

# FLOOD WISE COMMUNITIES

*Enroll Today!*

[floodwisecommunities.org](http://floodwisecommunities.org)

*Contact:*

[ProjectTeam@floodwisecommunities.org](mailto:ProjectTeam@floodwisecommunities.org)

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The National  
Academies of | SCIENCES  
ENGINEERING  
MEDICINE

GLISA  
A NOAA RISA TEAM

SCIPP  
A NOAA RISA TEAM

 **Stanford**  
University

 **adaptation**  
international

 **HEADWATERS**  
ECONOMICS

NATIONAL  
ASSOCIATION  
of COUNTIES **NACo.**  


**NLC** NATIONAL  
LEAGUE  
OF CITIES

  
Sea Grant  
Texas  
AT TEXAS A&M UNIVERSITY



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# Stormwater Vulnerability Assessments for Communities in Gulf States

Informational Webinar  
December 17th, 2020



# Webinar Logistics

## Zoom Platform:

- **Audio & Video →**

- Disabled for all attendees.

- **Q&A box →**

- Please enter all questions here.

- **Chat Box →**

- Poll answers & moderator use only.

- **Webinar Recording →**

- Live recorded & available online.

# Before We Begin...

## In *seven* words or less:

1. **Describe your community** (*e.g. small, medium, urban, rural, coastal, inland, Gulf-side, Atlantic-side, etc.*)

2. **How many extreme weather events or impacts**  
w/ in the last 5 years? (major storms, floods, etc.)

3. **Your biggest concern or priority** for local  
stormwater infrastructure, management or  
planning

*“small, inland,  
3 floods,  
budget limitations”*

# Today's Agenda

## 1. Introduction

## 2. About the Project

## 3. Project Design and Expectations

- Design
- Time Commitments
- Support & Resources
- Eligibility

## 4. About the Assessment Tool

- Climate Profiles
- Socioeconomic Profiles

## 5. Practitioner Perspectives

## 6. Discussion

# Today's Speakers



**Teal Harrison**

Climate Resilience Specialist  
Adaptation International  
FloodWise Communities  
[teal@floodwisecommunities.org](mailto:teal@floodwisecommunities.org)



**Sascha Petersen**

Founder and Director  
Adaptation International  
FloodWise Communities  
[sascha@floodwisecommunities.org](mailto:sascha@floodwisecommunities.org)



**Mark Shafer**

Associate Professor  
SCIPP – University of Oklahoma  
FloodWise Communities  
[mshafer@mesonet.org](mailto:mshafer@mesonet.org)



**Matthew Naud**

Senior Consultant  
[adapt.city](http://adapt.city)  
GLISA Practitioner in Residence  
[mnaud@recycle.com](mailto:mnaud@recycle.com)

# About The Project



# The FloodWise Team

FloodWise Communities is a National Academy of Sciences Gulf Research Program Thriving Communities grantee.

## Our Project Partners

- **NOAA RISA Teams** (Regional Integrated Sciences and Assessments)
  - **GLISA** (*Great Lakes Integrated Sciences and Assessments*)
  - **SCIPP** (*Southern Climate Impacts Planning Program*)
- **Stanford University**
- **Adaptation International**
- **Headwaters Economics**



# Our Endorsements

National League of Cities

National Association of Counties

Texas Sea Grant

## Our Areas of Expertise

Extreme Weather Impacts

Environmental and Social Risk

Co-producing Knowledge

Strategic Planning

Public Policy

Stakeholder Engagement &  
Collaboration



**FloodWise Communities, or “FloodWise,”** is a nationally- and regionally-backed project developed to help communities better prepare for heavy precipitation & extreme weather.

**FloodWise provides FREE custom vulnerability & adaptive capacity assessments that are:**

- Collaborative
- Accessible to every city
- Technology-assisted
- Community-centered
- Widely applicable

## Our 3 Main Goals

1. **Support** local assessments of stormwater systems' extreme weather vulnerabilities using a co-developed template.
2. **Test** how technology can increase collaboration among practitioners & researchers to help increase community resilience.
3. **Explore** how technology-based engagement and vulnerability assessments can be widely-used throughout the United States.

