

Geography of Risk

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DEFINE THE PROBLEM:

\$3 TRILLION OF PROPERTY IN HARM'S WAY

SHARP SPIKE IN HURRICANE AND FLOOD DAMAGE
WITH MAJORITY OF DAMAGE IN LAST TWO DECADES

RISKS INCREASE IN AGE OF CLIMATE CHANGE
SLR, EXPANDING FLOODPLAINS, BIGGER, MORE
POWERFUL STORMS

WHO PAYS? PRIVATE VS PUBLIC RISKS. CREATING
MORAL HAZARD AT THE COAST

OPPORTUNITIES FOR CHANGE. RESILIENT COASTS?
UNDER-VALUING RISK, CHANGING ECONOMICS AND
LOWER PROPERTY VALUES. A BUBBLE BURSTS AT THE
COAST?



Surf Shack circa 1970



Beach Cottage 2018

BUILDING THE MODERN COAST 1945-2019

- Morris Shapiro goes for a drive
- Inventing a market for second homes
- Long Beach Island & Beach Haven West
- Manufacturing Dirt: Lagoons & fill
- 30K acres of wetlands destroyed
- The Ash Wednesday Storm of 1962
- Opportunities lost
- Tipping Point: 1985-2019
- The land rush: Inflation and ever bigger houses. The suburbanization of the coast
3K SF “bungalows”
- Long Beach Island worth \$100 million in 1962; worth \$15 billion in 2019
- Hurricane Sandy, ‘Stronger Than The Storm’



Jenny &
Morris
Shapiro
Circa 1940



M.L. Shapiro Real Estate Circa 1930



Beach Haven West, 2017



Beach Haven West Lagoon



Long Beach Island, New Jersey, 2017

DISASTER CAPITALISM AT THE COAST

- DEVELOPMENT, POLITICS & NATURE
- A GROWING ENTITLEMENT
- SUBSIDIES ON THE FRONT END
- BAILOUTS ON THE BACK END
- THE ECONOMICS OF RECOVERY
- THE NFIP: DOOMED TO FAIL
- THE CORPS & BEACH REPAIRS: BOTOX FOR THE BEACH

BOTOX FOR THE BEACH

Corps of Engineers has pumped over 500 million cubic yards of sand at a cost of nearly \$6 billion dollars to widen eroding beaches.

Nearly 40% of the sand has been used to widen beaches in New Jersey, which has about 5% of the nation's beaches. How is that? We invented the politics of beach repairs.

The average "fill" lasts about three years. That means the engineers have to return to touch up their work, at a cost of tens of millions more. I call it Botox for the Beach.

Corps' contracts used to be for 15 years. In 1986, it was changed to 50 years. Take a guess how that happened?

The primary beneficiaries are oceanfront houses worth millions each.

**THE FEDERAL GOVERNMENT
HAS PAID OUT OVER \$500 BILLION SINCE 2000
FOR COASTAL DISASTERS.**

Some of the major programs include:

- FEMA Individual Assistance & Public Assistance
- HHS Community Development & Block Grants
- Corps of Engineers Beach Repairs & Cleanup
- SBA Low Interest Business Loans
- Hazard Mitigation Grants
- NFIP: FMA, PMA & ICC
- Agriculture: Rural Development Grants
- NOAA: Planning, Weather, Resiliency
- EPA: Resiliency

FEDERALIZING DISASTERS

If you draw a graph, development and federal expenditures at the coast overlap. Development creates expectations and expectations lead to politics and money.

In 1955, the federal government paid for 5% of the cost of recovery after hurricanes.

Today, it pays for 70% on average, and sometimes more. Most funds come from supplemental appropriations.

Meanwhile, the local share of recovery cost has declined for beach repairs, Public Assistance and other programs, distorting risk and creating a moral hazard at the coast

SOURCES: DAVID MOSS, HOWARD KUNREUTHER, RUTHERFORD PLATT, GAUL

HURRICANE MATTHEW 2016

IN NORTH CAROLINA:

- 81,498 FAMILIES APPLIED FOR ASSISTANCE
- 5,868 FILED FLOOD CLAIMS
- \$195 MILLION PAID FOR FLOOD ASSISTANCE
- \$98 MILLION IN INDIVIDUAL ASSISTANCE
- \$63 MILLION IN PUBLIC ASSISTANCE
- \$102 MILLION IN LOW-INTEREST SBA LOANS

