

*A vision for a more resilient Iowa*

# The Iowa Watershed Approach

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Many Iowans know what it means to be personally resilient



Iowans also know what it means to lack resilience



# Iowa communities help decide who is flood resilient



# Iowa communities help decide who is flood resilient



# Increasing flood resilience requires actions and resources



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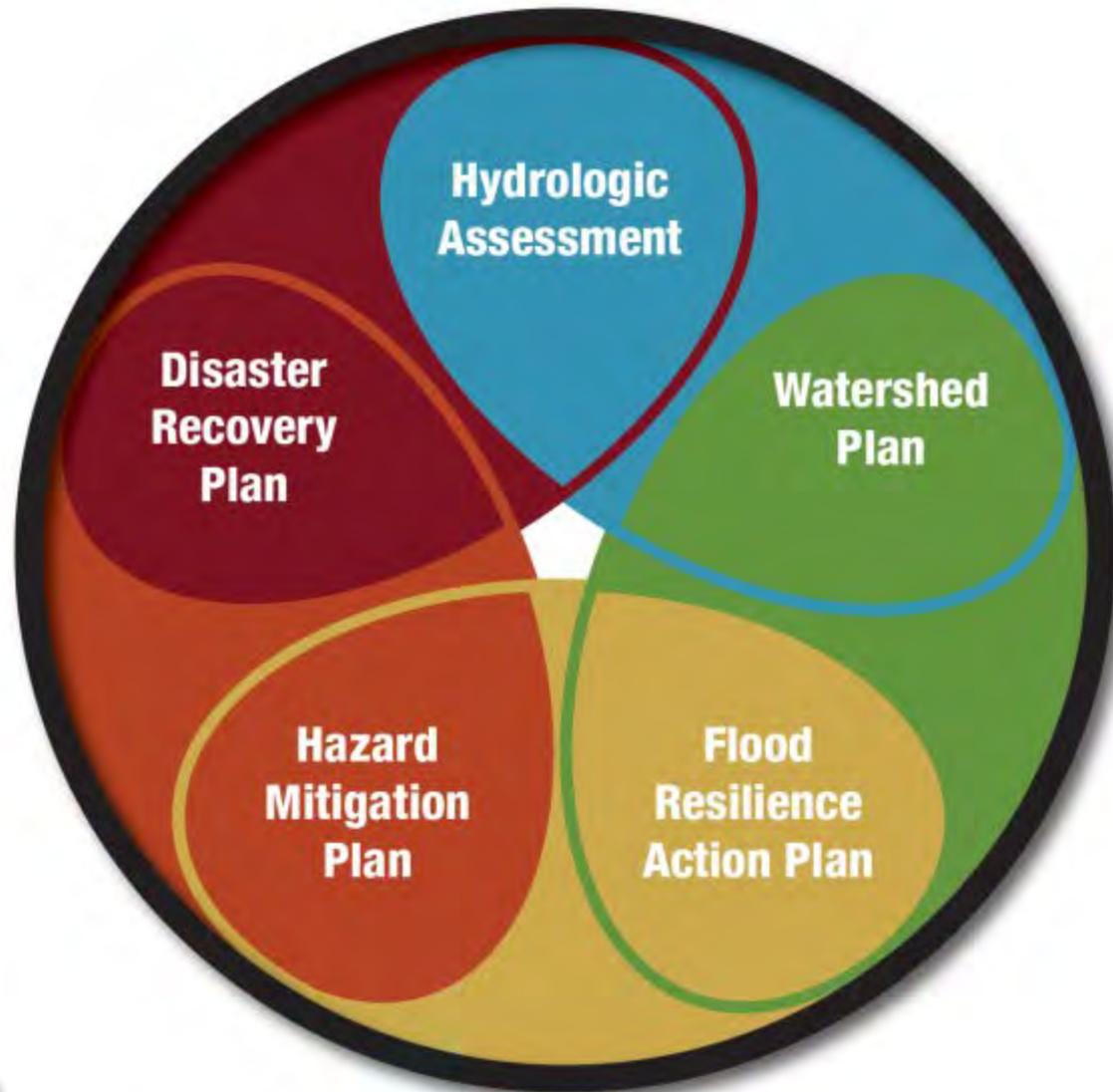


# Social Resources is a Resilience “Gap” Across Watersheds



Social Resources are *community* characteristics that facilitate collective action. The ability to trust, build partnerships, form social networks, and pursue collective learning are examples.

