

Evansville MPO Region: Climate Stressors, Risks, and Adaptations

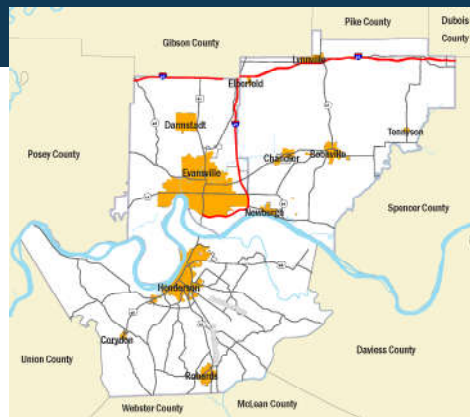
Evansville MPO
Nicole Chandler

Evansville MPO



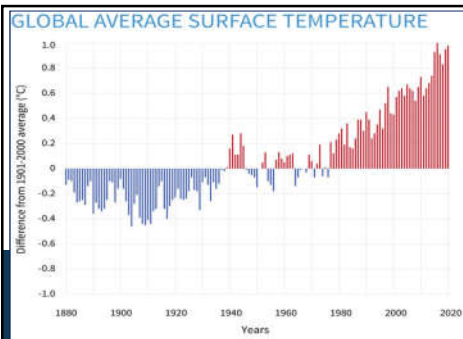
Henderson • Vanderburgh • Warrick

Agenda

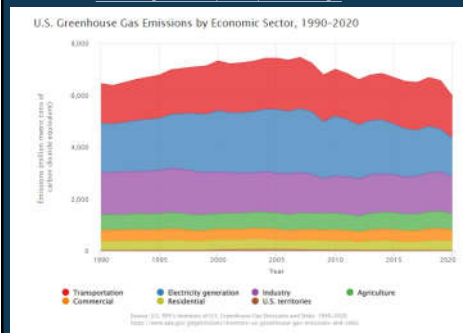


1. Current U.S. Climate Change Predictions and Trends
2. EMPO Regional Climate Stressors
3. EMPO Regional Climate Risks to Transportation
4. Regional Adaptive Strategies/Risk Reduction for Transportation
5. Citations





Climate Change: Global Temperature | NOAA Climate.gov

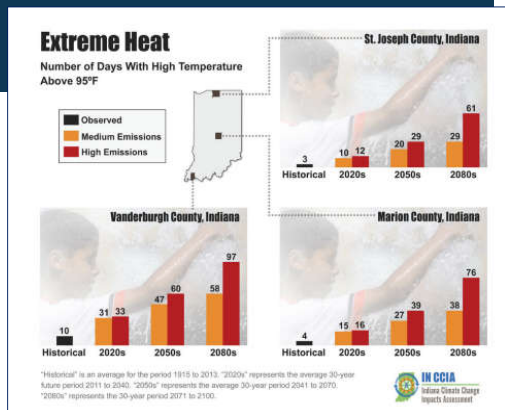


Current U.S. Climate Change Predictions and Trends

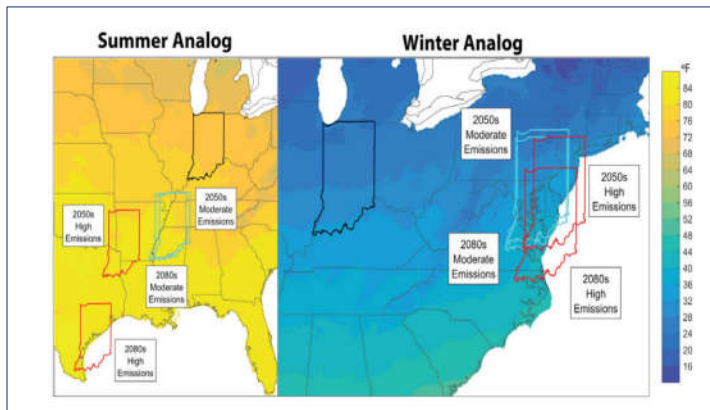
- The 10 warmest years on record have occurred since 2005 ⁽¹⁾
- Greenhouse gases (GHG) trapped 49% more heat in the atmosphere in 2021 than they did in 1990 ⁽²⁾
- Impacts will continue into next century
- What does this mean for the U.S. ⁽³⁾:
 - Changes in average temperatures and seasons
 - Changes in precipitation regimes
 - More frequent and intense extreme weather events (floods, droughts, tornados, etc.)
 - Estimated cost of climate inaction \$2 trillion annually ⁽⁵⁾

