# Colorado Natural Heritage Program Conservation Data Services

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Colorado State University

Botany Ecology Zoology Conservation Planning Conservation Data Services













## Mission

" To preserve the natural diversity of life by contributing the essential scientific foundation that leads to lasting conservation of Colorado's biological wealth."





#### **§**A staff of 25 dedicated employees

§Over 2 million dollar annual budget from grants and contracts

§Conservation efforts that include partnering with over 15 organizations

§One of Colorado's leaders in biodiversity











§ CNHP specializes in tracking the location and status of rare and imperiled "Elements of Diversity"

- § Plants
- § Animals (verts and inverts)
- § Natural communities





# CNHP offers:

§ A dataset consisting of over 12,000 element occurrence records for rare and imperiled plants, animals, and natural communities

§ Over 1800 mapped Potential Conservation Areas

§ Staff with biological expertise
§ On-the-ground biological assessments
§ Monitoring and research
§ And more.....

# The Heritage Network

NatureServe serves as the hub of the network. With the input of heritage programs, they develop the data management methodology and specialized computer programs used by network members. They help establish data standards and work to develop multi-jurisdictional datasets and products.



#### The NatureServe Network Nationwide and Beyond

80 inventory and monitoring programs with 800+ staff across the Western Hemisphere

#### Natural Heritage Programs

- § Operate in every U.S. state, all Canadian provinces, and selected Latin America countries
- S Collect, analyze and distribute detailed local biodiversity data
- § Conduct environmental reviews, assessments and planning

#### NatureServe Staff

- § Provide technical and scientific support to natural heritage programs
- § Advance the network's scientific standards and data management software
- § Develop and maintain comprehensive rangewide (global) data for species and ecosystems





## NatureServe in Brief

- § An independent, non-profit conservation organization
- § Provides the scientific basis for effective conservation and natural resource management
- § Coordinates and supports the network of state natural heritage programs (public-private partnership)
- § Carries forward 30 years of scientific experience
- § Collaboration and service to all sectors—government, conservation NGOs, academia, and industry.







## NatureServe Information Value Chain

Guiding Resource Decisions

Decision-support systems

Aggregation and Presentation Conservation expertise and analysis

Information access and delivery

Exploration and Discovery

Data management and quality assurance

Interpretation

and Use

Data collection and recording

Scientific standards and methods





#### Reliability of NatureServe Data

NatureServe's databases represent "one of the most comprehensive information sources on rare and imperiled species."

- US Fish and Wildlife Service. Federal Register publication on the "Identification of Candidates for Listing"

"The Fish and Wildlife Service uses the best available scientific information to assess species for consideration for listing. One chief source of information is the network of state Natural Heritage Program databases, which tracks species already imperiled and those that are declining or at risk."

- Department of Interior FY2006 Budget Justification

"The Forest Service and numerous other federal agencies rely daily on the scientific data, information management tools, and conservation services provided by NatureServe and its affiliated state natural heritage programs."



Service

#### **CNHP** Tracked Elements

§ BLM sensitive species
§ USFS sensitive species
§ USFWS listed Threatened & Endangered species
§ CDOW state legal status species
§ Others







## **CNHP** Tracked Elements

| Major Group         | Tracked | WatchListed* | TOTAL |
|---------------------|---------|--------------|-------|
| Amphibians          | 9       | 1            | 10    |
| Birds               | 41      | 10           | 51    |
| Crayfish            | 1       |              | 1     |
| Fish                | 16      | 1            | 17    |
| Insects             | 95      | 7            | 102   |
| Mammals             | 43      | 2            | 45    |
| Mollusks            | 14      |              | 14    |
| Natural Communities | 582     |              | 582   |
| Nonvascular Plants  | 128     |              | 128   |
| Reptiles            | 17      | 7            | 24    |
| Vascular Plants     | 520     | 24           | 544   |
| TOTAL               | 1466    | 52           | 1518  |



\* Data are maintained in an Observation Database

Knowledge to Go Places

(as of August 2006)

Herita

# **CNHP** Dataset

- § BIOTICS (Biodiversity Tracking and Conservation System)
  - § ArcView (Mapper)– Oracle (Tracker)
- § Over 18,000 Mapped Locations for rare and imperiled plants, animals, and natural communities tracked by CNHP

§ Represented in BIOTICS as over 12,000 Element Occurrences

§ Over 1800 mapped Potential Conservation Areas





(as of August 2006)

Sources of Data Include: § CDOW § State Parks, Natural Areas Program **§** BLM **§** USFS **§** NPS **§** RMBO **§** Staff biologists § Museums § Literature § Etc.



