Making the Case for Resilience as a Competitive Edge

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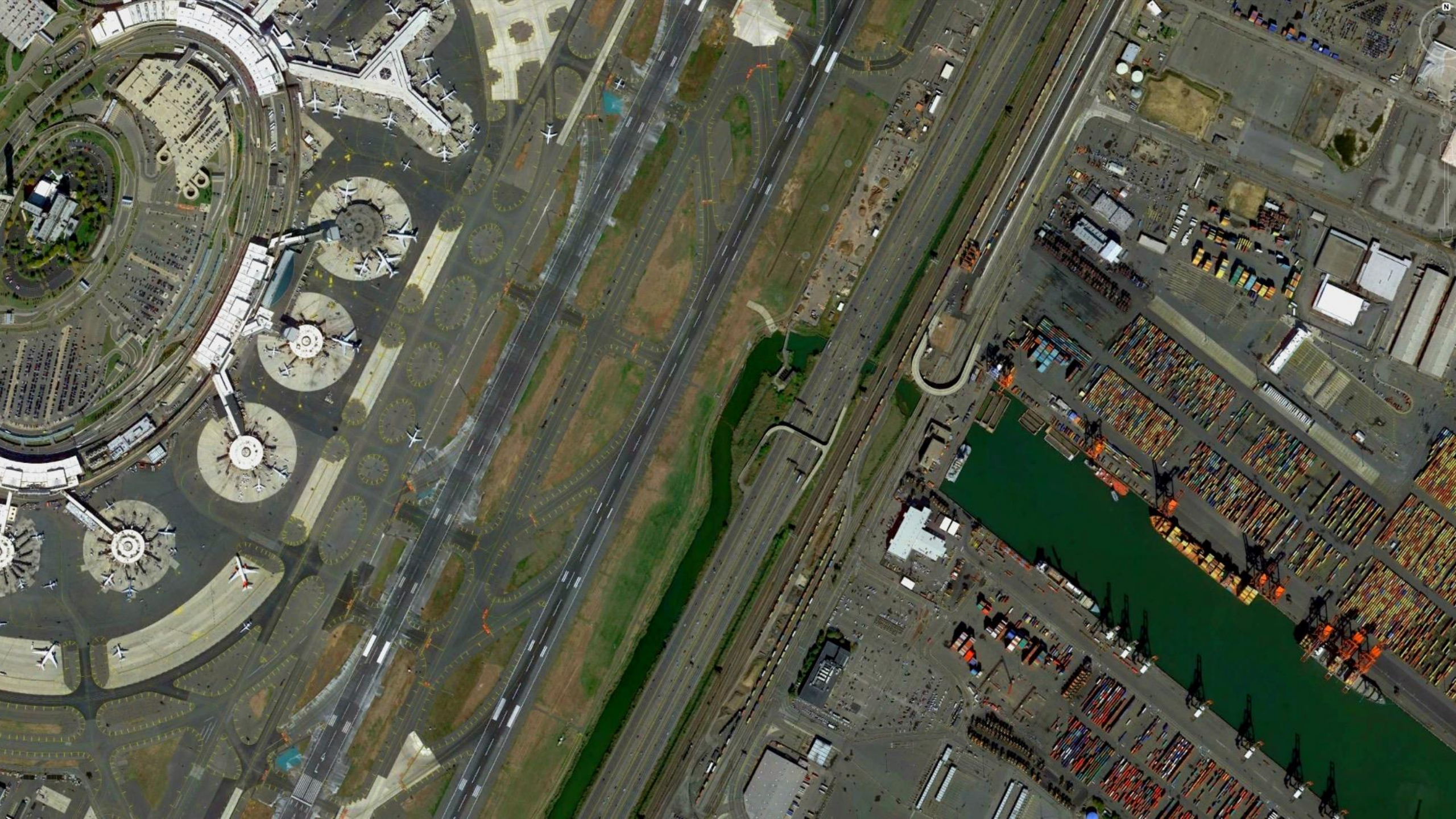
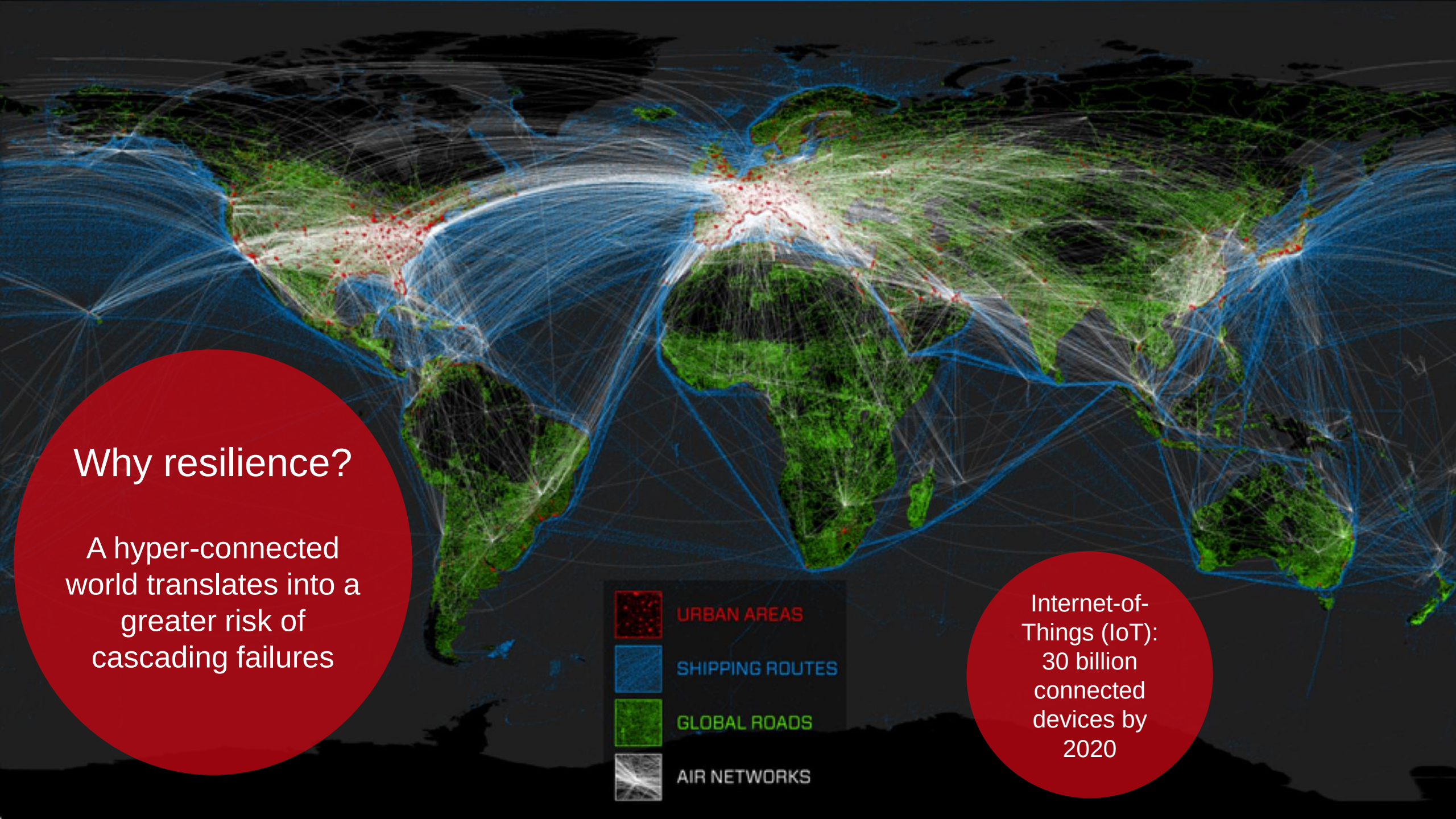
Rivier University

