THE PEW CHARITABLE TRUSTS

Welcome to the briefing: Flooding Threatens Public Schools Across the Country

The webinar will begin shortly.

For the full report, log on to www.pewtrusts.org/flood-prepared-communities

August 1, 2017

Questions?

Please type your question in the text field at the bottom right of your screen.

If you do not see this field, click on the Q&A icon in the top right corner (blue when enabled).

Questions will be addressed at the end of the briefing.

Today's presenters

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FLOOD


INFRASTRUCTURE


NATURE-BASED
SOLUTIONS

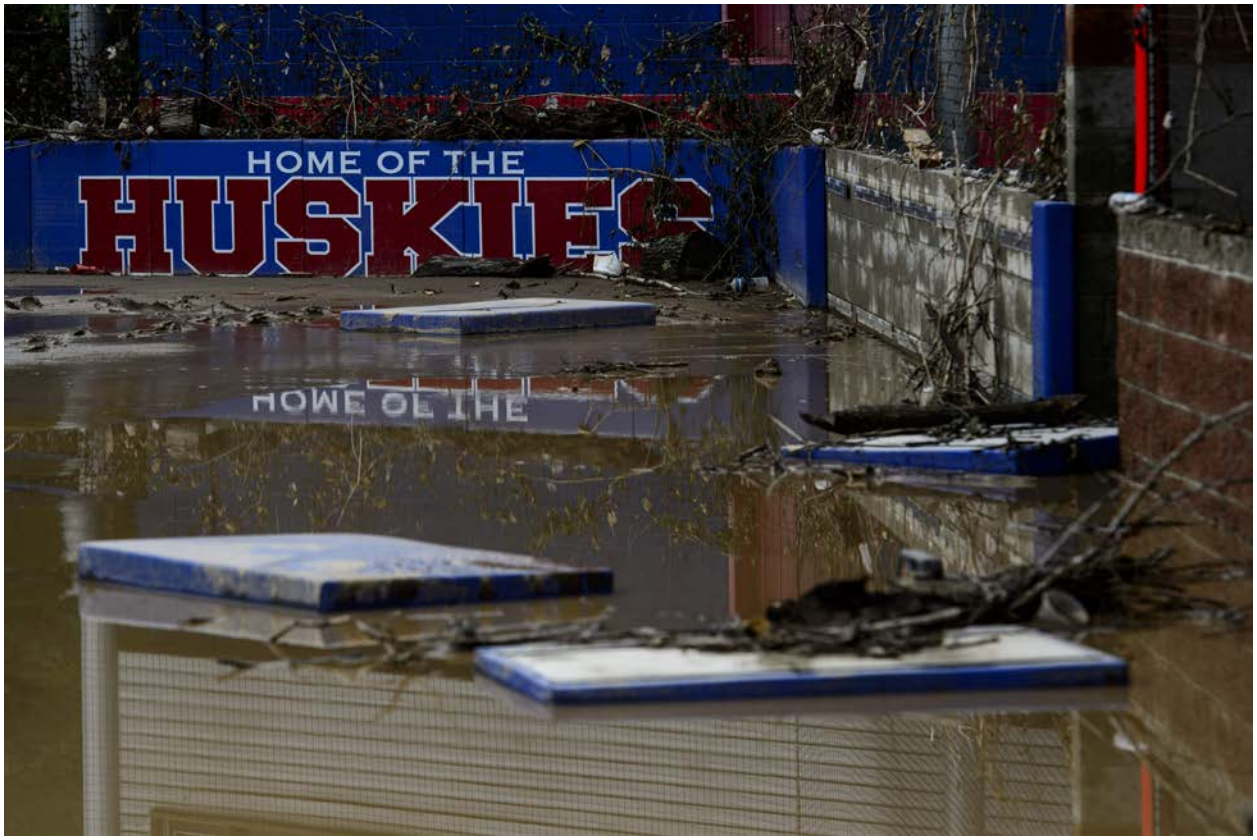

DISASTER
MITIGATION

The Problem

Flooding is the costliest, most common natural disaster in the U.S.

- Flooding cost Americans more than $260 billion in damage since 1980.
- In 2016, the federal government declared 36 disasters involving floods or hurricanes.
- Four of those floods caused at least $1 billion in damages each.

Schools at Risk



Floods in West Virginia in June 2016 caused $130 million in damage to regional schools including Herbert Hoover High School in Clendenin.

A chartbook from THE PEW CHARITABLE TRUSTS | Aug 2017

Flooding Threatens Public Schools Across the Country

Infrastructure analysis evaluates county-level flood risk

Methodology: Data

School locations, school characteristics & physical risk:

National Center for Education Statistics Elementary/ Secondary Information System

Urban-centric Locale [Public School] 2013-14	…al Students, All Grades (Excludes AE) [Public School] 2013-14
21-Suburb: Large	1,365
11-City: Large	103
11-City: Large	†
42-Rural: Distant	96
22-Suburb: Mid-size	169
21-Suburb: Large	2
21-Suburb: Large	59
13-City: Small	573
12-City: Mid-size	†
21-Suburb: Large	0

FEMA National Flood Hazard Layer

FEMA Disaster Declarations

FEMA … As Of: 7/13/17

Disaster Number	IH Program Declared	IA Program Declared	PA Prog… Declared	… Program Declared	State	Declaration Date	Disaster Type
4323	No	No	Yes	Yes	ND	7/12/2017	DR
4323	No	No	Yes	Yes	ND	7/12/2017	DR
4323	No	No	Yes	Yes	ND	7/12/2017	DR
4323	No	No	Yes	Yes	ND	7/12/2017	DR
4323	No	No	Yes	Yes	ND	7/12/2017	DR
4323	No	No	Yes	Yes	ND	7/12/2017	DR
4323	No	No	Yes	Yes	ND	7/12/2017	DR
4323	No	No	Yes	Yes	ND	7/12/2017	DR
4323	No	No	Yes	Yes	ND	7/12/2017	DR
4323	No	No	Yes	Yes	ND	7/12/2017	DR
4323	No	No	Yes	Yes	ND	7/12/2017	DR
4322	No	No	Yes	Yes	NY	7/12/2017	DR
4322	No	No	Yes	Yes	NY	7/12/2017	DR
4322	No	No	Yes	Yes	NY	7/12/2017	DR
4322	No	No	Yes	Yes	NY	7/12/2017	DR
4322	No	No	Yes	Yes	NY	7/12/2017	DR
4322	No	No	Yes	Yes	NY	7/12/2017	DR
4322	No	No	Yes	Yes	NY	7/12/2017	DR
4322	No	No	Yes	Yes	NY	7/12/2017	DR
4322	No	No	Yes	Yes	NY	7/12/2017	DR