EMPO Regional Climate Stressors

- Average temperatures have risen approximately 2°F since the 1960s
- Average temperatures are projected to rise by about 5-6°F by the mid-century
- 38-51 extremely hot days (temps >95°F) per year
- Extreme cold events (days with temp <0°F) and temperatures are declining



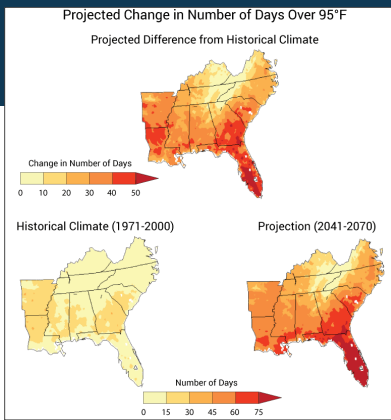
<https://ag.purdue.edu/indianacclimate/>



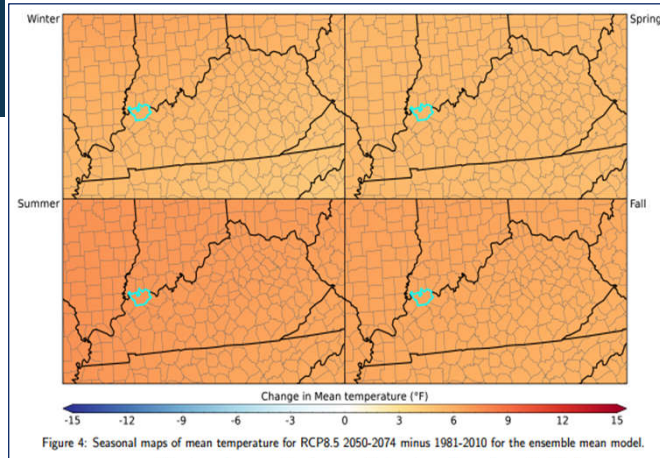
<https://ag.purdue.edu/indianacclimate/>

EMPO Regional Climate Stressors

- Summers are expected to get warmer and drier
- Heat waves are projected to increase by the mid-century
- Increased temperatures can lead to prolonged and more intense droughts



<https://nca2014.globalchange.gov/report/regions/southeast/intro-section-2>

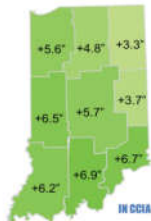


https://www2.usgs.gov/landresources/lcs/nccv/maca2/maca2_counties.html

EMPO Regional Climate Stressors

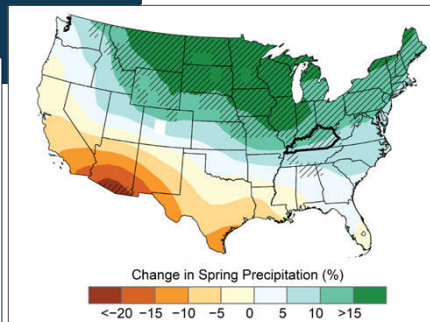
- Precipitation regimes will be altered with more frequent heavy downpours
 - More precipitation is anticipated in Winter and Spring
 - Less precipitation during summer months
- Average annual precipitation has increased since the 2000s
- Increase in the number of extreme precipitation events in Kentucky (events with > 2 inches of precipitation)

