2013-2014 Partners Meeting

USGS Fort Collins Science Center
January 14, 2014
10:00AM-3:30PM

Colorado Natural Heritage Program
Colorado State University
www.cnhp.colostate.edu
Purpose of Today’s Meeting

• Connect the key members of Colorado’s Conservation Community
• Updates from CNHP and Partners on current activities
• Highlight successful partnerships
• Discuss the future: how can we all do a better job of achieving conservation goals?
Acknowledgments

• USGS- Jeff Morisette, Shelby Vallejo
• Ken Wilson and the FWCB Department
• Allan Cox, Montana NHP
• Lee Grunau, CNHP
• And of course, you!
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00-10:30</td>
<td>Welcome</td>
</tr>
<tr>
<td>10:30-11:30</td>
<td>CNHP Highlights</td>
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<tr>
<td>11:30-12:00</td>
<td>Directions for the future</td>
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<tr>
<td>12:00-1:00</td>
<td>Lunch on-site</td>
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<tr>
<td>1:00-1:05</td>
<td>Welcome from Joyce Berry</td>
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<tr>
<td>1:05-2:30</td>
<td>Partner Presentations</td>
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<tr>
<td>2:30-3:15</td>
<td>Moderated Partner Roundtable</td>
</tr>
<tr>
<td>3:15-3:30</td>
<td>Summary and Wrap-Up</td>
</tr>
<tr>
<td>3:30-?</td>
<td>Happy Hour at El Monte Grill</td>
</tr>
</tbody>
</table>
What is CNHP?

- Service, research, teaching, extension
- Self funded

Fish, Wildlife, and Conservation Biology
Human Dimensions of Natural Resources
Ecosystem Science and Sustainability
Forest and Rangeland Stewardship
Geosciences
What is CNHP?

- Objective and Science-based
- Support conservation, management and development with science, information, and data
- Five Teams:
  - Botany
  - Ecology
  - Zoology
  - Conservation Data Services
  - Conservation Planning
The Five Key Biodiversity Conservation Questions

1. What species and ecosystems exist?
2. Which are at risk or otherwise significant?
3. Where precisely are those found?
4. How are they doing at those locations?
5. What are the most important and urgent places to protect?
How do we answer these questions?

• Build and share data on the location, status, and conservation priority of Colorado’s rare and imperiled species

• Field surveys
• Monitoring
• Scientific research
• Spatial analysis
• Modeling
• Planning
• Database development
• Payment for Ecosystem Services

• Climate change assessment
• Citizen science
• Mapping
• Online mapping tools
• Protected areas data management
• Disaster assistance
• Restoration and reclamation
• Teaching
• Career development
Colorado’s Element Occurrences
Colorado’s Potential Conservation Areas

Biodiversity Significance Rank

- B1: Outstanding Biodiversity Significance
- B2: Very High Biodiversity Significance
- B3: High Biodiversity Significance
- B4: Moderate Biodiversity Significance
- B5: General Biodiversity Interest
What is CNHP?

• We work through partnerships

• We work with all segments of the conservation community
  – Today, we have 75 RSVPs
  – 32 Different Entities:
    • Federal
    • State
    • Local
    • Educational Institutions
    • Land trusts
    • Conservation Organizations
Topology of Social Networks

- Centralized (A)
- Decentralized (B)
- Distributed (C)

[Diagram showing various network topologies]
Botany Team

Jill Handwerk, Botany Team Leader
Colorado Natural Heritage Program
www.cnhp.colostate.edu
Botany Team Members

Jill Handwerk, Botany Team Leader and Information Manager

Bernadette Kuhn, Botanist

Pamela Smith, Botanist

Susan Spackman-Panjabi, Botanist

Delia Malone, West Slope Ecologist and Botanist

Denise Culver, Collaborating Ecologist
Core Functions:

- Rare Plant Database
- Rare Plant Surveys
- County Inventories
- Vegetation/Rare Plant Monitoring
- Habitat Modeling
- Climate Change Vulnerability Assessments
- Weed Research and Mapping
- Outreach
Rare Plant Database

BIOTICS
• 500+ tracked species
• 5000 element occurrences
• 13,500+ mapped locations

Rare Plant Guide
Rare Plant Symposium
Rare Plant Conservation Initiative
Best Management Practices
USFS R2 Species Assessments
Rare Plant Surveys

• Focus on G1-G2, Federally listed and Sensitive species
• Over 25 years of data compilation
• Results support ACEC, RNA and Colorado Natural Area designations
County Surveys of Critical Biological Resources

• Focus on private lands; G1-G2, Federally listed and sensitive species
• 38 counties surveyed
• Results support open space, natural areas and National Park designations
Vegetation/Rare Plant Monitoring

- Assess habitat condition and demographic trends of imperiled species
- Monitor vegetation changes over time in response to management activities
- Results guide land management decisions and species conservation
Habitat Modeling

