'Managing Biological Resources in a State Undergoing Climate Change'

A Workshop Organized by the Missouri Chapter of the Society for Conservation Biology.

Moderator:

Alan Journet, President of the Missouri Chapter Society for Conservation Biology,

Department of Biology and Environmental Science, Southeast Missouri State University, One University Plaza, Cape Girardeau, MO 63701-4799

Abstract:

That the climate is changing is well understood and accepted. It is definitely time for natural resource managers to consider how these resources should be managed as climate change overtakes our state. In this workshop, speakers from a diversity of backgrounds will reflect upon considerations essential to planning for the future, combined with strategies and tactics that we should employ in undertaking that planning. The presentations will be followed by a panel and open discussion of ideas relevant to developing an approach to planning for our natural resource future.

Schedule:

8:00 a.m. Alan Journet "Welcome, Introduction and Opening Remarks." President of the Missouri Chapter, Society for Conservation Biology. ajournet@semo.edu

Abstract

Journet, Alan

In setting the scene for this workshop, the opening remarks will summarize briefly the scientific consensus on climate change as presented by the Intergovernmental Panel on Climate Change and the predictions for Missouri suggested at last year's workshop by state meteorologist, Pat Guinan.

8:10 a.m. Paul Nelson: "How will Missouri's Natural Communities respond to climate change; a strategy for protecting biodiversity." Mark Twain National Forest, Supervisors Office, Rolla Missouri 65401 pwnelson@fs.fed.us

Abstract

Nelson, Paul W.

A popular theme in discussions of global climate change is that Missouri natural communities will migrate elsewhere in response to changing weather patterns. This has led to suggestions that we facilitate the migration process by translocating plant and animal species in anticipation of their extirpation in their present locations. Missouri land managing agencies have nearly 30 years of experience in restoring and sustaining the glades, savannas, prairies, woodlands, forests and other unique natural communities and ecosystems that comprise the state's natural diversity. In many cases these systems have been rescued from nearly two centuries of post-European settlement impacts. Conservation assessments and strategic plans reveal that we must set measurable objectives for restoring viable ecosystems at appropriate scales. In the contemporary landscape, ecosystems and their associated conservative plants and animals face daunting obstacles that will in many cases impede their successful migration as viable individual populations, let alone as diverse and intact constellations of biota comprising whole habitats and natural communities. Threats such as fragmentation, homogenization, altered soil chemistry, exotic species invasion, expanding urbanization and loss of historical disturbance processes pose far greater immediate consequences for loss of biodiversity. Climate change is a significant risk and must be placed in perspective. But given uncertainties of predictive models, a greater priority at this point is maintaining and restoring those irreplaceable natural systems remaining to us, in the locations where they currently occur. Given the knowledge gaps in technology and limited history of success in translocating single organisms, it would be naive to devote significant resources at this point to fanciful and largely conjectural schemes for relocating natural communities. Restoring functional, diverse habitats and ecosystems should be the first order to combat climate change. Managers and decision makers should follow a logical, risk-based, analysis to target resources to the most imminent and critical threats to system survival. Simultaneous, we must remain attuned to more nebulous threats such as future climate change. A good example of this approach are the ecosystem restoration objectives outlined in the 2005 Forest Plan for the Mark Twain National Forest, which compliment Missouri's Wildlife Action Plan focusing ecosystem restoration within Conservation Opportunity Areas.

8:35: Ken McCarty, "Climate Change and Missouri's State Parks." Department of Natural Resources, P.O. Box, 176 Jefferson City, MO, 65102
ken.mccarty@dnr.mo.gov

Abstract:

McCarty, Ken (per Alan Journet)

This presentation will explore how the management of Missouri's State Parks might be undertaken in the future to account for the impact of climate change.