# A dynamic Flood Resilience Action Plan can make hazard mitigation and watershed planning more valuable



# The IWA Flood Resilience Action Plans can inform multi-jurisdiction hazard mitigation plans



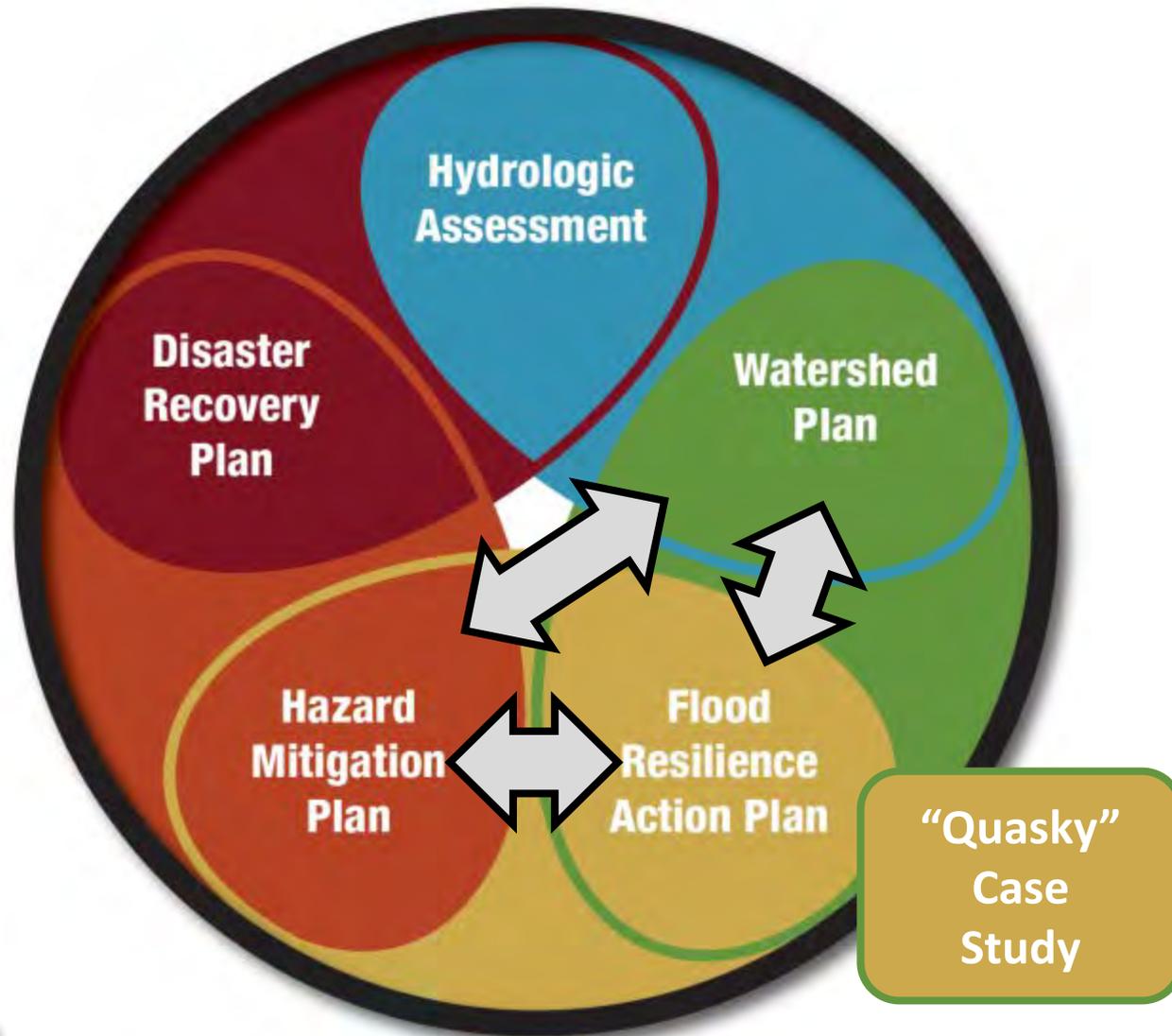
# The IWA Flood Resilience Action Plans can inform watershed plans



Ideally, a well structured watershed plan will inform the flood-focused hazard mitigation plans



# Highlighting a local “case study” can increase stakeholder interest



# IWA Flood Resilience Goals and Current Products

The IWA Flood Resilience Team Seeks to:

- Measure, visualize, and communicate flood resilience resources
- Enhance flood resilience content in formal watershed plans
- Improve social resources for flood resilience

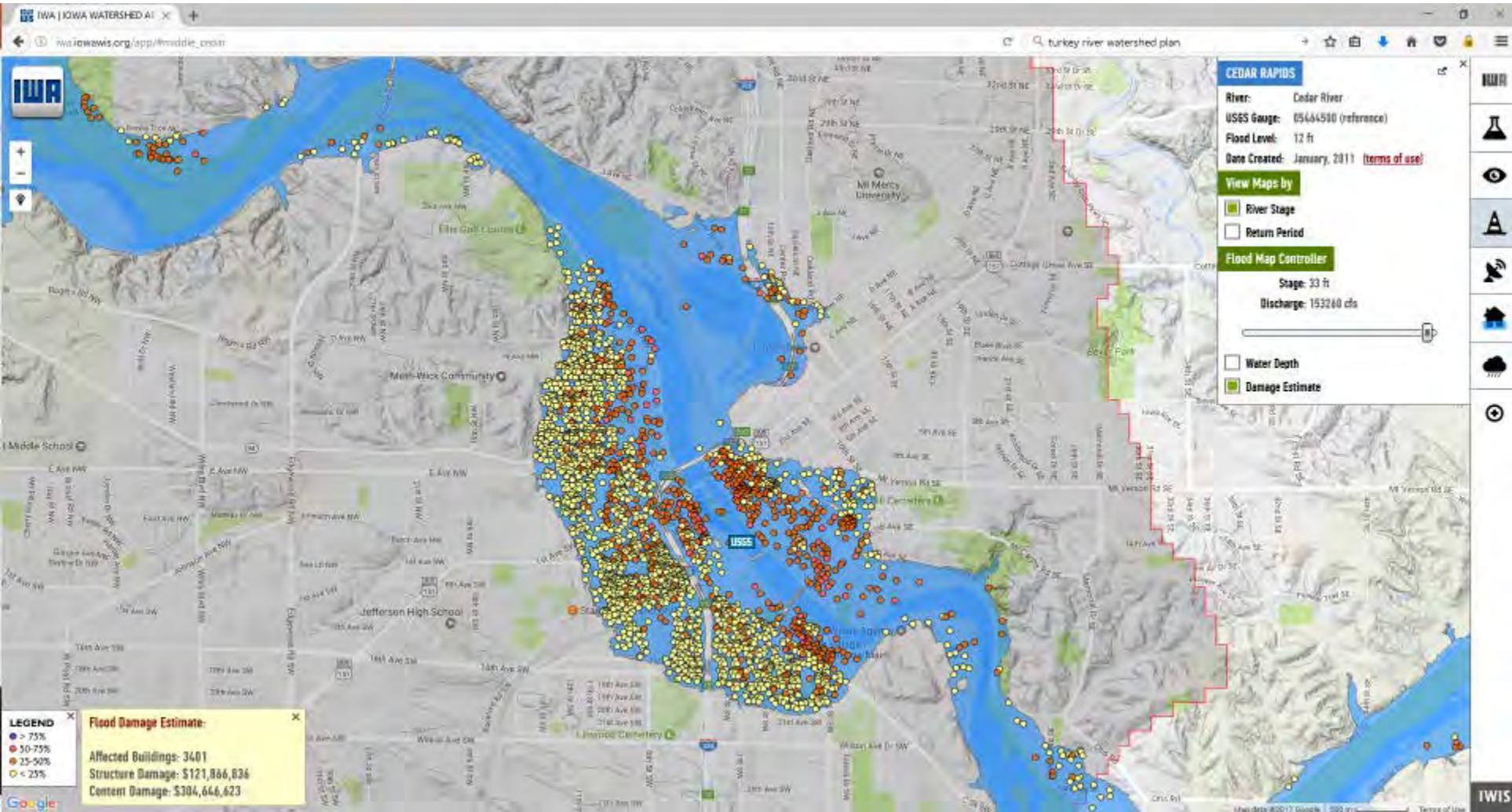
Our Current Products Include:

