



FEMA

# Breaking the Disaster Cycle and Minimizing Damages through Collaboration and Planning

**EPA Smart Growth Conference, Charlotte, NC  
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**RiskMAP**

Increasing Resilience Together



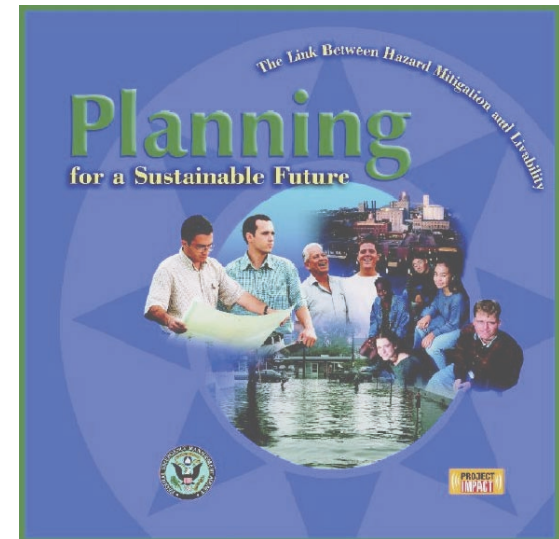
# Presentation Overview

- **EPA/FEMA Memorandum of Agreement (MOA)**
- **Overview of Mitigation Planning**
  - Planning Process
  - Risk Assessment Data and Tools
  - Mitigation Resources
- **Links to Long Term Recovery Planning**
  - Post-disaster opportunities to rebuild more safely
- **Looking Towards the Future**
- **EPA/FEMA Projects Under the MOA**

# EPA/FEMA Memorandum of Agreement

## Overall Goals:

- **Enhanced Agency Coordination** for both Headquarters and Regional offices of both agencies
- **Smart Growth Assistance to local governments** recovering from recent disasters or working to mitigate future disasters
- **Community Resiliency and Climate Change Adaptation** that coordinates agency activities as appropriate through Smart Growth, recovery and mitigation planning programs
- **Cross-Training and Joint Training** at the national, regional, and local, and Tribal levels



# Creating Resilient and Sustainable Communities

- **FEMA – EPA partnership**
- **State and community disaster recovery**
- **Accommodating the next increment of growth**
- **Overlapping outcomes**
  - Economic
  - Environmental
  - Community
  - Public Health
- **Projects identified – more to come**
  - Iowa, Kansas, Spirit Lake Nation

# Introduction to Hazard Mitigation

## Mitigation

Sustained actions taken to reduce or eliminate long-term risk to people and property from hazards and their effects

### Recovery

Putting a community back together after a disaster



### Preparedness

Getting people and equipment ready to quickly and effectively respond to a disaster

### Response

Saving life and property during and immediately after a disaster

# Mitigation Saves Lives and Protects Property



# Hazard Mitigation

- **Sustained action taken to reduce or eliminate long-term risk to people and property from hazards and their effects**
- **Mitigation actions have a **long-term** impact**
- **Mitigation actions are different from:**
  - Preparedness for an impending event
  - Immediate response to an event
  - Short-term recovery from an event





# Benefits of Mitigation Planning

- **Ongoing planning process can help raise risk awareness and reduce disaster losses**
  - Citizens and Tribal members can learn more about what to do now to protect its members and assets, and minimize risk in the future (new development)
- **May develop or update plan to identify high risk areas for planning**
  - Data can also assist with emergency management
- **Mitigation planning can be combined with other ongoing planning and risk reduction processes**
  - Floodplain management, watershed management, comprehensive planning, building codes, zoning, etc.
- **Access resources available in the recovery process to rebuild to mitigate future losses**
  - Better positioned to apply for grant and project funds with an approved plan if a disaster affects a jurisdiction
- **Mitigation is cost-effective; save \$4 for every dollar spent**



# Mitigation Plan Requirements for FEMA Assistance

	Program	State	Local	Tribal
<div> <div>Stafford Act</div> <div>National Flood Insurance Act</div> </div>	IA	No Mitigation Plan Requirement		
	PA (A-B)	No Mitigation Plan Requirement		
	PA (C-G)	✓		✓ (ONLY if Grantee)
	FMAG	✓		✓ (ONLY if Grantee)
	HMGP (\$)	✓	✓	✓
	PDM (\$)	✓	✓	✓
	FMA (\$)	✓	✓	✓
	SRL	✓	✓	✓
	RFC	✓		

(\$) funding may be available for mitigation planning

# Mitigation Planning Process

- Encourage sound decision-making based on a good understanding of hazards and vulnerabilities; and stakeholder values and priorities



# Organize Resources

- **Assess support and capabilities; technical and financial resources**
  - Other Federal, State, local, or Tribal agencies, public/private sector, nonprofits, academia, regional planning agencies, professional associations
- **Engage the public**
  - Provide multiple opportunities for public participation throughout the planning area
  - Educate the public about hazards and mitigation actions

- **Build a planning team**

- Identify dedicated and interested individuals to be on the planning team



# Risk Assessment

- Process of measuring the potential for property damage, economic loss, injury, or death that may result from a hazard event
- There are four steps to completing a risk assessment
- The risk assessment provides the factual basis for mitigation actions proposed in the plan



# Hazards to Consider

- Avalanche
- Coastal Erosion
- Coastal Storm
- Dam Failure
- Drought
- Earthquake
- Expansive Soils
- Extreme Heat
- Hailstorm
- Land Subsidence
- Landslide
- Riverine Flooding
- Ice Storm
- Sinkholes
- Storm Surge
- Tornado
- Tsunami
- Volcano
- Wildfire
- Windstorm
- Others?

Even if a State, Tribe, or community has not been affected by a hazard in several years, but if that hazard is **possible**, then it is relevant and must be addressed in the plan.

Multi-jurisdictional plans must address each hazard that might affect any part of **each jurisdiction** involved in the plan.

