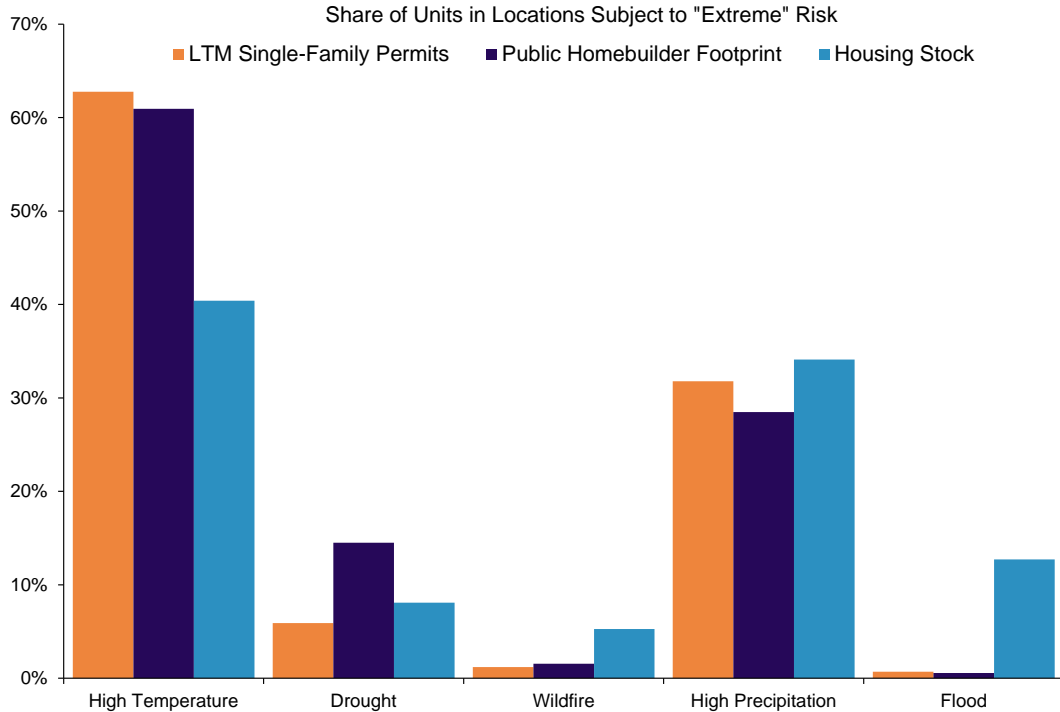


Peering Into Permits New Home Market More Exposed to Heat Wave Risk

As highlighted in our [Annual Housing Summit](#), climate change has, and will continue to have, an increasing impact on the housing market in the coming years and decades. Based on our analysis of data from [ClimateCheck](#), the single-family new home market remains somewhat better-positioned versus the existing housing stock with respect to most risks, with the notable exception of heat waves. In the near term, we expect the economics facing potential homebuyers, not their views on climate change, will be the primary driver of changes in demand for homes in higher-risk areas. Said another way, as it becomes more expensive to build, buy and own new homes in more at-risk areas, buyers with more limited budgets and, over time, homebuilders, will likely shift their sights to other locations.