Methodology: Indicators

Flood Zone Risk: Potential for direct risk to the school

- *School's location in a 1% or 0.2% annual chance flood zone*

ZIP Code Risk: Potential for indirect risk to the school via the risk of the surrounding community

- *Percentage of the school's zip code located in the 0.2% annual chance flood zone*

Disaster Count Risk: Potential for direct or indirect risk based on frequency of historical flood-related disasters

- *Number of historical flood-related disaster declarations in the school's county*

Methodology: Calculations

Composite Flood Risk:
Sum of flood zone, ZIP code, and disaster count risk scores

Scores are calculated at the county level: individual school indicator scores are averaged across all schools in the county to create county-level indicator scores

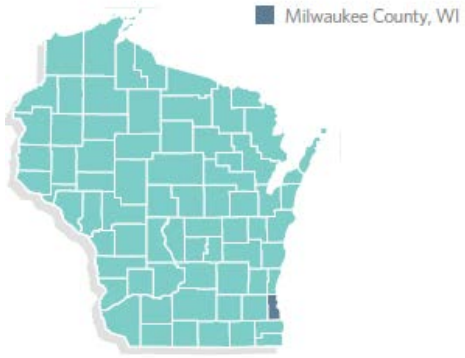
Nicolet High School, WI

Maintenance crews pump water out of Nicolet High School in 2010 after it flooded.

Flooding Spurs Renovations at Wisconsin School

Stormwater management project increases flood resilience

- July 2010, 8 inches of rain resulted in $14 million in damages
- $1.2 million on upgrades to better manage stormwater runoff



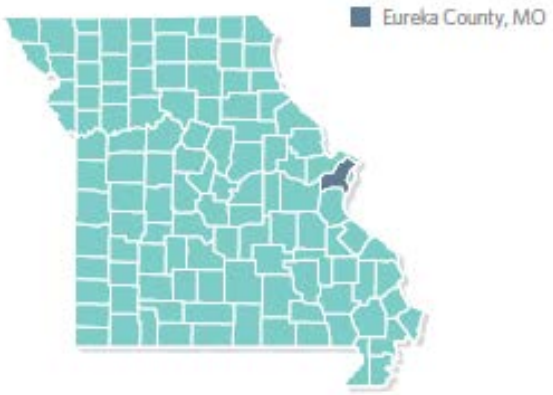
Eureka High School, MO

In December 2015, heavy rain flooded Eureka High School in Eureka, Missouri, causing millions of dollars in damage.

Missouri High School Looks to Collaboration to Reduce Flood Risks

Officials consider pre-disaster measures to protect investments

- Dec. 2015, 3 days of heavy rainfall flooded 75% of school, costing $2.5 million in damages
- School is collaborating with FEMA to increase resilience



McDowell Elementary, KY

Flooding in 2013 caused $60,000 in damage to McDowell Elementary School in McDowell, Kentucky.

Kentucky Elementary School Relocates to Break Cycle of Flooding, Rebuilding

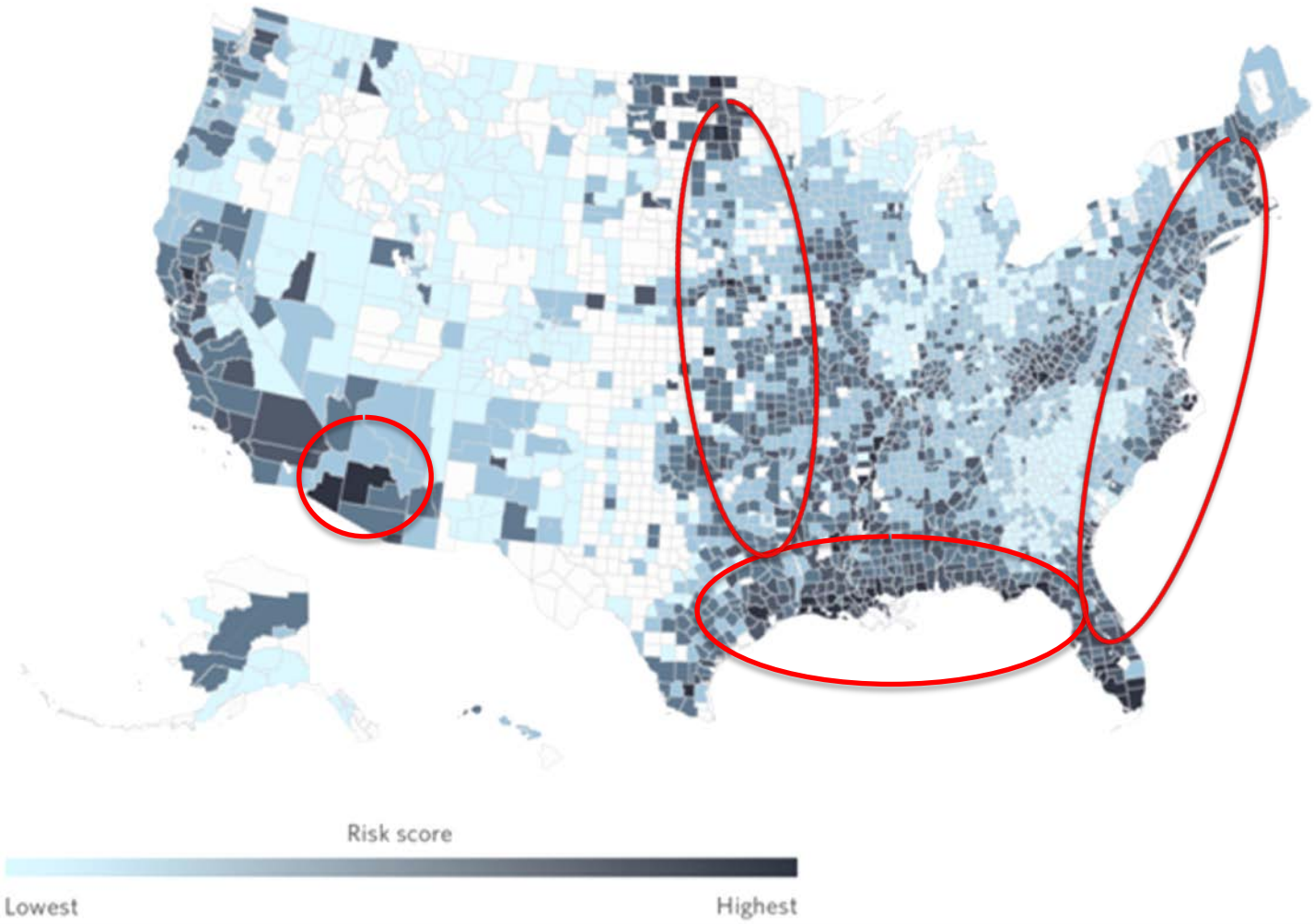
Preventive measures reduce its future exposure to flood risk

