

How are Michigan Communities Preparing for their Climate Future? Outcomes of a Document Analysis of Municipal and County Plans for Climate Change, Risks, and Priorities

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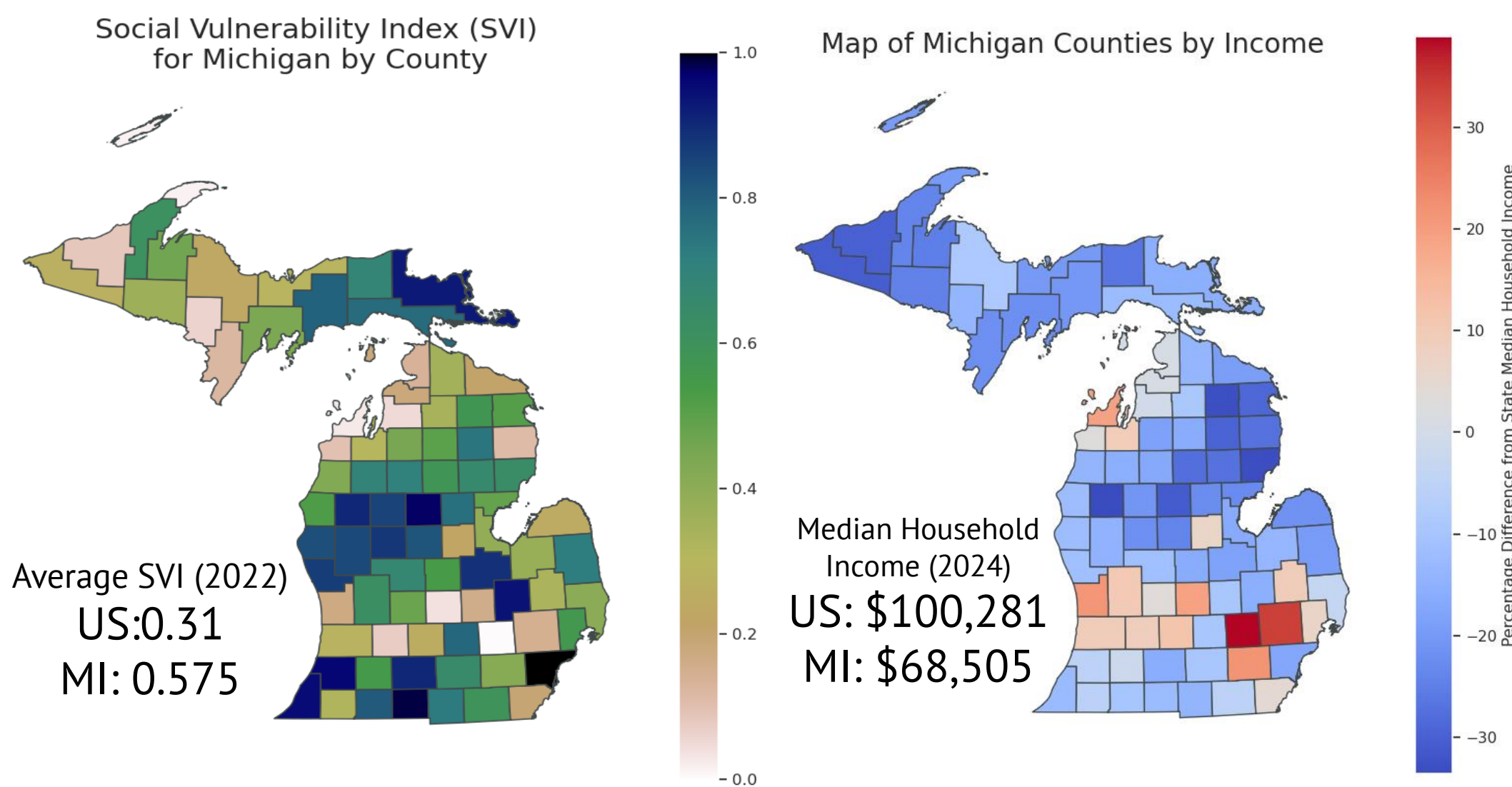
Abstract

