Homes Threatened by Rising Seas

Jeff Tucker, Economist, Zillow

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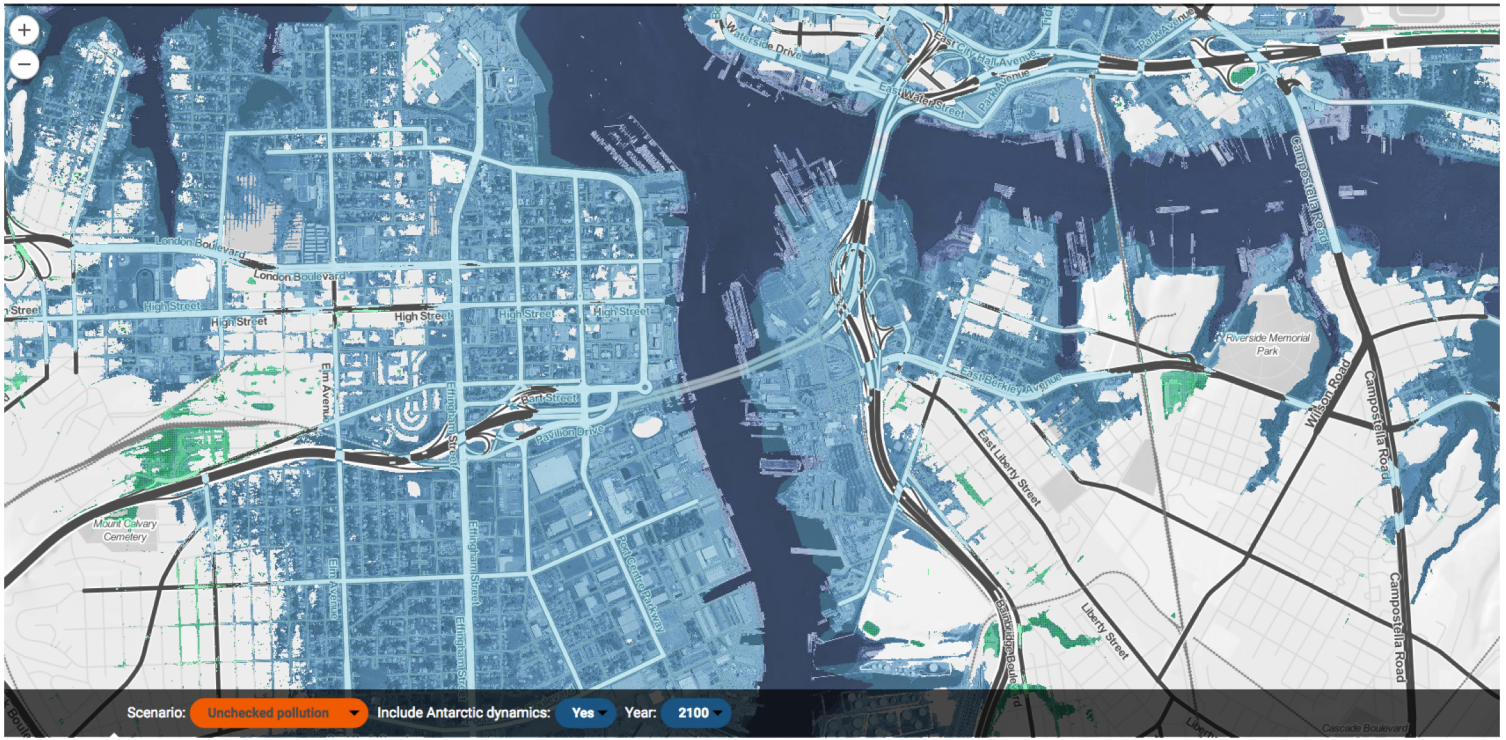
Estimating the Costs of Climate Change

- Residential real estate is one of the biggest components of national wealth
  - And for most American homeowners, their biggest single asset
- Climate change will interact with housing in several ways
  - Changes in cooling and heating needs
  - Shifting desirability of markets
  - Growing wildfire risk at urban/forest interface
  - Sea level rise (today's subject)

