

# Climate Resilience Evaluation: Kent Ohio

## Present Status



### Disaster Resilience



Disaster Resilience: Based on the FEMA Resilience Analysis and Planning Tool, Portage County has around average resilience to natural disasters compared to other US counties.



### Housing



Housing: The vacancy rental rate for Portage County (3.5%) is roughly half of the US average and properties are selling above their listed prices. Both indicators suggest pressure on the housing market in Kent.



### Food Insecurity



Food Insecurity: Food insecurity estimates for 2019 project that 13.5% of individuals living in Portage County are experiencing food insecurity. The 13.5% estimate was slightly lower than the average estimate per county, but also suggested increasing food insecurity in Portage County compared to previous years.



### Water Quality/Quantity



Water: Above average precipitation, a shallow unconfined aquifer system, and high municipal water treatment capacity suggest that Kent has the capacity to exceed water needs. Ohio EPA identified potential sources of water contamination for drinking water sources presenting a high risk to water quality.



## Climate Change Predictions, Impacts, and Kent Adaptation Potential



### Temperatures

Kent's average summertime temperatures are projected to increase by 4.5 °C by 2080, with its climate being like the current climate of Louisiana by 2100.



### Heat Waves and Heat Stress

Extreme heating events, like heat waves, are projected to increase in both frequency and intensity for Kent. These events are expected to increase the occurrences of heat-related illnesses and deaths, stress electrical infrastructure, and place vulnerable populations, like individuals living in retirement homes or unhoused individuals, in increasingly dangerous situations.



### Migration and Climate Gentrification

The Northern Midwest and Great Lakes regions are expecting to see increased populations from climate-driven migration. By 2100, the US is projected to have tens of millions of individuals displaced by climate change, leading to migration and gentrification crises.



### Precipitation

Kent's average summertime precipitation is projected to increase by 3.6% by 2080, with heavier precipitation in the early spring and more droughts in the summer. Intense precipitation events are projected to increase.



### Food Availability and Price

Climate Change is projected to profoundly impact agricultural production. By 2050, agricultural production in the Midwest is expected to decline by 5-25%, with other US agricultural regions expecting similar, if not more intense declines. Globally, agricultural demand is expected to exceed production leading to food shortages and increased prices.



### Adaptation: Urban Agricultural Potential

Based on parcel data and Kent residential zoning codes, Kent has a minimum of 1,100 acres of urban green spaces that could be converted to agricultural production, providing roughly 4% of the food needs for the community.



### Adaptation: Emergency Shelter Potential

Kent has a minimum of 15 active congregations with church buildings. Together, the church buildings have a maximum of 21,000 ft<sup>2</sup> that could possibly shelter up to 5,250 individuals in long-term emergency shelter situations.

## Sources

Disaster Resilience: Disaster resilience score was taken from the Resilience Analysis and Planning Tool (RAPT) for Portage County. RAPT was created in 2019 by Argonne National Lab and the Federal Emergency Management Agency (FEMA). More information for RAPT can be found at (<https://www.fema.gov/emergency-managers/practitioners/resilience-analysis-and-planning-tool>). Accessed 7/12/2021.

Housing: Housing was evaluated for both occupancy and demand. Occupancy information was provided by the US Census Bureau through RAPT. Housing demand was obtained through realtor.com (accessed 7/12/2021).

Food Insecurity: Food insecurity data and estimates were provided by Feeding America ([www.feedingamerica.org](http://www.feedingamerica.org)).

Water Quality/Quantity: Water quantity and quality data were compiled from numerous sources. Pumping capacity was provided by the city of Kent (<https://www.kentohio.org/182/Water-Treatment>; accessed 7/12/2021). Water quality and aquifer data were provided by the city of Kent (<https://oh-kent.civicplus.com/ArchiveCenter/ViewFile/Item/177>; accessed 7/12/2021). Drinking Water Source Assessment, including contamination potential, was provided by the Ohio Environmental Protection Agency (OEPA) (<http://wwwapp.epa.ohio.gov/gis/swpa/OH6701812.pdf>; accessed 7/12/2021). Precipitation data were provided by the National Oceanic and Atmospheric Administration (NOAA) (<https://www.ncei.noaa.gov/access/us-climate-normals/>; accessed 7/12/2021).

Temperatures and Precipitation: The temperature and precipitation projections for 2080 is an average of multiple potential climate models under a high-emissions scenario (RCP 8.5) and was provided by the University of Maryland Center for Environmental Science (<https://fitzlab.shinyapps.io/cityapp/>; accessed 7/12/2021). The analogy of Ohio's climate being similar to the current climate of Louisiana by 2100 was from NOAA State Summary for Ohio (<https://statesummaries.ncics.org/chapter/oh/>; accessed 7/12/2021).

Heat Waves and Heat Stress: Data for projected heat waves and heat stress was provided by NOAA in State Summary for Ohio (<https://statesummaries.ncics.org/chapter/oh/>) and the 4<sup>th</sup> National Climate Assessment (<https://statesummaries.ncics.org/chapter/oh/>; accessed 7/12/2021)

Food Availability and Price: Food availability and price information was provided by the 4<sup>th</sup> National Climate Assessment (<https://nca2018.globalchange.gov/>; accessed 7/12/2021) and the report "Food Security, Farming, and Climate Change to 2050" (<https://www.ifpri.org/publication/food-security-farming-and-climate-change-2050>; accessed 7/12/2021).

Migration and Climate Gentrification: Climate migration estimates were expanded from multiple sources but assumed general patterns as described in the publication *Modeling migration patterns in the USA under sea level rise* by Caleb Robinson, Bistra Dilkina, and Juan Moreno-Cruz (<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0227436>; accessed 7/12/2021).

Urban Agricultural Potential: Urban agricultural potential was calculated from the City of Kent's zoning laws (<https://www.kentohio.org/643/Zoning-Map>; accessed 7/12/2021) and the Portage County GIS parcel data (<https://www.portagecounty-oh.gov/geographic-information-systems/pages/data-downloads>; accessed 6/25/2021). Based on zoning codes, it was estimated that each residence had a minimum of 0.2 acres of greenspace that could be converted to agricultural production to augment projected food shortages.

Emergency Shelter Potential: Faith communities were identified using the All Places of Worship GIS dataset provided by Homeland Infrastructure Foundation-Level Data (<https://hifld-geoplatform.opendata.arcgis.com/>; Department of Homeland Security; accessed 7/7/2021) and Google maps ([www.google.com/maps](http://www.google.com/maps)). Square footage estimates were formed from aerial photographs and Google Earth, assuming each worship building was single-story. The total numbers of people that could be sheltered was derived from FEMA design guidelines that each individual in a long-term sheltering situation needs 40 ft<sup>2</sup> (<https://www.fema.gov/pdf/plan/prevent/rms/453/fema453.pdf>).

For more information on calculations or information, please contact [info@brugmansiaministries.org](mailto:info@brugmansiaministries.org).