- Interactive Flood Damage Estimations

Our Products Under Development:

- Interactive Social Vulnerability & Flood Risk Platform
  - Flood vulnerability indices at the intersections of flood risk
  - Estimation & visualization of financial and displacement burdens
- City-scale Flood Resilience Action Plans

# Interactive Flood Damage Estimations



# Enhance Formal Watershed Plans – An Example We Like



## Wood-Pawcatuck Watershed Flood Resiliency Management Plan

prepared by  FUSS & O'NEILL

MAY 2017



## 1 Introduction

This watershed management plan provides recommendations to protect and enhance the flood resiliency of communities in the 300-acre Wood-Pawcatuck watershed and improve river and stream ecosystems, including water quality and habitat. This introductory section describes: 1) the flooding and water quality issues in the Wood-Pawcatuck watershed, 2) the purpose and benefits of developing a comprehensive watershed-based plan and a multi-benefit, ecosystem-based approach to flood resiliency, and 3) the overall organization of this document.

### Watershed Management

A watershed is the land area that drains

**“Flood First”**

to a process that identifies ways to protect and restore the water quality and other natural resources in a watershed. The outcome of the watershed planning process is documented in a watershed management plan.

### 1.1 The Wood-Pawcatuck Watershed

The Pawcatuck River and its major tributary, the Wood River, are located in southwestern Rhode Island and portions of southeastern Connecticut (Figure 1-1). The lower Pawcatuck River forms the border between Rhode Island and Connecticut and flows into the eastern end of Long Island Sound at Little Narragansett Bay. The area of land that drains to the Pawcatuck and Wood Rivers – commonly referred to as the “Wood-Pawcatuck watershed” – is approximately 300 square miles and includes numerous tributaries (Queen, Usquepaug, Chickasheen, Chipuxet, Ashaway, Beaver, Shunock, and Green Falls Rivers) and portions of 14 communities. The Wood-Pawcatuck is the most rural and least developed major watershed in Rhode Island, with a majority of the development focused in the southern part of the watershed in Westerly, Rhode Island and Stonington, Connecticut as well as small towns and villages along the Pawcatuck and its tributaries.

### Flood Resiliency

The term “resiliency” or “resilience” has made a significant impact on the way we think about floods. It includes measures taken to reduce the vulnerability of communities to damages from flooding and to support long-term recovery after an extreme flood (EPA, 2014).

**Resilience  
Oriented**

### 1.2 Flooding in the Wood-Pawcatuck

# Additional Attributes We Like

## Clear objectives naming resilience and flooding prominently

### *Project Objectives*

The objectives of this project are to:

1. Assess the vulnerability of the watershed to the growing risks from flooding and riverine erosion,
2. Develop a comprehensive, watershed-based management plan that will identify prioritized actions to protect and enhance the resiliency of the watershed communities to future flooding and improve river and stream ecosystems, including water quality and habitat.

## “Cross-connectivity” with local hazard mitigation plans

1. *Incorporate priority stream crossings identified in this study into local hazard mitigation plans.*

Communities with FEMA-approved hazard mitigation plans are eligible to apply for Hazard Mitigation Grant Program funding from FEMA for measures identified in their plans. Stream crossing upgrade priorities need to be included in these plans before floods occur. Vulnerable stream crossings identified in this watershed management plan and the accompanying *Dams, Bridges and Culverts Assessment Technical Memorandum* in Appendix G, particularly crossings identified as high- and medium-priority, should be included in the hazard mitigation plans of the watershed communities.