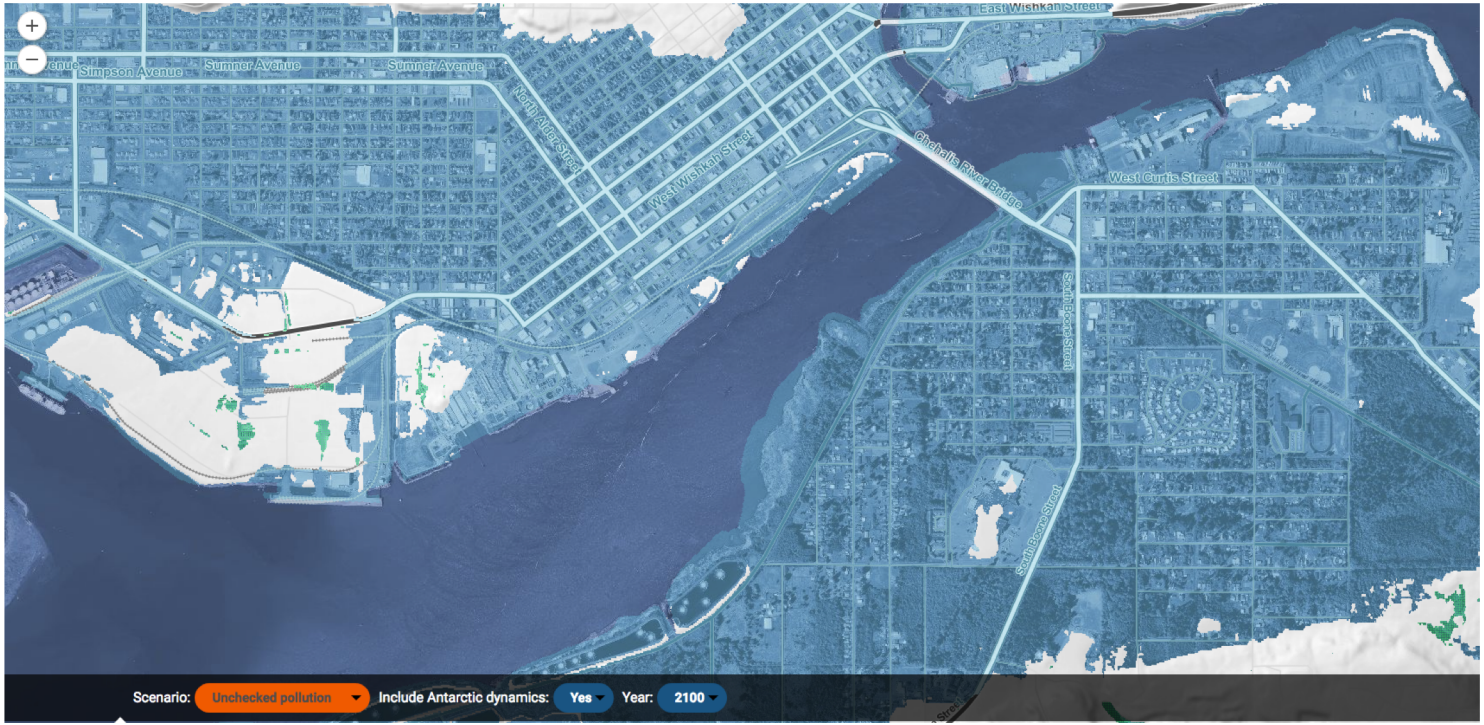
Sea Level Rise: An Exceptionally Clear Risk

- Experts can model sea level rise under different CO2 concentration pathways
- Climate Central has produced detailed interactive maps to show the areas expected to flood under different scenarios

Sea Level Rise in Norfolk, Va.



