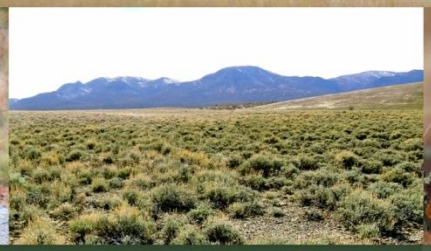
State of Nevada Conservation Credit System for Sage Grouse Habitat

State of Nevada Sagebrush Ecosystem Program

May 31, 2013

Introductions

- Melissa Sherman – Senior Regulatory/Permitting Lead
- Chris Behr – Principal Economist

Company Overview

- HDR offers full suite of consulting services that represent a full spectrum of scientific disciplines
- 165 offices, 7,700 employee-owners
- Offices in Reno, Carson City, Las Vegas
- Business Model – strong local staffing supported by company-wide resources and expertise

HDR's Available Team

- Environmental, Biological, Ecological, and GIS Specialists
- Decision Economics Group – Natural Resource Economists

The Challenges

- Finding a cost-effective mechanism for maintaining or enhancing habitat
  - Balancing state economics with conservation strategies
- 80% of Nevada is public land with multiple uses
  - Landscape scale of greater sage-grouse habitat
- Developing a sustainable and adaptable credit system

The Goals

- Create a regulatory mechanism to promote species and habitat conservation (no-net-loss)
  - Scientifically sound and legally defensible system
  - Applicable to public and private lands
- Use habitat value and functions and fair market values
  - Support project-level analysis
  - Dynamic adjustments to credit system over time, as needed

Key Elements for the Conservation Credit System

Computation of Credit and Debit

- Metrics based habitat values and functions as it relates to population viability
- Full value of habitat services over time = credit/debit
- Needs to be verifiable

Habitat Quality Indicators

- Substance of metrics
- Dr. Coates Habitat Suitability Model – establishing predictor variables (ex. elevation, vegetation, proximity to urban areas)
- Anthropogenic Disturbance Activities (Threats)
- Mitigation and Conservation Activities

Uncertainties

- Rate of habitat recovery after mitigation
- Duration until new habitat service baseline recovered
- Effectiveness of mitigation or habitat creation strategies
- Statistical uncertainty in models

‘Habitat Economics’ Approach to Establish Fair Market Value

Principles of Market Mechanism

- Demand and supply forces determine prices
- Many sources of demand and supply efficiently allocates resources
- Regulation often involved in establishing the product ‘standards’ in the market

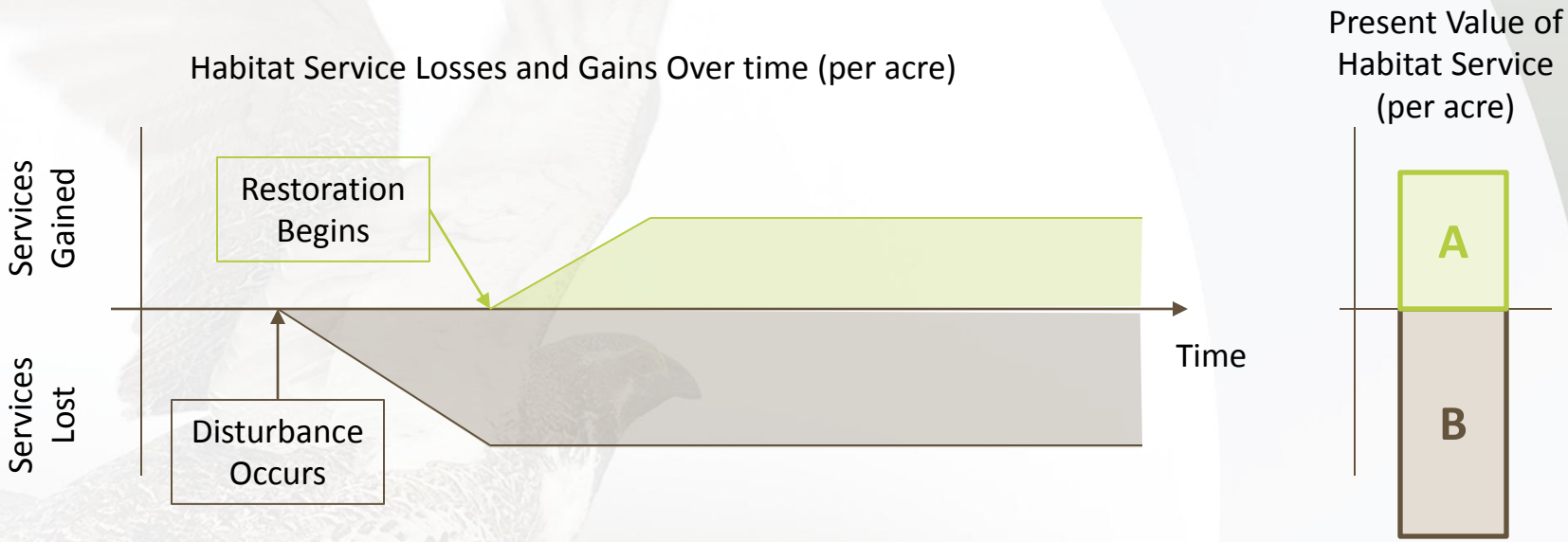
Conservation Credit System as a ‘market’

