

PCCRC

Purdue Climate Change Research Center

Indiana Climate Change Impacts Assessment (IN CCIA) Finding Useful Information for the Transportation Sector

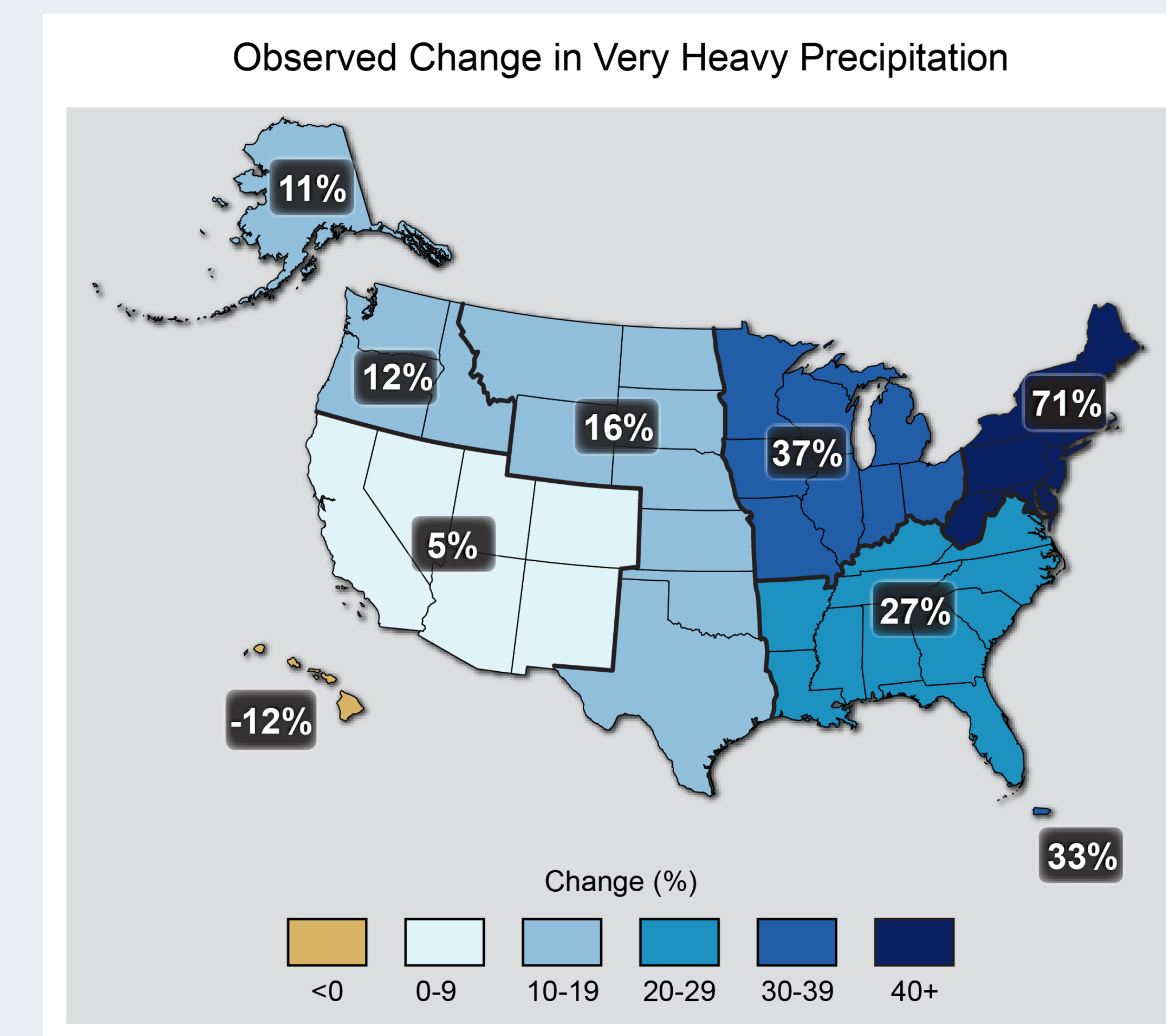
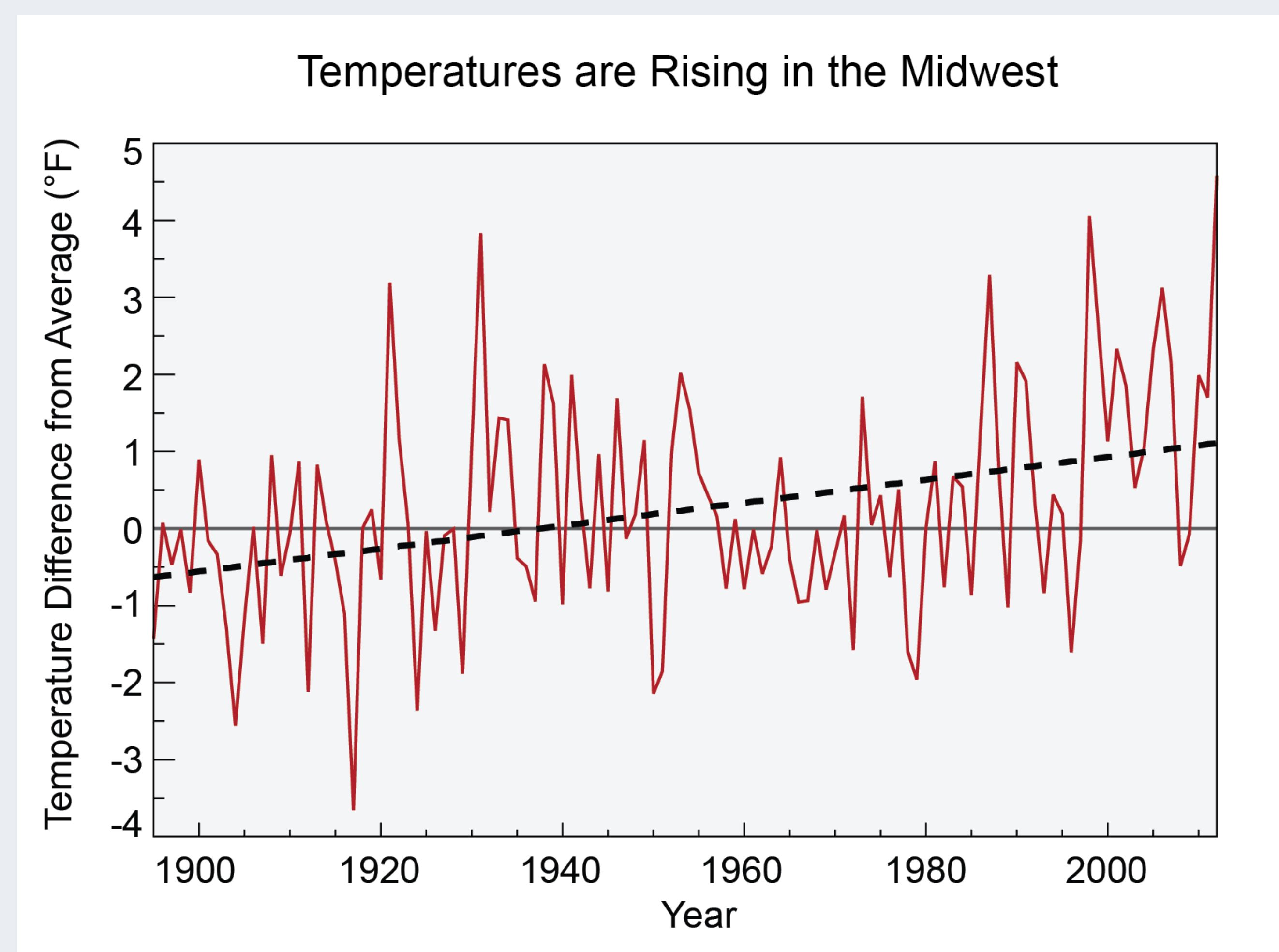
Regional Climate Observations

Key Messages:

- Temperatures are rising
- Precipitation amount & intensity are increasing

Left: Annual average temperatures (red line) across the Midwest show a trend towards increasing temperature. The trend (heavy black line) calculated over the period 1895-2012 is equal to an increase of 1.5°F. (Figure source: updated from Kunkel et al. 2013).

