Road to Resilience

Changing Natural Hazards, Increasing Risk, & Science-Backed Solutions

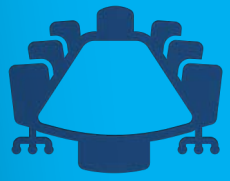
Sarah Dillingham

Senior Director of Product Design &
Senior Meteorologist

Insurance Institute for Business & Home Safety

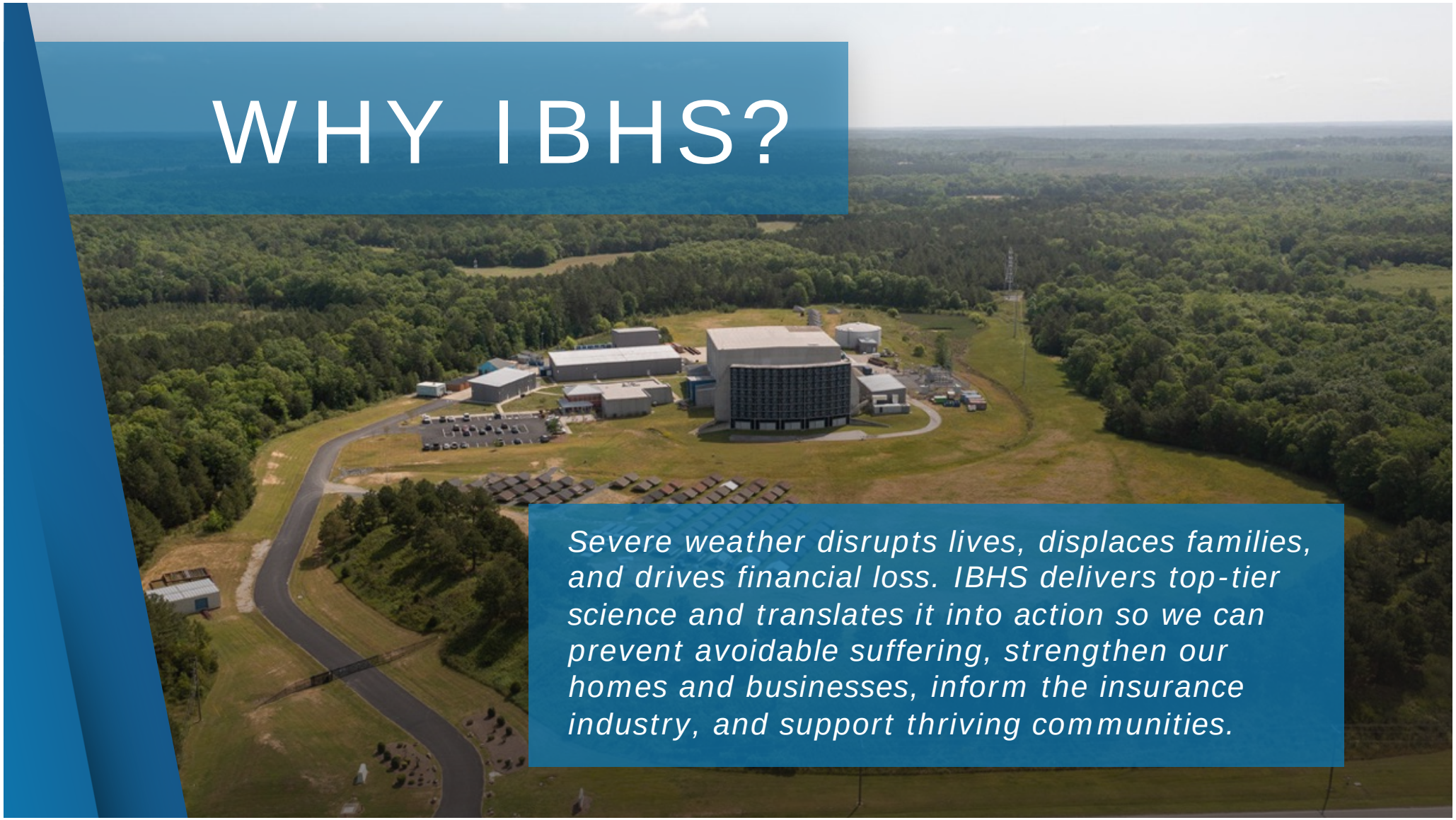
Gen Re®

IBHS member since 1996



Active on the IBHS Board of Directors

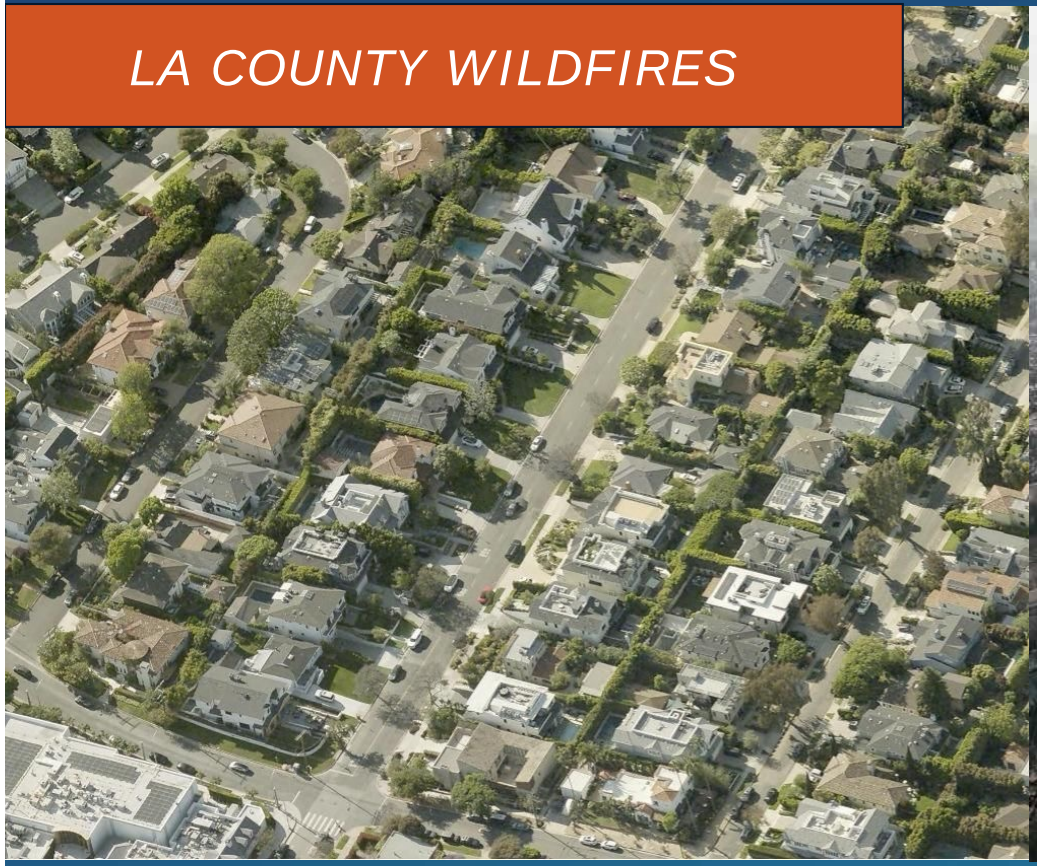
WHY IBHS?



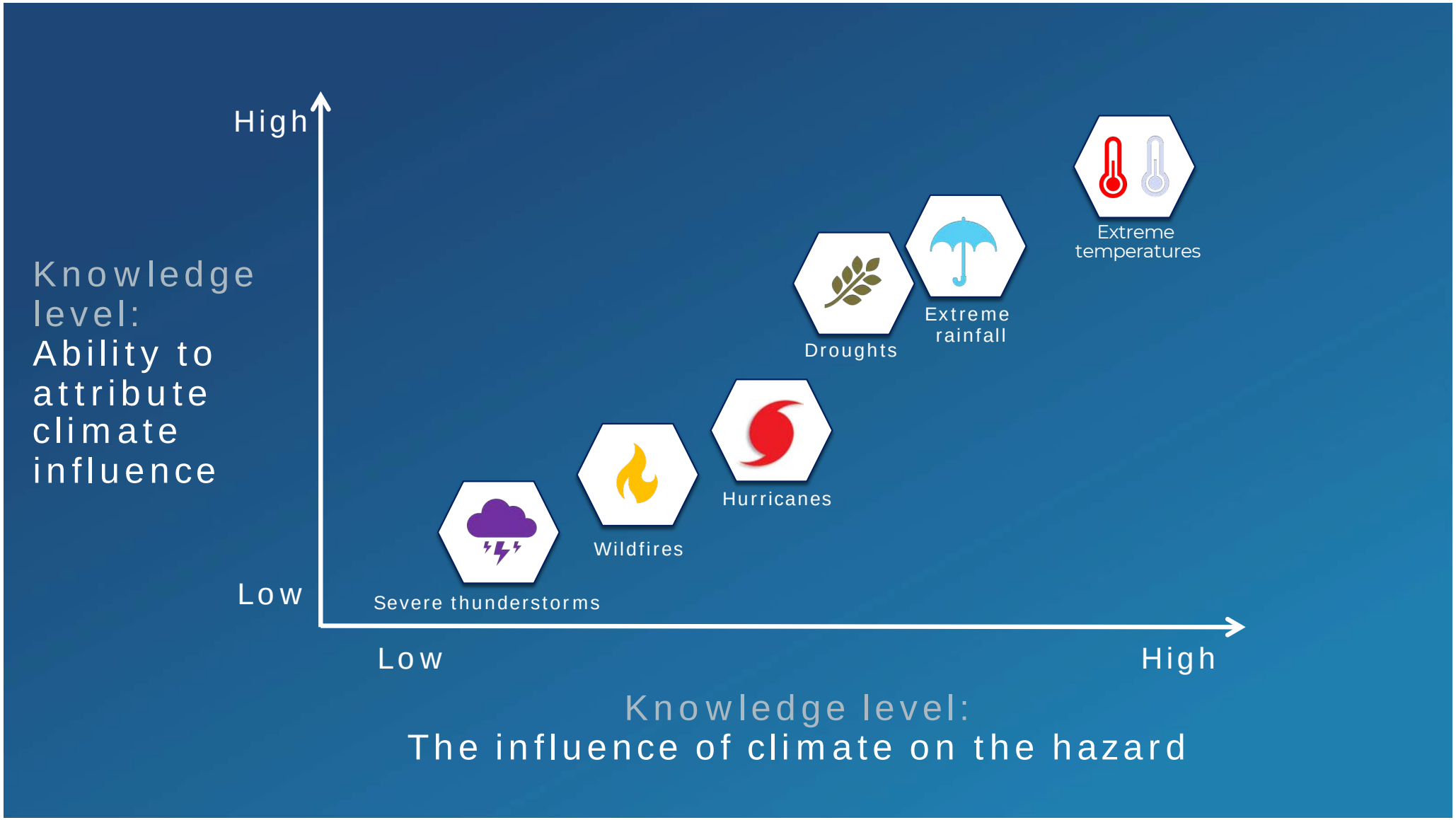
Severe weather disrupts lives, displaces families, and drives financial loss. IBHS delivers top-tier science and translates it into action so we can prevent avoidable suffering, strengthen our homes and businesses, inform the insurance industry, and support thriving communities.


