



Department of Defense Legacy Resource Management Program

PROJECT NUMBER #08-214

***Central Shortgrass Prairie Species at Risk
Conservation Innovation and
Implementation Project***

Shortgrass Prairie Partnership

April 30, 2009



Central Shortgrass Prairie Species at Risk Conservation Innovation and Implementation Project

08-214

Background:

Grasslands are one of the least protected and most converted habitats on Earth. Populations of key shortgrass prairie species such as the Mountain Plover are declining. Increasing human population and associated impacts require a coordinated, proactive approach to conserving the species at risk (SAR) in the Central Shortgrass Prairie (CSP). The Shortgrass Prairie Partnership (SPP), a diverse partnership of 17 land managers, public agencies, private organizations, and landowners, has been working together since 2004 to ensure the long-term viability of the native species, natural communities, and ecosystems of the CSP while promoting economically productive landscapes that sustain local communities. Initial funding by the Department of Defense (DoD) Legacy Program enabled the SPP to complete a science-based ecoregional assessment in 2006 to guide collaborative conservation efforts.

With the help of continued DoD funding in 2007, the SPP formalized the Partnership with a Memorandum of Understanding, completed a long-term strategic plan for landscape-scale conservation within the ecoregion and an assessment of species at risk (SAR) on DoD lands.

Building on previous efforts, this project was undertaken in 2008 to help the DoD address the growing need for off-site mitigation of on-site impacts to SAR on military lands. This project was designed to help the DoD proactively improve the conservation status of SAR across the ecoregion, thus reducing the need for future listings under the Endangered Species Act and avoid potential conflicts that interfere with their ability to achieve the mission of military training/readiness and range sustainability.

Objective:

The overall goal of this project was to develop a conservation program, using both new and traditional tools, to facilitate **proactive, voluntary, collaborative** conservation of multiple species-at-risk (SAR) in the CSP to offset or mitigate impacts. Objectives were to:

1. Identify **species at risk** (SAR) that occur on DoD lands within the CSP;
2. Conduct a focused **impact assessment** for the SAR and their habitats to assess and help prioritize geographic areas with the greatest probability for conservation success;

3. Identify **priority SAR habitats** across the ecoregion, to help determine the most efficient and effective areas for potential off-site conservation projects;
4. Develop SAR-specific **scorecards** based on status, threats and level of protection, to measure progress and demonstrate success toward conservation goals over time;
5. Evaluate new and **innovative conservation tools** that the DoD and the SPP could effectively implement; and
6. Develop a framework for a **conservation program** that is proactive, voluntary, and adaptable enough to meet a variety of situations and needs for public and private landowners, as well as for species and habitats.

Summary of Approach:

The project approach consisted of two key parts: 1) SAR identification, habitat mapping and impact analysis, and scorecard; and 2) an evaluation of collaborative tools and development of a conservation program that the DoD and partners could use to conserve priority species at risk in the CSP. While the information and recommendations in this document were compiled for the DoD, they were designed with the goal of being easily adaptable for broad applicability to larger partnership efforts as well as other stakeholders and species.

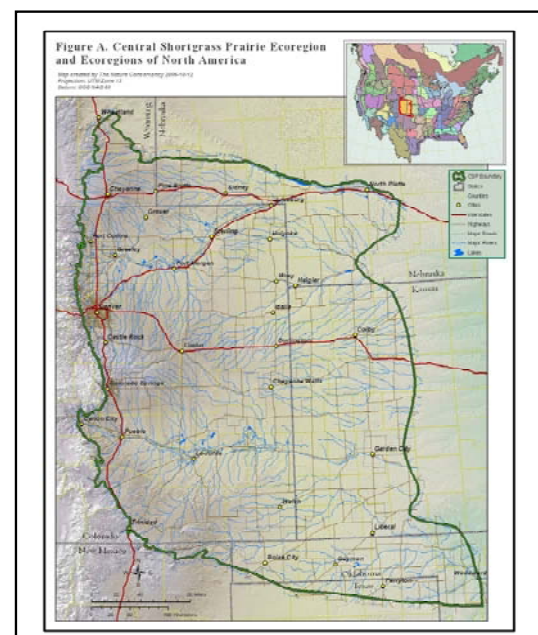


Figure 1. The Central Shortgrass Prairie Ecoregion encompasses 56 million acres and parts of seven states: Colorado, Kansas, Nebraska, New Mexico, Oklahoma, Texas, and Wyoming.

Benefit:

This product provides the DoD and SPP partners with tools and a framework for working collaboratively to improve the conservation status of priority SAR across the CSP by offsetting or mitigating impacts, helping to avoid the need for future listings. The benefits to the military are a reduced need for regulatory compliance, potentially greater ease in regulatory consultation and project permitting, and improved public relations. If regulatory compliance is unavoidable, this report provides a roadmap for potentially assisting with compliance offsite in a Readiness and Environmental Protection Initiative (REPI) framework. The SAR maps and scorecard, recommended conservation tools and program, and set of supportive partners, can help the DoD maintain flexibility needed to meet their training mission.

The project identifies conservation opportunities and solutions to the DoD beyond their fence-line, including off-site mitigation. SAR and their habitats will benefit by increased habitat acreage under permanent conservation, improved habitat conditions in priority areas, and sustained or increased populations.

Accomplishments:

The team identified 20 priority species at risk within four habitat groups (shortgrass, shrubland/mixed grass, burrow dependent reptiles, and Arkansas Valley rare plants) occurring on military lands and across the CSP that warrant conservation. The team assessed and mapped impacts to the SAR, including housing/commercial development, conversion to crops, gas pipelines, mining, oil and gas development, roads, transmission lines, and wind development. The impacts with the greatest current threats to SAR are housing/commercial development, conversion to cropland, roads, and climate change.

The team mapped priority habitats for each SAR, set conservation goals in acres for each species, and produced an overall habitat map to identify the least amount of area to meet the conservation goals for all 20 SAR. The team also developed SAR scorecards to establish baselines to measure conservation success, based on priority habitat and status of protection and threats, etc.

The team evaluated 20 conservation tools in use across the US to determine the most appropriate tools for conserving SAR in the CSP. To further assess the feasibility of implementing these tools, the team held focus group meetings with private landowners, homebuilders, the DoD, and other agencies. Taking into account the focus group feedback, the team recommended five tools that are market-based, voluntary, and incentive-based, including: 1) grass collaboratives; 2) Candidate Conservation Agreements; 3) Candidate Conservation Agreements with Assurances; 4) voluntary offsite mitigation programs; and

5) Farm Bill Facilitation. Both temporary and permanent tools are needed, but the team recommends an emphasis on long-term tools, to ensure viability of the SAR. Because the DoD places greater emphasis on permanent tools, other SPP partners may focus on the term-limited tools. The SPP recommends that the DoD, working with the SPP, support implementing grass cooperatives (i.e., grazing land is offered in exchange for ranchers' voluntary commitments to conservation measures), building on the grass bank concept, to conserve SAR in the ecoregion.

The recommended conservation program represents an exciting opportunity for DoD to help achieve large landscape-scale conservation in the CSP. Implementation can serve as a catalyst for leveraging existing and new funding sources, building and nurturing partnerships, and ensuring that species do not continue to decline toward federal listing, while enabling partners to meet their respective responsibilities and missions.

Several data gaps and resource issues need to be addressed in future efforts: 1) assess impacts and develop adaptation strategies to address climate change on SAR; 2) develop ecoregion-wide data sets to predict future impacts (e.g., native grassland or Conservation Reserve Program conversion rates); and 3) continue to bring together the resources necessary to support a team of experts to conduct analyses and design programs such as this one.



Figure 2. Selected Species at Risk in the Central Shortgrass Prairie (clockwise from upper right): Golden blazing star, Ornate box turtle, Swift fox, and Mountain Plover. Photographs by CNHP, RMBO and CDOW.

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***Central Shortgrass Prairie Species at Risk
Conservation Innovation and Implementation Project***

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For

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Project 08-214***

April 30, 2009

Shortgrass Prairie Partnership

Colorado Association of Conservation Districts (CACD)

Colorado Division of Wildlife (CDOW)

Colorado Natural Heritage Program (CNHP)

Colorado Open Lands (COL)

Colorado State Land Board (SLB)

Department of Defense (DoD) – U.S. Army

Department of Defense (DoD) – U.S. Air Force

Department of Defense (DoD) – Partners in Flight

Environmental Defense Fund (EDF)

Environmental Protection Agency (EPA)

Natural Resources Conservation Service (NRCS)

The Nature Conservancy (TNC)

Palmer Land Trust (PLT)

Playa Lakes Joint Venture (PLJV)

Rocky Mountain Bird Observatory (RMBO)

U.S. Fish & Wildlife Service (USFWS)

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Purpose of this Report

This document summarizes the Shortgrass Prairie Partnership's (SPP) findings and conclusions on Species at Risk (SAR) and their habitats occurring on Department of Defense (DoD) lands in the Central Shortgrass Prairie (CSP) ecoregion. It further recommends the use of landscape-scale cooperative conservation tools and conservation programs focused on these species. The team designed this project to help the DoD to proactively improve the conservation status of SAR across the ecoregion and reduce the need for future listings under the Endangered Species Act while meeting its mission in the areas of training/readiness and range sustainability, Regional Ecosystem Management Initiatives, Cooperative Conservation, Integrated Natural Resource Management Plans, and the Readiness and Environmental Protection Initiative. This report can serve as the basis for implementation of a SAR-focused conservation program.

While this project is focused towards DoD conservation goals, other members of the SPP can use this report to inform and support conservation work for SAR across the ecoregion. For example, Appendix A includes maps of SAR priority habitats, impacts, and scorecards for 20 SAR to help measure conservation success that organizations can use to guide their conservation priorities. Appendix B defines known conservation tools, evaluates them for their appropriateness for the CSP based on lessons learned from detailed case studies, and recommends landscape-scale tools that the SPP could work on together to introduce or increase use of in the CSP. Building on previous work accomplished by the SPP with DoD Legacy Program funding, the team recognizes that long-term conservation effectiveness and efficiency will be greater if multiple partners work together towards common goals.

Introduction

Grasslands are one of the least protected, most impacted habitat types on Earth, and one of the most imperiled ecosystems in North America. Grassland birds have exhibited the most extensive declines of any other class of North American species. Large grazing animal species have been greatly altered in almost all temperate grasslands and in America. Populations of several other key prairie species, including the Mountain Plover and the black-tailed prairie dog, have also declined. Increasing human population and associated impacts require a coordinated, proactive approach to conserving the biodiversity of the shortgrass prairie. Due in a large part to land-use patterns and past stewardship practices on private and public lands, approximately 50% of the ecoregion remains in a predominantly natural condition. As a result, the ecoregion presents a significant opportunity to conserve remaining examples of intact shortgrass prairie landscapes and the species they support.

The CSP ecoregion lies in the western portion of the Great Plains of North America, along the eastern edge of the Rocky Mountains. The ecoregion encompasses approximately 56 million acres and includes eastern Colorado, western Kansas and Nebraska, northeastern New Mexico, the Oklahoma Panhandle, a small amount of the Texas Panhandle, and southeastern Wyoming. The majority of the land in the ecoregion is privately owned (92%), with 5% in state, and 3% in federal ownership (military

installations include Fort Carson, Pinon Canyon Maneuver Site, Pueblo Chemical Depot, the Air Force Academy, and Schriever, F. E. Warren, Peterson and Buckley Air Force Bases). Fortunately there are still large, unbroken tracts of grasslands in the ecoregion that are relatively intact due to a history of ranching and compatible uses. These lands provide suitable wildlife habitat for many of the native plants and animals that define the region. Because the majority of the ecoregion is privately owned and managed, conservation efforts must include private landowners and agricultural producers, be voluntary, collaborative, and incentive-based in order to be successful.

By taking a proactive approach to conserve viable populations of declining prairie species, the DoD, working with the SPP and others, can reduce the need for future regulation under the Endangered Species Act, and thereby avoid potential conflicts that could greatly complicate its ability to achieve the military training mission. For most species, on-site conservation on military installations is insufficient as a stand-alone strategy to reduce the need for federal listings and associated regulatory constraints. To fully achieve the goal of conservation and recovery of SAR, off-site conservation tools and approaches are also needed. Recognizing the benefits of this approach, Fort Carson's Environmental Office, Air Force Space Command, and the DoD Legacy Resource Management Program (DoD Legacy) supported this effort.

Project Background

The Shortgrass Prairie Partnership (SPP), a diverse group of 17 public land managers, public agencies, private organizations, and private landowners, has been working together since 2004. The goal of the SPP is to provide land owners and managers, public agencies and private organizations collaborative opportunities to ensure the long-term viability of native species, natural communities, and ecosystems of the CSP ecoregion while promoting the continued existence of economically sustainable landscapes that support local human economies. Initial funding by the DoD Legacy Program, the Colorado Division of Wildlife, and The Nature Conservancy enabled the SPP to complete a science-based ecoregional assessment (Neely *et al.* 2006) to guide collaborative conservation efforts in the CSP. The assessment identified:

- Species, communities, and ecosystems that represent the full suite of native biodiversity in the ecoregion;
- Priority conservation areas that identify locations where conservation need and likelihood of conservation success is greatest;
- The first-ever ecoregion-wide biodiversity scorecard to establish a baseline against which future conservation success can be measured.

With the help of continued DoD Legacy Program support and funding, the SPP formalized the Partnership with a Memorandum of Understanding, completed a long-term strategic plan for landscape-scale conservation within the ecoregion and an assessment of SAR on Department of Defense lands (CNHP 2007, SPP 2007).

The DoD Legacy Program most recently funded this project, the *Central Shortgrass Prairie Species at Risk Conservation Innovation and Implementation Project*, to develop an innovative conservation program with collaborative tools that the DoD and other

partners could implement to achieve the SPP’s strategic conservation goals and conserve SAR within the CSP (see Figure 1). This project was designed to help the DoD to address the growing need for off-site mitigation of on-site impacts on SAR on military lands. While the team developed the project and recommendations for the DoD, it was designed to be adaptable for broad applicability to other SPP efforts as well as other stakeholders and species.

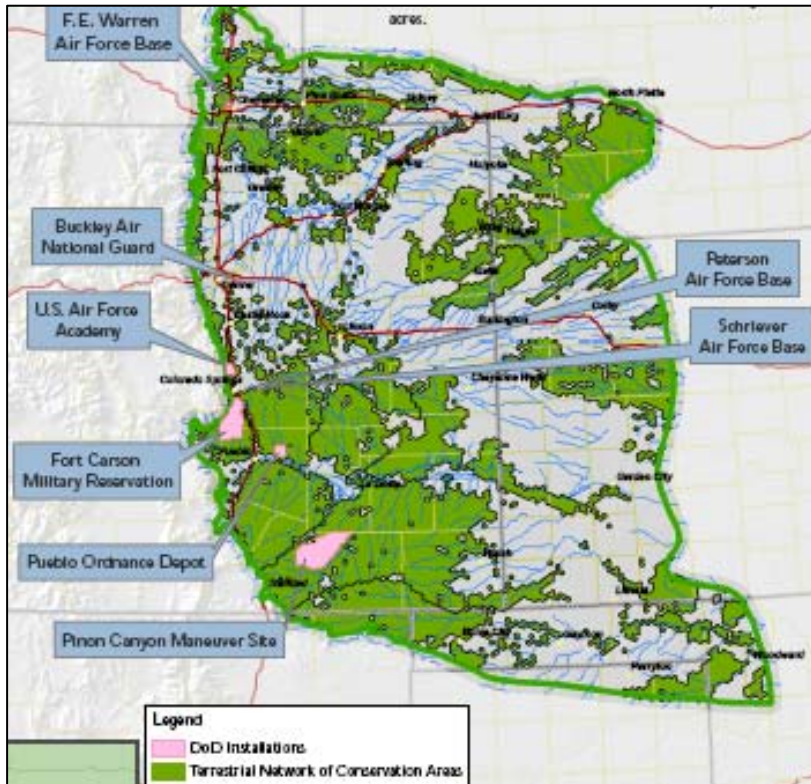


Figure 1. Geographic Scope—The Central Shortgrass Prairie (CSP)

This project’s geographic scope is the Central Shortgrass Prairie ecoregion focusing on Species at Risk (SAR) that occur on DoD lands. The eight military installations within the ecoregion are shown in pink. The conservation areas (highlighted in green) represent places to achieve conservation outcomes for species, communities and ecosystems representative of the CSP identified in the CSP Assessment (2006).

Project Goal and Objectives

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 (SAR) in the CSP. To do this, the project team achieved the following objectives:

1. Identified **SAR** that occur on DoD lands within the CSP;
2. Conducted a focused **impact assessment** for the SAR and their habitats to prioritize geographic areas with the greatest probability for conservation success;
3. Identified **SAR priority habitats** across the ecoregion, to help determine the most efficient and effective areas for potential off-site conservation projects;

4. Developed SAR-specific **scorecards** based on status, threats and level of protection, to measure progress and demonstrate success toward conservation goals over time;
5. Evaluated new and **innovative conservation tools** that the DoD and the SPP could effectively implement; and
6. Developed a framework for a **conservation program** that is proactive, voluntary, and adaptable enough to meet a variety of situations and needs for public and private landowners, as well as for species and habitats.