- 2013 floods resulted in $60,000 of damages and initiated conversation on long-term outlook
- Due to a history of repeated flooding, officials have relocated and are consolidating school outside the floodplain

Key Findings

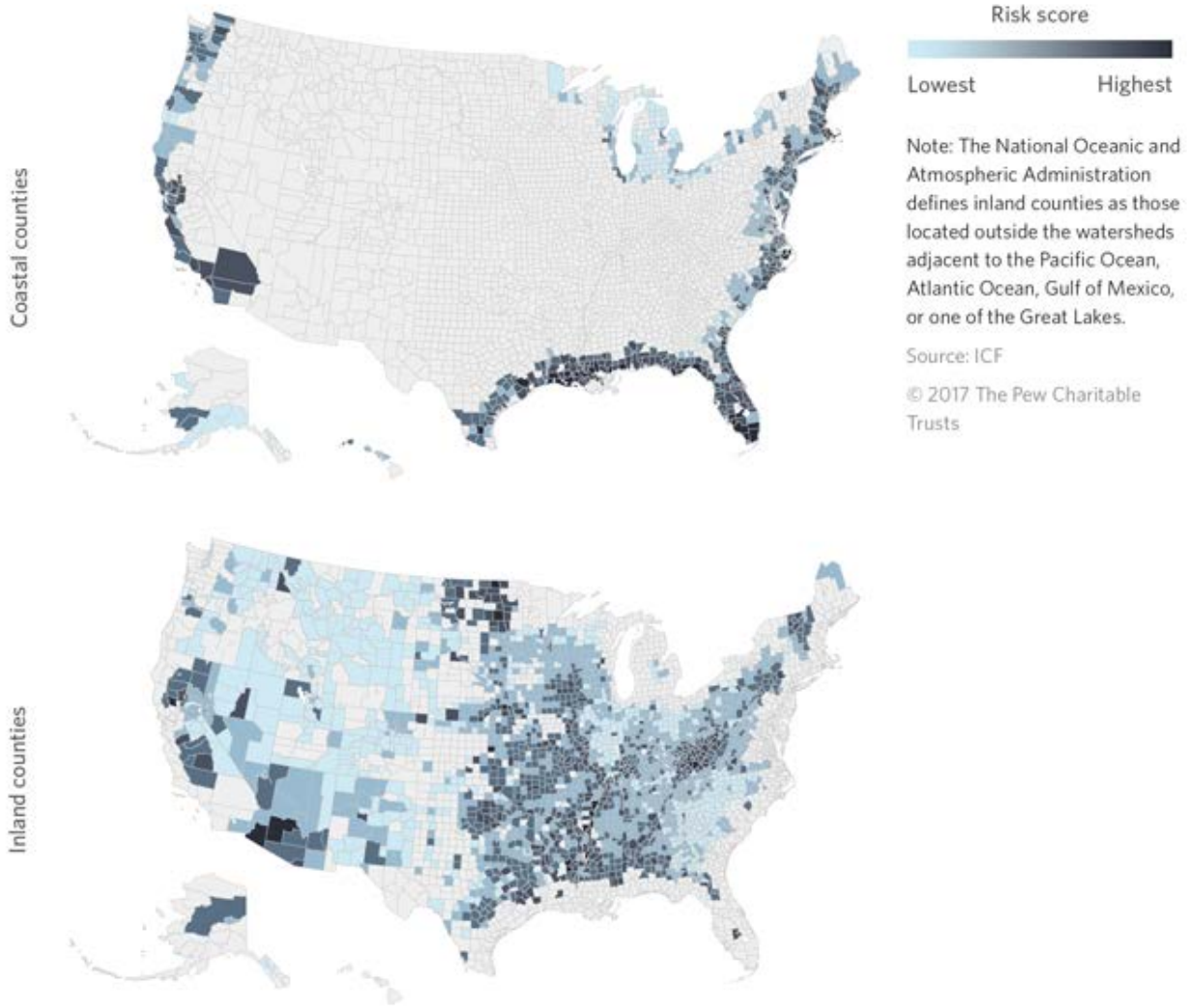
School Flood Risk Is Distributed Widely Across the U.S.