As the effects of climate change become more prevalent in our day-to-day lives, so too does the reality that not everyone is prepared for its impacts. While regional climate impact assessments for the upper Midwestern U.S. highlight the risks and vulnerabilities that communities may face including but not limited to more annual precipitation, more frequent heavy precipitation events, and an increase in average temperature, the information is not always incorporated into community planning documents. This represents a potentially critical gap between vulnerability and awareness; these documents (such as Master Plans, Self-Assessments, and Zoning Codes) guide how communities plan for infrastructure and investments on a multi-year time frame, and in Michigan, there has not been a published systematic analysis of how communities are recognizing and addressing their vulnerabilities across the state. This study explores relationships between community demographics and their recognition of and plans for climate change, as reflected in their planning documents. Preliminary results indicate that poorer and more rural communities are potentially less prepared to address their climate change vulnerability; as median household income and population density decreased, it was far more frequent that a community's planning documents were a decade or more out of date (drafted, revised, or approved prior to 2014) or did not contain language that recognized the role of climate change in altering future risk. These results highlight disparities that are likely not only experienced in Michigan, but in all 50 states, showing the need for a call to action across state and local governments to ensure that all communities, especially the most vulnerable, are prepared to continue to adapt and plan for climate change resilience.

Background

Michigan communities face **elevated threat** from extreme weather in the next 75 years relative to the previous 75-year period because of climate change. Michigan is **more vulnerable than U.S. average**:

Threat + Vulnerability = Risk of Harm

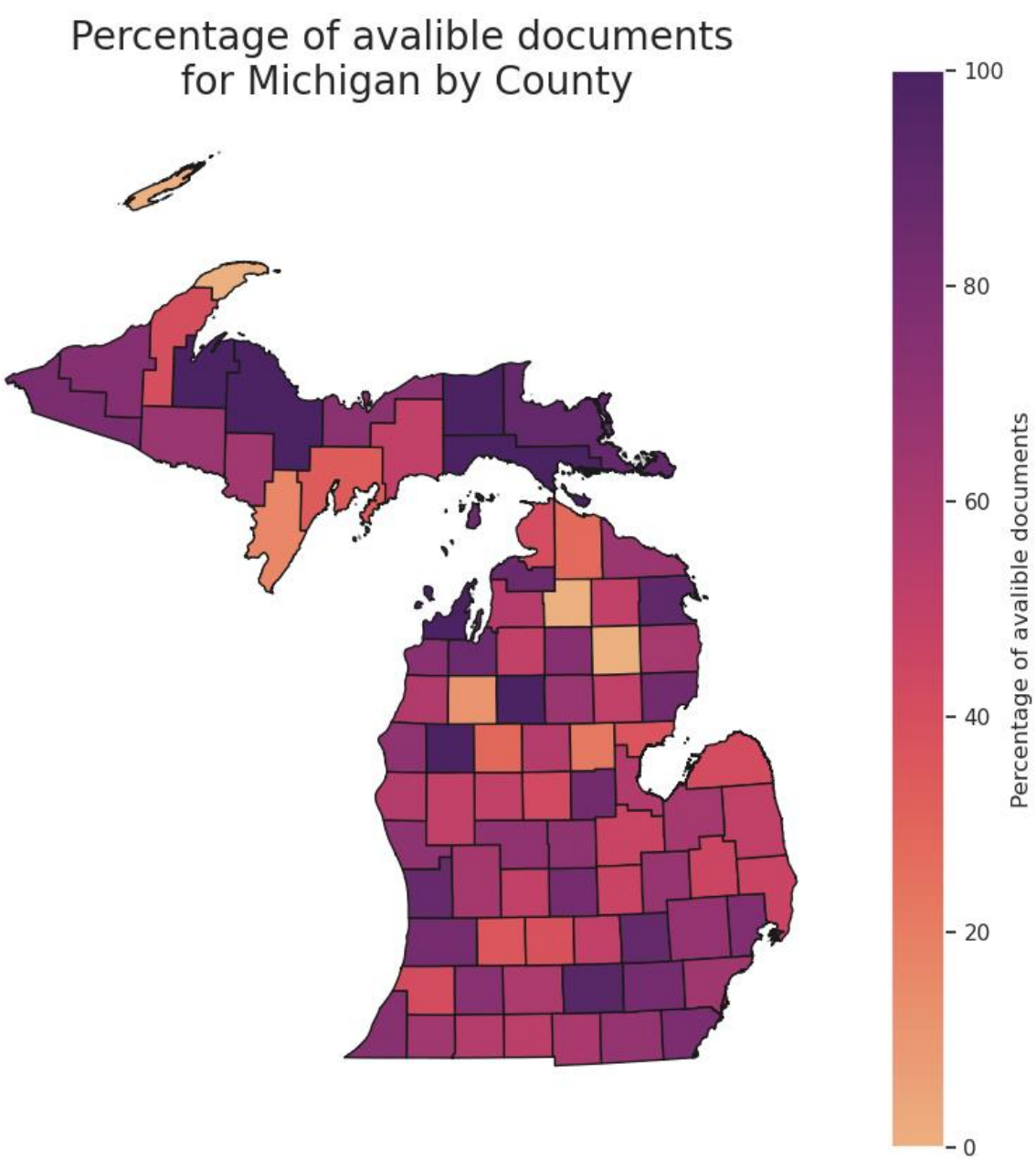


Multi-level governance presents opportunities and identifies weaknesses in the efforts to help prepare MI communities for their climate future. Qualitative Document Analysis (QDA) provides insight into community awareness, priorities, and preparation for climate resilience.

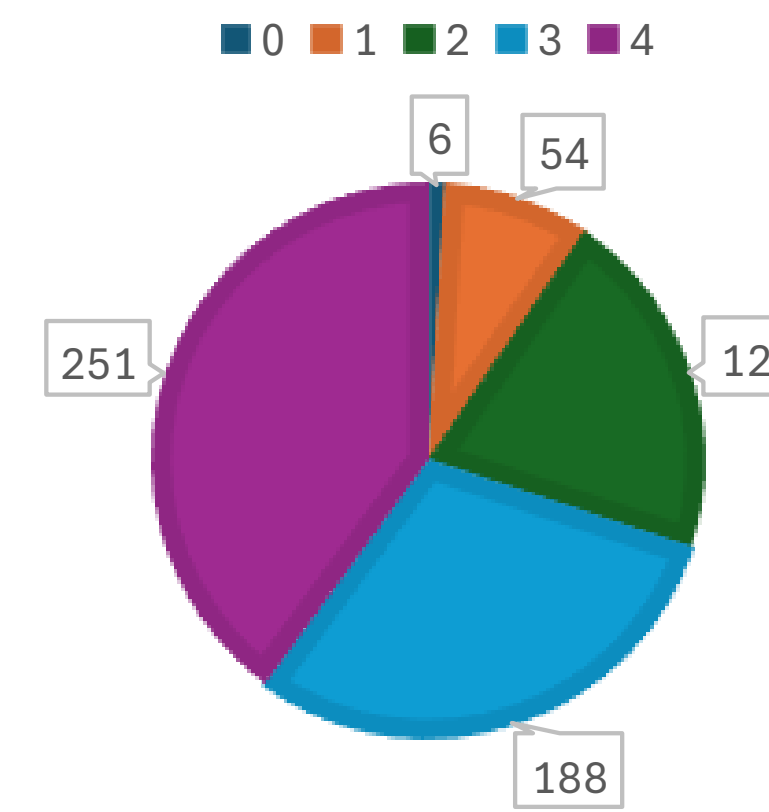
Results

We assessed **628 documents** that met criteria for inclusion (n = 770 qualifying entities in MI).