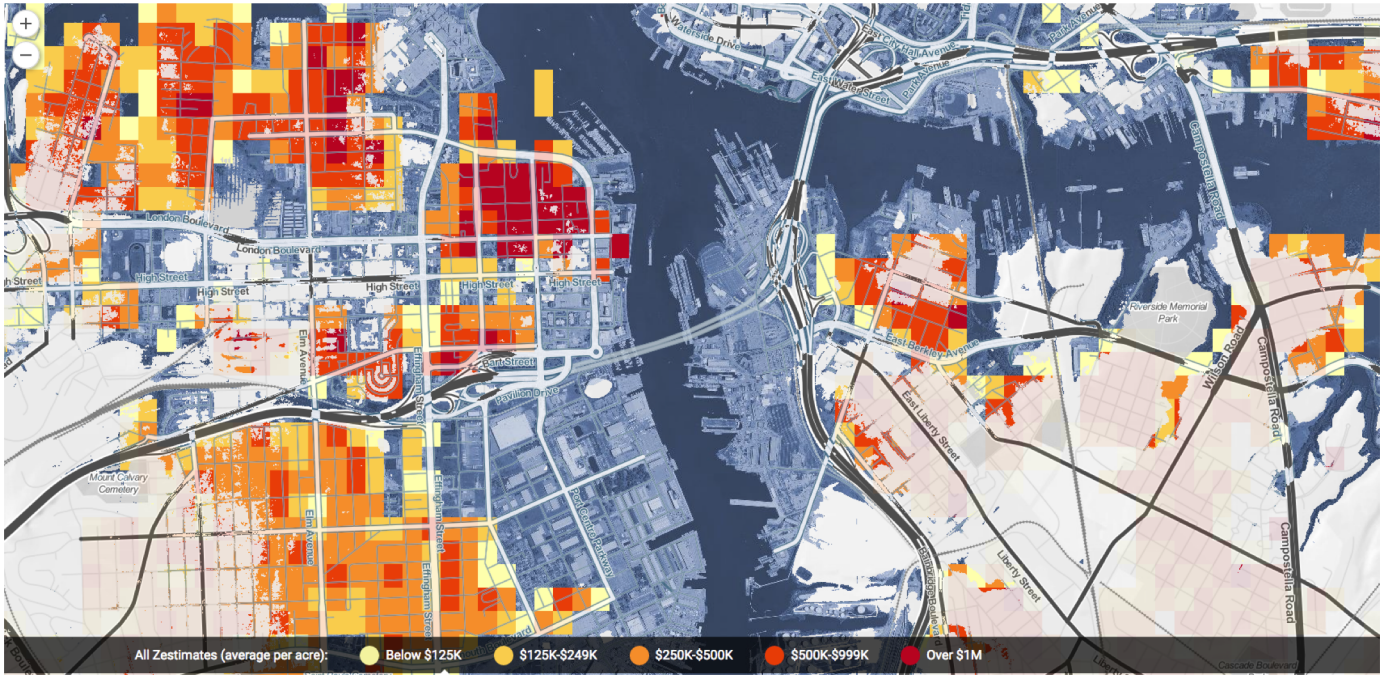
Sea Level Rise in Aberdeen, Wash.