Right: The map shows percent increases in the amount of precipitation falling in very heavy events (defined as the heaviest 1% of all daily events) from 1958 to 2012 for each region of the continental United States. The changes shown in this figure are calculated from the beginning and end points of the trends for 1958 to 2012. (Figure source: updated from Karl et al. 2009)



ANTICIPATED CLIMATIC CHANGE	EXPECTED IMPACTS
Increase in average temperature	Pavement buckling and rutting
	Bridge expansion joints
	Lengthened construction season
Increase in frequency and intensity of heavy rainstorms	Increased damage to bridges due to stream scour
	Inadequate hydraulic opening in some culverts
	Disruptions to barge traffic
Increase in seasonal climate variability	Road closures
	Increased difficulty of planning (e.g., budgeting for snow removal costs)
	Difficulty maintaining system performance

Source: Climate Resilience in Illinois presentation at National Adaptation Forum, available at <http://bit.ly/1RaRJWY>

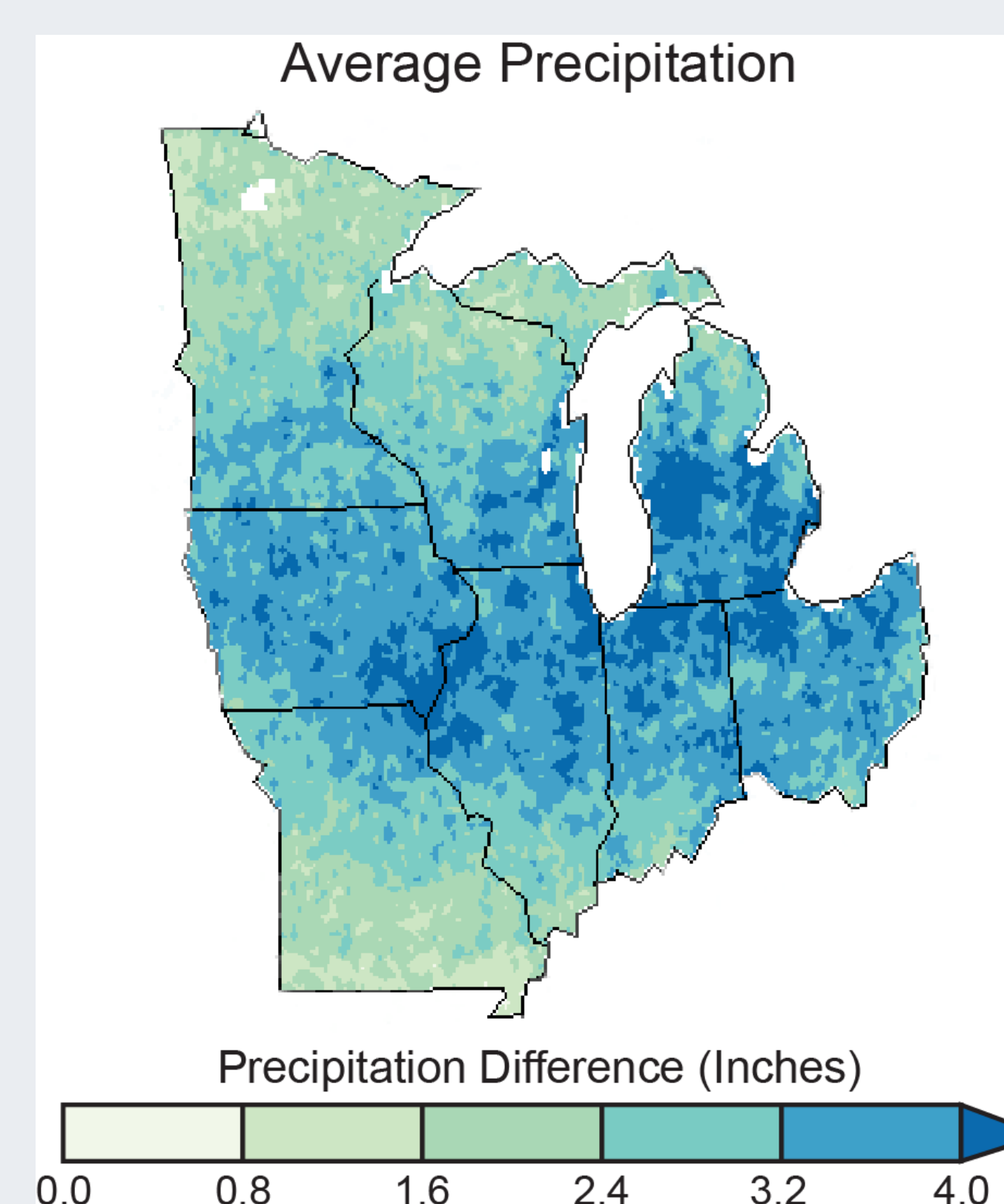
Climate Change and Transportation Impacts