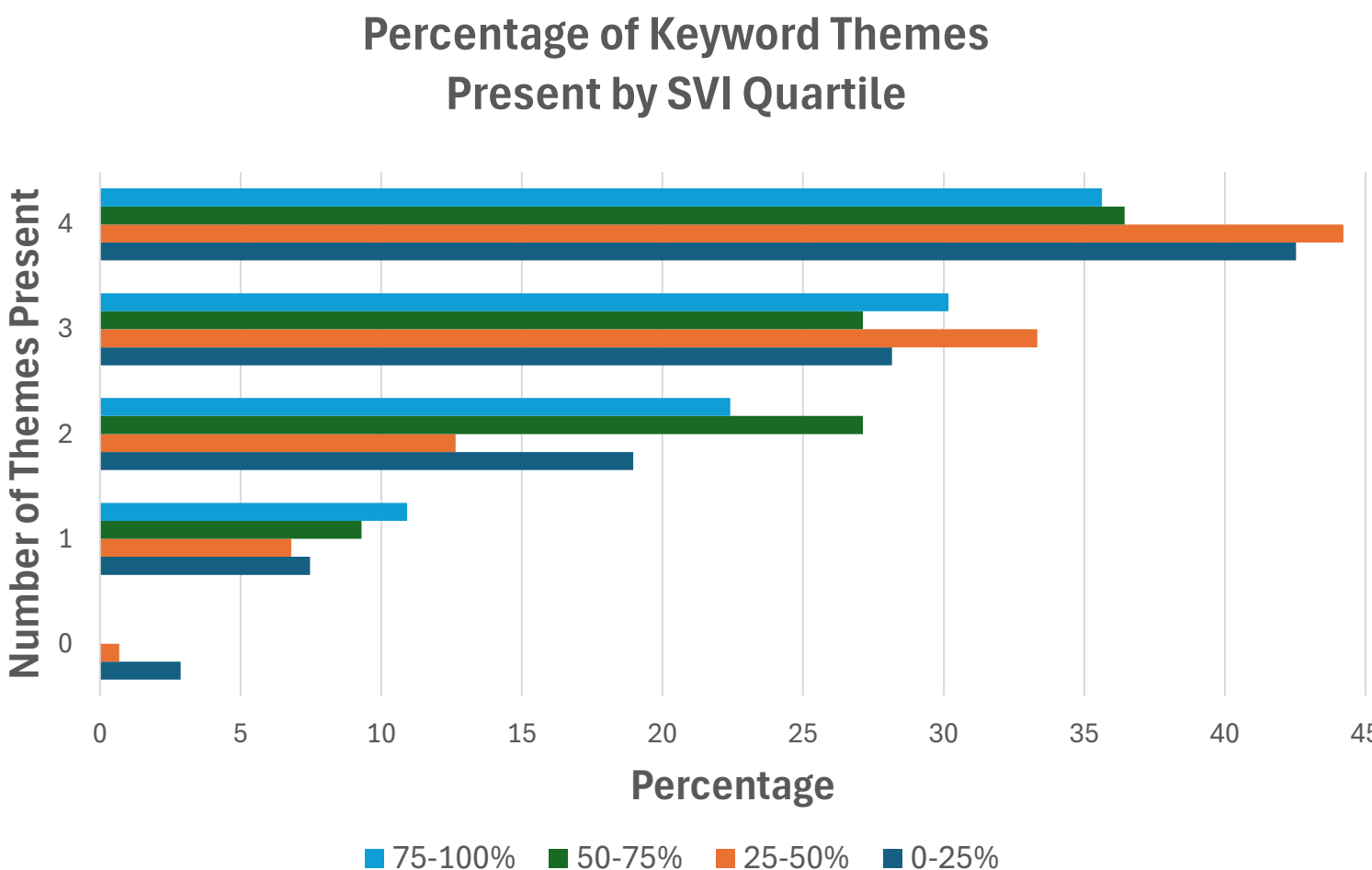
- ~81% representation
- Many disqualified documents were drafted prior to 2015 and not updated.
- Rural areas and counties with high SVI had higher occurrence of outdated or missing/unavailable documents.