Dr. Stephen E. Flynn
Founding Director, Global Resilience Institute
s.flynn@northeastern.edu

Northeastern University
Global Resilience Institute





Why resilience?

A hyper-connected world translates into a greater risk of cascading failures

Internet-of-Things (IoT): 30 billion connected devices by 2020

Why Resilience?

More Frequent and Consequential Disasters

The World Bank estimates $300b - $500b in annual worldwide economic losses

Resilience as a Competitive Advantage

Communities, **companies**, and **countries** need to focus on building resilience as a way to not just survive, but to thrive in the face of growing turbulence.

People and companies that have a choice will chose to live and invest in those communities and enterprises that are resilient, and gravitate / run away from those that are not.

Building the Resilient City Requires Overcoming 5 Critical Barriers

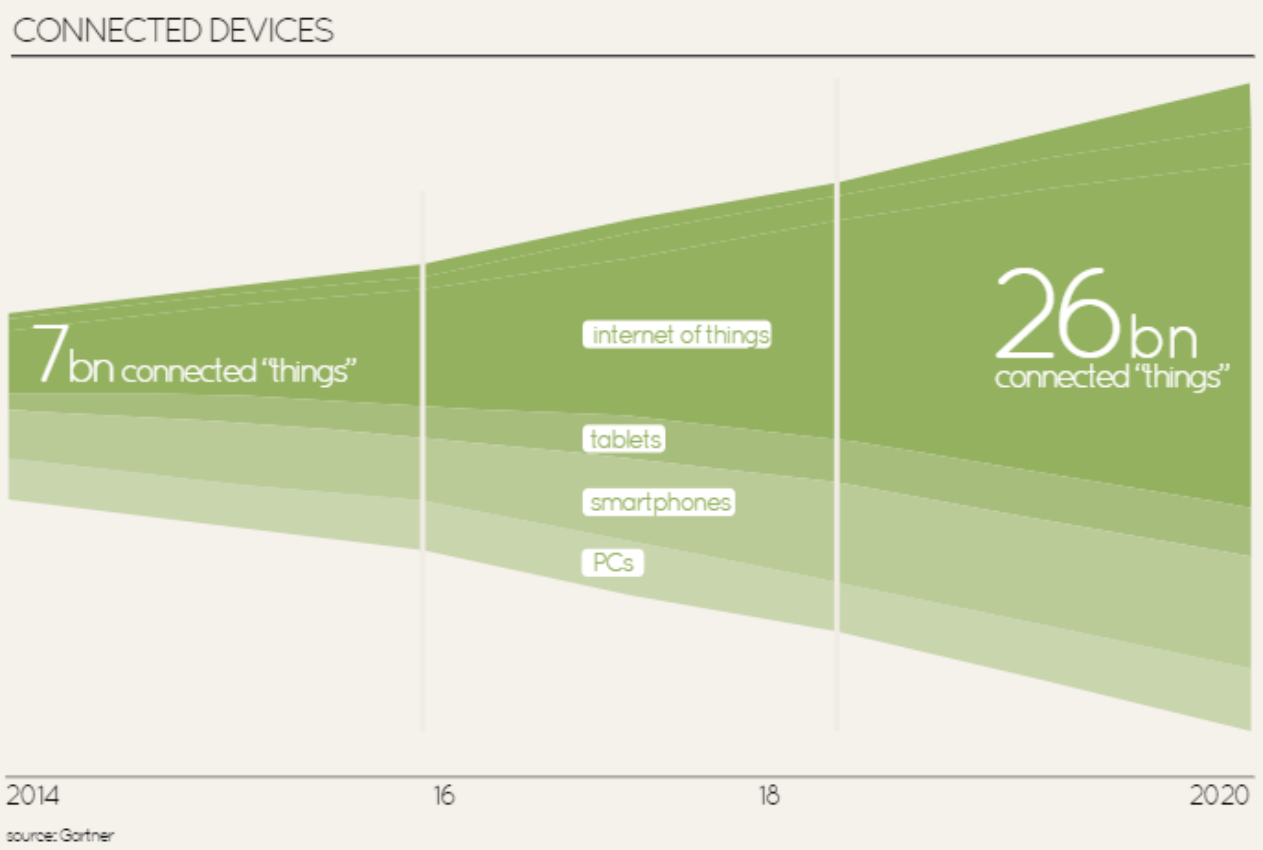
Risk Illiteracy
and a pervasive lack of understanding of interdependent systems

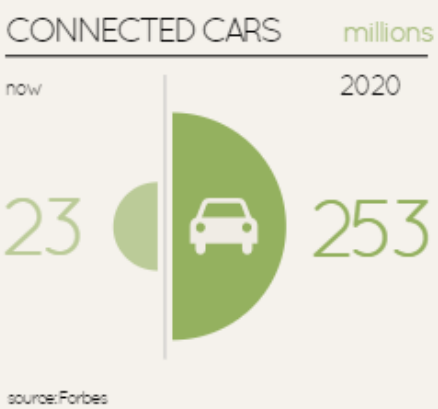
Inadequate designs
for embedding resilience into systems at multiple levels