# Vulnerability, Sensitivity & Adaptive Capacity

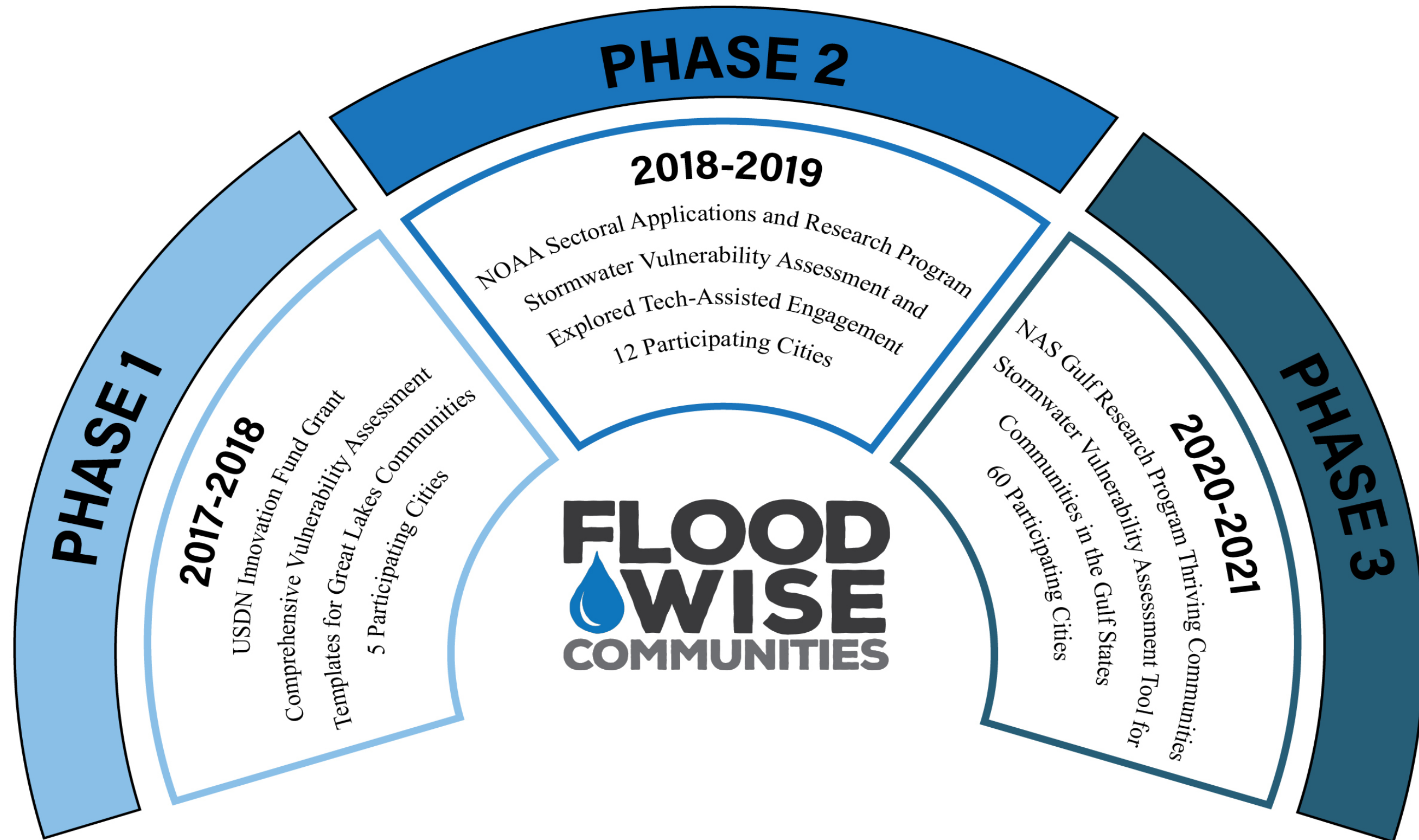
## **Vulnerability:**

The degree to which a system is susceptible to (*sensitivity*) and unable to cope with (*adaptive capacity*) adverse effects of extreme weather events like heavy precipitation.

## **Vulnerability Assessments Help Identify:**

1. Projected changes in weather, climate, & stormwater system impacts
2. Community levels of exposure to these projected changes
3. Sensitivity of municipal infrastructure, systems, and public services to projected changes and impacts
4. Capacity of city systems and services to adapt.

The FloodWise Communities Gulf-wide Stormwater System Vulnerability Assessment is ***Phase 3*** of a multi-year & well-tested project ***initiated and designed by cities, for cities.***



# **PHASE 1**

**2017-2018**

USDN Innovation Fund Grant  
Comprehensive Vulnerability Assessment  
Templates for Great Lakes Communities  
5 Participating Cities



# PHASE 2

**2018-2019**

NOAA Sectoral Applications and Research Program  
Stormwater Vulnerability Assessment and  
Explored Tech-Assisted Engagement  
12 Participating Cities



# PHASE 3

**2020-2021**

NAS Gulf Research Program Thriving Communities  
Stormwater Vulnerability Assessment Tool for  
Communities in the Gulf States  
60 Participating Cities

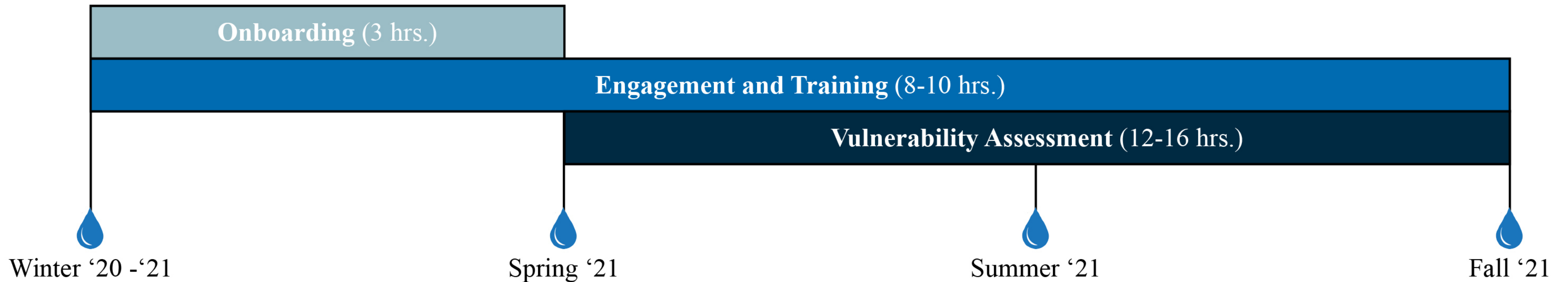
# All phases have yielded positive & tangible results!

- Access to the best available data
- Improved SWS, hazard mitigation, and emergency management planning and operations
- Data-backed grant and budget proposals
- Effective communication across departments and with local decision makers
- Improved local stormwater and community resilience
- Advancement of regional and national resilience building efforts

# Project Design & Expectations

Cities will work with the FloodWise Team to complete their SWS vulnerability assessment over approx. 24 hours, or 3 workdays in 2021 (non-consecutive).

## FLOODWISE COMMUNITIES TIMELINE





# With the FloodWise team, participants will assess their local SWS vulnerabilities in one of three ways:

- In-person
- Webinar-assisted
- Self-guided



## All Participants Will Receive:

1. Completed Stormwater Vulnerability Assessment
2. Access to the FloodWise Assessment Tool
3. Downscaled, High-resolution Data Profiles
4. Custom Training Packet
5. Professional Support
6. Access to a Online Dashboard and Peer Forum



# Formal Engagements & Continued Support

All cities have FloodWise professional support to successfully completing their assessment, regardless of approach.