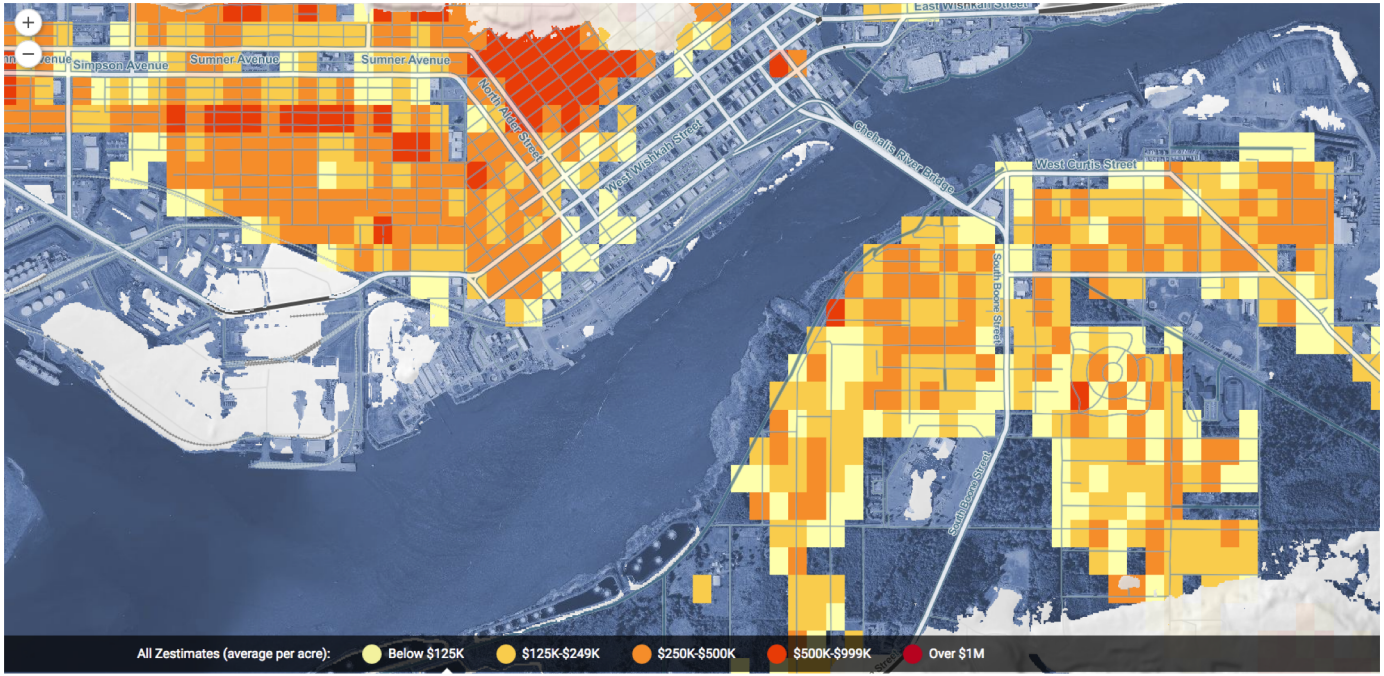
Where Zillow Comes In

- Zillow has the most comprehensive database of U.S. home locations and estimated market values
- We combine our geocoded set of homes with Climate Central's maps of risk zones
  - Areas expected to be inundated by a combination of sea-level rise and expected annual flooding
- Result: total property counts and values at risk from sea level rise, separately under three representative concentration pathways, and measured at 2050 and 2100 projected sea levels

Property Values at Risk in Norfolk, Va.



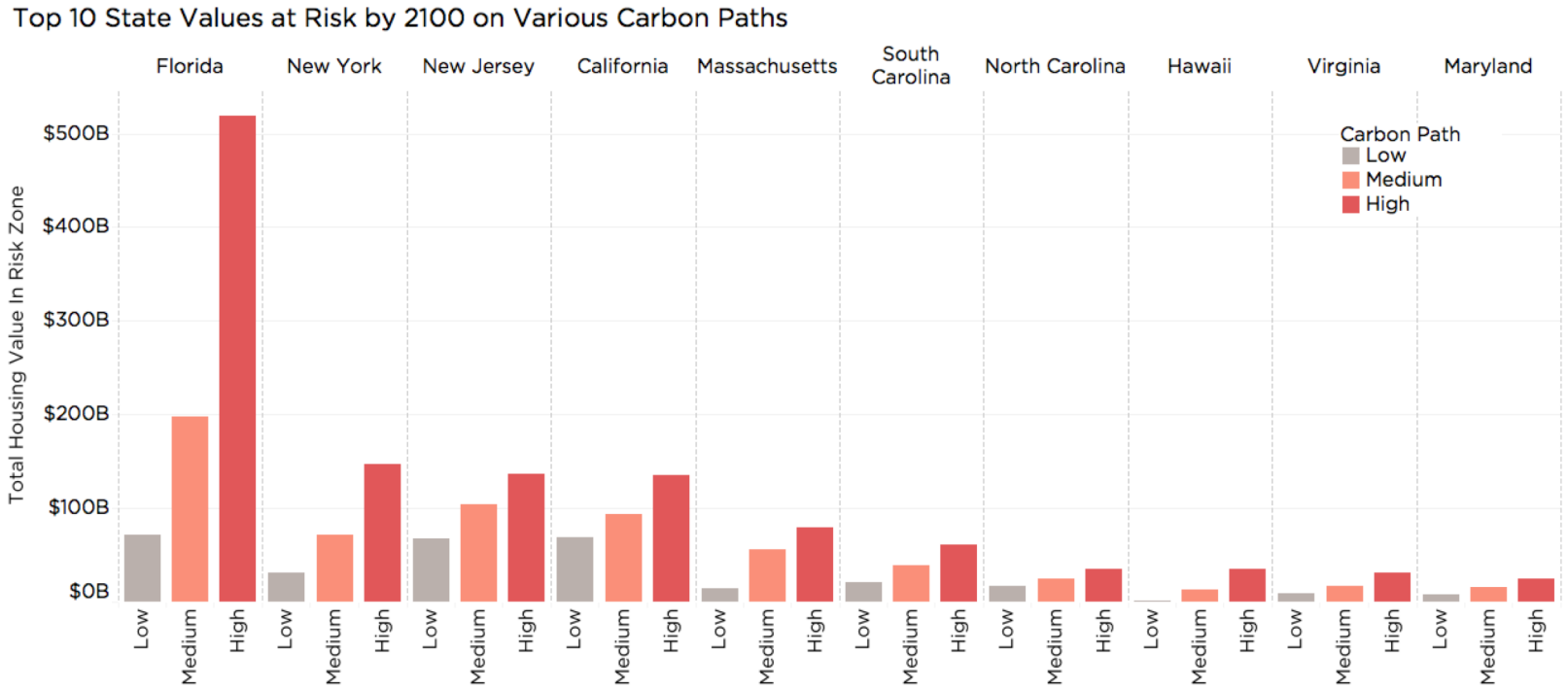
Property Values at Risk in Aberdeen, Wash.