The IWA Flood Resilience Team will:

**Increase the Depth of Social  
Vulnerability Considerations**

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**Increase the Depth of Social Vulnerability Considerations**

**Provide Interactive Scenario Exploration and Visualization**

Nat Hazards (2016) 80:2055–2079

DOI 10.1007/s11069-015-2060-8



ORIGINAL PAPER

## Flood recovery and property acquisition in Cedar Rapids, Iowa

Eric Tate<sup>1</sup> · Aaron Strong<sup>2</sup> · Travis Kraus<sup>3</sup> · Haoyi Xiong<sup>1</sup>

# Social Vulnerability Indices at the Intersections of Flood Risk

Indicator	Rationale
Poverty	Lower savings and insurance, home repair difficulties, negative physical and mental health outcomes, greater displacement

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Disabled	Social isolation

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Disabled	Social isolation
Low educational attainment	Increased difficulties with insurance and assistance claims
Female-headed household	Less emotional support, additional care responsibilities

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Hispanic	Lower assistance-to-damage ratios

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Unemployed	Difficulty returning to home
Linguistic isolation	Impedes access to information and assistance
Disabled	Social isolation
Low educational attainment	Increased difficulties with insurance and assistance claims
Female-headed household	Less emotional support, additional care responsibilities
Hispanic	Lower assistance-to-damage ratios
No vehicle access	Increased isolation

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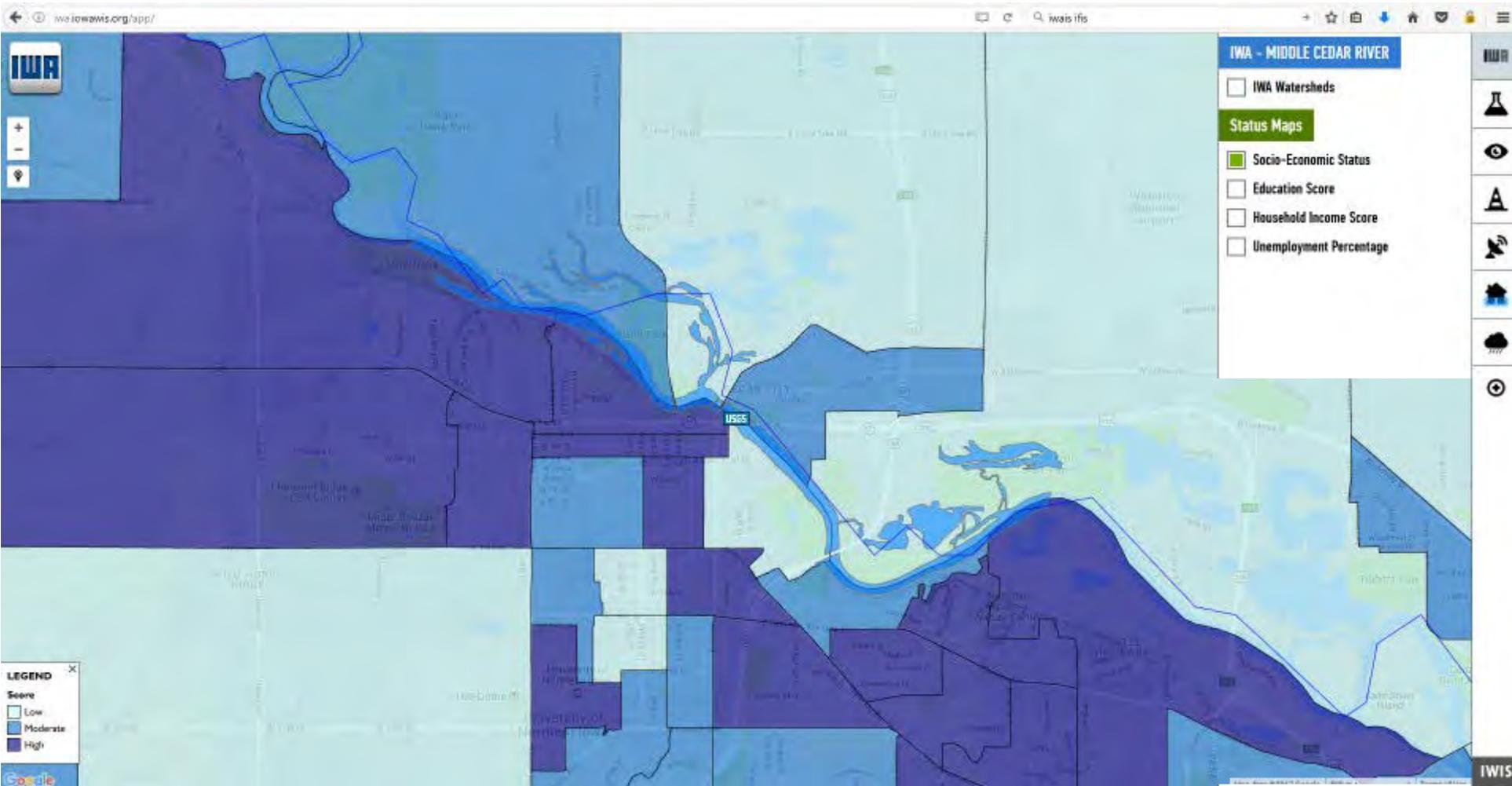