# Vulnerability

- **Vulnerability is susceptibility to damage or economic loss**
- **Depends on location, construction, and contents**
  - Location (e.g., in a floodplain, on steep hillside)
  - Construction (e.g., elevated, meets building code)
  - Contents (e.g., antiques, important documents)
- **Helps communities decide what to do and how to be safer and more resilient from disasters**



Photo: Mary Shaw

# Example Vulnerability Assessment

Type of Structure (Occupancy Class)	Number of Structures			Value of Structures			Number of People		
	# in Community or State	# in Hazard Area	% in Hazard Area	\$ in Community or State	\$ in Hazard Area	% in Hazard Area	# in Community or State	# in Hazard Area	% in Hazard Area
Residential	61	16	25%	3,927,000	439,000	11%	403	69	7%
Commercial	5	4	80%	6,500,000	4,500,000	69%	570	345	61%
Industrial	0	0	0%	0	0	0	0	0	0
Agricultural	2	1	50%	175,000	90,000	51%	10	5	50%

Source: FEMA 386-2 Understanding Your Risks: Identifying Hazards and Estimating Losses



# Collect Additional Building Data

Building Characteristics	Flood	Earthquake	Tsunami	Tornado	Coastal Storm	Landslide	Wildfire
Building Type / Type of Foundation	✓	✓	✓		✓		
Building Code Design Level / Date of Construction	✓	✓	✓	✓	✓		✓
Roof Material				✓	✓		✓
Roof Construction				✓	✓		✓
Vegetation							✓
Topography	✓				✓	✓	✓
Distance from the Hazard Zone	✓		✓		✓	✓	✓

Source: FEMA 386-2 Understanding Your Risks: Identifying Hazards and Estimating Losses

- Age of building
- Square footage
- Function
- Content value
- Occupancy (and variation by time of day/season)
- Displacement cost
- Explain process for gathering data
- Identify data limitations

# Estimate Losses

- Estimate how assets will be damaged by a typical hazard event
- Loss estimation tables have been developed based on past damages
- Provided for flooding in How-To Guide (FEMA 386-2, pages 4-13 to 4-15)
  - Percent damage to **structures**
  - Percent damage to **contents**
  - **Functional downtime** is average time (in days) that a business will be disrupted by a hazard event
  - **Displacement time** is average time (in days) that business must operate from a temporary location

# Develop the Mitigation Strategy

- Focus on the **most damaging** hazards and the **most vulnerable** assets
- Clarify problems, issues, and opportunities for hazard mitigation
- Engage the public
- Define goals and objectives that are related to potential impacts
- Identify and prioritize actions
- Consider capabilities and resources



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# Mitigation Project Examples

- **Voluntary acquisition of property for conversion to open space (in perpetuity)**
  - The planning process provides a good review process to develop and build support for this type of project
- **Demolition or relocation of high-risk buildings**
- **Elevation of existing structures to avoid flooding**
- **Structural and non-structural retrofitting (e.g., storm shutters, hurricane clips, bracing systems) to meet or exceed applicable building codes**
- **Construction of safe rooms**
- **Protective measures for infrastructure and utilities**
- **Storm water management projects**
- **Localized flood control projects to protect critical facilities**

# Adopt and Implement the Plan



- **Adopt the mitigation plan**
- **Implement the plan**
  - Evaluate planning results
  - Monitor progress
- **Incorporate other planning mechanisms**
- **Keep the public involved**
- **Revise/update the plan**



# Monitor Actions

- Review actions to determine if they are being implemented
- Identify milestones and a timeline
- Document progress
- Responsible parties should report on their progress periodically



# Cedar Rapids, Iowa

APRIL 2009

## Working Our Plan: Cedar Rapids Flood Recovery & Reinvestment

### 1. Improve Flood Protection

We will strengthen the protection of our homes, businesses and public facilities against future flooding. The City's three-part flood management strategy includes:

- Temporary barriers to reinforce current levees
- Construction of a permanent system of floodwalls and levees
- Pursue improved state watershed management policies

#### PROGRESS:

- 2.66 miles – length of temporary barriers purchased to reinforce current levees
- \$900,000 – cost of temporary barriers
- 24 feet – increased height of current levees with temporary barriers
- 863 – residents provided input on permanent flood management system
- \$1 billion – estimated cost of permanent system of floodwalls and levees
- 120 days – the time it took to create a Flood Management Plan for permanent flood protection. Typically, it takes two years to do this. Thanks to your participation, we did it in 120 days. Now the US Army Corps of Engineers is studying the feasibility of the plan.



The Grand Forks flood protection system includes a levee, gateway and permanent and removable floodwalls. This system is similar to Cedar Rapids' plan for a permanent flood management system.



These removable flood wall panels are installed with pins and slits in permanent structures.



Cedar Rapids' interim flood protection system reinforces the City's current levees with sand and sand-filled temporary barriers.



These new single-family homes are being built in the Oak Hill Neighborhood.



This is a proposed multi-family development that may be built in the Oak Hill Neighborhood.



This is a sample of one of the 60 Habitat for Humanity homes that will be built in Cedar Rapids over the next three years.

### 2. Reinvest in Housing, Businesses and Neighborhoods

We are reinvesting in the neighborhoods and business districts along the Cedar River to create vibrant centers for our kids, grandkids and the next generation workforce.

#### PROGRESS:

- \$26.1 million – Jumpstart funds invested in 1,210 households
- 14 – new houses built to replace the houses lost to floodwaters, so far
- 1,400 – number of residents who participated in the creation of the Neighborhood Reinvestment Area Plan
- 459 – small businesses reopened after the flood, so far
- \$10 million – Jumpstart funds invested in rebuilding 500 businesses
- 120 days – the time it took to create a Neighborhood Reinvestment Area Plan for 10 neighborhoods. Typically, it takes a year to create a plan for one neighborhood. Thanks to residents like you, we created the plan in four months.



Residents help restore a City park damaged in the flood.



After the flood damaged the Water Wastewater Treatment Plant, City crews pumped the sanitary sewer system to remove water in a safe manner.



The first floor of the Public Works building continues to undergo reconstruction and rehabilitation.

### 3. Rebuild Public Facilities

We will rebuild and repair the flood-damaged City facilities with a focus on customer service needs and sustainable construction standards that will last for decades to come.