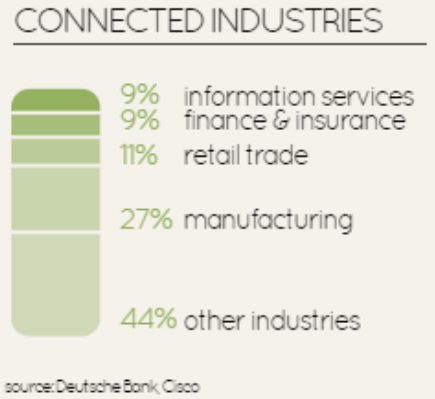
Pervasive economic disincentives
for investing in resilience

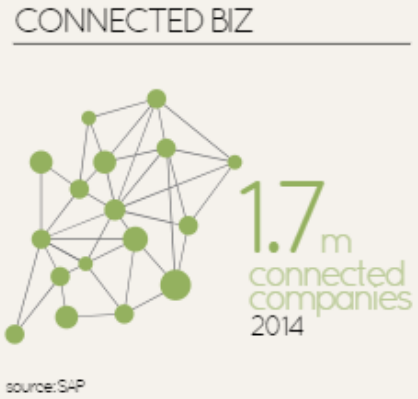
Inadequate governance frameworks
and policy guidance to foster resilience

Lack of adequate training
and education to support the development and implementation of tools, applications, processes and policies

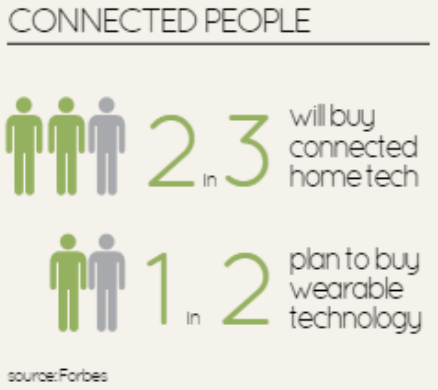


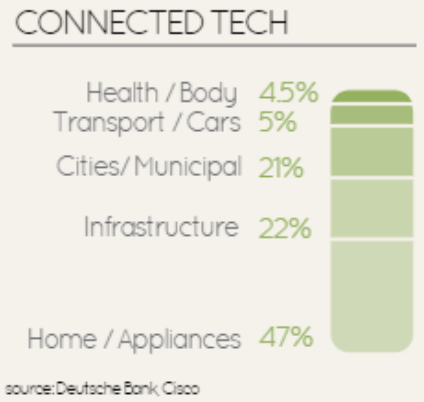






- Hyperconnectivity compounds the consequences of disruptions.
- While connections often bring benefits, they also create dependencies and interdependencies.
- What used to be local shocks are increasingly likely to have far-reaching and costly consequences.



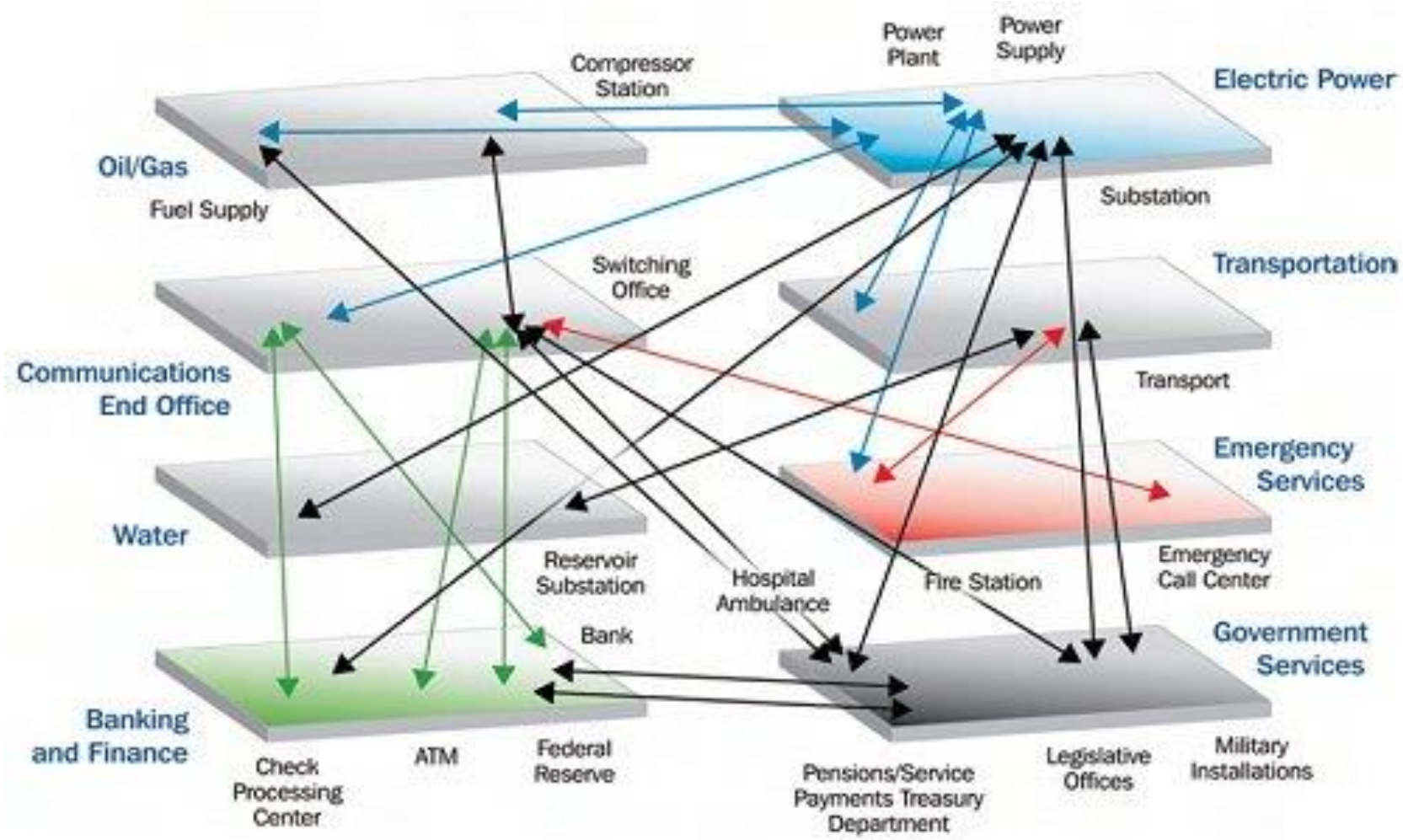


SAP

informationisbeautiful.net

Sources: Forbes, Gartner, SAP. / https://informationisbeautiful.net/visualizations/the-internet-of-things-a-primer/

