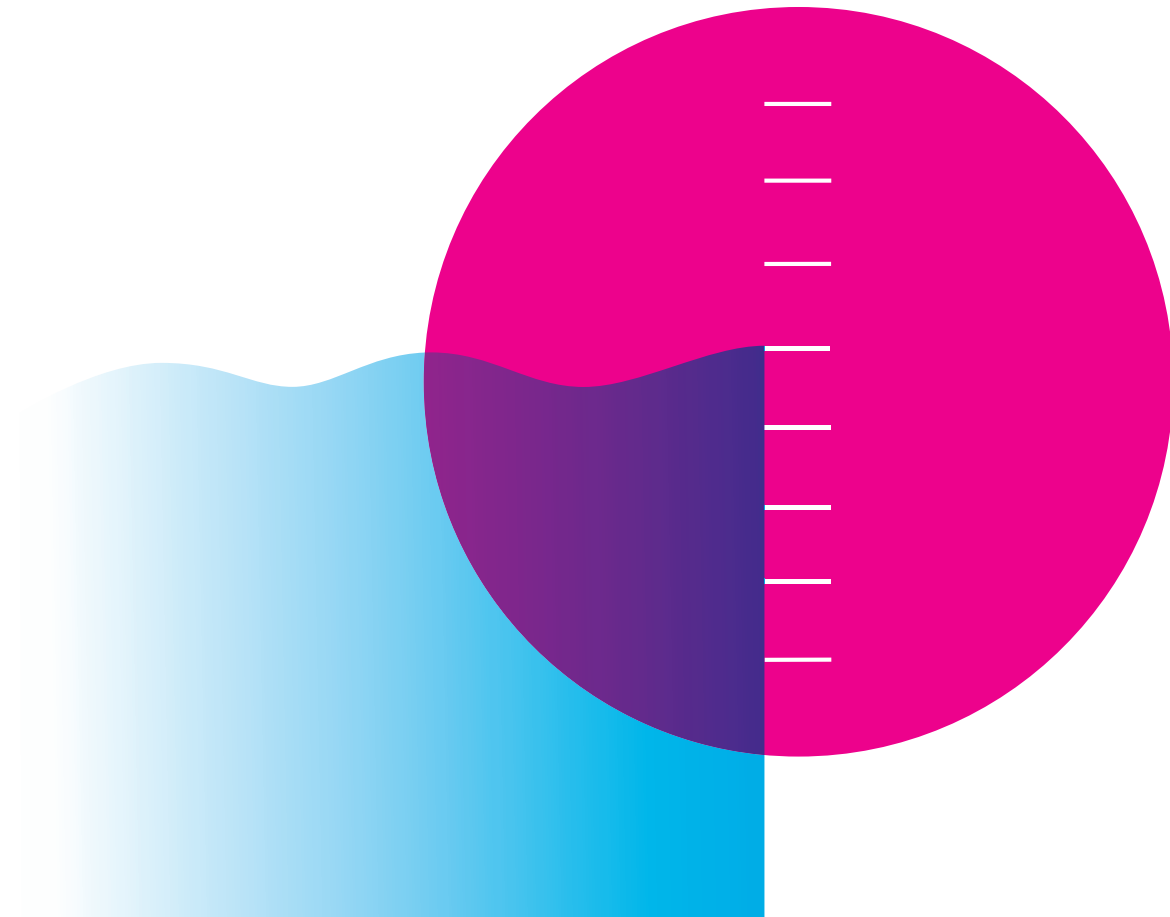


HIGH-WATER MARKS



By Jerry Speltz
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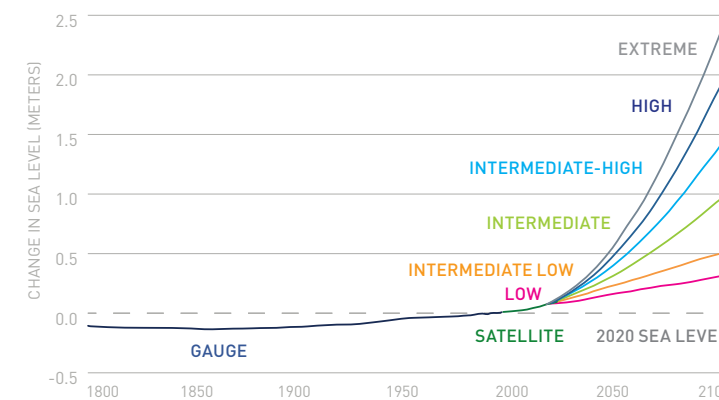
Interest and excellence in ESG performance is becoming increasingly critical to portfolio strategy. So with sea levels on the rise, how can portfolios stay above water?