#### Heritage Methodology **§** What species and ecological communities exist? **§** Which are at greatest risk of extinction? **§** Where are they found? **§** What are their biological and ecological characteristics? **§** What is their viability status? S Where are the most important sites to protect? **§** What actions are needed for the protection of those sites? Colorado

What species and ecological communities are at risk? **§** Rank species and ecological communities according to their conservation status § Rank reflects their extinction potential, levels of rarity, and threats in relation to the world and Colorado 1 - critically imperiled 2 - imperiled § World Rank: G1-G5 3 – vulnerable § Colorado Rank: S1-S5 4 – apparently secure

5 – demonstrably secure







## Critically imperiled worldwide (G1)

Penstemon debilis Worldwide distribution of Parachute Penstemon (Restricted to Garfield County in Colorado)







## Colorado Element by Rank Summary



#### TOTAL = 839

#### **TOTAL** = 917



# Vulnerable statewide (S3)



Boreal owl



### Where are they found?

#### **§** Element Occurrence (EO)

- § An area of land and/or water in which a species or natural community is, or was, present
  - § Mapped Locations converted to EOs through application of Natural Heritage Methodology

#### § Element Occurrence Record (EOR)

§ Contains both spatial and tabular components including a mapped feature and its supporting database attributes



# Where are they found?

#### CNHP Element Occurrences in Central Gunnison County



# Where are they found?



#### What is their viability status? **§** Each EO is ranked for three factors § Size of population § Condition of population § Landscape context **§** Ranked from excellent (A) to poor (D) **§** Combined factors **§** Estimated viability/ecological integrity = EO Rank



## Size

§ Quantitative measure of area/abundance
§ Area of occupancy
§ Population abundance (species)
§ Population density (species)
§ Population fluctuation (species)







Condition and Landscape Context **§** Qualitative measure of biotic/abiotic factors, structures, processes **§** Within EO = Condition § <u>Surrounding</u> EO = Landscape Context **§** Reproduction and health (species) **§** Development / maturity (communities) § Ecological processes § Species composition and biological structure § Abiotic physical / chemical factors







# **Basic EO Ranks**

| EO Rank | Description    |  |
|---------|----------------|--|
| A       | Excellent      |  |
| B       | Good           |  |
| С       | Fair           |  |
| D       | Poor           |  |
| E       | Extant         |  |
| Н       | Historical     |  |
| F       | Failed to Find |  |
| Х       | Extirpated     |  |



Knowledge to Go Places

Colorado State University



# What are the most important sites to protect?

**§** Potential Conservation Areas (PCAs)

§ Best estimate of the primary area supporting the longterm survival of targeted species or natural communities







# PCA Ranks

#### **§** Biodiversity Rank

- § Prioritized on a scale of 1-5
- § Based upon a combination of species conservation status ranks and the element occurrence ranks
  - **§** B1= Outstanding Global Significance (Irreplaceable)
    - § if this site is lost there is a high probability that at least one species or community will go extinct
  - § B5 = General or Local Significance
    - § many areas provide suitable habitat

#### § Protection and Management Urgency Ranks

- **§** P/M 1 = Very high urgency
  - \$ action(s) are required within one year or stresses may reduce viability and/or irretrievably degrade the element(s) within the PCA

P/M 5 = None





# Colorado's Potential Conservation Areas

39 B1 Sites





# CNHP resources can help planners with:

§ Open space acquisition
§ Placement of development projects
§ Research projects
§ Conservation planning
§ Conservation easements
§ Land trades







**CNHP** provides biological conservation information to planners **§** Level of detail varies § Recommendations have no legal status **§** Confidentiality assured for sensitive land ownership or biological data **§** CNHP is a non-political scientific advisory program





