



Colorado Natural Heritage Program Projects 2008-2009



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WARNER COLLEGE OF NATURAL RESOURCES

The Colorado Natural Heritage Program is within the Warner College of Natural Resources, Fish, Wildlife, and Conservation Biology Department at Colorado State University. CNHP is a nonprofit organization externally funded through grants and contracts.

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Cover photo by Michael Menefee, View from Soapstone Rim

From the Director:

Although we find ourselves in challenging times now due to the economic downturn, it is critical that we not lose sight of one very valuable piece of capital we are sitting on now - Colorado's biodiversity riches. We have always had this source of wealth, and with good stewardship we can keep it. CNHP's role in Colorado is like that of a good finance manager, making sure that we do not lose assets through poor decisions or failure to act when we should. The future of our biodiversity holdings is something that we control right now, and the urgency of protecting them is not diminished by a troubled economy.



CNHP is the only comprehensive source of the information needed to maximize the return on these investments in terms of biodiversity. We currently have data on over 21,000 mapped locations of species and plant communities of concern in Colorado, as well as nearly 2000 biological planning boundaries (Potential Conservation Areas). Conserving biodiversity resources really is a win-win activity right now- it creates jobs, improves the environment, and ensures that our descendants will live richer, happier lives. What better activity to engage in for economic recovery?

Conservation investments work at the federal, state, and local levels to preserve and increase biodiversity value for the future. Examples such as Rocky Mountain National Park, Castlewood Canyon State Park, or the Heil Valley Ranch Open Space have proven to be sound long-term investments for biodiversity conservation, as well as for the economic, recreational, and aesthetic benefits they provide to us all. And we can rest assured that they will continue to increase in value long into the future. With the growth of our understanding of the Earth's biogeochemical cycles, we are beginning to see that conserving biodiversity, natural places, and the ecosystem services they provide lies at the focal point of a sustainable future for the world as we know it.

The projects highlighted here showcase inventory, monitoring, conservation planning, and other work that directly contributes to the knowledge base that allows Coloradoans to manage their biodiversity resources well. Our work on Colorado's Biodiversity Scorecard project has shown us that the majority of our biodiversity resources are still viable, but that their future hangs in the balance of decisions we are making now. We have much at stake as we move forward. CNHP made a lot of progress over the past year and we have momentum in some exciting new directions right now! It is our pleasure to share the results with you here, and I hope you'll enjoy reading about them.

David G. Anderson



CNHP Staff

Primary funders (in alphabetical order)



Chaffee County

Survey of Critical Biological Resources in Chaffee County

Colorado Department of Natural Resources

Rare Plant Survey of Lone Mesa State Park

Colorado Department of Transportation

Department of Transportation Conservation Easement Monitoring

Colorado Division of Wildlife

Survey of Critical Biological Resources in Chaffee County

Boreal Toad Monitoring and Survey Project

Statewide Strategies for Colorado Wetlands

Colorado Natural Areas Program

Pagosa Skyrocket Inventory, Monitoring and Conservation

Threatened and Endangered Plant Species Data Development and Field Surveys

Analysis of Mesa Verde sclerocactus monitoring data

Denver Water

Pawnee Montane Skipper Post-fire Habitat Assessment Survey

Great Outdoors Colorado (GOCO)

Survey of Critical Biological Resources in Chaffee County

National Fish and Wildlife Foundation

Rare Plant Conservation Initiative

Pagosa Skyrocket Inventory, Monitoring and Conservation

National Park Service

Vegetation Classification & Mapping of Great Sand Dunes National Park

Plant Species Vouchering for Great Sand Dunes National Park

Review and Evaluation of Proposed National Natural Landmarks

National Park Service Data Management Support

Assistance for NPS Vegetation Inventory Program

NatureServe

CNHP Environmental Review and Data Distribution Projects

LandScope America: The Conservation Guide to America's Natural Places

The Nature Conservancy

Department of Transportation Conservation Easement Monitoring

Rare Plant Conservation Initiative

Measuring Colorado's Biodiversity Health

Statewide Forest Assessment

General support from The Nature Conservancy

Pueblo Springs Ranch, LLC

Rapid Biological Assessment of the Pueblo Springs Ranch

U.S. Bureau of Land Management

Survey of Critical Biological Resources in Chaffee County

Longnose Leopard Lizard and Collared Lizard Movement and habitat use

Rare Plant Survey on BLM Lands, Gateway, Mesa County

Bureau of Land Management Data Processing and Statewide Dataset

U.S. Department of Defense

Central Shortgrass Prairie Ecoregional Assessment and Partnership Initiative

US Air Force Academy Noxious Weed Mapping & Monitoring

Preble's Meadow Jumping Mouse Populations at the U.S. Air Force Academy

U.S. Environmental Protection Agency

Survey of Critical Wetland Resources in Chaffee County

Statewide Strategies for Colorado Wetlands

U.S. Fish and Wildlife Service

Pagosa Skyrocket Inventory, Monitoring and Conservation

Pawnee Montane Skipper Post-fire Habitat Assessment Survey

Threatened and Endangered Plant Species Data Development and Field Surveys

U.S. Forest Service

Boreal Toad Surveys and Habitat Evaluations on Selected Grazing Allotments

Rare Plant Monitoring on San Juan National Forest

Pawnee Montane Skipper Post-fire Habitat Assessment Survey

U.S. Forest Service Region 2 Data Processing and Statewide Dataset

West Hill Foundation for Nature

LandScope America: The Conservation Guide to America's Natural Places



Survey of Critical Biological Resources in Chaffee County

Denise Culver, Delia Malone, and Stephanie Neid

In 2008, Chaffee County became the 31st Colorado county surveyed for critical biological resources by CNHP. With funding from Chaffee County, Great Outdoors Colorado, Colorado Division of Wildlife, the Bureau of Land Management, and the U.S. Environmental Protection Agency, Region 8, the survey included both wetland and upland areas.