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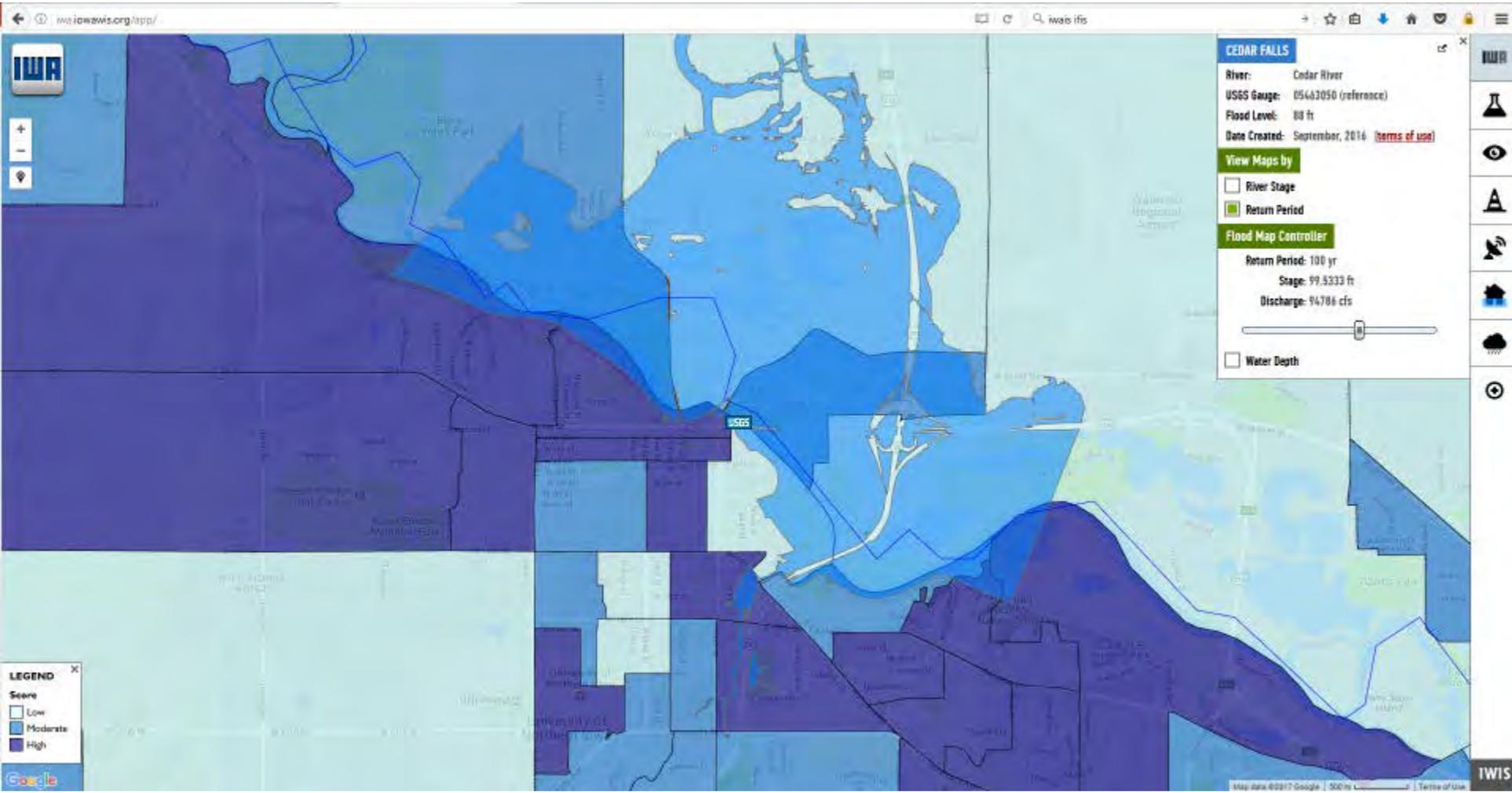
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