Understanding the Interdependency Challenge

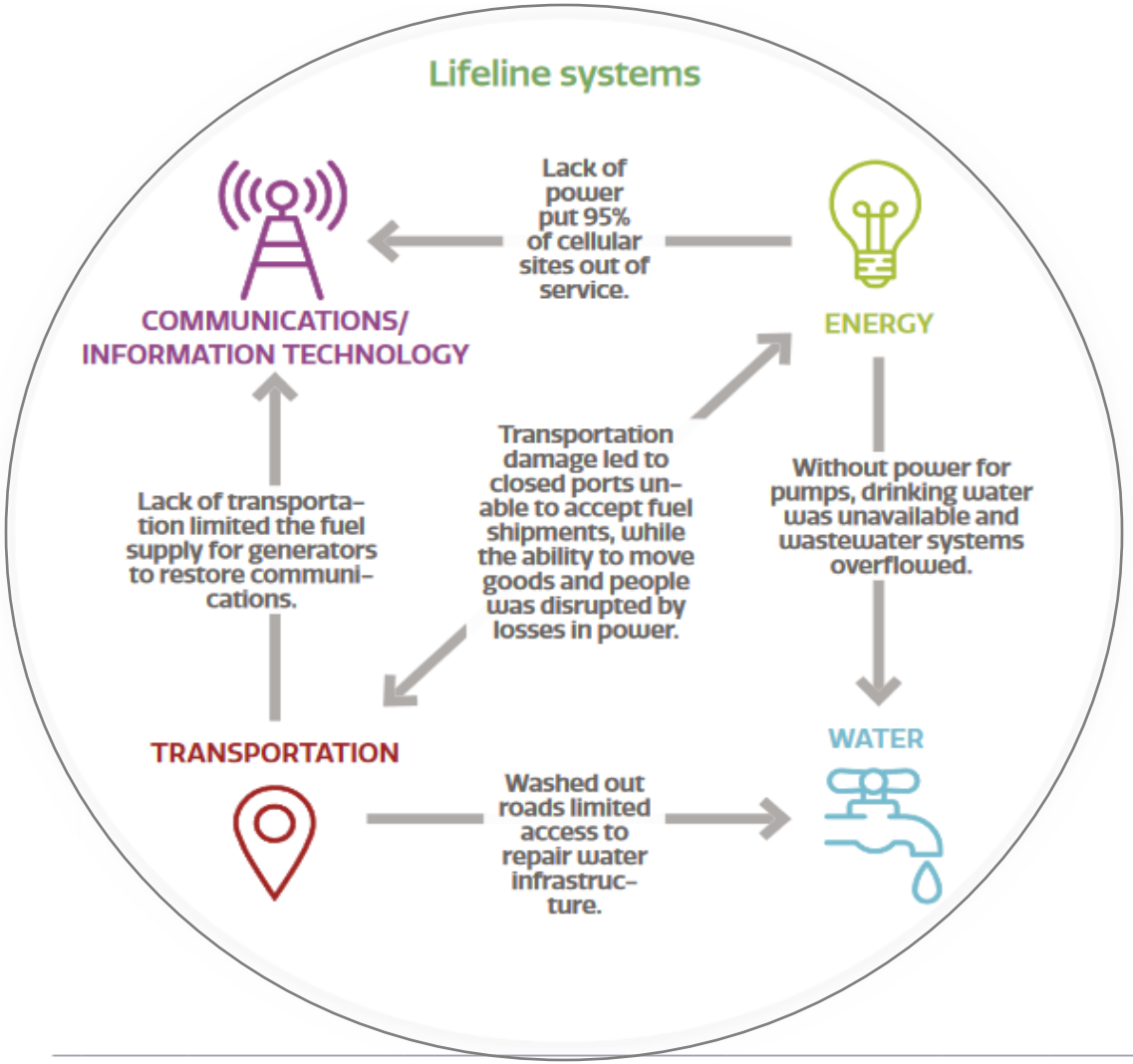


National Aeronautics and Space Administration. NASA Science News. Severe Space Weather – Social and Economic Impacts. June 2009 at http://science.nasa.gov/science-news/science-at-nasa/2009/21jan_severespaceweather/

Resilience is the ability to prepare for and adapt to changing conditions and withstand and recover rapidly from disruptions. Resilience includes the ability to withstand and recover from deliberate attacks, accidents, or naturally occurring threats or incidents.

-U.S. Presidential Policy Directive 21 (2013)

Puerto Rico: Post-Hurricane Maria



Superstorm Sandy

Goldman Sachs Headquarters

200 West St. New York, NY

Goldman Sachs Headquarters

200 West St. New York, NY

HQ is dry and has electric power, but . . .

No employees due to disruption of transportation system

Little ability to telecommute due to region wide power outages

October 29, 2012

Source: Google+ Johanes Sugiharto

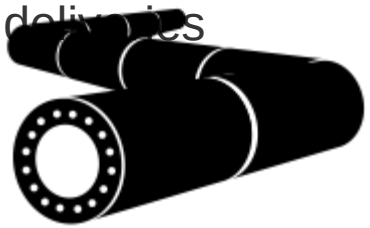
Goldman Sachs

Superstorm Sandy's Impact on Metro NY/NJ Liquid Fuels Distribution

SUPPLY (42m gallons of petroleum products per day):

Port closure during and following the storm halted all maritime shipments (60+%)

Bayway Refinery and **Hess Port Reading Refinery** disabled due to damage and power outages (20%)