DISASTERS
HAZARD RISK
PHYSICAL VULNERABILITY
SOCIAL VULNERABILITY

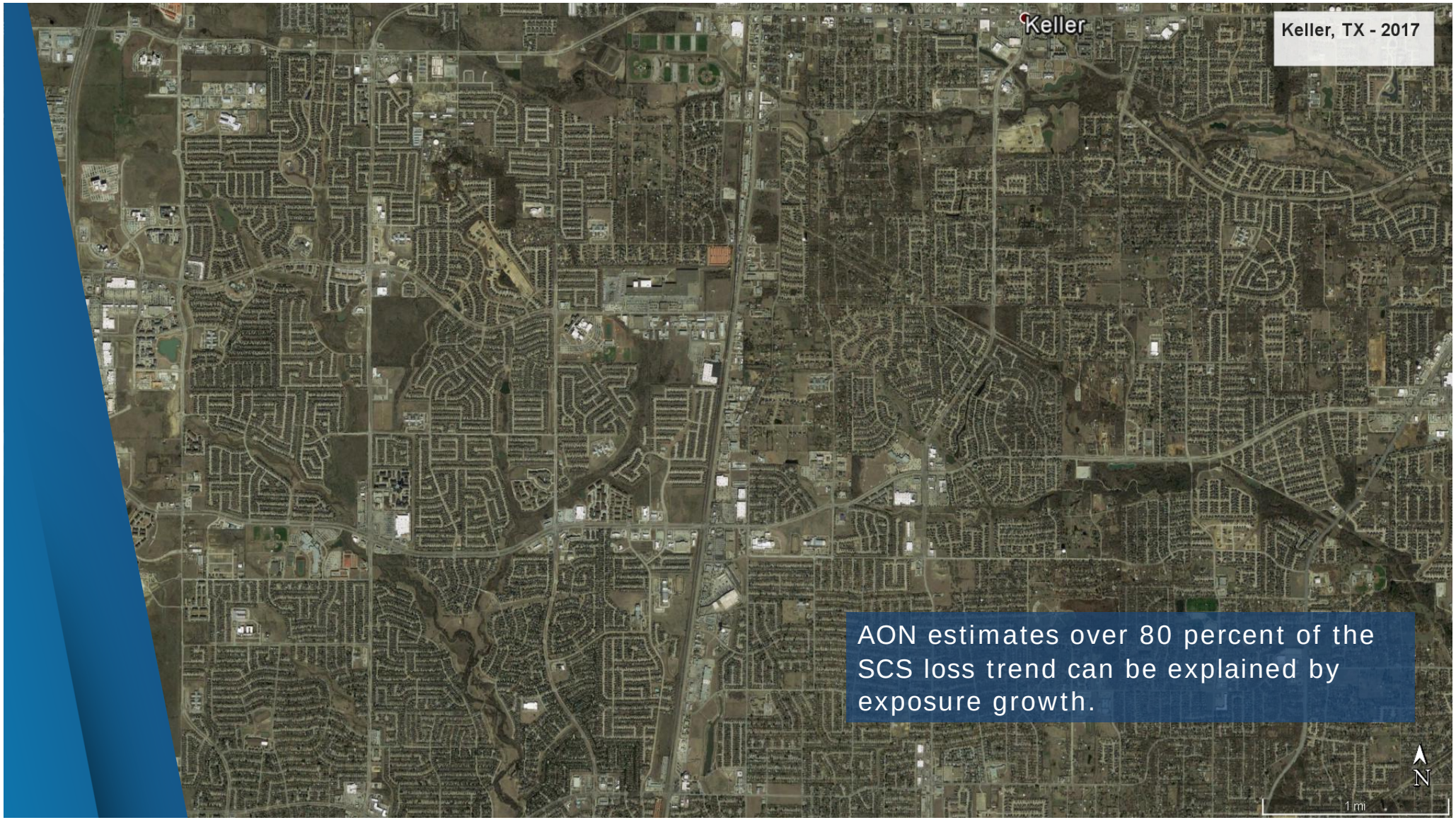
LA COUNTY WILDFIRES




ROOF
✓ Choose a Class A fire-rated roof maintained clear of debris
✓ Choose noncombustible gutters & downspouts
WILDFIRE PREPARED HOME + PLUS
ADDITIONAL MITIGATION
✓ Remove back-to-back fencing
✓ Eliminate combustible siding
✓ Enclose eaves
✓ Upgrade to a wildfire-resistant deck
✓ Upgrade windows & doors
✓ Cover gutters
✓ Move outbuildings at least 30 feet away
BUILDING FEATURES
✓ Install ember- & flame-resistant vents
✓ Ensure 6-inch vertical noncombustible clearance at base of wall
WILDFIRE PREPARED
A PROGRAM OF IBHS
DEFENSIBLE SPACE
✓ Create & maintain the home ignition zone (0-5 ft) including the removal of branches that overhang this area
✓ Clear & maintain the underdeck area; enclose low-elevation decks
✓ Maintain yard clear of debris
✓ Replace combustible fencing within 5 ft of the home

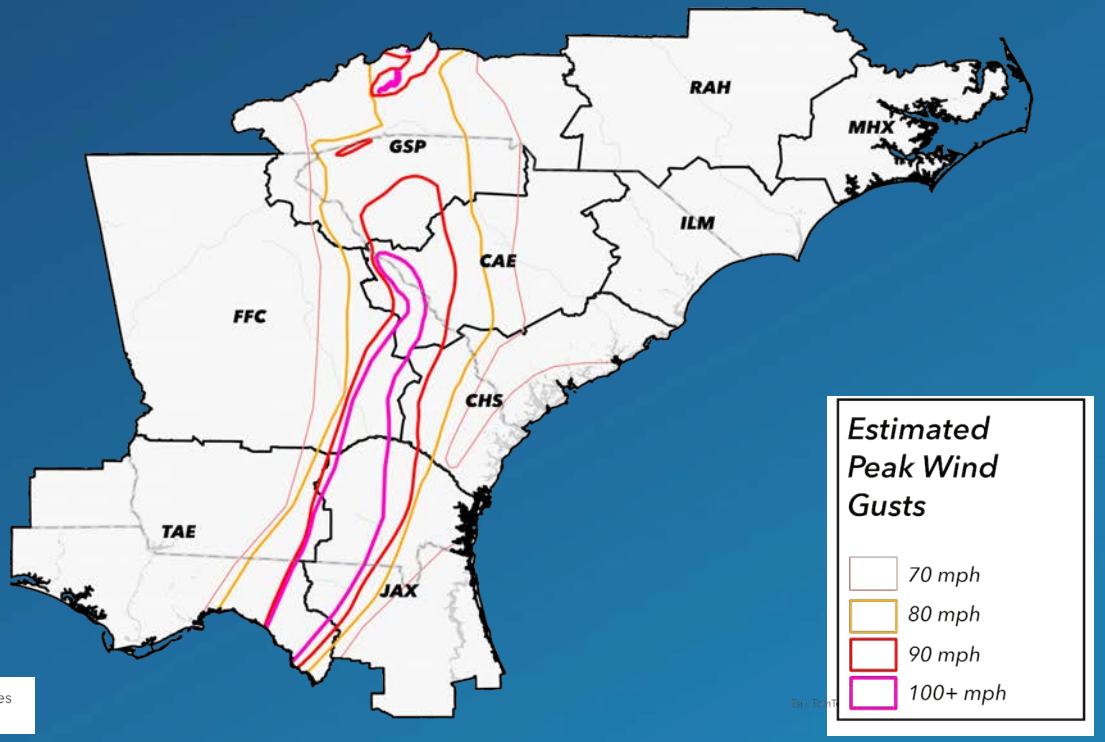

High
Knowledge level:
Ability to attribute climate influence
Low
Severe thunderstorms
Wildfires
Hurricanes
Droughts
Extreme rainfall
Extreme temperatures
Low
High
Knowledge level:
The influence of climate on the hazard


Nashville
TENNESSEE
Albuquerque
OKLAHOMA
Memphis
ARIZONA
ARKANSAS
NEW MEXICO
MISSISSIPPI
ALABA
Phoenix
Dallas
Tucson
Ciudad Juárez
TEXAS
SONORA
LOUISIANA
Houston
New Orleans
San Antonio
CHIHUAHUA
COAHUILA
Google Earth
Google US, Landsat / Copernicus, Data SIO
NUEVO LEON
BAJA
ORNIA SUR
SINALOA
Gulf of
Mexico
Monterrey


Keller
Keller, TX - 2017
AON estimates over 80 percent of the SCS loss trend can be explained by exposure growth.
N
1 mi

Estimated Peak Wind Gusts from Hurricane Helene

This map represents a collaborative effort amongst offices impacted by Hurricane Helene to properly assess the peak wind gusts as Helene moved inland. Winds were estimated based upon several days of ground surveys, satellite imagery, and consultation with experts. These are estimates and may not represent the peak wind gust at every spot on the map.