- Suppliers (landowners, land managers):
  - Create viable habitat ‘credits’, given some quality standard
  - Incur costs: opportunity cost of land, restoration, active management
- Buyers (land developers, project proponents, etc.):
  - Must purchase habitat credits if project causes habitat disturbance
  - Evaluate tradeoffs in alternative design, alignment, mitigation
- Regulators: set standards for level and quality of habitat services
- Fair market value for such habitat services determined by supply and demand

Establishing Credits with Habitat Equivalency Analysis (HEA)

- Transparent, consistent, credible and proven method
- Establishes full value of a habitat disturbance or restoration over time:
  - Magnitude and rate of decline in services (after disturbance)
  - Magnitude and rate of increase in services (after restoration)
  - Impacts in different time periods
- Can be applied separately on different habitat types, locations, or qualities
- Establishes habitat quality standards to enable comparison between sites
- Provides dual metrics on losses and gains with acre-services and monetary values
  - Determines how many acres of restoration are required after disturbance
  - Establishes a baseline cost for ‘purchasing’ a restoration credit

Illustration of Habitat Equivalency Analysis



Equivalency Establishes that:

[Disturbed Acres] · B = [# of Restored Acres]· A

Restoration Credit:

[Disturbed Acres] · B/A = [# of Restored Acres]

Habitat Equivalency Analysis Process – Site-specific Analysis

Step 1 – Define habitat services/assign value

- Focus on services of primary importance
- Use Coates' habitat suitability model or best available habitat seasonal use data

Step 2 – Establish baseline habitat service level

- Propose calculating in each Habitat Management Area (or PMU)
- Use existing feature/function data, habitat mapping: veg, ecosite, fire history, etc.
- GIS platform to produce data inputs to HEA-variables modeled separately

Step 3 – Create impact model

- Team to identify anthropogenic disturbances to model
- Calculates rate of change, interim service loss

Step 4 – Create conservation/mitigation model

- Team to identify types of mitigation and level of effectiveness
- Measured by habitat service metric

Step 5 – Valuation

- Estimate dollar-based metric based on lifecycle costs of mitigation/conservation

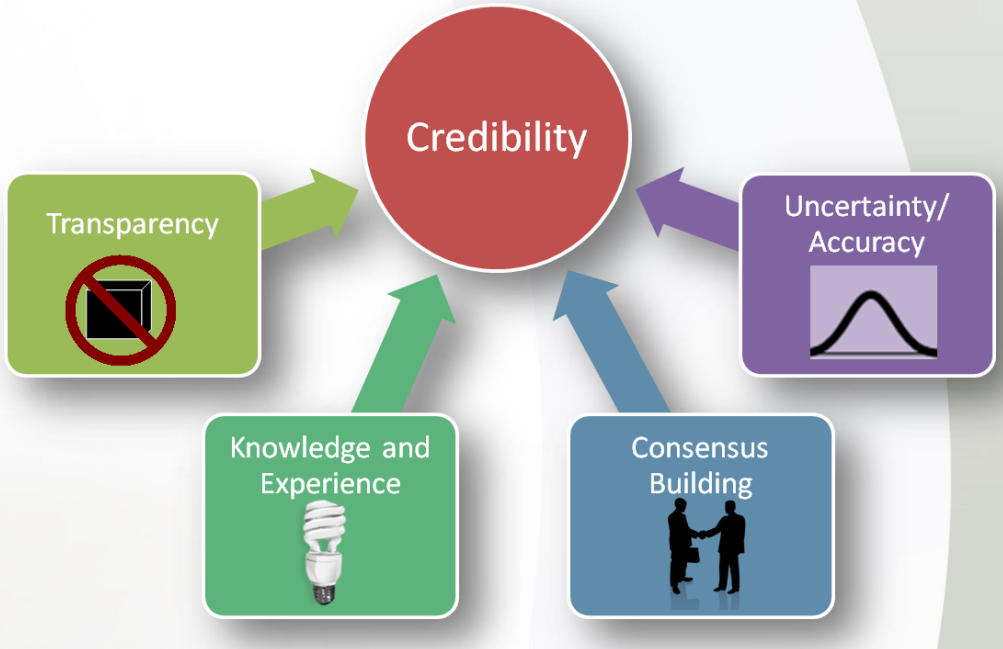
Key to Features of HDR's Risk Analysis Process