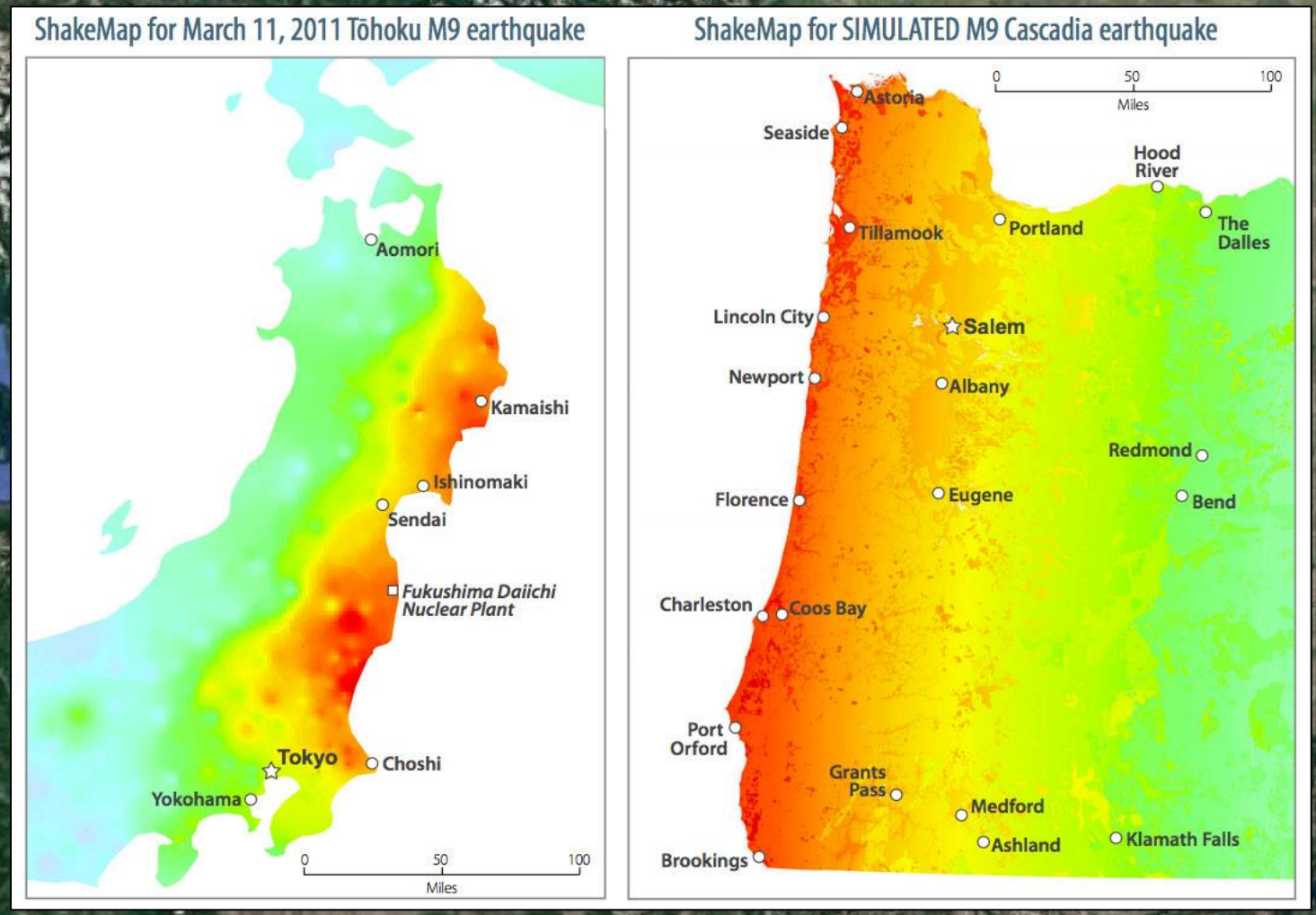


Colonial Pipeline stopped deliveries to northern NJ due to damage and power outages, slowing entire pipeline back to Gulf Coast (15%)

Source: National Geographic, Nov. 2015

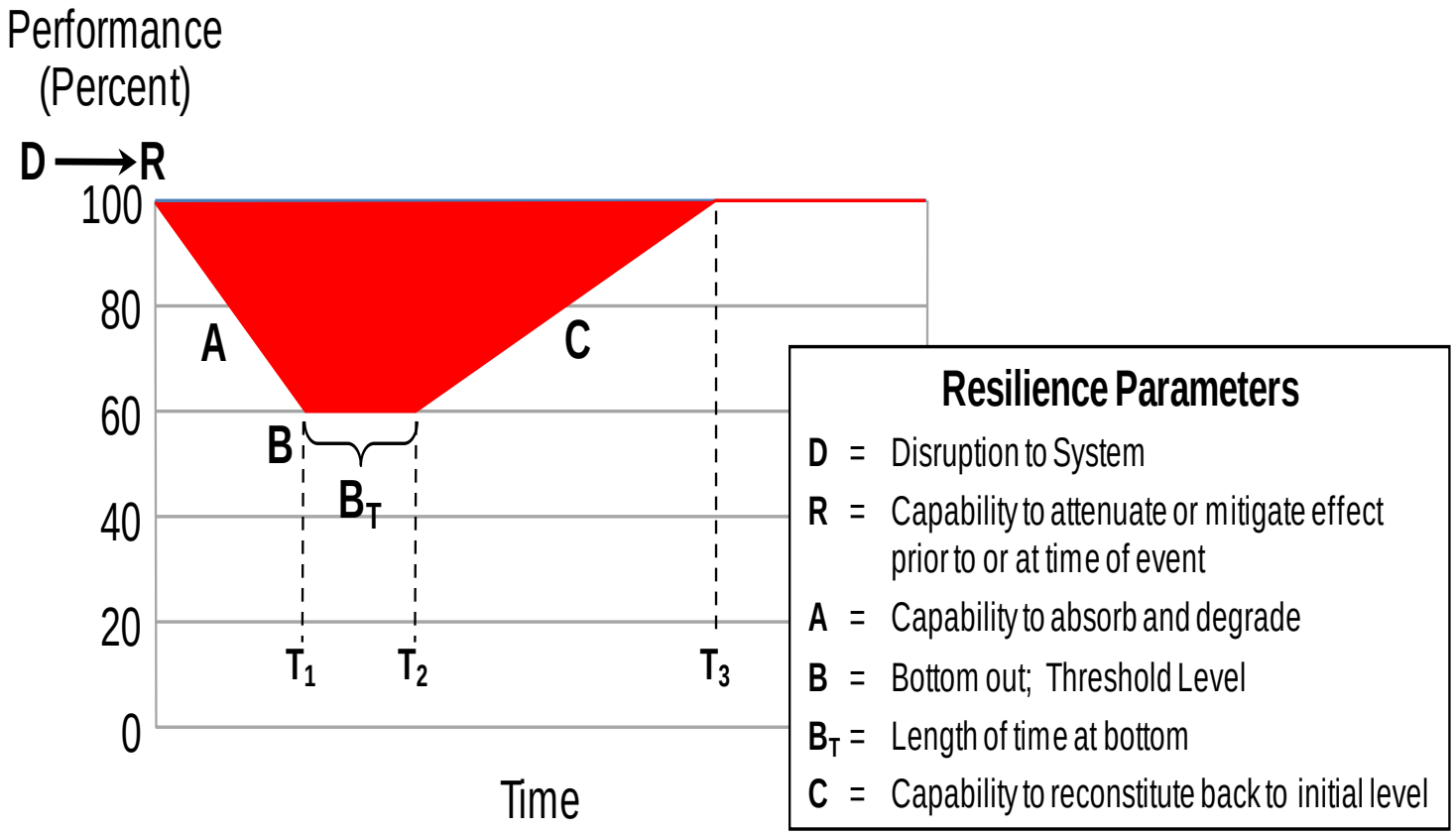
Cascadia Megaquake Scenario

Extended delays in **recovery** would result in companies that can leave to move out of the impacted region. . . They are unlikely to come back