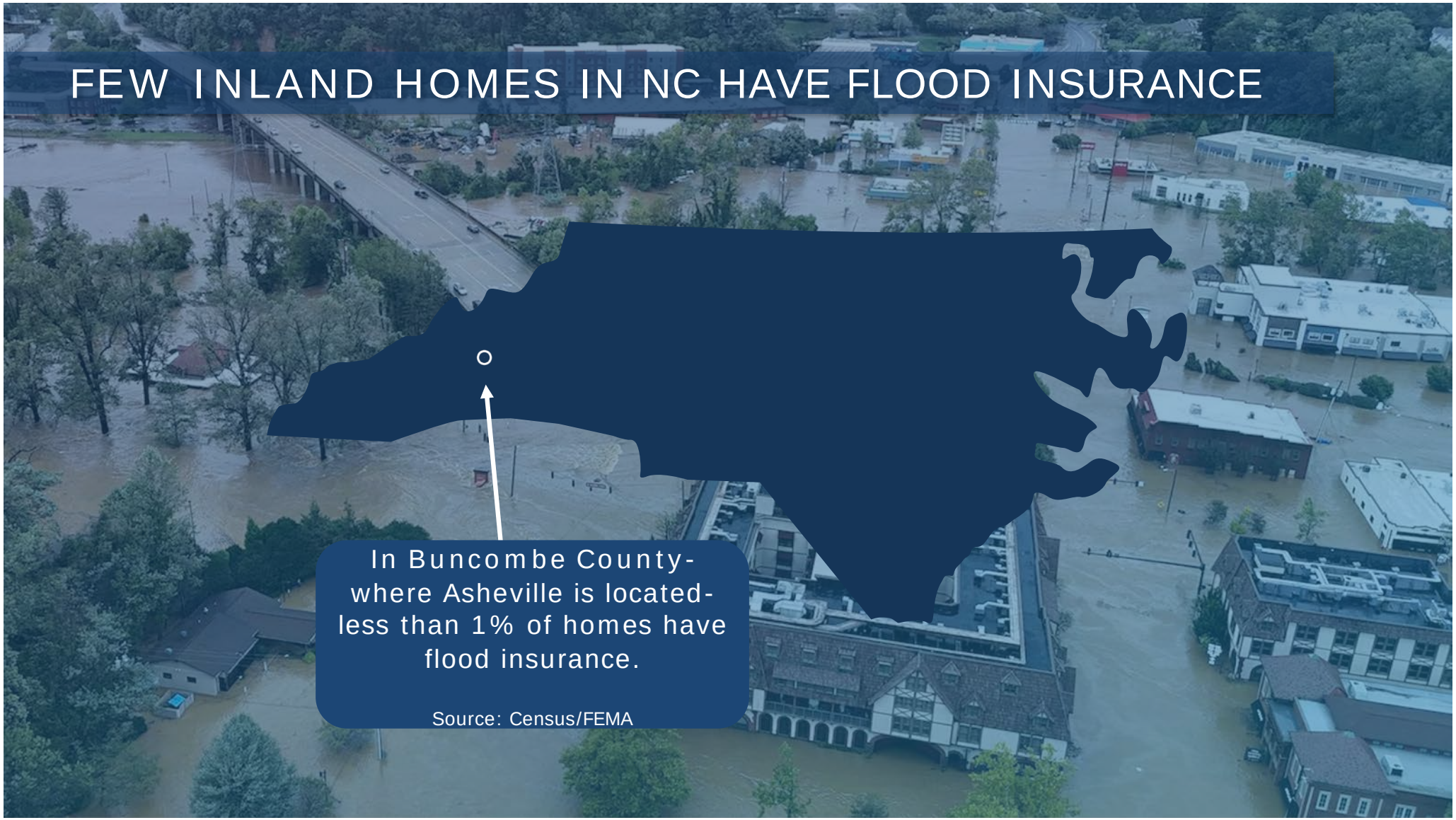


HURRICANE HELENE

AUGUSTA, GA

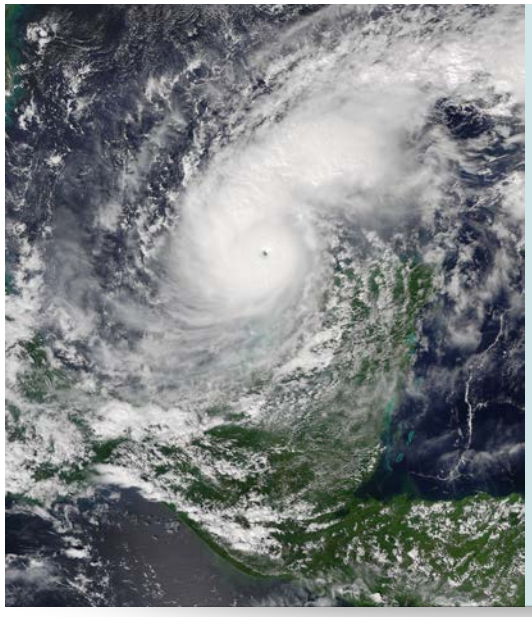
250+ miles from landfall

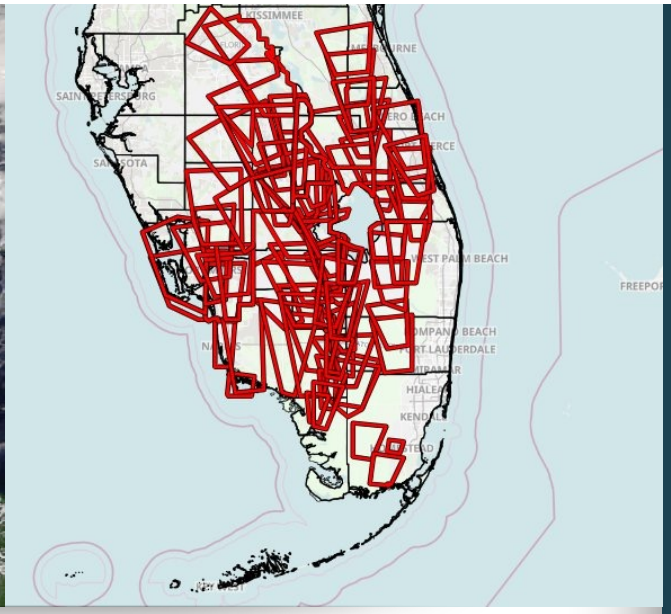
FEW INLAND HOMES IN NC HAVE FLOOD INSURANCE



In Buncombe County- where Asheville is located- less than 1% of homes have flood insurance.