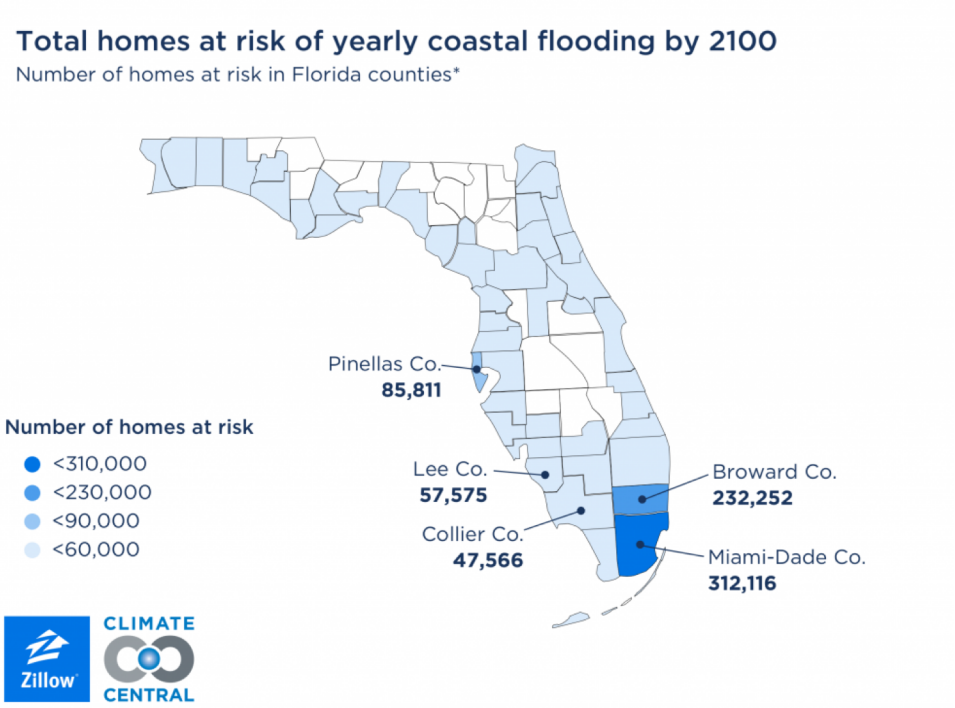
National total home value at risk by 2100

- $372 billion under RCP 2.6 (deep emissions cuts)
- $715 billion under RCP 4.5 (Paris accord, moderate cuts)
- $1,328 billion under RCP 8.5 (unchecked emissions)