# COVID-19 Considerations & Contingency Plan

## **Participant health and safety is our priority!**

- Following each community's local guidance and best practices
- Accommodating practitioners' comfort level w/ in-person engagements
- Developing alternate engagement strategies for all cities, if necessary

# Is my city eligible?

- ✓ Community in TX, LA, MS, AL or FL
- ✓ Located within 100 miles the Gulf Coast
- ✓ Small-to-medium municipality

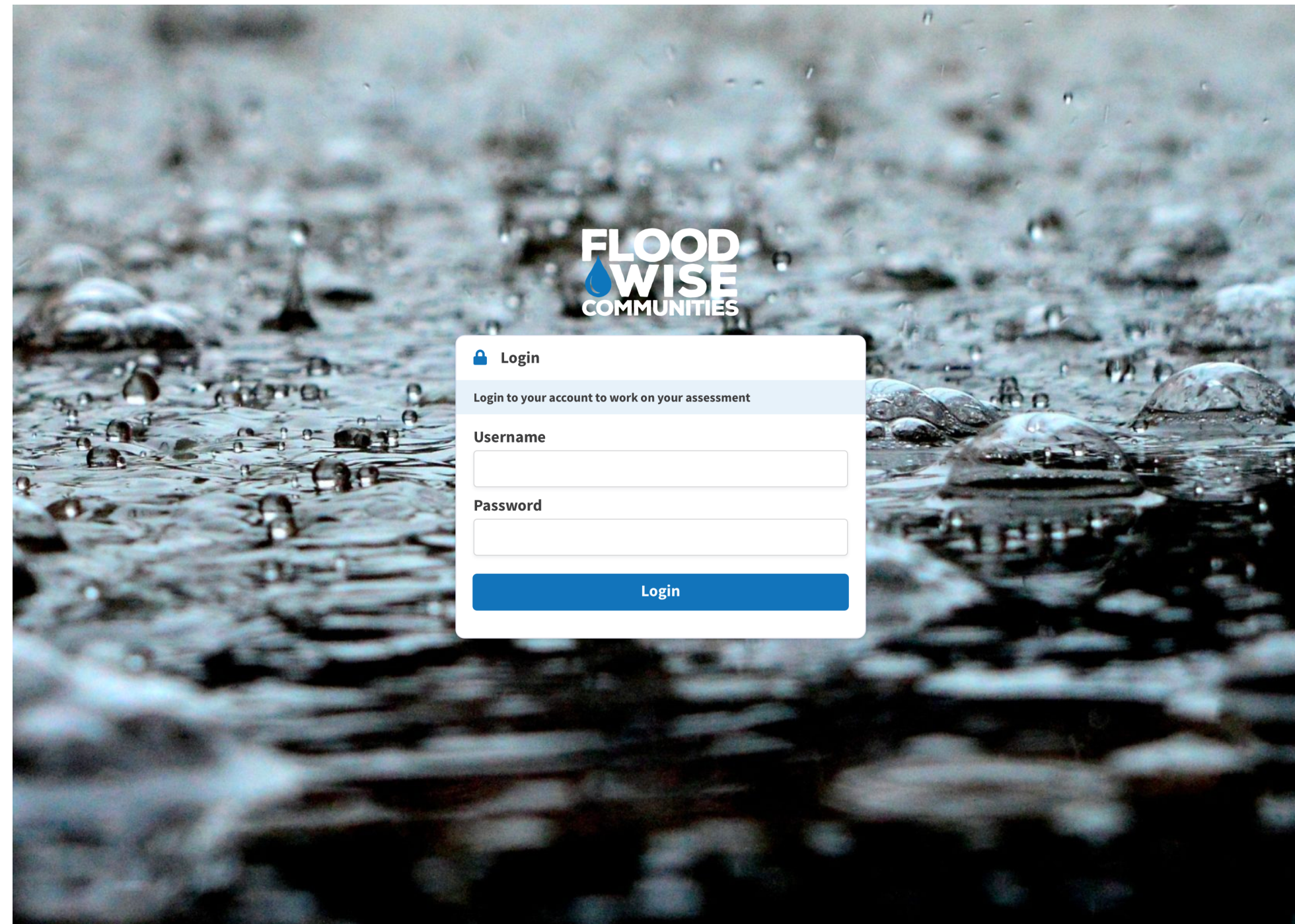
- ✓ Can assemble team of 3-5 practitioners, local officials or partners
- ✓ Can invest approx. 24 hours/person (~3 days) over the course of several months
- ✓ Can host up to 2 on-site workshops

Priority will be given to communities that apply by December 18!

*We encourage communities to apply even if they feel they can't meet all eligibility criteria (e.g. # of team members) or meet the priority enrollment date.*

# About the FloodWise Tool

**The FloodWise tool is a step-by-step process walking users through examining extreme weather and climate vulnerabilities of their community's stormwater system.**





# The FloodWise Tool Can Assess:

- Open and closed systems
- Natural and traditional infrastructure
- High-risk infrastructure
- Critical infrastructure
- Operational capacity
- Emergency services
- Socially vulnerability



## Welcome to the Mobile, AL stormwater vulnerability assessment

This assessment is designed for stormwater practitioners, local officials, local partners, and adaptation professionals who wish to collaboratively address the adaptive stormwater management, infrastructure, and municipal planning needs of their community. A guided, step-by-step tool, this vulnerability assessment examines the City of Mobile's stormwater system vulnerability to heavy precipitation and other extreme weather impacts.

As a member of the **Mobile, AL** team, you will complete a **webinar-assisted** stormwater vulnerability assessment, incorporating the best available weather and climate data and high-resolution socioeconomic mapping to produce a tailored, comprehensive evaluation of the stormwater-related risks, vulnerabilities and adaptive capacity of your community. To get started, or to continue Mobile's assessment, click below.

[Open the assessment](#)

# There are 3 main components of the assessment:

1. Setting the Foundation
2. Assessment
3. Vulnerability Scores

[See example response](#)

[Save answers](#)

Adapative capacity

3 unanswered

[View related info](#)

Where 1 is easy and 10 is hard, how much capacity does your community stormwater system have in each of the following areas:

Personnel

1

2

3

4

5

6

7

8

9

10

EasyHard

Funding/Financial Capacity

1

2

3

4

5

6

7

8

9

10

EasyHard

Information/Data

1

2

3

4

5

6

7

8

9

10

EasyHard

Action Channels and Social and Political Support

1

2

3

4

5

6

7

8

9

10

EasyHard

Infrastructure

1

2

3

4

5

6

7

8

9

10

EasyHard



# Stormwater systems assessment

## Built systems

Add a built component +

Street gutters

✓ Sensitivity Assessment  
4 of 4 sections complete

! Adaptive Capacity Assessment  
1 of 3 sections complete

Evaluate

5  
of 7

Impermeable pavement

✓ Sensitivity Assessment  
4 of 4 sections complete

✓ Adaptive Capacity Assessment  
3 of 3 sections complete

Evaluate

7  
of 7

Pumps

! Sensitivity Assessment  
3 of 4 sections complete

! Adaptive Capacity Assessment  
0 of 3 sections complete

Evaluate

3  
of 7

Swirl treatments

! Sensitivity Assessment  
0 of 4 sections complete

! Adaptive Capacity Assessment  
0 of 3 sections complete

Evaluate

0  
of 7

## Natural systems

Add a natural component +

Above ground storage - wetlands

! Sensitivity Assessment  
3 of 4 sections complete

! Adaptive Capacity Assessment  
0 of 3 sections complete

Evaluate

3  
of 7

Street trees - residential

! Sensitivity Assessment  
0 of 4 sections complete

! Adaptive Capacity Assessment  
0 of 3 sections complete

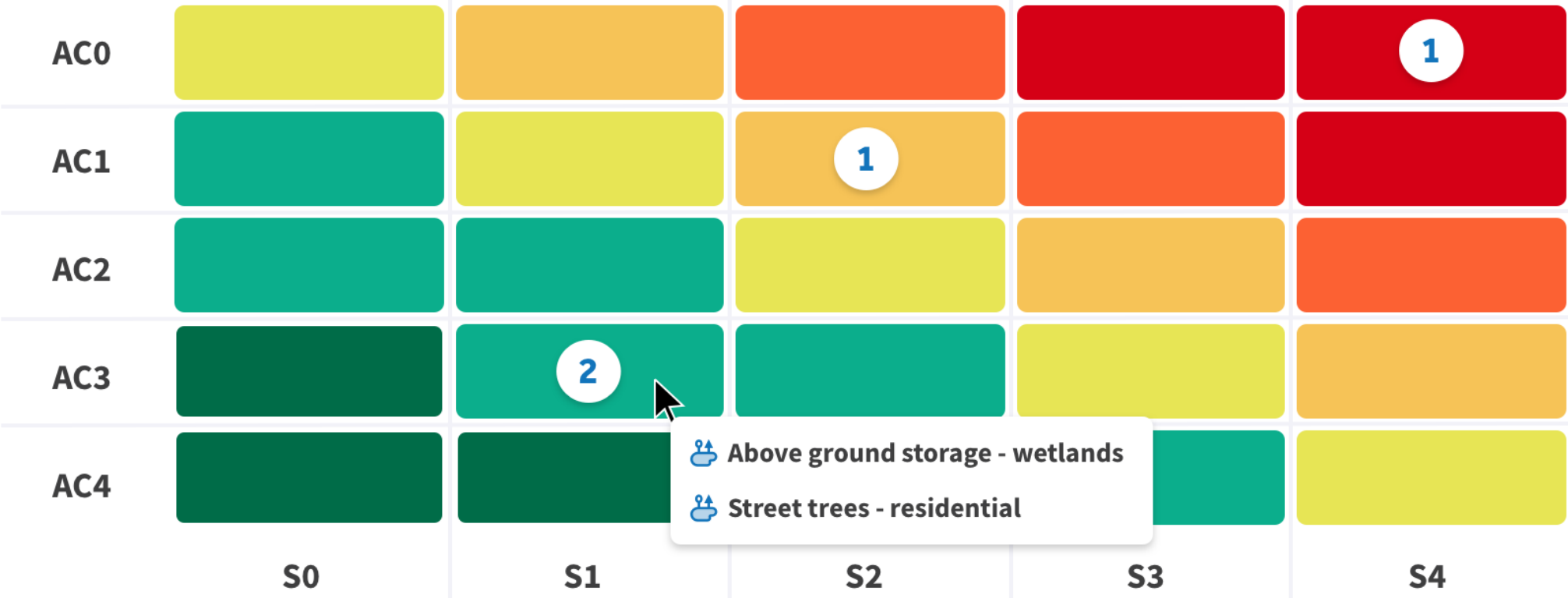
Evaluate

0  
of 7

Vulnerability scores

Print report

Scores matrix



Overview

Open full report

System component	Sensitivity score	Adaptive capacity score	Vulnerability score	
Street gutters	S4	AC0		Responses
Impermeable pavement	S2	AC1		Responses
Above ground storage - wetlands	S1	AC3		Responses

FloodWise Stormwater Vulnerability Assessment Tool:

# **Custom Weather & Climate Profiles**

# Background & Motivation

## About FloodWise climate scientists

- Climatologists at SCIPP and GLISA.
- Years of experience; work on previous projects.

## Motivation behind customized climate profiles

- Variable climate hazards along the Gulf Coast.
- Provision of community-specific climate info.

## Purpose of the climate profiles

- Detailing historical and future climate change at the city/county level for better flood preparedness.



# Data and Methodology

## Types of Data and Sources

- Historical weather & climate observations (local) - [NOAA SRCC](#).
- Future weather & climate projections (local) [NA-CORDEX](#).
- [Flood Risk](#) & [Sea Level Rise](#) maps (city).
- Severe weather event reports (local) - [NOAA NCEI](#).
- Historical climate trend (regional) - [SCIPP](#)

## Methodology

- Balance of information and effective communication.
- Using data and presentation that has worked before, e.g. Phase 2 (SARP).

*FloodWise will provide data that has been evaluated and determined to be the best available for the Gulf region, which saving time and ensuring data quality.*



# What's Included:

## Unique profiles for all participating cities.

- Weather & climate summary (top)
- Temperature summary (middle)
- Rainfall summary + table
- Recent local severe weather events
- Flood risk summary
- Sea level rise summary (if applicable)

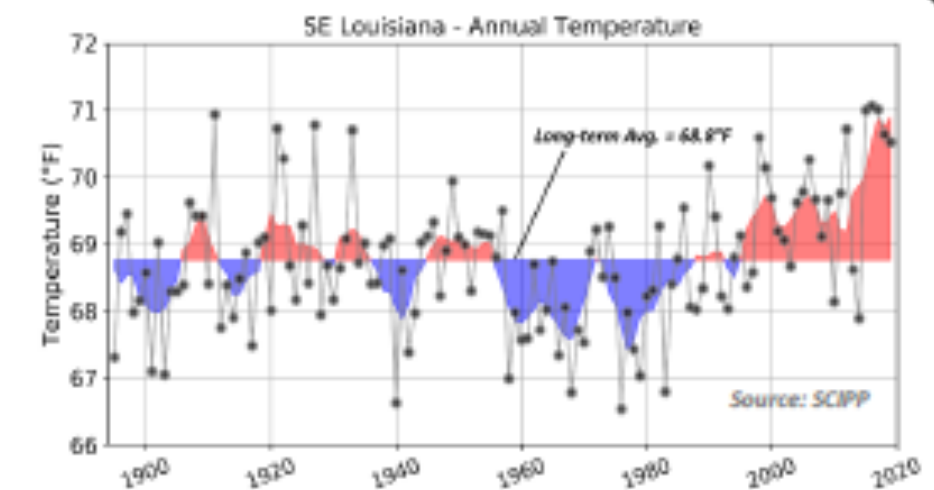
### Climate Profile – New Orleans, LA

#### City Summary

- Temperatures in New Orleans have increased by 1.3°F in recent years.
- Business-as-usual could increase temperatures by 5.7 to 9°F by late-21<sup>st</sup> Century.
- New Orleans has recently lost almost 7 in of annual rainfall, becoming slightly less heavy.
- Future rainfall trends are unclear, wide range of potential outcomes.
- A sea level rise of 3 feet could submerge the outer edges of the city.