Source: Census/FEMA

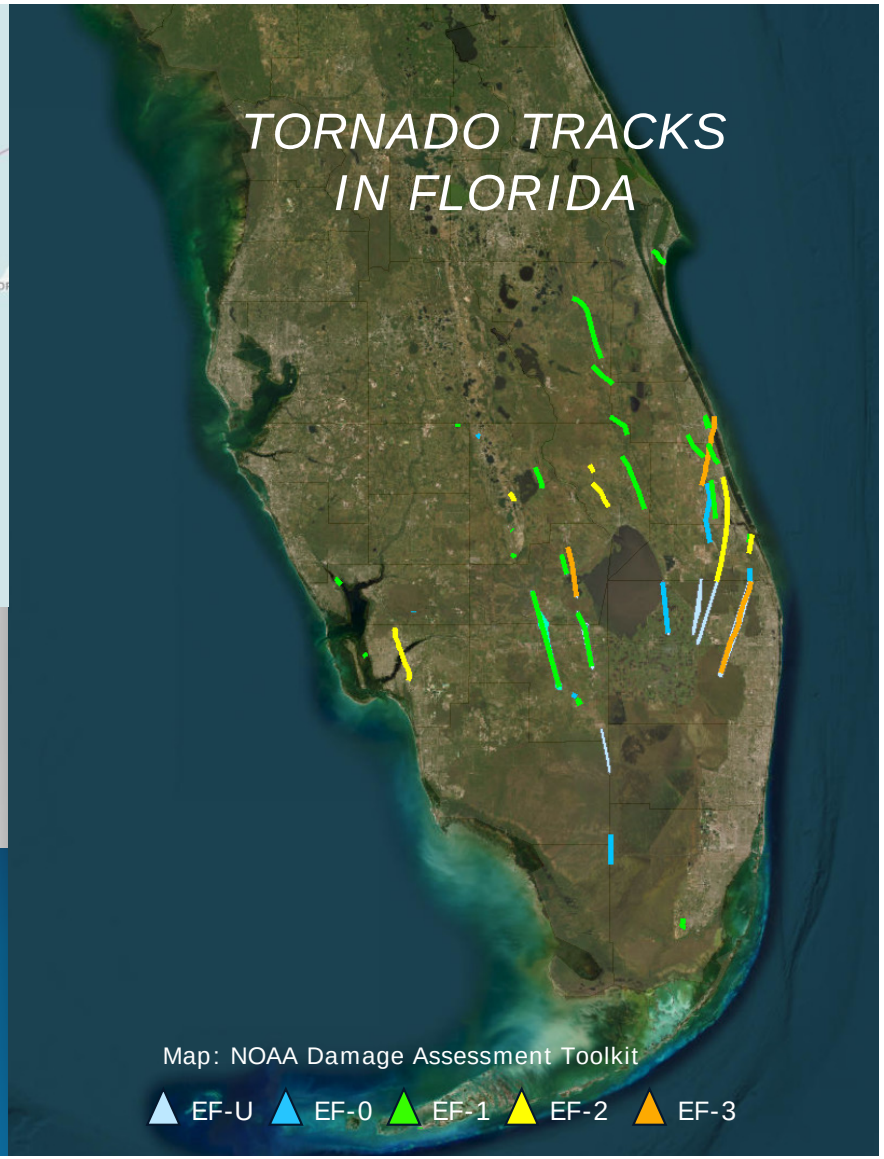




46 tornadoes in Florida

including 3 EF-3s

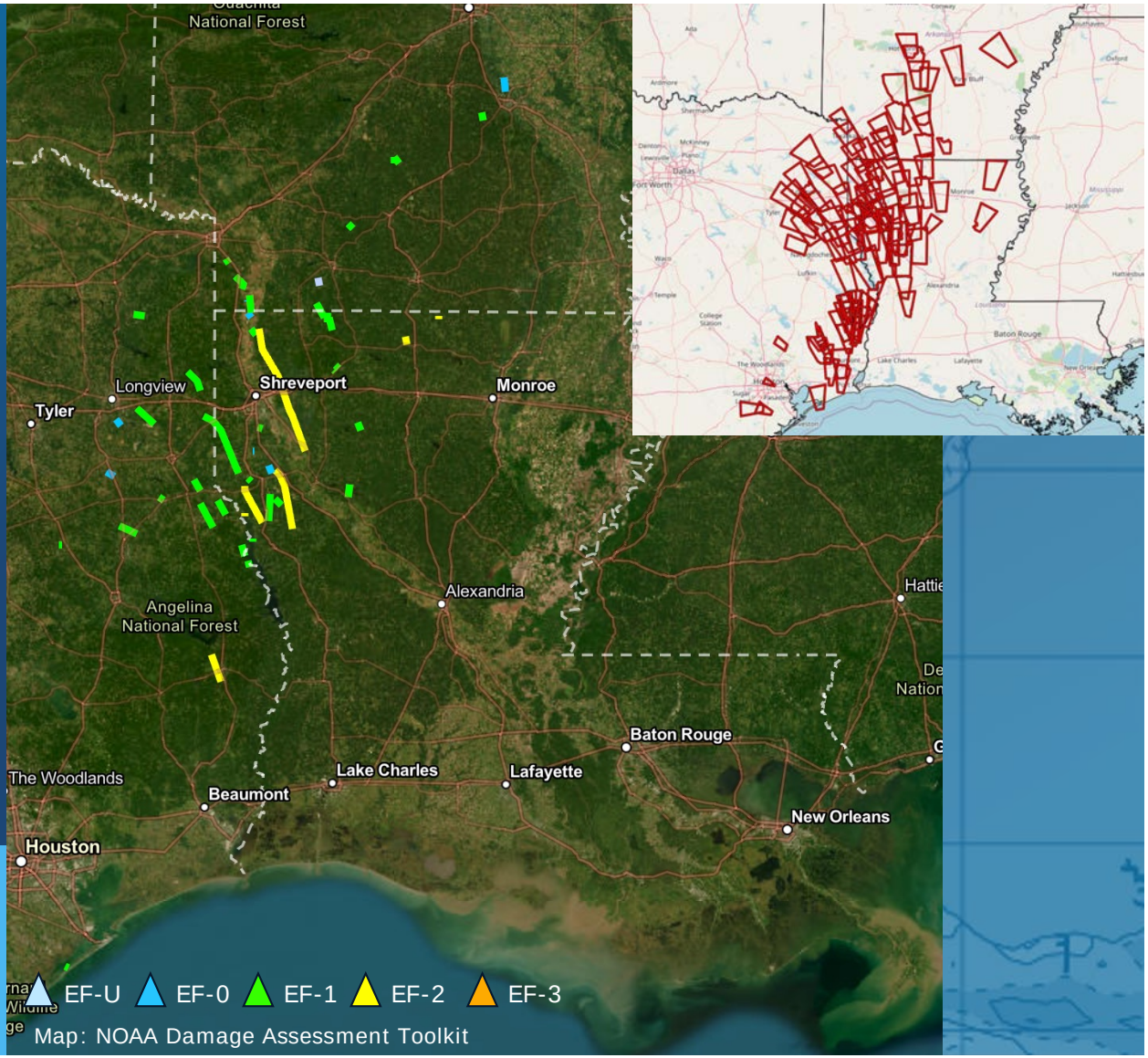
HURRICANE MILTON



68

Confirmed Tornadoes Across Multiple States

HURRICANE BERYL

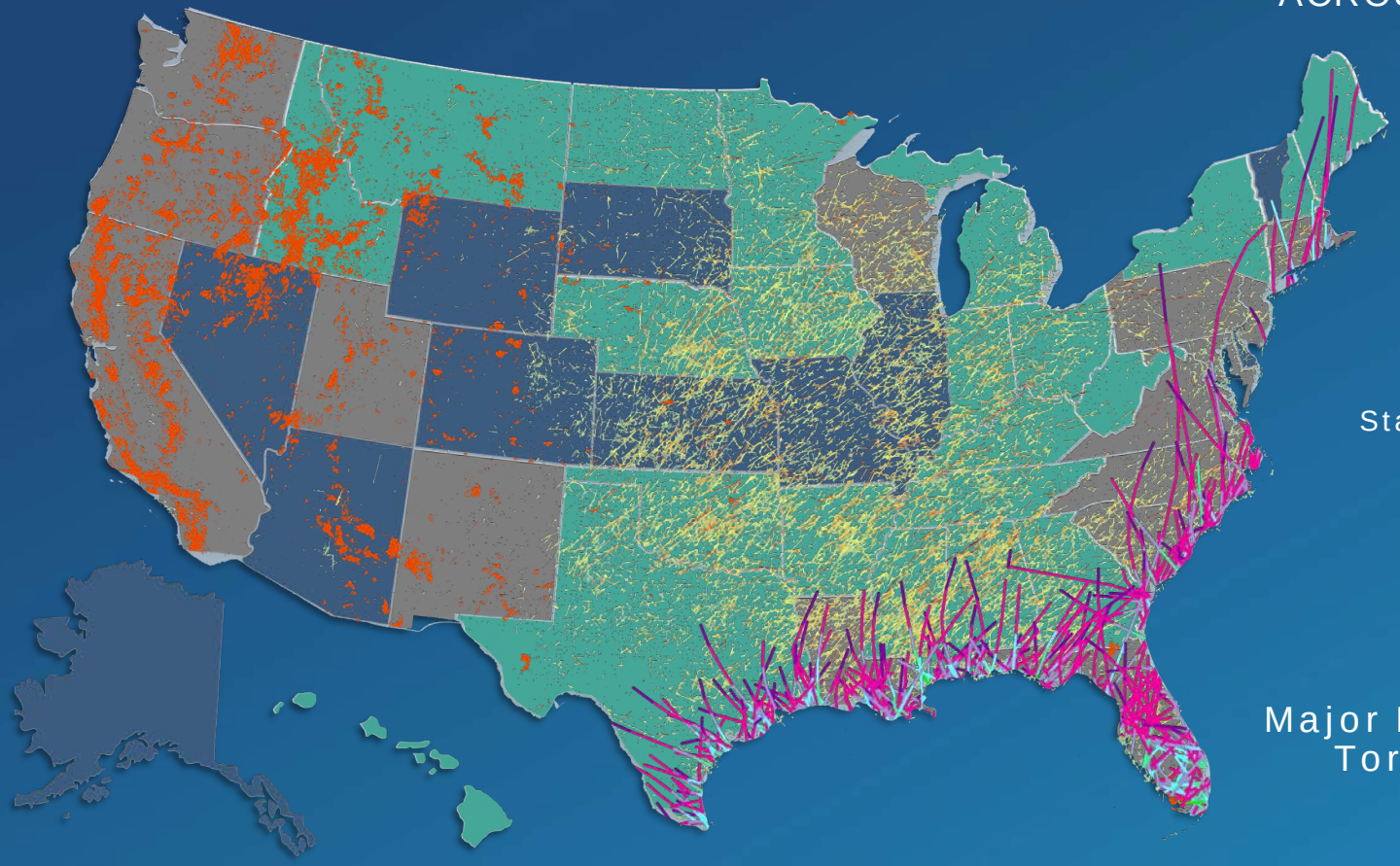


Factors Influencing Loss

- Climate changing our hazards
- Bullseye Effect
- Overlapping Hazards
- Inflationary pressure

Statewide Building Codes

ACROSS THE UNITED STATES



Statewide and Enforced Code

Statewide Code without Uniform Enforcement

No Statewide Code

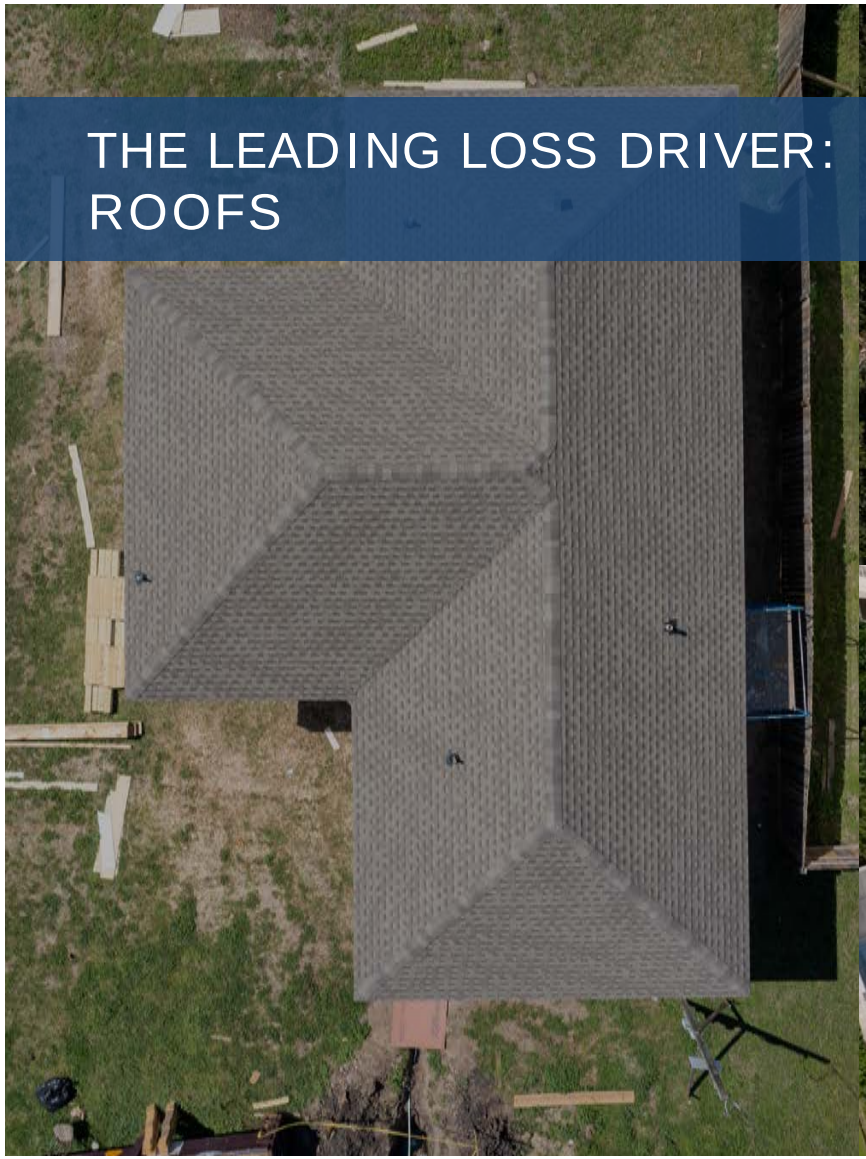
Major Landfalling Hurricanes, Tornadoes, & Wildfires (1950s to 2022)


HURRICANE EXTRA
FINAL EDITION
The Miami Herald
TUESDAY, AUGUST 25, 1992
35 CENTS
DESTRUCTION AT DAWN
Andrew left path of rubble, pain
10 killed in Dade; many face week or more without power
HURRICANE
KEY DEVELOPMENTS
Storm at most savage
©Insurance Institute for Business and Home Safety
©Insurance Institute for Business and Home Safety
D+S-
HoKanson
Home Designed
By Andrew
©Insurance Institute for Business and Home Safety


1974
Florida adopts state minimum building code law.
1992
Hurricane Andrew
1996
Florida Building Commission established setting the framework for statewide enforcement.
2002
First Edition of the Florida Building Code released establishing the statewide code.
2004
Hurricane Charley
2017
Hurricane Irma
2022
Hurricane Ian


The Florida Building Code saved
$1-3 Billion in structural damage
in Hurricane Ian.

