Hard to capture costs locally for benefits that occur regionally	Flood storage projects challenging to implement because most benefits are outside city
City Structure	Hard to align goals across departments and plans	Limited incentives for cross-disciplinary participation
Plan Topic and Scale	Some issues may have had a risk reduction benefit, but may not have been best addressed through he NHMP	Private property interventions were not seen as viable.

Key Observations for Cross Sector Collaboration

Need to engage multi-disciplinary teams

- Emergency management and water quality not seen as complimentary
- Require through grants, take message outside your discipline

Language and funding programs are a barrier

- HMA, PDM, 44 CFR 201.6, Risk, Vulnerability, Mitigation
- TMDL, CWSRF, 319 Funds, MS4 Permit, Bioswale

Programs need shared set of principles

- Resilience presents an overarching framework
- Alignment needs to occur at the top

Questions

EPA United States Environmental Protection Agency

University of Oregon
Institute for Policy Research and Engagement

FEMA

REGION 2 PLANNING AND DEVELOPMENT COUNCIL

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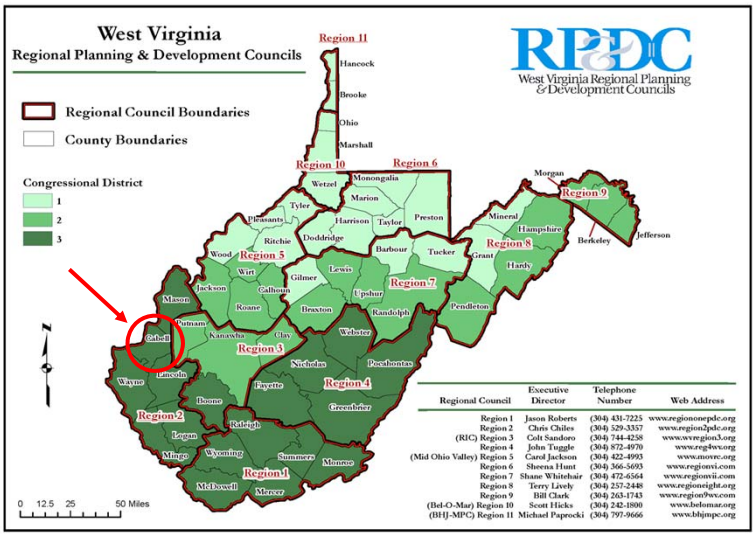
What is a Regional Planning and Development Council?

What is a Regional Planning and Development Council? (Continued)

About RDOs

- Serve as forum to **craft regional solutions for areawide** needs and opportunities
- **Prepare plans and strategies** for broad range of regional and local issues, including compliance with federal mandates and requirements
- Strengthen **local governments** through technical assistance, public administration and leadership capacity
- **Advocate for regions and locals** at federal and state levels



Regional Council Roles in Hazard Mitigation

- Since 2012 – Regional Councils responsible for producing Region-Wide Hazard Mitigation Plan (Update every 5 years)
  - Cabell, Lincoln, Logan, Mason, Mingo, and Wayne Counties
- Obtained a grant through FEMA and WVDHSEM to hire consultant to assist with Plan Update (JH Consulting LLC)
- Work with counties and municipalities to develop Hazard Mitigation Plan and offer technical assistance

Regional Council Roles in Hazard Mitigation (Continued)

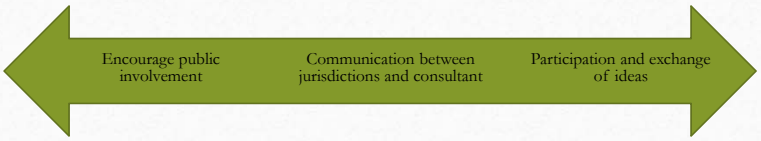
- Coordinate with elected officials and stakeholders
- Research other local/regional plans and how to coordinate
- Help with a Point of Contact for various agencies
- Grants and funding proposals

Overview of Hazard Mitigation and the Planning Process

The Hazard Mitigation Plan

- Planning Process
- Description of the planning area
- Risk Assessment
  - Hazard profiles
  - Assets inventory
  - Development trends
- Action plan
  - Goals
  - Strategies (projects)
- Plan maintenance
- Appendices

Overview of Hazard Mitigation and the Planning Process (Continued)



KYOVA INTERSTATE PLANNING COMMISSION

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What is an MPO (Metropolitan Planning Organization)?

