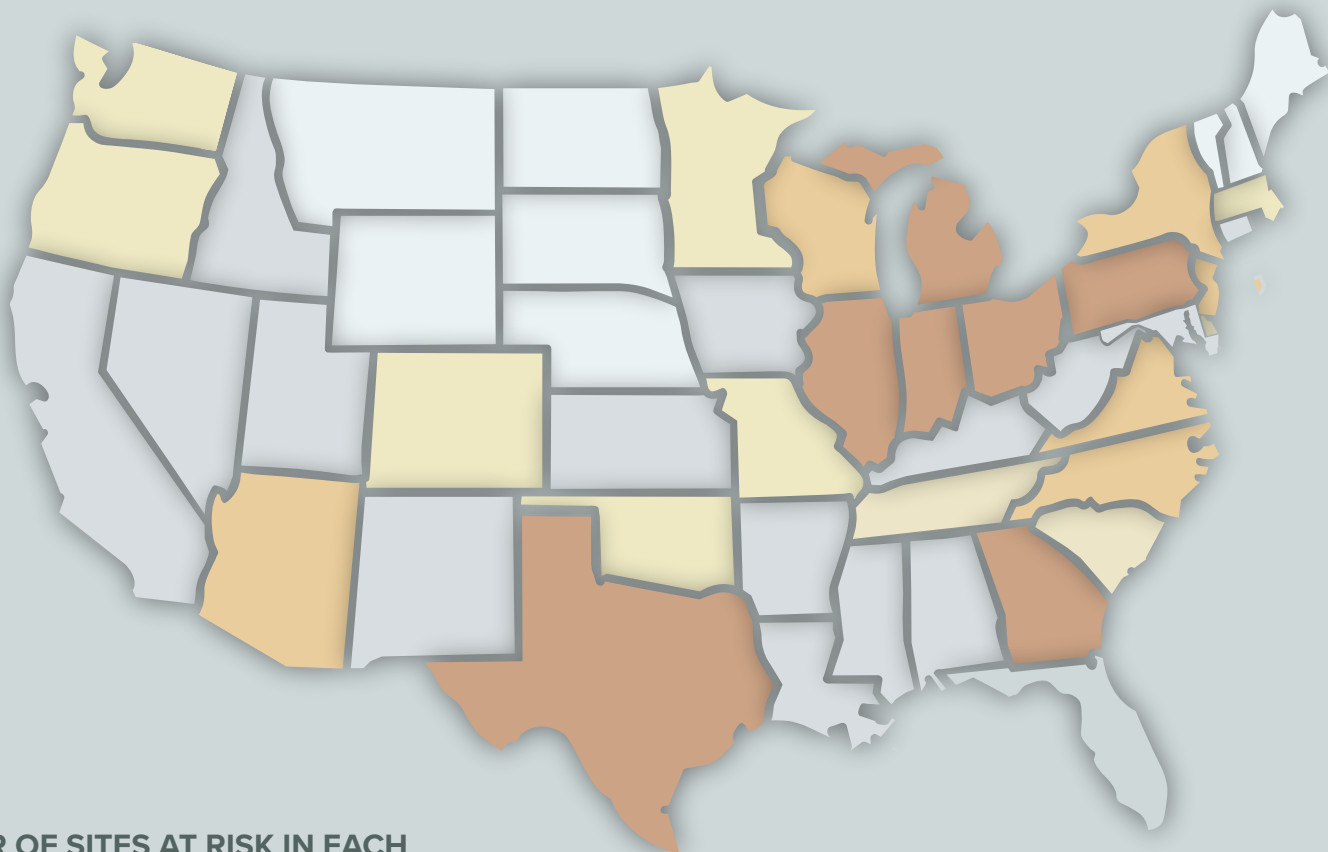# MULTI-SITE CLIMATE RISK STUDY

Risk factors for multiple distribution and supply centers

NUMBER OF SITES AT RISK IN EACH STATE FROM CLIMATE FACTORS

	10+ sites	7 States
	7-9 sites	7 States
	4-6 sites	8 States
	1-3 sites	15 States

NUMBER OF LOCATIONS BY RISK RANK

Risk Rank	Number of Locations	Percentage of Locations
Score 15	45	17%
Score 14	66	25%
Score 13	60	23%
Score 12	35	13%
Score 11	28	11%
Score 10	12	5%
Score 9	10	4%
Score 8	5	2%
Score 7	0	-
Score 6	0	-

NUMBER OF LOCATIONS BY RISK FACTOR

Risk Factor	Number of Locations	Percentage of Locations
Temperature	50	19%
Flooding	26	10%
Drought	45	17%
Transportation	45	17%
Extreme Heat	38	15%
Allergens	10	4%
Sea Level Rise	5	2%
Precipitation	42	16%

About Resilient Analytics

Resilient Analytics answers climate impact questions with the Infrastructure Planning Support System (IPSS). IPSS is a unique, first-of-its-kind system that performs engineering analysis within a broader resiliency perspective. IPSS models infrastructure vulnerability to future climate conditions, considers specific adaptation scenarios, and provides a cost benefit based risk analysis. IPSS draws its data from a range of climate science projections, engineering and materials studies, and environmental research to provide users with decision support that is based in real-world risk scenarios.

Resilient Analytics Project Summaries

Climate change affects geographic locations in different ways. In some places it results in higher temperatures while in others it results in significant precipitation events. This variability translates to different risks being associated with different geographic regions. Unfortunately for an asset portfolio manager, either within an organization or managing for other organizations, this translates to potentially different risks for each asset. Understanding this variation both in terms of severity and in terms of financial planning is critical to ensure business continuity.

Resilient Analytics, Inc has demonstrated this risk variation for clients in multiple sectors including manufacturing, agriculture, services, utilities, and hospitality. In each of these studies, the focus was on both direct impacts such as flood impacts as well as indirect impacts such as extreme heat reducing worker productivity. As the findings demonstrated, climate change impacts do not stop at direct risks. Rather, climate change impacts both the physical assets as well as the human assets required to maintain operations. Understanding the potential impact on both of these assets is essential to understanding the total climate change risk.

In the case study illustrated here, Resilient Analytics, Inc evaluated multiple risk factors for an organization's primary and supplier locations. With over 250 locations spread geographically across the United States, the organization was vulnerable to multiple climate change impacts. For this study, Resilient Analytics, Inc focused on a set of six potential impacts; energy demand from increased cooling, building impact from extreme precipitation, worker health impact from extreme heat, water supply interruption from drought, site access impact from transportation interruptions, and worker health impacts from increased disease vectors.

The study found that over 50% of the locations studied will have increased risk within the next decade. Additionally, by 2050, over 80% of locations will incur significant increases in climate vulnerability. Within these overall risk increases, the greatest impacts will be experienced in upper Midwest and western locations. In terms of the areas of impact, the greatest threat to the organization will be in increased energy demand and heat stress impacts on workers. These are followed closely by possible business interruption due to transportation impacts.

The result of this study was a significant shift in operational focus for the organization to ensure that facilities at the greatest risk received additional maintenance funding as well as additional operational analysis for redundancy planning and interruption planning. Ultimately, this change is intended to reduce the impact of the projected changes and to retain the value leveraged from both physical and human assets.