#### Temperature in New Orleans

Being in a humid-subtropical zone, New Orleans' climate is characterized by warm summers and mild winters. Recent decades have seen average temperatures increase by over 1°F in New Orleans, with over an extra 30 hot days and warm nights each year. If current warming trends continue, temperatures well above 90°F could be a common occurrence by 2100.



*Temperatures in Southeast Louisiana have increased by 2°F in just the last few decades.*

#### Historic and Projected Temperature – New Orleans

Variable	Historic: 1981-2010	Historic Change: 1981-2010	Mid-Century Projections: 2041-2070	End-Century Projections: 2071-2100
Annual Avg Temp.	70.6 °F	1.3 °F	73.3 to 76.0 °F	76.3 to 79.6 °F
Winter Avg Temp.	56.0 °F	-0.2 °F	58.4 to 60.4 °F	60.3 to 63.8 °F
Spring Avg Temp.	70.5 °F	1.9 °F	73.1 to 76.6 °F	76.3 to 79.1 °F
Summer Avg Temp.	83.6 °F	2.9 °F	86.2 to 89.7 °F	89.4 to 92.2 °F
Autumn Avg Temp.	72.1 °F	-0.1 °F	74.5 to 78.2 °F	78.2 to 84.4 °F
Annual Avg High	79.5 °F	1.6 °F	82.0 to 85.0 °F	85.2 to 88.0 °F
Annual Avg Low	61.7 °F	1.1 °F	64.5 to 67.0 °F	67.5 to 71.3 °F
Hot Days (>95°F) per year	26 days	35 days	43 to 97 days	89 to 140 days
Warm Nights (>75°F) per year	70 days	32 days	132 to 158 days	163 to 201 days

Source: SC-ACIS; NA-CORDEX



# Custom Climate Profiles in Practice

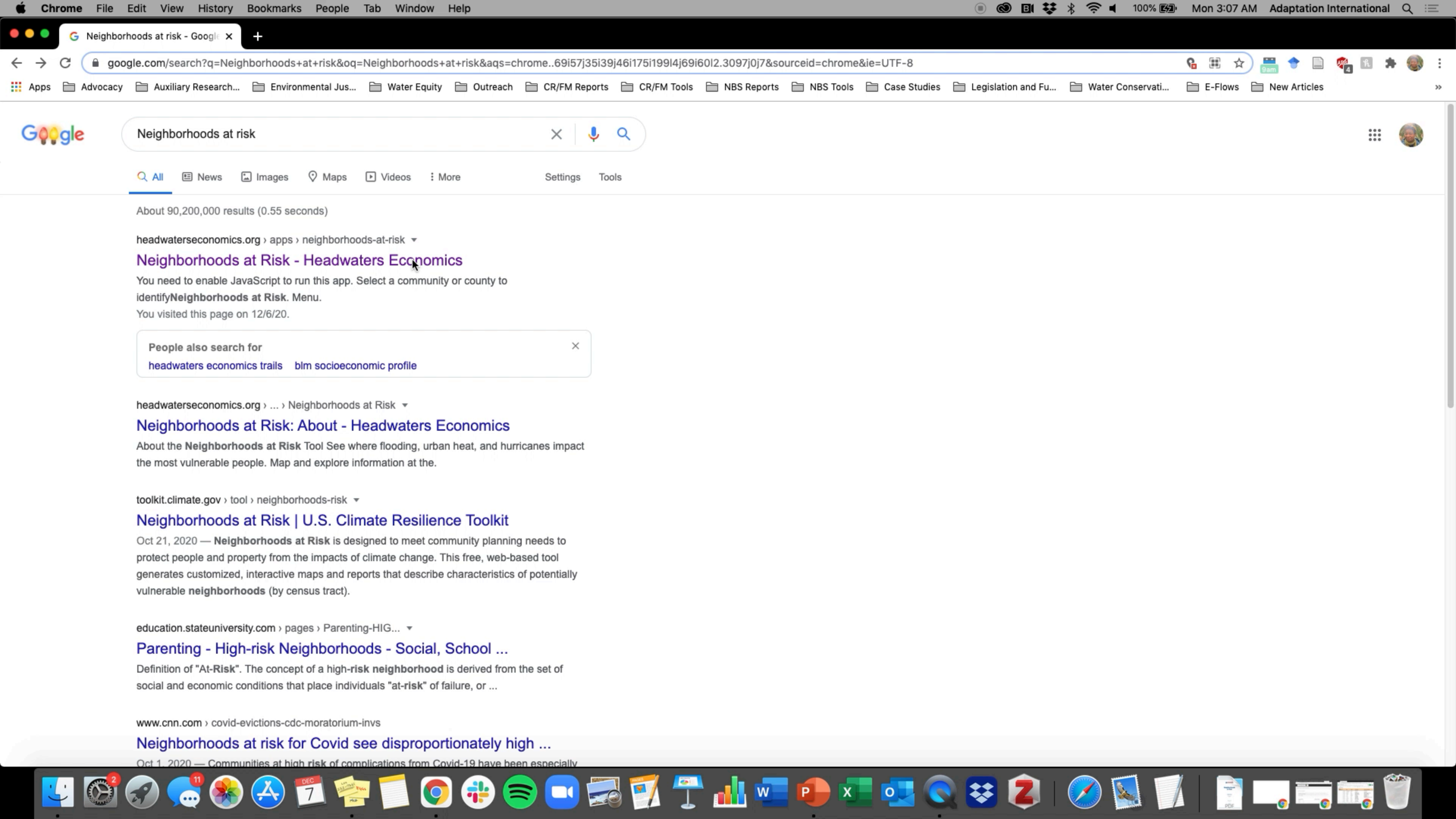
Downscaled, custom weather and climate data will be incorporated at several points as cities complete their assessment and can be applied to other contexts!