According to the Federal Highway Administration (2012) changing climatic conditions will result in a range of impacts on transportation systems. Changes in temperature patterns (ex. Increase in very hot days, heat waves, changes to freeze-thaw cycles, etc.) and precipitation patterns (ex. Increase in rainfall intensity, extended droughts, etc.) will be particularly disruptive to transportation systems.

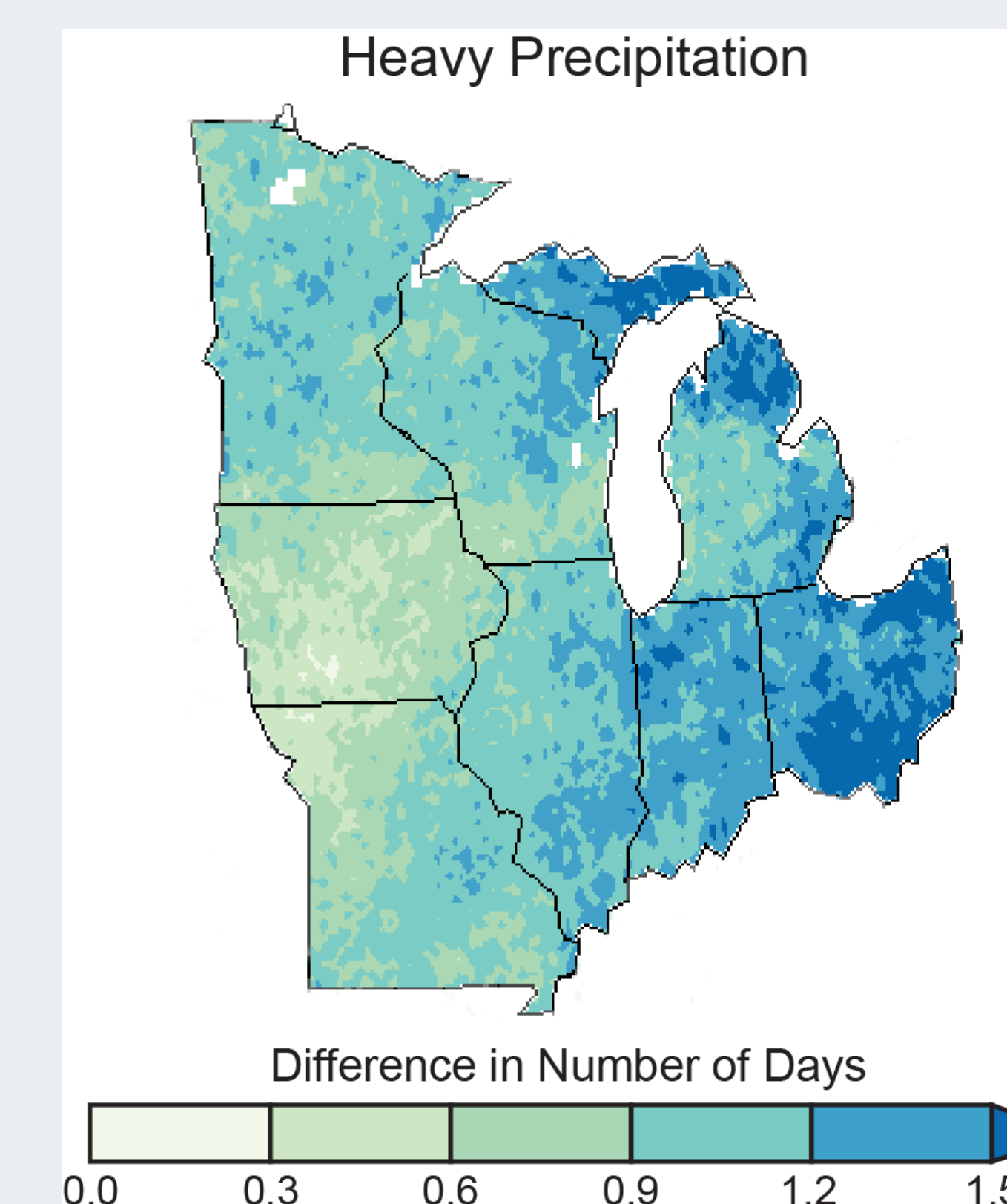
Regional Climate Projections

Key Messages:

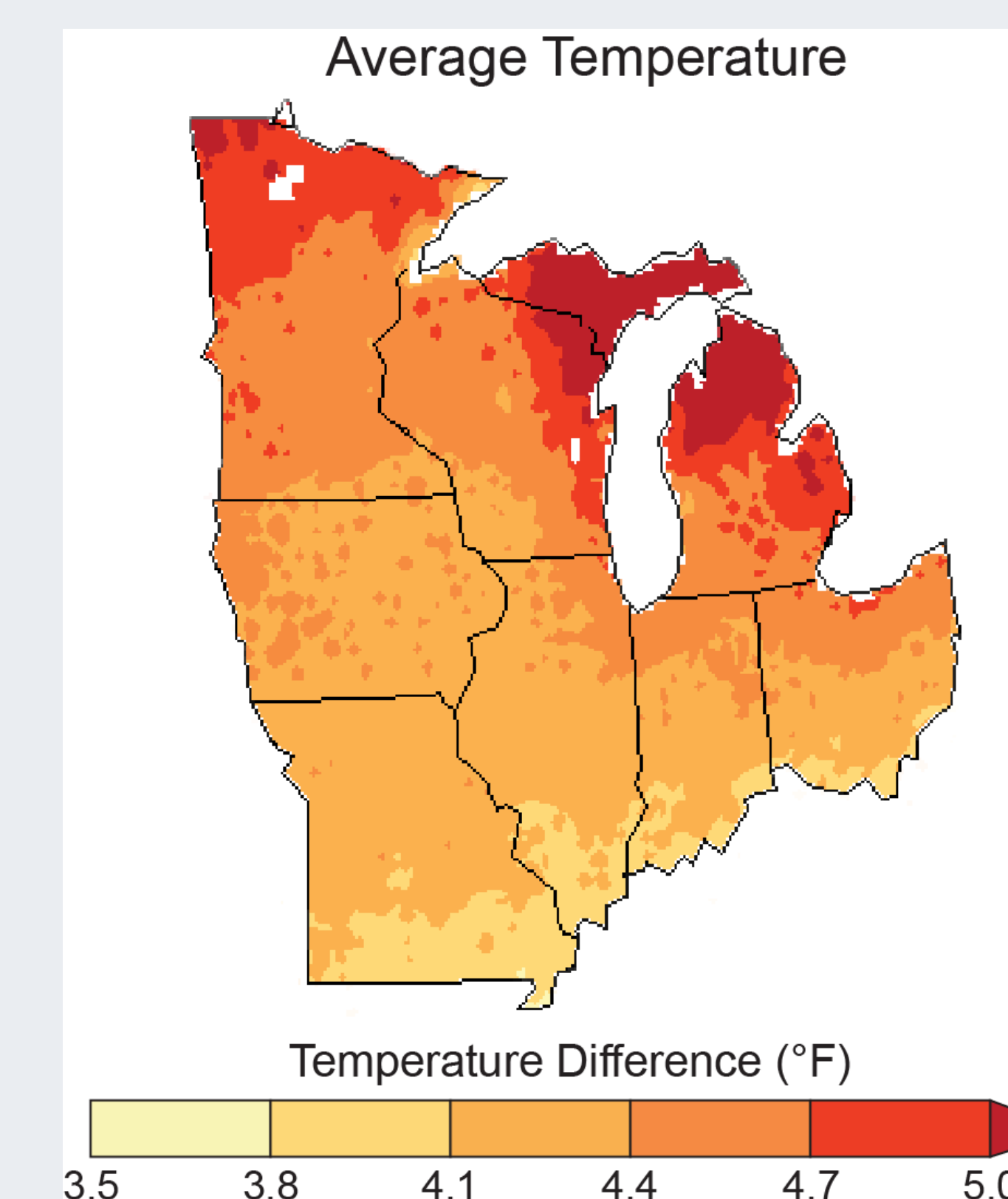
- Temperatures are expected to increase
- Precipitation intensity is expected to increase
- Precipitation amounts are expected to increase in fall, winter, & spring and decrease in summer