Overall composite flood risk scores



High Flood Risk Scores Are Not Limited to the Coasts

Composite flood risk scores for coastal and inland counties

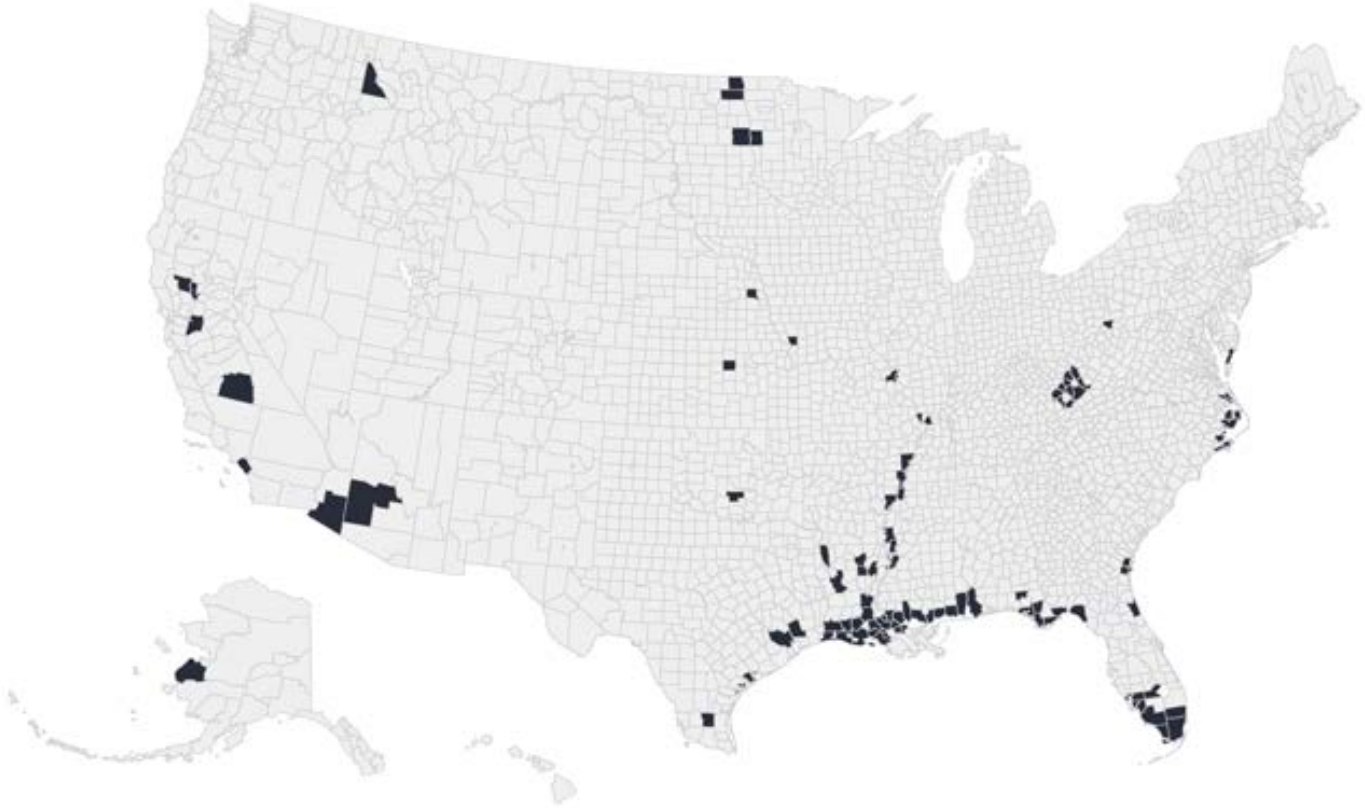


Note: The National Oceanic and Atmospheric Administration defines inland counties as those located outside the watersheds adjacent to the Pacific Ocean, Atlantic Ocean, Gulf of Mexico, or one of the Great Lakes.

Source: ICF

Counties With Highest Composite Scores Serve Nearly 4 Million Students

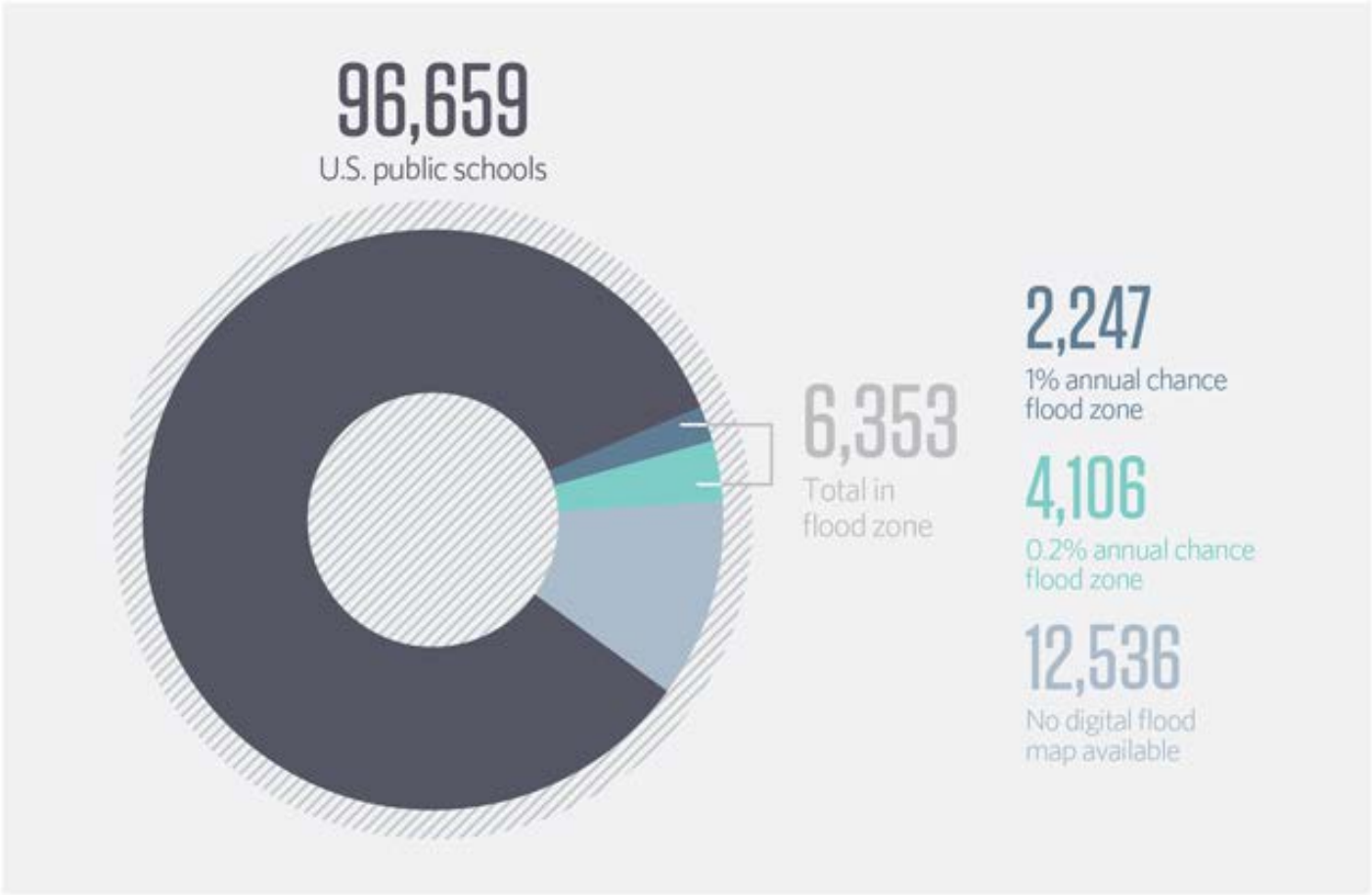
100 counties with highest composite flood risk scores