*Our commitment to sustainability reflects the need to protect our environment, assure long term economic vitality and control the cost of government.*

#### PROGRESS:

- 310 – number of City facilities damaged by the flood
- 44 – number of public facility rebuilding projects submitted for FEMA funding
- \$500 million – estimated cost of rebuilding and repairing all damaged City facilities
- 11 – number of public facility rebuilding projects expected to begin in 2009
- 3 – number of open houses planned for the summer of 2009 to gather feedback on rebuilding community facilities

*Building a greater community for our kids, grandkids and the next generation workforce*

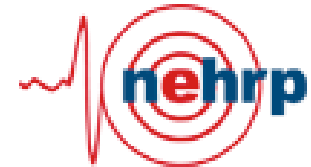
#### FLOOD RECOVERY PLAN TIMELINE





# FEMA Tools and Training

- **HAZUS-MH**
- **RiskMAP Flood Hazard Data**
- **Building Codes and Engineering Standards**
  - National Earthquake Hazards Reduction Program
- **Mitigation Planning Guides**
- **Floodplain Management Publications**
- **Recovery Planning Information**
- **Emergency Management Institute Courses**



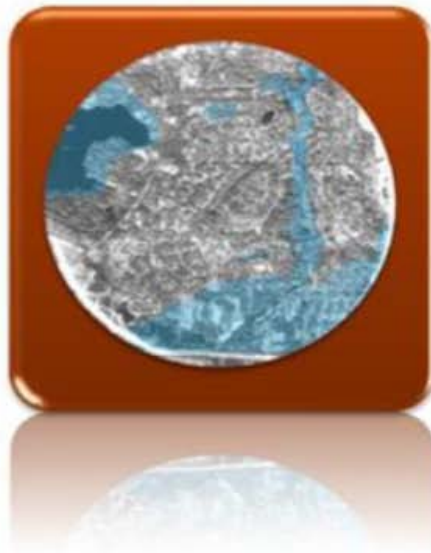
# Estimate Losses

- Estimate how assets will be damaged by a typical hazard event
- HAZUS-MH (Hazards U.S. Multi-Hazards) is GIS-based software from FEMA used to inventory assets and estimate damages from flood, earthquake, and hurricane winds
- HAZUS-MH allows user to:
  - **Identify** vulnerable areas
  - **Assess** level of readiness and preparedness
  - **Estimate** potential losses from specific events
  - **Decide** how to allocate resources
  - **Prioritize** mitigation measures
  - **Simulate** mitigation measures



# Risk MAP

Through collaboration with State, Local, and Tribal entities, Risk MAP will deliver quality data that increases public awareness and leads to action that reduces risk to life and property.





# Flood Risk Datasets

- Changes Since Last Flood Insurance Rate Map
- Flood Depth & Analysis Grids
- Flood Risk Data (including digital products)
- Areas of Mitigation Interest (helps with planning)