Chaffee County has three Potential Conservation Areas (PCA) ranked with an Outstanding Biodiversity Significance (B1) due to the rarity and/or excellent condition of a species. The Middle and South Cottonwood Creek PCA is Colorado's best breeding site for the State Endangered (G4T1QS1) Boreal Toad (*Bufo boreas boreas*). The Castle Gardens and Droney Gulch PCAs are also ranked as outstanding due to the documentation of the critically imperiled (G1G2S1S2) Brandegee wild buckwheat (*Eriogonum brandegeei*), a Colorado endemic and Fendler's townsend-daisy (*Townsendia fendleri*) (G2S2), a regional endemic.

The project increased the number of PCAs in the county to 57 and added 53 new element occurrences and updated 27 known occurrences. The information from the survey is already being used by several land trusts to establish conservation easements for private properties, and also provides an additional data resource for the Chaffee County's Comprehensive Plan.



Rare Plant Survey of Lone Mesa State Park

Peggy Lyon and Jill Handwerk

CNHP worked with Colorado State Parks to collect detailed baseline information on rare and imperiled plants and plant communities found at the new Lone Mesa State Park, in southwestern Colorado.

Work included detailed mapping of imperiled plants and plant communities using GPS, documentation of rare element habitat, quality, condition, and viability, a list of all species observed on the Park (358 as of September 2008), assessment of current and potential threats, and development of a permanent monitoring plan for *Physaria pulvinata*.

An unexpected result was the discovery of a new plant species, published in December 2008 as *Gutierrezia elegans* (Lone Mesa snakeweed). An additional species not yet published, to be named *Physaria cnema* by Steve O'Kane and James Reveal, was also found on the Park.

Vegetation Classification and Mapping of Great Sand Dunes National Park and Preserve

Joe Stevens, Jodie Bell, Karin Decker, Michelle Fink, and Michael Menefee

Since 2005, CNHP has been working with the National Park Service, U.S. Fish and Wildlife Service, U.S. Forest Service, U.S. Bureau of Reclamation, U.S. Geological Service, NatureServe, and The Nature Conservancy to classify and map the diverse vegetation of the Great Sand Dunes National Park and Preserve and its surrounding ecosystem.

The Park and Preserve showcase a wide range of ecosystems on a steep elevational gradient, going from dunes, shrublands, lakes and wetlands at 7,550 feet on the valley floor through montane and subalpine forests to alpine tundra at over 13,000 feet in the space of just three or four miles. The project area boundary encompasses 413,000 acres.

Wrapping up in summer 2009, the final products include a detailed map of the area's vegetation, descriptions of all the classified types, a field key to the vegetation, a database of approximately 800 plots, and a photo database of the plot locations. The map includes about 60 different map classes representing approximately 200 different plant associations.



Great Sand Dunes National Park and Preserve Vascular Plant Inventory and Voucher Collection

Joe Stevens, Elin Franzen, Denise Culver, and Alix Gadd

Under objectives from the National Park Service Biological Inventories Program, CNHP assisted the Great Sand Dunes staff to identify vascular plant species within the Park, and to collect voucher specimens of all known Park species for the Park herbarium.

The 2005 vegetation mapping field work identified 640 plant species from the area; about 200 of these were not yet documented by collections. During the field season of 2008 a total of 87 additional voucher specimens were collected.

A state-rare sedge, slender sedge (*Carex lasiocarpa*, G5S1) was documented, as well as western bitterweed (*Rydbergia (Tetranneuris) brandegeei*), a regional endemic found only in the Sangre DeCristo mountains in Colorado.



Statewide Strategies for Colorado Wetlands

Joanna Lemly

Statewide Strategies for Colorado Wetlands is a collaborative effort by CNHP and the Colorado Division of Wildlife's Wetlands Program that aims to determine the types, abundance, threats to, and level of protection currently provided to Colorado's wetlands and to initiate the process of assessing their ecological condition. The outcome of these efforts will be the development of a statewide strategy for protecting and restoring wetlands in Colorado for the benefit of wetland-dependent wildlife.

This project will pull together existing geospatial data for wetlands in Colorado to establish a single, standardized, centralized database that contains the current knowledge of wetlands in Colorado and will make this data set available via the web to wetland conservation partners statewide. Digital spatial data for wetlands are currently being compiled, and existing paper maps from the National Wetlands Inventory have been scanned and digitized for the Rio Grande Headwaters and North Platte river basin, adding new digital spatial data that were previously unavailable.



In addition, this project will begin to assess the ecological condition of Colorado's wetlands by carrying out a pilot wetland condition assessment in the Rio Grande Headwaters river basin. As part of the pilot assessment, over 115 wetlands were surveyed during the summer of 2008. An additional 60 sites will be targeted during the 2009 field season.

Rapid Biological Assessment of the Pueblo Springs Ranch

John Sovell and Joe Stevens

A recent example of how CNHP works with private landowners to identify sites containing significant biological resources was the 2008 assessment of the 24,000 acre Pueblo Springs Ranch. The owners funded the survey as a proactive planning measure to help conserve these resources during development of the property.

Some species of conservation interest documented on the ranch include the blacktailed prairie dog, Ferruginous Hawk, Loggerhead Shrike, Scaled Quail, and pronghorn. The ranch also has potential habitat for other conservation priority species such as plains leopard frogs and northern leopard frogs.

CNHP's rapid biological assessment highlighted opportunities for reducing the effects of development at the ranch, and ways to contribute to the conservation of biodiversity in the surrounding area.



Rare Plant Survey on Bureau of Land Management Lands, Gateway, Mesa County

Peggy Lyon

In response to the increased development and recreational use of BLM land the Gateway area in Mesa County, CNHP continued a survey for rare plants begun in 2007. Knowing the locations and condition of sensitive plant species is essential to BLM's management planning to reduce impacts on these species.