Source: ICF

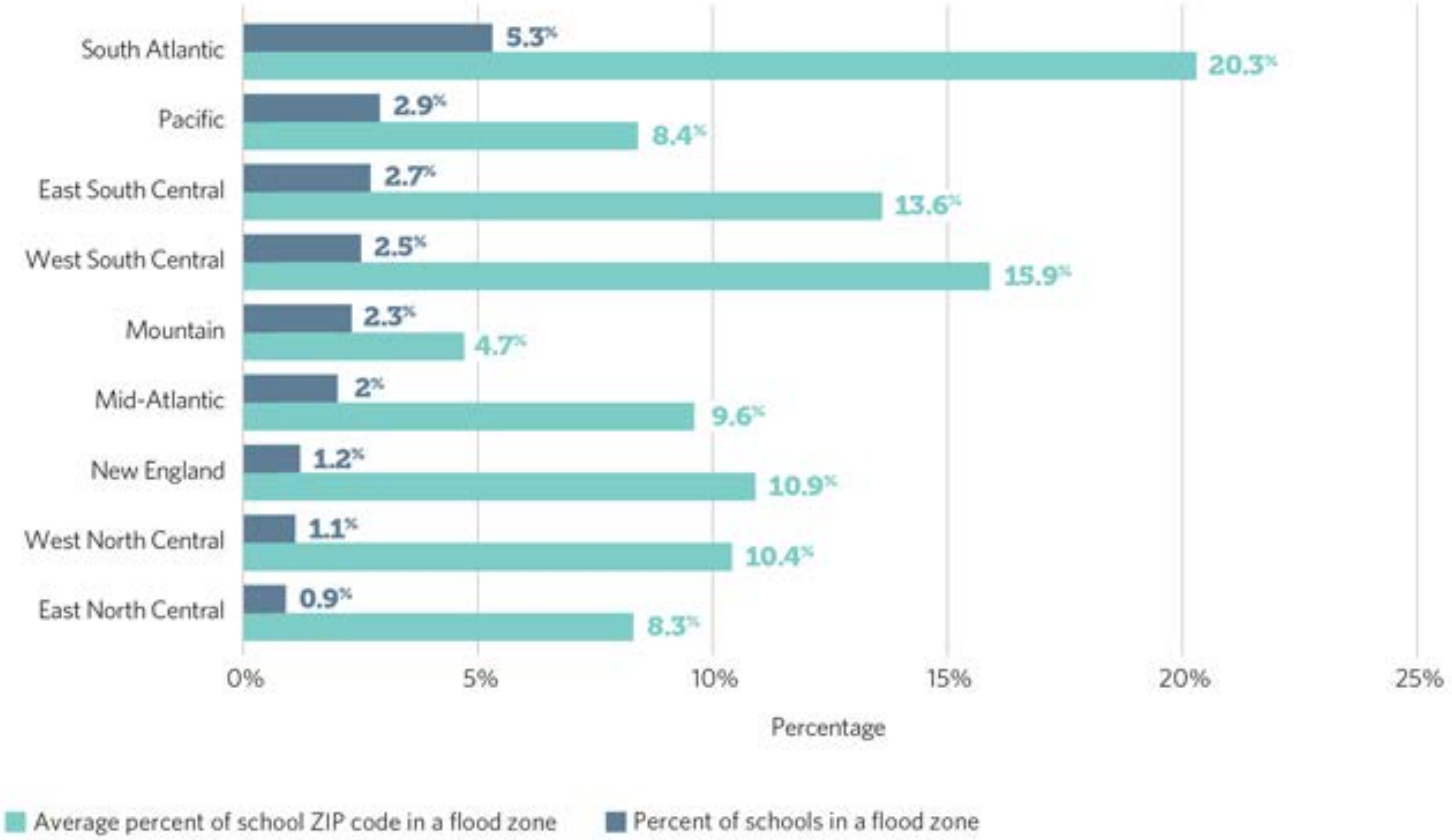
6,353 Schools Are Located in a Flood Zone