- Developed with Maxent and CART methodology
- Spatial data available to land managers
- Results guide rare plant habitat conservation in areas of intensive energy development

Predicted suitable habitat for *Physaria obcordata*, random forest (CART) models.
Climate Change Vulnerability Assessments

- Over 150 G1-G2, Federally listed and Sensitive plant species assessed so far
- Use NatureServe CCVI tool
- Results guide species adaptation strategies

<table>
<thead>
<tr>
<th>Species</th>
<th>Common Name</th>
<th>Ecosystem</th>
<th>Index Score</th>
<th>Confidence</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Aliciella sedifolia</em></td>
<td>Stonecrop gilia</td>
<td>Alpine</td>
<td>Extremely Vulnerable</td>
<td>L</td>
</tr>
<tr>
<td><em>Astragalus anisus</em></td>
<td>Gunnison milkvetch</td>
<td>Low elevation sagebrush</td>
<td>Presumed Stable</td>
<td>M</td>
</tr>
<tr>
<td><em>Astragalus iodopterus</em></td>
<td>Violet milkvetch</td>
<td>Montane sagebrush</td>
<td>Extremely Vulnerable</td>
<td>M</td>
</tr>
<tr>
<td><em>Astragalus microcymbus</em></td>
<td>Skiff milkvetch</td>
<td>Low elevation sagebrush</td>
<td>Extremely Vulnerable</td>
<td>H</td>
</tr>
<tr>
<td><em>Astragalus molybdenus</em></td>
<td>Leadville Milkvetch</td>
<td>Alpine</td>
<td>Extremely Vulnerable</td>
<td>M</td>
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<tr>
<td><em>Boechera crandalli</em></td>
<td>Crandall’s rock cress</td>
<td>Low elevation sagebrush</td>
<td>Highly Vulnerable</td>
<td>L</td>
</tr>
<tr>
<td><em>Botrychium echo</em></td>
<td>Reflected moonwort</td>
<td>Spruce-fir; Alpine</td>
<td>Moderately Vulnerable</td>
<td>M</td>
</tr>
<tr>
<td><em>Botrychium furcatum</em></td>
<td>Forkleaved moonwort</td>
<td>Spruce-fir</td>
<td>Moderately Vulnerable</td>
<td>L</td>
</tr>
<tr>
<td><em>Botrychium minganense</em></td>
<td>Mingan’s moonwort</td>
<td>Spruce-fir; Alpine</td>
<td>Moderately Vulnerable</td>
<td>M</td>
</tr>
<tr>
<td><em>Botrychium pallidum</em></td>
<td>Pale moonwort</td>
<td>Spruce-fir; Alpine</td>
<td>Moderately Vulnerable</td>
<td>M</td>
</tr>
<tr>
<td><em>Botrychium paradoxum</em></td>
<td>Peculiar moonwort</td>
<td>Spruce-fir; Alpine</td>
<td>Extremely Vulnerable</td>
<td>H</td>
</tr>
<tr>
<td><em>Botrychium pinnatum</em></td>
<td>Northern moonwort</td>
<td>Spruce-fir; Alpine</td>
<td>Moderately Vulnerable</td>
<td>M</td>
</tr>
<tr>
<td><em>Braya globella subsp. globella</em></td>
<td>Arctic braya</td>
<td>Alpine</td>
<td>Extremely Vulnerable</td>
<td>M</td>
</tr>
</tbody>
</table>
Weed Research and Mapping

- Weed surveys and mapping to sub-meter accuracy
- Monitoring to assess treatment efficacy
- Results inform land management planning
Outreach

• CoNPS plant identification workshops

• Native Plant Master classes

• Adopt-a-Rare-Plant

• BioBlitz participation
Future Directions

• All counties surveyed
• Continue work in areas with energy development
• Expand monitoring efforts to include response to climate change
• Support incorporation of plants into the SWAP
• Climate change vulnerability assessments and habitat modeling for all tracked plant species
• Eliminate data backlog
• Expand weed monitoring and mapping
• Exotics database
Ecology Team

Joe Stevens, Ecology Team Leader
Colorado Natural Heritage Program
www.cnhp.colostate.edu
Ecology Team Members

Joe Stevens, Ecology Team Leader and Project Manager
Vegetation Ecologist

Joanna Lemly, Wetland Ecologist
Sub-Team Lead and Project Manager

Denise Culver, Ecologist and Botanist
Lead author on wetland plant field guides, over 15 years experience managing County Surveys.

Delia Malone, Ecologist and Botanist
West slope field office
Ecology Team Members

Laurie Gilligan, Wetland Ecologist
Field lead for condition assessment projects, protocol development, training, and data analysis.

Gabrielle Smith, Wetland / GIS Specialist
Wetland mapping and spatial analysis, lead on developing online data sharing tools.

Jeremy Sueltenfuss, Wetland / GIS Specialist
Wetland mapping and restoration specialist, lead on developing restoration prioritization tools.