FloodWise Stormwater Vulnerability Assessment Tool:

# **Neighborhoods at Risk Socioeconomic Profiles**





Neighborhoods at risk

All News Images Maps Videos More Settings Tools

About 90,200,000 results (0.55 seconds)

headwaterseconomics.org › apps › neighborhoods-at-risk

### Neighborhoods at Risk - Headwaters Economics

You need to enable JavaScript to run this app. Select a community or county to identify **Neighborhoods at Risk**. Menu.

You visited this page on 12/6/20.

People also search for

headwaters economics trails blm socioeconomic profile

headwaterseconomics.org › ... › Neighborhoods at Risk

### Neighborhoods at Risk: About - Headwaters Economics

About the **Neighborhoods at Risk** Tool See where flooding, urban heat, and hurricanes impact the most vulnerable people. Map and explore information at the.

toolkit.climate.gov › tool › neighborhoods-risk

### Neighborhoods at Risk | U.S. Climate Resilience Toolkit

Oct 21, 2020 — **Neighborhoods at Risk** is designed to meet community planning needs to protect people and property from the impacts of climate change. This free, web-based tool generates customized, interactive maps and reports that describe characteristics of potentially vulnerable **neighborhoods** (by census tract).

education.stateuniversity.com › pages › Parenting-HIG...

### Parenting - High-risk Neighborhoods - Social, School ...

Definition of "At-Risk". The concept of a high-risk **neighborhood** is derived from the set of social and economic conditions that place individuals "at-risk" of failure, or ...

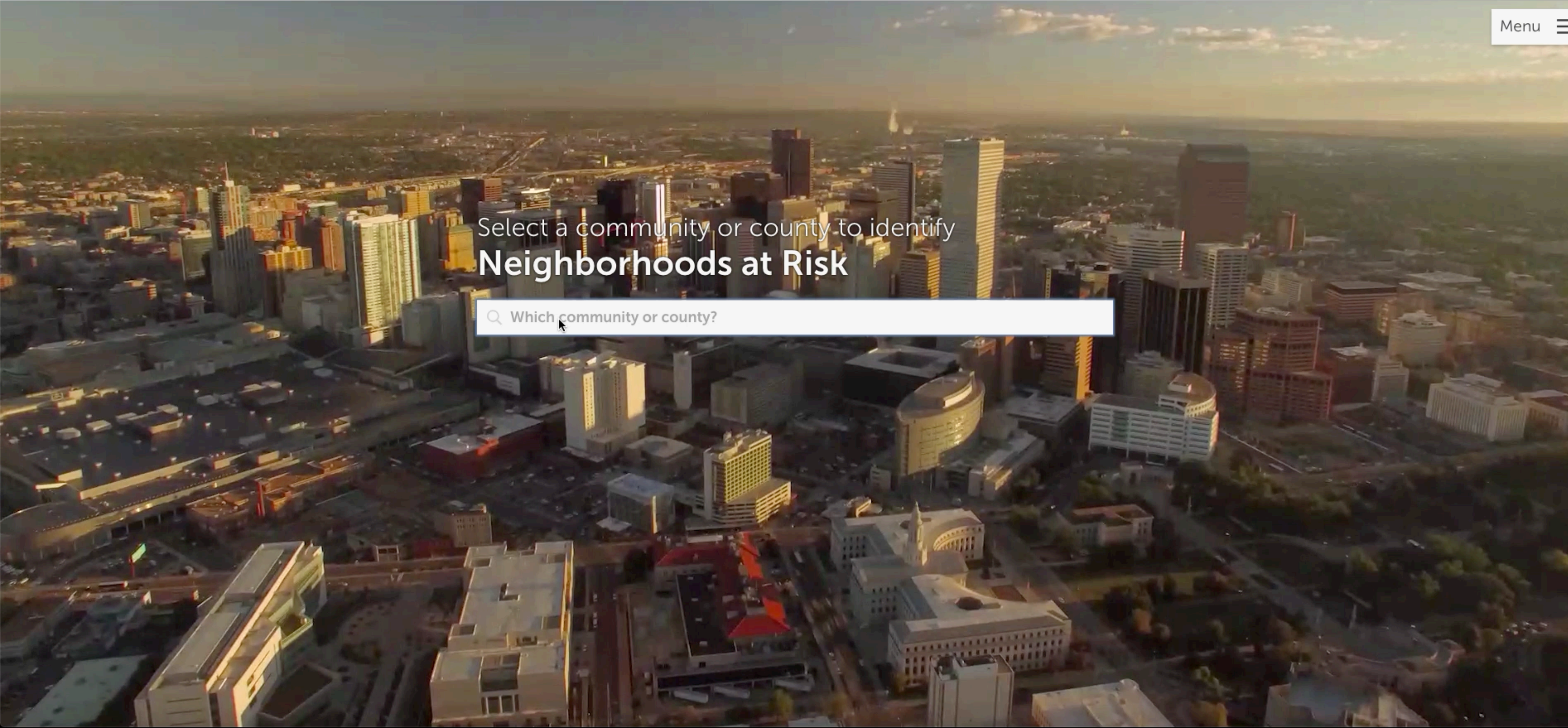
www.cnn.com › covid-evictions-cdc-moratorium-invs

### Neighborhoods at risk for Covid see disproportionately high ...

Oct 1, 2020 — Communities at high **risk** of complications from Covid-19 have been especially







Select a community or county to identify  
**Neighborhoods at Risk**

Which community or county?





# Neighborhoods at Risk

## Selected Tracts

Selected Location(s):  
Mobile, AL

Comparison Location:  
U.S.