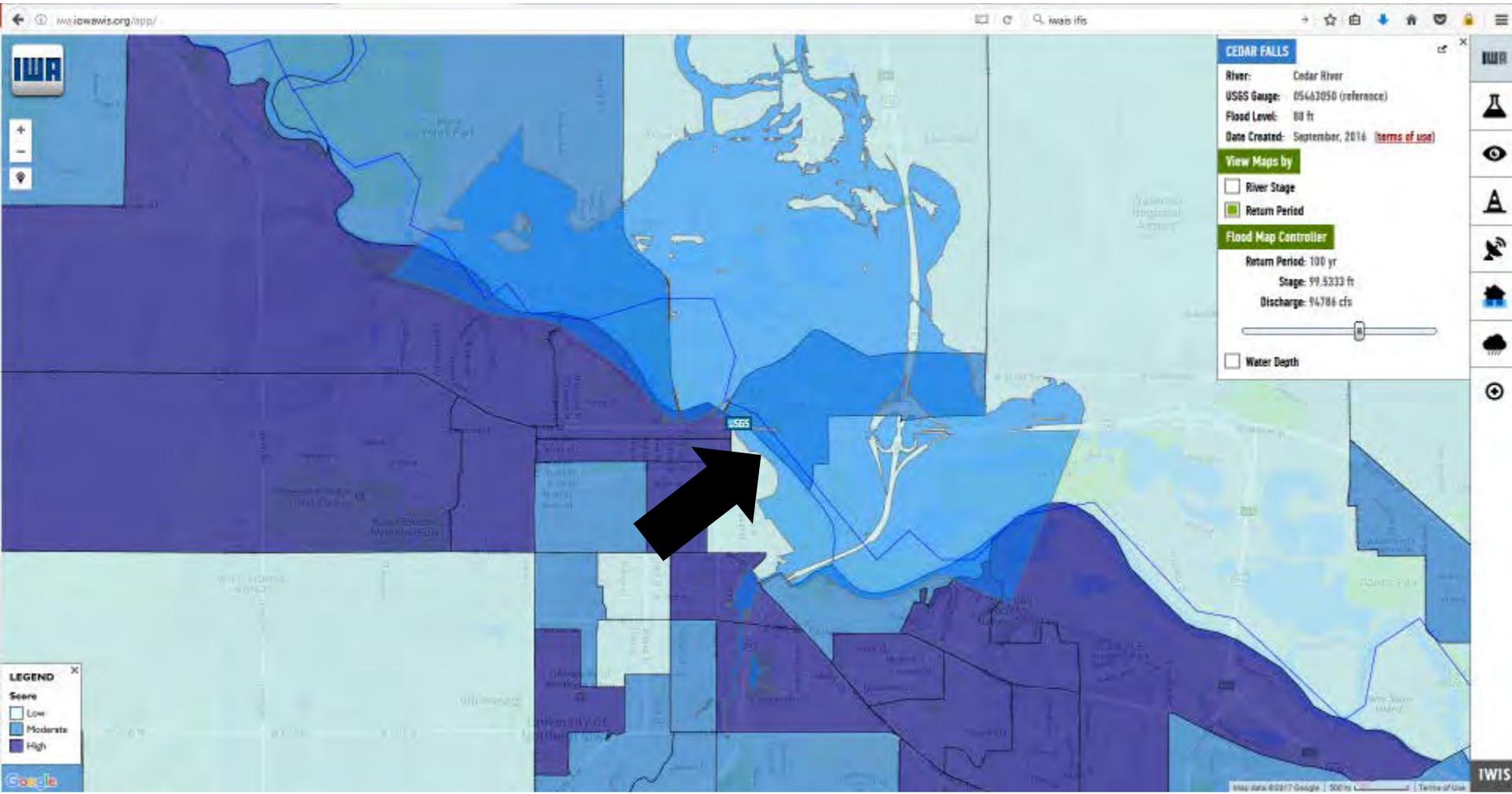
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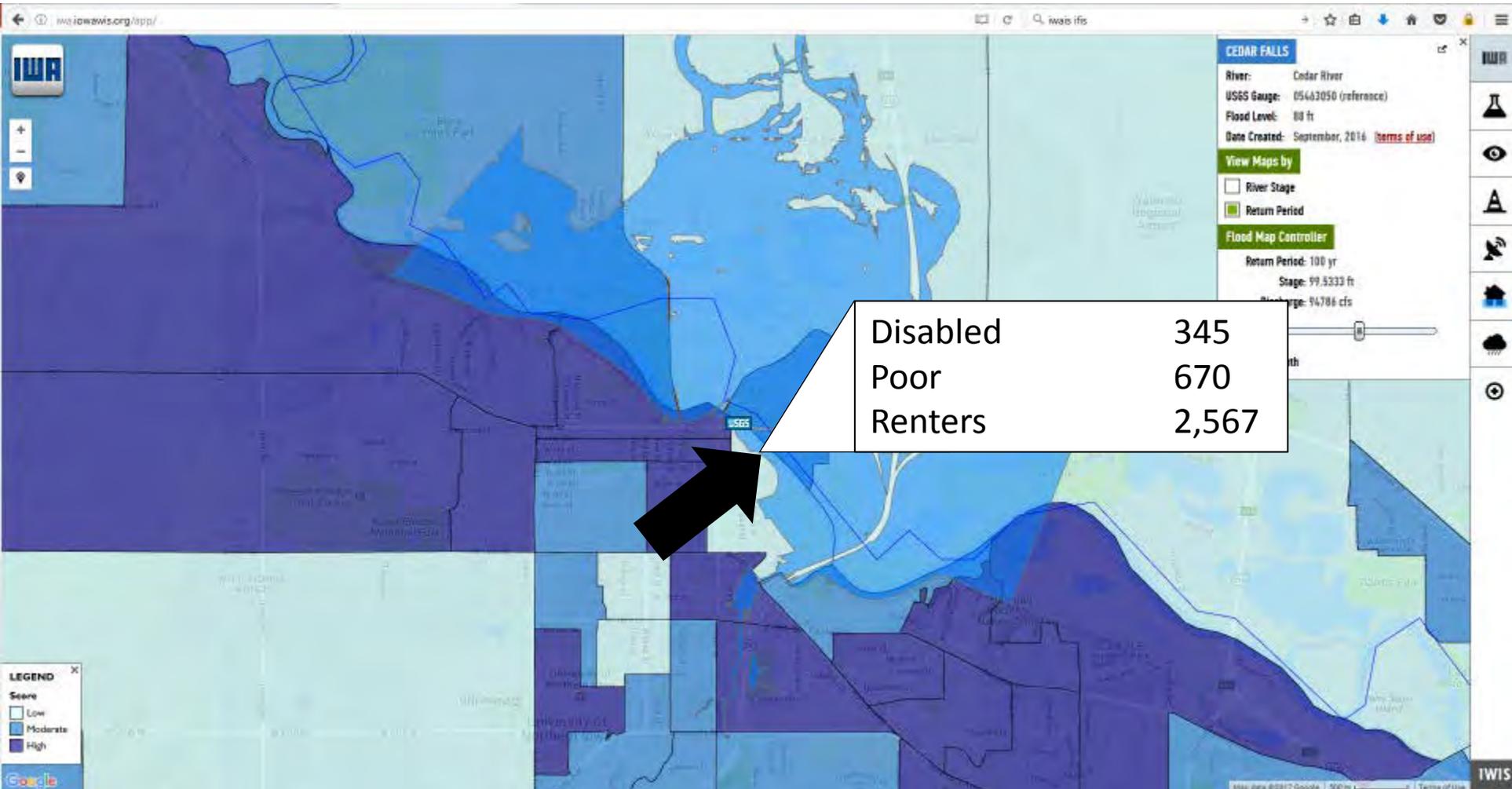
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