The combined forces that brought about the California wildfires are growing more and more present in the Northeast

- The built environment is encroaching on the wildlands and the wildlands are encroaching on the built environment through reforestation
- Changing climate



RED area represents loss of infrastructure function when there is a disruption:

A = Mitigation B = Response C=Recovery

Enhancing Resilience has economic value by reducing loss of function

Source: J. Kahan, et. al., Risk and Resilience: Exploring the Relationship, Homeland Security Studies and Analysis Institute, Nov 20, 2010 & Mary Ellen Hynes, "Extreme Loading of Physical Infrastructure" presentation at the 4th DHS University Network Summit, March 11, 2010;

New infrastructure function gained from investing in adaptation after the disruption.

Loss of function due to either poor mitigation measures, or slow response

Best (relatively small area)

Acceptable (relatively average day)

Worst (relatively large area)

Good mitigation & rapid response

Limited mitigation measures, rapid response

Slow response, good mitigation measures

Weak mitigation measures and a slow response—that reduces the capability to achieve long-term recovery.

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Investment in resilience prior to a disaster and swift adaptation after a disaster can result in a net gain in infrastructure function

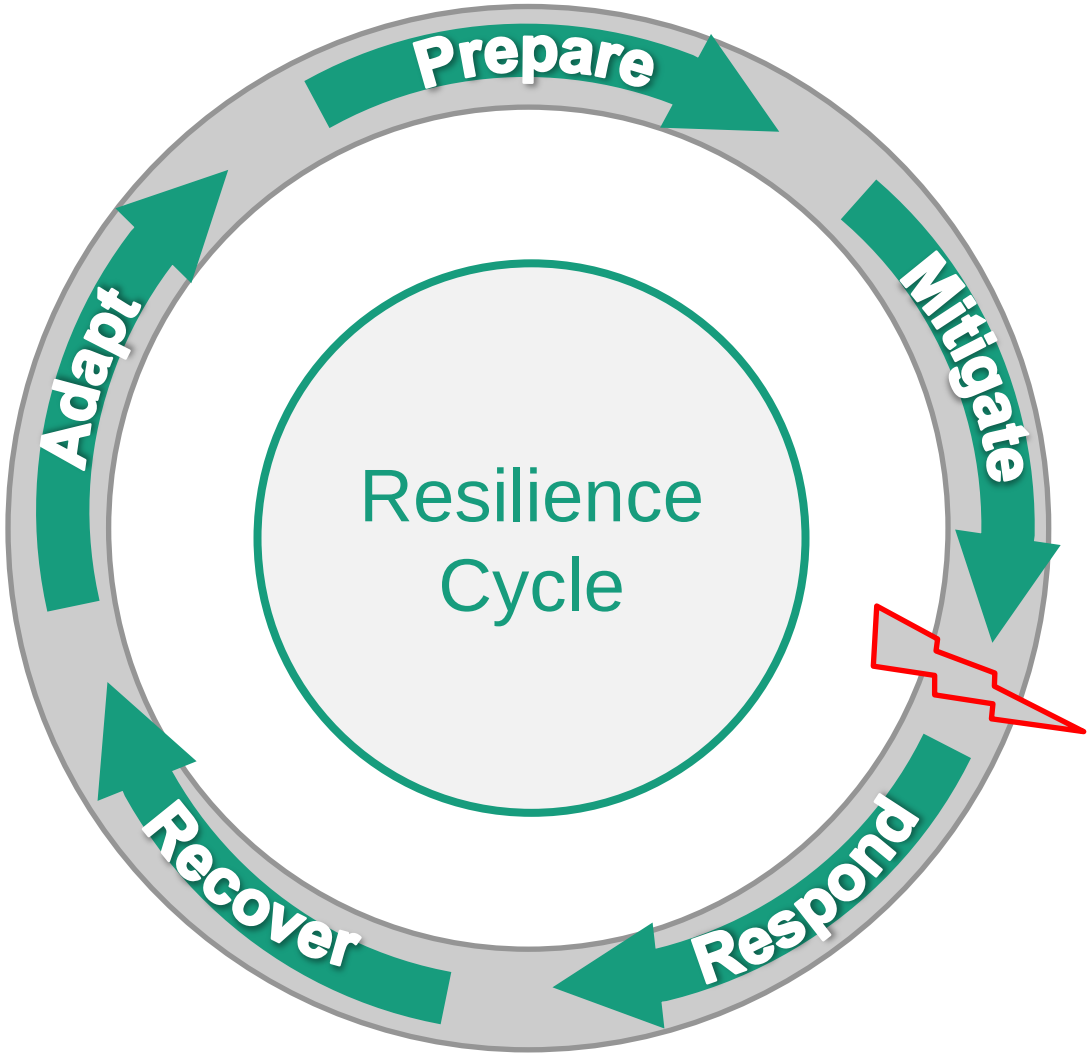
Putting Resilience into Practice

Resilience measures need to be incorporated into managing the risk of community disruption:

- Prior to a disaster
- During a disaster
- Following a disaster

Harnessing:

- Innovative solutions
- Civil society



Adapted from "Resilience Cycle" by Stefan Hiermaier, Director, Fraunhofer EMI

Deploy Innovative Solutions

Example: Moveable flood barrier

- Precast concrete barriers set in underground CIP foundations
- Made to rise to block flood waters and debris
- Custom designed from 3’ to 20’ height
- Stops hurricane flooding

Harnessing Civil Society

Social media: A powerful tool during disaster response

Maritza RITZ Willis @RitzWillis · Aug 27
The children and I are safe. Thank you everyone and thank you Facebook!!!!!! The miracles of social media. Forever grateful!!!
81 496 2.0K

Maritza RITZ Willis @RitzWillis · Aug 27
Got picked up bty the fire rescue . Thank You . One of you had connections and all I can say is I'll be eternally grateful!!!
57 318 1.3K

Maritza RITZ Willis @RitzWillis · Aug 26
I have 2 children with me and tge,water is swallowing us up. Please send help.
1[redacted] S[redacted]
Houston,Tx.
911 is not responding!!!!!!
476 15K 8.6K

Maritza RITZ Willis @RitzWillis · Aug 26
We're at 1[redacted] S[redacted] In Houston. Water is swallowing us up. Please try calling 911 for rescue. Please send help
69 686 375

Stranded Houstonians turned to social media during Hurricane Harvey, when calling 911 failed

Cajun Navy – everyday citizens taking part in response

Louisiana Cajun Navy/Facebook

Priscilla
@MaeMee

#Houston Hang on. The CAJUN NAVY is already activated and on the way.

