



Boulder County Nature Association  
P.O. Box 493, Boulder, Colorado 80306

**BOULDER COUNTY ECOSYSTEM SYMPOSIUM ABSTRACTS**  
**11 MARCH, 1994**

***BOULDER COUNTY ECOSYSTEMS: IS THERE HOPE?*** Jones, Steve. Boulder County Nature Association.

Compared to many areas in the country, Boulder County has done a remarkable job of protecting open lands. Nevertheless, most local ecosystems have suffered serious degradation. All of our native grasslands have been paved over, plowed under, or altered by overgrazing and weed infestation. Wetlands have been drained for development, inundated by reservoirs, and surrounded by subdivisions. Mountain forests still show the scars of catastrophic disturbances inflicted by nineteenth century settlers; only about 1% of Boulder County's ponderosa pine and Douglas-fir forests currently qualify as "old-growth" under U. S. Forest Service guidelines.

Breeding bird populations can serve as a barometer of environmental disturbance. The Boulder County avian species of special concern list, compiled by Mike Figgs and Dave Hallock for the Boulder County Parks and Open Space Department, lists 18 species as either extirpated or declining in Boulder County. Of the four extirpated species, three are grassland nesters (Mountain Plover, Long-billed Curlew, and Sharp-tailed Grouse), and one is a wetland nester (Barrow's Goldeneye). Of the 14 declining species, four are primarily grassland nesters (Burrowing Owls, Loggerhead Shrike, Lark Bunting, and Swainson's Hawk), and four are primarily wetland nesters (Eared Grebe, American Bittern, Northern Harrier, and Willow Flycatcher). Several species appear to be victims of habitat fragmentation; nesting populations of American Bitterns, Northern Harriers, Long-eared Owls, and Burrowing Owls continue to decline despite successful efforts to protect known nesting areas.

If the fragmented grasslands and wetlands of Boulder County are losing their viability as breeding bird habitats, can mountain forests be far behind? Northern Goshawks, which are sensitive to coniferous forest fragmentation, were recently added to the declining species list. Their survival, and the survival of healthy, natural ecosystems, may depend on our ability to limit ecosystem fragmentation. Human population growth and human encroachment into natural areas may pose the greatest threats to these efforts.

***INVASION OF THE LITTLE GREEN CREATURES - PONDEROSA PINE ON THE PRAIRIE.***  
Linhart, Yan. EPO Biology, University of Colorado.

Ponderosa pines are advancing onto prairies in many locations along the Colorado Front Range. This encroachment has been going on for the past 100 years, and is continuing today. As pine densities increase, prairies are being changed to dense forests.

The primary factors contributing to this forest encroachment involve a combination of human induced changes in fire regimes and grazing, and periodic episodes of climatic conditions (mostly increased rainfall) that favor pine seedling establishment and survival. Ecological consequences of this forest invasion include (1) replacement of plant and animal species that characterize open prairie by woodland species, and (2) increased likelihood of intense fires as a result of fuel buildup in these

newly forested areas.

There is abundant evidence for patterns of forest encroachment onto grasslands, and increased density of existing ponderosa pine forests, as well as the ecological consequences of these patterns, from data collected throughout the range of Rocky Mountain ponderosa pine, from South Dakota, Colorado, Arizona, and New Mexico.

**"ECOSYSTEM MANAGEMENT" - PERSPECTIVES FROM THE U.S. FOREST SERVICE, ROOSEVELT NATIONAL FOREST, BOULDER RANGER DISTRICT.** Parmenter, Rebecca. Wildlife Biologist, USFS.

In June of 1992, the Forest Service announced a policy which identified Ecosystems Management as the guiding direction for all future management and research activities on National Forest System lands. As articulated in the initial policy statement:

Ecosystem Management means using an ecological approach to achieving multiple-use management of national forest and grasslands by blending the needs of people and environmental values in such a way that the national forests and grasslands represent diverse, healthy, productive, and sustainable ecosystems.

Highlights of the Rocky Mountain Regional strategy for implementing ecosystems management will be presented. Examples of the integration of ecosystems management concepts and principles into the Arapaho and Roosevelt National Forests and Pawnee National Grasslands Land Management Plan (currently under revision) will also be presented, as well as some examples of how the Boulder Ranger District of the Arapaho National Forest has begun implementing ecosystems management.

**THE IMPACT OF PREDATION AND BROOD PARASITISM ON THE REPRODUCTIVE SUCCESS OF THE SOLITARY VIREO.** Chace, Jameson F., Alexander Cruz, & Rebecca E. Marvil. EPO Biology, University of Colorado.