While the conservation program and the recommended tools are initially focused on a subset of SAR directly applicable to the DoD, the long-term goal is to increase the conservation benefit of the project by expanding the scope of species and habitats covered, as well as participation of additional private and public entities (e.g., potentially energy developers, agriculture industry, and others). The team anticipates that this project will serve as a catalyst for engaging new conservation partners to support more effective conservation, to enhance funding efficiencies and conservation impact, and to serve as a model of innovative, collaborative conservation for other areas across the country.

Species at Risk

To ensure that the conservation recommendations of this project support the DoD conservation program, the project team focused on those SAR that occur on DoD lands within the ecoregion. The team developed the SAR list through literature review and evaluation of existing species of concern lists, including DoD's 2004 national Species at Risk list (NatureServe 2004), the SPP's CSP Assessment (Neely *et al.* 2006), Colorado's State Wildlife Action Plan (CDOW 2006), the Colorado Department of Transportation's (CDOT) Shortgrass Prairie Initiative, the U.S. Fish and Wildlife Service's Birds of Conservation Concern (USFWS 2002a), and the 2002 Migratory Bird Program Focal Species (USFWS 2002b). The team narrowed down the preliminary list based on three criteria: 1) species must be a priority to one or more of the SPP partners; 2) species selected must occur on DoD lands within the CSP; and 3) species with distributions and impacts that could be reliably mapped. A variety of regional species experts and DoD staff reviewed the proposed SAR list, which was then approved by the Advisory Group SAR subcommittee (See Appendix A). The list is not intended to represent all the potential SAR, but is a subset representing a range of species and common habitats being impacted across the ecoregion.

The recommended SAR list includes 20 species divided into four habitat groups.

1. **Arkansas Valley Barrens rare plants:**
 - Arkansas Valley feverfew (*Parthenium tetraeuris*)
 - Golden blazing star (*Mentzelia chrysantha*)
 - Arkansas Valley evening primrose (*Oenothera harringtonii*)
 - Pueblo goldenweed (*Oonopsis puebloensis*)
 - Round-leaf four o'clock (*Mirabilis rotundifolia*)

2. ***Burrow Dependent Reptiles:***

- Massasauga rattlesnake (*Sistrurus catenatus*)
- Ornate box turtle (*Terrapene ornata*)





3. ***Shortgrass Community:***

- Burrowing Owl (*Athene cunicularia*)
- Chestnut-collared Longspur (*Calcarius ornatus*)
- Ferruginous Hawk (*Buteo regalis*)
- Lark Bunting (*Calamospiza melanocorys*)
- Long-billed Curlew (*Numenius americanus*)
- McCown's Longspur (*Calcarius mccownii*)
- Mountain Plover (*Charadrius montanus*)
- Black-tailed prairie dog (*Cynomys ludovicianus*)
- Swift fox (*Vulpes velox*)

4. ***Shrubland/Mixed Grass Community:***

- Brewer's Sparrow (*Spizella breweri*)
- Cassin's Sparrow (*Aimophila cassinii*)
- Grasshopper Sparrow (*Ammodramus savannarum*)
- Loggerhead Shrike (*Lanius ludovicianus*)

The team grouped the species into their primary habitat, though some of these species occur in more than one habitat type (e.g., Lark Bunting inhabits both the Shortgrass and the Shrublands/Mixed Grass Communities). All of these species occur across public and/or private lands in addition to the DoD installations (see Appendix A, Section 1).

SAR group	Common name	
1. Arkansas Valley Barrens rare plants	1. Arkansas Valley Feverfew	
	2. Golden Blazing Star	
	3. Arkansas Valley Evening Primrose	
	4. Pueblo Goldenweed	
	5. Round-leaf Four O'Clock	
2. Burrow dependent reptiles group	1. Massasauga Rattlesnake	
	2. Ornate Box Turtle	
3. Shortgrass Community	1. Burrowing Owl	
	2. Chestnut-collared Longspur	
	3. Ferruginous Hawk	
	4. Lark Bunting	
	5. Long-billed Curlew	
	6. McCown's Longspur	
	7. Mountain Plover	
	8. Prairie Dog, Black-tailed	
	9. Swift Fox	
4. Shrubland / mixed grass community	1. Brewer's Sparrow	
	2. Cassin's Sparrow	
	3. Grasshopper Sparrow	
	4. Loggerhead Shrike	

Note: This SAR list is based on meeting the DoD's future mitigation needs in the CSP.
Sources: Photos from Renee Rondeau—Colorado Natural Heritage Program, Tom Blackman, Seth Gallagher, Tony Leukering, Ross Lock, Bill Schmoker—Rocky Mountain Bird Observatory, or public sources without copyrights.

Figure 2. Recommended SAR List and Images

The four habitat types with 20 Species at Risk shown above are recommended to the DoD as the highest priority for its conservation program in the CSP. See Appendix A, Section 1—SAR List for details on these species.

While the federal Migratory Bird Treaty Act provides the migratory birds some regulatory protection, none of the selected species are listed as threatened or endangered by the US Fish and Wildlife Service, though several of the species have been petitioned for listing in the recent past. The black-tailed prairie dog is currently under consideration for listing. Only the Burrowing Owl is included on Colorado's state threatened and endangered species list (threatened).

Other species associated with two habitat groups were identified as important and should be considered for future analyses. These species and associated habitats are: 1) Pinyon woodlands: Gray Vireo (*Vireo vicinior*) and Pinyon Jay (*Gymnorhinus cyanocephalus*); and 2) Riparian/playa: Northern Leopard Frog (*Rana pipiens*) and Plains Leopard Frog (*Rana blairi*). One species with significant needs, the Lesser Prairie-Chicken (*Tympanuchus pallidicinctus*), was not included in this project because it is not known to occur on DoD lands. The methods used for this project could also be used to evaluate these and other species, if warranted, by species status, available funding sources, and mitigation needs based on future impacts.

Impacts Assessment

To assess those threats that are most significant and prevalent across the range of SAR in the CSP and where these threats are most likely to occur, the project team conducted a GIS-based impacts assessment for each SAR group. Impacts are defined as human

activities that cause destruction, degradation, and/or impairment of species, associated habitats, and key ecological attributes.

Specific impacts to each SAR group were identified based on expert opinion and literature review. The impact assessment was based on a GIS analysis of mappable impacts¹ (see Appendix A for details). For plants, detailed location data were available, and were used to analyze potential impacts. For animals, detailed data were not available across the CSP, so the team modeled suitable habitats based on select parameters (e.g., vegetation type, elevation) consistent with known occupied habitats.² Mapped current impacts included in the analysis were: housing and urban development (including commercial and industrial), roads, oil and gas wells, surface mines, wind turbines, cultivated lands, gas pipelines, and electricity transmission lines. While the team attempted to include future impacts, they ultimately were not included due to lack of available and consistent data across the ecoregion.

The impacts with the greatest current threats to most of the SAR are: housing and urban development, conversion to cropland, roads and climate change (see Table 1). Housing and urban development are having a significant to moderate impact on all four groups of SAR, conversion to cropland has significantly impacted the three animal groups and may continue to do so in some places, roads are having a significant to moderate impact on the reptile, shortgrass and shrubland groups, and climate change is likely impacting all four groups. See Table 1 for a summary of results of this evaluation. The habitat models and the mapped impacts were then overlaid in GIS to identify priority habitats, discussed in the following section. See Appendix A (Section 2) for CSP-wide cumulative impacts and individual habitat suitability and impact maps, as well as technical GIS methods.

¹ To be useful, GIS datasets needed to be an appropriate scale for the analysis and cover the entire CSP study area.

² Using data from the Colorado Division of Wildlife, Colorado Natural Heritage Program, and Rocky Mountain Bird Observatory.

Table 1. Top Negative Impacts on SAR

The table below shows significant or moderate negative impacts on the four groups of SAR. Not all of these impacts could be mapped for this project. Please see Appendix A, Section 2 for full details on the impacts assessment.

Impact	Arkansas Valley rare plants	Burrow dependent Reptiles	Shortgrass Community	Shrubland/ Mixed Grass Community	Included in Spatial Analysis
Housing/Urban Development	X	X	X	X	X
Commercial/ Industrial Development	X		X		X
Conversion to Cropland		X	X	X	X
Natural System Modification			X	X	
Roads and Right of Way Maintenance	X	X	X		X
Oil and Gas Drilling		X		X	X
Mining	X				X
Wind Energy		X			X
Poisoning			X		
Incompatible Grazing Management			X	X	
Motorized Recreation	X				
Diseases			X		
Climate Change	X	X	X	X	

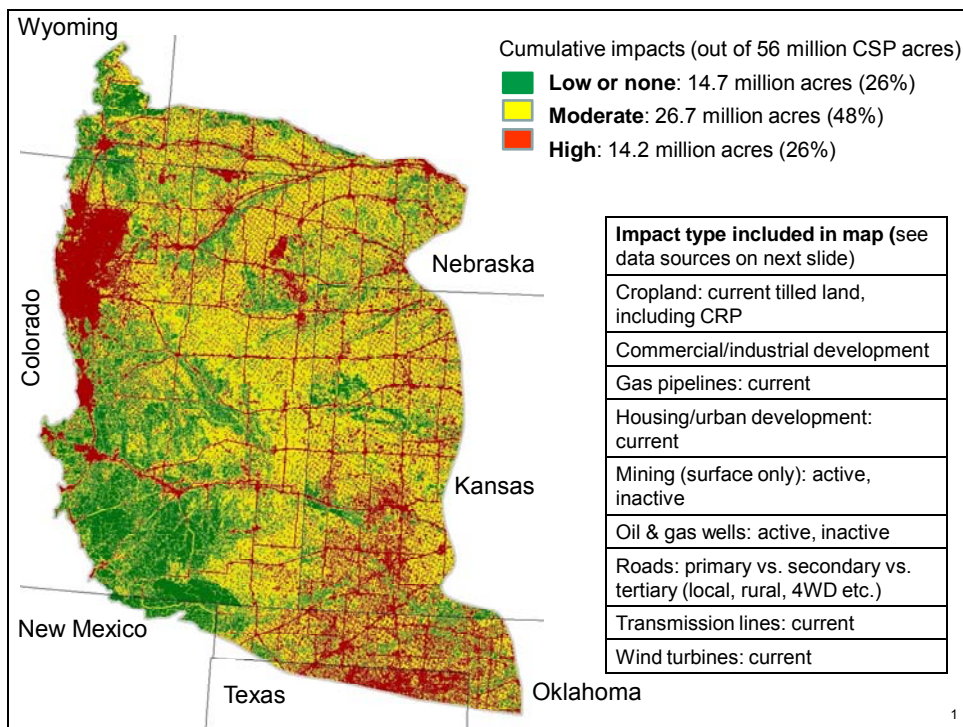


Figure 3. Map of Cumulative Negative Impacts

The map above is an illustrative depiction of cumulative negative impacts affecting SAR within the CSP. Red areas have the highest cumulative impacts; green areas have the lowest. Continuous variables from impacts assessment were incorporated into maps of target conservation sites (see Appendix A, section 3). Cut-offs for low/moderate/high impacts shown here are arbitrary cut-offs for illustrative purposes only. Maps of individual impacts (e.g., housing, roads, etc.) are included in Appendix A, Section 2—Impacts Assessment.

Priority Habitat Maps

The team developed maps of modeled habitat that incorporated ecological systems (CNHP and TNC 2008b), distribution information (USGS 2004, CDOW 2006, Grunau *et al.* 2007 and others), and current impacts (CNHP and TNC 2008c) for each species to identify geographic areas that would be most suitable for conservation projects. To qualitatively verify the accuracy of the models, the team solicited expert review and, where data were available, compared known point locations for each species. The team combined the modeled habitat with the impacts analysis (described above) to produce a final priority habitat map for each individual SAR. Priority habitats for each species include: 1) the highest quality modeled habitats for the species³; 2) areas where species are believed to be the most abundant; and 3) areas with the lowest level of human impacts or disturbances (see Figure 4 below and Appendix A, Section 3, for other individual SAR priority habitat maps and technical methods).

³ Quality was defined by six habitat classes: top, high, moderately high, medium, low priority, and incidental.

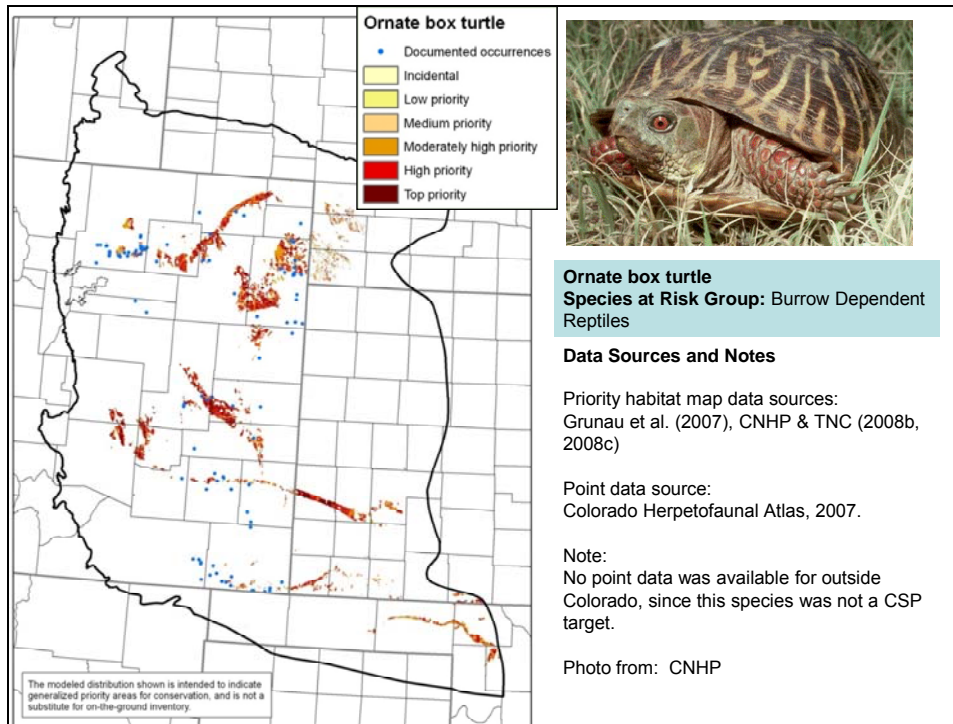


Figure 4. Sample Priority Habitat Map—Ornate Box Turtle within the CSP

The map shown above is one example of a Priority Habitat Map, for the Ornate Box Turtle within the CSP. Priority Habitat Maps for the other 19 SAR are in Appendix A, Section 3—CSP SAR Priority Habitats. Six habitat classes are shown on the map. The darker colors (orange to brown) represent the optimal habitats with low or no impacts while the lighter colors (yellows) show the less optimal, more impacted habitats. Documented occurrences are shown in blue where data is available (lack of documentation may mean the site has not yet been field-assessed). The data from this map are used in the SAR Scorecards.

Setting Biologically Based Conservation Goals

The team developed relatively subjective, biologically based conservation goals (in acres of habitat) for all animal SAR. These acres were used to depict the red “Goal” bars on animal species graphs.

For most of the bird SAR, NatureServe (website accessed April 2009) recommends maintaining 150 occurrences as a qualitative goal for maintaining their range-wide status. For this project the team considered a stable population (= occurrence here) as 7000 individuals (Reed *et al.* 2003); therefore 150 occurrences of 7,000 individuals would result in approximately one million total individuals. The CSP goal was arrived at by determining the proportion of the species geographic range represented by the CSP (based only on area, not on any density relationship), and then assuming the same proportion of the one million individuals goal. Acres of habitat needed to support that number was the biologically based goal and was calculated using density data from the Rocky Mountain Bird Observatory. The goals were higher for species with the greater proportion of their entire range within the CSP, and lower for species occupying a smaller part of their entire range within the CSP. This might be looked at as one way to represent the relative “conservation responsibility” of the CSP for an individual species.

Mammal goals were based on estimated occupied range (black-tailed prairie dog and swift fox), and for massasauga and ornate box turtle based on information from Dobson (1996). Mapped occurrences, potential conservation areas, and the Arkansas Valley Barrens network of conservation areas (CNHP 2008) were used to indicate priority habitat for the plant SAR.

The species area curve modified from Dobson (1996) suggests that coarse-filter representation set at 40% of habitat would conserve approximately 80% of the native species (see Appendix A, Section 4 Technical Methods). The team used this as a basis for setting goals for: 1) massasauga set at 40% of historic habitat extent (because we estimated there had been little loss or permanent conversion of the habitat to date); and 2) ornate box turtle set at 60% of current habitat extent (adjusted upward from the 40% of original habitat because we estimated that a significant amount of the original habitat had already been lost or converted).

After setting goals, the team then produced a summary habitat map of the 15 animal SAR using a site-selection tool called SITES (Andelman *et al.* 1999) to select the geographic areas that could most efficiently meet conservation goals for the animal SAR (see Figure 5). The total area of priority habitat encompasses 9.8 million acres (17% of the ecoregion). Priority plant habitats were not included in the SITES analysis (because they restricted to certain geologic formations and are fairly well documented by the CNHP in the ecoregion), but were overlaid onto the final map shown below. Maintenance and/or management for the conditions needed for the SAR in those priority habitats represent the best opportunities for effective conservation of those species and their habitats within the CSP. The habitat maps will be useful for prioritizing conservation projects. While the priority habitats identified in this project are for the SAR recommended to DoD, the methods used are easily adaptable to other species.