THE LEADING LOSS DRIVER: ROOFS



In Hurricane Ian,
METAL ROOFS had a
damage rate of

LESS
THAN 5 %

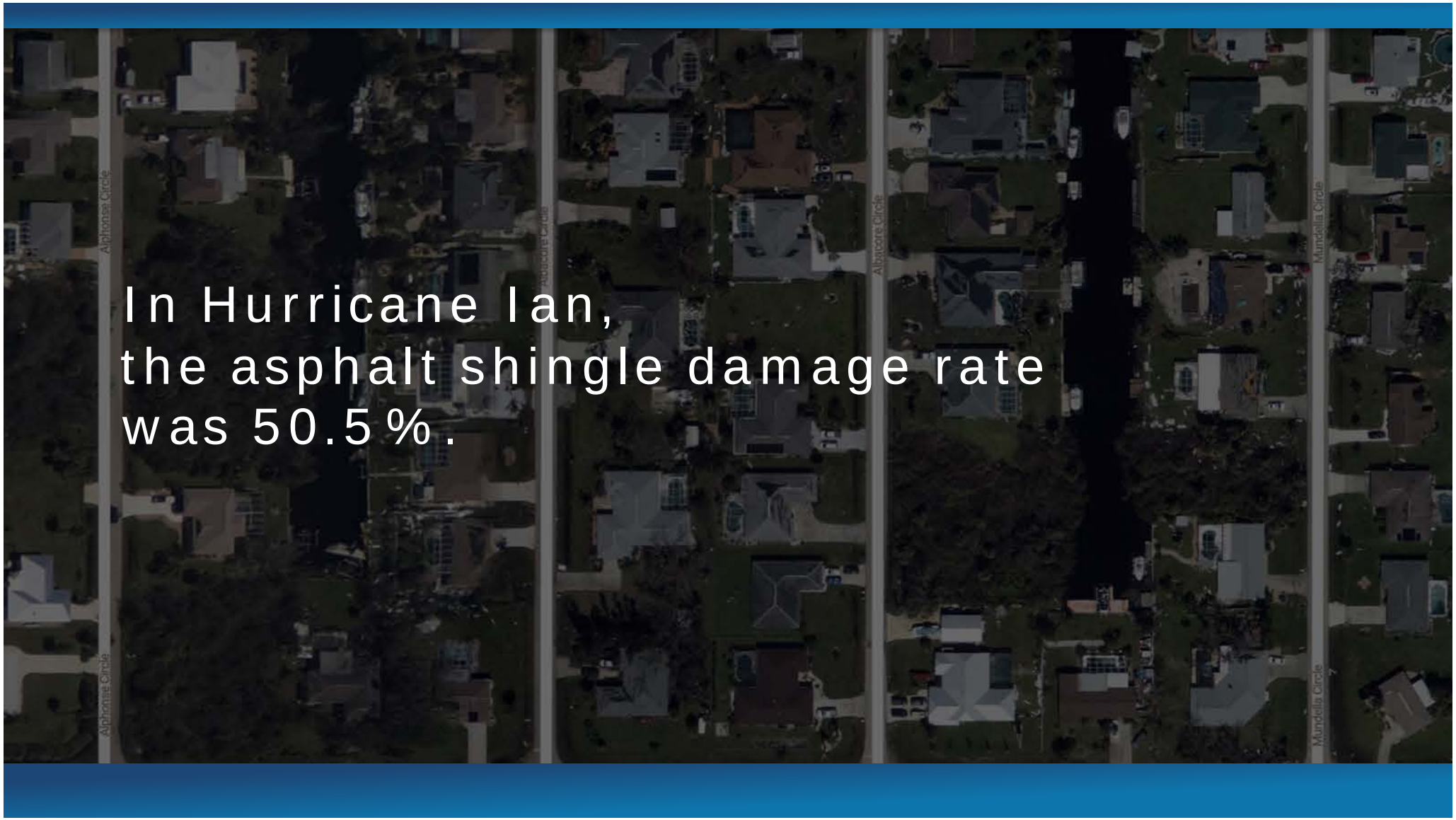
in peak winds
up to 130 mph.

IBHS RESEARCH CENTER
WIND

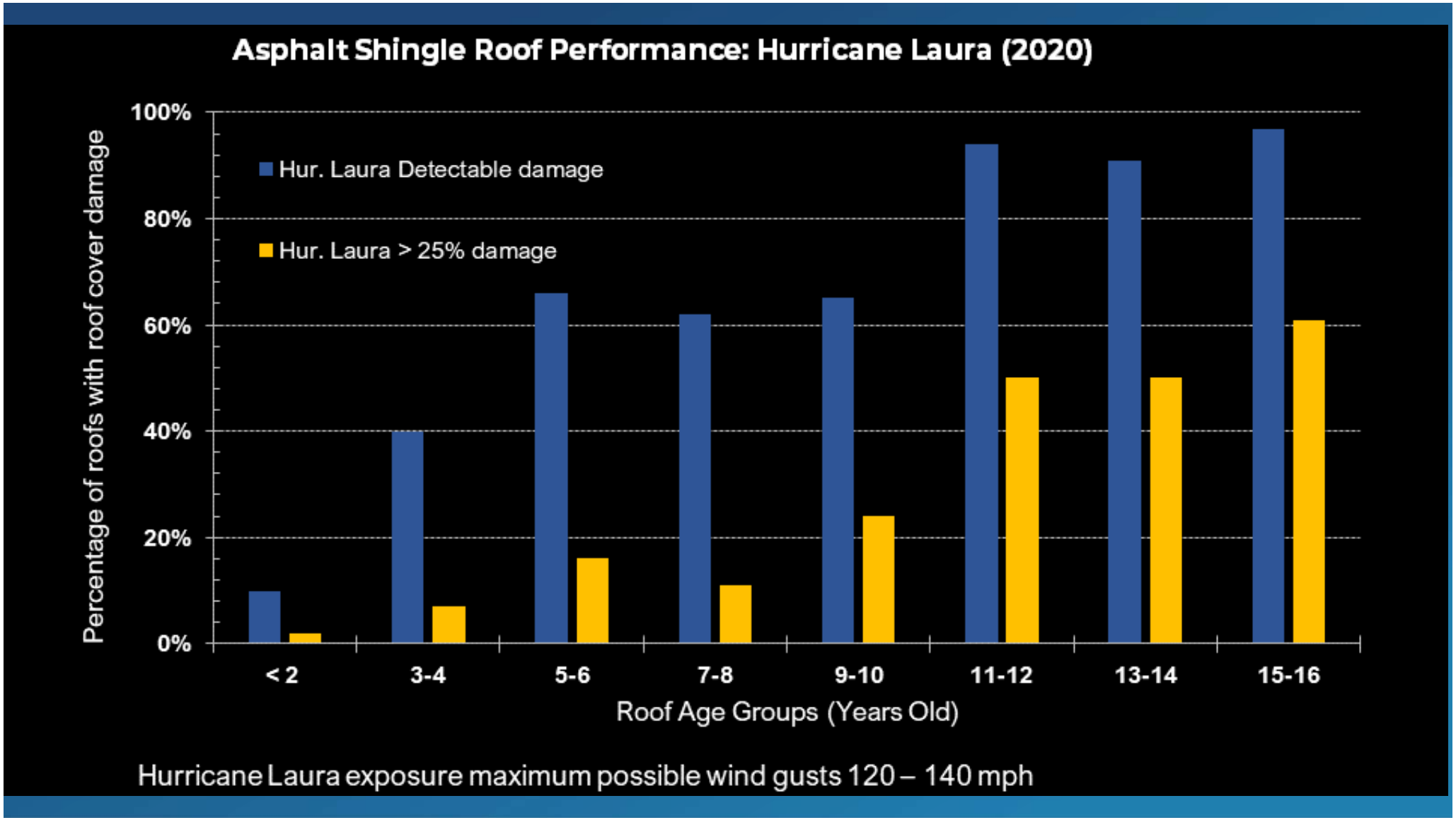
Image: NSF StEER

Hurricane Charley (2004)

