Underwater:
Rising Seas, Chronic Floods, and the Implications for U.S. Coastal Property
Shana Udvardy, Climate Resilience Analyst
Our Coast & Why we did this work
What we did and found
Chronic inundation + Properties at risk
Mapping Chronic Inundation

1. Tide gauge records

Photo: NOAA
Mapping Chronic Inundation

2. Digital Elevation Models

Photo: NOAA
3. Sea level rise projections

- Extreme scenario
- High scenario
- Intermediate scenario
- Low scenario
- Observed

Sea Level Rise (feet above 1992 level) vs. Year (2000 to 2100)
US Coastal Property at Risk from Rising Seas

What’s at Risk by ZIP Code

What’s at risk from rising seas

Click the buttons to see what’s at risk from chronic inundation (high-tide flooding that occurs 26 or more times per year).

In 2045
- Homes
- Value
- Population
- Tax Base

In 2100
- Homes
- Value
- Population
- Tax Base

This scenario assumes a high rate of sea level rise caused by a continued rise in global carbon emissions and an increasing loss of land ice. In this scenario, global average sea level is projected to rise about 2 feet by 2045 and about 6.5 feet by 2100.

Note that these projections do not include future development or new homes; they capture only today’s homes and current property values.

*Data provided by third parties through the Zillow Transaction and Assessment Dataset (ZTRAX). More information on accessing the data can be found at http://www.zillow.com/ztrax. The results and opinions presented in this report are those of the author(s) and do not reflect the position of Zillow Group.*
Number of homes at risk of chronic inundation

2045:
- 300,000 homes
- 4.7 million people (size of LA)
- 14,000 commercial businesses

2100:
- ~2.4 million homes
- 100,000 commercial properties

Florida, New Jersey, Louisiana, California
Current market value of properties at risk

2045:
- $117.5 billion nationally
- NJ, FL, CA, SC, NY

2100:
- $1.07 trillion = GDP of FL
- FL, NJ, NY, CA, MA,
Current tax base contribution of properties at risk

2045:

- **80 communities** = 25% or > of the local property tax base
- **30 communities** = > ½ local property tax base at risk
Acute Exposure in Florida:
Percent of Current Property Tax Base at Risk
Housing Risk Hotspots

Bay Area:
- ~13,000 homes
- 33,000 people

Long Island:
- 15,000 homes
- ~40,000 people
Poverty, race, & tides create hotspots of risk

Nationwide, in 2045, approx. 175 communities could see 10% or > of housing stock at risk & ~40% are low-income communities w/ poverty levels above the national average.
Poverty, race, & tides create hotspots of risk

Louisiana
- By 2045, 60% of 120 communities have at least 1 home w/at risk property are above national poverty average (12.7%)

Maryland
- By 2045, 30 of the 105 communities w/at risk properties have above average national poverty rates
Business as usual?

In 2045, 96% of ~2,600 commercial properties would be at risk (shops, hotels, & restaurants).
Additional state stories...

- TEXAS AND NORTH CAROLINA:
  - Generational wealth at stake

- THE NORTHEAST AND THE NORTHWEST:
  - Blue-collar America at risk

- VACATION STATES:
  - Tourist income at stake.
What about lower emissions and SLR?

- By 2060 # homes at risk ↓ by nearly 80% (500,000 fewer)
- In 2100 could avoid $782 billion in residential property value, housing 4.1 million, valued at and $10.4 billion in annual property tax revenue to municipal governments

![Number of Properties at Risk](chart)

- Low: 340,000 homes
- Int: 2.4 million homes
- High: 3,000,000 homes
The Potential Economic Reverberations of Chronically Inundated Properties
Our Challenges and Choices
Our Challenges and Choices
Knowing our risk

Closing the awareness gap

- Home-Buyer’s
- State & local role
- Federal Role
- Market place
Realign policies and market incentives to reflect risk
Planning for a resilient future for all
Thank you

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Realign policies and market incentives to reflect risk

Market experts: “Matrix of Voices”

“S&P Global Ratings see the uniform and transparent disclosure by governments of the potential effects of gradual environmental change and extreme weather events as both an important input into our assessment of management's ability to respond to the risks and one of the largest challenges to the market.”