By 2100, Florida bears two fifths of all risk



Miami-Dade & Broward Counties Contain Half of Florida's Homes at Risk



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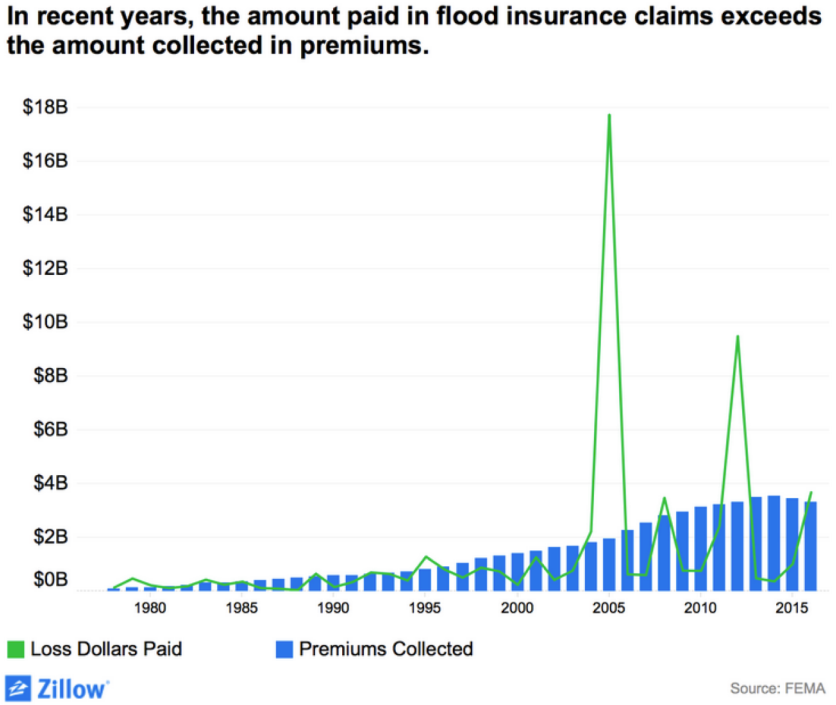
These Risk Assessments Are a Lower Bound

- Zillow used 2018 home values and locations
- More homes are built every year in coastal areas at risk
  - Since 2010, Florida has added 14,270 new homes which will likely flood by 2100, representing an additional 3% or $15.6 billion worth of homes at risk
  - New Jersey has added another 5% or $7.4 billion worth of homes in risk zones since 2010

Policy – What is Done Now?

- National Flood Insurance Program is current front-line policy
- Homeowners in FEMA's 100-year flood zones are required to buy insurance
- Claims have outpaced premiums, requiring $16 billion in debt forgiveness recently



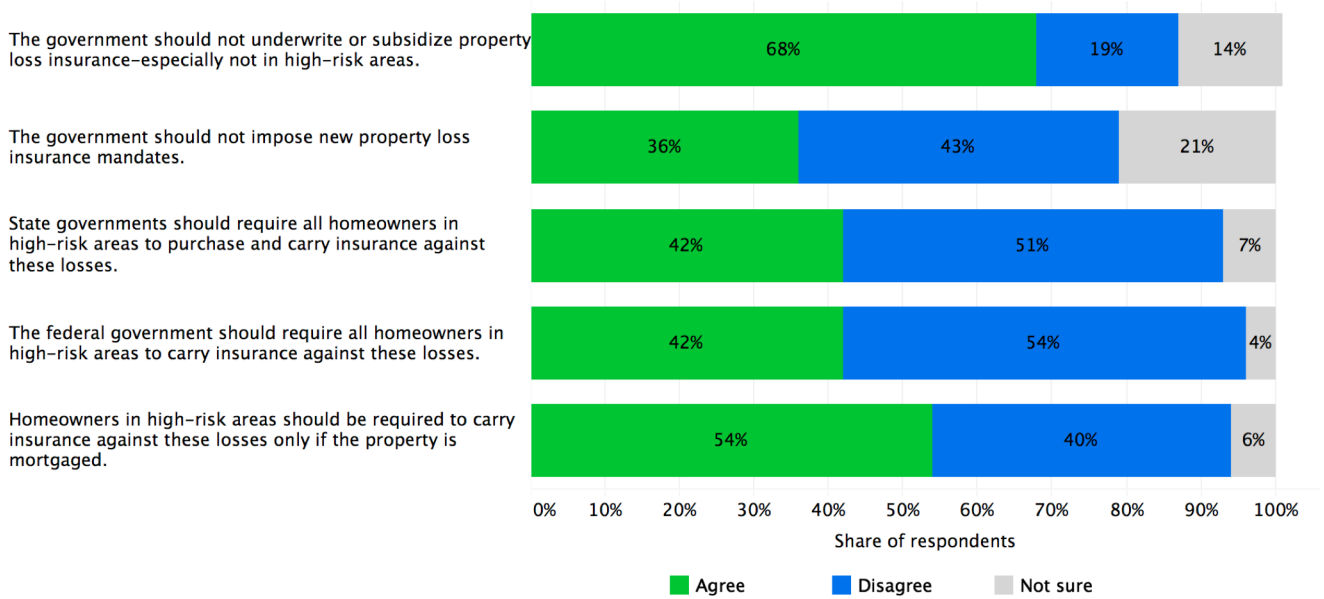
Policy – What Do Economists Recommend?