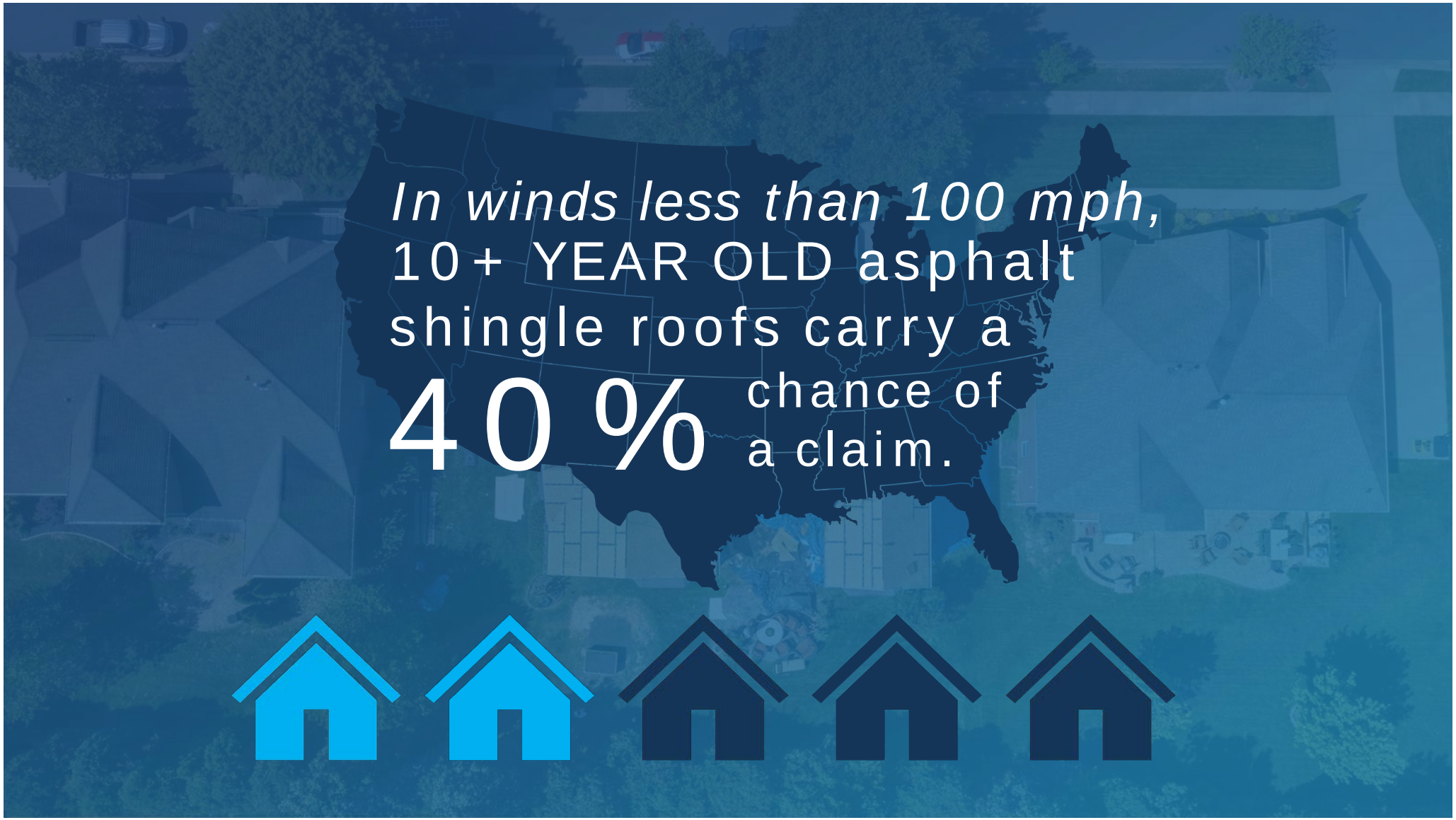
Hurricane Ian (2022)



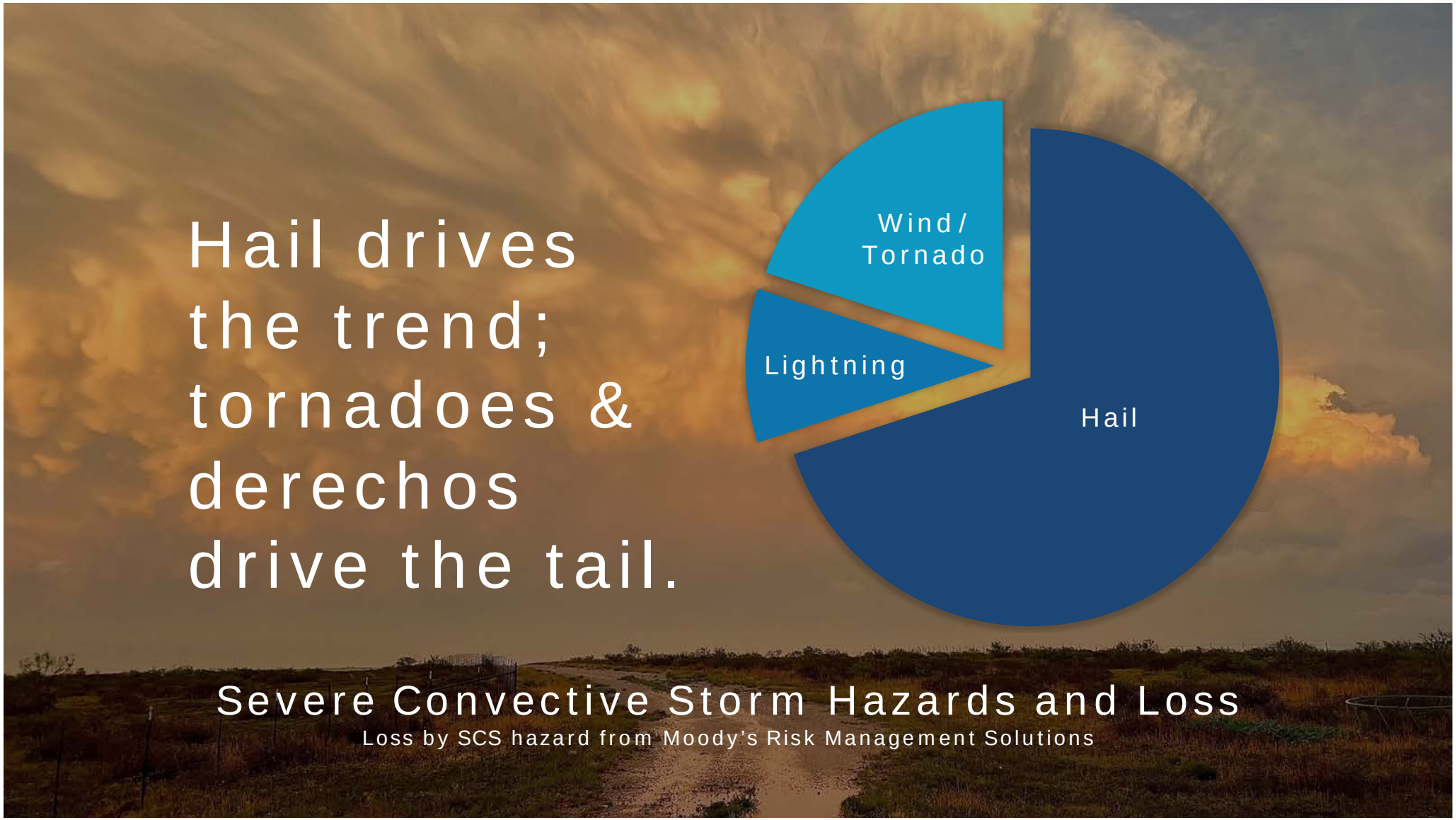
In Hurricane Ian,
the asphalt shingle damage rate
was 50.5%.

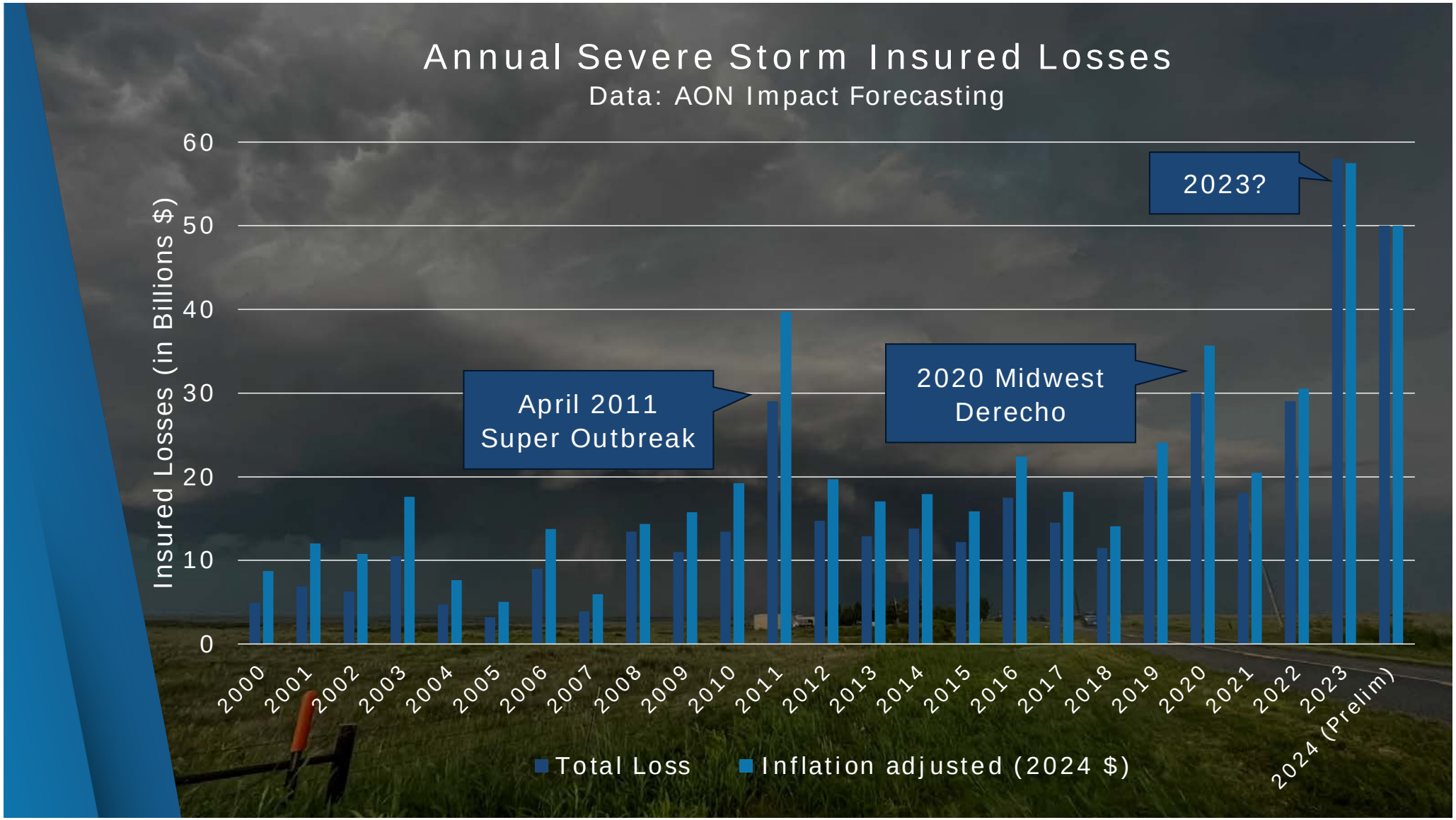

Asphalt Shingle Roof Performance: Hurricane Laura (2020)
Percentage of roofs with roof cover damage
100%
80%
60%
40%
20%
0%
Hur. Laura Detectable damage
Hur. Laura > 25% damage
< 2
3-4
5-6
7-8
9-10
11-12
13-14
15-16
Roof Age Groups (Years Old)
Hurricane Laura exposure maximum possible wind gusts 120 – 140 mph