We have studied the reproductive success of the Solitary Vireo (*Vireo solitarius plumbeus*) over the past ten years in the ponderosa pine forests of Boulder County, Colorado. One hundred and seventeen nests were monitored from the egg laying stage during the years of 1984, 1985, 1986, 1992, and 1993. Nest predation and brood parasitism were found to be the most important factors influencing reproductive success. During the investigation 29.8% of Solitary Vireo nests were preyed upon, and 47.0% of the nests were parasitized by Brown-headed Cowbirds (*Molothrus ater*). Nests preyed upon rarely had surviving progeny, resulting in renesting attempts and reduced reproductive success of adults. Additional evidence from an artificial nest experiment suggests that nests near roads, residential areas, and trails are more likely to be preyed upon than are nests isolated from human disturbance. Parasitized nests had significantly lower clutch size and fledglings per active nest than unparasitized nests. The Solitary Vireo population remains vigorous despite localized predation and parasitism pressure; future testing of a Solitary Vireo source-sink population hypothesis is warranted.

**PROTECTING ECOSYSTEMS IN DEVELOPED LANDSCAPES: OXYMORON OR CONUNDRUM?** Kuntz, Dave. City of Boulder Open Space Department.

Ecosystem management has become the land management watchword of the 1990s. The notion of ecosystem management has as many definitions as a white-tailed ptarmigan has color phases. Most examples of ecosystem management efforts encompass large undeveloped wild areas such as the Greater Yellowstone Ecosystem project or the Northern Rockies Ecosystem initiative.

A different urban-wild land context exists along the populated Front Range of Colorado. The coming together of the Great Plains prairies with the foothill forests and montane shrublands of the Front Range creates varied habitats of biological richness and natural diversity. In the Boulder area this convergence and the sculpting of the wind and water through geologic time have resulted in many micro-environments that support numerous native plants and animals. This place also attracts settlement and development that benefits from the abundant natural diversity. Natural and human communities define a place. Along the Front Range this sense of place requires an understanding and protection of natural and native spaces. In viewing a Western landscape it helps if we're looking from a regional overlook.

The City of Boulder has determined to complete an ecosystem management plan by 1995. This plan proposes to diverge from the traditional wildlife habitat planning approach of delineating single species' habitats in urban-rural setting. The purpose of Boulder's ecosystem plan is to evaluate current biological information, and to collect necessary additional information, in order to develop a full range of policy options to maintain, protect, or restore the environmental quality and natural diversity in and around the Boulder Valley. Key issues underlying Boulder's ecosystem plan are: (1) continuing impacts on natural communities resulting in further habitat fragmentation and destruction; (2) rapid disappearance of native plants and animals replaced by non-native species; (3) integrating both public and private lands to maintain and protect environmental quality; and, (4) implementing specific management techniques and directions into the City's planning and development processes.

Four principle goals focus Boulder's ecosystem plan: \* protect the natural environment of the Boulder Creek watershed, including Lefthand Creek, Four Mile Creek, South Boulder Creek, and Rock Creek (including tributaries); \* preserve, protect, and restore, where feasible, naturally functioning ecosystems (defined by the presence of native species and the absence of non-native species); \* maintain or enhance human-modified landscapes to complement and perpetuate the existence and function of native ecosystems; and \* develop options for guidelines and procedures for inter-departmental and inter-agency coordination and cooperation for wildlife and ecosystem protection and management on public lands, including cooperation with private landowners.

**COOPERATIVE RESEARCH BETWEEN BOULDER COUNTY PARKS AND OPEN SPACE AND THE USDA AGRICULTURAL RESEARCH SERVICE, RANGELANDS WEEDS LAB (BOZEMAN, MT): BIOLOGICAL CONTROL OF *ACOSTA DIFFUSA* (DIFFUSE Knapweed) USING A RECENTLY APPROVED SEED HEAD WEEVIL, *BANGASTERNUS FAUSTI*.** Owsley, Cindy. Boulder County Open Space.