SOURCE: NC STATE HAZARD MITIGATION PLAN



JET STAR SANDY 2012
\$40 BILLION IN DAMAGE IN NJ
NO PAUSE IN DEVELOPMENT

THE NATIONAL FLOOD INSURANCE PROGRAM

GILBERT FOWLER WHITE

Floods are Acts of God; Flood Losses are Acts of Man

The broad problem of flood-loss reduction is that the rate at which flood losses are being eliminated by construction of engineering or land-treatment works is of about the same magnitude as the rate at which new property is being subjected to damage

A FLOOD OF TROUBLE

- The long path to flood insurance
- Private insurers leave market
- Study after study
- 1966 Gilbert White: Must include land use and charge actuarial premiums
- What happened: Subsidized the riskiest properties at the coast, discounted premiums, watered-down land use, and didn't include any reserves, relying on U.S. Treasury as backstop
- Catastrophic hurricanes leave program \$40 Billion in debt. Trump "forgives" \$16 billion.
- One of every three insured properties are beach houses or second homes: 1.7 million homes.

BILLION-DOLLAR FLOODS

EIGHT FLOODS HAVE COST THE FEDERAL
FLOOD-INSURANCE PROGRAM OVER ONE
BILLION. SEVEN OF THE EIGHT WERE COASTAL
FLOODS.

STORM	YEAR	AMOUNT
ALLISON	2001	1,105,003,344
IVAN	2004	1,607,456,621
KATRINA	2005	16,257,661,592
IKE	2008	2,699,982,523
IRENE	2011	1,345,530,083
SANDY	2012	8,702,594,207
LOUISIANA	2016	2,451,760,141
HARVEY	2017	8,366,653,032
TOTAL:		42,536,641,543
COAST:		40,084,881,402
		94%

SOURCE: NFIP SIGNIFICANT EVENT DATABASE,
AUTHOR'S ANALYSIS.

NOTE: THE LOUISIANA FLOOD WAS A TORRENTIAL
RAIN STORM, ALSO CALLED A RAIN BOMB. IT
OCCURRED NEAR BATON ROUGE, ABOUT 60

MILES FROM THE COAST.

BILLION-DOLLAR WEATHER DISASTERS: 1980-2019

Hurricanes dwarf wildfires, droughts & floods combined

Hurricanes: \$946 Billion

Wildfires: \$85 Billion

Droughts: \$250 Billion

Floods: \$147 Billion

14 of FEMA'S 15 MOST EXPENSIVE DISASTERS HAVE BEEN HURRICANES

Source: NOAA-NCEI, 2020; FEMA 2015 REPORT

A HURRICANE PROBLEM

\$975 BILLION IN DAMAGE SINCE 1980

MOST DAMAGE SINCE 2000

STORM	YEAR	DAMAGE*
IMELDA	2019	\$1.0
FLORENCE	2018	\$22.0
MICHAEL	2018	\$25.0
MARIA	2017	\$91.0
IRMA	2017	\$51.0
HARVEY	2017	\$126.0
MATTHEW	2016	\$11.0
SANDY	2012	\$72.0
ISAAC	2012	\$3.0
LEE	2011	\$3.0
IRENE	2011	\$15.0
IKE	2008	\$35.0
GUSTAV	2008	\$7.0
DOLLY	2008	\$2.0
WILMA	2005	\$25.0
RITA	2005	\$24.0
KATRINA	2005	\$164.0
DENNIS	2005	\$3.0
JEANNE	2004	\$11.0
IVAN	2004	\$26.0
FRANCES	2004	\$17.0
CHARLEY	2004	\$27.0
ISABEL	2003	\$8.0
ALLISON	2001	\$12.0
TOTAL:		\$778.0