In 2008, work focused on three priority areas: the Dolores River Canyon, John Brown Canyon, and Unaweep Canyon.

Twenty-nine new rare plant occurrences and three natural communities were documented in 2008, along with eleven updates of known occurrences. Two species, *Astragalus raphaelensis* and *Enneapogon desvauxii*, represent county records for Mesa County.

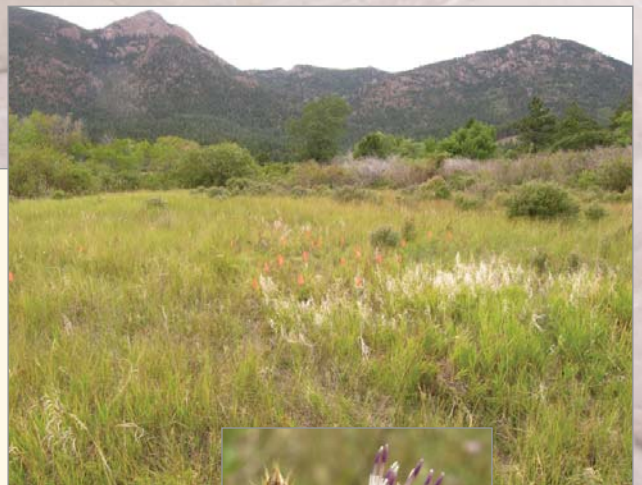


Noxious Weed Monitoring at the U.S. Air Force Academy

David G. Anderson, Amy Lavender, Stephanie Neid, and Renée Rondeau

2009 marks the fifth year of monitoring to measure the effectiveness of weed management activities at the USAFA. In 2008 we made adjustments to our sampling methodology based on analyses of the past three years' data, and streamlined the project to focus resources on the most urgent weed management challenges. Leafy spurge, musk thistle, Scotch thistle, and spotted knapweed continue to spread at the Academy and remain significant weed management challenges. There has been some success with myrtle spurge, common St. Johnswort, Canada thistle, and Russian knapweed, but further work is needed to control and/or eradicate these species at the Academy.

We also established intensive weed monitoring plots at five locations within occurrences of rare plants. Noxious weed targets are present in the vicinity of all target rare plant species but the magnitude and immediacy of the threat they pose to the viability of these occurrences is unknown. We hope to gain insights through monitoring these plots on the nature of interactions between weeds and rare plants that will assist with proactive management of these resources.



Wildlife Survey and Monitoring

Jeremy Siemers

Habitat Use by Bats in Hydromowed Pinyon-Juniper Woodlands

In 2008, CNHP worked with the Bureau of Land Management, Dolores Public Land Office, to conduct a habitat assessment of bat use in hydromowed pinyon-juniper woodlands. Hydromowing is a method of vegetation control used by land managers to thin forest stands. CNHP zoologists documented new roosts for the silver-haired bat (*Lasionycteris noctivagans*) during the course of this study.

Pygmy shrew (*Sorex hoyi*) survey on the White River National Forest

In 2009 CNHP will survey for the pygmy shrew throughout the White River National Forest. Known from fewer than ten locations in Colorado, this species is a species of concern for the Forest Service and is one of Colorado's rarest and least understood mammals.

Maxwell Ranch wind resource area wildlife monitoring

Working with faculty from the Fish, Wildlife, and Conservation Biology Department as well as other CSU departments and federal agencies, CNHP zoologists will be conducting bird, bat, and small mammal surveys at the CSU-owned Maxwell Ranch. Data will be collected to establish a baseline to examine effects of the proposed wind facility on wildlife.



Preble's Meadow Jumping Mouse Populations at the U.S. Air Force Academy

Rob Schorr and Jeremy Siemers



Rob is in his 10th year of mark-recapture sampling of the Preble's meadow jumping mouse population along Monument Creek. In 2008, population sampling was especially challenging due to August flooding on the creek, and the actions of trap-raiding raccoons and bears. Both of these events likely hindered capture of some jumping mice.

Several locations where habitat mitigation measures are being implemented were included in the sampling, but shrub density and ground cover have not yet increased to a level that would sustain jumping mouse use in those locations. We will continue to sample in these areas to document when jumping mice return to the area.

Trapping on the east side of northbound Interstate 25 and on the west side of southbound Interstate 25 demonstrated that jumping mice are utilizing the riparian habitats nearby. Unfortunately, efforts to trap jumping mice between the northbound and southbound lanes were unsuccessful.

In 2009, we hope to begin a systematic sampling of the riparian corridors of the Academy, producing a comprehensive map of jumping mouse presence, and allow us to continue efforts to model jumping mouse occupancy within riparian areas at the Academy.