- Kurt Forsgren, Managing Director – Infrastructure Sector Lead
S&P Global – Ratings U.S. Public Finance
Knowing our risk

Closing the awareness gap

- Home-Buyer’s
- State & local role
- Federal Role
- Market place
Extra slides
Market experts: “Matrix of Voices”

The six main insights that emerged from the experts consulted were:

1) The financial risks of sea level rise are largely **unaccounted for in the current market.**

2) **Barriers exist** to doing so—including a lack of standardized data/metrics for assessing risks and the market’s bias toward investment horizons.

3) Some **federal and local policies**, in their current form—particularly those related to disaster risk response, flood insurance, and zoning regulations—unintentionally serve to mask the risks to coastal communities.

4) A **coastal property market correction is inevitable**, but the form and severity it will take in specific locations, and its timing, are still uncertain.

5) **Some communities will be hit harder than others**, especially if policy interventions are not made ahead of a steep downward adjustment in property values.

6) **Standards and guidelines for risk disclosure** are an important first step for market actors to be able to account for these risks in their business models.
Chronic Inundation

Today

With Future Sea Level Rise

A. High tide level
B. Chronic flooding level
C. Permanent inundation zone (underwater with each high tide)
D. Chronic inundation zone (underwater 26 times or more a year)
Encroaching Tides
How Sea Level Rise and Tidal Flooding Threaten U.S. East and Gulf Coast Communities over the Next 30 Years

Effective inundation of continental United States communities with 21st century sea level rise
Kirsten A. Dahl*, Erika Spangler-Siegfried*, Astrid Caldas* and Shana Udvardy*

When Rising Seas Hit Home
Hard Choices Ahead for Hundreds of US Coastal Communities

The US Military on the Front Lines of Rising Seas
Growing Exposure to Coastal Flooding at East and Gulf Coast Military Bases

Underwater
Rising Seas, Chronic Floods, and the Implications for US Coastal Real Estate
Our Challenges and Choices

1) Know the risk
2) Realign policies and market incentives to reflect risk
3) Planning for a Resilient Future for all
Planning for a Resilient Future for all
Using “Response Time” Wisely
Knowing our risk

Home-Buyer’s

- Ask yourself
- Ask locals
- Ask Home inspector & / or Engineer
- Ask the Seller, Realtor, Town Planner’s Office
- Ask your insurance agent
As an investment manager, one of the biggest challenges is the disconnect between time horizons for our clients’ investments in bonds—usually 3 to 5 years—and the timeframe for significant tipping points when, say, 50 to 70 percent of the tax base is at risk of flooding.”

- Andrew Teras, Vice-President and Senior Analyst, Breckinridge Capital Advisors
Loss in Home Value with Chronic Inundation

- Representative Historical Trend
- Typical Future Price Trend
- Sharp Devaluation with Chronic Inundation
- Stepwise Decline with Chronic Inundation
When Rising Seas Hit Home: An Analysis by the Union of Concerned Scientists

Communities at Risk

Many more communities at risk with higher sea level rise

More than 650 communities will become chronically flooded by 2100 with higher sea level rise.

In this scenario, global carbon emissions rise through the end of the century, ice sheets respond by melting more rapidly, and sea level rises more quickly. By 2100, seas rise by more than 6 feet globally.

Click the buttons below to see how this high scenario pushes many more communities over the threshold of chronic inundation more quickly:

Today 2030 2045 2060 2080 2100

For more on this analysis, see www.ucsusa.org/RisingSeasHitHome
Chronic inundation in 2100:
Equivalent to Hurricane Sandy flood extent
Acute Exposure in Florida: Residential Properties at Risk
Knowing our risk

Home-Buyer’s

✓ Ask yourself
✓ Ask locals
✓ Ask Home inspector & / or Engineer
✓ Ask the Seller, Realtor, Town Planner’s Office
✓ Ask your insurance agent
Acute Exposure in Florida: Residential Properties at Risk