3:28 PM - Aug 27, 2017

7,618 3,306 people are talking about this

Houston Police
@houstonpolice

Anyone with a boat who can volunteer to help please call 713-881-3100 #HurricaneHarvey

7:52 PM - Aug 27, 2017

35.4K 43.6K people are talking about this

“I can’t look at somebody knowing that I have a perfect boat in my driveway to be doing this and to just sit at home…”

Jordy Bloodsworth, Cajun Navy

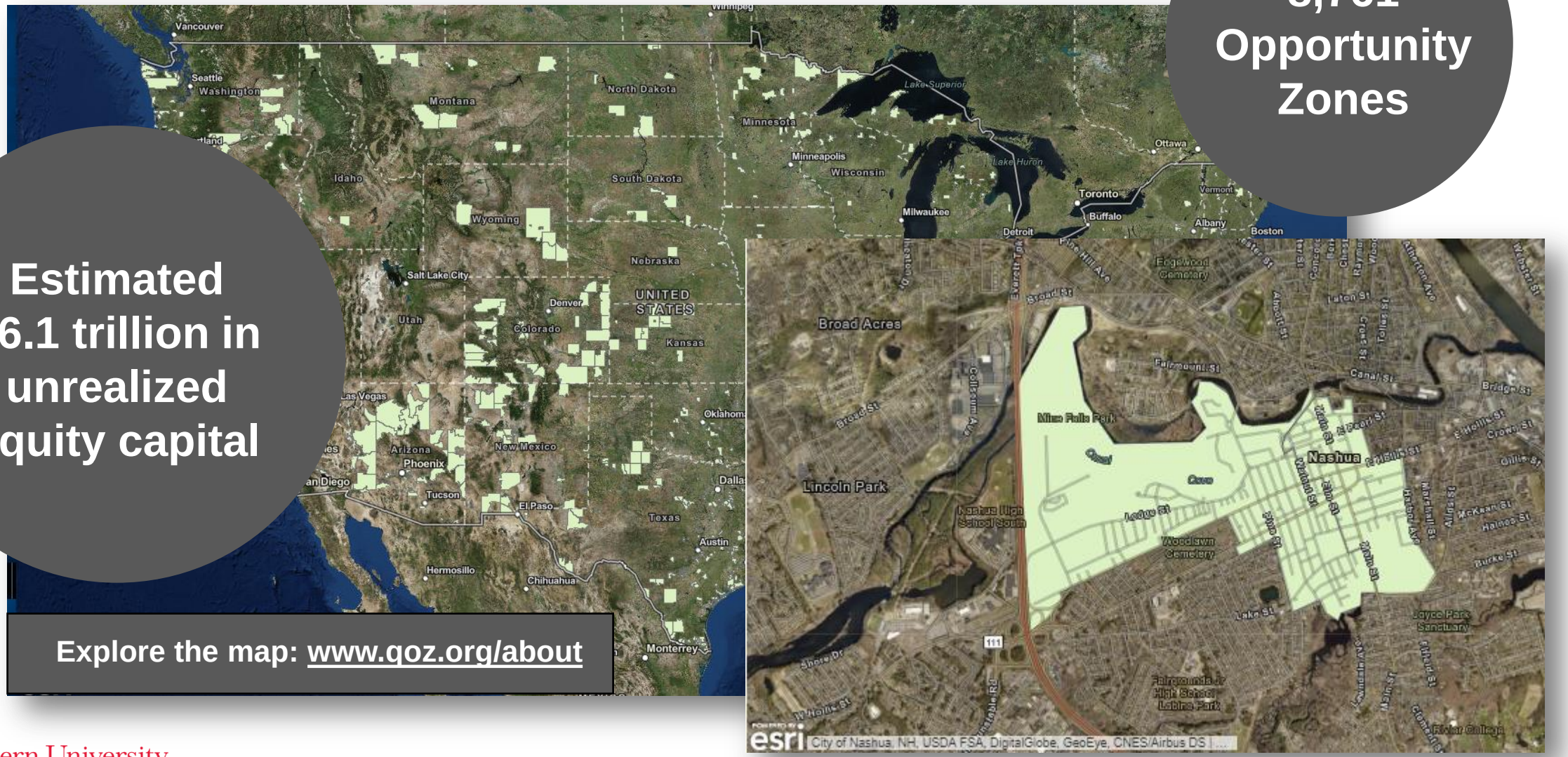
Resilience as a Competitive Advantage

The elevated house that the owners call the Sand Palace, on 36th Street in Mexico Beach, Fla., came through Hurricane Michael almost unscathed.
Credit: Johnny Milano for The New York Times

Financing Resilience Solutions: Nationwide Opportunity Zones

8,761 Opportunity Zones

Estimated $6.1 trillion in unrealized equity capital



Explore the map: www.goz.org/about

Opportunity Zone Overview

- The Opportunity Zones tax incentive will provide an estimated $100b in tax advantaged private investment in low-income urban and rural communities nationwide