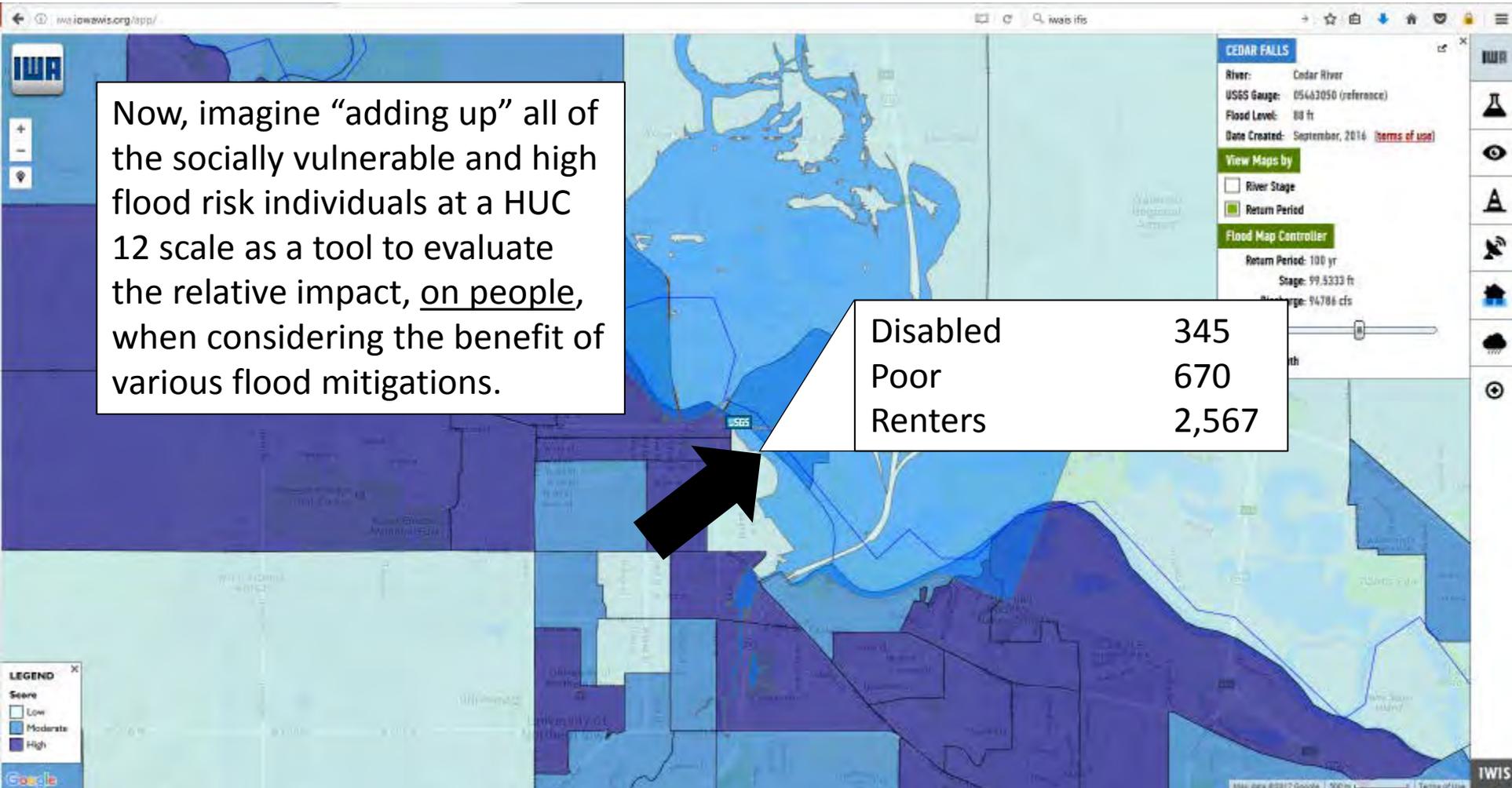
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# Interactive Scenario Exploration and Visualization