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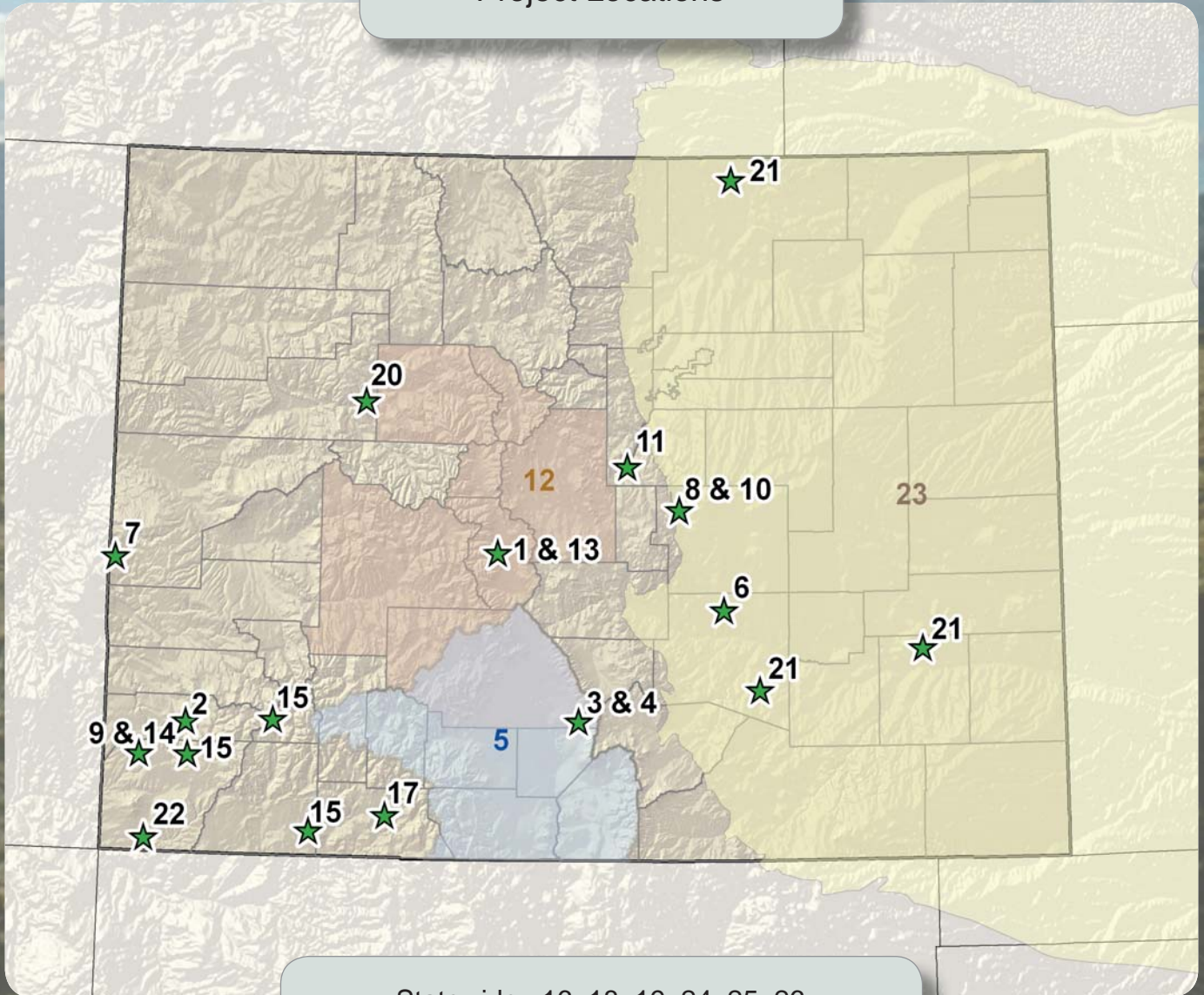
Check our website for reports on these and many other projects, as well as other information about Colorado's biodiversity!

Projects

1. Survey of Critical Biological Resources in Chaffee County
2. Rare Plant Survey of Lone Mesa State Park
3. Vegetation Classification and Mapping of Great Sand Dunes National Park and Preserve
4. Great Sand Dunes National Park and Preserve Vascular Plant Inventory and Voucher Collection
5. Statewide Strategies for Colorado Wetlands
6. Rapid Biological Assessment of the Pueblo Springs Ranch
7. Rare Plant Survey on Bureau of Land Management Lands, Gateway, Mesa County
8. Noxious Weed Monitoring at the U.S. Air Force Academy
9. Wildlife Survey and Monitoring
10. Preble's Meadow Jumping Mouse Populations at the U.S. Air Force Academy
11. Pawnee Montane Skipper Post-fire Habitat Assessment Survey
12. Boreal Toad Monitoring and Survey
13. Boreal Toad Surveys and Habitat Evaluations on Selected Grazing Allotments Managed by the Salida Ranger District, Colorado
14. Longnose Leopard Lizard and Collared Lizard Movement and habitat use in Canyons of the Ancients National Monument
15. Monitoring of Sensitive Plants for the U. S. Forest Service
16. Threatened and Endangered Plant Species Data Development and Field Surveys
17. Pagosa skyrocket Inventory, Monitoring and Conservation
18. Rare Plant Conservation Initiative
19. Colorado's Biodiversity Scorecard
20. Review and Evaluation of Potential National Natural Landmarks
21. Department of Transportation Conservation Easement Monitoring
22. Analysis of Mesa Verde sclerocactus Monitoring Data
23. Central Shortgrass Prairie Ecoregional Assessment and Partnership Initiative
24. Landscape America
25. Statewide Forest Assessment
26. Conservation Data Services and other Support Projects

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Project Locations



Pawnee Montane Skipper Post-fire Habitat Assessment Survey

John Sovell

John has been conducting yearly monitoring of the federally listed threatened Pawnee montane skipper butterfly (*Hesperia leonardus montana*) in the area burned by the Hayman forest fire since the summer of 2002 in Colorado's South Platte River Valley. The fire burned across a significant part of the historical habitat of this rare Colorado butterfly.

After seven years, the general trend since the 2002 fire has been an increase through 2008 in the counts of Pawnee montane skippers, but population numbers are still much lower than those recorded in the 1980's.

Although numbers are low, recent counts in the most severely burned areas show a substantial increase in the skipper population in comparison with the immediate post fire counts, suggesting skippers are beginning to reenter the severely burned areas of the Hayman Fire, an encouraging sign for the conservation of this species.



Boreal Toad Monitoring and Survey

Brad Lambert

Since 1999, CNHP, in partnership with the CDOW, has been monitoring known breeding sites of the state endangered boreal toad (*Bufo boreas*) and surveying locations throughout Colorado for new populations. Data collected helps the Boreal Toad Recovery Team assess the status of the boreal toad in Colorado, and the U.S.