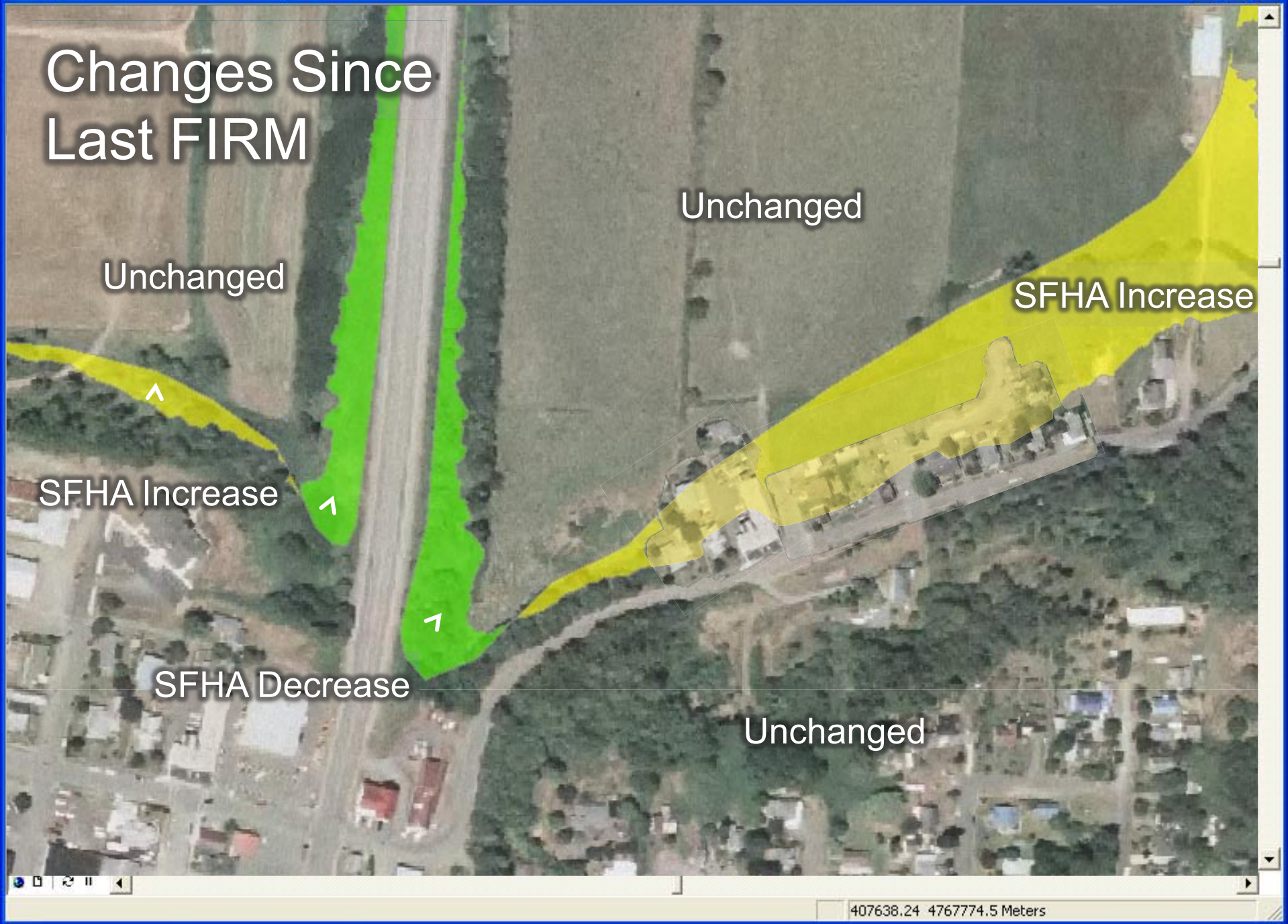
**RiskMAP**

Increasing Resilience Together



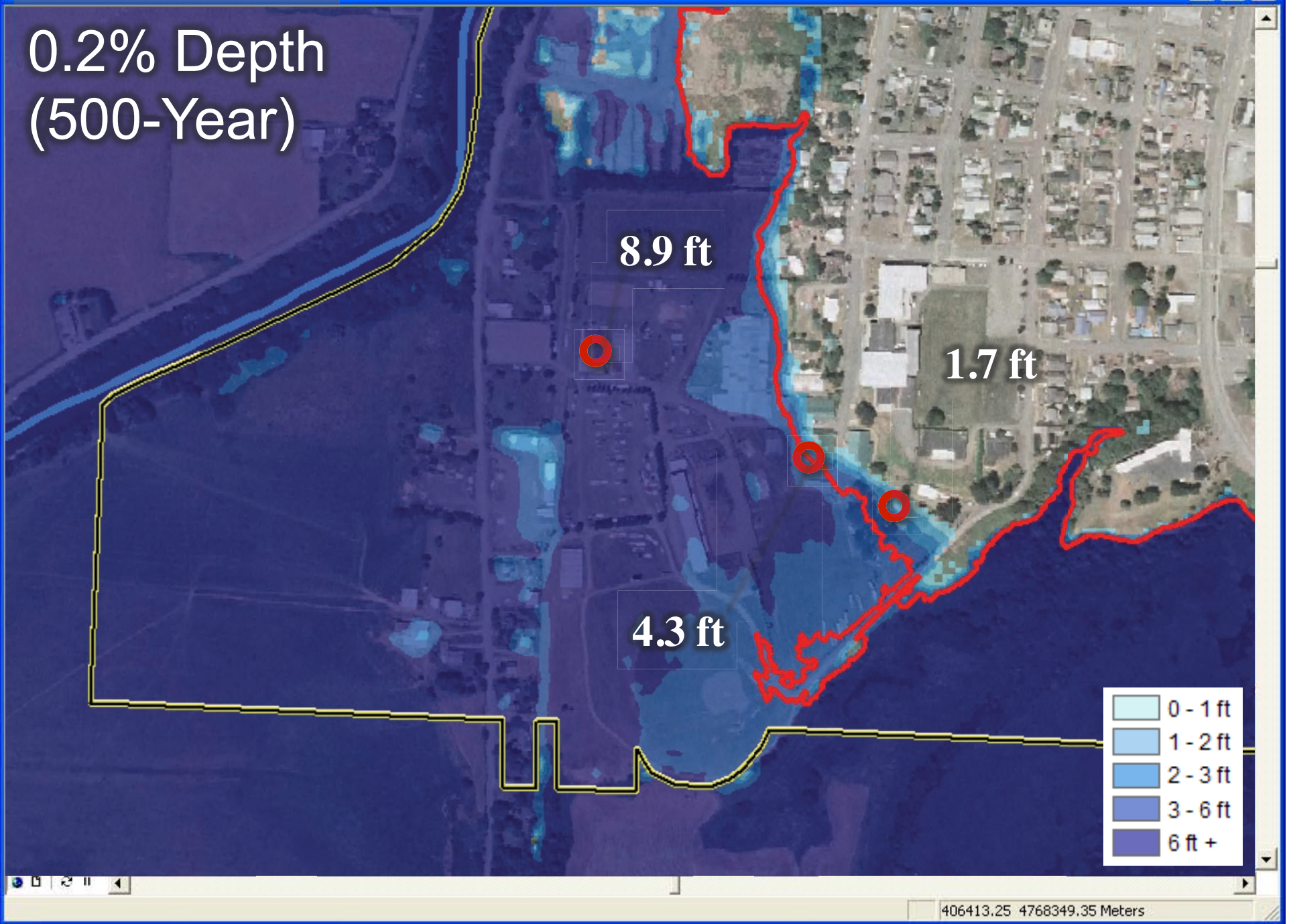


# Changes Since Last FIRM





# 0.2% Depth (500-Year)



# Areas of Mitigation Interest Purpose and Intended Uses

- Creating public and community awareness of issues affecting flooding and risk
- Providing “food for thought” for communities to sharpen focus and research toward future plan updates and project development
- Identifying interrelationships between upstream/downstream community issues within a watershed
- Using existing areas of focus in mitigation plans to broaden awareness to new audiences
- Showing examples between communities and the public of what has worked in other areas to reduce damages
- Demonstrating that both existing physical hydraulic features (e.g., pinch points) and future development actions (e.g., significant proposed development) can have impacts
- Increasing public awareness of areas where actions can be taken to reduce risks