As investors focus more each day on environmental, social, and governance (ESG) considerations, one risk that should increasingly come into focus is the rise in sea levels globally. There is no longer much of a debate around if sea levels are rising—they are, and they’ve risen by eight inches globally since 1880, and faster since 1900, than in any preceding century for at least 3,000 years.¹ But the evidence suggests that this pace is accelerating materially, with some areas along the US East Coast and Gulf of Mexico seeing eight-inch rises in the last fifty years alone.²

Today, the debate has moved from if to how fast sea levels will rise from here. This is a function of a variety of interrelated factors that include greenhouse gas emissions, global temperature rises, and the rate of melting ice. The National Oceanic and Atmospheric Administration (NOAA) has summarized the debate by publishing a hundred-year forecast incorporating the latest science. They forecast a twelve-inch global sea level rise by 2100 at the “low” level, and an approximately six-foot rise at the “high” level.

EXHIBIT 1: POSSIBLE FUTURE SEA LEVELS FOR DIFFERENT GREENHOUSE GAS PATHWAYS

Source: NOAA and Climate.gov



Note: Observed sea level from tide gauges (dark blue) and satellites (dark green) from 1800–2015, with future sea level through 2100 under six possible future scenarios (colored lines). The scenarios differ based on potential future rates of greenhouse gas emissions and differences in the plausible rates of glacier and ice sheet loss.

ASSESSING THE RISKS

From a real estate investor’s point of view, assessing the risk of such potentially dramatic changes can be a challenge, but steps can be taken to begin to quantify exposure and to mitigate risks. The risks to real estate assets range from periodic flooding to chronic inundation, which not only damage property but limit tenants’ ability to conduct business.

Eight of the world’s ten largest cities are in or near coastal areas—suggesting that the economic activity potentially at risk cannot be understated. In the US, almost 40% of the population is clustered in high-density coastal areas, which are prone to flooding, shoreline erosion, and hazards from storms.

Indeed, a recent NASA study indicates a rise of two feet above today’s sea level would put more than US\$1 trillion of property and structures in the US at risk of inundation, with roughly half of that exposure concentrated in Florida.³

Other coastal states with large areas of low-lying land, including California, Louisiana, North Carolina, and South Carolina, also look particularly vulnerable to rising seas and coastal storm surges.

TIME FOR ACTION

Negative impacts to communities in these regions are almost certainly on the horizon, but there is hope. With some foresight and planning, it should be possible to reduce future losses through strategies that include mitigation and diversification.

While one might expect the impact from sea level rise to be gradual, experience suggests otherwise. More likely, the effects of sea level rise will be subject to “tipping points” triggered by such events as major storm surges from hurricanes, and the inundation of (or damage to) key infrastructure, such as ports, highways, bridges, and treatment plants.

Some jurisdictions are better suited than others to respond to inundation. In Manhattan, for example, the protected nature of the island, the intense urbanization, and the value of the real estate make the consideration of sea walls and mitigation efforts reasonable.⁴ For cities like Miami, however, there is no similarly reasonable solution. And in smaller communities, the available solutions may not prove cost effective even when feasible. Additionally, much uncertainty exists around who would pay for such solutions, and it would likely take years of political negotiations to structure tax plans and insurance policies to effectively protect at-risk properties. Managed retreat is an equally complex political problem, where consensus is nearly impossible.

With some foresight and planning, it should be possible to reduce future losses through strategies that include mitigation and diversification.

MAKING A PLAN

With the dollar value of the potential risk so high, analyses of sea level risks are likely to strongly influence investment strategies with exposure to coastal areas in the coming decades. Tactically, there are actions that can be taken today to begin to quantify and mitigate such risks, including:

- **ADVANCED MODELING:** Through the use of increasingly sophisticated technology, property owners and investors can gain a better understanding of which buildings and market areas are most vulnerable.
- **MONITORING ACCUMULATION:** By leveraging the output of the models, property owners can focus on where to monitor accumulation most closely.
- **PRE-ACQUISITION SEA-LEVEL RISE PROTOCOLS:** Bolstering and strictly adhering to multi-step, pre-acquisition, sea-level risk analyses for properties in vulnerable areas should better inform pricing and acquisition decisions.
- **BUILDING ABOVE CODE REQUIREMENTS:** It is far cheaper to build to higher standards than to mitigate flood risk.
- **PRUDENT ASSET MANAGEMENT:** Judicious capital investment, suitable insurance programs, and informed emergency response plans to protect existing portfolio assets are crucial to helping tenants continue business without interruption through flooding events.
- **PUSHING FOR SOLUTIONS:** This can include everything from analyzing the cost and feasibility of solutions, such as seawalls, to advocating for revised zoning regulations.
- **REDUCING EXPOSURE IN HIGH-RISK MARKETS:** Properties in areas where tourism and recreation become less attractive—and other business activities become more cumbersome and expensive due to increased flooding risks—will likely represent less attractive investments over time, and therefore, will be strong candidates for divestment.