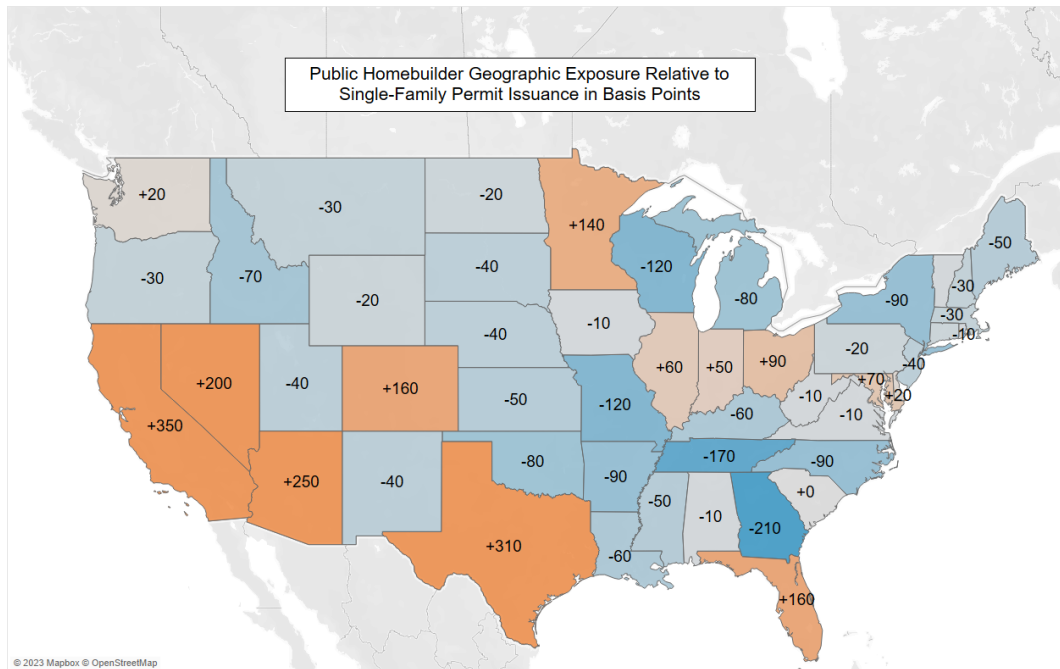
- **ClimateCheck Data Sheds Light on New Home Submarkets' Climate and Environmental Risks:** We aggregated ClimateCheck's forward-looking data on the expected frequency and magnitude of climate- and environment-related risks on over a hundred million properties to quantify risk across roughly 20,000 local homebuilding submarkets, [over 6,000 public homebuilder communities](#) and 140 million residential housing units. Given the regional variability of what constitutes factors such as excessive heat and precipitation, ClimateCheck's relative rating accounts for local baseline conditions as well as projected changes in order to assess the *incremental* strain potentially facing regions that otherwise may be accustomed to events such as elevated temperatures or rainfall.
- **For Most Risks, New Home Market Better Positioned than Existing Housing Stock:** Based on the geographic distribution of LTM single-family permit issuance, risks to the new home market are meaningfully lower than those faced by the existing housing stock with respect to drought, wildfire and flood. Interestingly, public homebuilders' outsized exposure to states such as AZ, CA and TX leave them more susceptible to droughts, with 15% of communities facing "Extreme" drought risk, more than double that of the new home market overall. (See Exhibit 1 and Exhibit 2)
- **High Temperatures Increasingly the Most Outsized Risk to New Home Market:** Since 1990, single-family permit issuance has steadily shifted to regions subject to elevated heat wave risk. ClimateCheck's heat risk rating accounts for expected severity, length and frequency of periods of much higher-than-normal temperatures in the coming decades.
 - More specifically, 63% of LTM single-family permits were issued in regions facing "Extreme" risk due to high temperatures, according to ClimateCheck, while 53% were issued in these geographies in 2010 and just 40% in 1990. For comparison, nationally, 40% of all housing units currently face "Extreme" risk from high temperatures. (See Exhibit 3)
 - Although the implication of excessive heat on consumer demand is difficult to quantify, it could result in a significant number of deaths in the event it overlaps with a widespread power outage. It also impacts the construction process, as it can strain labor resources and, as noted in our [recent Homebuilding Survey](#), slow construction timelines if, for instance, concrete must be poured overnight to avoid higher temperatures.
- **In Our View, New Home Demand Likely Most Influenced by Economics, Not Ideals, in Near Term:** For areas facing elevated climate-related risks, we do not anticipate a drastic change in homebuyer behavior in the near term. For instance, according to a survey conducted by the Yale Program on Climate Change Communication, only 11% of Americans have *considered* moving to avoid the potential impacts of climate change, with presumably a much lower share *actually* opting to do so. However, we do expect marginal shifts in demand to arise when the economics of buying and owning a home are altered. Notably, homebuilding industry contacts have expressed concern about rapidly-increasing homeowners' insurance costs which – whether driven by climate risks, lack of competition or other market dynamics – will deter some homebuyers, especially within more price-sensitive cohorts.

Exhibit 1: Homebuilding Industry Has Outsized Exposure to Heat-Related Risks



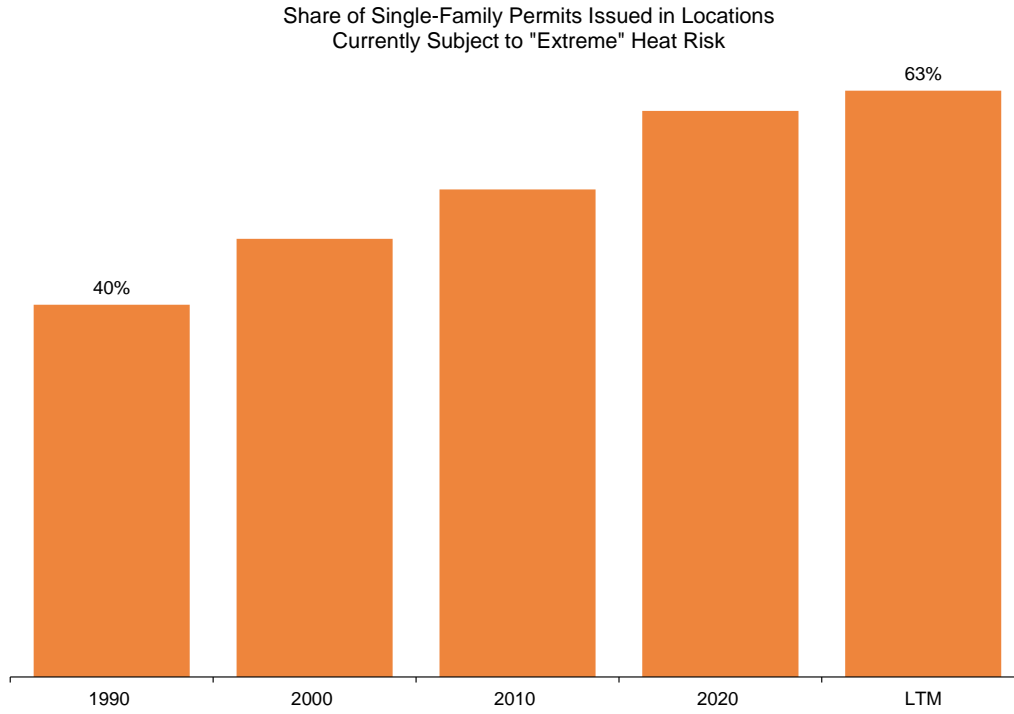
Source: Census Bureau, ClimateCheck, Zelman & Associates analysis

Exhibit 2: Publics' Elevated Exposure to Southwest Drives Outsized Drought Risk



Source: Census Bureau, Zelman & Associates analysis

Exhibit 3: Single-Family Construction Has Shifted Significantly to Hotter Areas



Source: Census Bureau, ClimateCheck, Zelman & Associates analysis

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