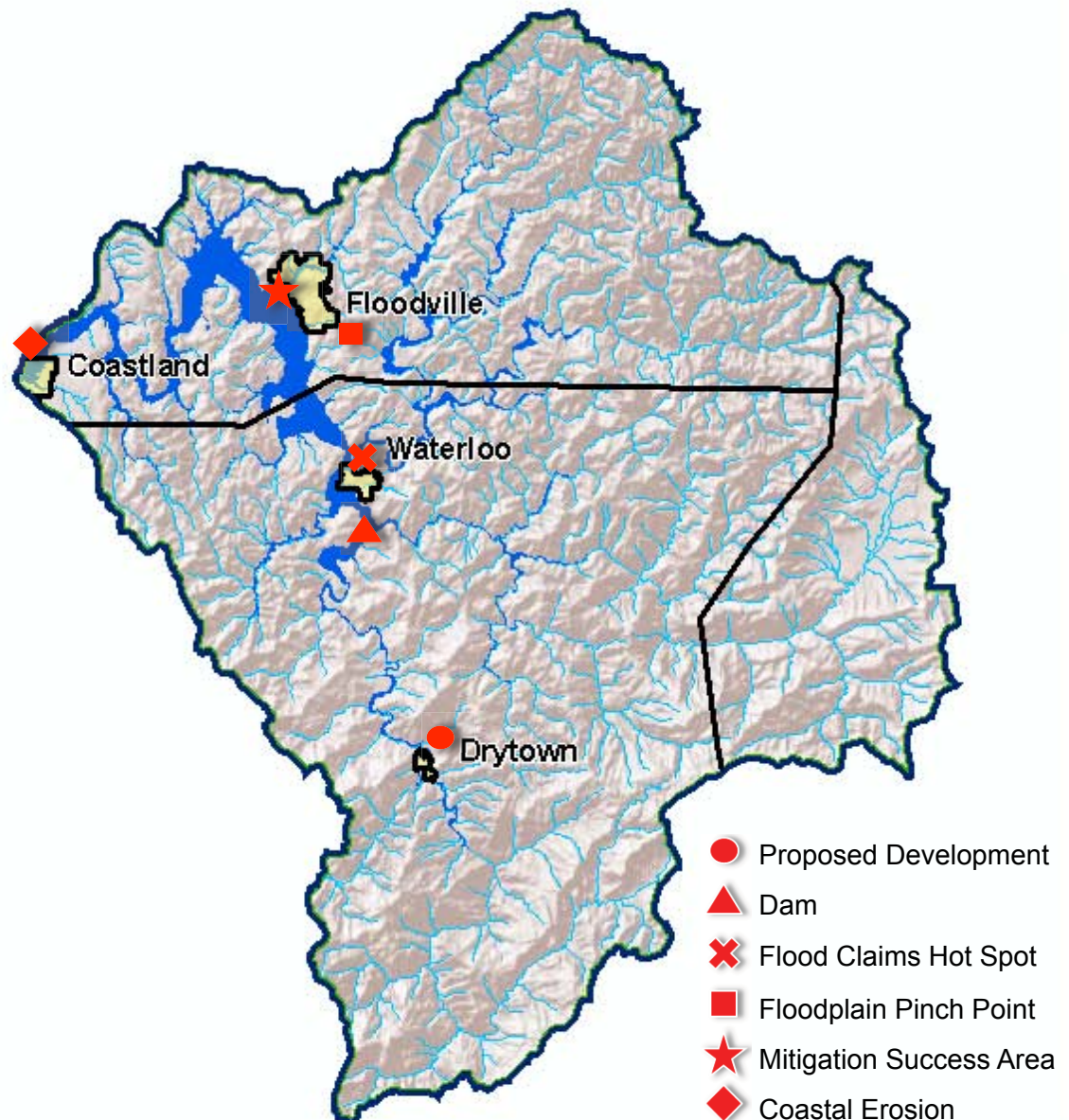


**Flood Claims Hot Spot****Description:**

Quietwater neighborhood has flooded on 4 separate occasions since 1995. The results have produced over 36 claims from 16 structures. Of these structures, 12 are Repetitive Loss and 2 are Severe Repetitive Loss

**Source:**

State NFIP and SHMO  
Waterloo Planning and Zoning Dept



# Other FEMA Resources

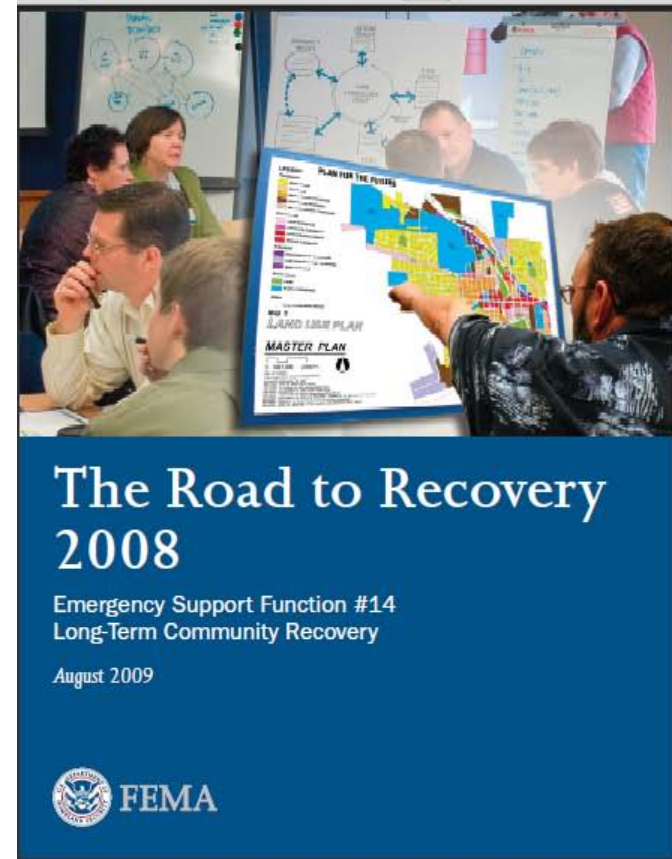
## ■ Mitigation Programs

- Risk Analysis – includes flood hazard maps
- Risk Reduction – grant programs, building science, floodplain management
- Best Practices Portfolio