Fish and Wildlife Service evaluate its status for potential federal listing as an endangered species.

In 2008, CNHP monitored 26 known breeding sites in Chaffee, Eagle, and Summit Counties, making repeated visits to collect baseline information on toad numbers and breeding success. In addition, 91 sites throughout Colorado were surveyed for boreal toads, resulting in the documentation of two new breeding sites in Chaffee County.

An ongoing mark-recapture study in the Cottonwood Creek drainage in Chaffee County investigating demographic variables in a large metapopulation of boreal toads was continued. Over 1,500 adult toads have been tagged between 1999 and 2008.



Boreal Toad (*Bufo boreas*) Surveys and Habitat Evaluations on Selected Grazing Allotments Managed by the Salida Ranger District, Colorado

Brad Lambert



In 2008 the United States Forest Service contracted the Colorado Natural Heritage Program to conduct boreal toad field surveys and to evaluate potential habitat in selected grazing allotments on the Salida Ranger District in Chaffee and Saguache Counties. Habitat evaluations for the potential presence of boreal toads are valuable tools for USFS biologists in future management of these grazing allotments.

Between early June and mid September, 57 sites were surveyed for boreal toads. No new boreal toad populations were discovered during these surveys.

Approximately 153 acres within selected grazing allotments were evaluated for boreal toad suitability. Fifty-seven acres were identified as suitable habitat, which gives hope that populations of boreal toads may yet be discovered in these grazing allotments with future survey work.

Longnose Leopard Lizard and Collared Lizard Movement and habitat use in Canyons of the Ancients National Monument

Brad Lambert and Rob Schorr

In 2008, CNHP collaborated with the BLM in a radio telemetry project to collect information on habitat use and movement by the rare longnose leopard lizard and the sympatric (common) collared lizard on the BLM managed Canyons of the Ancients National Monument (CANM) in Montezuma County. CNHP assisted with capture, radio transmitter attachment and data analysis, while BLM biologists conducted the daily tracking and data collection.



Radio transmitters were attached to 8 longnose leopard lizards and 6 collared lizards between June 23rd and June 25th on Rinsley Mesa within the CANM and tracked daily through July 21st. Vegetation and other habitat variables were recorded at each capture location.

Preliminary analysis shows that longnose leopard lizards made greater movements and maintained larger home ranges than the collared lizards. Additional analysis is currently being conducted on habitat use by the two lizard species.

Monitoring of Sensitive Plants for the U. S. Forest Service

Peggy Lyon and Janis Huggins

As a follow-up to years of rare plant inventory, the San Juan National Forest is now taking its stewardship of sensitive plant species to the next level by establishing permanent monitoring sites to assess the viability of its special plants.

This multi-year project focused on eleven USFS sensitive species: *Astragalus missouriensis* ssp. *humistratus*, *Astragalus proximus*, *Draba smithii*, *Epipactis gigantea*, *Eriophorum altaicum* ssp. *neogaeum*, *Eriophorum chamissonis*, *Lesquerella pruinosa*, *Machaeranthera coloradoensis*, *Physaria pulvinata*, and *Triteleia grandiflora*.

Continuing the work begun in 2007, CNHP established eight additional permanent transects for five sensitive plant species in 2008. Sites will be re-visited on two to five year intervals, and any changes in population size or health will provide essential information for the Forest's management of these unique resources. CNHP also provided an assessment of threats and recommendations for management and future monitoring.



Threatened and Endangered Plant Species Data Development and Field Surveys

Jill Handwerk and Peggy Lyon

An on-going partnership between CNHP, the Colorado Natural Areas Program, and the U.S. Fish and Wildlife Service develops and manages biological and conservation data on federally-listed Threatened (LT), Endangered (LE), and Candidate (C) plant species occurring in Colorado, integrating all element occurrence data into a single comprehensive source.

In 2008, element occurrence data for *Astragalus humillimus* (LE), *Eutrema penlandii* (LT), *Oenothera acutissima*, *Sclerocactus mesae-verde* (LT), and *Spiranthes diluvialis* (LT), were updated. Field surveys were conducted for potential candidate and candidate species including *Astragalus equisolensis*, *Cryptantha gypsophila*, *Lygodesmia doloresensis*, *Physaria pulvinata*, and *Phacelia submutica*.

Data were provided to the USFWS and CNAP via an ArcMap Hyperlink Tool which links a GIS shape to its associated text file containing tabular data for that particular element occurrence.



***Ipomopsis polyantha* inventory, monitoring and conservation**

Peggy Lyon and Jill Handwerk

Ipomopsis polyantha (Pagosa skyrocket) is an extremely narrow endemic known from three populations in the vicinity of Pagosa Springs, Colorado, where it occurs on sparsely vegetated or barren Mancos Shale, often where there has been some natural or anthropogenic disturbance, such as on highway right-of-ways.

In 2008 CNHP re-surveyed sites from the previous year, and set up permanent transects on new sites.

Surveys show that the species undergoes extreme fluctuations from year to year, and researchers concluded that for effective conservation we need to know more about its life cycle. How long will a new plant remain as a basal rosette before producing a flower stalk? How long does it live? How do variations in population sizes correlate with environmental variables such as precipitation, temperature and disturbance? To investigate these questions, we began a demographic study in which tagged individual plants will be measured annually.



Rare Plant Conservation Initiative: Saving Colorado's Wildflowers

Susan Spackman Panjabi, Jill Handwerk, and Peggy Lyon

COLORADO RARE PLANT CONSERVATION STRATEGY



BY: THE RARE PLANT CONSERVATION INITIATIVE | MAY 2009

The Colorado Natural Heritage Program botany team is working with numerous partners to conserve Colorado's most vulnerable native plant species, and to secure a long-term funding source to facilitate conservation, education, and research (e.g., inventory, monitoring) for these vulnerable species.