Renee Rondeau, Collaborating Ecologist
Conservation Planning Team Leader, West Slope Field Office
Ecology Team Overview

Core Mission:
• To document, classify, and assess native ecosystems in Colorado and the west, and to disseminate this information to public and private partners engaged in land management and conservation.

Core Functions:
• Natural Communities Database
• US National Vegetation Classification
• Vegetation Inventories
• Restoration Studies
• Monitoring Studies
• Wetland Studies
Natural Communities Database

Biotics:

- 3,608 Community Element Occurrence Records
- 544 Tracked Natural Communities
- 5,338 Mapped Locations
- US NVC Associations
- NatureServe Ecological Systems
## US National Vegetation Classification

**USNVC:**
- The Nature Conservancy
- NatureServe, FGDC, ESA, State Heritage Programs, Federal Agency Partners
- 2008 Revised Hierarchy
- Federal Geographic Data Committee Standard

<table>
<thead>
<tr>
<th>Hierarchy Level</th>
<th>Criteria</th>
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<tbody>
<tr>
<td><strong>Upper:</strong></td>
<td></td>
</tr>
</tbody>
</table>
| L1 - Formation Class | Physiognomy plays a predominant role  
Broad combinations of general dominant growth forms. |
| L2 - Formation Subclass | Combinations of general dominant and diagnostic growth forms. |
| L3 – Formation | Combinations of dominant and diagnostic growth forms. |
| **Middle:**     |          |
| L4 – Division | Floristics and physiognomy play predominant roles  
Combinations of dominant and diagnostic growth forms and a broad set of diagnostic plant species. |
| L5 – Macrogroup | Combinations of moderate sets of diagnostic plant species and diagnostic growth forms. |
| L6 – Group | Combinations of relatively narrow sets of diagnostic plant species (including dominants and co-dominants), broadly similar composition, and diagnostic growth forms. |
| **Lower:**      |          |
| L7 - Alliance | Floristics plays a predominant role  
Diagnostic species, including some from the dominant growth form or layer, and moderately similar composition. |
| L8 - Association | Diagnostic species, usually from multiple growth forms or layers, and more narrowly similar composition. |

[www.usnvc.org](http://www.usnvc.org)
County Biological Inventories

Natural Community inventories in 38 Counties

Funding from GOCO, EPA, USFS, BLM, CPW, the Counties, and others

Final Report
Mapped Locations
Quality Ranks
Conservation Guidance

Land Planning and Land Use Decisions
Rocky Mountain National Park

Great Sand Dunes National Park and Preserve

Bent’s Old Fort and Sand Creek Massacre National Historic Sites

Bighorn Canyon National Recreation Area

Lake Mead National Recreation Area
Restoration Studies

Colorado Springs Utilities
Southern Delivery System

Rare Species Concerns
Restoration Specification Review
Seed Mix Species Recommendations
Pre Disturbance and Post Restoration Evaluations
GLORIA High Elevation Climate Change Monitoring
  Yellowstone NP
  Grand Teton NP
  Rocky Mountain NP
  Great Sand Dunes NP&P

Vegetation Monitoring
  Lesser Prairie Chicken
  Pueblo Chemical Depot
  TNC-CDOT Conservation Easements
  TNC Wetland Restoration
Wetland Studies

Ecology Team Wetland Group...
Strategic Directions

1. Wetland Types
2. Extent and Location
3. Wetland Assessment Methods
4. Wetland Condition Assessment
5. Biodiversity Significance
6. Empowering Public and Private Partners
Wetland Types: Classification and Identification

Wetland Types: Classification and Identification

Wetland Types: Classification and Identification

Wetland Types: Classification and Identification

- Colorado Wetland Information Center
- Colorado Wetland Mobile App

Scientific Name

- Allium schoenoprasum var. sibiricum
- wild chives
- Liliaceae (Liliaceae)

Calypso bulbosa
- fairy slipper
- Orchidaceae

Cypripedium pubescens
- yellow lady's slipper
- Orchidaceae (Cypripediaceae)

Epipactis gigantea
- stream orchid
- Orchidaceae

Photo credit: Al Schneider Southwestern Colorado Wildflowers

Denise R. Culver & Joanna M. Lemly
Extent and Location: Wetland Mapping

Classification of Wetlands and Deepwater Habitats of the United States

U.S. Department of the Interior
Fish and Wildlife Service
Less than 15% digital in 2008
100% digital by end of 2014
Wetland Condition: Assessment Methods

**Modeling**
- Landscape Integrity Model (LIM)

**Field Studies**
- Ecological Integrity Assessment (EIA)
- Floristic Quality Assessment (FQA)
- Vegetation Index of Biotic Condition (VIBI)
Wetland Condition: Basin Assessments

Field Surveys

- Targeted “reference” wetlands
- Randomly selected wetlands
  - Vegetation surveys
  - Soil pits
  - Basic water chemistry
  - Landscape and local scale stressors
  - Habitat quality indices
Biodiversity Significance: County Surveys

