

8TH BOULDER COUNTY ECOSYSTEM SYMPOSIUM

The abstracts from the talks are presented below.

Complexities Of Water Hole Use By A Coloradan Bat Community

Rick A. Adams, Department of Biological Sciences, University of Wisconsin-Whitewater, President, Colorado Bat Society

Investigations into patterns of water hole use among nine species of Coloradan bats reveal the influences of biotic and abiotic components of resource utilization. By categorizing water holes as either high usage (>100 captures total over five years) or low usage (<100 captures total over five years), significant differences among species visitation patterns is discerned using one-way analysis of variance (ANOVA). Mineral availability, in particular dissolved calcium levels, at water holes appears to strongly influence visitation patterns of females and juveniles. By categorizing water hole approachability relative to amount of abiotic clutter (open = flyways > 3 m in diameter; closed = flyways < 3 m in diameter), within species analysis of body weights shows significant differences between site availability relative to body weight of an individual. These data have particular significance for reproductive females that increase in body weight during pregnancy, and, therefore, may be restricted from higher calcium sites.

Elk Management and Research in Rocky Mountain National Park: An Adaptive Approach

Therese L. Johnson, USNPS-Rocky Mountain National Park

Elk populations in and adjacent to Rocky Mountain National Park have been managed in various ways since the area was settled by Euro-Americans in the 1860s, ranging from complete extirpation and re-establishment to complete protection. Given a history of considerable human influence on the ecosystem, determining how best to meet the park's mandate to preserve natural conditions and processes is challenging. Recent research and simulation modeling examined the ecosystem effects of elk populations along with other human influences. I will review some of the key results from this work in the context of National Park Service management policies. Park managers are using these and other research results as a basis to define the range of ecologically acceptable conditions, given the natural variation in which the ecosystem evolved. We will incorporate social values into management decisions using the National Environmental Policy Act process to evaluate management alternatives within this range. Our adaptive management

approach focuses on defining specific objectives, modeling to evaluate management strategies, a commitment to implement any necessary actions, and long-term monitoring to evaluate and redirect management as needed.

Bark Beetle Activity in Douglas-fir Following the 1994 Beaver Mountain Fire

Catherine A. Cunningham, Forest Resource Department, Utah State University

In 1994, ground fire ignited in Douglas-fir forests, *Pseudotsuga menziesii* var. *glauca*, on Beaver Mountain. Despite shorter flight seasons due to lower annual temperatures and persistent snow, the Douglas-fir bark beetle, *Dendroctonus pseudotsugae* Hopkins, attacked a range of moderately fire-injured host conifers in 1995. A logistic regression model run for 1995 data illustrated that one year after the fire event, associated bark beetles selected and attacked large diameter Douglas-fir with 60-80% crown volume scorch and 50-70% probability of mortality due to fire. In 1996, beetle preference shifted to smaller diameter trees with lighter fire injury. Large fire-damaged conifers were colonized by beetles in 1995. Beetle populations did not reach outbreak proportions outside the fire boundary, but 53 green trees were also infested in 1997 along the burn perimeter. Log linear tests conducted to quantify beetle emergence supported conclusions that beetles were not only attracted to mature and moderately fire-weakened conifers, but they also produced greater brood densities in these hosts with up to 60-80 emergence holes/1800cm². Fire-defoliated trees provided bark beetles with sufficient phloem and limited resistance.

Forest Management Practices and the Relation to Forest Health and Wild Fire Mitigation: An Empirical View

Eric Folwell, Boulder County Parks and Open Space Forestry Section

Following 25 years of forest management activities on Walker Ranch open space, a wildfire ignited and became known as the Walker Ranch Fire in September 2000. Various models, such as BEHAVE predicted wildfire potential and associated fire behavior in that event. Thinning operations, implemented on the Walker Ranch property since 1976, contributed greatly to reducing the total impact of the fire and increased the safety of firefighters and the public, including structures such as homes. The benefit of forest management activities, especially thinning operations, is self-evident and greatly enhances the forest environment through increased

health and vigor of individual trees and increased species diversity in the forest ecosystem.

Historical Ponderosa Pine Landscapes in the Colorado Front Range Insights from Cheesman Lake

Merrill R. Kaufmann, USDA Forest Service, Rocky Mountain Research Station

Wildfires during the last few years and the new National Fire Plan point to high forest density as a major problem in lower montane forests of the Colorado Front Range. Is there scientific evidence supporting efforts toward forest "restoration" that would reduce forest density? And would more open forests reduce the wildfire risk? Yes, for forests that historically were dominated by ponderosa pine. Evidence comes from Cheesman Lake on the South Platte River, where more than 30 km² of ponderosa pine forest was protected from logging and grazing. This forest is the perhaps the best example anywhere of historical ponderosa pine landscapes. Earlier forests at Cheesman Lake were much less dense than current forests along the Front Range. Studies of fire history (spanning eight centuries) and forest regeneration (thousands of trees aged) indicate that earlier forests had few areas dense enough to support an active crown fire, and many openings were created by natural fires across the landscape. Historical fire patterns appear to be similar at other places in the Front Range, and it is likely that results from Cheesman Lake provide insight into the structure of historical ponderosa pine forests beyond the South Platte watershed.