With at least 215 species currently considered vulnerable to extinction in Colorado, and soaring human population growth and associated developments, Colorado's plants need attention. Although 13 species are federally listed as threatened or endangered, there is no legal protection for plants on the state level in Colorado, and federal protections do not generally apply to private lands.

Our overall approach includes: 1) securing on-the-ground protection for plant species and their habitats by prioritizing species, developing appropriate strategies, and taking conservation action on both private and public lands; and 2) developing an overall statewide strategy for long-term conservation of native plants in Colorado including potential legislative initiatives and appropriations. CNHP's Biodiversity Scorecard analysis for Colorado rare plants was used in developing the strategy.

The Colorado Rare Plant Conservation Strategy was published in May 2009, and is available at:

<http://conserveonline.org/workspaces/corareplantinitiative/documents/>

Colorado's Biodiversity Scorecard

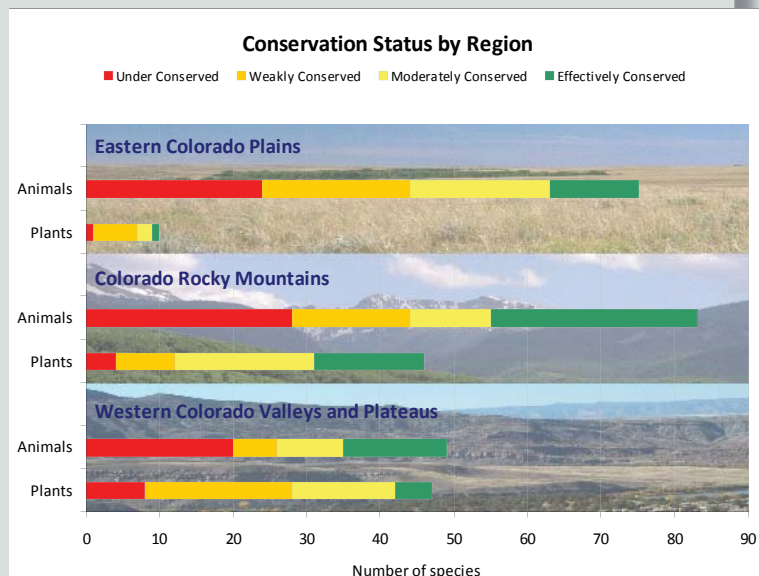
CNHP provided The Nature Conservancy with the results of our multi-year analysis of Colorado's Biodiversity health. We evaluated the status of 103 rare plants, 170 animal species of concern, and 11 ecosystem types under three broad categories: 1) Biodiversity Status – including abundance and quality, 2) Threat status – current and potential future impacts, and 3) Protection/Land management Status.

Plants, animals, and ecological systems can only be considered effectively conserved when their biodiversity status is viable, threats have been abated, and land management/protection is sufficient to ensure the long-term persistence of the element.

The majority of rare plant species received good to very good scores in at least two of the conservation status categories, and most can be considered reasonably well conserved. However, of the species having a significant portion of their range in Colorado, nearly half are poorly or weakly conserved. Fortunately, we still have high quality occurrences of many of these species, which gives us the opportunity to improve our rare plant grade through prompt conservation action.

About half of Colorado's animal species of concern are weakly or poorly conserved under at least one of the three conservation status categories. Animals associated with wetlands are the most likely to be in need of conservation action.

Our analysis indicates that the common and widespread ecological systems in Colorado are generally of good to high quality and part of functional landscapes. Although we have lost substantial parts of ecosystems in the eastern plains and Front Range, there are still some very large, high quality areas that present excellent opportunities for conservation.



Review and Evaluation of the National Park Service's Potential Natural Natural Landmarks

Karin Decker, Joe Stevens, Jodie Bell, John Sovell

The National Park Service established the National Natural Landmarks program in 1962 to document and encourage preservation of sites possessing the best remaining examples of the biological and geological features of America's natural landscape. There are currently ten designated Landmarks in Colorado, and CNHP is assisting the NPS to increase this number.



In 2008, the Hanging Lake site in Garfield County was evaluated and recommended for designation as a National Natural Landmark in the Southern Rocky Mountain biophysiological province.

Hanging Lake is associated with a series of travertine falls on Dead Horse Creek above the Colorado River in Glenwood Canyon. Hanging Lake is an example of an active 'travertine-depositing system' that has resulted in the formation of a beautiful natural lake and waterfalls. The site is also one of the larger and least altered travertine systems in the area, where natural geologic and hydrologic processes continue to operate as they have done throughout the history of the lake.

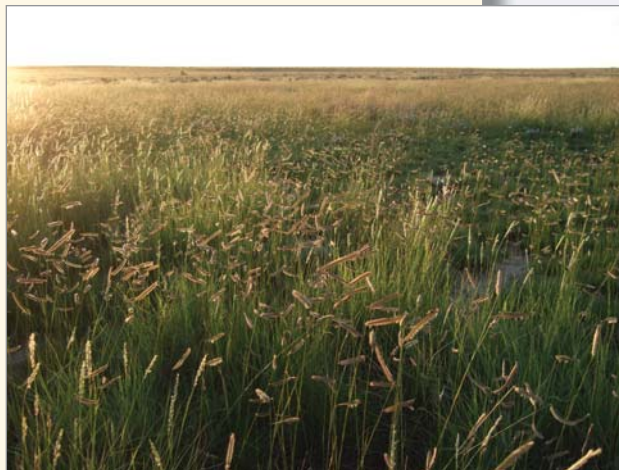
Department of Transportation Conservation Easement Monitoring

Renée Rondeau, Lee Grunau, and Karin Decker

CNHP continued annual monitoring on three conservation easements in eastern Colorado. The easements are held by The Nature Conservancy and were funded by the Colorado Department of Transportation as part of CDOT's Shortgrass Prairie Initiative.

