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# Climate Change in Illinois: Ecosystems

Illinois' ecosystems have always been dynamic, with plants and wildlife shifting in response to climate and other environmental changes. Yet, the current rate of climate change is more rapid than anything experienced in the past. Widespread land conversion has also greatly diminished the extent of Illinois' original ecosystems, hindering the ability of native plants and animals to adapt or migrate as the climate changes.











#### **Climate Impacts on the Landscape**

**Forests:** Warmer, wetter springs followed by hotter, drier summers are likely to make Illinois more suitable for some tree species and less suitable for others, shifting the overall composition. Many tree species found in Illinois, such as basswood, Ohio buckeye, and quaking aspen, are poorly adapted to warm, drier summers, although forest management can also influence species survival. Warmer temperatures may increase the number of new, non-native species, as plants such as kudzu and Chinese privet expand their ranges

**Grasslands:** Changes in climate will affect grasslands largely by shifting the amount and seasonal pattern of precipitation and soil water availability. Increased summer temperatures and evaporation may negatively affect grasslands by increasing loss of soil moisture, leading to decreased plant growth and reproduction. Native prairie plants adapted to survive periodic droughts and warmer temperatures will likely fare better than species not adapted to these conditions.

Wetlands: Wetlands will be impacted by climate changes affecting the water balance, like droughts and floods. Increased summer drying will impact small and ephemeral wetlands and wetland-dependent species, by decreasing wetland area and water permanence. Wetlands near rivers and streams will be impacted by more frequent and severe flooding. Tree composition in forested wetlands will favor species more tolerant of prolonged flooding. More intense flooding is also likely to decrease the ability of wetlands to filter nutrients and sediments from water.

**Streams, Rivers, Lakes, and Ponds:** Warmer water temperatures will alter the growth, survival, and reproduction of aquatic species, as well as predator-prey relationships. Warmer water will reduce habitat and competitive abilities for cold- and cool-water fish. Increasing precipitation and more extreme rain events are likely to cause higher average flow rates, favoring stronger swimmers. Increased peak flows also cause substrate removal and transport species downstream to unfavorable habitats. Drought could reduce freshwater habitat connectivity.

Lake Michigan: Warmer water is likely to result in summer stratification that starts earlier and lasts longer, as well as related changes in the spatial distribution of fish. Cold water species may spend more time offshore, while warm water species may become more widespread. Warmer water may also increase opportunities for the establishment of additional invasive species. Because precipitation and evaporation are both expected to increase, water levels may either increase or decrease, and related changes in lake levels will affect habitat availability for some species.

# **Pathways Forward**

Native ecosystems in Illinois play important roles in reducing the adverse effects of climate change, in addition to providing many other benefits to people. In Illinois, lands that remain in a natural or semi-natural condition are mostly in private ownership. Restoring Illinois' ecosystems at landscape scales and managing these lands effectively in a changing climate will require cooperation among private landowners, land trusts, and natural resource agencies.

#### The Nature Conservancy's Contributions

TNC works in Illinois and across the globe to conserve and restore natural areas, improving connectivity and ecosystem resilience. In Illinois, TNC has helped to protect more than 88,000 acres. As one example, TNC is currently participating in a multistakeholder effort at Dogtooth Bend in southern Illinois to facilitate the large-scale restoration of over 8,000 acres of floodplain in the Mississippi River Basin. The project will provide financial relief to landowners who have faced repetitive flood losses while increasing flood storage and wetland habitat, making the area more resilient to climate change.

## **Floodplain Prioritization Tool**

The Floodplain Prioritization Tool was developed by TNC to identify the best opportunities for floodplain conservation and restoration in the Mississippi River Basin. Healthy floodplains are instrumental for reducing flood impacts, recharging aquifers, and improving water quality and wildlife habitat. The web-based tool can help decision-makers in Illinois—like government agencies, county planners, natural resource managers, and private landowners—optimize investments and prioritize areas for floodplain conservation and restoration. The Floodplain Prioritization Tool is available through the Freshwater Network's website.

## **Resilient Land Mapping Tool**

TNC's Resilient Land Mapping Tool maps a network of landscapes across the U.S. that are the most well-suited to support biological diversity and ecological functions in a changing climate. The tool is publicly available and can be used as a starting place for collaboration to increase the pace and scale of strategic planning and the protection of areas that are the most resilient to climate change. To explore the Resilient Land Mapping Tool, please visit our website.

# **Site Wind Right**

To avoid the worst impacts of climate change, Illinois will need to vastly scale-up renewable energy production, which could have large impacts on natural areas. However, with careful planning and siting, it is possible to minimize adverse impacts to habitat, wildlife, and ecosystem services. TNC developed the Site Wind Right tool to inform turbine siting decisions across the Central United States, including Illinois. This interactive online map can be used to identify areas with minimal negative impacts to nature. To explore the Site Wind Right Mapping tool, visit our website.

Learn more about climate change in Illinois in the report, An Assessment of the Impacts of Climate Change in Illinois, on our website.