Counties Inventoried by the Colorado Natural Heritage Program

<table>
<thead>
<tr>
<th>County</th>
<th>Inventory Year(s)</th>
</tr>
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<tbody>
<tr>
<td>Moffat</td>
<td>2009</td>
</tr>
<tr>
<td>Routt</td>
<td>1995</td>
</tr>
<tr>
<td>Jackson</td>
<td>2009</td>
</tr>
<tr>
<td>Larimer</td>
<td>1996 and 2004</td>
</tr>
<tr>
<td>Boulder</td>
<td>2007</td>
</tr>
<tr>
<td>Broomfield</td>
<td>2007</td>
</tr>
<tr>
<td>Weld</td>
<td>2010</td>
</tr>
<tr>
<td>Logan</td>
<td>2011</td>
</tr>
<tr>
<td>Sedgwick</td>
<td>2013</td>
</tr>
<tr>
<td>Logan</td>
<td>2007</td>
</tr>
<tr>
<td>SEDGWICK</td>
<td>2013</td>
</tr>
<tr>
<td>Phillips</td>
<td>2007</td>
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<tr>
<td>Adams</td>
<td>2007</td>
</tr>
<tr>
<td>Washington</td>
<td>2007</td>
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<tr>
<td>Yuma</td>
<td>2007</td>
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<tr>
<td>Denver</td>
<td>2007</td>
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<tr>
<td>Arapahoe</td>
<td>2007</td>
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<tr>
<td>Elbert</td>
<td>2007</td>
</tr>
<tr>
<td>Douglas</td>
<td>2007</td>
</tr>
<tr>
<td>El Paso</td>
<td>2007</td>
</tr>
<tr>
<td>Lincoln</td>
<td>2007</td>
</tr>
<tr>
<td>Cheyenne</td>
<td>2007</td>
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<tr>
<td>Kiowa</td>
<td>2007</td>
</tr>
<tr>
<td>Bent</td>
<td>2007</td>
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<tr>
<td>Prowers</td>
<td>2007</td>
</tr>
<tr>
<td>Baca</td>
<td>2007</td>
</tr>
<tr>
<td>Costilla</td>
<td>2003</td>
</tr>
<tr>
<td>Huerfano</td>
<td>2007 and 2008</td>
</tr>
<tr>
<td>Costilla</td>
<td>2003</td>
</tr>
<tr>
<td>Las Animas</td>
<td>2007 and 2008</td>
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</table>

Type of Inventory:
- Comprehensive
- Wetland Focus
- Upland Focus
- Proposed

Version Date: September 30, 2013
Empowering Partners: Data into Decisions

**CNHP Projects**
- Randomized Wetland Assessments
- Targeted Wetland Assessments
- Watershed Approach to Wetland Mitigation

**Partners**
- CPW
- USFS National Forest
- ACOE/ EPA / CDOT

**Benefits**
- Prioritization of Wetland Restoration Funding
- Prioritize Management Actions
- Mitigation Decision Making and Review Criteria
Future Directions

Statewide Collaborative Wetland Program Plan

Watershed Planning Toolbox

Wetland Water Quality Research

Statewide Reference Network
Zoology

Jeremy Siemers
Colorado Natural Heritage Program
Colorado State University
www.cnhp.colostate.edu
CNHP’s Zoology Team

**Jeremy Siemers, Zoologist & Team Leader**
- Bat Projects
- Vertebrate Ranking & Assessment

**Brad Lambert, Herpetologist**
- Boreal Toad
- Amphibian & Reptile Inventory

**Rob Schorr, Animal Ecologist**
- Preble’s Meadow Jumping Mouse
- Bat Projects

**John Sovell, Invertebrate Zoologist & Animal Ecologist**
- Pawnee Montane Skipper
- County Inventories
CNHP’s Zoology Team

Core Functions

• Animal Conservation Ranking and Mapping

• Inventory to identify new populations

• Monitoring the condition of animal populations

• Research to answer questions of conservation and management interest
Zoology Inventory

Current & Recent Inventory Projects

- County & Local Government Inventories
- Boreal Toad breeding site inventory
- Pygmy Shrew inventory on USFS lands
- Buckley AFB Bird Inventory
- State Land Board Stewardship Trust
- Southeastern Colorado Inventory
- Lowry Range Inventory
- Small Mammal Atlas
- Pygmy Rabbit survey
**Zoology Monitoring**

**Current & Recent Monitoring Projects**

- Boreal Toad breeding site monitoring
- Preble’s Meadow Jumping Mouse population monitoring on USAFA
- Pawnee Montane Skipper
- White-nose Syndrome surveillance
- Lesser Prairie Chicken habitat monitoring
- Prairie reptile and bird habitat monitoring
- Occupancy of amphibians on Routt NF
Zoology Monitoring

**Boreal Toad**

- Chaffee County
- Mark-recapture of largest population in Colorado
- 15 years
- Population trend
- Chytrid fungus surveillance

**Recent Publications**

- **Pilliod et al. 2010.** Effects of amphibian chytrid fungus on individual survival probability in wild boreal toads. *Conservation Biology.*
- **Scherer et al. 2008.** Effects of weather on survival in populations of boreal toads in Colorado. *Journal of Herpetology.*
Zoology Monitoring

Preble’s Meadow Jumping Mouse on the US Air Force Academy

Longest-running monitoring of this Threatened subspecies.