These easements were established on private ranches to protect habitat for a suite of declining prairie species. Target species include McCown's longspur, box turtle, bald eagle, burrowing owl, Cassin's sparrow, ferruginous hawk, lark bunting, loggerhead shrike, long-billed curlew, mountain plover, black-tailed prairie dog, massasauga, and Texas horned lizard.

This year marked the end of the initial monitoring period for these easements, which is intended to establish a baseline of current conditions for comparison with monitoring results in future years.

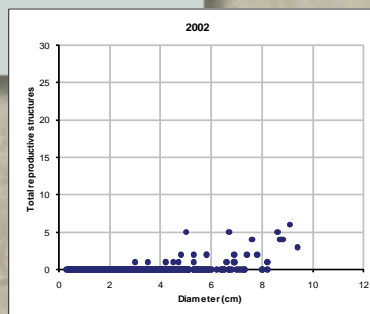
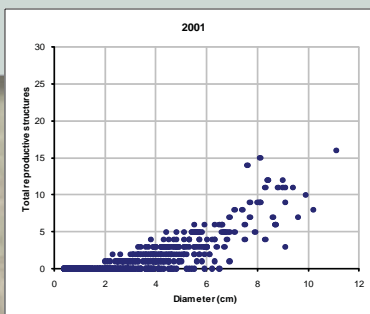
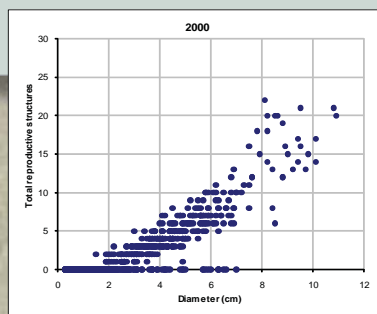


Analysis of 20-year dataset from *Sclerocactus mesa-verdae* monitoring.

Karin Decker

The Colorado Natural Areas Program, with financial support from the U.S. Fish and Wildlife Service (USFWS) and in-kind support from the Colorado Native Plant Society, completed a 20-year demographic monitoring study of the Mesa Verde Cactus (*Sclerocactus mesa-verdae*) in 2005.

CNHP is analyzing all demographic data collected during the 20-year monitoring project. Growth, mortality, and reproduction patterns were tracked annually for more than 1600 marked stems in three plots in south-western Colorado. Although annual progress summaries were completed during the course of the monitoring program, this will be the first complete published summary of the results of the study.

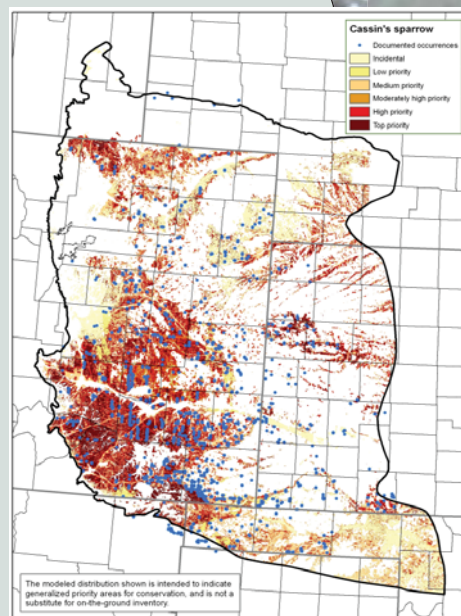


Central Shortgrass Prairie Ecoregional Assessment and Partnership Initiative

Lee Grunau, Karin Decker, Michelle Fink, and Renée Rondeau

As a member of the Shortgrass Prairie Partnership, a diverse group of 17 public land managers, public agencies, private organizations, and private landowners, CNHP has been contributing since 2004 to efforts to support the long-term viability of the native species, natural communities, and ecosystems of the Central Shortgrass Prairie ecoregion while promoting economically productive landscapes that sustain local communities. The overall goal of this project is to develop a conservation program, using both new and traditional tools, to facilitate proactive, voluntary, collaborative conservation of multiple species-at-risk in the ecoregion.

During the most recent phase of work CNHP staff helped identify species-at-risk that occur on DoD lands in the ecoregion, and developed maps of potential habitat for these species throughout the area. A focused impact assessment for each species was applied to the habitat maps to prioritize geographic areas with the greatest probability for conservation success, and to develop individual species scorecards based on status, threats and level of protection, to measure progress and demonstrate success toward conservation goals over time.

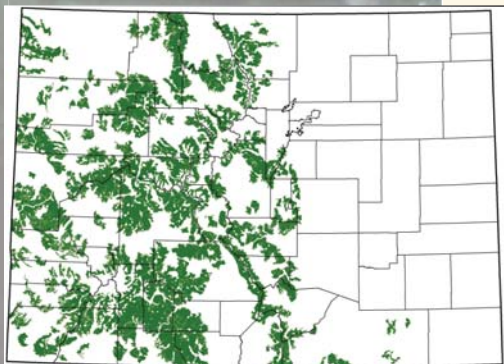


Statewide Forest Assessment: Identifying Important Fish and Wildlife Areas Associated with Colorado Forests

Renée Rondeau, Michelle Fink, Lee Grunau, and Karin Decker

CNHP has partnered with The Nature Conservancy and the Colorado State Forest Service to identify forested landscapes that significantly contribute to the sustainability of Colorado's native biological diversity.

The project seeks to identify forest landscapes that represent or contribute to viable wildlife habitat, contain high species richness, endemism, and/or that represent core habitat for focal conservation species. All these data will be used to support future conservation projects through one or more voluntary, incentive-based programs, potentially including development of grass cooperatives and impact offset programs.