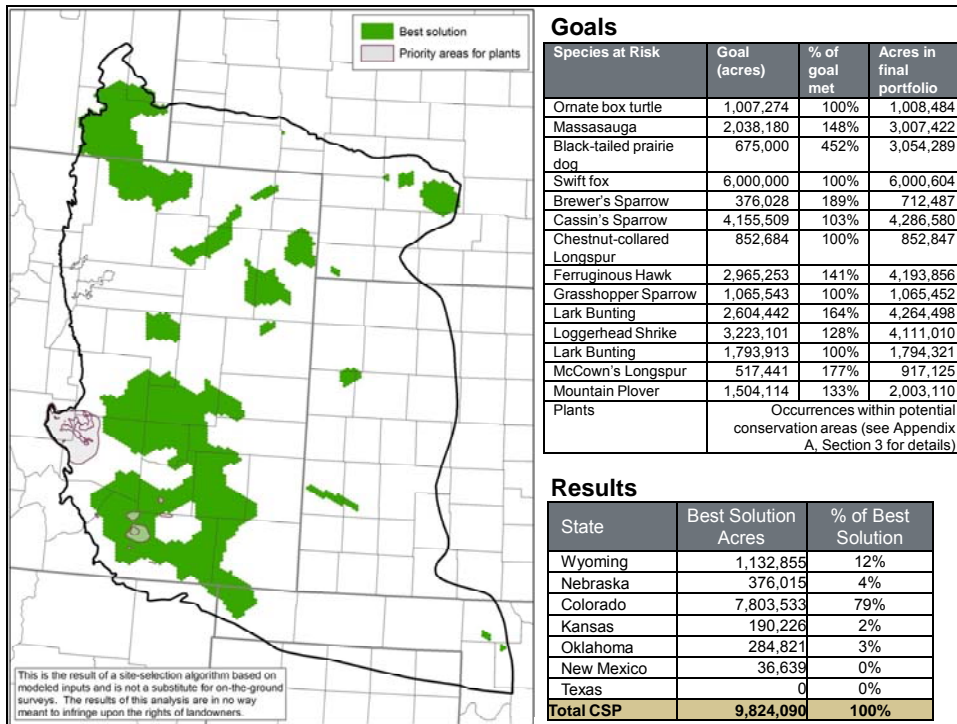


Figure 5. Overall Priority Habitat Map for SAR in the CSP

A site-selection tool (SITES) produced one overall priority habitat map for all animal SAR, as shown above, to estimate the least amount of area that would meet the individual conservation goals for each Species at Risk (green areas on map). The priority rare plant areas were later incorporated (purple areas on map).

SAR Scorecard

Building on the SPP’s ecoregion-wide scorecard framework (Neely *et al.* 2006) and the Biodiversity Scorecard for Colorado (CNHP and TNC 2008a), the team defined the baseline conservation status for each of the SAR to provide a gauge to measure future conservation success. The scorecards developed for each of the 20 SAR define the current baseline status of the species. For animals, the limited data available required an analysis where scorecards are based on priority habitats (which incorporate impacts) and land tenure protection status (see Figure 6). Scorecards for plants are based on biodiversity status (size, quality, and landscape integrity of occurrences), threat status, and formal protection status (see Figure 7 below for a sample plant scorecard and Appendix A for all other individual scorecards and technical methods).

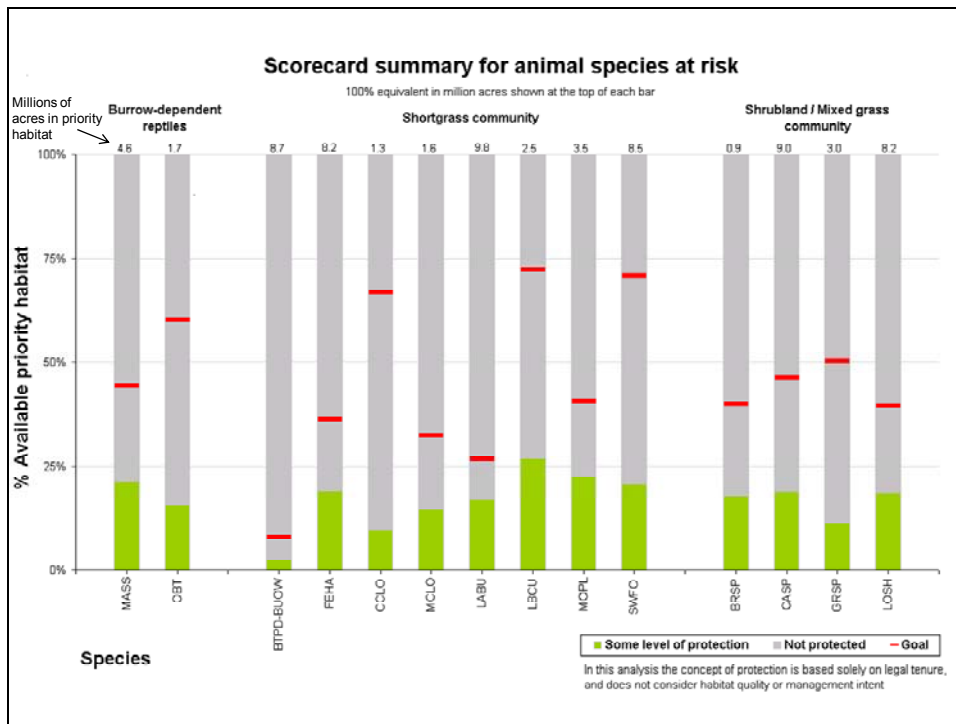


Figure 6. Summary Scorecard for 15 Animal SAR in the CSP

Each vertical bar shows the total available priority habitat for each species (defined as the top 3 habitat classes from priority habitat maps). The green portions represent the proportion of available priority habitat that has some level of legal protection. Conservation goals for each species are represented by the red lines. A simple way to assess conservation progress in the context of legal land protection would be take actions that move the green bar towards the red line. (Legend: MASS=Massasauga, OBT=Ornate Box Turtle, BTPD-BUOW=Black-tailed prairie dog and Burrowing Owl, FEHA=Ferruginous Hawk, CCLO=Chestnut-collared Longspur, MCLO=McCown’s Longspur, LABU=Lark Bunting, MOPL=Mountain Plover, SWFO=Swift fox, BRSP=Brewer’s Sparrow, CASP=Cassin’s Sparrow, GRSP=Grasshopper Sparrow, LOSH=Loggerhead Shrike).

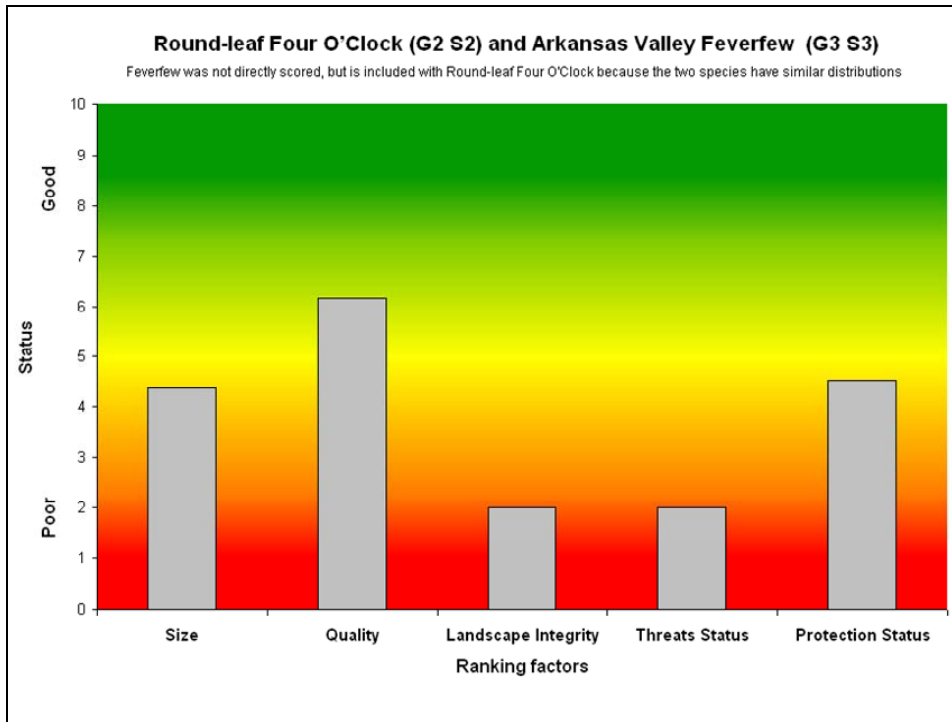


Figure 7. Sample Scorecard for Plant SAR—Round-leaf four o'clock and Arkansas Valley feverfew

In this sample Arkansas Valley Barrens Rare Plant scorecard, the round-leaf four o'clock is combined with the Arkansas Valley feverfew because they have similar distributions. All data used in the scorecard are from CNHP. See Appendix A, Section 4—Scorecards for other plant scorecards and definitions of ranking factors (size, quality, landscape integrity, threats status, protection status).

The team determined the amount of habitat in formal protection status based on legal tenure using GAP classes (Scott and Jennings 1997, Neely *et al.* 2006). The team recognizes that this method does not address management intent or habitat quality. Many privately owned lands within the CSP are well managed and provide high quality habitat. However, detailed data on management effectiveness and habitat quality are not currently available to assess in a GIS environment. In addition, there can be no certainty the high quality status of these lands will remain into the future without legal protection (i.e., fee ownership for conservation purposes, conservation easement).

Unlike some other regions within the Great Plains, the CSP still supports a significant amount of high quality habitat for SAR. As such, many conservation opportunities exist, but there is much work to be done. None of the SAR analyzed in this project are considered effectively conserved (at or above conservation goals). Collaborative implementation of the recommended conservation program described in the following section will make a significant contribution toward abating threats and achieving conservation goals in the CSP ecoregion.

Recommended Conservation Tools

This project includes recommendations to the DoD and the SPP on new collaborative conservation tools for potential application or expansion in the CSP. To do this, the team identified all known conservation tools, based on original case studies and research, and

further evaluation through focus groups with landowners and potential conservation funders.

Conservation Tools Considered for the CSP

Through published research and expert consultation, the team identified 20 different conservation tools that have been used in various environments. Based on initial screening, the team categorized the tools into four groups:

1. **Collaborative tools:** market-based approaches and other voluntary, incentive-based tools (e.g., Candidate Conservation Agreements, Candidate Conservation Agreements with Assurances, voluntary offsite mitigation programs, grass banks/cooperatives, Farm Bill facilitation, and recovery credit systems);
2. **Traditional tools:** tools that are already in use in the CSP including the most commonly used tools in the land trust and conservation communities (e.g., conservation easements, lease agreements, management agreements, traditional Farm Bill);
3. **Lower priority tools:** These are tools that include a voluntary change in ownership, such as purchase by an agency, non-governmental organization, non-traditional rancher, “conservation buyer,” or absentee owner. These tools should still be available and applied at landowner request, but not a focus of this project, and
4. **Excluded tools:** tools that are already being implemented in the CSP via other efforts; tools that are regulatory in nature, eminent domain and/or any means of compulsory purchase.

The project team determined that the “traditional tools” that have been used successfully within the CSP would be obvious components of the conservation program to be developed and did not warrant further investigation. The team decided not to focus on “lower priority tools” and “excluded tools” because they were not considered appropriate approaches for a program based on voluntary, incentive-based tools, and involving only willing landowners. Instead, the team devoted the rest of its effort to investigating the “collaborative tools” for feasibility and landowner interest. Table 2, below, defines these collaborative tools with examples from case studies (see Appendix B, Sections 1 and 2 for more details).

Table 3. Definitions of Collaborative Conservation Tools

Tool	Definition	Case Study
Candidate Conservation Agreement (CCA)	Voluntary agreement between federal agencies and the FWS for a Candidate species, or one or more species not yet federally listed. There are no assurances against future regulation associated with this agreement.	Ft. Lewis Conservation Program (WA)
Candidate Conservation Agreement with Assurances (CCAA)	Voluntary agreement between a non-federal landowner and the FWS for a Candidate species, or one or more species not yet federally listed. Landowner agrees to conservation actions for the species in return for protection against increased requirements in the future should the species be listed.	Ft. Lewis Conservation Program (WA) Cooperative Sagebrush Initiative (western US)
Farm Bill Facilitation	Technical and financial support is provided to agricultural producers to help deliver Farm Bill Programs to producers. A number of Farm Bill programs can be used to conserve SAR, by helping share the cost of practices implemented on private lands.	Sandhills Task Force
Grass Bank / Grass Cooperative	Grazing land is offered (at below market value rate) in exchange for ranchers' voluntary commitments to conservation measures on the participating home ranches (Gripne 2005). Leases can vary in duration depending on conservation values and extent of trusted relationships A (proposed) grass cooperative builds on the traditional concept of a grass "bank" but addresses the shortfalls, e.g., financial outlay and ecological concerns. It would promote community-based sustainable grazing, conservation of SAR through a market-based framework, funding mechanisms to improve financial solvency, options for term and perpetual commitments, and potentially serve as a mitigation tool (Gallagher 2009).	Matador Ranch, MT
Recovery Credit System (RCS)	Recovery credit systems are modeled after the USDA-NRCS Conservation Reserve Program in that term agreements are made to manage habitats for priority species.	Ft. Hood RCS
Voluntary Offsite Mitigation Program	Conservation funding is provided by an entity that expects to have environmental impacts due to development (oil and gas, wind, pipeline, roads, housing, etc.). Funding is used to buy conservation easements on properties with similar ecological features to the land that will be impacted. Funds can also be used for restoration and management agreements.	Shortgrass Prairie Initiative (CO) Horizon/ Smoky Hills (KS) Jonah Fields (WY)

Case Studies and Focus Groups Used to Evaluate Conservation Tools

Many innovative conservation programs have been implemented across the country to conserve species and habitats, including species that are federally listed, and increasingly including species that are declining but not requiring federal regulatory protection. To build upon this knowledge, and to avoid duplication of effort, the team identified major active conservation tools and programs across the United States. Since none of the SAR are federally listed, the team focused on tools and programs that are applicable to non-listed SAR. Using expert input, the team identified 27 potential case studies for research to better understand the use, effectiveness, and constraints of different tools and programs. These case studies were prioritized according to eight criteria⁴, and preliminary research was conducted to determine which case studies best meet the needs of the DoD and the SPP. Based on the preliminary research, the team selected the top ten case studies for detailed research and interviews with case study participants (see Appendix B, Section 3—Case Studies for completed case studies and research results).

The final case studies with most relevance and application to the CSP were:

1. **Cooperative Sagebrush Initiative** (western US): This partnership is currently exploring the development of a multi-landowner CCAA and is using an NRCS-funded Conservation Innovation Grant to demonstrate the first-ever use of a credit banking system for a non-federally listed species.
2. **Ft. Hood Recovery Credit System** (TX): This case study illustrates the use of a recovery credit system (RCS), which is like conservation banking except with term limited contracts instead of perpetual conservation agreements.
3. **Ft. Lewis Conservation Program** (WA): Ft. Lewis is just one example of the DoD's participation in a CCA (some participating non-federal landowners have CCAs).
4. **Gulf Coastal Plain Ecosystem Partnership** (southeastern US): In this partnership, the DoD works closely with neighboring landowners to set conservation goals and align management practices.
5. **Horizon/Smoky Hills** (KS): This is only known example of the use of voluntary offsite mitigation funds in the wind development industry.
6. **Jonah Natural Gas Fields** (WY): This is an example of an offsite mitigation fund in the oil and gas development industry with mitigation goals of more than 75,000 acres.
7. **Matador Ranch** (MT): This ~60,000 acre grass bank is perpetually conserved (owned by TNC) and leverages its forage in exchange for conservation commitments on ~150,000 acres of surrounding private ranchland.
8. **San Diego County Multiple Species Conservation Program** (CA): This regulatory-driven program inserts conservation goals into the construction

⁴ Criteria for prioritizing case studies: voluntary participation, multiple species, multiple scales, similarity of species to CSP SAR, participation of multiple agencies and landowners, range of tools employed, maturity of program with lessons learned, and DoD participation.

- permitting process. It has already conserved ~85,000 acres, roughly half of its total goal.
9. **Sandhills Task Force** (NE): This landowner-driven nonprofit which completed 14 projects in 2007 with on-the-ground funding of approximately \$500,000. With NRCS providing one-third of project funding, this is an example Farm Bill Facilitation in practice (as defined by the project team).
 10. **Shortgrass Prairie Initiative** (CO): This is the only known voluntary offsite mitigation fund ever implemented in the CSP, on behalf of the Colorado Department of Transportation (CDOT). It cost roughly \$4 million and conserved almost 30,000 acres through conservation easements.

Some of the case study programs employed innovative tools that have not yet been implemented in the CSP. The DoD, in collaboration with the SPP, is well positioned to introduce some of these voluntary and incentive-based tools into the ecoregion. Additionally, the case study programs employ a wide variety of approaches for program framework, funding, administration, and decision-making. However, many offer consistent lessons on the key components of a successful collaborative conservation program, including:

- Strong science as a foundation;
- Involvement of multiple partners, including private landowners, as well as private, state and federal agencies;
- Dedicated long-term funding sources or opportunities;
- Conservation tools that leverage large-scale landscape conservation; and
- Effective outreach and education within the local community.

Key findings from case studies regarding conservation tools to use in the CSP and how to structure a CSP-focused conservation program are described below (see Appendix B, Section 3 for detailed case study results).