Hurricane Harvey
Wind Damage Investigation
Tanya M. Brown-Giammanco, PhD.
Ian M. Giammanco, PhD.
Hank Pogorzelski
Insurance Institute for Business & Home Safety
JULY 2018
IBHS RESEARCH
THE EFFECT OF ROOF AGE ON ASPHALT SHINGLE PERFORMANCE:
HURRICANE RITA TO HURRICANE LAURA
IBHS RESEARCH REPORT
August 2022
Rachel Kovar
Walsh Group
Formerly of the University of Illinois
Frank Lombardo, PhD
University of Illinois
Tanya Brown-Giammanco, PhD
National Institute of Standards and Technology
Murray Morrison, PhD
Insurance Institute for Business & Home Safety
Ian Giammanco, PhD
Insurance Institute for Business & Home Safety
IBHS RESEARCH
Cedar Rapids, Iowa and the 2020 Midwest Derecho
The Performance of Asphalt Shingle Roofs in Extreme Severe Convective Storm Winds
Ian M. Giammanco, PhD
Insurance Institute for Business & Home Safety
Alana Weston
University of North Carolina at Greensboro
Hank Pogorzelski
Insurance Institute for Business & Home Safety
July 2023
OBSERVATIONS OF BUILDING PERFORMANCE IN SOUTHWEST FLORIDA DURING HURRICANE IAN (2022):
PART I: ROOF COVER DAMAGE ASSESSMENT ON RESIDENTIAL AND LIGHT COMMERCIAL STRUCTURES
IBHS RESEARCH REPORT
September 2023
Ian M. Giammanco, PhD
Emily Newby
William H. Pogorzelski
Insurance Institute for Business & Home Safety


In winds less than 100 mph,
10+ YEAR OLD asphalt
shingle roofs carry a
40 % chance of
a claim.


AGE is likely the
MOST IMPORTANT VARIABLE
in predicting ASPHALT SHINGLE
performance in high winds.


Hail drives the trend; tornadoes & derechos drive the tail.
Wind / Tornado
Lightning
Hail
Severe Convective Storm Hazards and Loss
Loss by SCS hazard from Moody's Risk Management Solutions


Annual Severe Storm Insured Losses
Data: AON Impact Forecasting
Insured Losses (in Billions $)
60
50
40
30
20
10
0
2023?
April 2011
Super Outbreak
2020 Midwest
Derecho
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024 (Prelim)
Total Loss
Inflation adjusted (2024 $)

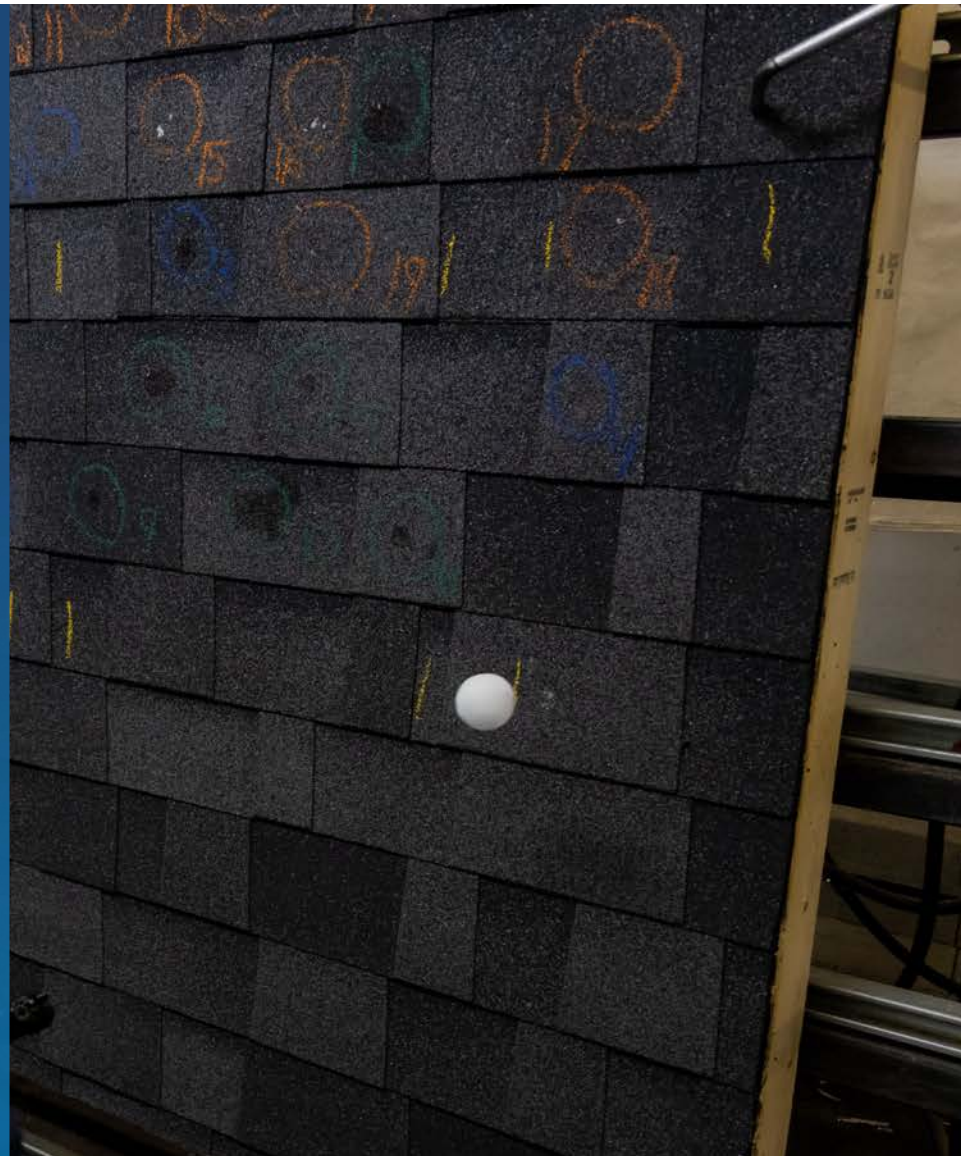

From 1990 to 2022, severe convective storm losses increased at an annual rate of 8.9 percent. AON 2023

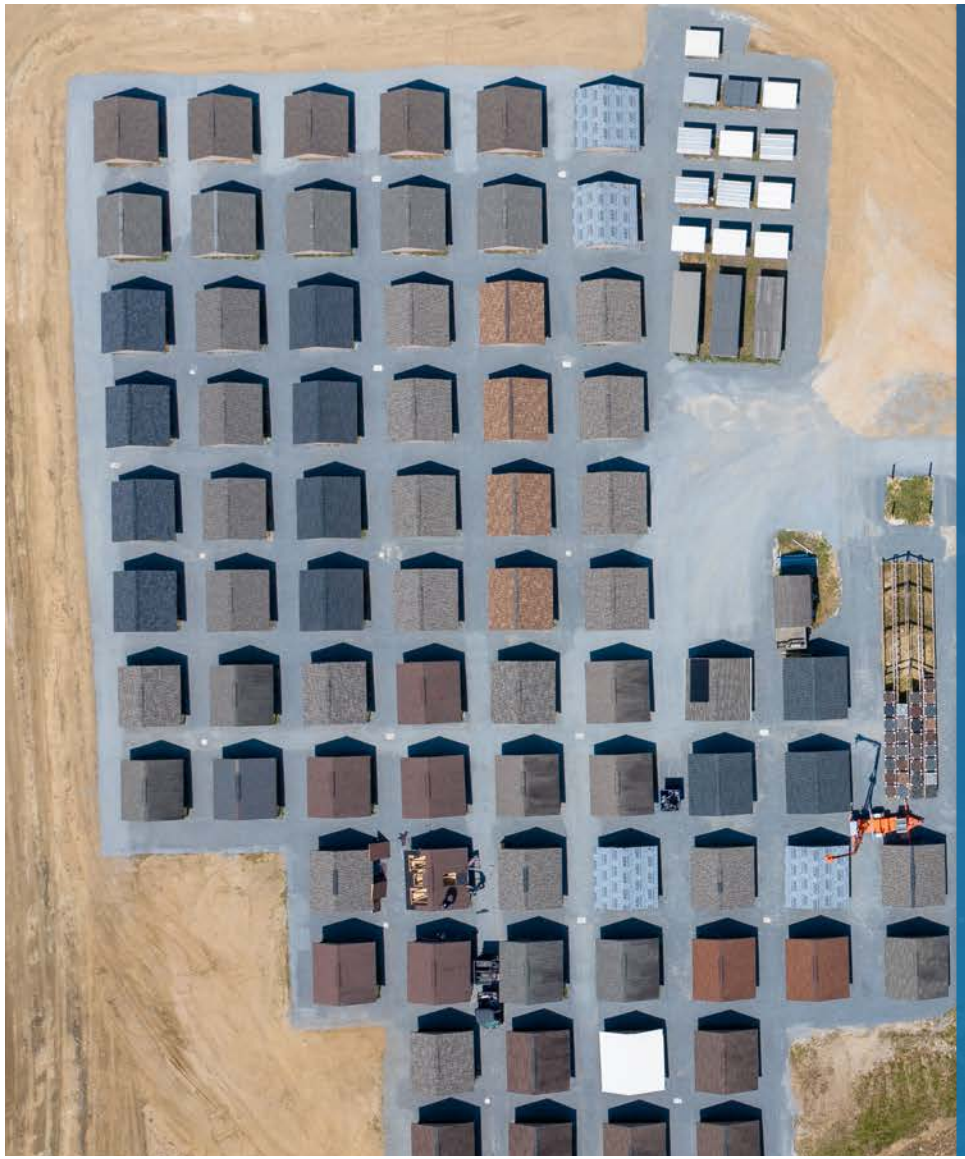

86%
of re-roofs are
asphalt shingles
LIKE
KIND
QUALITY
Data: Fredonia (2022)

NEW IMPACT-RATED
products perform

10-35%

BETTER than new
conventional shingles
in IBHS lab testing with 2-inch hail.