- <http://www.fema.gov/government/mitigation.shtm>

## ■ Disaster Response and Recovery Resources

- Multi-hazard information



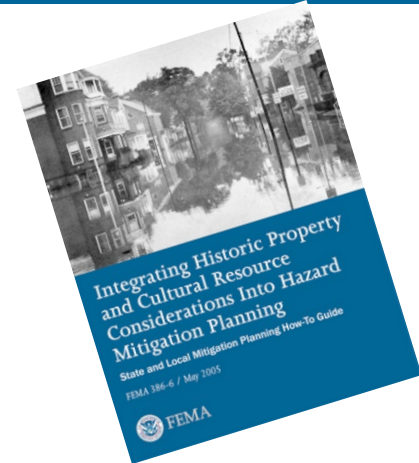
# Post-Disaster Recovery Maps





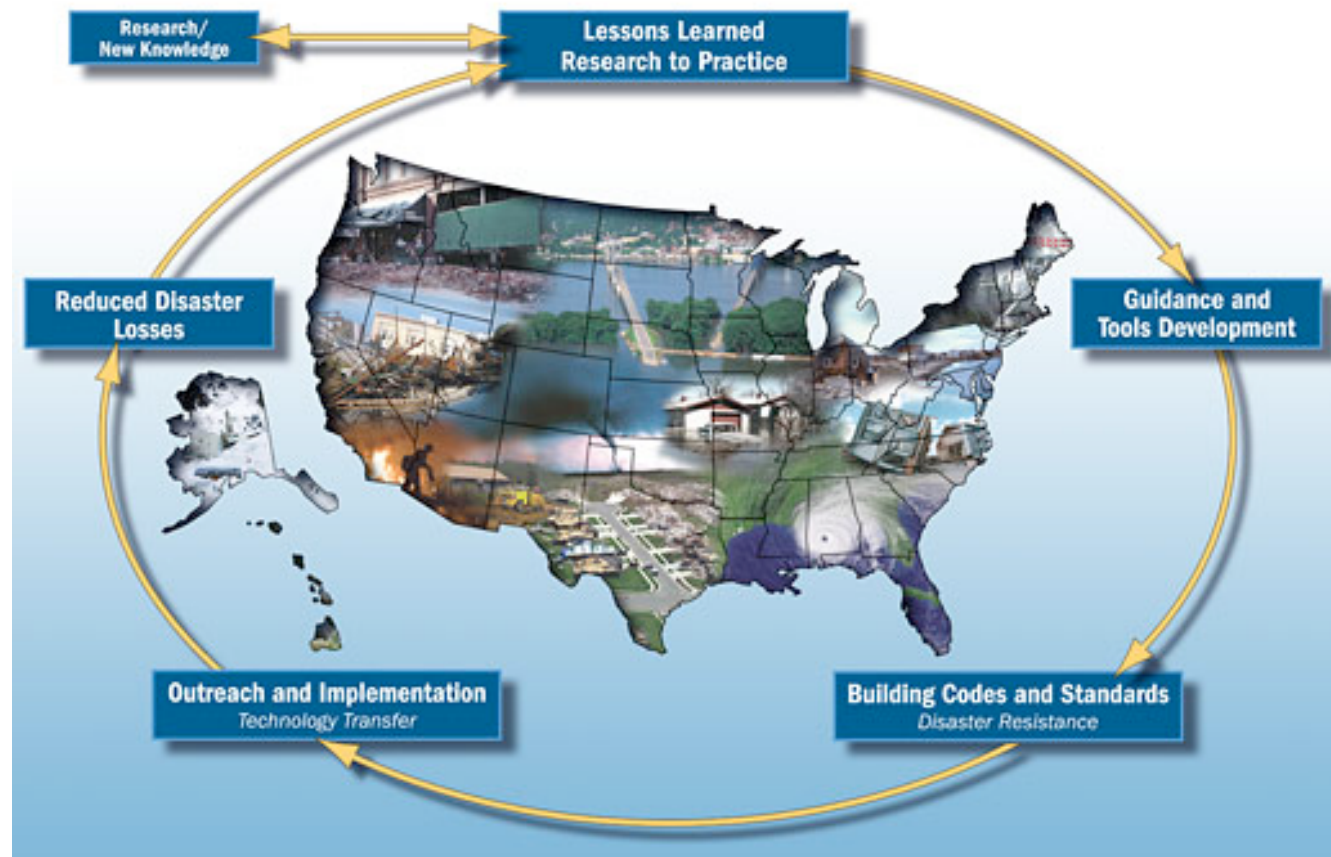
# Mitigation Planning How-To Guides

- **FEMA 386-1** Getting Started
- **FEMA 386-2** Understanding Your Risks
- **FEMA 386-3** Developing the Mitigation Plan
- **FEMA 386-4** Bringing the Plan to Life
- **FEMA 386-5** Using Benefit-Cost Review
- **FEMA 386-6** Integrating Historic Property and Cultural Resource Considerations into Mitigation Planning
- **FEMA 386-7** Integrating Manmade Hazards into Mitigation Planning
- **FEMA 386-8** Multi-Jurisdictional Mitigation Planning
- **FEMA 386-9** Using the Hazard Mitigation Plan to Prepare Successful Mitigation Projects



<http://www.fema.gov/plan/mitplanning/index.shtm>

# Building Science Helpline

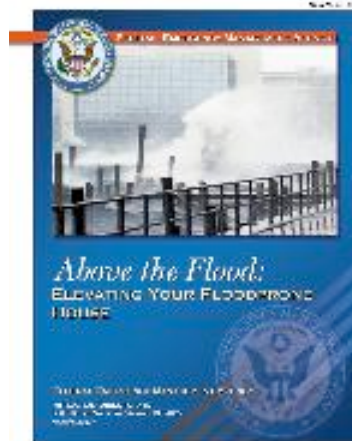


Call the Building Science Helpline at (866) 927-2104 or  
email [FEMA-Buildingsciencehelp@dhs.gov](mailto:FEMA-Buildingsciencehelp@dhs.gov).