In order to evaluate the feasibility of implementing the collaborative tools, the team conducted several focus group meetings with CSP landowners and other potential stakeholders. Two focus group meetings were held with private landowners in northeastern and southeastern Colorado, where the project team learned whether local landowners are interested in exploring conservation for their properties, and if so, which tools they would be most interested in using. While the first focus group included landowners who were already interested in conservation, the second focus group was part of a broader agenda of a local cattlemen's association meeting, and therefore also included landowners not necessarily interested in formal conservation programs.

Private landowners who attended the focus group meetings expressed the most interest in grass cooperatives, followed by CCAAs, recovery credit systems, and offsite mitigation. Responding to a written confidential questionnaire, landowners reported that a grass cooperative is the innovative tool most landowners would consider using. Fifty percent of respondents reported that they would be "very interested" in participating with an additional 36% of respondents saying they were "somewhat interested." These results put

grass cooperatives far in the lead. Two other tools came in at close second and third positions: interest in CCAAs slightly exceeded interest in recovery credit systems. The fewest respondents reported interest in offsite mitigation (however almost 60% were very or somewhat interested in using this tool), largely due to landowner wariness of perpetual conservation easements on which offsite mitigation programs are based. While the team met with only a small number of landowners, results were consistent between two different groups. Because the CSP is predominantly private land, effective conservation cannot be achieved without private landowner support. Therefore, the results of landowner focus groups were assigned greater weight in determining final recommendations.

The focus group discussions with other stakeholders explored whether participant organizations or industries would support participating in a conservation program in the CSP, and secondly, whether any organizations (as potential funders) preferred some conservation tools over others. For this set of focus groups, the team met with representatives of the following industries and agencies: “green” homebuilders, traditional homebuilders, the Natural Resource Conservation Service, DoD representatives from the Army and Air Force, U.S. Fish and Wildlife Service, and the Colorado Renewables Conservation Collaborative, a coalition of wind power developers and conservation groups.

Evaluation of Collaborative Conservation Tools

The results of the focus groups, when combined with other key criteria, allowed the project team to prioritize which of the new collaborative tools could be introduced in the CSP and recommended to the DoD to pursue. The results of this evaluation are shown in Figure 8 and are described below.

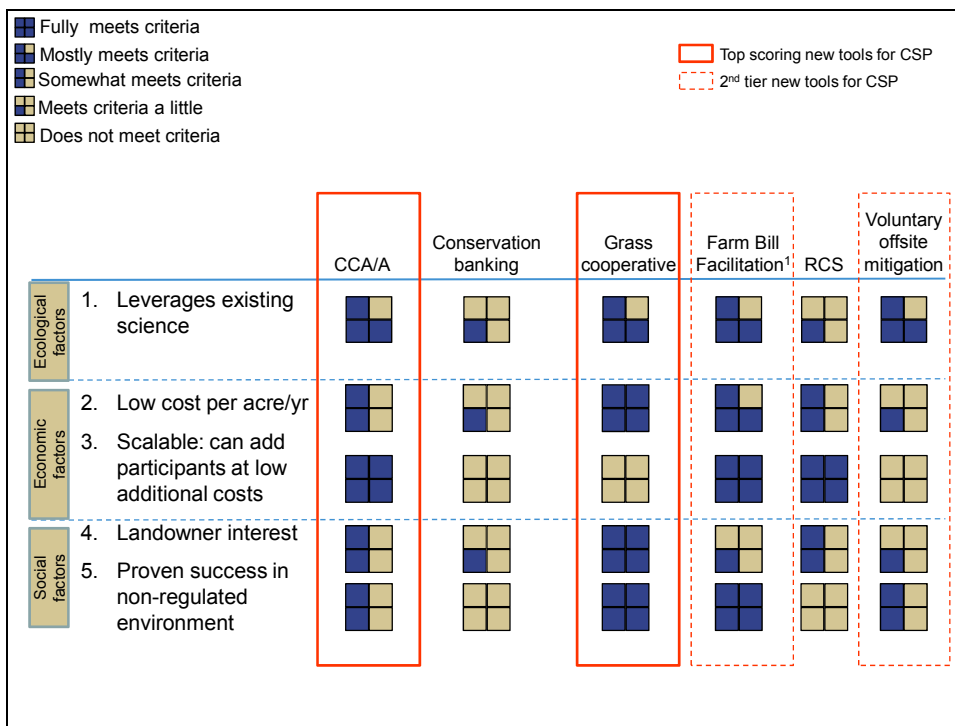


Figure 8. Summary Evaluation of Collaborative Conservation Tools Considered for the CSP

This figure summarizes the project team’s overall evaluation of new collaborative conservation tools to potentially introduce or expand in the CSP. Each tool was evaluated against a set of ecological, economic, and social criteria. As shown in the legend on the top left corner, a rating with four blue quadrants indicates that the tool fully meets the criteria shown while a rating with four brown boxes means the tool does not meet the criteria at all.

First, the team considered whether the tool **leverages existing science** or if new investments in science need to be made before this tool can be implemented. The team concluded that conservation banking and recovery credit systems (RCS) are not ready for near-term implementation for several reasons: 1) there is ongoing debate regarding the effectiveness of RCS in protecting DoD training range assets over the long-term, and 2) because the ecological conditions of the landscape must be translated into units of economic “currency” or transparently-derived values for conservation credits such that the credits can be bought, sold, and exchanged. This is a complex undertaking that other programs have spent years and hundreds of thousands of dollars developing. Given that the SPP has been planning its conservation strategy and investing in science since 2004, the project team recommends that the DoD and the SPP prioritize the collaborative conservation tools that are ready for implementation.

Next, the team considered **economic factors** in terms of conservation at a relatively **low cost-per-acre-per-year**. Long-term conservation tools such as perpetual easements are typically more expensive than short-term tools such as temporary management agreements, at least initially. Therefore, conservation banking and offsite mitigation programs rated lower than the other tools. Start up costs for a RCS can also be high, due to the need for developing measures of currency as noted above. CCAAs are rated at the same level as a RCS since CCAAs also involve an investment in personnel to work with landowner on developing the conservation agreements. The process of developing and

securing CCAAs can be slow, as they are still a new tool (Bean 2009). Farm Bill Facilitation programs rated second-best on cost factors because of the ability to leverage federal funding in every conservation project. Grass cooperatives scored the best on cost because as long as grass cooperatives are implemented without a transfer of land ownership, operating costs can be fairly low and the operation may even turn a profit.

Another economic factor the team took into consideration was whether the conservation tools are **scalable**. In other words, can new landowners be added in the future at a low marginal cost or is there an upper limit on how many landowners can be involved? CCAAs, Farm Bill Facilitation programs, and recovery credit systems are scalable at low marginal costs. An investment is made up front in setting up the program, but then other landowners may join the program at relatively low marginal costs. In contrast, with grass cooperatives, conservation banks, and offsite mitigation programs, the number of participating landowners is limited by the original design.

Finally, the team evaluated **social factors** for each conservation tool, including landowner interest and proven success in environments similar to the CSP. **Landowner interest** in each tool was rated based on the results of the two focus groups, as described above. The rating for Farm Bill Facilitation indicates relatively low landowner interest. However, many landowners currently participate in Farm Bill programs. This result may be an indication that although landowners see the Farm Bill tools as desirable, they are tools already in use, and therefore are not new or additive. This result may indicate that landowners are interested in other new tools rather than increasing their current use of the Farm Bill. It may also reflect a lack of understanding or capacity of Farm Bill programs that can be used to help conserve SAR and their habitats.

Another social factor considered was whether the tool has been **successfully demonstrated** in environments where species are not federally listed. Conservation banking and recovery credits systems have not been implemented for unlisted species, although the Cooperative Sagebrush Initiative is currently developing a program that does just that. Offsite mitigation programs have been implemented on a mostly-voluntary basis for unlisted species (there is believed to have been some regulatory pressure in the known examples). CCAAs are intended for non-federally listed species, but because they have only recently been implemented, their success is difficult to measure. Grass cooperatives have been implemented for unlisted species, and are well suited to address a variety of species whether they are listed or not.

Recommended Conservation Tools for CSP

The recommended collaborative conservation tools listed in Table 3 below are in the order of the results of the team's evaluation. First, the team strongly recommends that the DoD work with the SPP to bring grass cooperatives to the CSP. Second, the team strongly believes that the DoD and SAR will benefit from establishing a CCA and then leveraged into multi-landowner CCAAs. Third, the SPP should continue to pursue voluntary mitigation fund opportunities until a funding source is identified. Finally, Farm Bill Facilitation should be expanded in the CSP to leverage the largest available funding pool for conservation. Farm Bill funding can be leveraged with the Readiness and

Environmental Protection Initiative (REPI) program to concurrently facilitate SPP conservation objectives, buffer military installations from incompatible development and mitigate endangered species restrictions that impact Soldier training.

Table 3. Collaborative Conservation Tools Recommended to the DoD and the SPP for the CSP

Recommended Tool	Benefits and Reasons for Recommendation	Implementation Challenges
1. Grass Cooperative	<ul style="list-style-type: none"> • One of the lowest cost tools in terms of the amount of acreage conserved per dollar invested on an annual basis (after start-up) • Potential to improve relations between DoD and neighboring landowners. • 86% of landowners in focus groups were interested in using this tool. 	<ul style="list-style-type: none"> • Small onsite grass cooperatives may be possible on Air Force lands and would build relationships with landowners • Many offsite grass cooperative opportunities exist in the CSP but funding sources for implementation still need to be secured (team has applied for federal NRCS Conservation Innovation Grant funding)
2. Onsite Candidate Conservation Agreement (CCA)	<ul style="list-style-type: none"> • Would align management practices for the DoD across 7 installations • Could streamline ESA consultation • Has been successfully implemented at many DoD installations with positive results of Candidates de-listed • Most applicable for species that have a greater chance of being listed: e.g. Black-tailed Prairie Dog, Mountain Plover. 	<ul style="list-style-type: none"> • DoD staff would need to contribute time to the development of a CCA • Funding sources for a team to help the DoD write a CCA still need to be identified (e.g., DoD Legacy Program?)

Recommended Tool	Benefits and Reasons for Recommendation	Implementation Challenges
<p>3. Offsite Candidate Conservation Agreement with Assurances (CCAA)</p>	<ul style="list-style-type: none"> • An investment in developing a CCA for the DoD and other public agencies could later be easily expanded to a CCAA for private landowners. • Assurances provide a powerful incentive for private landowners to reduce risk. • 72% of landowners in focus groups were interested in using this tool. • Two CCAAs have demonstrated that landscape-scale, multi-landowner is possible (e.g., Grayling-Big Hole River has 33 private lands with 164,182 acres, 51% of the project area; Idaho Ground Squirrel has 5 private lands with ~50,000 acres). 	<ul style="list-style-type: none"> • Implementing CCAAs has gotten more complex over time, especially for multi-species agreements; thus many team resources are required and funding sources have not yet been identified for this purpose
<p>4. Voluntary Offsite Mitigation Program</p>	<ul style="list-style-type: none"> • Results in permanent conservation results. • Has been successfully implemented in CSP with Colorado Department of Transportation Shortgrass Prairie Initiative. • 60% of landowners at focus groups reported they are interested in using this tool. 	<ul style="list-style-type: none"> • The only barrier to implementing a second such program in the CSP is recruiting a mitigation funder, such as the DoD or energy developers.
<p>5. Farm Bill Facilitation</p>	<ul style="list-style-type: none"> • One of the largest sources of conservation funding currently available • Offers increased capacity for outreach, technical expertise and management recommendations to meet the needs of SAR species. 	<ul style="list-style-type: none"> • CSP landowners are wary of increasing their involvement in Farm Bill programs, but the project team believes that SPP technical support and funding would improve conservation outcomes and producer satisfaction with participation.

All of these conservation tools are appropriate for use to conserve SAR within the ecoregion. The tools described above are both perpetual and temporary, thus meeting needs of most landowners and the identified potential funders. However, some participants (both private landowners and potential funders) may have needs, mandates, or missions that limit to the choice between term and perpetual agreements. DoD will

likely focus on perpetual agreements to protect their facilities and training missions, but other SPP partners may utilize term agreements to reach their goals.

Recommended Conservation Program

The project team recommends that the DoD participate in a collaborative conservation program focused on SAR in the CSP. Describing a framework for such a conservation program requires three broad elements: 1) a conservation strategy; 2) a conservation process; and 3) program organization. Each of these is described below.

Conservation Strategy

The conservation strategy consists of short- and long-term goals, a defined geographic scope and a conservation toolbox.

The **short-term goal** of the CSP conservation program is to fund and facilitate actions to conserve SAR and their habitats in the CSP above the combined level that each SPP partner (including DoD) would be able to achieve on its own. The **long-term goal** is to reduce the need for listing of SAR under the Endangered Species Act so that private and public landowners may continue to use their lands in accordance with their private interests or public missions while reducing the risk of additional regulatory burdens in the future.

The project-by-project conservation goal for this program is that conservation efforts by mitigation funders result in improved conservation status for SAR at least equal to or preferably greater than any loss from impacts. Any funder to the program should be required to conduct an impacts assessment for its own lands and then consequently fund the necessary level of conservation that would completely mitigate for those impacts.

The recommended **geographic scope** of the program is the entire CSP, but DoD may wish to concentrate its individual efforts in Colorado and Wyoming to meet the DoD's goal of conserving species of risk that exist on or near its military installations. These two states alone encompass more than half of the ecoregion and 95% of SAR-related priority habitats. This program is primarily intended for conservation on private lands since 92% of the CSP is privately owned. However, it is possible that public landowners, such as state land managers, may wish to participate and this program is adaptable to include other land types as appropriate.

The project team recommends the addition of a **new suite of collaborative tools** for the CSP, including grass cooperatives, onsite CCAs, offsite CCAAs with private landowners, and offsite mitigation. These innovative tools could be used in conjunction with the traditional tools such as permanent conservation easements, Farm Bill programs, and term leases. The complexity of species, habitats, impacts, and landowner needs warrants the use of a suite of both long-term and term-limited conservation tools. Some participants (both private landowners and potential funders) may have needs, mandates or missions that require focus on one or the other. Recognizing that the DoD currently uses a range of conservation tools, Figure 9 below shows both the tools that DoD already uses in addition to the new tools that the project team recommends for the DoD.

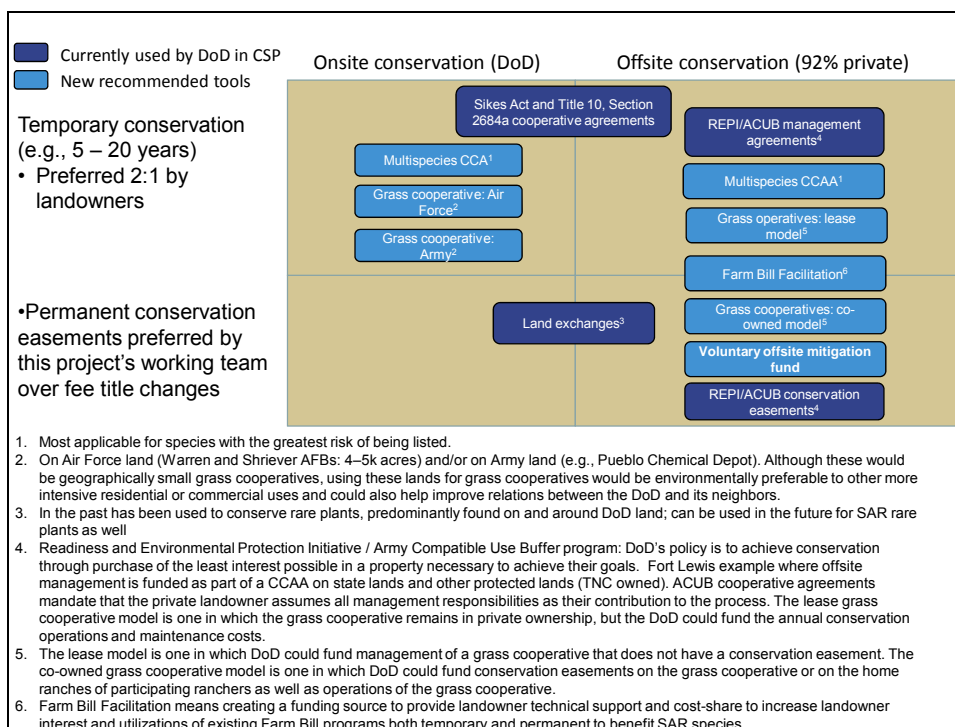


Figure 9. Recommended Conservation Toolbox for DoD in the CSP

The tools shown in dark blue are the ones that DoD already uses, and the tools shown in light blue are the new tools that the project team recommends that the DoD consider adding to its toolbox.

The tools in the recommended toolbox above are categorized on a matrix with two dimensions. The first dimension (the vertical columns) shows whether each tool is applicable onsite, offsite, or both. The second dimension (the horizontal rows) shows which tools result in temporary conservation versus those that result in permanent conservation. Some tools are categorized under temporary—such as CCAAs and grass cooperatives—because landowners may discontinue their involvement in these tools if so desired, but these tools are not necessarily temporary by definition and it is possible that participating landowners may wish to participate in such programs indefinitely.

Program Organization

The team recommends the following organization for the conservation program, including program structure, functional roles, and organizations.

The proposed conservation program is 100% voluntary for all parties with tangible benefits for participation. The program could be **structured**, at a high level, with conservation facilitators bringing together funders and landowners as shown in Figure 10 below. Conservation funders are defined as organizations that wish to support and fund conservation in the CSP or mitigate for expected environmental impacts on CSP lands. Conservation facilitators are organizations that want a CSP conservation program to succeed and are willing to invest time or money. Conservation landowners are mostly private landowners who would apply for funding to take conservation actions on their lands.