- Economists are broadly unhappy with current policy
  - Subsidized insurance for homes in risky areas incentivizes putting more homes and lives at risk
  - Current programs are often used to re-build in place
  - Most flood insurance claims are paid to owners of above-median-value homes, so the NFIP is effectively a regressive program
- Zillow asked our panel of housing economists about policies related to natural disasters, including flooding from sea level rise

Policy – Zillow Survey Results

Experts: Government should work to lessen natural disaster losses, not insure them

Most mortgage lenders currently require home buyers in high-risk areas to purchase and carry insurance against natural disaster losses - including losses from floods, fires, hurricanes, storms surges and mudslides. Please indicate whether you agree, or disagree, with each of the following statements.



Zillow Economic Research | Source: Zillow Home Price Expectations Survey, 2019 Q1

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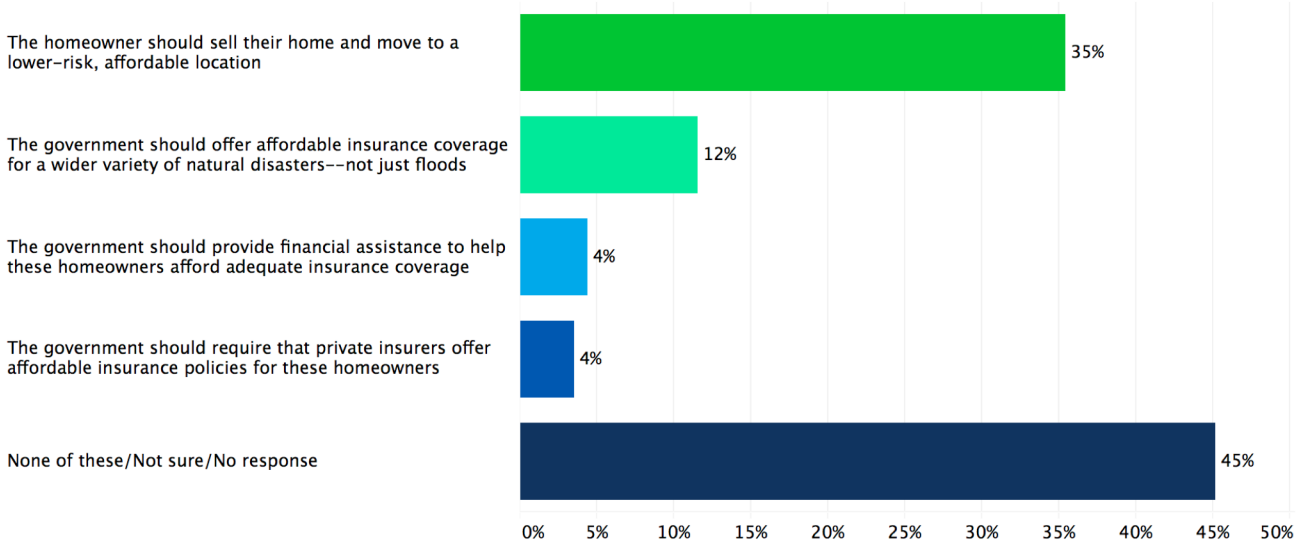
Policy – Zillow Survey Results, Part 2

Experts to homeowners who can't afford insurance in high-risk areas: Sell

Regarding homeowners living in high-risk areas who no longer can find property insurance coverage or afford significantly increased premiums, which one of the following choices best reflects your view?