9:00 *Matt Albrecht*: "The role of ex situ conservation in securing and preserving plant diversity." Center for Conservation and Sustainable Development, Missouri Botanical Garden, P.O. Box 299, St. Louis, MO 63166
Matthew.Albrecht@mobot.org

Abstract

Albrecht, Matt

Anthropogenic climate change is expected to accelerate plant extinction in the 21st century. Projections of plant distributions in future climate scenarios suggests that many rare and

narrowly distributed species will experience large geographic range displacement, forcing species to colonize areas beyond the habitat reserves that currently protect them. *Ex situ* conservation – the practice of storing plants in off-site seed banks – is a practical and efficient way to supplement *in situ* conservation and ensure the basic ecosystem services that human populations depend upon are sustained indefinitely. However, as *ex situ* conservation becomes increasingly integrated with restoration ecology, restoration and conservation biologists face two major challenges: 1) establishing populations from seed bank collections into habitats that have changed since the initial collections were made, and 2) introducing species into novel habitats because their preferred habitat no longer exists or is projected to disappear in the near future. Examples of plant reintroductions from *ex situ* collections – 1) Robbins cinquefoil (*Potentilla robbinsiana*), 2) hammock shrubverbena (*Lantana canescens*), and 3) Pyne's ground plum (*Astragalus bibullatus*) – illustrate the challenges of restoring species in an era of climate changes and habitat loss. Given the large degree of uncertainty in predicting climate-driven shifts in geographic ranges, *ex situ* programs will increasingly need to incorporate information gained from plant monitoring programs and ecological research to develop restoration protocols for wild plant populations.

9:25 Michael Leahy: "Missouri Natural Areas and Climate Change: Management Implications." Natural Areas Coordinator, Missouri Department of Conservation, PO Box 180, Jefferson City, Missouri 65102
Michael.Leahy@mdc.mo.gov

Abstract

Leahy, Michael

The consensus of the scientific community is that global warming is occurring due to human-induced emissions of greenhouse gases from fossil fuel use, agriculture and deforestation. Scientific studies indicate that it is very probable that Missouri will continue to get warmer over the next century with less certainty as to whether the state will see increased or decreased precipitation. The Missouri Natural Areas System was created in 1977 to protect and conserve Missouri's natural communities. Today we have 181 Missouri Natural Areas totaling 68,021 acres that represent a wide variety of terrestrial and aquatic natural communities and geologic features. From caves to glades, prairies to forests, the Missouri Natural Areas System contains a network of protected lands that contain remnants of Missouri's natural heritage, including populations of over 300 species of conservation concern. Climate is an overriding forcing function in the assembly of natural communities. It is unclear exactly what effects continued global warming will have on Missouri natural communities. Lessons from paleoecological research can give us hints as to how natural communities may change in a hotter and drier climate. Climate change will likely interact with current stressors of biological diversity, including habitat loss and degradation; invasive, exotic species; pollution, and altered disturbance regimes to further erode the ecological integrity of designated Missouri Natural Areas. Beyond reducing the actual emissions of greenhouse gases, natural area managers and planners should focus on reducing current stressors to natural areas; increase conservation lands and corridors; and prioritize work on the best sites.

9:50 Coffee Break

10:15 Brad Jacobs: "Ideas for Managing Birds under climate change." Wildlife Division, Missouri Department of Conservation, P.O. 180, Jefferson City, MO 65102-0180. Brad.Jacobs@mdc.mo.gov

Abstract

Jacobs, Brad (per Alan Journet)

This presentation will explore different scenarios and take some educated guesses as to what one might do with management to account for the consequences of future potential climate change for bird populations.

10:35: Tim Smith: Climate Change Effects on Missouri's Native and Exotic Plants.Research Scientists, Missouri Department of Conservation, P.O. 180, Jefferson City, MO 65102-0180.

Abstract

Smith, Tim

I will provide an overview of factors that influence the current distribution of the state's flora. Predictions for future climate change will be compared to the known floral shifts from past climatic changes such as the Xerothermic or Hypsithermal Period. Recent studies on phenological indications of global warming will be summarized. Habitats and floral assemblages at the greatest risk from climate change will be discussed under various climatic scenarios. Possible changes to the behavior of invasive exotic plant species will be addressed.

11:00 Panel and Open Discussion

11:55 Alan Journet "Summary and Closing Remarks." President of the Missouri Chapter Society for Conservation Biology.