Mark-recapture demographic survey

Survival, recruitment, trend

Population genetics analysis of connectivity

Recent Publications

- **Schorr. 2012.** Using a temporal symmetry model to assess population change and recruitment in Preble’s meadow jumping mouse (*Zapus hudsonius preblei*). *Journal of Mammalogy.*
- **Schorr et al. 2009.** Body mass and winter severity as predictors of overwinter survival in Preble’s meadow jumping mouse. *Journal of Mammalogy.*
Zoology Research

Current & Recent Research Projects

• Longnose Leopard Lizard Habitat Evaluation  

• Wildlife Fence Escape Ramp Monitoring  
  Siemers et al. 2013. *ICOET Proceedings*

• Pueblo Chemical Depot Small Mammal & Grasshopper  
  Schorr et al. 2007. *SW Naturalist*

• Bird population estimation on USAFA
Bat Research Projects

- Bats and Inactive Mines Project
- Cave Inventory and Monitoring on White River National Forest
- Jackson County Bat Inventory
- Bat Population Modeling
  - Schorr et al. In review. Acta Chiropterologica
- Bat Hibernacula Selection
  - Hayes et al. 2011. J. Wildlife Mgmt
- Pallid Bat Roost Site Selection
  - Schorr & Siemers. 2013. SW Naturalist
Zoology Future Directions

- Aquatic animal ecology – vertebrate & invertebrate
- Bird ecology
- Sampling methodology
- Population estimation of rare species
- Invertebrate conservation
- Invasive species
- Disease ecology
Conservation Data Services Team

**Michael Menefee, Data Distribution Coordinator**
Data distribution, environmental review, IT and project management.

**Kirstin Holfelder, Database and Web Developer**
Developer of wetland plant field guide app, database designer and website administrator.

**Amy Greenwell, GIS Program Manager**
Manages BIOTICS data, coordinates GIS for CNHP, spatial analysis.

**Gabe Scott, Systems Administrator**
Information technology specialist, provides IT support for all CNHP staff.
We bring it all together!

- Connecting CNHP’s data with our partners
- Implementing the latest information management tools to support data use and sharing
- Rolling up data from many sources into formats useful for the conservation community
- Continually looking for new ways to make our data more available and accessible
Conservation Data Services Team

Core Functions:

• Information Management
• GIS Mapping and Modeling
• Spatial Analysis
• Database Design and Management
• Website and App Development
• Project Environmental Review
• Sensitive Species Data Distribution
• Publication Production
• Dataset and Website Hosting
The BIOTICS Database

• Advanced Biodiversity Data Management Software

• 13,190 Element Occurrence Records
  – 4,994 Botany Records
  – 3,608 Ecology Records
  – 4,588 Zoology Records

• 33,016 Mapped Locations in all Statewide

• 1,919 Potential Conservation Areas and 34 Network of Conservation Areas
Biodiversity and Tracking Conservation System

All Mapped Locations by Global Rarity

Location by Global Conservation Status Rank (G-Rank)
- G1
- G2
- G3
- G4
- G5
Biodiversity and Tracking Conservation System

Natural Communities by Global Rarity

Location by Global Conservation Status Rank (G-Rank)
- G1
- G2
- G3
- G4
- G5
Biodiversity and Tracking Conservation System

Zoology Elements by Global Rarity

Location by Global Conservation Status Rank (G-Rank)
- G1
- G2
- G3
- G4
- G5

Map created by: [Creator Name]
Year: [Year]
CNHP Data Requests

CNHP Data Distribution and Environmental Review Projects

- Accurate, current, comprehensive biological data
- Vital resource for a variety of planning, natural science, and information technology professionals
- Data are available for site based, regional and statewide planning and are interpreted from state, national and global perspectives
- CNHP handles data requests from a range of clients including governmental agencies, consultants, land trusts, nonprofits, researchers, landowners and many more
CNHP Data

CNHP Data are Available in Many Formats:

- Spatial Data
- Tabular Reports
- Statewide Datasets
- Hyperlink GIS Projects
- Data is provided with extensive training and support
CNHP Sensitive Data Policy

Colorado Natural Heritage Program
Data Distribution Policy

Spatial Data Requested?