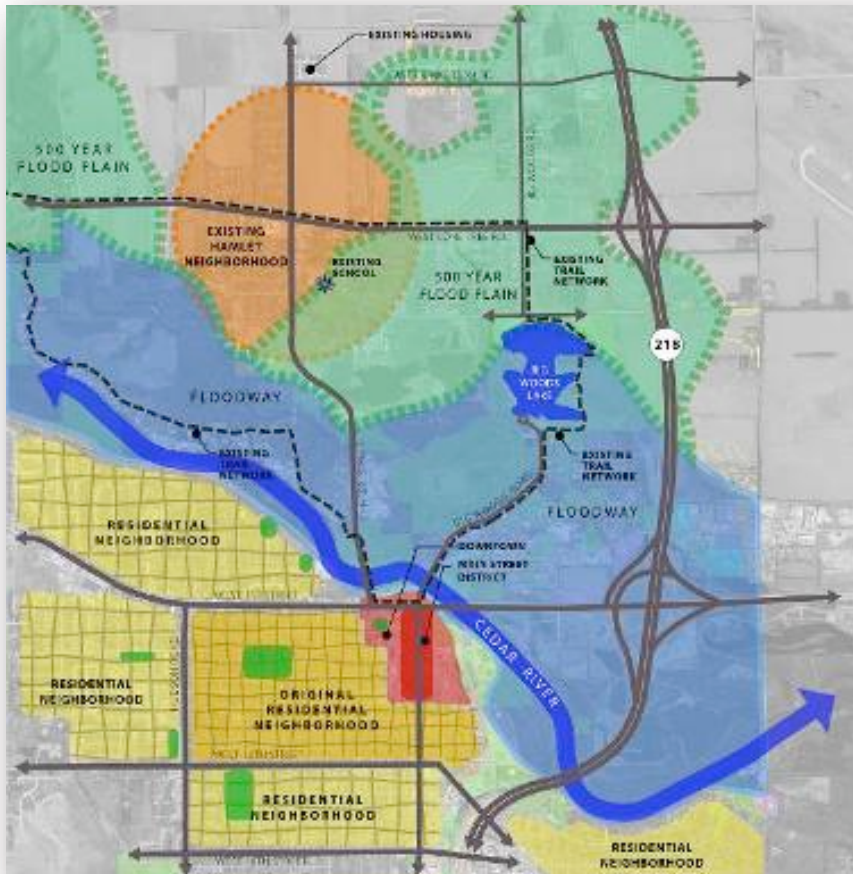
# Desired Outcomes – Shared Vision

- **Create resilient and sustainable communities**
- **Opportunity to explore policy considerations**
  - “Make room for the water.”
  - “Grow well where appropriate.”



[www.floods.org](http://www.floods.org)

# Community Recovery and Smart Growth Approaches



- **Improve economic development**
- **Invest in long-term sustainability**
- **Provide affordable housing choices**
- **Offer options for green infrastructure**

# Looking Forward

- **Improve interagency coordination**
- **Foster diverse partnerships**
- **Refine agency programs to better support community needs**
- **Include more sustainable approaches to community recovery**
- **Offer resources at the grass-roots level**
- **Apply strategies, tools and programs beyond disasters to build community preparedness and improve land use decision-making**

# Looking Forward

- **Identify opportunities**
- **Create partnerships**
- **Optimize resources**
- **Build capacity**
- **Foster sustainability**
- **Promote preparedness**



ONCE REBUILT NO OPPORTUNITY



# Questions???

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(202) 646-7058

**RiskMAP**  
Increasing Resilience Together





# Greensburg, Kansas

- **Total devastation.**
- **Opportunity to start fresh.**
  - School.
  - Hospital.
  - Community facilities.
  - Infrastructure.
  - Housing.
  - Businesses.
  - New amenities.

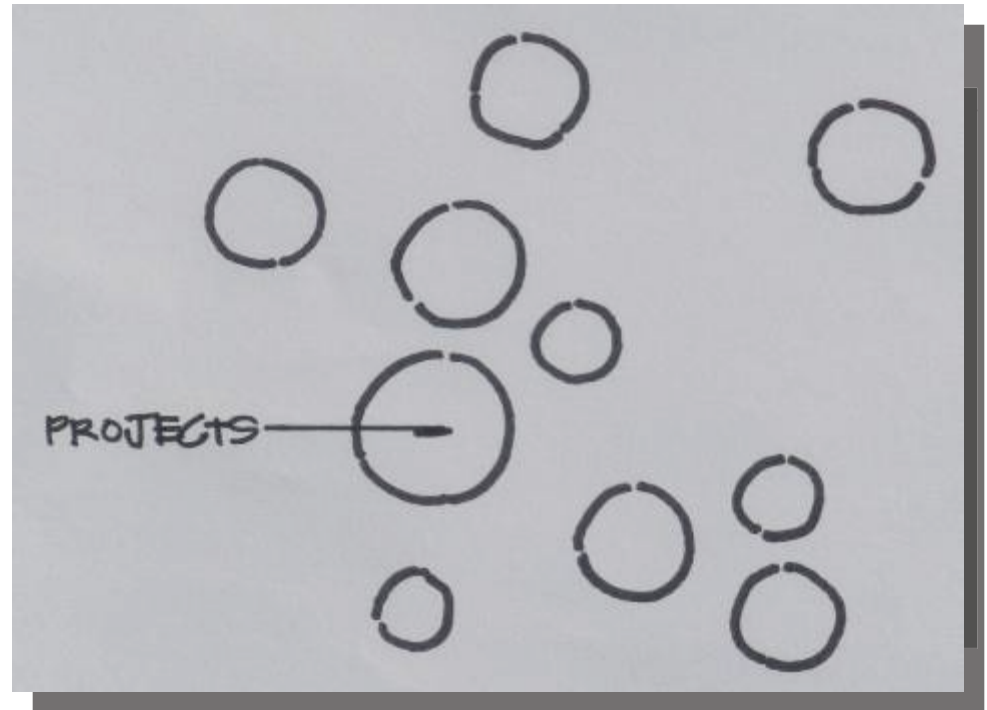


# Greensburg, Kansas

## ■ What's remaining?

- People.
- Jobs.
- Housing.
- Quality of life.
- Final details.