For 5-year-old shingles, IMPACT-RATED products perform up to **50%** **BETTER** than conventional shingles in IBHS lab testing with 2-inch hail.

GOOD and EXCELLENT performing asphalt shingles could ELIMINATE the need for ONE ROOF REPLACEMENT CYCLE.

Other roof covers produce predictable levels of reliability.

Not asphalt shingles.

FORTIFIED ROOF™

Keep the roof on and water out.
Enhanced by a sealed roof deck.
High wind rated roof cover.

Keep the roof on, water out.
Reduce damage amplifiers:
Strengthen gable walls & porches.
Strengthen garage door openings.
Protect openings against debris impact.**

FORTIFIED SILVER™

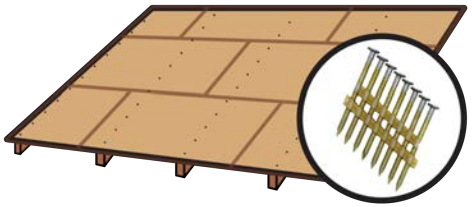
FORTIFIED GOLD™

Keep the roof on, water out.
Reduce damage amplifiers.
Keep the entire building intact with a continuous load path (CLP).
Protect openings against high pressures.**

FORTIFIED Home

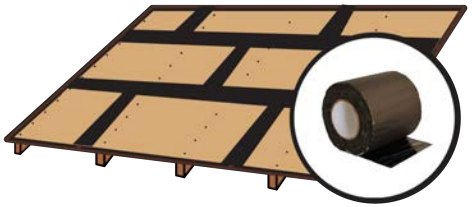
FORTIFIED HOME

1. KEEP THE ROOF ON.



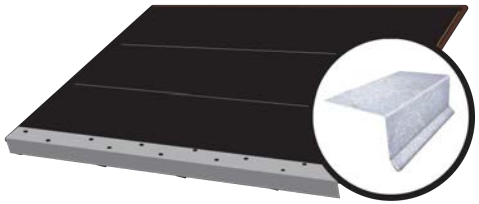
Stronger Connections

2. KEEP THE WATER OUT.



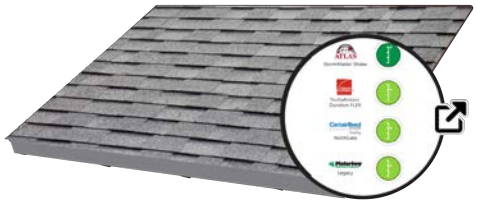
Sealed Seams

3. KEEP THE WIND OUT.



Lock the Edges Down

4. DEFEND THE SHINGLES.



Choose an Impact-Rated Shingle**

FORTIFIED ROOF


SEALED
ROOF DECK
UNSEALED ROOF DECK: COST OF CLAIM
3X
LOSS
ESTIMATE
SEALED
UNSEALED

HURRICANE SALLY Results

7% reduction in claims rate

13% reduction in claims amount

FORTIFIED

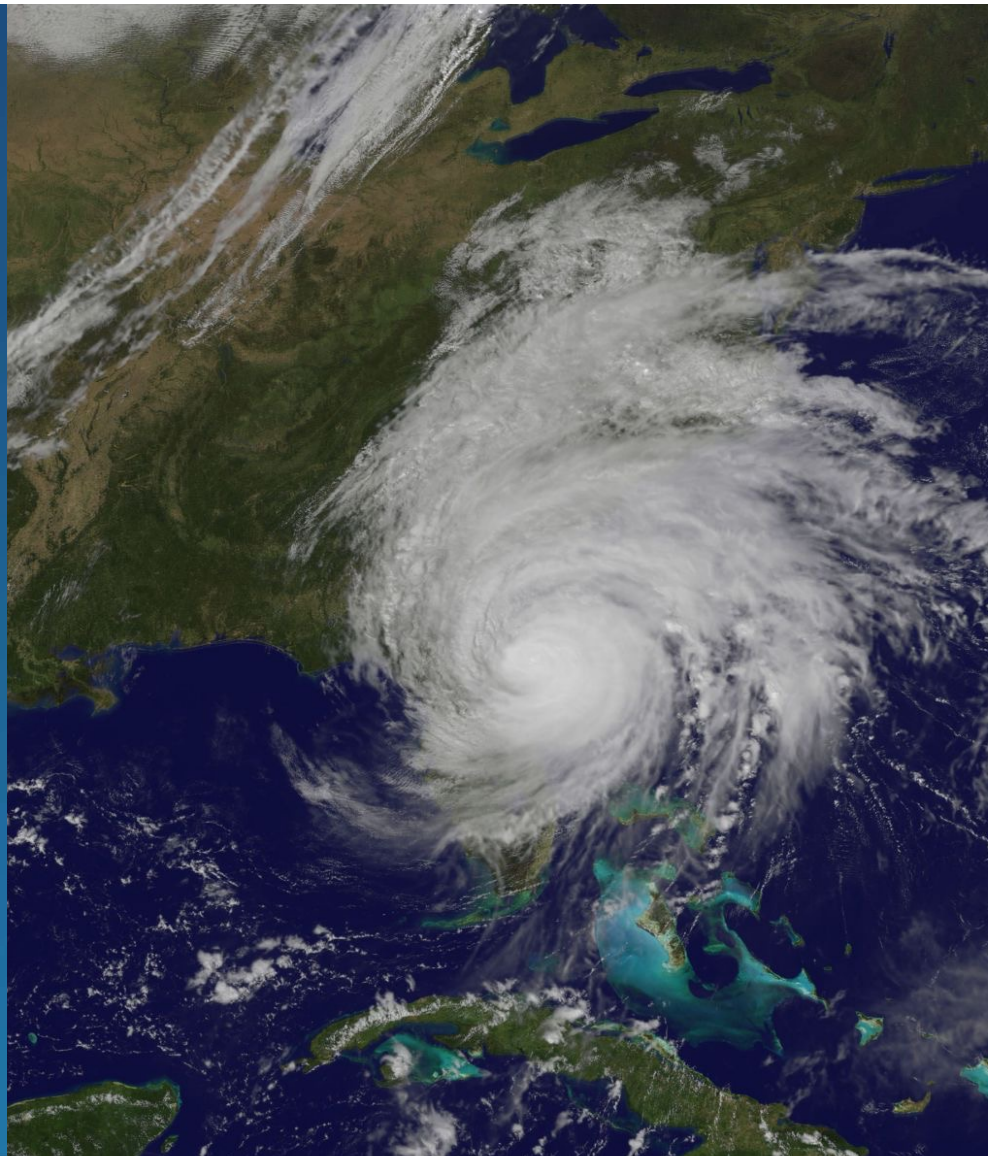
A PROGRAM OF IBHS®

North Carolina Hurricanes
Results

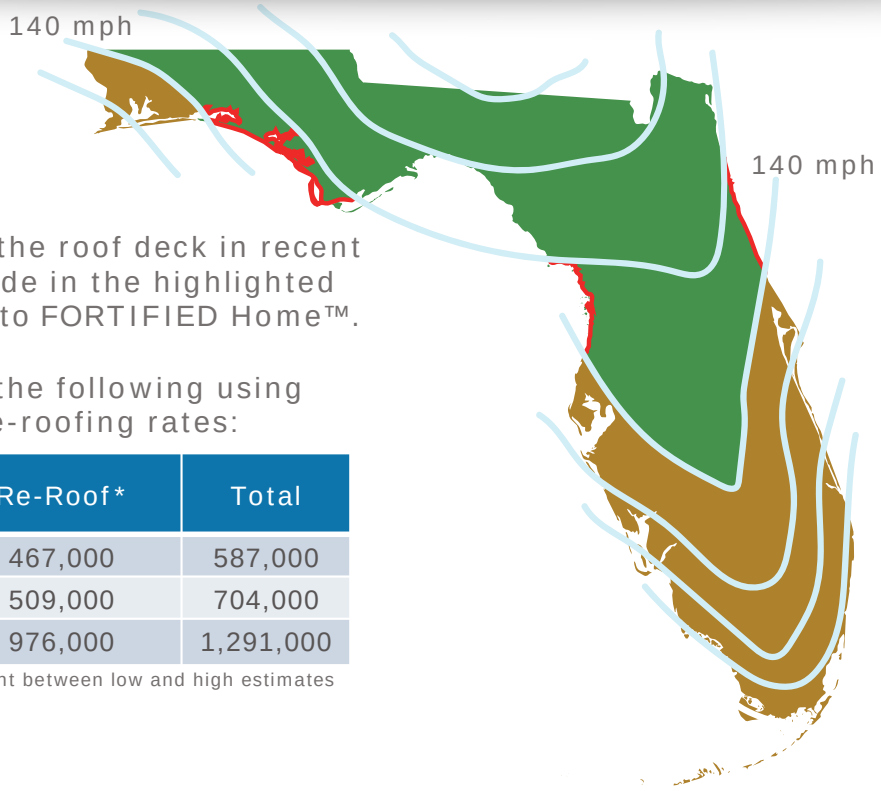
MATTHEW, FLORENCE, DORIAN, ISAIAS

- 22% less damage on average
- 35% less likely to have a claim
- $3,000 smaller claim on average

Data: NCIUA/NCJUA & NC State Analysis



Estimation of Homes and Roofs Built to the 2021 FBC a.k.a FORTIFIED-Like



Designation Regions

FORTIFIED ROOF

FORTIFIED GOLD

Wind-Borne Debris Region

With the inclusion of sealing the roof deck in recent updates, Florida's building code in the highlighted areas is now nearly identical to FORTIFIED Home™.

For 2021-2023, we estimate the following using permit data and customary re-roofing rates:

FORTIFIED-Like	New Construction	Re-Roof*	Total
Gold	120,000	467,000	587,000
Roof	195,000	509,000	704,000
Total	315,000	976,000	1,291,000

* Mid-point between low and high estimates

CONSIDER THE RESILIENCE OF EVERY DOLLAR

Sarah Dillingham

Senior Director of Product Design & Senior Meteorologist

ibhs.org

IBHS_org