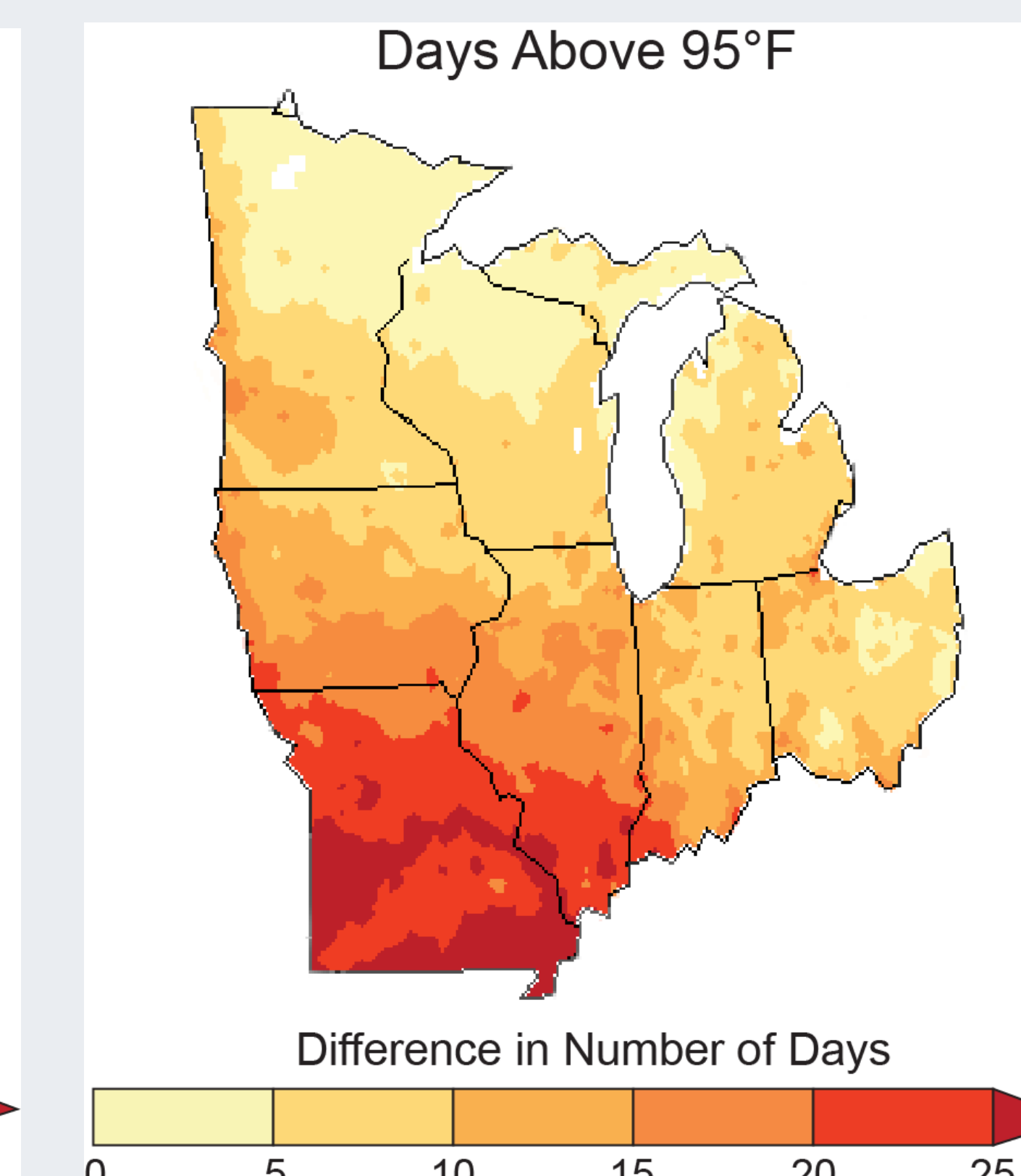
Above: Projected mid-century (2041-2070) change in total annual precipitation) relative to 1971-2000 across the Midwest under continued emissions (A2 scenario).