Count of Documents Containing 0, 1, 2, 3 and 4 Keyword Themes



In every quartile at least **35% or more of documents contained all 4 themes.**



Next Steps

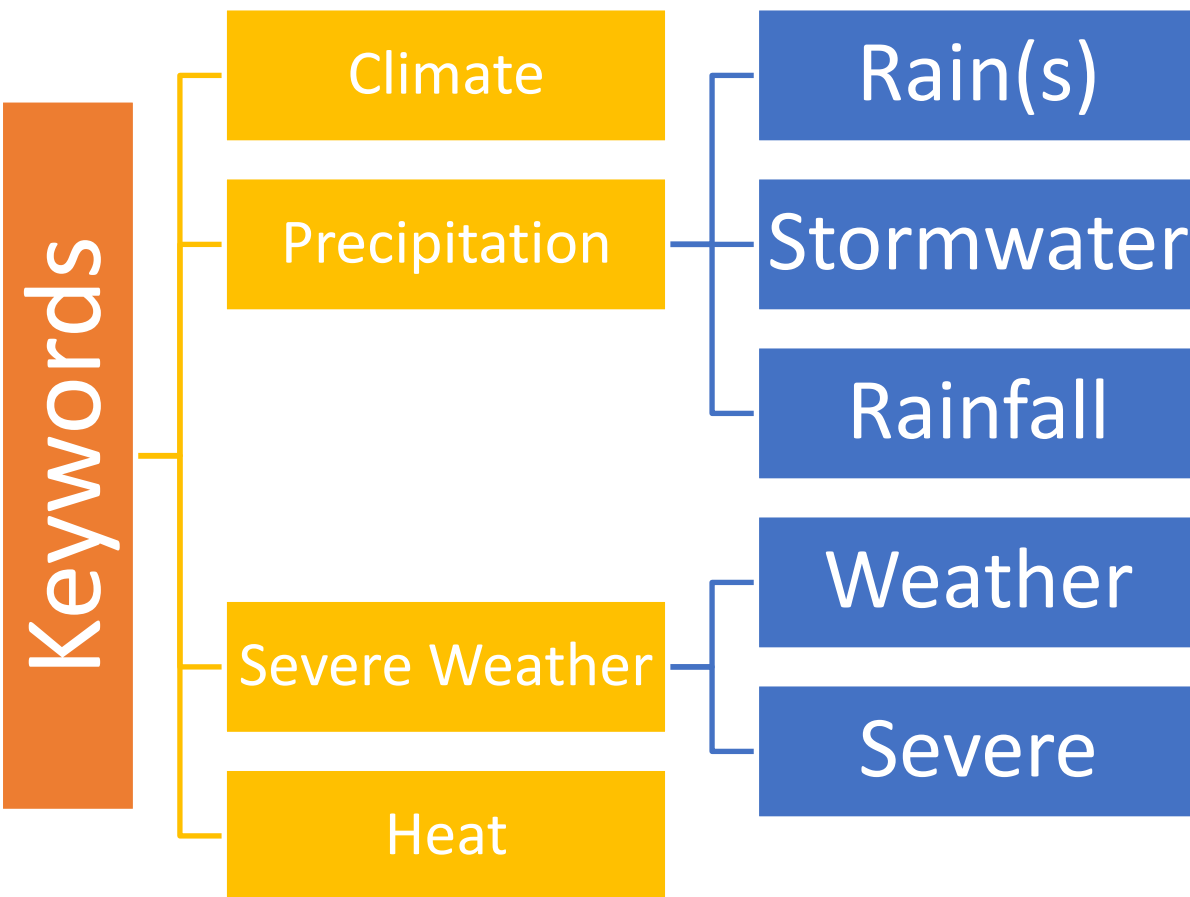
- Granular analysis: census tract, at-risk-populations, correlations between vulnerability, threat, and awareness
- Thematic analysis of document sections to investigate the "why" behind differing priorities and preparedness.
- Surveys and interviews to understand community perspectives and identify opportunities for engagement in future resilience planning.

Methods

We used the CDC/ATSDR Social Vulnerability Index (SVI) as a proxy to indicate potential county-level vulnerability to climate change hazards. We selected and searched planning and regulatory documents for keywords related to climate change themes as an initial approach to identify community awareness and priorities. We then compared SVI to keyword presence to evaluate gaps in awareness versus vulnerability.

Document Criteria:

- Must be **publicly available** and drafted by a governmental entity with zoning, regulatory, or provisioning authority (federally recognized tribes, charter townships, municipalities, villages, counties) in Michigan.
- May be regulatory and planning documents in draft or final version (Master Plans, Climate Resilience Plans, Community Sustainability Self-Assessments, Zoning Codes, Climate Change Vulnerability Assessments).
- Excluded documents drafted prior to **and** not updated during or after 2015.



References

U.S. Census Bureau, 2023: QuickFacts: United States. Retrieved from <https://www.census.gov/quickfacts/fact/table/US>

Agency for Toxic Substances and Disease Registry (ATSDR), 2024: CDC/ATSDR Social Vulnerability Index (SVI) Interactive Map. U.S. Department of Health and Human Services. Accessed 19 Dec. 2024, <https://www.atsdr.cdc.gov/place-health/php/svi/svi-interactive-map.html>.

Acknowledgments

Funding for this work was supported by a US Department of Energy Office of Science Research Development and Partnership Pilot (RDPP) award to PI Robertson (**DE-SC0023215**), Central Michigan's Office of Research and Graduate Studies, and Central Michigan University Department of Earth and Atmospheric Sciences Meteorology Travel Fund. Poster template from PosterPresentations.com. Thank you to everyone who helped and supported me on this project.