YES

Land Owner/Manager?
(surface or subsurface)

YES

Environmental Review Tabular Reports ($)
- Species/communities – location identified to TRS (1 sq. mile) if non-sensitive, and to TR (36 sq. miles) if sensitive
- Potential Conservation Areas – non-sensitive only, no site directions provided

NO

Environmental Review Tabular Reports ($)
- Species/communities – location identified to TRS (1 sq. mile) if non-sensitive, and to TR (36 sq. miles) if sensitive
- Potential Conservation Areas – non-sensitive only, no site directions provided

Signed Data License?

YES

Client Lands ($)
Internal Use Only/Not for Redistribution
- Species/communities – "as-is"
- Potential Conservation Areas – all

External Display
- Species/communities – non-sensitive @ 1 sq. mile, sensitive @ 9 sq. miles
- Potential Conservation Areas – non-sensitive only

FREE Data on CNHP website
- Species/communities - by USGS Quad (~4 sq. miles)
- Potential Conservation Areas – non-sensitive only

NO

Signed Data License?

YES

Non-client Lands ($)
Internal Use Only/Not for Redistribution
- Species/communities – non-sensitive @ 1 sq. mile; sensitive @ 4 sq. miles
- Potential Conservation Areas – non-sensitive only

External Display
- Species/communities – non-sensitive @ 1 sq. mile, sensitive @ 9 sq. miles
- Potential Conservation Areas – non-sensitive only

NO

Mar 2008
Three Tiers of Access:

• Tier I: Spatial Data (requires data license)
• Tier II: Tabular Reports by Area/Species (generalized)
• Tier III: Free Data Available on the Web (heavily generalized)
CNHP Sensitive Data Policy

Three Levels of Detail:

• Level I: Precise data (internal use only) provided on lands with landowner permission

• Level II: Data generalized one to four miles (internal use only) provided for all other lands

• Level III: Heavily generalized data for public display
CNHP Sensitive Data Policy

Level 1 Data

Level 2 Data

Level 3 Data
Hyperlink GIS Projects
CNHP Has Many Data Partners

Some of our key statewide data partners:

- The Nature Conservancy
- Colorado Parks and Wildlife/Colorado Natural Areas Program
- Colorado State Land Board
- Natural Resources Conservation Service
- USDA Forest Service
- BLM
- Denver Botanic Gardens
- US Fish and Wildlife Service
- Land owners
- Scientists
- Local and state governments
- Consultants
- Industry
- Citizen Scientists
- Students

...but the big picture comes from hundreds of other partners too!!!
### Conservation Easements Online Management System

#### Editing easement information for Pueblo001

**General information**

- **Record number:** Pueblo001
- **Recording number:** 1310690
- **County acreage:** 338
- **Deed acreage:** 338
- **Mapped acreage:** 316.103
- **County:** Pueblo
- **Easement date:** 12/23/1999

**Key provisions**

- **Subdivision allowed:** No
- **Subdivision notes:**
- **Building envelope:** Yes
- **Envelope acreage:**
- **Envelope number:** 1
- **Envelope notes:** Residential building envelope; allows ability to maintain, repair current residences; no acreage given; caps on square footage

**Conservation purposes**

- (2) Biological/wildlife habitat and ecological
- (3) Agricultural, scenic, and government policy

#### Reports: Overall summary

**County:** Pueblo
**Grantee:** The Nature Conservancy
**Grantee certification level:** Certified

**Total number of easements:** 10

### Acreage statistics

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Total</th>
<th>Records with data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deed acreage</td>
<td>4493</td>
<td>2640</td>
<td>44932</td>
<td>10</td>
</tr>
<tr>
<td>Mapped acreage</td>
<td>4543</td>
<td>2556</td>
<td>45428</td>
<td>10</td>
</tr>
<tr>
<td>County recorded acreage</td>
<td>4493</td>
<td>2640</td>
<td>44932</td>
<td>10</td>
</tr>
</tbody>
</table>

#### Building envelopes

- Allow building envelopes: 1
- Don't allow building envelopes: 9
- Unknown: 0

**Average number of envelopes per easement:** 3
**Average acreage of envelopes per easement:** 15
**Average % of easement in envelope(s):** 0.07%

### Conservation purposes

An easement can have one, some, or all of the following conservation purposes:

<table>
<thead>
<tr>
<th>Number of easements</th>
<th>Mean deed acreage</th>
<th>Total deed acreage</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Recreational and educational</td>
<td>1</td>
<td>960</td>
</tr>
<tr>
<td>(2) Biological/wildlife habitat and ecological</td>
<td>10</td>
<td>4493</td>
</tr>
<tr>
<td>(3) Agricultural, scenic, and government policy</td>
<td>9</td>
<td>4886</td>
</tr>
<tr>
<td>(4) Historical</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
CNHP Social

Find us on:

• The CNHP Blog
• Facebook
• Twitter
• YouTube
• Flickr
Spatial database of all protected lands in Colorado
Managed at CSU by CNHP and the Geospatial Centroid
Initiated by Dr. David Theobald at the Natural Resources Ecology Lab in 2004, with periodic updates since
Currently in 9th edition
Used by hundreds of individuals and agencies across Colorado
Recent funding from GOCO to update data and take it online!
New GOCO funding will support:

- Development of online interactive map
- Capability for "live" updates
- GIS data services and data downloads
- Development of subscription service
- Training for users and contributors

Interface is based on Map Collaborator (GreenInfo Network)
Future Directions

• Implementing BIOTICS 5 in Summer 2014
  • The future of biodiversity data management
  • Upgrade the program’s features to current standards
  • Interoperability and data sharing through web services

• Providing Online Data Access
  • NatureServe Data Explorer
  • Improved accessibility and broadened data offerings

• CNHP is working on finding partners to help us bring this tool online
Conservation Planning

Renée Rondeau
Ecologist/Conservation Planner
CNHP’s Conservation Planning Team

Renee Rondeau, Ecologist and Conservation Planner
Karin Decker, Ecologist and Landscape Analyst
Michelle Fink, Landscape Ecologist and GIS analyst
Lee Grunau, Conservation Planner
CNHP’s Conservation Planning Team

Core Functions

• Collaboration with partners to apply scientific information at multiple scales
• Spatial analysis that brings CNHP and other natural resource data together to synthesize complex issues
  o species & habitat distribution modeling
  o impact analysis
  o optimization modeling
• Planning for climate change
• Monitoring, management, mitigation, and site conservation plans
Conservation Planning

**Statewide, Regional, and Site-level Scales**

All of our planning work is a collaborative effort with multiple partners, including The Nature Conservancy, Colorado Parks & Wildlife, NatureServe, USGS, State Land Board, and many others.

- State of Colorado’s Biodiversity
- State Wildlife Action Plan
- Climate change vulnerability and adaptation assessments
- Environmental sustainability planning for transportation and energy development
- Ecoregional assessments and partnership initiatives
The State of Colorado’s Biodiversity

- Conservation status for:
  - Major ecosystems
  - Species of Concern
  - Regions

- Considered:
  - Condition
  - Threats
  - Level of protection
Conservation Planning

The State of Colorado’s Biodiversity: Ecosystem Condition

- 18 terrestrial ecosystems analyzed for size, condition, threats, and level of protection.
- The prairie is one of our least protected systems, but there are still opportunities to conserve large intact patches.
Conservation Planning

The State of Colorado’s Biodiversity: Animals of Concern

All Animals

<table>
<thead>
<tr>
<th>Habitat</th>
<th>Number of Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetlands/aquatics</td>
<td>46</td>
</tr>
<tr>
<td>Grasslands</td>
<td>28</td>
</tr>
<tr>
<td>Forests</td>
<td>13</td>
</tr>
<tr>
<td>Shrublands</td>
<td>10</td>
</tr>
<tr>
<td>Cliff and canyon</td>
<td>7</td>
</tr>
<tr>
<td>Pinyon-juniper</td>
<td>7</td>
</tr>
<tr>
<td>Alpine</td>
<td>1</td>
</tr>
</tbody>
</table>
Conservation Planning

The State of Colorado’s Biodiversity: Plants of Concern

- 103 G1-G2’s analyzed
- Barrens <1% of landscape, but support 80% of our most threatened species.
Conservation Planning

The State of Colorado’s Biodiversity: by region

Conservation Status by Region

- **Eastern Colorado**
  - Animals: 20 (Under Conserved) + 20 (Moderately Conserved) + 20 (Effectively Conserved)
  - Plants: 10 (Under Conserved) + 10 (Weakly Conserved) + 10 (Moderately Conserved) + 10 (Effectively Conserved)

- **Colorado Rocky Mountains**
  - Animals: 30 (Under Conserved) + 30 (Effectively Conserved)
  - Plants: 10 (Under Conserved) + 10 (Weakly Conserved) + 10 (Moderately Conserved) + 10 (Effectively Conserved)

- **Western Colorado Valleys and Plateaus**
  - Animals: 40 (Under Conserved) + 40 (Moderately Conserved)
  - Plants: 10 (Under Conserved) + 10 (Weakly Conserved) + 10 (Moderately Conserved) + 10 (Effectively Conserved)

Number of species: 0-70
Impact Analysis

- Distance-decay method used to model effects of disturbance

- We analyzed:
  - Development
  - Agriculture
  - Transportation
  - Energy
  - Mining