Above: Projected mid-century (2041-2070) change in the number of days with heavy rainfall (top 2% of rainfalls each year) relative to 1971-2000 across the Midwest under continued emissions (A2 scenario).



Above: Projected mid-century (2041-2070) change in annual average temperature relative to 1971-2000 across the Midwest under continued emissions (A2 scenario).



Above: Projected mid-century (2041-2070) change in the number of the days over 95°F relative to 1971-2000 across the Midwest under continued emissions (A2 scenario).

Regional climate observations and projections from the 3rd National Climate Assessment

Our climate shapes our lives. The ways we build our roads, manage our farms, move our water, and use our energy are all influenced by our unique Indiana climate. But our climate has been changing, and we expect it to continue changing in ways that will affect our productivity, our safety, and our livelihoods. **We need to know what climate change means for Indiana.**

Scientists and decision makers from across the state are working together to develop a series of reports that show how a changing climate will affect state and local interests. The **Indiana Climate Change Impacts Assessment (IN CCIA)** will provide accessible, credible climate science to Hoosiers, allowing us to better understand climate change-related risks and build more effective plans for a more productive future.

Key Questions for the Indiana Transportation Sector

Collaboration

- Are there specific people/groups with knowledge and interest in climate issues who we should contact?
- What are the best ways for us to engage the Indiana transportation community?

Information Needs

- What is your primary concern regarding climate change?
- What questions that you would like to have addressed in the IN CCIA?
- What types of climate change impact information would be useful for planning and management decisions?

Planning and Decision Making

- How does weather & climate information currently factor into your planning and decision making?
- What are they types of decisions for which you would you like to use climate change information?

CONTACT INFORMATION

Melissa Widhalm
IN CCIA Coordinator
mwidhalm@purdue.edu

Jeff Dukes
PCCRC Director
jsdukes@purdue.edu