PUTTING THE PLAN INTO ACTION

To help understand how such analyses and mitigation plans are structured, it is worth a closer look at the process that is undertaken. As part of this closer look, the Barings Real Estate team has conducted sea level risk analyses and mitigation plans for multi-billion dollar real estate portfolios with broad exposure to coastal regions across hundreds of individual debt and equity investments.

The first step in assessing such risks is a three-part analysis conducted at the portfolio level:

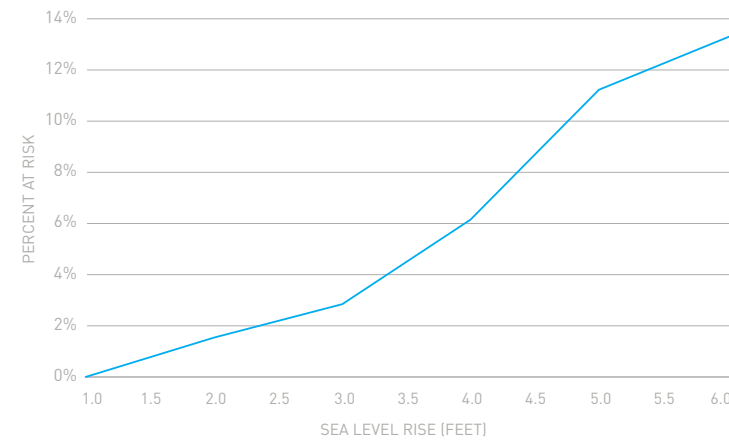
- **LEVEL 1:** A site-level estimate of depth of flooding based on NOAA’s global sea level rise scenarios
- **LEVEL 2:** An analysis of the probabilistic exposure to sea level rise over time including low, moderate, and high estimates of sea level rise scenarios for 2030, 2040, 2050, 2060, and 2070
- **LEVEL 3:** A community-level risk assessment and accumulation estimate based on the tracking of at-risk markets for events and changes that may impact the entire market as opposed to a single asset

As a result of this analysis, it is possible to quantify the number of properties within the portfolio that are exposed to inundation risk based on the NOAA’s low-, medium-, and high-level scenarios. Of course, the dollar portfolio value that is actually exposed to such risk varies dramatically as scenarios change.

In the hypothetical example in *Exhibit 2*, for instance, a one-foot rise from current sea levels resulted in minimal property value exposure, but that exposure rose to approximately 13% of the portfolio under the six-foot rise scenario.

EXHIBIT 2: PERCENTAGE OF HYPOTHETICAL PORTFOLIO VALUE AT RISK

Source: Barings. Illustrative example only.

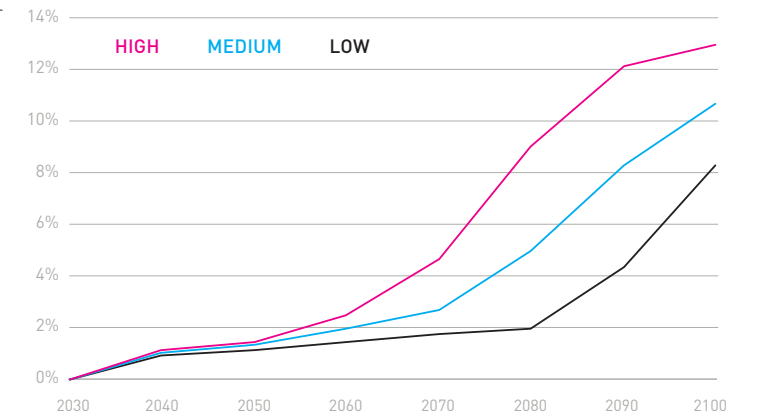


Rise from current sea levels resulted in minimal property value exposure, but that exposure rose to approximately 13% of the portfolio under the six-foot rise scenario.

Looking at it another way, and taking into account NOAA’s various scenarios over multiple decades, the next step is to hone in on approximately when the risks begin to increase for the portfolio, as shown in *Exhibit 3*.

