



The Harbinger

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“...dedicated to the study, appreciation, and conservation of the native flora and natural communities of Illinois.”



Ohio Spiderwort (*Tradescantia ohioensis*) is a beautiful wildflower in the Dayflower family and can be distinguished from the 3 other spiderwort species in Illinois by the glabrous sepals and narrow leaves. Photo: Christine Prairie.

In the third issue of *The Harbinger* for 2020, we highlight a tribute to early Illinois botanist Herman Pepon, the implications of climate change on plants, and research by a couple recipients of our grants program. There will be one more issue published later in the year and if anyone has a contribution or suggestions for content, please let me know. Enjoy! ☺ Chris Benda, Editor

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Also see:

Ritterbusch, Cory. 2011. *H.S. Pepon: Conservation Pioneer, Essays on Ecology 1904-1933*. Arras Publishing.

Greenberg, Joel. 2008. *Of Prairie, Woods, and Water: Two Centuries of Chicago Nature Writing*. University of Chicago Press.

Kathleen Garness is a scientific affiliate of the Field Museum and Morton Arboretum. Her illustrations have been featured by the Smithsonian Institution, the Field Museum, and the new illustrated Glossary to Flora of the Chicago Region (Wilhelm and Rericha, 2017, Indiana Academy of Science). She has been a Plants of Concern monitor since 2001 and a natural areas steward since 2003. She teaches botanical art at the Prairie House in Westchester and elsewhere. She is a past contributor to Erigenia.

How Will Climate Change Affect Native Plants in Illinois?

By Dr. Emily Dangremond.

Illinois has a variety of habitats that support over 2,000 species of native plants. However, more than 300 of our native plant species are already listed as threatened or endangered (T&E), and face an uncertain future in the face of climate change, habitat destruction, and other human activities. In Illinois, climate change models predict an increase in temperature, making our summers more similar to Texas summers. Plant species will respond to the warmer temperatures, but not all species will respond the same way. Many species are predicted to shift their ranges north to match the temperatures that are most suitable for them. What does this mean for plants in Illinois?

A recent analysis by researchers at the Illinois Natural History Survey predicts that almost all (88%) of the T&E species in Illinois are vulnerable to decline due to the effects of climate change.¹ The researchers systematically reviewed each T&E plant species in Illinois using a tool called the Climate Change Vulnerability Index.² This tool combines scientific information on the biology of each species to assess how much climate is changing in a species' geographic location, and how sensitive or adaptable each species is.

The major reason for the vulnerability of Illinois plants is that so much of their habitat has already been destroyed, and the fragments of habitat that are left are not well connected. The lack of available habitat poses a severe barrier to any species that finds itself in a less than suitable climate.

Another consideration that might make migrating tough is simply the ability of a plant to disperse its seeds. Each plant species has one way of dispersing its seeds—by wind, animals, gravity, or even water. Wind-dispersed seeds can generally move the farthest. Some T&E species barely make seeds at all and rely instead on clonal growth, sending up new stems that are genetically identical. These species are especially at-risk due to the lack of genetic diversity and low reproductive output.

Given that so many species are vulnerable, how does a conservation biologist choose which species to help?



Prairie white-fringed orchid (*Platanthera leucophaea*).

INHS researchers Brenda Molano-Flores and colleagues recommend that conservation efforts focus on species that have all or a substantial portion of their geographic ranges in Illinois—for example, the prairie white-fringed orchid (*Platanthera leucophaea*) or the Kankakee mallow (*Iliamna remota*). In Illinois, some species reach their northernmost limit—most of the geographic range extends farther south, while other species ranges dip into Illinois from the north and Illinois therefore forms the southern edge of these species ranges. These



Kankakee mallow (*Iliamna remota*).

northern, cold-loving species might be especially vulnerable to climate change and it is tempting to want to focus conservation efforts on them. However, Molano-Flores and colleagues recommend a non-traditional strategy of thinking about which species might benefit the most from conservation efforts: focus on the species for which Illinois climate might become more suitable, rather than the species at the cold-loving end of the spectrum. It is most likely that temperatures will be too high to support the northern, cold-temperature species, so energy would be better spent on making sure that the species that will flourish here have the habitat to do so. What does this look like? It could mean assisted

migration—physically moving plants, seeds, or pollen—to establish new populations or increase genetic diversity of already-established populations. Other research on habitat fragmentation shows that connecting habitat fragments with a corridor (a strip of suitable habitat connecting two parcels of the same habitat) can support increased biodiversity by increasing colonization rates and lowering the rates at which a species is lost from that parcel of land.³

Conservation of the native flora of Illinois will be challenging, given the combined threats of climate change and habitat loss. It seems likely that in 50-100 years, some species will no longer be found in Illinois, but others may arrive or expand their presence here if habitat is available for them.

References:

1. Molano-Flores, B, DN Zaya, J Baty, G Spyreas. 2019. An Assessment of the Vulnerability of Illinois' Rarest Plant Species to Climate Change. *Castanea* 84: 115-127.
2. NatureServe. Young, B.E., E. Byers, G. Hammerson, A. Frances, L. Oliver, and A. Treher. 2016. Guidelines for using the NatureServe Climate Change Vulnerability Index Release 3.02. NatureServe. Arlington, Virginia.
3. Damschen, E, et al. 2019. Ongoing accumulation of plant diversity through habitat connectivity in an 18-year experiment. *Science* 365: 1478-1480.

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