Ecosystem Resilience and Adaptation

Climate change leads to warmer temperatures and changes in precipitation, which not only impacts the land, but the wildlife that calls the land home, leading to disruption and destruction of ecosystems and habitats. Add wildfire, pathogens and human disturbances to the mix and there becomes a strong need for a science-based triage approach to conserve biodiversity most at risk in the Northern Great Plains region. NC CASC members and partners recently contributed to the “Ecosystems and Biodiversity” section of the US Climate Resilience Toolkit (https://toolkit.climate.gov/regions/northern-great-plains/ecosystems-and-biodiversity) and some key messages are presented below.

As climate change leads to increases in not only the frequency but also the intensity of extreme weather events, this could accelerate species invasion to the region by putting native species at a competitive disadvantage. Pests and diseases are expected to expand and shift their ranges as climate warms, which could contribute to large-scale disease and death in native plants or animals. That, in turn, is expected to promote less varied populations which could result in increased competition and ultimately contribute to local extinctions and reduced community resilience.

Transformations of ecosystems into new and different groupings of species are expected as large-scale ecological disturbances occur. In the short-term, this could be irreversible. One of the big challenges is simply not knowing how (and when) species or ecosystems will respond under different scenarios of climate change. The human impact has a fingerprint here as well – as agricultural needs change and more water is needed, for example, this could further limit water available for fish, wildlife and plants – as well as increase contaminant toxicity.

As the scale of the problem grows and resources for conservation become limited, available resources should be used more strategically for conservation. Managers need to be ready to make hard decisions and use the best available scientific research towards making choices based on an increased likelihood for whether ecosystems will be able to recover, persist or have to simply transition to a new (acceptable) state.