A HURRICANE PROBLEM

FIVE STORMS, FAT TAILS, ACCOUNT FOR
OUTSIZED DAMAGE

- MARIA 2017 \$91.0
- IRMA 2017 \$51.0
- HARVEY 2017 \$126.0
- SANDY 2012 \$72.0
- KATRINA 2005 \$164.0

TOTAL: \$504.0

52% DAMAGE SINCE 1980

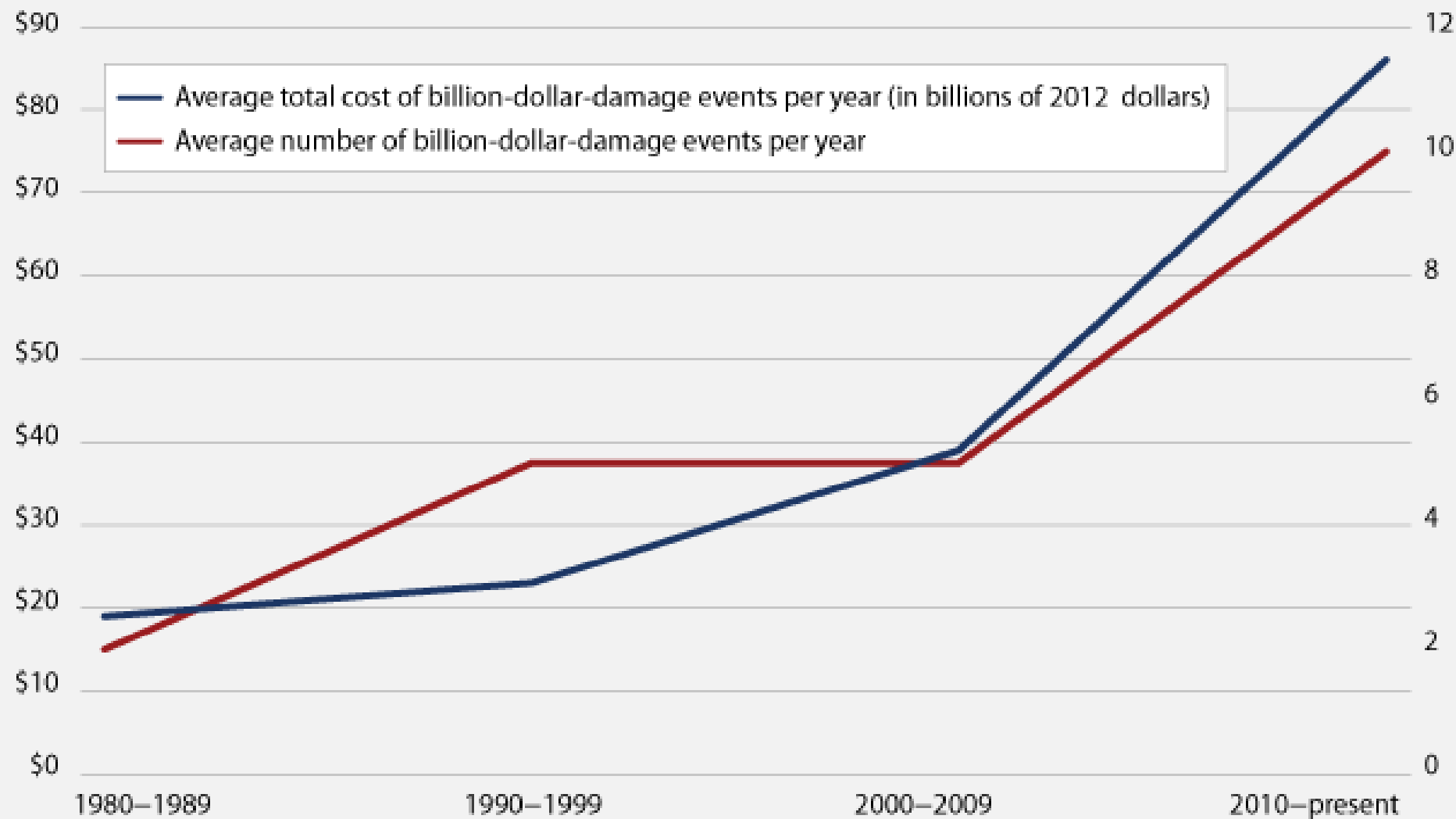
*SOURCE: NOAA, AUTHOR'S ANALYSIS
ALL FIGURES ROUNDED AND ADJUSTED
FOR INFLATION

BUILDING A BETTER HURRICANE
Ivan, Pensacola Beach 2004
\$26 Billion in Damage



FIGURE 1

Billions of dollars in damages from extreme weather events increasing in frequency, cost from 1980–2012



Source: National Oceanic and Atmospheric Administration.