Number of schools in FEMA's mapped flood hazard areas



Schools Outside Flood Zones Still Have Students Affected by Potential Floods

Percentage of schools and school ZIP codes in flood zone, by region

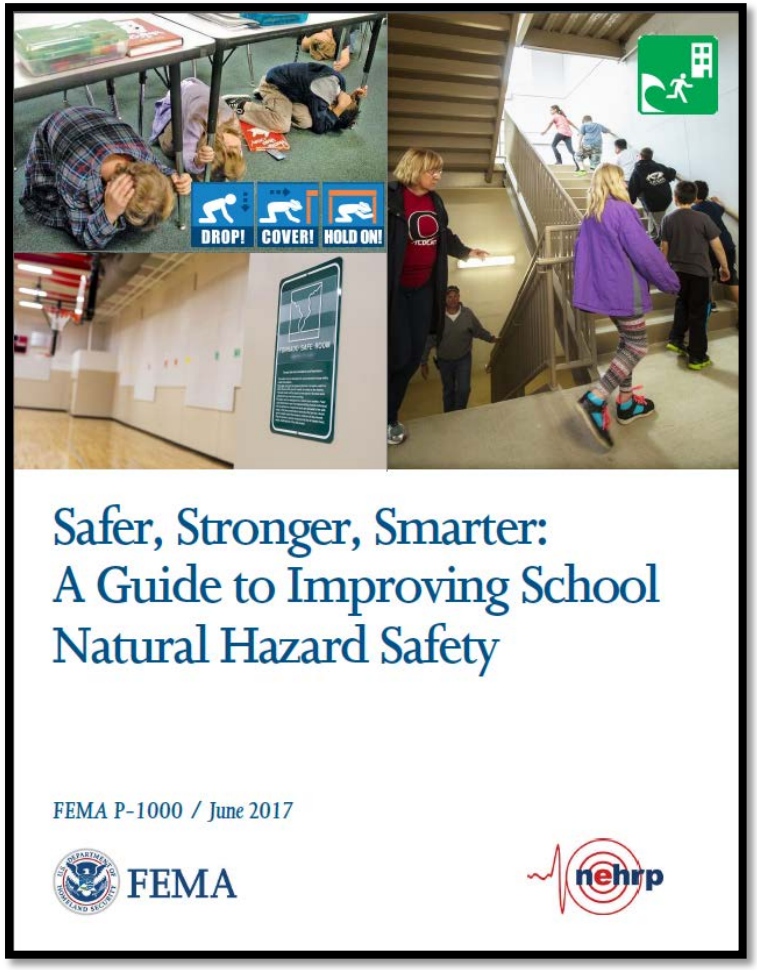


Underinvesting in Mitigation and Infrastructure

Recommendations

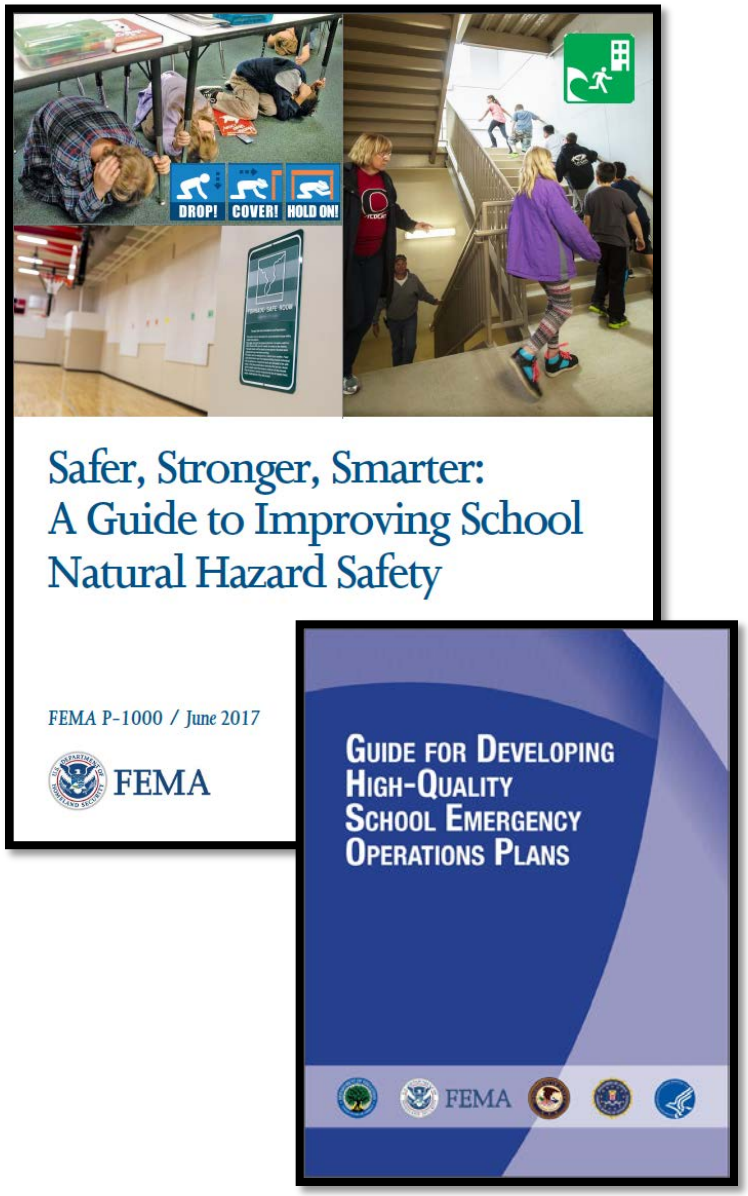
Modernize maps	Develop pre-disaster plans for schools
Leverage federal assistance	Rebuild smarter with federal dollars

FEMA P-1000


DROP!
COVER!
HOLD ON!
Safer, Stronger, Smarter:
A Guide to Improving School
Natural Hazard Safety
FEMA P-1000 / June 2017
FEMA
nehrp

Where to start?

- *Guide on Developing High Quality School Emergency Operations Plans* (DoE, 2013)
- ***Safer, Stronger, Smarter: A Guide to Improving School Natural Hazard Safety* (FEMA P-1000, 2017)**



FEMA P-1000 – *Safer, Stronger, Smarter: A Guide to Improving School Natural Hazard Safety*

- Provides up-to-date, authoritative information and guidance that schools can use to develop a comprehensive strategy for addressing natural hazards including actions to take before, during, and after a hazard event.
- Developed for administrators, facilities managers, emergency managers, emergency planning committees, and teachers and staff at K through 12 schools.
- Also valuable for state officials, district administrators, school boards, teacher union leaders, as well as parents, caregivers, and students.
- Includes real-world case studies and examples highlighting the importance and effectiveness of the guidance.