Diffuse knapweed (*Acosta diffusa*) is the most widespread undesirable plant in Boulder County. Knapweeds dominate over 4.5 million acres in the state of Montana and gain more ground each year. The 1980's brought numerous releases of seed head flies such as *Urophora affinis* and *U. quadrifasciata*. The greatest success of these flies only yielded up to 50% seed reduction in the most favorable conditions. *Bangasternus fausti* is a recently cleared seed head weevil for diffuse knapweed and spotted knapweed (*Acosta maculosa*) and at this early date promises more effective seed

elimination than the seed head flies. Its recent approval cleared it of conflicts for native plants, key crop plants, and potential for its ability to harbor diseases and parasites. The USDA Agricultural Research Service is currently researching *Bangasternus* for its viability in montane ecosystems. Walker Ranch is the first site in Colorado where the insect is being released for study. This research is taking place to determine not only if the seed head weevil can survive in the harsh winter habitat of Walker Ranch, but to also understand how the two types of insects perform together. The Walker Ranch area benefits from this research because it brings one more management tool into the process of limiting further habitat losses to diffuse knapweed.

***ELDORA ENVIRONMENTAL PRESERVATION PLAN: A COMMUNITY APPROACH TO ECOSYSTEM PLANNING.*** Ripple, Bob. Natural Resources Consultant.

During the past twenty years, significant increases in population, development, and recreation along the Front Range corridor have exerted pressures on the Eldora, Colorado area. Impacts on the community and natural resources of the area show typical effects of suburbanization: fragmentation and degradation of native habitat, increased traffic and recreational impacts, and modification of historical structures and landscapes. In order to address issues of growth and development, the Eldora Civic Association (ECA) in 1993 initiated the Eldora Environmental Preservation Project (EEPP), a long range comprehensive planning project.

The goals of the project are: (1) to develop a comprehensive natural and cultural resource inventory, (2) to create planning objectives and monitoring tools which reflect the desires of the Eldora community, (3) to implement these goals through participation in the county, state, and federal agencies' planning processes and by working with citizens groups and non-profit organizations.

As a first step, the ECA commissioned LREP, Inc. to conduct a baseline environmental resource study, the Eldora Environmental Preservation Plan. The study was completed in February, 1994; this document details the geologic, hydrologic, plant and soil, wildlife, cultural, and recreational resources of the Eldora area. The report concludes with an overview of the Boulder County and Arapaho-Roosevelt National Forest planning and management processes, and sections devoted to land conservation, ecosystem planning, and land use planning recommendations.

The specific recommendations contained in the report form the basis for the next stage of the project: creating and adopting a statement of community planning objectives and the creation of implementation committees. This work will be carried on concomitantly with the third phase of the project, the incorporation of the community's objectives into government planning processes. EEPP will be an ongoing process, with updates and revisions of the plan as the community evolves and its vision is refined.

***FIRE HISTORY OF A PONDEROSA PINE-DOUGLAS FIR FOREST IN FOURMILE CANYON, BOULDER COUNTY, COLORADO.*** Goldblum, Dave. Department of Geography, University of Colorado.

During the past five years the impacts of wildfires in Boulder County have become apparent. Dozens of homes and thousands of acres of private and public property have been burned. As long as humans live in the urban-forest interface it is vital that the natural fire regime is understood and respected. This study evaluated the natural fire regime in one portion of Boulder County prior to European settlement through the present. Dates of fires and average interval between fires were computed for the study area. Early mining and recreational activity as well as current fire

suppression policies are evident in the fire record. Specific methods for determining fire dates and methodological problems associated with fire studies will be addressed.

***BIODIVERSITY OF OPEN SPACE GRASSLANDS AT A SUBURBAN/AGRICULTURAL INTERFACE: A COOPERATIVE STUDY SPONSORED BY THE COLORADO ROCKIES REGIONAL COOPERATIVE, NATIONAL BIOLOGICAL SURVEY, UNIVERSITY OF COLORADO AT BOULDER, & CITY OF BOULDER OPEN SPACE DEPARTMENT.*** Bock, Carl E. & Jane H. Bock, EPO Biology, University of Colorado.

Background: Urban and suburban encroachment upon natural and agricultural ecosystems is a serious threat to the biodiversity of areas with high human population densities. In Colorado, the major area of human population growth is at the east face of the Rocky Mountains, from Fort Collins to Pueblo: the so called Front Range Corridor. Establishing "open space" or "natural areas" peripheral to extant cities and towns is one way of both protecting native plants and wildlife, and simultaneously improving or sustaining the quality of human life. Grasslands are the principal natural habitat of growth, but they have been little-studied. Two major conservation goals for an open space system should be: (1) to support viable populations of the greatest variety of native flora and fauna, and (2) to provide habitats for those species especially threatened by the consequences of urban sprawl. However, it is not clear how such factors as patch size, land use, and landscape setting influence the biodiversity of grasslands.