Zillow Economic Research | Source: Zillow Home Price Expectations Survey, 2019 Q1

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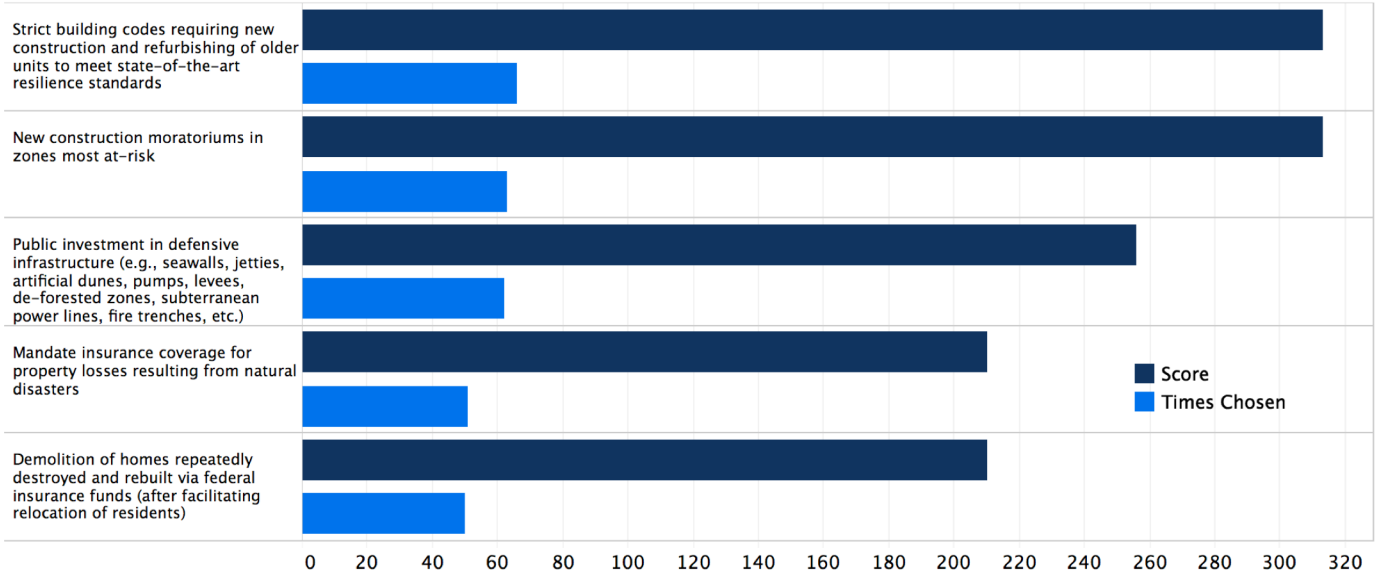
Policy – Zillow Survey Results, Part 3

Experts: Stop increasing homes at risk

Of the following policy proposals to prevent or significantly reduce recurring property losses in communities that are especially vulnerable to devastating hazards, which do you support? For those you support, please order them according to anticipated effectiveness.



Zillow Economic Research | Source: Zillow Home Price Expectations Survey, 2019 Q1
[Note: 8 write-in responses omitted from 95 responses.]

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Links

- Zillow research brief, Nov. 2018
  - https://www.zillow.com/research/ocean-at-the-door-21931/
- Climate Central research brief, Nov. 2018
  - https://www.climatecentral.org/news/ocean-at-the-door-new-homes-in-harms-way-zillow-analysis-21953
- Climate Central-Zillow collaborative interactive maps
  - https://rzh.climatecentral.org/#12/46.9754/-123.8157?show=zillow_k17&projections=1&level=6&unit=feet&pois=hide
- Kopp et al. (2017) source for Climate Central's sea level rise model
  - https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/2017EF000663

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Questions?