THE COMING STORM

- \$3 Trillion in property at risk, Atlantic & Gulf coasts
- Rising Water
- Warming Oceans
- Rain Bombs
- Kerry Emanuel: Bigger, more catastrophic storms
- Michael Oppenheimer: A Hundred Year Storm every year
- The Problem With the Bays



Resiliency, Sustainability & The Ike Dike

- Will it work? How Long?
- What do we plan for – 50, 100, 500, 10,000 years?
- Who Pays? Private vs Public.
- \$119 Billion to Wall Off Lower Manhattan
- The \$31 Billion Ike Dike. Protecting Houston or the Oil Industry?
- We aren't the Dutch
- Learning to live with water
- Elevations and sand
- Wetlands and living shorelines
- Retreat: 13 million climate refugees



Dauphin Island, Ala., West End



Dauphin Island-Katrina

BUYOUTS

THE HMGP & SEVERAL OTHER PROGRAMS
USE \$ TO BUY DAMAGED AND FLOOD-PRONE
PROPERTY.

BUT FUNDING IS LIMITED AND CAN'T MEET
DEMAND.

\$1 FOR BUYOUTS FOR EVERY \$100 FOR DISASTER
RECOVERY.

NJ SANDY EXPERIENCE: @340,000 HOUSES
DAMAGED OR DESTROYED. JUST 1,000
PURCHASED.

NEARLY ALL OF THE \$300 MILLION WENT TO
THREE UPLAND COUNTIES WITH RIVER FLOODING.
A SMALL NUMBER OF PURCHASES ALONG THE
DELAWARE BAY. ZERO IN THE FOUR COASTAL
COUNTIES. UNCLEAR IF STATE DEP EVEN TRIED.
MAYOR OF LITTLE EGG HARBOR, WHERE
THOUSANDS OF HOUSES FLOODED, TOLD ME HE
NEVER SAW OR HEARD FROM THE STATE.

**RESILIENCY IS GREAT
BUT IT DOESN'T MATTER
IF YOU DON'T DO LAND USE**

- WHO CONTROLS ZONING AND BUILDING?
- MAYORS CONFLICTED, OFTEN DEVELOPERS & REALTORS
- SHORT-TERM VS LONG
-TERM THINKING:
- STATES SLOW TO ACT. DO THEY HAVE A PLAN?
- IS THE LMS REAL? FUNDED? ENFORCED?
- PROPERTY RIGHTS vs CONSERVATION

CAN WE SAVE HORRY COUNTY, SC?

ONE OF THE FASTEST-GROWING AREAS IN THE NATION. IN 2010, THE POPULATION WAS 269,291. IT IS NOW 347,147. AND IT IS EXPECTED TO BE 584,500.

COUNTY OFFICIALS WANT “QUALITY GROWTH.”

BUT IT IS LOSING FORESTS, AG LAND AND WETLANDS.

COOASTAL COUNTIES ARE BEING DEVELOPED AND COVERED (IMPERVIOUS COVER) AT RATES EXCEEDING OTHER COUNTIES.

FLOOD LOSSES IN COASTAL COUNTIES ARE ALSO GROWING (FLORENCE, IRMA, MATTHEW) AND NOW TOP \$600 MILLION.

MUCH OF THE FLOODING ALONG COASTAL RIVERS (CONWAY \$20 MILLION)

Source: NOAA, FEMA, April Thomas

ENDGAME: Risk, Property Values And Broken Bubbles

- Zillow: Hundreds of thousands of homes in Florida could be underwater
- Barrier Islands buried at high tide
- Most of Florida Keys lost
- Hurricanes wipe out Miami & Tampa
- Millions of climate refugees

CAN THE MARKET SOLVE A PUBLIC PROBLEM?

- Enter the credit rating agencies
- No more 30-year mortgages at the coast?
- The Big Short Redux: David Burt Shorts coastal real estate
- Calpers, Blackrock, McKinsey, et al
- The Bubble Bursts: Sean Beckett a 2008-style collapse?
- Price signals already in the market: stagnant or declining values in NC, VA and SE Fla

CAN THE MARKET SOLVE A PUBLIC PROBLEM?

- Credit rating agencies & the cost of borrowing money
- Spencer Glendon: No more 30-year mortgages in SE Florida.
- The Big Short Redux: David Burt is shorting coastal real estate.
- Calpers, Blackrock, McKinsey, Bloomberg et al
- The Bubble at the Beach Bursts: Sean Beckett a 2008-style collapse?
- Or a slow decline in prices?
- Signals already in the market: Stagnant or declining values in NC, VA and SE Fla.
- But the market is still under-pricing risk at the coast (SLR, erosion, storm probabilities, rain bombs, nuisance flooding)
- NBER Study: 3.8 million homes in flood plains. Market overvalues by \$34 Billion. In other words, less \$34 B if you factor in the risks.