Annual Average Precipitation on the Rise

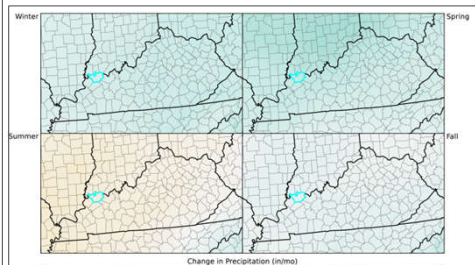


Above: Increase in annual precipitation for Indiana's nine climate divisions, based on a linear trend, from 1895 to 2016. Source: NOAA Climate at a Glance Database.

<https://ag.purdue.edu/indianaclimate/>



<https://statesummaries.ncics.org/chapter/ky/>



https://www2.usgs.gov/landresources/lcs/nccv/maca2/maca2_counties.html

EMPO Regional Climate Risks to Transportation

- Potential for rutting of roads, pathways, and sidewalks due to high temps
- Changes in timing and length of road construction/maintenance season
- Reduced lifespan of pavement
- Increased stressors on transportation vehicles, roads, and bridges
- Disruptions in supply chains
- Disruptions and failures of utility services and electrical grid
- Potential for washout of roads, flooding of sewer systems, delays or disruptions to public transit, erosion and/or soil loss due to increase in flash-flooding events



<https://www.courierpress.com/story/news/local/2021/03/02/evansville-flood-warning-issued-ohio-river-set-overflow-friday/6890290002/>



<https://www.mywabashvalley.com/news/local-news/storms-cause-damage-road-closures-throughout-knox-county/>

Regional Adaptive Strategies/Risk Reduction for Transportation

- Create and implement sustainability and resiliency policies
- Identify locations to install additional EV charging stations and utilize renewable resources
- Convert city and public transit vehicles to EVs
- Encourage use of public transit by making it more affordable, efficient, and attractive to users
- Encourage and promote use of high albedo materials for roads, sidewalks, parking lots, and pathways
- Increase the availability to bicycle and pedestrian facilities
- Encourage car pooling



Bogota, Columbia: 2022 Sustainable Transport Award Winner



SR 662 Road Diet in Warrick County

Regional Adaptive Strategies/Risk Reduction for Transportation

- Utilize future projections for rainfall in stormwater management design
- Implement sustainable and resiliency practices/programs into city planning, transportation and city services
- Utilize and promote green infrastructure design
 - Strategic urban forestry
 - Effective greenspaces
- Plant and maintain rain gardens in areas with impervious surfaces to reduce flooding
- Promote and encourage use of rain barrels and cisterns
 - Help mitigate stormwater



<https://www.reasite.com/projects/jacobsville-north-main-streetscape>



Walnut Street Rain Garden

Citations

1. NOAA climate data: <https://www.climate.gov/news-features/understanding-climate/climate-change-global-temperature#:~:text=According%20to%20NOAA's%202020%20Annual,more%20than%20twice%20that%20rate.>
2. NOAA research news: <https://research.noaa.gov/article/ArtMID/587/ArticleID/2877/Greenhouse-gas-pollution-trapped-49-more-heat-in-2021-than-in-1990-NOAA-finds>
3. NASA the effects of climate change: <https://climate.nasa.gov/effects/>
4. Widhalm, M., Hamlet, A. Byun, K., Robeson, S., Baldwin, M., Staten, P., Chiu, C., Coleman, J., Hall, B., Hoogewind, K., Huber, M., Kieu, C., Yoo, J., Dukes, J.S. 2018. Indiana's Past & Future Climate: A Report from the Indiana Climate Change Impacts Assessment. Purdue Climate Change Research Center, Purdue University, West Lafayette, Indiana. DOI:10.5703/1288284316634: <https://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=1000&context=climatetr>
5. NPR <https://www.npr.org/2022/04/07/1091258821/the-future-cost-of-climate-inaction-2-trillion-a-year-says-the-government>