- KYOVA is MPO (Metropolitan Planning Organization) for the Tri-State
  - Sister Agency to Region 2 Planning and Development Council
- Transportation policy-making and planning body with representatives of local, state & federal government and transportation authorities
- A forum for cooperative decision making involving key stakeholders
- Federal *requirement* in urbanized areas of 50,000 or more
- If more than 200,000 in population designated a Transportation Management Area (TMA)
- After the 2010 Census, more than 420 MPOs

Previous Study – KYOVA and AECOM

- Assist the City of Huntington in evaluating and addressing mobility issues due to flooding
- Address stormwater improvements that will positively impact the traffic network and mitigation measures to decrease the likelihood of future catastrophic events
- Study the flow of vehicular traffic, as well as public transit, bicycles, and pedestrians

Project Area

Courtesy of Herald-Dispatch


Courtesy of Herald-Dispatch

Project Approach

- Circulation
  - Multi-modal transportation issues: CSX rail network, pedestrian traffic, transit
  - Pedestrian and bike facilities connecting the main routes
  - Improved connections and flexibility
- Stormwater & Green Infrastructure
  - Sustainable transportation network
  - Green infrastructure strategy that complements the failing storm system
  - Future economic stability and growth

How to Handle Excess Stormwater?

- "Complete Streets"
- Green Infrastructure
  - Permeable Pavement and Sidewalks
  - Bioretention Boulevards
  - Bioretention Islands
  - Bioretention Bumpout
  - Bio-tree Trench
  - Green Alleys

KYOVA INTERSTATE PLANNING COMMISSION

AECOM

Alt #	Section	Hardscape (cost)						Vegetative (cost)			Permeable (cost)			Total Cost
		Existing Sidewalk	Drop-off Area	Existing Front Yard	Outdoor Public Realm	Travel lane	Bicycle / Multi-use Path	Landscape Buffer	Median / Turn Lane / Bioretention	Bioretention	Parking (parallel, 45 degree)	Two-way cycle track	Buffer	
1	3rd Avenue: Stadium Area (25th Street to 16th Street)	$7,312,500	$0	$0	$0	$4,640,625	$0	$675,000	$0	$1,350,000	$1,350,000	$1,350,000	$843,750	$17,520,000
1	3rd Avenue: CBD Area (16th Street to 13th Street)	$900,000	$0	$112,500	$0	$825,000	$0	$180,000	$450,000	$540,000	$360,000	$360,000	$225,000	$3,950,000
2	5th Avenue: Business Area (29th Street to 20th Street)	$4,224,000	$0	$0	$15,206,400	$5,808,000	$0	$704,000	$0	$4,787,200	$0	$1,689,600	$1,056,000	$33,480,000
2	5th Avenue: University Area (20th Street to 16th Street)	$1,841,000	$1,656,900	$65,750	$0	$1,446,500	$0	$1,525,400	$789,000	$0	$1,262,400	$631,200	$394,500	$9,610,000
2	5th Avenue: Residential Area (16th Street to 13th Street)	$900,000	$0	$0	$0	$825,000	$0	$630,000	$450,000	$0	$720,000	$360,000	$225,000	$4,110,000
3	20th Street: University Area (7th Avenue to 5th Avenue)	$816,000	$0	$0	$0	$561,000	$0	$122,400	$183,600	$265,200	$244,800	$244,800	$91,800	$2,530,000
3	20th Street: Underpass Area (8th Avenue to 7th Avenue)	$0	$0	$0	$0	$349,250	$0	$0	$209,550	$0	$0	$152,400	$76,200	$790,000
4	Hal Greer Boulevard: University Area (7th Avenue to 5th Avenue)	$612,000	$0	$0	$0	$561,000	$0	$122,400	$183,600	$265,200	$244,800	$244,800	$91,800	$2,330,000
4	Hal Greer Boulevard: Underpass Area (8th Avenue to 7th Avenue)	$0	$0	$0	$0	$349,250	$0	$0	$209,550	$0	$0	$152,400	$76,200	$790,000
6	10th Street: Central Business District (7th Avenue to 5th Avenue)	$840,000	$0	$0	$0	$577,500	$0	$0	$0	$315,000	$504,000	$252,000	$94,500	$2,580,000
6	10th Street: Underpass Area (8th Avenue to 7th Avenue)	$0	$0	$0	$0	$346,500	$75,600	$0	$0	$0	$0	$0	$0	$420,000
7	8th Street: Central Business District (7th Avenue to 5th Avenue)	$1,010,000	$0	$0	$0	$1,010,000	$0	$80,800	$303,000	$0	$0	$242,400	$90,900	$2,740,000
7	8th Street: Underpass Area (8th Avenue to 7th Avenue)	$0	$0	$0	$0	$384,000	$96,000	$0	$0	$140,800	$0	$0	$0	$620,000
8	1st Street: Central Business District (7th Avenue to 5th Avenue)	$812,000	$0	$91,350	$0	$507,500	$0	$203,000	$304,500	$0	$0	$243,600	$121,800	$2,280,000
8	1st Street: Underpass Area (8th Avenue to 7th Avenue)	$384,000	$0	$0	$0	$384,000	$96,000	$0	$0	$0	$0	$0	$0	$860,000
9	5th Avenue: West of CBD (1st Street to 6th Street)	$1,509,000	$0	$603,600	$0	$1,383,250	$0	$1,408,400	$0	$0	$1,207,200	$603,600	$301,800	$7,020,000
9	5th Avenue: Central Business District (6th Street to 10th Street)	$1,800,000	$0	$0	$3,200,000	$1,100,000	$0	$240,000	$600,000	$0	$1,920,000	$480,000	$240,000	$9,580,000
9	5th Avenue: Religion Row (10th Street to 13th Street)	$912,000	$0	$0	$0	$836,000	$0	$364,800	$456,000	$0	$729,600	$364,800	$182,400	$3,850,000

a. Planning-level cost estimates include demolition and site preparation.
b. Projects assume reconstruction of existing facilities to better integrate into the design (i.e. sidewalks)