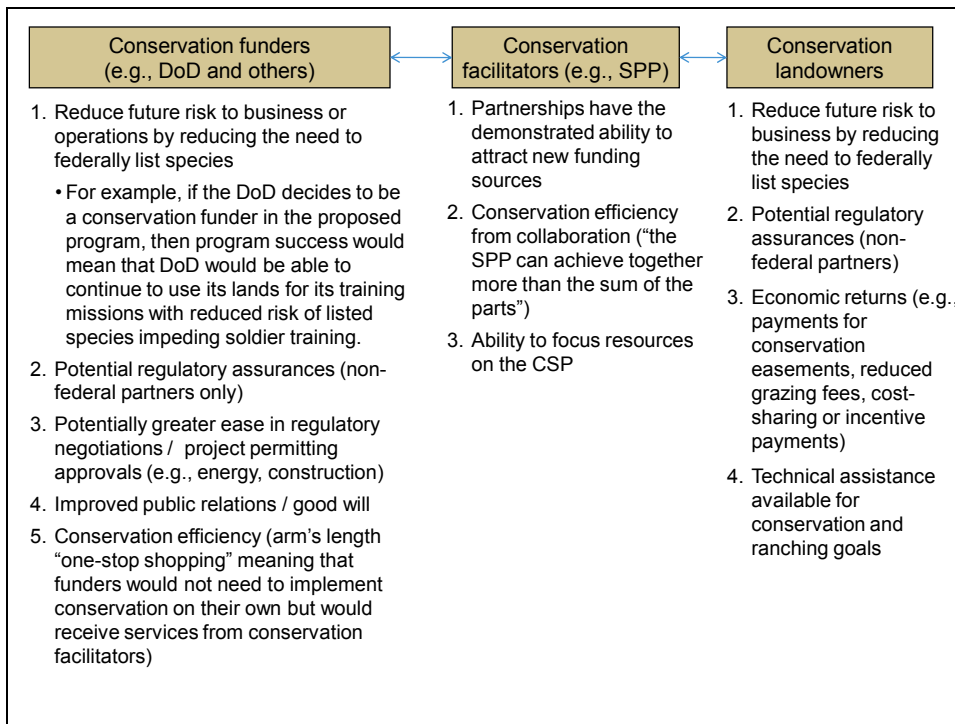


Figure 10. Proposed Program Participants and Expected Benefits

The recommended program would meet the needs of **conservation funders** by offering risk management from a reduced need to federally-list SAR, potential regulatory assurances for non-federal partners, potentially greater ease in regulatory negotiations and project permitting processes, improved public relations through corporate good will, and conservation efficiency. As an example, if the DoD becomes a conservation to this program, then program success would mean that DoD would be able to continue to use its lands for its training missions with reduced risk of listed species impeding soldier training. In addition, if new future regulatory requirements are unavoidable, this proposed conservation program would provide the roadmap for potentially dealing with new compliance requirements offsite in a REPI framework.

It is possible that a funder would be required to do conservation, but no funder is required to participate in this program over other available conservation actions. While this program is currently designed to meet the needs of the DoD, the recommended program is adaptable to other potential partners such as state or federal transportation departments, wind energy developers, home developers, oil and gas developers, and any funder wishing to mitigate for environmental impacts. The intent is that the proposed centralized program management structure results in organizational efficiencies among multiple funders, in effect providing "one stop shopping" for conservation needs and greater conservation benefits than those provided on a project by project basis.

Conservation facilitators would benefit from attracting new funding sources, achieving conservation efficiency from collaboration adding up to "more than the sum of the parts," and from the ability to focus specifically on the CSP. The program would benefit **conservation landowners** from the reduced need to federally list species (and thus

reduced business risk to ranching operations), potential regulatory assurances (which would also reduce business risk), economic returns from potential payments for conservation easements, reduced grazing fees, cost-sharing and incentive payments, and technical assistance to achieve conservation and ranching goals

In implementing this proposed conservation program, the team recommends that DoD work within the existing structure of the SPP, which already brings together key stakeholders and landowners in the CSP. Helping to implement DoD’s CSP conservation program could be one of several SPP initiatives. An external review panel could guide the program, which would delegate responsibilities to program staff. The program could be covered by an MOU with a designated fiscal agent (e.g., a member of the SPP) facilitating the transfer of funds from partners to landowners. This structure for the conservation facilitation portion of the program structure is shown in Figure 11 below.

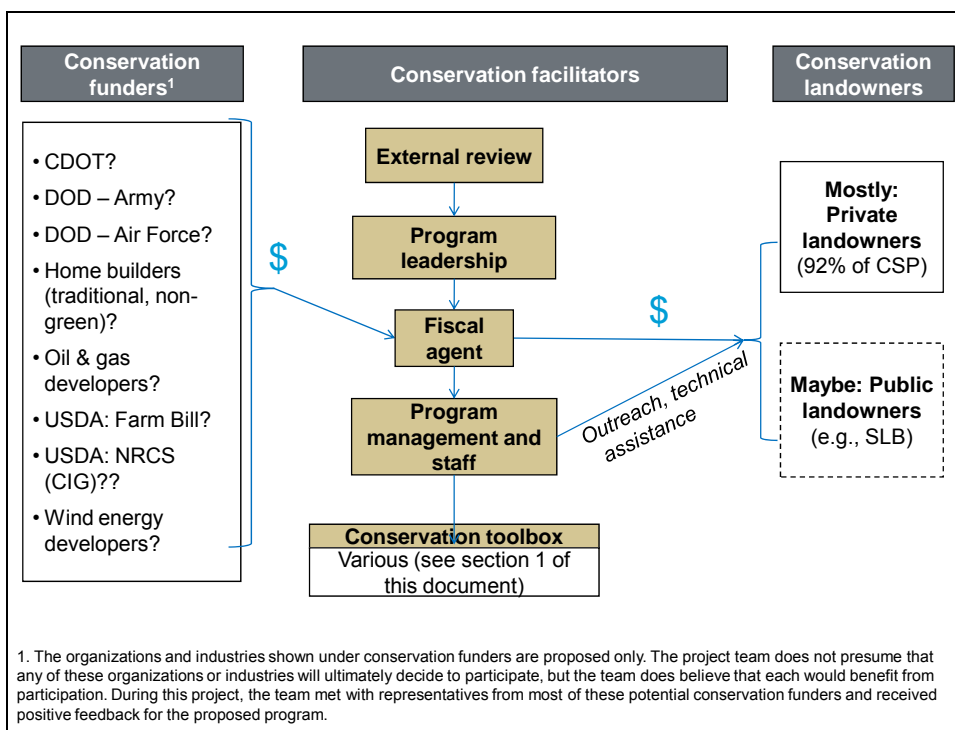


Figure 11. Recommended Conservation Program Organizational Structure

This figure lists potential funders that might be recruited to participate in the proposed conservation program. It also emphasizes that most conservation landowners will be private ranchers. The Conservation Facilitation role of could be carried out as an initiative by the SPP, of which the DoD is a member.

The program management and staff role shown in Figure 11 above is further broken down by **functional roles** in Figure 12 below. Specifically, the program could include the participation of program staff with expertise in fundraising, education and outreach, science, and landowner support. These staff members do not need to be fully dedicated to this initiative of the SPP, and their time may be donated by partnering organizations as in-kind contributions. All of these skills currently exist within the SPP but would be organized around an initiative specific to DoD’s conservation and mitigation needs.

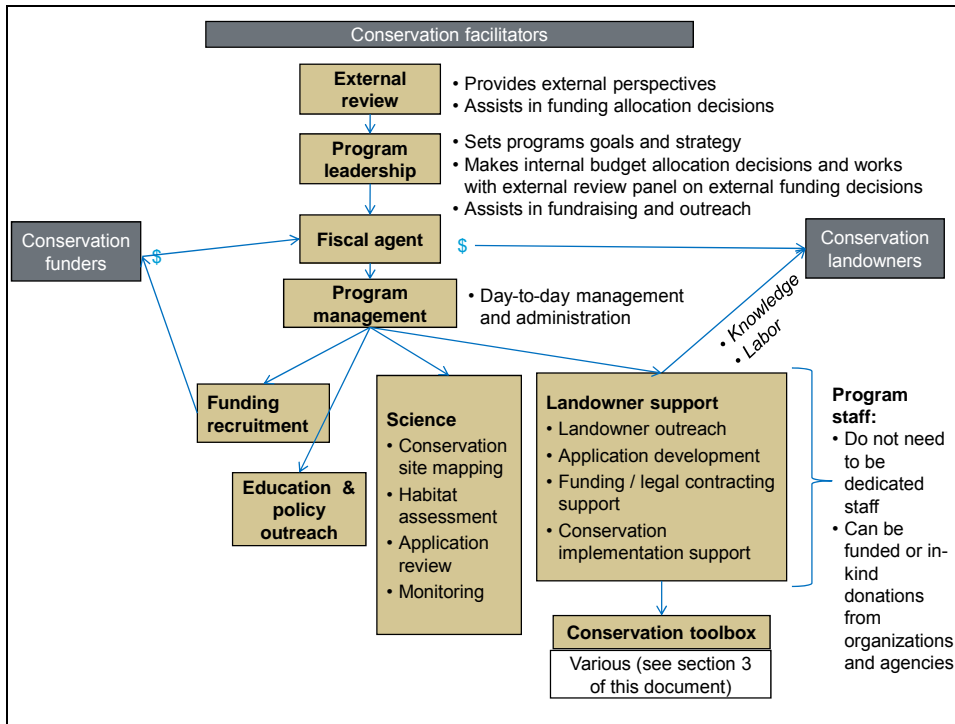


Figure 12. Program Roles for Conservation Facilitation

This figure focuses on the organizational structure and roles recommended for the conservation facilitation component of the overall program structure. Required program staff roles include fundraising, education and outreach, science, and landowner support.

Potential **participating organizations** include: an expert review panel of the SPP Working Landscapes Advisory Group; grazing and farmers’ associations, Colorado State University, and other academics and external stakeholders, as interested. Program leadership can be provided by the SPP, including the DoD. Fiscal agency and project management may be provided by a member of the SPP with rotating responsibilities over time. The project staff in fundraising, outreach, science, and landowner support roles could include the Colorado Division of Wildlife, the Colorado Natural Heritage Program, the Environmental Defense Fund, the Rocky Mountain Bird Observatory, the Nature Conservancy, and the U.S. Fish & Wildlife Service.

Conservation Process

Part of recommending a conservation program framework is defining how such an organization would carry out its conservation goals. This section defines an overall conservation process, as shown in Figure 13 below, starting with an assessment of expected impacts to SAR and then developing a mitigation plan to address the needs of species expected to be impacted.

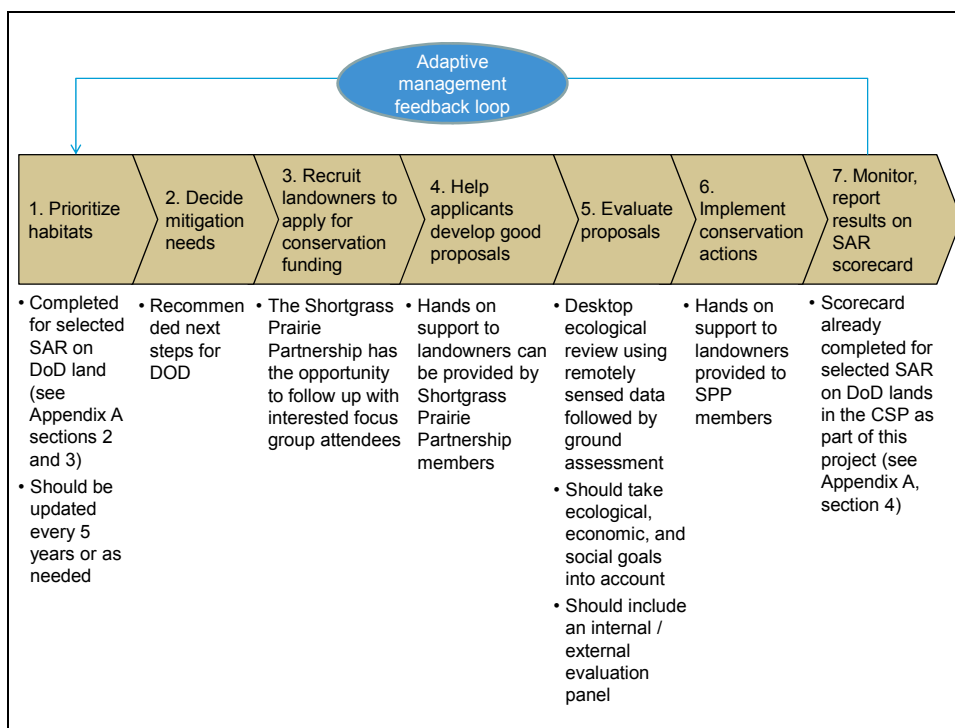


Figure 13. Recommended Conservation Process for the Proposed Program

This figure outlines a recommended conservation process for the DoD. The first step, prioritizing habitats, was already completed as part of this project. The next step recommended for the DoD is to estimate its mitigation needs based on likely future impacts.

Specific steps in the proposed conservation process include:

1. **Prioritize SAR habitats** based on viable population distributions and expected impacts to habitats;
2. **Determine mitigation funding levels** in partnership with potential funders and conservation biologists to help translate onsite impacts into offsite conservation needs;
3. **Recruit landowners** through a top-down and bottom-up process through targeted geographic outreach;
4. Help landowners **develop good proposals** with support of conservation organizations, translating the conservation goals into proposals;
5. **Evaluate proposals** based on criteria including ecological, economic, social and political factors (by a panel of internal program leaders and external experts);
6. **Implement conservation** actions for SAR; and
7. **Monitor and report** conservation results using SAR scorecards.

The program’s continuous improvement can be ensured through collaborative commitments by participating partners and implementation of an adaptive management cycle where the program leadership: 1) regularly assesses the conservation strategy; 2) implements conservation according to that strategy; 3) monitors progress and reports on it annually; and 4) adapts the strategy and conservation actions based on progress made towards conservation goals.

A key step in the above process is evaluating project applications for funding. Many different criteria may be taken into account when evaluating applications of conservation projects for potential funding, including ecological, social, economic, and political factors. The team recommends four sets of evaluation screens, as shown in Figure 14 below, with the first three screens being ecological screens of increasing granularity.

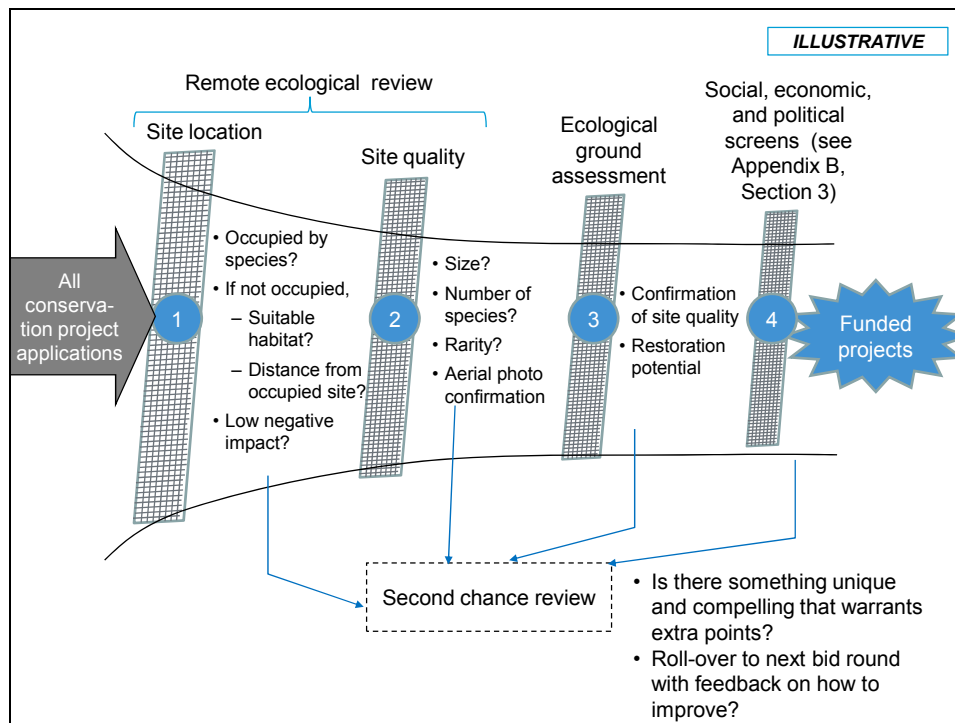


Figure 14. Recommended Project Application Evaluation Process

This figure provides further detail on how the fifth step in the proposed conservation process should be implemented—namely, how to evaluate proposals based on criteria including ecological, economic, social and political factors. Examples of social, economic, and political factors to be considered can be found in Appendix B (Section 3).

The first screen could be based on **site location**, i.e., if property described in the application lies within SAR priority habitat. Factors that determine whether a location was defined as priority habitat include: 1) habitat is known to be occupied by SAR based on field observations, or (lacking field observations); 2) location is classified as suitable habitat in terms of vegetation coverage; 3) property is near to other occupied locations, and; 4) location is known to have low negative impacts based on the impact assessment completed in this project.