LandScope America: The Conservation Guide to America's Natural Places

Lee Grunau, Michael Menefee, and Renée Rondeau

LandScope America is an online conservation and educational guide for the land protection community and the public. This collaborative effort between NatureServe and the National Geographic Society is designed to increase the pace and effectiveness of land-protection investments in every state by offering a website that informs and inspires collaborative place-based conservation.

Colorado is one of five pilot states selected to assist with implementation of LandScope America. The site features a state-of-the-art map viewer that integrates detailed maps, text, photos, statistics, audio, and video about America's natural places. LandScope America will be a valuable resource for anyone working on land protection, and will provide a set of useful online tools for conservation planning and priority-setting by integrating, mapping, and viewing conservation priorities identified through multiple initiatives, at local, regional, and national scales.

The preview is available at www.landscape.org/colorado/. The official site launch is scheduled for Summer 2009.



Conservation Data Services and other Support Projects

Melissa Landon, Fagan Johnson, Amy Lavender, Michael Menefee, Michelle Fink, and Garrett Pichler

Data Management Support:

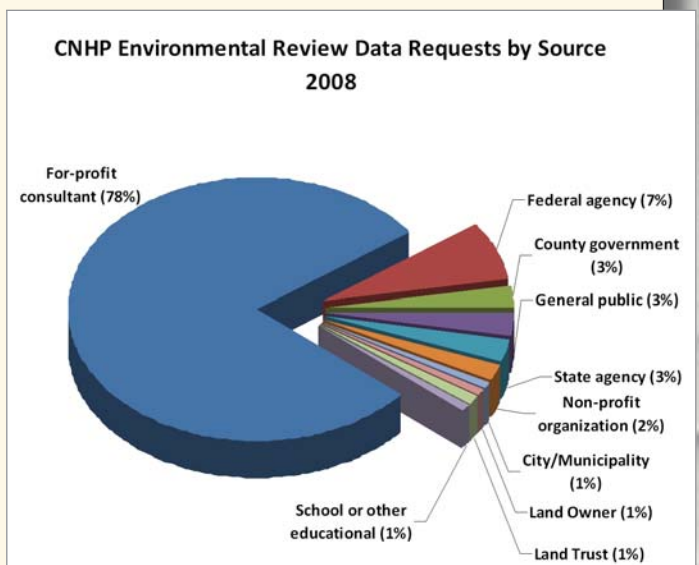
CNHP has an on-going partnership with both the National Park Service and the Bureau of Land Management to develop and maintain national databases for threatened and endangered species, Species of Management Concern, and Invasive Animals in units managed by these agencies. CNHP also provides support and training to NPS and BLM personnel to utilize the data and summary statistics to comply with annual reporting requirements.

Data Processing and Statewide Datasets:

We provide US Forest Service and Bureau of Land Management personnel with a comprehensive dataset for public lands within Colorado once per year. As part of this partnership, we also provide data and expertise on revisions to the USFS Sensitive Species list and the BLM Sensitive/Special Status Species list, comment on the potential impacts of USFS and BLM projects and management plans, and work with the USFS and BLM to continually improve data management and distribution methods and tools.

CNHP Data Distribution and Environmental Review Projects:

CNHP maintains the most comprehensive spatial database of element occurrence locations for sensitive species and natural communities for the state of Colorado, as well as an extensive library of publications available for distribution, with subjects ranging from county biological inventories to rare plant field guides. For a nominal fee, CNHP will conduct a spatial search of our Biodiversity Tracking and Conservation System (BIOTICS) database for documented records of rare species, natural communities and critical conservation sites near or in a given project site. CNHP furnishes our clients with life history and habitat information for all tracked species and communities, as well as their legal protection status with various federal and state agencies. CNHP also supplies conservation site reports, custom mapping, spatial data and supporting tabular data for a wide variety of environmental review projects each year. Our information serves as a vital resource for a variety of planning, natural science, and information technology professionals.



During 2008, CNHP handled about 110 data requests for a variety of projects in both the public and private sector. In terms of total requests, for-profit consultants made up more than three quarters of all data requests (see chart), and federal agencies were the next largest sources for data inquiries.

National Park Service Vegetation Inventory Program Support:

The National Park Service is collaborating with Colorado Natural Heritage Program in employing an assistant manager position in the Vegetation Inventory Program. CNHP is providing technical writing and editing assistance in the production of final reports to the Northern Colorado Plateau Inventory and Monitoring Network. In addition, Colorado Natural Heritage Program staff has been involved on various projects including database design and programming, data management, and formatting of final products for the NPS Vegetation Inventory Program.

General Support for The Nature Conservancy:

Although the Colorado Natural Heritage Program has been part of Colorado State University since 1994, we have maintained close ties with The Nature Conservancy since their inception of the Natural Heritage Programs in the 1970s. The continuing support of The Nature Conservancy through our General Support agreement allows this conservation partnership to flourish. CNHP has been extremely active with TNC's ecoregional assessment effort, measures of success, and local scale conservation planning.



Colorado Natural Heritage Program

Connecting Conservation and Science

With numerous projects every year, CNHP has the opportunity to work in all of Colorado's habitats including high and low elevations, wet and dry habitats, and all four corners of the state. Along with the varied terrain, we also work with a variety of subjects that include all major taxonomic groups and ecological communities. The common thread that ties all of these inventory, monitoring, and planning projects together is our commitment to providing quality conservation science.

Throughout all of our projects we try to answer the following questions:

- 1. What species and ecological communities exist in Colorado?**
- 2. Which are at greatest risk of extinction?**
- 3. What are their biological and ecological characteristics?**
- 4. Where are they found?**
- 5. What is their condition at those locations?**
- 6. What processes or activities are sustaining or threatening them?**
- 7. Where are the most important sites to protect?**
- 8. What actions are needed for the protection of those sites?**

These basic questions are important to carrying out biodiversity conservation efforts, and are at the core of all Natural Heritage Programs. As you read through these abstracts you will see this foundation in all of our projects.