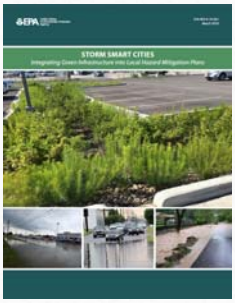
KYOVA INTERSTATE PLANNING COMMISSION

AECOM

Incorporation of Green Infrastructure into Hazard Mitigation Planning

Support of a nationally competed/selected **EPA Pilot Project** to identify **Green Infrastructure** (GI) sites and incorporate the results into **Hazard Mitigation Plans**

- EPA Region 3
- Huntington Stormwater Utility Board
- West Virginia Silver Jackets
  - U.S. Army Corps of Engineers
- FEMA Region 3
- Region 2 Planning and Development Council
- KYOVA Interstate Planning Commission
- Other federal, state, and local stakeholders



Incorporation of Green Infrastructure into Hazard Mitigation Planning (continued)

This Project brought together a collaborative Project Team to:

- Gather local and regional partners to obtain their input on GI
  - Especially in the Huntington area
- Working with a contractor to develop a crosswalk of suggested GI related activities
- Identify programs to be integrated into the planning process
- Develop a planning process for incorporating Green Infrastructure into Local Hazard Mitigation Plans

Incorporation of Green Infrastructure into Hazard Mitigation Planning (continued)

This Project brought together a collaborative Project Team to:

- Develop recommended methodologies to identify GI sites
- Provide case study examples of GI practices for hazard mitigation and improved water quality
- Explore development and use of GIS modeling and analysis
- Workshops and multi-day Charrette with public officials and private citizens to increase their understanding of Green Infrastructure

Potential Locations in Huntington for Green Infrastructure

- Highlawn Area (3rd and 5th Avenue)
  - Also location of EPA Brownfields Grants
- Viaducts/Overpasses
  - 1st, 8th, 10th, 16th, and 20th Streets
- Fourpole Creek (Ritter Park)

Lessons Learned

1. Form a coalition of stakeholders
2. Identify local champions
3. Build on previous successes
4. Understand local experience and capacity for green infrastructure

Type of Project	Name	Location
Bioretention Cell	Amp Gymnastic	Kinetic Park
	Residential Apartments	10th Street
	Cabell-Huntington Hospital Parking Lot	13th Avenue & Cypress St. 15th Street 16th Street
	CVS Pharmacy	Fifth Avenue
	Dollar General	Monroe Avenue
	Family Dollar	Waverly Road
	RMS Pro Finishes	Third Avenue
	Sheetz	Fifth Avenue
	Beltone	6th Avenue
	Fairfield Inn	Kinetic Park
	Residential Apartments	6th Avenue
	Taco Bell	Kinetic Park
	Atomic Distribution	7th Avenue
	Bimbo Bakery Parking Lot	14th Street West & Adams
	St. Mary's Hospital	1st Avenue
	Texas Roadhouse	US Route 60
	Uptowner Inn Impoundment Lot	Madison Avenue & 16th Street W.
Infiltration System	Huntington Gardens	Doulton Avenue
	Sheetz	6th Avenue
Porous Pavement	River Park Hospital Gym	6th Avenue
	Sheetz	6th Avenue & 8th Street
	Residential Apartments	6th Avenue
	Buffalo Crossing Development	Third Avenue
	Parking Lot	First Street
	Cookout Restaurant	25th Street
Stormwater Planters	Taco Bell	Kinetic Park

Table 1: Completed Green Infrastructure Projects in Huntington

What's Next?

- City of Huntington application to incorporate Complete Streets and Green Infrastructure along 3rd Avenue
  - Continuation of previous Stormwater Study
  - Includes area around Marshall University and Medical School
  - Corridor Study and Design should begin in FY 2020

What's Next?

- Huntington Pilot Project is only beginning of increased collaboration between federal, state, and local partners
- Additional efforts underway in the City (Old Central City Historical District)
  - Already had kickoff meeting with consultant and local leaders
  - Green Street Charette mid-May 2019

QUESTIONS?

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Participation Certificate

- If you would like to obtain a participation certificate you can access the PDF in the **Handouts** section of your control panel.
- You can type each of the attendees names into the PDF and print the certificates.

Watershed Academy Webcasts

More webcasts coming soon!

www.epa/gov/watershedacademy

The slides from today's presentations are posted.
A recording will be posted within the next 2-3 weeks.

Thank You!