Now, imagine “adding up” all of the socially vulnerable and high flood risk individuals at a HUC 12 scale as a tool to evaluate the relative impact, on people, when considering the benefit of various flood mitigations.

Disabled	345
Poor	670
Renters	2,567

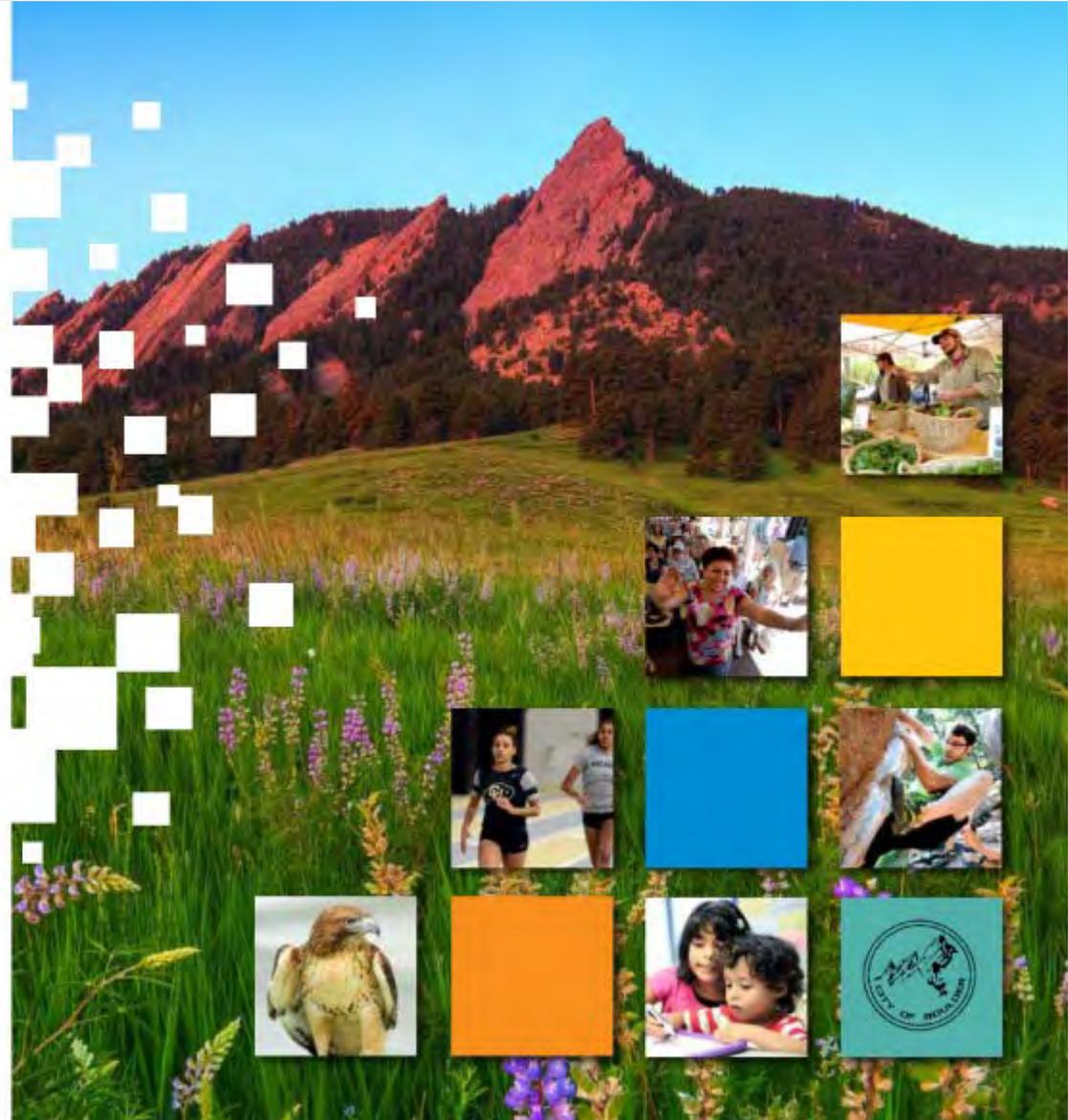


# City-scale Flood Resilience Action Plans – Case Studies

## CITY OF BOULDER RESILIENCE STRATEGY

SPONSORED BY THE  
ROCKEFELLER FOUNDATION

100 RESILIENT CITIES



# Social Vulnerability Considerations Highlighted

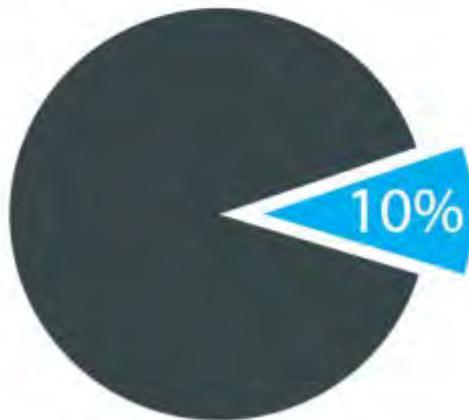
**“Lower-income people are among the least able to recover, yet they are often central to the economy and culture of a community.”**

- ISET INTERNATIONAL

## Shocks Expose Stresses

Boulder's social and economic stresses are sometimes harder to see, but can be exposed and exacerbated during a crisis or disaster. The city's vibrant economy and high quality of life often mask latent stresses that strain the community and make it less resilient overall. Natural disasters like floods and fires disproportionately impact low-income residents who already struggle to thrive in a city that is becoming more unaffordable. A Boulderite living on a fixed income, for example, whose home is damaged in a disaster has limited options to find affordably-priced alternatives because the city has a constrained supply of housing.

Stresses can also present a threat to our economic future. Successful, thriving cities need young people to fuel their economic pipeline. However, in Boulder, individuals between the ages of 25 to 44 is a cohort that has declined by 15 percent since 2000. Similarly, increasing real estate prices have also affected the commercial sector. High office rents and limited commercial space hamper the opportunity of growth-stage firms seeking to expand from start-up status, and many of these companies choose to expand in places like Denver and Longmont where there may be more available space.



Percentage of Boulder families that have children under the poverty level.



# Resilience Isn't New – the IWA is Built on the Work of Others

## Watershed Resiliency Plan

A 20 Year Strategic Plan to Increase the Hydrologic Function & Resiliency of the Turkey River Watershed

Developed for the TRWMA by Northeast Iowa RCD Inc. with Funding provided by HUD/CDBG and the Iowa Department of Natural Resources



Turkey  
River  
Watershed  
Management  
Authority



## Flood Risk Report

*Middle Cedar Watershed (Iowa), 07080205*

Report Number 001

8/28/2015

*Draft*



FEMA

**RiskMAP**  
Increasing Resilience Together

*A vision for a more resilient Iowa*

# The Iowa Watershed Approach

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**319-384-1729**

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