If a project application meets these location-based ecological criteria, then it would be assessed at the second level of ecological review, which is based on **site quality**. Quality could be measured by the size of the project site (the larger the better), the number of SAR that could use the habitats conserved by the project (the more the better), the rarity of the species that would benefit from the project, and whether aerial imagery confirms that the site is not impacted (as assumed by the high-level impacts assessment). If the

project application passes this second screen, then it would then be further evaluated for ecological quality with an **on-the-ground assessment**.

Finally, if the property passes the ecological ground assessment, the project would be evaluated for social, economic, and political factors. **Social factors** include the timeframe of the proposed project (longer would be better) and whether neighbors support the landowners application. **Economic factors** include the estimated conservation cost per acre per year, whether the conservation actions proposed could improve ranching profitability, and whether the project could attract outside or matching funding (e.g., Farm Bill funds). **Political factors** are whether the proposed project would impact property or state income taxes and whether the project meets or conflicts with other local political goals.

This proposed application evaluation process should be consistent, transparent, and objective so that project applicants know what factors will determine whether a project gets funded. However, the team recognizes that there may special circumstances that warrant a second look at an application even if it doesn't pass through the four recommended screens. Before any applications are rejected for funding, the project evaluation committee should take a second look at the application to see if there are special circumstances that warrant funding even if all recommended criteria are not met.

With this description of the recommended conservation process, the framework for a proposed conservation program is complete and ready for launching as soon as new funding sources are identified. The recommended program organization could serve as a blueprint to implementing the proposed program, based on the science conducted in this project, and using the conservation process outlined above.

Summary and Recommendations

This report summarizes the results of a year long effort by the SPP that: 1) addresses 15 animal and 5 plant SAR that occur on DoD lands but also occur on non-DoD lands, including their priority habitats, impacts assessment, and species-specific scorecards; 2) evaluates new and innovative conservation tools; and 3) recommends a collaborative conservation program focused on conserving these 20 species in the CSP. This project, through the report and methods detailed here, can be used as the basis for an implementation plan should DoD decide to support off-site conservation/mitigation for SAR. Other SPP members can use the results of this project to inform and support conservation work in the ecoregion related to the identified SAR. Other entities impacting habitat in the CSP could also use the results of this project to determine proactive conservation projects to offset their impacts.

Initial conservation focus should be on meeting conservation goals for the 20 SAR in the four habitat groups: 1) shortgrass community, 2) shrubland/mixed-grass community, 3) burrow-dependent reptiles, and 4) Arkansas Valley Barrens rare plants. As priorities change in the future and the program matures, other SAR groups could be included, e.g., pinyon woodlands and riparian/playas. The identified SAR priority habitats and impacts

assessment can be used to guide more efficient conservation decisions, and the scorecards can be used to help measure conservation success over time.

The proposed program provides a collaborative framework for the DoD and others to proactively improve the conservation status of SAR in the CSP. The program can help the DoD meet its training and readiness mission by: 1) reducing the potential for regulatory compliance under the Endangered Species Act; 2) increasing SAR habitat acreage under permanent conservation; 3) improving habitat conditions on priority habitat; 4) maintaining or increasing SAR populations in the ecoregion; and 5) providing information that will help with effective implementation of REPI and other programs. By working together, the DoD and the SPP can achieve conservation goals for SAR and their habitats, at a landscape scale, more efficiently, and with greater conservation impact than each partner could achieve on its own.

The program contains a suite of permanent and term-limited conservation tools, including grass cooperatives, CCA/As, offsite mitigation, Farm Bill facilitation, conservation easements, and term leases. Recommendations regarding tools are as follows:

1. Both **temporary and permanent tools** are needed to conserve the SAR, but the team recommends an emphasis on long-term tools, where possible, to ensure long-term viability of the SAR. Because the DoD places greater emphasis on permanent tools, other SPP partners may focus on the term-limited tools where these are appropriate and effective.
2. The SPP is well positioned and strongly recommends that **the DoD, working through the SPP**, support implementing grass cooperatives in the CSP.
3. The DoD and SAR can both benefit from establishing a **CCA** (which can then be leveraged into multi-landowner **CCAAs**).
4. The SPP should continue to pursue **voluntary offsite mitigation fund** opportunities until a funding source is identified.
5. **Farm Bill Facilitation** should be expanded in the CSP to leverage the largest available funding pool for conservation. In addition, Farm Bill funding can be leveraged with the DoD REPI program to facilitate SPP conservation objectives, buffer military installations from incompatible development and mitigate endangered species restrictions that impact military training.

While this program is designed for the DoD, it is adaptable to the SPP and others, including transportation departments, wind energy developers, home developers, oil and gas developers, and other funders wishing to offset or mitigate for impacts, or invest in conservation in the CSP. The program is focused towards conservation on private lands, but is adaptable to other ownerships such as state lands. Participating landowners would benefit from a reduced need for regulatory compliance, assurances against future regulation, reduced grazing fees, incentive payments for conservation and technical assistance.

The recommended conservation program represents an exciting opportunity for DoD to help achieve large landscape-scale conservation in the CSP ecoregion. Implementation of

this conservation program can serve as a catalyst for leveraging existing and new funding sources, building and nurturing partnerships, and ensuring that species do not continue to decline toward federal listing, all while enabling partners to meet their respective responsibilities and missions.

During the course of this project, the team identified several data gaps and resource issues that need to be addressed in future efforts. These include: 1) assessing impacts of climate change on SAR and their habitats, and developing adaptation strategies to address climate change; 2) developing ecoregion-wide data sets to help predict future impacts (such as native grassland or Conservation Reserve Program conversion rates); and 3) continuing to bring together the resources necessary to support a team of experts (from biologist to economists) from numerous agencies and organizations to conduct the analyses and design programs such as this one.

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(The references below were used in this summary report. For a full set of references used throughout this project, see Appendices A and B.)

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Appendix A

1. Species at Risk (SAR) List
2. Impacts Assessment
3. Central Shortgrass Prairie SAR Priority Habitat Maps
4. Scorecard
5. Technical Methods



Section 1. Species at Risk (SAR) List



Background To Developing the CSP SAR List

The CSP SAR list for this project was developed through a collaborative process involving multiple organizations including natural resource management staff from several local DoD installations. This list includes the species that were on the original DoD SAR list (NatureServe 2004) but has been updated and made more comprehensive based on input from local and regional experts:

1. The project team began with a broad suite of species of concern created by merging various lists from a range of organizations. Consideration was given to whether the selected species are important priorities to one or more members of the Shortgrass Prairie Partnership (SPP).
2. The team then narrowed the preliminary list to a workable subset of species and groups based on two key criteria. First, since the DoD is the funder of this project, the species and groups selected for the SAR list must also occur on DoD lands; and second, the team prioritized species with distributions and impacts that can be reliably mapped.
3. Finally, the team solicited feedback from a range of experts to help finalize a list that could represent species at risk and their habitats. Exclusion from the final project list is not intended to imply lack of importance in the Central Shortgrass Prairie (CSP).

By funding this project, the DoD hopes to expand or enhance management tools available to conserve these species in order to avoid the need for listing and/or future regulatory constraints on its training missions. The species selected currently have little or no regulatory mandate for management or protection at the state or federal level (exceptions are the state threatened Burrowing Owl and some federal regulations regarding migratory birds). DoD is acting proactively and voluntarily to conserve the species that occur on its land. All of the species selected for the SAR list also occur on other public (besides DoD) and/or private lands.

SAR List Scope

AGREED AT 5/3/08 ADVISORY GROUP MEETING

In Scope

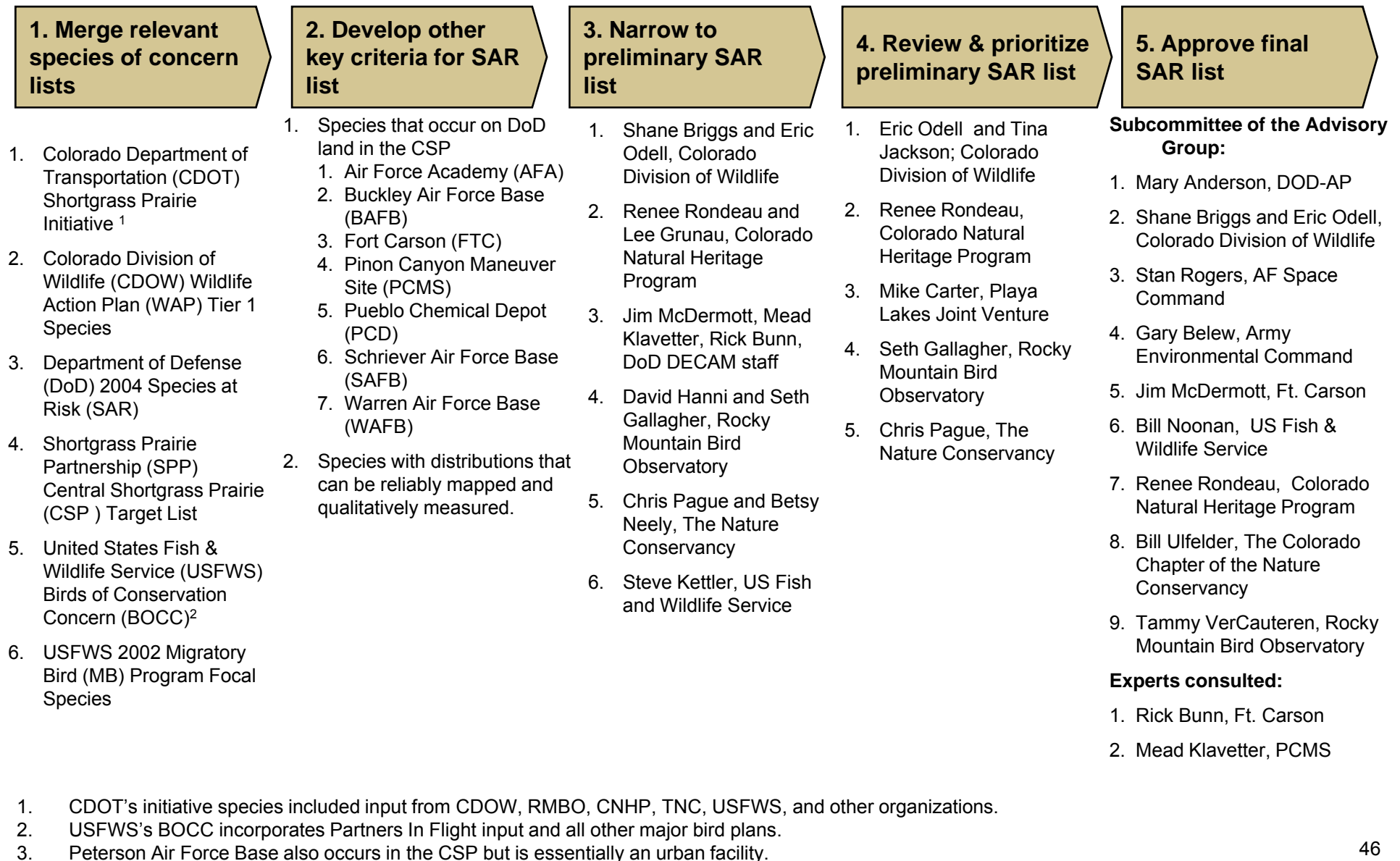
- This project focuses on species at risk (SAR) that occur on DoD land in the Central Shortgrass Prairie (CSP)¹
 - We can expand the SAR list to include additional species and areas in future phases, as needed, depending on funding sources and mitigation needs based on future impacts (e.g., Energy industry funders → Lesser Prairie-chicken).
- This project focuses on ensuring the long term viability of CSP species and avoiding future regulatory constraints imposed on any public or private landowner by taking proactive conservation steps to reduce the need for listing of the selected SAR.

Out of scope

- Species that do not occur or depend on DoD land or airspace
- This project is not associated with any plans or efforts to expand the boundaries of Pinon Canyon Maneuver Site.

1. The CSP encompasses the eastern plains of Colorado and adjacent portions of six other states (WY, NE, KS, OK, TX, NM).

Process for Developing the CSP SAR List



Recommended CSP SAR List and Groups for DoD

	Habitat groups	Common name used in this project ¹	Latin name ¹
Included in impacts assessments, habitat priorities, and scorecards (see Appendix A, sections 2, 3, and 4)	1. Arkansas Valley Barrens rare plants	1. Arkansas Valley Feverfew 2. Golden Blazing Star 3. Arkansas Valley Evening Primrose 4. Pueblo Goldenweed 5. Round-leaf Four O'Clock	1. <i>Parthenium tetraeuris</i> 2. <i>Mentzelia chrysantha</i> 3. <i>Oenothera harringtonii</i> 4. <i>Oonopsis puebloensis</i> 5. <i>Mirabilis rotundifolia</i>
	2. Burrow dependent reptiles group	1. Massasauga Rattlesnake 2. Ornate Box Turtle	1. <i>Sistrurus catenatus</i> 2. <i>Terrapene ornata</i>
	3. Shortgrass community	1. Burrowing Owl 2. Chestnut-collared Longspur 3. Ferruginous Hawk 4. Lark Bunting ² 5. Long-billed Curlew 6. McCown's Longspur 7. Mountain Plover 8. Prairie Dog (black-tailed) 9. Swift Fox	1. <i>Athene cunicularia</i> 2. <i>Calcarius ornatus</i> 3. <i>Buteo regalis</i> 4. <i>Calamospiza melanocorys</i> 5. <i>Numenius americanus</i> 6. <i>Calcarius mccownii</i> 7. <i>Charadrius montanus</i> 8. <i>Cynomys ludovicianus</i> 9. <i>Vulpes velox</i>
	4. Shrubland / mixed grass community	1. Brewer's Sparrow 2. Cassin's Sparrow 3. Grasshopper Sparrow 4. Loggerhead Shrike ²	1. <i>Spizella breweri</i> 2. <i>Aimophila cassinii</i> 3. <i>Ammodramus savannarum</i> 4. <i>Lanius ludovicianus</i>
Future priorities ³	5. Pinyon woodlands group	1. Gray Vireo 2. Pinyon Jay	1. <i>Vireo vicinior</i> 2. <i>Gymnorhinus cyanocephalus</i>
	6. Riparian / playa group	1. Northern Leopard Frog 2. Plains Leopard Frog	1. <i>Rana pipiens</i> 2. <i>Rana blairi</i>

- Some species listed here have more than one common or scientific name. The names shown here are the ones used in this project.
- Regarding groupings shown here, some species occur in more than one habitat type but are shown here in their primary habitats. For example, the Lark Bunting also inhabits shrublands/mixed grass and the Loggerhead Shrike also inhabits shortgrass habitats.
- This list is based on meeting the DoD's future mitigation needs in the CSP. Groups 5 and 6 were not prioritized for this project due to time and budget constraints. Note: Visit www.cnhp.colostate.edu for more information and for global and state imperilment ranks.

Recommended Species at Risk (SAR) and Habitats for DoD's Conservation Program in the CSP

Included in impacts assessments, habitat priorities, and scorecards (see Appendix A, sections 2,3, and 4)

Future priorities¹

Habitat grouping

Common name

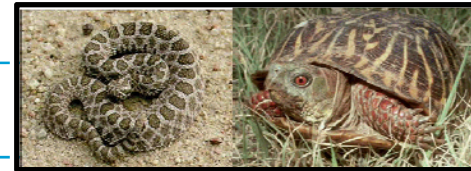
1. Arkansas Valley Barrens rare plants

1. Arkansas Valley Feverfew
2. Golden Blazing Star
3. Arkansas Valley Evening Primrose
4. Pueblo Goldenweed
5. Round-leaf Four O'Clock



2. Burrow dependent reptiles group

1. Massasauga Rattlesnake
2. Ornate Box Turtle



3. Shortgrass Community

1. Burrowing Owl
2. Chestnut-collared Longspur
3. Ferruginous Hawk
4. Lark Bunting
5. Long-billed Curlew
6. McCown's Longspur
7. Mountain Plover
8. Prairie Dog
9. Swift Fox



4. Shrubland / mixed grass community

1. Brewer's Sparrow
2. Cassin's Sparrow
3. Grasshopper Sparrow
4. Loggerhead Shrike



5. Pinyon woodlands group

1. Gray Vireo
2. Pinyon Jay



6. Riparian / playa group

1. Northern Leopard Frog
2. Plains Leopard Frog



1. This list is based on meeting the DoD's future mitigation needs in the CSP. Groups 5 and 6 were not prioritized for this project due to time and budget constraints. All photos used on this page and following pages are from the Colorado Natural Heritage Program, public sources without copyrights, or the Rocky Mountain Bird Observatory: Seth Gallagher, Tony Leukering, Bill Schmoker, Ross Lock, Tom Blackman (for all birds and the prairie dog).

Recommended SAR List: Groups 1 and 2

1. Arkansas Valley Barrens rare plants



Arkansas Valley
Feverfew



Golden Blazing Star



Arkansas Valley
Evening Primrose



Pueblo
Goldenweed



Round-Leaf
Four O'Clock

2. Burrow dependent reptiles group



Massasauga Rattlesnake



Ornate Box Turtle

Recommended SAR List: Group 3

3. Shortgrass community



Burrowing Owl



Chestnut-Collared Longspur



Ferruginous Hawk



Lark Bunting



Long-Billed Curlew



McCown's Longspur



Mountain Plover



Prairie Dog



Swift Fox

Recommended SAR List: Groups 4, 5 and 6

4. Shrubland / mixed grass community



Brewer's Sparrow



Cassin's Sparrow



Grasshopper Sparrow



Loggerhead Shrike

5. Pinyon woodlands group¹



Gray Vireo



Pinyon Jay

6. Riparian / playa group¹



Northern Leopard
Frog



Plains Leopard
Frog

1. Groups 5 and 6 are of importance to the Shortgrass Prairie Partnership but were not prioritized due to time and budget constraints. They are not included in this project's impacts assessment, priority habitats, or scorecards.