Produced by  
Headwaters Economics'  
**Economic Profile System (EPS)**  
December 7, 2020

## Neighborhoods at Risk

### Selected Tracts

## Families in Poverty

	Mobile, AL	Selected Tracts	U.S.
Total families for whom poverty status is determined, 2018*	43,356	62,247	78,697,103
Families in poverty	7,301	9,726	7,930,699
Families with children in poverty	5,618	7,441	5,909,657
Single mother families in poverty	4,544	5,679	3,563,666

### Percent of Total, 2018\*

Families in poverty	16.8%	15.6%	10.1%
Families with children in poverty	13.0%	12.0%	7.5%
Single mother families in poverty	10.5%	9.1%	4.5%

### Change in Percentage Points, 2010\*-2018\*

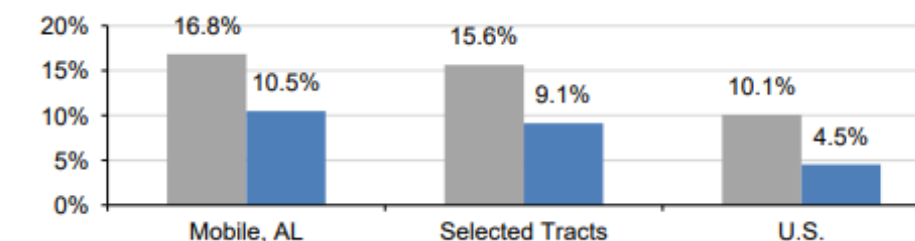
For example, if the value is 3% in 2010\* and 4.5% in 2018\*, the reported change in percentage points is 1.5.

Families in poverty	-1.1	-0.9	0.0
Families with children in poverty	-1.4	-1.4	-0.4
Single mother families in poverty	-1.1	-1.2	-0.3

**High Reliability:** Data with coefficients of variation (CVs) < 12% are in black to indicate that the sampling error is relatively small.  
**Medium Reliability:** Data with CVs between 12 & 40% are in orange to indicate that the values should be interpreted with caution.  
**Low Reliability:** Data with CVs > 40% are displayed in red to indicate that the estimate is considered very unreliable.

### Families in Poverty, Percent of Total, 2018\*

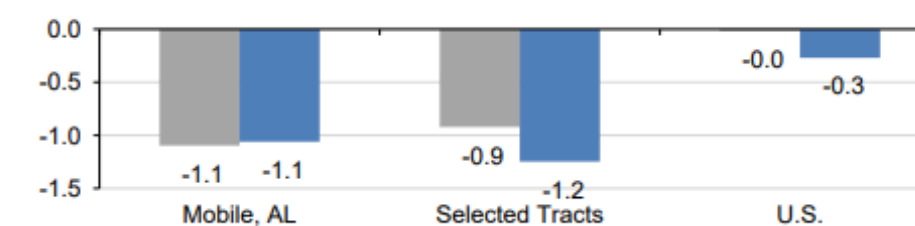
- Mobile, AL has the largest share of single mother families in poverty (10.5%).



■ Families in poverty ■ Single mother families in poverty

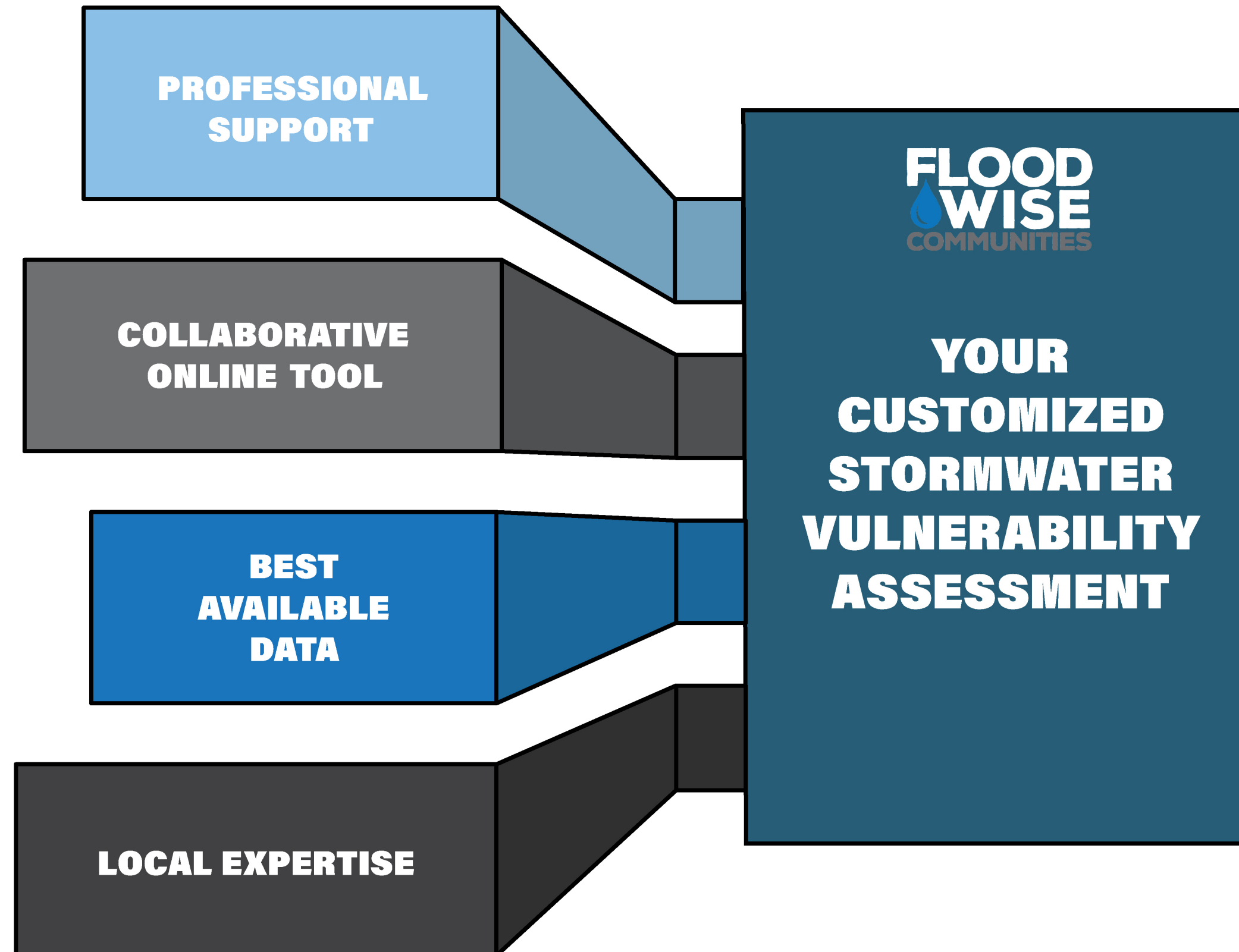
### Families in Poverty, Change in Percentage Points, 2010\*-2018\*

- The largest change in the share of single mother families in poverty occurred in Selected Tracts, which went from 10.4% to 9.1%.