## ■ Whole or sum of parts?



# Public Process + Committees

- **Consensus was reached and people felt ownership**



# IOWA CITY RIVERFRONT CROSSINGS

# Sustainable Rebuilding

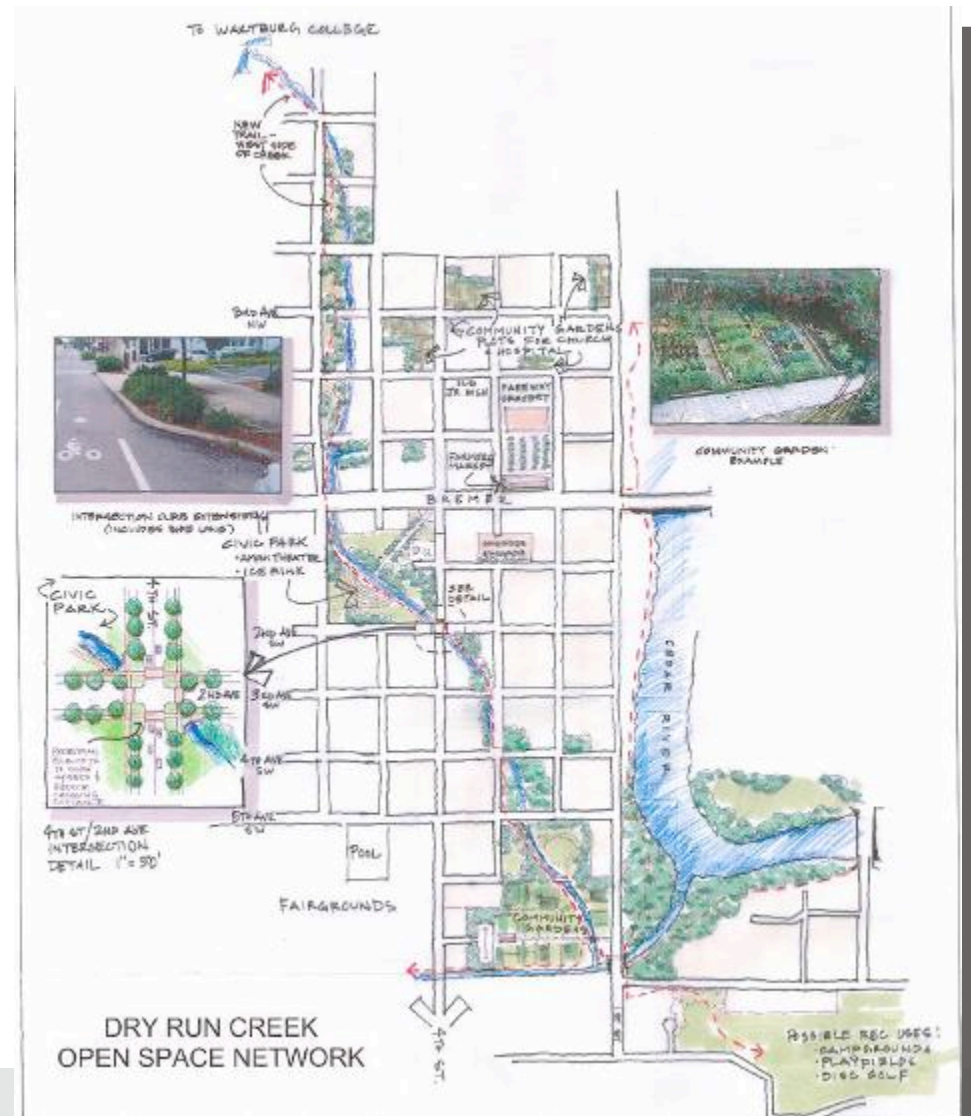
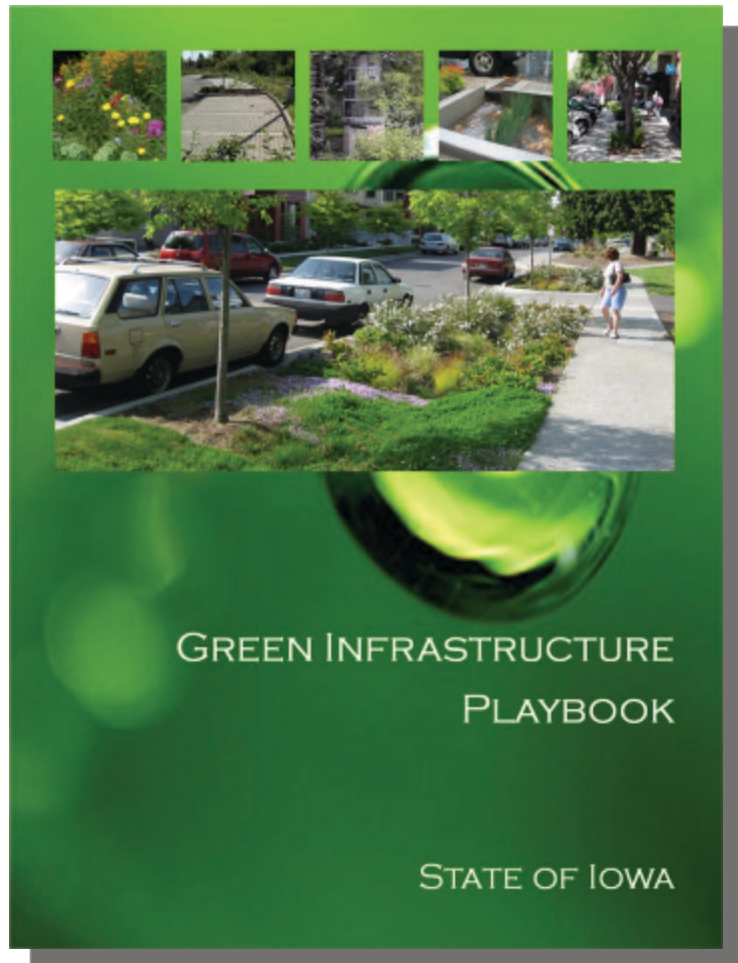
- **Neighborhood visioning.**
- **Economic and redevelopment planning.**
- **Green infrastructure.**
  - Stormwater management.
  - Flood mitigation.
- **Affordable housing choices.**
- **Improve community interconnectivity.**
- **Streetscape design.**
- **Mixed use and infill development.**



# Economic + Redevelopment Planning



# Green Infrastructure





# Mixed Use and Infill Development



# Smart Growth Workshops

- ▶ **Grass roots**
- ▶ **Simple and accessible**
- ▶ **“Discovered opportunities”**
- ▶ **Ownership and synergy**
- ▶ **New partnerships + resources**
- ▶ **Teaching beyond the disaster**





# Iowa City, Iowa





# Iowa City, Iowa

- **Policy options**

- Riverfront Corridor District
- Transportation network / connectivity



# Iowa City, Iowa