Sources in Developing the CSP SAR List



✓ Listed on list of species of concern by organization

Listed as species of concern by...¹

		CDOT	CDOW WAP	DoD SAR	SPP SAR	USFWS BOCC	USFWS MB
Included in impacts assessments, habitat priorities, and scorecards (see Appendix A, sections 2, 3 and 4)	Arkansas Valley Barrens rare plants	1. ✓ 2. ✓ 3. ✓ 4. ✓ 5. ✓			✓ ✓ ✓ ✓ ✓		
	Burrow dependent reptiles group	1. ✓ 2. ✓	✓ ✓		✓ ✓		
	Shortgrass community	1. ✓ 2. ✓ 3. ✓ 4. ✓ 5. ✓ 6. ✓ 7. ✓ 8. ✓	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓		✓	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓
	Tall structure bird group	1. ✓ 2. ✓ 3. ✓ 4. ✓ 5. ✓	✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓		✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓
	Pinyon woodlands group	1. ✓ 2. ✓		✓ ✓	✓ ✓		✓ ✓
	Riparian / playa group	1. ✓ 2. ✓	✓ ✓	✓ ✓	✓ ✓		✓ ✓

1. The full names for the abbreviations shown for species of concern lists are on an earlier slide titled "Process for Developing the SAR List."

SAR Occurrence on DoD CSP Land

 Nesting occurrence (and possibly migration)
 Migratory occurrence only

Occur or likely to occur on the following DoD installations...¹

SPICE Grouping	Common name used in SPICE project	AFA	BAFB	FTC	PCMS	PCD	SAFB	WAFB	
Included in spatial impacts and conservation site maps	Arkansas Valley Barrens rare plants	1. Arkansas Valley Feverfew							
		2. Golden Blazing Star							
		3. Arkansas Valley Evening Primrose							
		4. Pueblo Goldenweed							
		5. Round-leaf Four O'Clock							
	Burrow dependent reptiles group	1. Massasauga Rattlesnake							
		2. Ornate Box Turtle							
	Shortgrass community	1. Burrowing Owl							
		2. Chestnut-Collared Longspur							
		3. Ferruginous Hawk							
		4. Long-billed Curlew							
		5. McCown's Longspur							
		6. Mountain Plover							
		7. Prairie Dog							
		8. Swift Fox							
	Tall structure bird group	1. Brewer's Sparrow							
		2. Cassin's Sparrow							
		3. Grasshopper Sparrow							
		4. Lark Bunting							
		5. Loggerhead Shrike							
Future priorities	Pinyon woodlands group	1. Gray Vireo							
		2. Pinyon Jay							
Riparian / playa group	1. Northern Leopard Frog								
	2. Plains Leopard Frog								

1. The full names for the abbreviations shown for DoD installations are on an earlier slide titled "Process for Developing the SAR List".

Section 2: Impacts Assessment



Deliverable Scope – Impacts Assessment

AGREED AT 5/3/08 ADVISORY GROUP MEETING

In Scope

- An estimated ecoregional impact assessment for SAR and their habitats that may include impacts from outside of CO, the CSP and/or DoD lands and airspace (target: 20 – 30 year time frame)
- Positive impacts were considered as well as negative

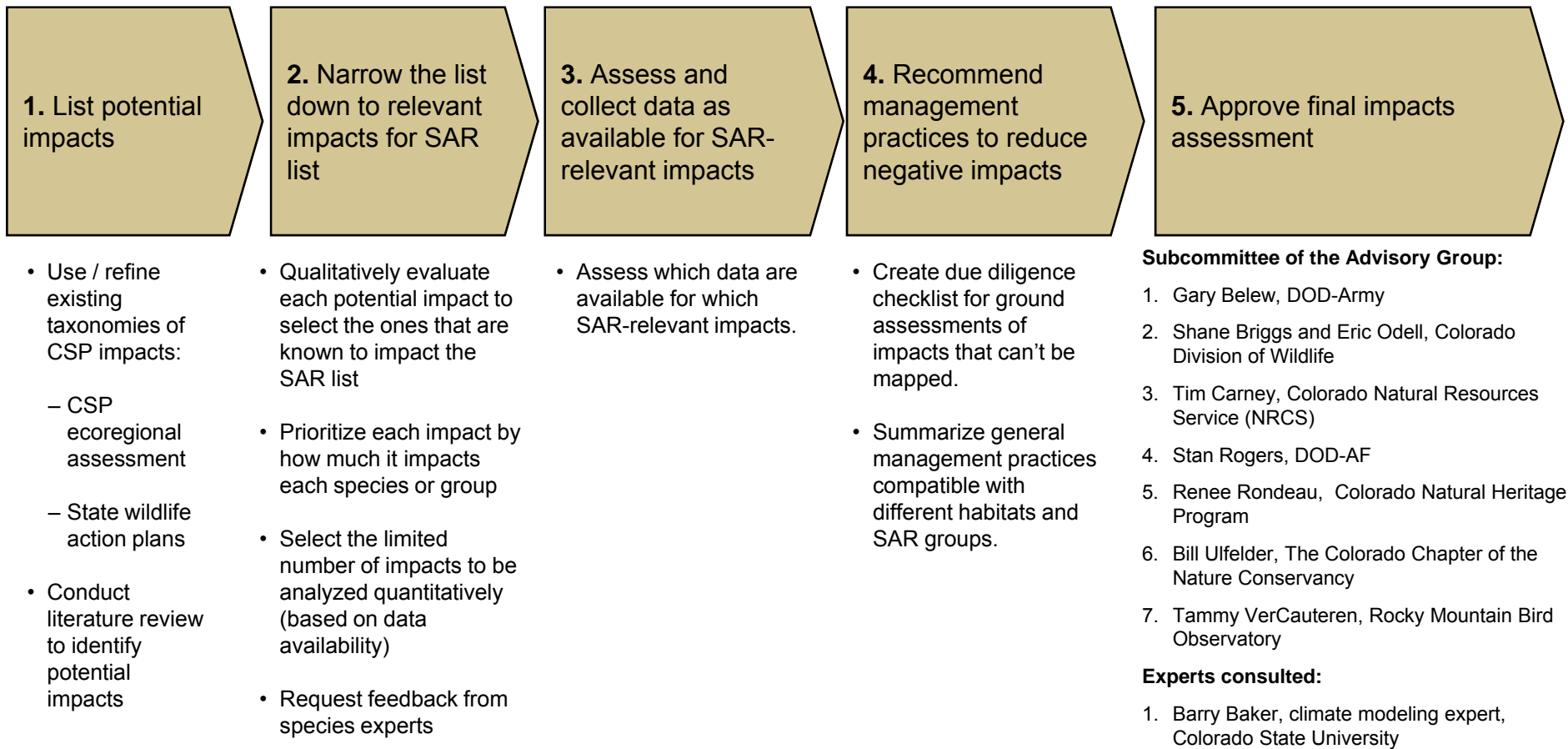
Out of scope

- Although the project team agreed to try to evaluate all possible impacts, we determined that if any could not be reliably or readily mapped, they would ultimately be excluded from spatial analyses.

Definitions and Context of Impacts Assessment

- An **impact** is a human activity or process that affects biodiversity and natural processes. In our impacts assessment, we considered **positive** and **negative** impacts.
- A **negative impact** is a human activity or process that has caused, is causing, or may cause the destruction, degradation and/or impairment of species, their habitats or any of the key ecological attributes of the species or habitats that if impaired would damage or destroy the target or their habitats. Our impacts assessment is based on **scope, severity, and irreversibility** at an ecoregional level. In future work, the methods developed here will allow us to focus on more specific impacts if those can be identified.
- A **positive impact** is a human activity or process that has caused, is causing or may cause the conservation, restoration, recovery, and or improvement of species, their habitats, or any of the key ecological attributes of the species or habitats. We considered **positive impacts**, such as Conservation Reserve Program (CRP) which may have a positive—albeit potentially temporary—impact on some birds (e.g., Grasshopper sparrows). However, we did not identify any positive impacts which could be mapped at the scale and detail necessary so these were not included in our maps of target priority habitat. We recommend including an evaluation of positive impacts during ground assessments before a conservation project is funded. Target priority habitat should leverage positive impacts already taking place, whenever possible.
- We initially attempted to considered **present** and **potential future** impacts, whenever possible. We defined future threats as those that are more than 10 years out. For example, we classified the planned Pueblo Reservoir expansion as a current impact although it has not yet been approved (likely 10 years out). While some future impacts data were available for parts of the CSP, complete datasets were not (e.g. future urban/suburban development, future commercial wind power facilities) or were not at a scale or detail suitable for our analysis (e.g. climate change projections) and ultimately we were unable assess potential future impacts.
- The results of our impacts assessment were combined with other key criteria (population occurrence and viable habitats) in mapping target priority habitat and used to derive scorecards for the SAR (see Appendix A, sections 3 and 4).

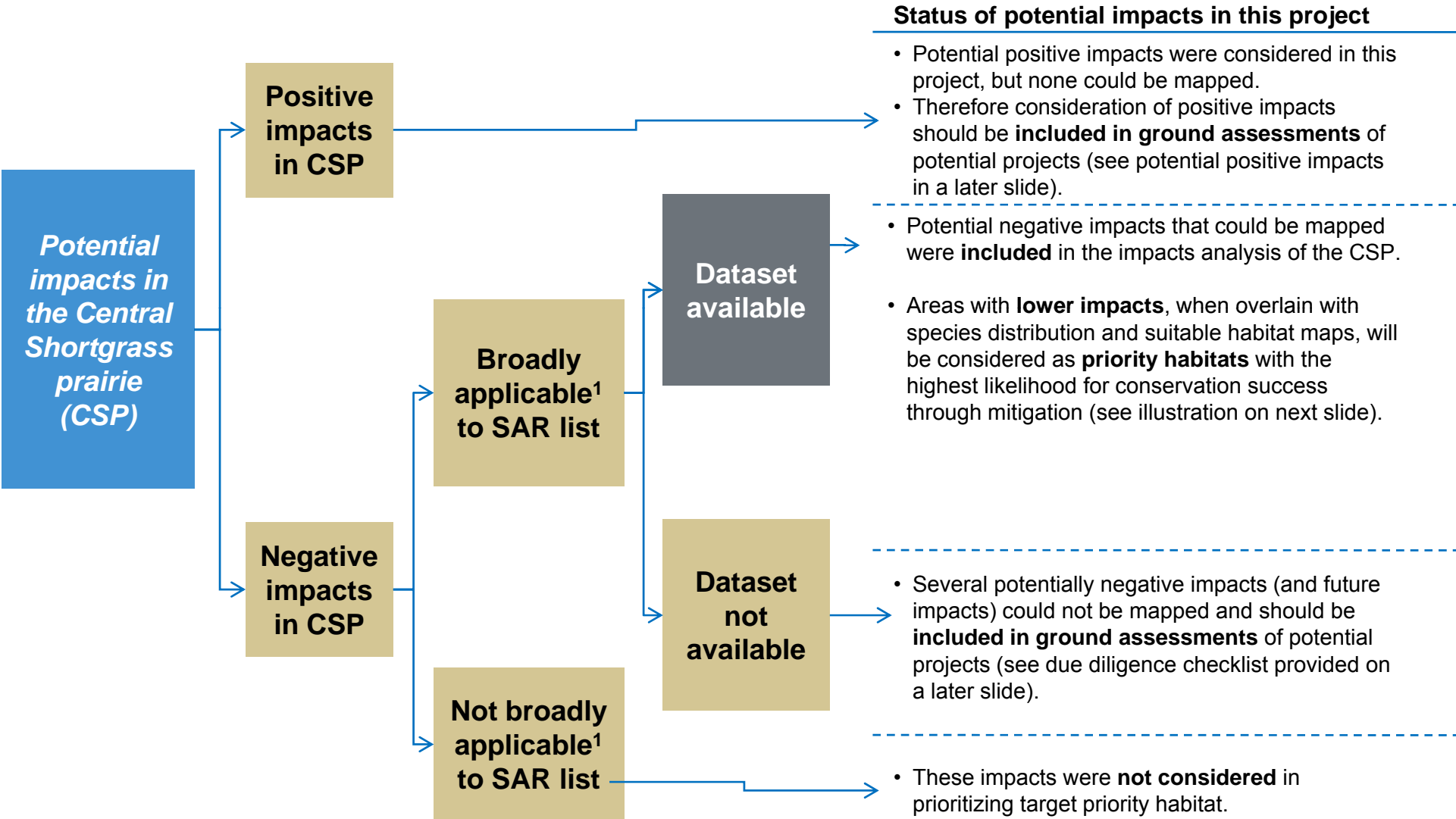
Process for Conducting Impacts Assessment



Process outputs

- List of potential impacts to consider
- Prioritized list of SAR-relevant impacts
- Useable data sources for each SAR-relevant impact
- Due diligence checklist for ground assessments
- Completed impacts assessment
- GIS data for deliverable 3 - Maps
- Summary of general recommended management practices

Process for Prioritizing Impacts for Cumulative Impacts Map



1. Applicable is defined as impacts that significantly affect the SAR species or groups at an ecoregional level. Each impact may not be present throughout the CSP. Note: This project only mapped impacts for which there were available GIS datasets at appropriate scales across the entire study area.

Potential Negative Impacts in the CSP Considered for Impacts Assessment

- The team first considered all impacts previously inventoried for the CSP. Impacts outlined in red below were selected for further evaluation due to a significant influence on at least one SAR across the CSP.
- Then, the effect of each prioritized CSP impact was evaluated for each SAR, group by group, as shown on the next five slides.

1. Habitat Conversion ¹	2. Habitat Degradation ²	3. Transportation Infrastructure	4. Energy and Mining	
<ul style="list-style-type: none"> A. Housing and urban development B. Commercial and industrial development C. Commercial hogfarm or feedlot D. Conversion to cropland E. Recreation areas F. Reservoirs 	<ul style="list-style-type: none"> A. Natural system modification B. Altered fire regime C. Altered hydrological regime 	<ul style="list-style-type: none"> A. Roads and ROW maintenance B. Railroads C. Utility lines D. Flight paths 	<ul style="list-style-type: none"> A. Oil & gas drilling B. Mining C. Wind energy D. Concentrated / Central Solar Projects E. Coal plants F. Nuclear plants 	<div style="border: 1px solid red; width: 20px; height: 10px; display: inline-block; margin-right: 5px;"></div> Included in impacts assessment as broadly applicable to DoD SAR in CSP
5. Harvesting of Biological Resources	6. Recreation and Research	7. Pollution	8. Invasive Species	
<ul style="list-style-type: none"> A. Hunting, trapping, & fishing B. Poisoning C. Gathering D. Incompatible grazing management E. Haying 	<ul style="list-style-type: none"> A. Motor-powered recreation B. Human-powered recreation C. Scientific research 	<ul style="list-style-type: none"> A. Chemicals and toxins B. Nutrient loads C. Solid waste D. Waste materials E. Greenhouse gases F. Radioactive materials G. Salt H. Light pollution I. Acid deposition or dust 	<ul style="list-style-type: none"> A. Invasive species B. Problematic native species C. Diseases 	<ul style="list-style-type: none"> A. Habitat shifting and alteration B. Climate variability

1. Habitat conversion is defined as total and human induced change to a non-native habitat.

2. Habitat degradation is partial and reversible human-induced change to a habitat resulting in altered composition and/or structure.

Source: Central Shortgrass Prairie Ecoregional Assessment, Final Report, 2006

Evaluation of Current Impacts on Arkansas Valley Barrens Rare Plants Group

A team of conservation biologists considered the magnitude of each of the prioritized CSP impacts against each of the Arkansas Valley Barrens rare plants. The results for each impact are shown on the bottom row by “overall group rating.” These results were then transferred to the group results on the summary slide following the group by group slides.

	1. Habitat Conversion	2. Habitat Degradation	3. Transportation & Infrastructure	4. Energy & Mining	5. Harvesting of Biological Resources	6. Recreation & Research	7. Pollution	8. Invasive Species	9. Climate Change
	Housing and urban development Commercial and industrial development Commercial hogfarm or feedlot Conversion to cropland Recreation areas (e.g., golf, parks) Reservoirs	Natural system modification Altered fire regime Altered hydrological regime	Roads and ROW maintenance Railroads Utility lines Flight paths	Oil & gas drilling Mining Wind energy	Hunting, trapping (fishing not applicable) Poisoning Gathering Incompatible grazing management Haying	Motor-powered recreation Human-powered recreation Scientific research	Chemicals and toxins Nutrient loads Solid waste Waste materials Greenhouse gases Radioactive materials Salt Light pollution Acid deposition or dust	Invasive species Problematic native species Diseases	Habitat shifting and alteration Climate variability Increased drought
	A. B. C. D. E. F.	A. B. C.	A. B. C. D.	A. B. C.	A. B. C. D. E.	A. B. C.	A. B. C. D. E. F. G. H. I.	A. B. C.	A. B. C.
1. Arkansas Valley Feverfew	●●		○	●	?	●			?
2. Golden blazing star	●●		●	●	○	●		●	?
3. Arkansas Valley Evening Primrose	●●		●	●	○	●●		●	?
4. Pueblo goldenweed	●●		○	●	○	●		○	?
5. Round-leaf four o'clock	●●	●	○	●	○	●			?
Overall group rating	●●		●	●	○	●		○	?