FEMA P-1000 – *Safer, Stronger, Smarter: A Guide to Improving School Natural Hazard Safety*

- Comprehensive approach to school natural hazard safety. Key components:
  - Identifying hazards
  - Approaches for making school buildings safer
  - Planning for hazard response
  - Planning for hazard recovery
  - Engaging the whole community

School buses in New Orleans, Louisiana were swamped by the floodwaters following Hurricane Katrina in September 2005 (Photo source: Liz Roll, FEMA).

- Hazard supplements and Appendices:
  - Earthquakes
  - Floods
  - Hurricanes
  - Tornadoes
  - Tsunamis
  - High Winds
  - Other Hazards: Snow storms, Volcanic Eruptions, and Wildfires

FEMA P-1000 – *Safer, Stronger, Smarter: A Guide to Improving School Natural Hazard Safety*

- Many of our Nation's schools are at risk of flooding and other hazards.
- Planning and preparing is essential.
- Limited resources and competing priorities require smart investments.
- Improve safety, recover more quickly, and be better prepared for the future.
- https://www.fema.gov/media-library/assets/documents/132592

Danville Middle School: Flood Retrofit Features

Figure F-6 Wall repair and reconstruction to resist future flood damage. (Photo source: Reynolds Restoration Services, Inc.)

Figure F-7 Metal lockers were replaced with high density polyethylene (HDPE) lockers (Scranton Products, 2016).

Figure F-8 Flood vents were installed throughout most of the school. Allowing floodwater to enter prevents structural failure of walls if water is outside but not inside (Smart Vent, 2016).