# Data Sensitivity & Confidentiality

#### § EOs

- **§** Species Sensitive
  - § USFWS Federal legal status
  - **§** Sensitive species for USFS and BLM
  - § CDOW state legal status
  - § CNHP sensitive frequently due to collection or disturbance pressure
- § Landowner Sensitive
  - § Sensitive due to land status
- § PCAs
  - § Considered sensitive if contain sensitive EO(s) and are less than one square mile in area



Knowledge to Go Places

Heritage

**Data Protection Measures** § Standardized polices regarding the release of sensitive EO and PCA data **§** Data Agreements **§** Data Use and License Agreements § Accompany data distribution products § Define data confidentiality § Outline restrictions on use of data and redistribution of data **§** Require notification of CORA/FOIA requests § Data Sharing Agreements Colorado § Two-way flow of data § NatureServe Knowledge to Go Places § RMBO, USFS R2

# **Data Protection Measures**

- **§** Levels of EO Data
  - § Internal Use DataSets
    - **§** Point data = centroids of EOs



- **§** Level 1 = "As-is" EO Representations
  - § EOs provided as carried in BIOTICS
  - § EO polygons incorporate locational uncertainty and estimated representation accuracy
  - § NCAs, PCAs
  - § For client managed lands
- **§** Level 2 = Generalized EO Representations
  - § EOs are generalized to 1 square mile for non-sensitive species and 4 sq. miles for sensitive species
  - § NCAs, non-senstive PCAs



orado § For non-client managed lands



#### Data Protection Measures **§** Levels of EO Data § External Display Datasets § Level 3 = Generalized EO Representations § Buffered to 1 square mile for non-sensitive species and 9 sq. miles for sensitive species § statewide **§** Public Datasets <u>**§** Level 4 = NCAs, nons-sensitive</u> PCAs, and EO data generalized to USGS § Available on CNHP website **§** Statewide





#### **CNHP** Data Products **§** ArcGIS Hyperlink Project § Spatial Data § EOs § Level 1 – Internal Use, "as-is" § Level 2 – Internal Use, generalized **§** Restricted distribution § PCAs § NCAs § Observations **§** Hyperlinked Attribute Reports § EOs, PCAs, NCAs **§** Level 3 Spatial Data (External Display) § EOs, PCAs, NCAs Colorado Knowledge to Go Places

### **CNHP** Data Products

- **§** Supporting Documents
  - § Guide to Interpreting CNHP Data
  - § CNHP Hyperlink User Guide
  - § Guide to EO, PCA, NCA Report Data Dictionaries
  - § CNHP Methodology for Generalizing Element Occurrence Data
  - § CNHP Element Occurrence Field Forms and associated data dictionaries
  - § CNHP Tracking List



# Summary of 2005 Projects

§ Inventory

- § Monitoring and Research
- **§** Conservation Planning
- **§** Vegetation Classification
- **§** Restoration and Weed Mapping
- § Heritage Methodology
- § Biological Database Development and Management
- § Environmental Review
- § Data Exchange





# 2005 Inventory Projects



## 2005 Monitoring and Research Projects



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# 2005 Conservation Planning Projects



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Other 2005 Projects § Vegetation Classification; Heritage Methodology § Restoration and Weed Mapping § Element Distribution Modeling





# Primary Funders of 2005 Projects





































# **CDOT Projects**

- § Assessing Transportation Effects on Biodiversity in the Southern Rocky Mountains (1999 - Grunau, Armstrong)
- **§** Noxious Weed Mapping (2000-2004 Spackman, Burkhart, Johnson, Handwerk, Bell, Grunau)
- § Shortgrass Prairie Initiative (2003 Grunau, Rondeau, Lavender)
- **§** Statewide Dataset (2003 CNHP)
- **§** Conservation Easement Monitoring (2005 Handwerk, Doyle, Rondeau)



Questions, Concerns, Comments § We want to hear from you!

§ Our database and other services are only effective if they are useful to you!



CDOT Noxious Weed / Rare Plant Identification Training May 2001



#### **Contact Information**

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