Objectives: The objective of this proposed study is to develop models predicting the conservation value of stands of open space grassland, based upon their habitat type, ecological condition (i.e. land use), and landscape context (e.g. proximity to suburban or agricultural development). Sixty-six 200-m diameter plots will be established on City of Boulder Open Space grasslands, placed to vary systematically in terms of habitat type, present primary land use, and proximity to other land uses and habitat types such as suburban housing developments, croplands, riparian corridors, and outdoor recreational facilities. These plots will be sampled over three field seasons for populations of flowering plants, grasshoppers (as a representative group of invertebrates), rodents, songbirds, and birds of prey. Each of these groups is important in grasslands, and together they represent a continuum from scarce, highly mobile organisms, to species that are abundant, but more nearly sedentary. Once the flora and fauna of the 66 plots have been quantified, various metrics of biodiversity of the plots then will be correlated with land use and landscape variables pertaining to those same plots, with the goal of developing the predictive models.

Progress to date: This project began on September 1, 1993. Sixty six plots have been established in the field, located on aerial photos of the Boulder Valley, and entered into the Boulder Open Space geographic information system. We have begun data collection on winter bird populations, the most important of which are diurnal birds of prey. Remaining field data will be collected from 1994 through 1996.

***BOULDER MOUNTAIN PARK: MANAGING AGAINST THE ODDS.*** Wichmann, Ann. Boulder Mountain Park.

Home to soaring eagles and falcons, relictual plant communities, the mountain lion and the black bear ... and playground for 2.5 million visitors??? The City of Boulder Mountain Parks, established in 1898 with the first purchases at Chautauqua and Flagstaff, has long been known for its natural resource attributes. It has also been a magnet for human exploration and exploitation, dating from early use by native peoples to the contemporary recreational visitor. While extractive uses of

the system have virtually ceased, the impacts of a constantly growing human population exact their own toll on the natural resources.

How are the Mountain Parks managed to ensure long term protection of these precious natural resources? We will explore past management practices, research conducted, and some of the controversial management decisions which have brought us to today in the Mountain Parks. The challenge in the present and for the future will be based on successfully integrating the desires of an educated and aware public with the realities of a finite carrying capacity. We will explore the options and the odds of achieving this difficult balance.

***PRAIRIE DOGS IN AN URBANIZING ENVIRONMENT: THE NEED FOR A NEW MANAGEMENT PARADIGM.*** Gershman, Mark. City of Boulder Open Space.

Before European settlement in western North America, extensive prairie dog colonies were scattered within the vast areas of shortgrass prairie. The long term impact of their foraging and burrowing activities had a drastic impact upon those grasslands. Over the past 150 years, the introduction of farming, ranching, urban development, weeds, disease, and the virtual elimination of large native herbivores and predators has had significant effects upon prairie dogs and their habitat. In the early part of this century, poisoning programs reduced prairie dogs close to extinction. Since the 1960's their populations have recovered dramatically along the High Plains/Rocky Mountain Foothill interface in Colorado.

For the first time since 1988 the City of Boulder Open Space Department is revising its prairie dog management plan. Open Space staff is facing the challenge of designing preserves that maintain the biological function and societal values associated with prairie dogs, while minimizing the ecological disruption and land use conflicts that they can cause. Little is known about the management of small and discrete prairie dog colonies, leaving many questions unanswered.

***DESIGNING A WILDLANDS RECOVERY PLAN FOR THE GREATER ROCKY MOUNTAIN NATIONAL PARK ECOSYSTEM.*** McClellan, Roz. Southern Rockies Ecosystem Project.

The Arapaho-Roosevelt National Forest is currently developing a revised plan to guide on-the-ground management for the next ten years. Citizens working with the Southern Rockies Ecosystem Project and the Colorado Environmental Coalition have prepared a management alternative designed to protect the biodiversity of the region.

The biodiversity protection plan is based on the principles of conservation biology as defined by Michael Soulé, Reed Noss, Jack Ward Thomas, and other biologists. It lays out a system of habitat reserves for the Greater Rocky Mountain National Park Ecosystem which will support, to the extent possible, a full range of vegetation types and minimum viable populations of all native species. The plan recognizes the importance of large sized reserves that are buffered from human disturbance and connected across the landscape in order to conserve biodiversity and prevent extinction.

The presentation will include maps and overlays, showing how the reserve system was designed and how the Forest Service lands in Boulder County fit into the Greater Rocky Mountain National Park Ecosystem.