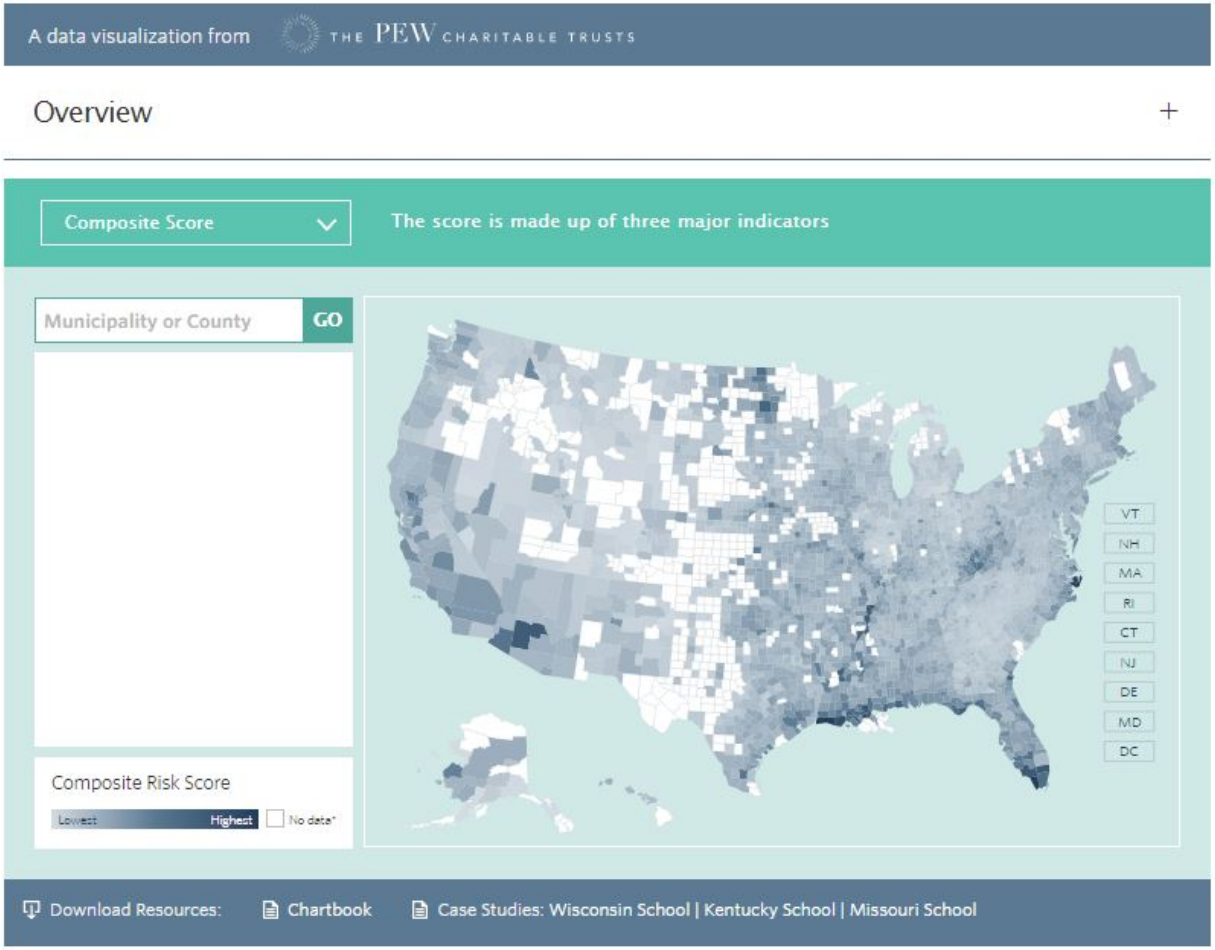
DATA VISUALIZATION

Schools in all 50 States Face Flood Challenges

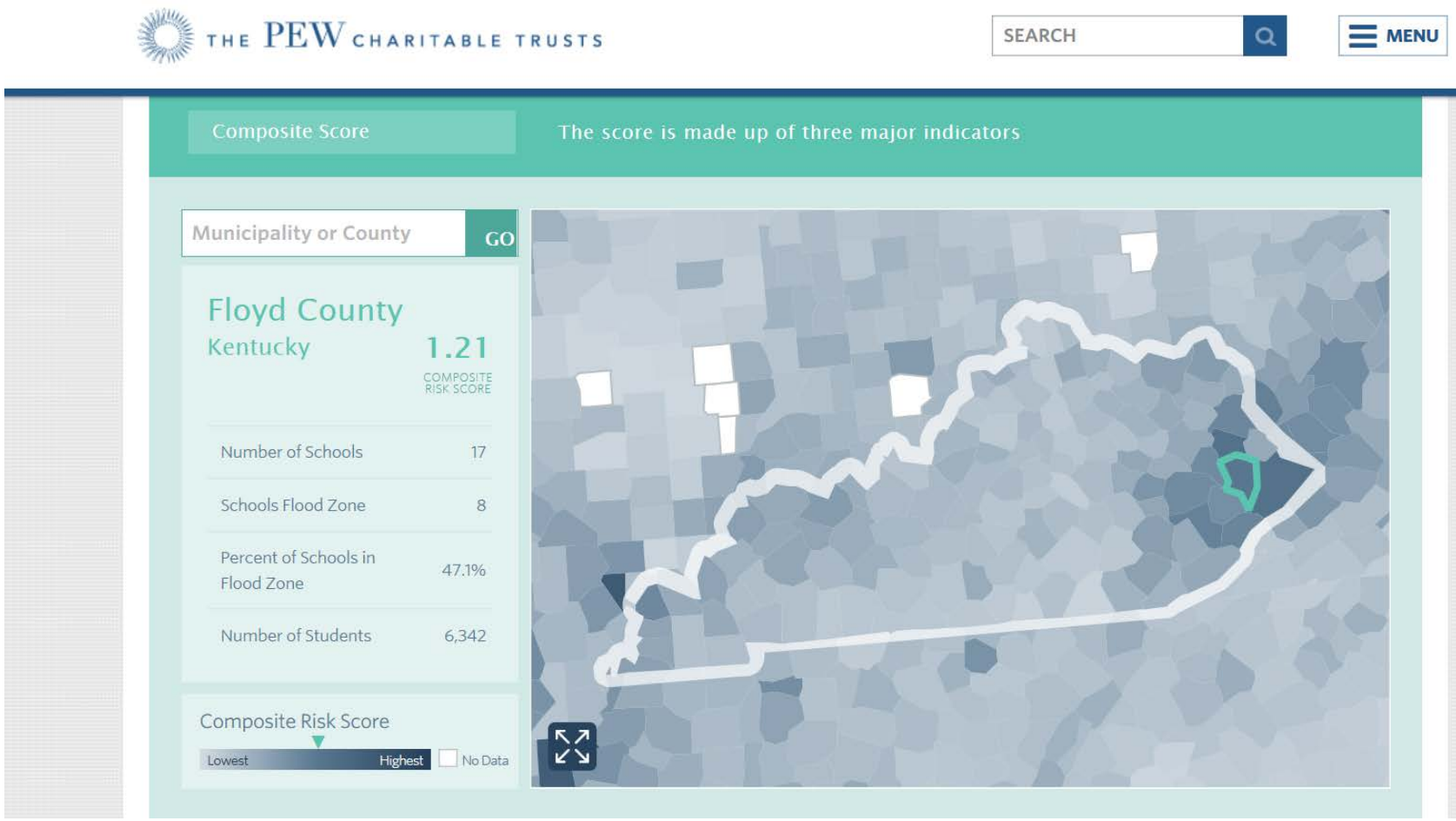
Evaluation of community infrastructure risk potential

August 01, 2017 | Flood-Prepared Communities

SHARE



County-level view



Composite Score

The score is made up of three major indicators

Municipality or County GO

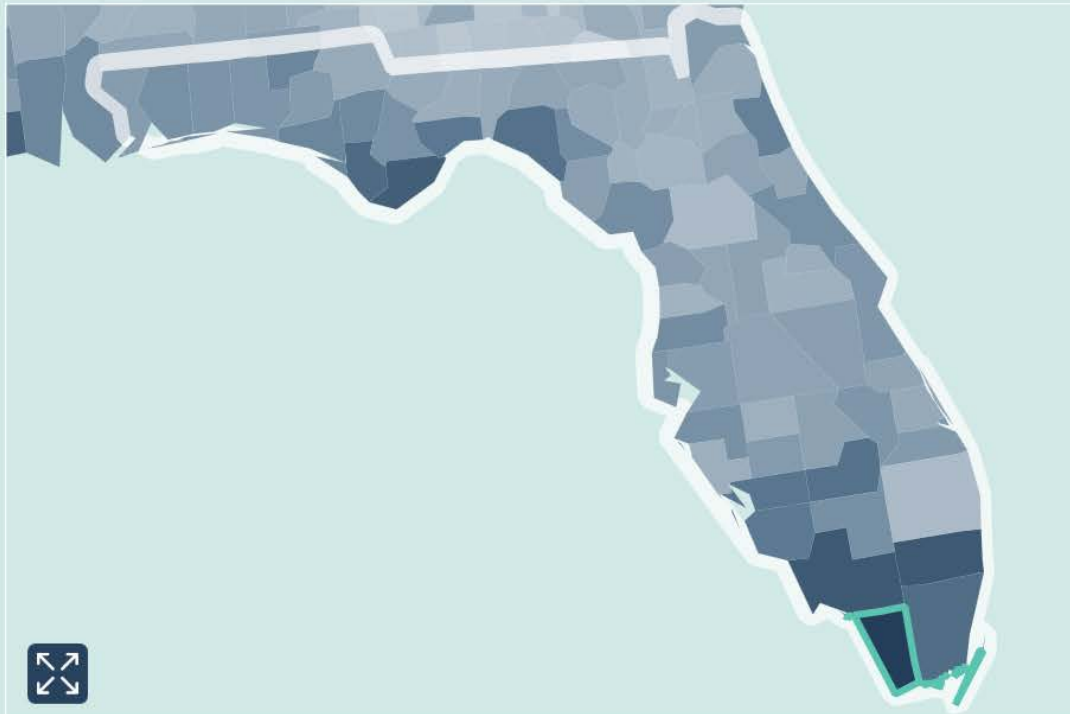
Monroe County
Florida

2.34
COMPOSITE RISK SCORE

Number of Schools	24
Schools Flood Zone	21
Percent of Schools in Flood Zone	87.5%
Number of Students	8,489

Composite Risk Score

Lowest — Highest ☐ No Data



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For more information and to access the report, go to:

http://www.pewtrusts.org/schools-flood-risk