■ Families in poverty ■ Single mother families in poverty

*Great on their own, stronger together.*



# Practitioner Perspectives

- **Senior Consultant**
  - [adapt.city/recycle.com](http://adapt.city/recycle.com)
- **Environmental Coordinator, Ann Arbor**
  - 2001-2018
- **Urban Sustainability Directors Network**
  - Michigan Green Communities
  - Great Lakes Climate Adaptation Network
  - 2010 – 2018
    - USDN Innovation Fund
    - Vulnerability Assessment Template
    - Neighborhoods at Risk

Matthew Naud

*adapt.city*

*Resource Recycling Systems*

*Ann Arbor, MI*



# Stormwater Vulnerability Assessments in Practice

- **Is there one template all cities can use?**
  - Common climate risk
  - Common stormwater elements
  - Solution sets will differ based on budget, staff capacity
- **How do we visualize extreme weather risk and equity?**
  - Neighborhoods at Risk
- **Begin with citywide review**
  - Macro analysis
  - How will climate affect service delivery

## Outputs

- Weather & Climate, Socioeconomic Profiles
- Vulnerability and Adaptive Capacity Matrix

## Stormwater Vulnerability Assessments in Practice

### **What tools do you need to inform decision makers & local officials about extreme weather and climate risk?**

- Do these tools help demonstrate why your budget should be funded?

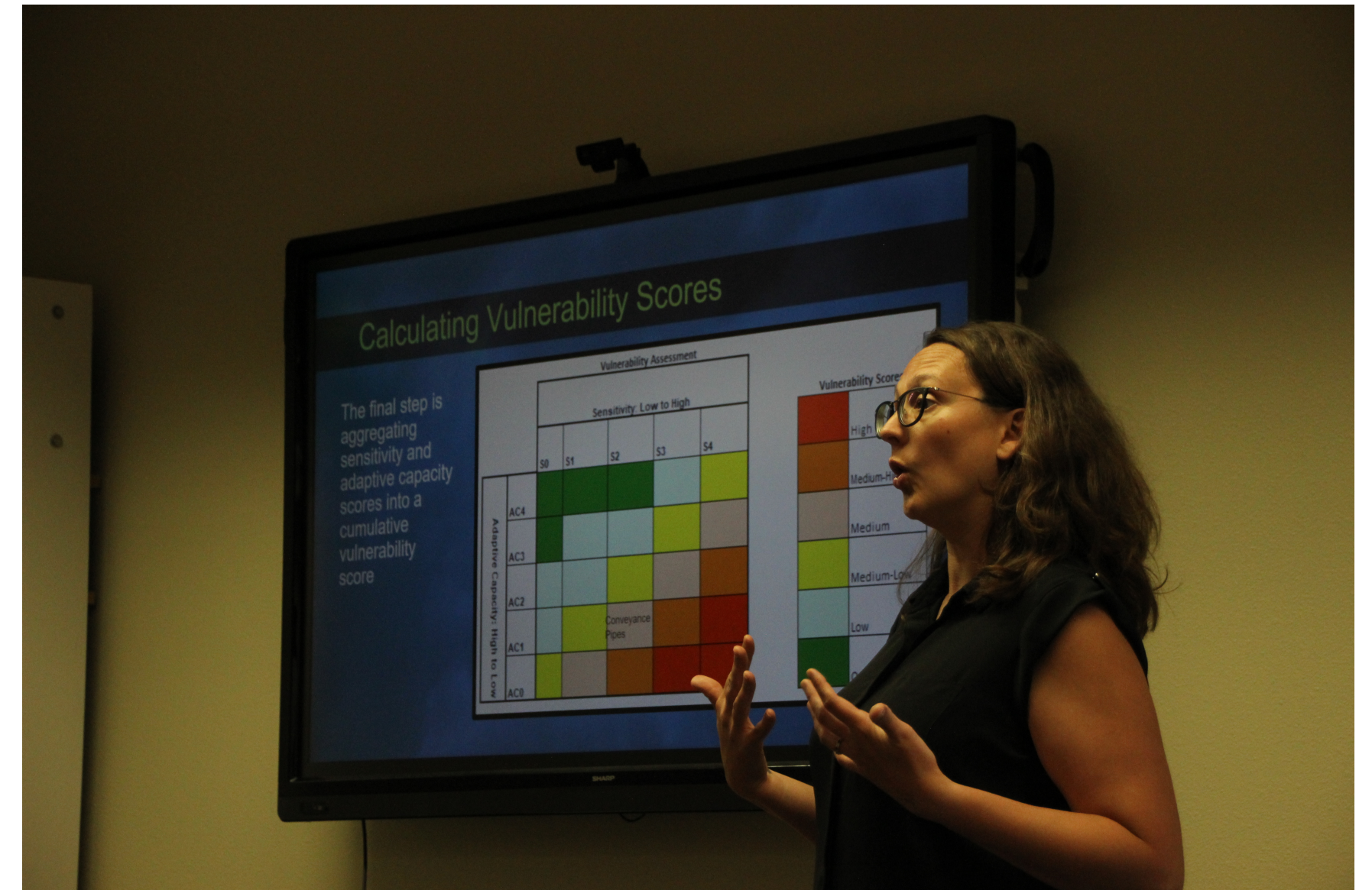
### **What data do you need for system design and planning?**

- Asset Management
- Bond Rating Risk

# Scalability to other city systems

## The process is transferable:

- *Elements of water distribution system*
- *Affordable housing sites*
- *Are we managing more trees in wealthy areas than poor areas?*
- *Is capital investment equitably distributed?*



*Learning from and with each other is  
the fastest way to solve for extreme  
weather impacts!*



# How to Enroll

- ✓ Visit [floodwisecommunities.org](https://floodwisecommunities.org)
- ✓ Click “Apply Today!”
- ✓ Fill out the enrollment form
- ✓ Hit Submit!

Priority will be given to communities that apply by December 18!

*We encourage communities to apply even if they feel they can't meet all eligibility criteria (e.g., # of team members) or meet the priority enrollment date.*

***Questions? Contact:***

*ProjectTeam@floodwisecommunities.org*





**Questions & Comments?**

**FLOOD  
WISE  
COMMUNITIES**



# Thank you!

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 **Stanford**  
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**NLC** NATIONAL  
LEAGUE  
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Sea Grant  
Texas  
AT TEXAS A&M UNIVERSITY