EXHIBIT 3: ASSESSING THE PERCENTAGE OF PORTFOLIO VALUE EXPOSED TO SEA LEVEL RISE OVER TIME

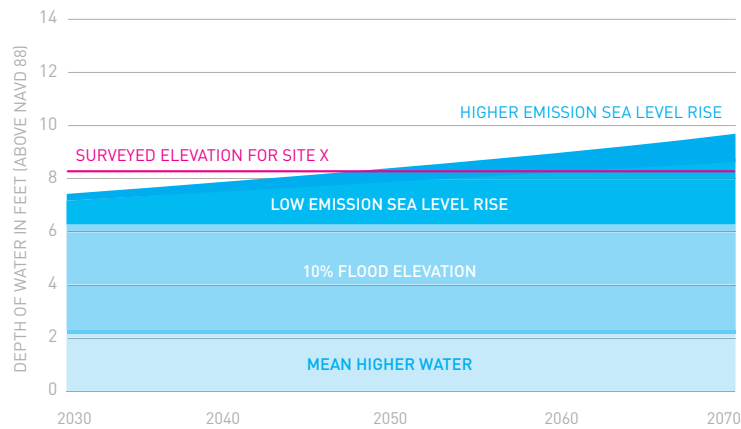
Source: Barings. Illustrative example only.



Finally, a property-level assessment is conducted for any asset considered “at risk” to provide more detail around which scenarios pose the greatest risks. This analysis takes into account not only the impact of global sea level rises, but also nuisance flooding, which is typically not deadly or dangerous, but can still have material impacts on a property values; for example, if a nearby bridge or road being inundated makes the property inaccessible. A sample visual of this analysis is shown in *Exhibit 4* (next page).

EXHIBIT 4: PROPERTY-LEVEL ANALYSIS OF FLOODING RISK

Source: Barings. Illustrative example only.



Note: The North American Vertical Datum of 1988 (NAVD 88) is the official vertical datum of the United States. It is a geodetic datum, or reference surface of zero elevation to which heights are referred to over a large geographic extent.

In addition to quantifying and creating a more holistic understanding of the climate-related risks to the portfolio, this analysis also helps to inform an asset and portfolio management action plan that can be implemented immediately to begin to mitigate risks. Such actions include:

- Deployment strategies for temporary flood barriers (e.g., “Aqua Fence”)
- Relocating electrical equipment to higher elevations
- Building above code requirements
- Working with professional organizations and political institutions to effect change
- Reducing financial exposure to high-risk real estate markets

These actions not only have short-term benefits for specific properties, but they also can result in other positive downstream impacts, such as enhancing competitive positioning of properties among their peer set, diversifying portfolios, reducing insurance premiums, and most importantly, driving long-term value for investors. Importantly, although a given building may not be at immediate risk, the economic health of the entire community may be at risk, and thus, the commercial value of buildings is very likely to be impacted.

EXPANDING THE MODEL

The type of analysis shown here will only get more sophisticated, and by necessity, more common. As real estate investment managers field increasingly detailed questions and grapple with increasingly stringent ESG-related requirements from their clients, being able to quantify and measure exposure to risks like sea level rise will be critical. While the scope of this article has been on this one risk, the same can be said for other critical areas like measuring and tracking the energy efficiency and carbon intensity of properties as well as creating pathways for these real estate assets to reach net zero carbon by 2050.

Ultimately, the ability for managers to meet these increasingly sophisticated investment requirements will come down to the quality of their systems. The time to invest heavily in technologies and systems—to measure, store, and analyze environmental metrics that can help to assess, and ultimately mitigate such risks—is now.

ABOUT THE AUTHOR

Jerry Speltz is Head of US Real Estate Engineering for Barings Real Estate. Barings is a \$382+ billion global investment manager sourcing differentiated opportunities and building long-term portfolios across public and private fixed income, real estate, and specialist equity markets.

NOTES

* Barings Real Estate intentionally employs in-house engineers and insurance professionals, and further partners with specialty third-party consultants, to ensure appropriate attention to climate risk analysis.

¹ Intergovernmental Panel on Climate Change, “Climate Change 2021,” August 2021, https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM.pdf.

² Rebecca Lindsey, “Climate Change: Global Sea Level,” ClimateWatch Magazine, August 2020, <https://www.climate.gov/news-features/understanding-climate/climate-change-global-sea-level>.

³ Union of Concerned Scientists, “Underwater: Rising Seas, Chronic Floods, and the Implications for US Coastal Real Estate,” June 2018, <https://www.ucsusa.org/sites/default/files/attach/2018/06/underwater-analysis-full-report.pdf>

⁴ Anne Barnard, “The \$119 Billion Sea Wall that Could Defend New York...or Not,” New York Times, January 17, 2020, <https://www.nytimes.com/2020/01/17/nyregion/sea-wall-nyc.html>.

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