- Impacts combined for cumulative score

- Models can be general or species-specific
### Conservation Planning

#### Climate Change: Vulnerability and Adaptation Projects

- **Gunnison Basin**
- **San Juan Basin**
- **SWAP**
- **BLM**

<table>
<thead>
<tr>
<th>Habitat</th>
<th>Vulnerability Score</th>
<th>Current Condition</th>
<th>Confidence in Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xeric tundra</td>
<td>Highly vulnerable</td>
<td>Very Good</td>
<td>High</td>
</tr>
<tr>
<td>Mesic tundra</td>
<td>Highly vulnerable</td>
<td>Very Good</td>
<td>High</td>
</tr>
<tr>
<td>Spruce-fir</td>
<td>Moderately vulnerable</td>
<td>Good</td>
<td>Low</td>
</tr>
<tr>
<td>Mixed conifer</td>
<td>Presumed Stable to Slight Increase</td>
<td>Good</td>
<td>Medium</td>
</tr>
<tr>
<td>Aspen</td>
<td>Moderately vulnerable</td>
<td>Fair to Good</td>
<td>Medium</td>
</tr>
<tr>
<td>Lodgepole</td>
<td>Moderately vulnerable</td>
<td>Good</td>
<td>Medium</td>
</tr>
<tr>
<td>Ponderosa Pine</td>
<td>Moderate Increase</td>
<td>Good</td>
<td>Low</td>
</tr>
<tr>
<td>Pinyon-Juniper</td>
<td>Presumed Stable to Moderate Increase</td>
<td>Good</td>
<td>Medium</td>
</tr>
<tr>
<td>Bristlecone pine</td>
<td>Highly vulnerable</td>
<td>Good</td>
<td>Low</td>
</tr>
</tbody>
</table>
Current and Ongoing Conservation Planning Projects

• State Wildlife Action Plan
  o Climate change vulnerability assessment for wildlife and habitats
  o Revision to include wildlife and rare plant components

• Climate Change
  o San Juan treeline study & ecosystem vulnerability assessments
  o Gunnison Basin resilience, restoration, and adaptation
  o Social-ecological climate resilience in SW Colorado

• Species Distribution Modeling

• Infrastructure Impacts
  o Transportation environmental planning
  o Energy by Design—Eastern plains
Future Directions

- Ecosystem services
- Comprehensive statewide climate vulnerability assessment
- Spatial modeling for climate vulnerability assessments
- “The State of Colorado’s Biodiversity” update
- Disaster recovery planning
- Potential Conservation Area database
- Engagement with social scientists
Directions for the Future

Colorado Natural Heritage Program
Colorado State University
www.cnhp.colostate.edu
Purpose of Today’s Meeting

- Connect the key members of Colorado’s Conservation Community
- Updates from CNHP and Partners on current activities
- Highlight successful partnerships
- Discuss the future: how can we all do a better job of achieving conservation goals?
CNHP’s 2011-2015 Strategic Plan

- **Goal 1:** Identify Areas for the Conservation of Colorado’s Natural Heritage
- **Goal 2:** Develop, Interpret, and Deliver Information to Guide Conservation Action
- **Goal 3:** Maintain an adaptable, sustainable, and indispensable organization that is supported in its mission
- **Goal 4:** Support a High Quality Work Environment
Data

- We want to:
  - Be more comprehensive and accessible
  - Have “real time” data access
  - Expand data offerings and services
  - Connect to other databases (e.g., CHAT, Data Basin, Landscape, NRIS)
NatureServe’s Heritage Data Explorer

Welcome to the Virginia Department of Conservation and Recreation’s Natural Heritage Data Explorer.

This site provides interactive access to various map data representing natural heritage and other conservation values in Virginia.

This site should be viewed in Firefox version 3.6 or higher, Google Chrome version 9 or higher, or Internet Explorer version 8 or higher.

Open Access: You may log in, if you are interested in planning or conserving the natural resources (i.e. natural communities) by reviewing the maps, watersheds, and other resources.

Subscription Access: A subscription is required to access additional data, and/or to use the site for project review. If you represent a government agency looking for this service, create a website access subscription.

Visit our homepage for more information on the Virginia DCR - Divisions of Natural Resources.

[Map image showing Virginia Natural Heritage Data Explorer interface]
How we are making it happen

FY 2013 CNHP Budget
Total: $1.7M

- Federal: 47%
- State: 35%
- Other Govt.: 8%
- Foundation: 4%
- Industry: 2%
- Donations: 2%
- Organizations: 2%
How we are making it happen

Desired Annual Budget Scenario

- Increase overall funding
- Diversifying and expanding our partnerships
Two Exciting Frontiers...

- Payment for Ecosystem Services
- Colorado Habitat Exchange
- Colorado Conservation Exchange
- Citizen Science
  - NatureServe’s Citizen Science Strategy
  - Wetland Tools App
  - Adopt-a-Rare Plant Program
• 2011: established a baseline
Our Partnership with Odell Brewing Co.
Partnering for Conservation

- Training
- Field Surveys
- Work with Industry
- Plan our communities and our future
- Climate Change
- Support Private Land Owners
- Disaster Response
- State Rare Plant List
- Work with Tribes
- Mapping
Partnering for Conservation

- What do you need?
- What are you excited about?
- How can we all help?
Partner Presentations
Moderated Partner Roundtable
Thank You!

NATURAL HERITAGE PROGRAM

COLORADO