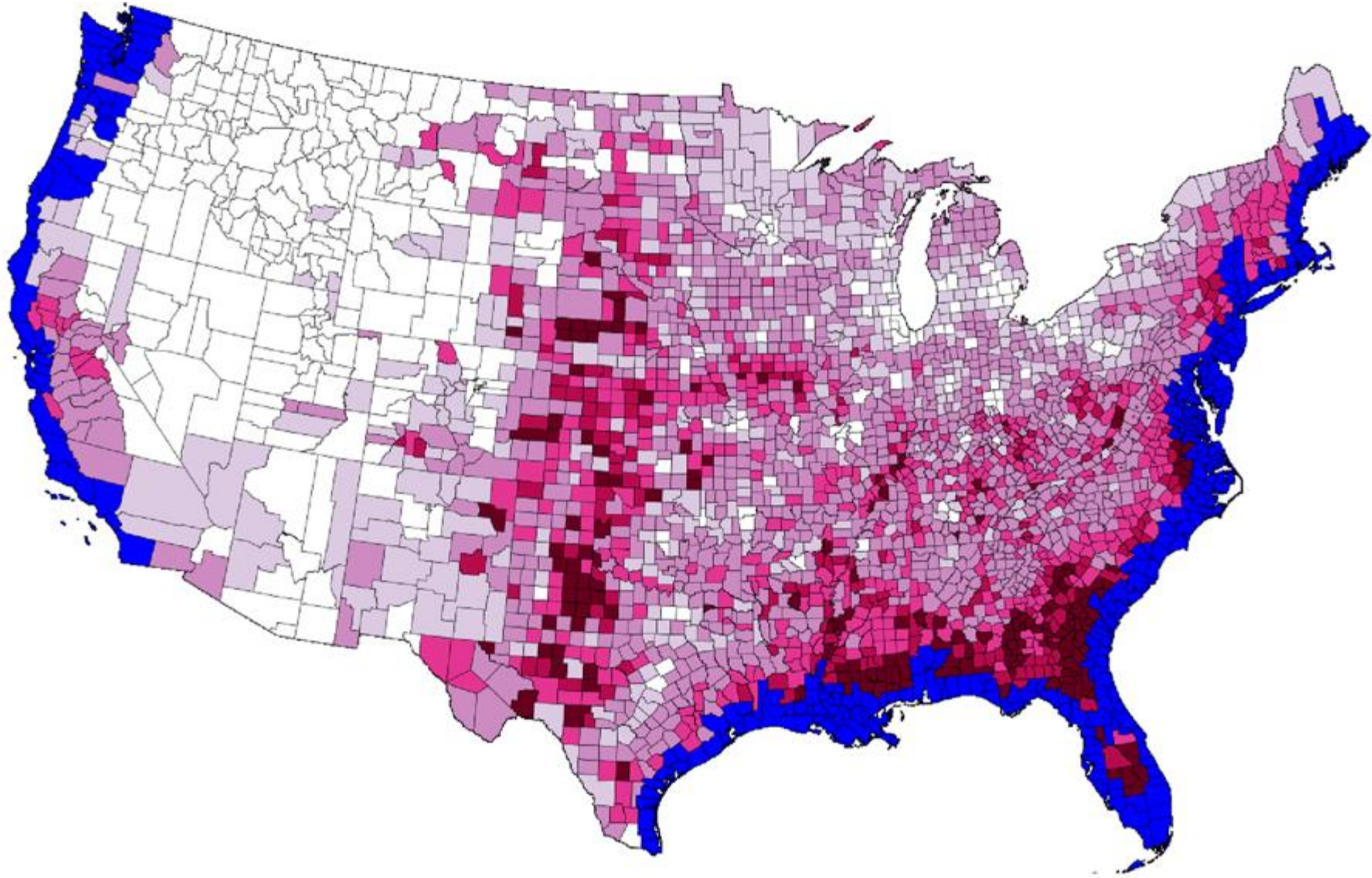


Corolla, N.C., 2018 Rain Bomb

NC 12 February 2020



Water wins
Water always wins



13 MILLION CLIMATE REFUGEES?