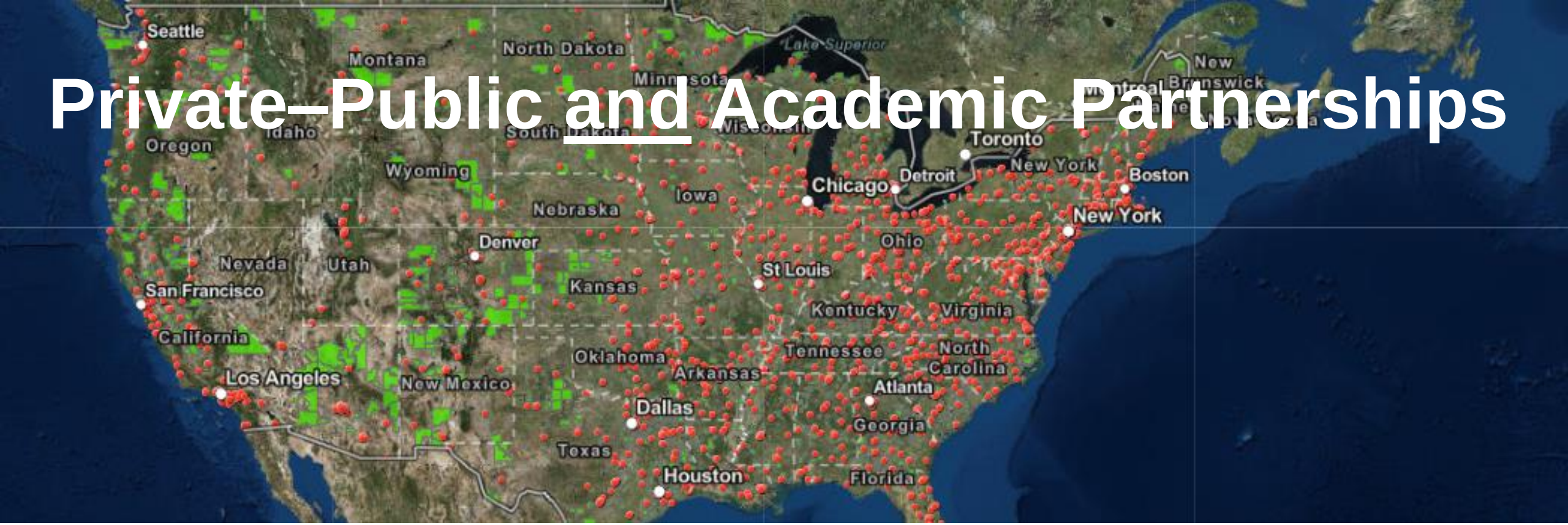
- OpZones were established by Congress in the 2017 Tax Cut and Jobs Act by incorporating the bipartisan “Investing in Opportunities Act” (Co-Sponsors Tim Scott R-SC and Cory Booker D-NJ)

- IRS Proposed Rules to governed “Qualified Opportunity Funds” issued on Oct. 19, 2018

Private investors can defer capital gains until 2026, and pay with a 15% discount.

If they hold the investment for ten years, they pay no taxes on the capital gains from that investment

Private–Public and Academic Partnerships



Within QOZs, there are at least **1,400 colleges/universities**

Keene STATE COLLEGE

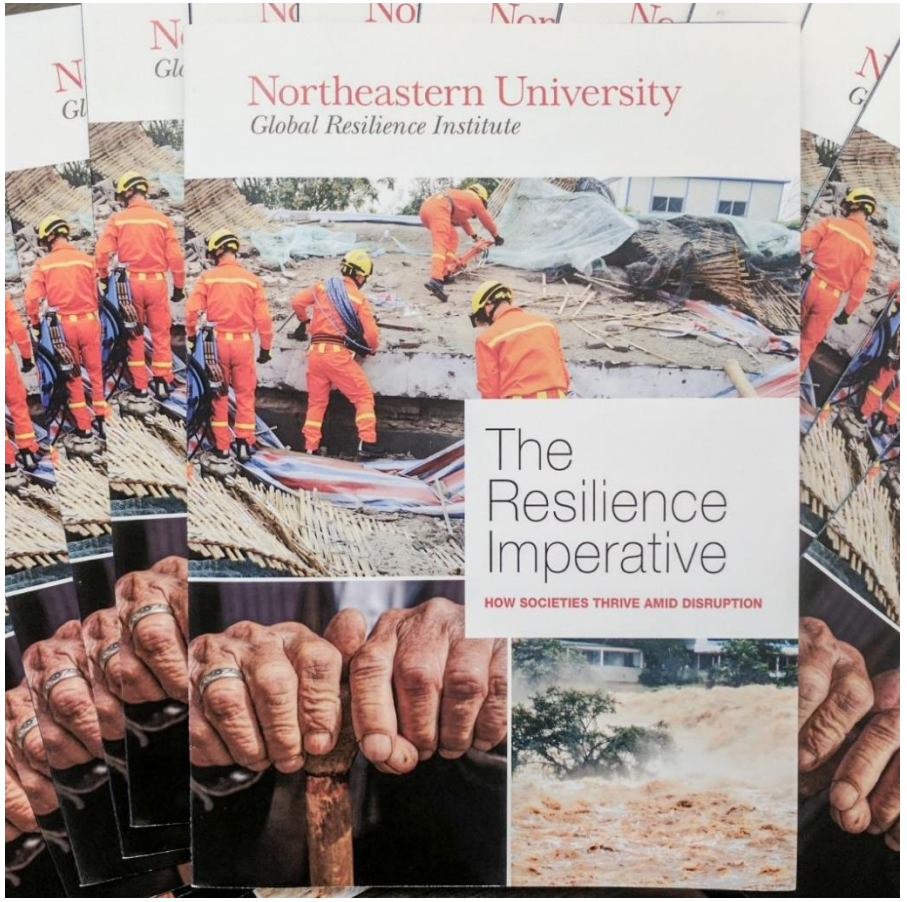
Plymouth State UNIVERSITY

White Mountains Community College

University of New Hampshire

Leveraging academia to bolster resilience

- Universities as trusted conveners
- Universities as experts
- Universities as large local enterprises
- Universities as community leaders for social good
- Universities as sources of continuity



Leveraging academia for innovation - Example 1: Harnessing drones for automated post-disaster assessment

- Minimizes the need for putting emergency responders in harm's way
- Speeds damage assessment, resource allocation
- Gives a region a more efficient response and accelerated recovery
- Repurpose other drone fleets – deputize corporate players
- Can be used for standard inspections on blue-sky days

Leveraging academia for innovation - Example 2: Constructing an ad-hoc emergency communications network

- When cell phone towers go offline, smartphones become “bricks”
- All smartphones using Android & iOS possess the ability to link up to others nearby into decentralized (ad-hoc) networks using short-range WiFi
- The phones *themselves* become the network infrastructure

Summary

- Resilience is increasingly a *competitiveness* issue: People and companies who have a choice will choose to invest and live in communities / regions that are resilient and gravitate away from those that are not
- Companies who embed resilience across the enterprise are more profitable than their competitors
- Resilience measures position a community to bounce back quicker and smarter
- Resilience measures are most affordable and effective when they are built into new infrastructure and systems
- First movers who develop best-practices can commercialize them for national and global markets

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Dr. Stephen E. Flynn
s.flynn@northeastern.edu