Transparency:
- Models, data, and decisions clear to all participants and outside stakeholders

Knowledge:
- Structured approach comprehensively reviews science, economics and local knowledge

Consensus Building
- In several meetings, evidence is reviewed and consensus reached on analyses and uncertainty

Uncertainty / Analysis
- Uncertainty is quantified with probability distributions which are integrated into HEA models and solved with Monte Carlo simulation



Market Mechanisms Provide Cost-effective Habitat Conservation Solutions

Land owners/managers:

- Create and manage acres of viable habitat credits where it is most cost effective
- Sell the habitat credits at market clearing price

Land developers/project proponents:

- Determine impact with HEA / RAP methods
- Determine whether to alter design, alignment or install mitigation measures or purchase credit

Cost of sale includes

- Private land owner cost of creating habitat and lost opportunity of alternative land use
- Private land owner profit, commensurate with risk
- Regulatory cost for monitoring and oversight of habitat exchange contract

Implications of market mechanisms

- Land owners establish GSG habitat according to market conditions and demand for credits
- Fair market value of credits fluctuate as more habitat credits are created
- Development is streamlined & mitigation is improved (to avoid habitat credit cost)
- Scientific understanding of disturbance / restoration improved through monitoring
- Cost-effectiveness of habitat conservation is achieved

Other Structures and Mechanisms

- Recommend conducting consensus building workshops, planning sessions with stakeholders, and preliminary model runs before deciding on final structures and mechanisms of system.

- Success Criteria – based on net increase in habitat value over time, serves as mechanism to issue credit

  Criteria can address and incorporate items in RFI:

  - Actions on public and private land
  - Actions in seasonal habitats
  - Actions that incorporate state and transition models, resistance to invasive weeds
  - Actions that address wildfire and invasive species
  - Actions that improve watershed function (added)

Structures and Mechanisms – continued…

- **Credit issued in form of habitat service acres based on percentage of habitat value created or added**
  - Immediately available credit, partial credit, full credit
  - Apply credits to project disturbances (debits) calculated with the same HEA generated metrics

- Policies and MOUs with agencies needed to establish credit values, transferences rules, use of credit for specific disturbances, maintenance and monitoring of mitigation/conservation efforts to assure habitat values over time (regulatory assurances)

Public Interface Model

- Web-based Interactive GIS Platform
- Used to calculate and track debits and credits
- Model would interface with population, fire, land ownership, geographic and habitat data or other existing or future mapping efforts
- Used to develop “budgets” for specific Management Areas and/or a state-wide budget to help achieve the no-net-loss goal
- Management Area or state-wide “budgets” can be updated on an annual basis to account for drought, fire, economics, or other conditions impacting localized populations

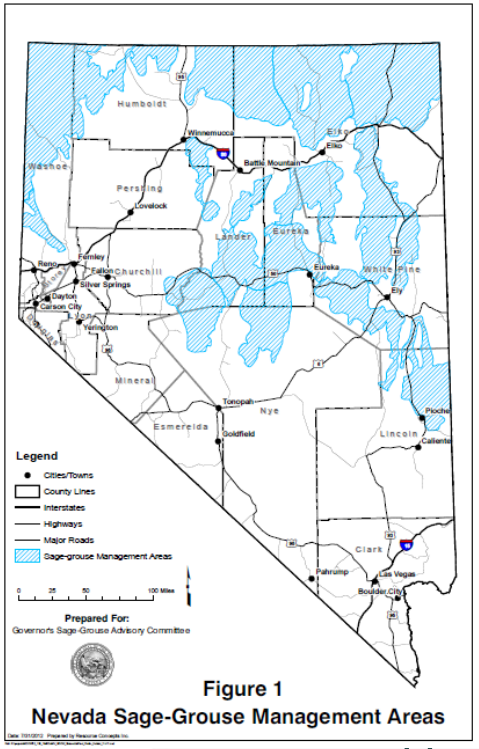


Figure 1
Nevada Sage-Grouse Management Areas

Model Updates and Maintenance

- Dynamic habitat-economic models
- Better habitat or population data becomes available
- Expanded to account for sagebrush habitat in general or other sagebrush obligate species
- Reconfigured if GSG becomes a listed species

Proposed Components of the Conservation Credit System Development Process

1. Consensus building workshops
2. Planning sessions with stakeholders (development/scoping of system, modeling and analysis, and implementation)
3. Economic and habitat modeling for habitat valuation to feed credit system metrics
4. Establish framework and mechanisms for issuing credits and tracking mitigation/conservation success
5. Create/Launch an interactive GIS-based application to manage credits and mitigation/conservation activities
6. Update and maintain models, metrics

CLOSING

HDR recognizes the importance of this effort and is available to support the SEP in any capacity.

Thank you for your time and consideration.

Questions?