Significant negative impact
 Moderate negative impact
 Low negative impact
 Impact suspected but no information

 (Note: no circle = no known impact)

Arkansas Valley Barrens rare plants

Sources: 1) recent conservation action plan meeting and field trip on June 19, 2008; 2) Species assessments for Evening Primrose (Ladyman 2005), Round-leaf Four O’Clock (Anderson 2006, Mayo et al. 2004); 3) CNHP Biodiversity Scorecard (draft 2008); 4) Arkansas Valley Barrens site conservation plan (2001); 5) Arkansas Valley Barrens Rare Plants Management Guidance Template (Kettler 2006 in DoD Legacy Resources Program funded CSP assessment)

Evaluation of Current Negative Impacts on the Shortgrass Community

- Positive impact of any level
 - Significant negative impact
 - Moderate negative impact
 - Low negative impact
 - Impact suspected but no information
- (Note: no circle = no known impact)

Shortgrass community

	1. Habitat Conversion						2. Habitat Degradation			3. Transportation & Infrastructure			4. Energy & Mining			5. Harvesting of Biological Resources					6. Recreation & Research									7. Pollution			8. Invasive Species			9. Climate Change				
	A. Housing and urban development	B. Commercial and industrial development	C. Commercial hogfarm or feedlot	D. Conversion to cropland	E. Recreation areas (e.g., golf, parks)	F. Reservoirs	A. Natural system modification	B. Altered fire regime	C. Altered hydrological regime	A. Roads and ROW maintenance	B. Railroads	C. Utility lines	D. Flight paths	A. Oil & gas drilling	B. Mining	C. Wind energy	A. Hunting, trapping (fishing not applicable)	B. Poisoning	C. Gathering	D. Incompatible grazing management	E. Haying	A. Motor-powered recreation	B. Human-powered recreation	C. Scientific research	A. Chemicals and toxins	B. Nutrient loads	C. Solid waste	D. Waste materials	E. Greenhouse gases	F. Radioactive materials	G. Salt	H. Light pollution	I. Acid deposition or dust	A. Invasive species	B. Problematic native species	C. Diseases	A. Habitat shifting and alteration	B. Climate variability	C. Increased drought	
1. Black Tailed Prairie Dog																																								
2. Burrowing Owl																			<i>Positive 3 year impact?</i>																					
3. Ferruginous Hawk																																								
4. Longbilled Curlew																																								
5. McCown's Longspur																																								
6. Mountain Plover																																								
7. Swift Fox																																								
8. Overall group rating																																								

Evaluation of Current Negative Impacts on the Shrubland / Mixed Grass Community

-  Significant negative impact
-  Moderate negative impact
-  Low negative impact
-  Impact suspected but no information

(Note: no circle = no known impact)

Shrubland / Mixed Grass Community

	1. Habitat Conversion						2. Habitat Degradation			3. Transportation & Infrastructure				4. Energy & Mining			5. Harvesting of Biological Resources					6. Recreation & Research									7. Pollution											8. Invasive Species			9. Climate Change		
	A. Housing and urban development	B. Commercial and industrial development	C. Commercial hogfarm or feedlot	D. Conversion to cropland	E. Recreation areas (e.g., golf, parks)	F. Reservoirs	A. Natural system modification	B. Altered fire regime	C. Altered hydrological regime	A. Roads and ROW maintenance	B. Railroads	C. Utility lines	D. Flight paths	A. Oil & gas drilling	B. Mining	C. Wind energy	A. Hunting, trapping (fishing not applicable)	B. Poisoning	C. Gathering	D. Incompatible grazing management	E. Haying	A. Motor-powered recreation	B. Human-powered recreation	C. Scientific research	A. Chemicals and toxins	B. Nutrient loads	C. Solid waste	D. Waste materials	E. Greenhouse gases	F. Radioactive materials	G. Salt	H. Light pollution	I. Acid deposition or dust	A. Invasive species	B. Problematic native species	C. Diseases	A. Habitat shifting and alteration	B. Climate variability	C. Increased drought								
1. Brewer's Sparrow <small><i>El Paso & Pueblo counties, CO</i></small>																																															
2. Cassin's Sparrow																																															
3. Chestnut-collared longspur																																															
4. Grasshopper Sparrow																																															
5. Lark Bunting																																															
6. Loggerhead Shrike																																															
Overall group rating																																															

Evaluation of Current Negative Impacts on Pinyon Woodlands Groups and Riparian/Playa *(Not Included in DoD CSP Impacts Assessment)*

- Significant negative impact
 - Moderate negative impact
 - Low negative impact
 - Impact suspected but no information
- (Note: no circle = no impact)*

	1. Habitat Conversion						2. Habitat Degradation			3. Transportation & Infrastructure				4. Energy & Mining			5. Harvesting of Biological Resources					6. Recreation & Research									7. Pollution											8. Invasive Species			9. Climate Change		
	A. Housing and urban development	B. Commercial and industrial development	C. Commercial hogfarm or feedlot	D. Conversion to cropland	E. Recreation areas (e.g., golf, parks)	F. Reservoirs	A. Natural system modification	B. Altered fire regime	C. Altered hydrological regime	A. Roads and ROW maintenance	B. Railroads	C. Utility lines	D. Flight paths	A. Oil & gas drilling	B. Mining	C. Wind energy	A. Hunting, trapping (fishing not applicable)	B. Poisoning	C. Gathering	D. Incompatible grazing management	E. Haying	A. Motor-powered recreation	B. Human-powered recreation	C. Scientific research	A. Chemicals and toxins	B. Nutrient loads	C. Solid waste	D. Waste materials	E. Greenhouse gases	F. Radioactive materials	G. Salt	H. Light pollution	I. Acid deposition or dust	A. Invasive species	B. Problematic native species	C. Diseases	A. Habitat shifting and alteration	B. Climate variability	C. Increased drought								
Pinyon Woodlands¹																																															
1. Gray Vireo																																															
2. Pinyon Jay																																															
Overall group rating																																															
Riparian / Playa¹																																															
1. Northern Leopard Frog																																															
2. Plains Leopard Frog																																															
Overall group rating																																															

1. The first four SAR groups were prioritized for the impacts assessment and mapping. Pinyon woodland and Riparian/ playa group were not prioritized for this project due to time and budget constraints. These could be assessed in the future.

Evaluation of Current Negative Impacts on SAR Groups (not all impacts could be mapped)

	1. Habitat Conversion						2. Habitat Degradation			3. Transportation & Infrastructure				4. Energy & Mining			5. Harvesting of Biological Resources					6. Recreation & Research									7. Pollution											8. Invasive Species			9. Climate Change	
	A. Housing and urban development	B. Commercial/industrial development	C. Commercial hogfarm or feedlot	D. Conversion to cropland	E. Recreation areas (e.g., golf, parks)	F. Reservoirs	A. Natural system modification	B. Altered fire regime	C. Altered hydrological regime	A. Roads and ROW maintenance	B. Railroads	C. Utility lines	D. Flight paths	A. Oil & gas drilling	B. Mining	C. Wind energy	A. Hunting, trapping (excludes fishing)	B. Poisoning	C. Gathering	D. Incompatible grazing management	E. Haying	A. Motor-powered recreation	B. Human-powered recreation	C. Scientific research	A. Chemicals and toxins	B. Nutrient loads	C. Solid waste	D. Waste materials	E. Greenhouse gases	F. Radioactive materials	G. Salt	H. Light pollution	I. Acid deposition or dust	A. Invasive species	B. Problematic native species	C. Diseases	A. Habitat shifting and alteration	B. Climate variability								
Arkansas Valley plants	●	●							●					●								●												○				●								
Burrow dependent reptiles	●			●					●		○			●		●			○	○																	○		●							
Shortgrass community	●	●		●			●		●		○			○	○	○	○	●																			●		●							
Shrubland / mixed grass community	●	●		●			●	○						●	○					○																	●		●							
Pinyon woodlands group¹	○						●	●																												●		●								
Riparian / playa group¹	●	●					●		○										●					●	●									●		○		●								

1. The first four SAR groups were prioritized for the impacts assessment and mapping. Pinyon woodland and Riparian/ playa group were identified as important groups as well, but they were determined to be beyond the scope of this project.

Evaluation of Future Negative Impacts on SAR Groups

(data were not available for entire CSP and thus were not mapped)

	Future impacts (more than 10 years out, requiring different spatial data that that used for present impacts assessment)								
	1. Habitat Conversion	2. Habitat Degradation	3. Transportation & Infrastructure	4. Energy & Mining	5. Harvesting of Biological Resources	6. Recreation & Research	7. Pollution	8. Invasive Species	9. Climate Change
	A. Housing and urban development B. Commercial/industrial development C. Commercial hogfarm or feedlot D. Conversion to cropland E. Recreation areas (e.g., golf, parks) F. Reservoirs	A. Natural system modification B. Altered fire regime C. Altered hydrological regime	A. Roads and ROW maintenance B. Railroads C. Utility lines D. Flight paths	A. Oil & gas drilling B. Mining C. Wind energy	A. Hunting, trapping (excludes fishing) B. Poisoning C. Gathering D. Incompatible grazing management E. Haying	A. Motor-powered recreation B. Human-powered recreation C. Scientific research	A. Chemicals and toxins B. Nutrient loads C. Solid waste D. Waste materials E. Greenhouse gases F. Radioactive materials G. Salt H. Light pollution I. Acid deposition or dust	A. Invasive species B. Problematic native species C. Diseases	A. Habitat shifting and alteration B. Climate variability
Arkansas Valley plants	● ●		●	●		●		○	●
Burrow dependent reptiles	●		● ○	● ●	○ ○			○	●
Shortgrass community	● ●	●	● ○	○ ○ ○	○ ● ●			●	●
Shrubland / mixed grass community	●	●	● ○	● ○					●
Pinyon woodlands group	○	● ●						●	●
Riparian / playa group	●	●	● ○		●	● ●		● ○	●

- Significant negative impact
- ◐ Moderate negative impact
- Low negative impact
- ⊙ Impact suspected but no information

(Note: no circle = no known impact)

- ▭ Impact prioritized for to spatial analysis; data available
- ▭ Impact prioritized for future ground assessment, data not available

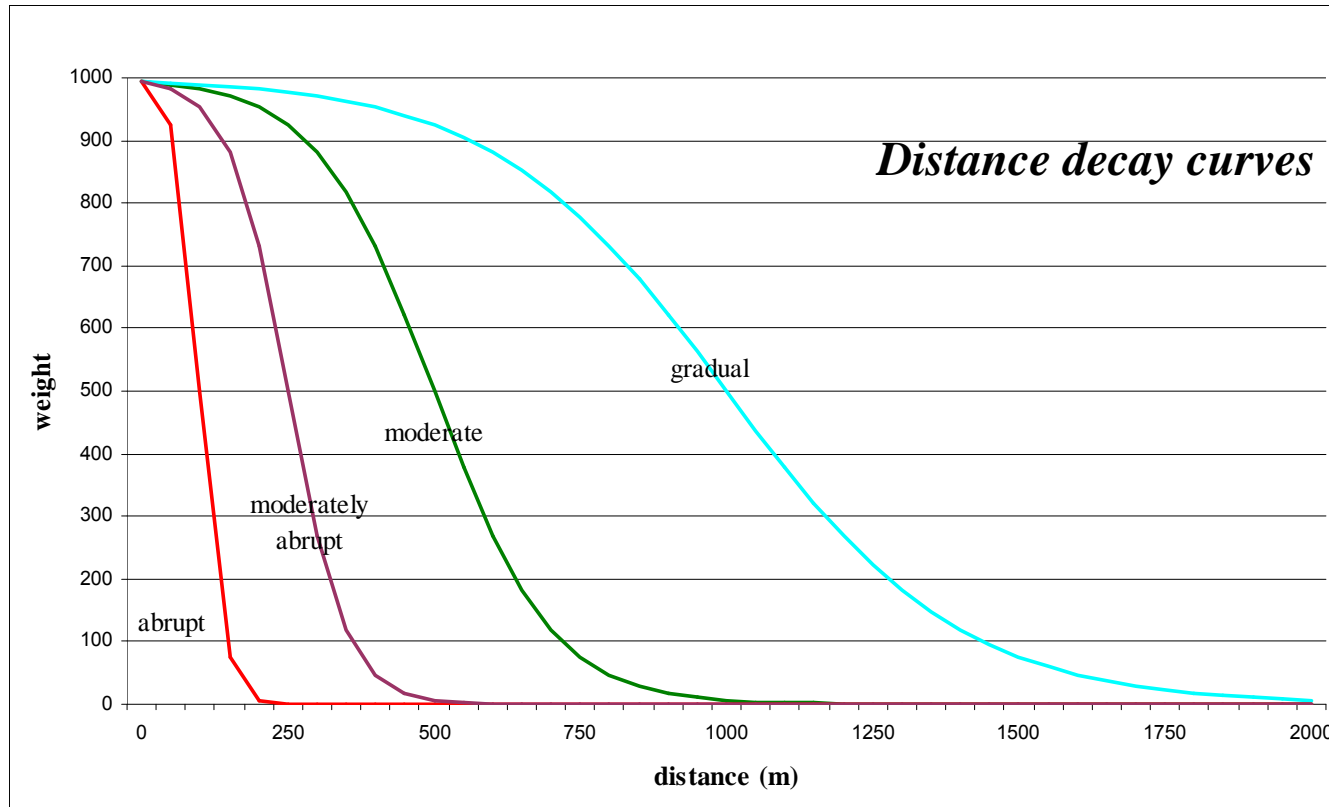
Summary of Potential Negative Impacts Prioritized as Relevant to SAR (not all mappable)

Impact category	Impact prioritized for spatial analysis	Impact type	Mapped in this project
Habitat Conversion	Housing and urban development	Present	Yes
		Future	No
	Commercial and industrial development	Present	No
	Conversion to cropland	Present	Yes
		Future	No
Natural system modification	Present	No	
Transportation & Infrastructure	Roads & right of way maintenance	Present	Yes
		Future	No
Energy & Mining	Oil & gas drilling	Present	Yes
		Future	No
	Mining	Present	Yes
		Future	No
	Wind energy	Present	Yes
		Future	No
Harvest Biological Resources	Poisoning	Present	No
	Incompatible grazing management	Present	No
Invasive Species	Diseases	Present	No
Climate Change	Climate variability	Present	No
		Future	No

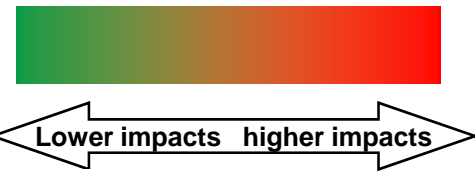
Negative Impacts

Effects of impacts decrease over distance, to varying degrees depending on the type of impact.

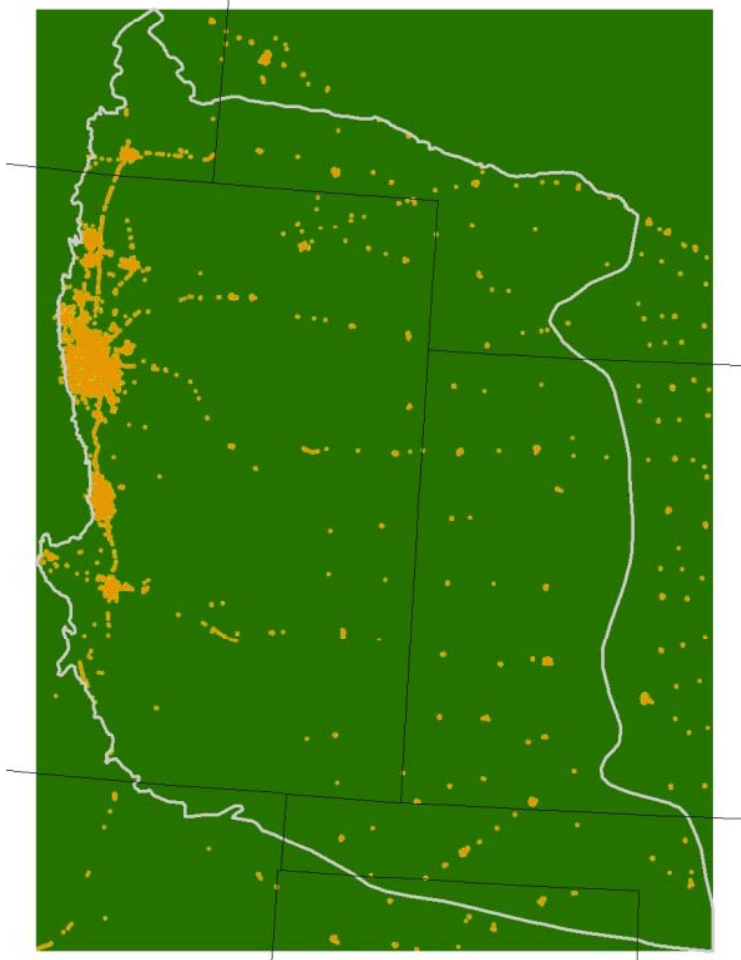
For example, impacts of primary roads (interstates, highways) “reach” further into adjacent lands (moderate decay=“moderate reach”) than those from infrequently used secondary roads (abrupt decay=“short reach”). The following slides show some examples of this. Distance zero represents the actual impact location in the graph below.



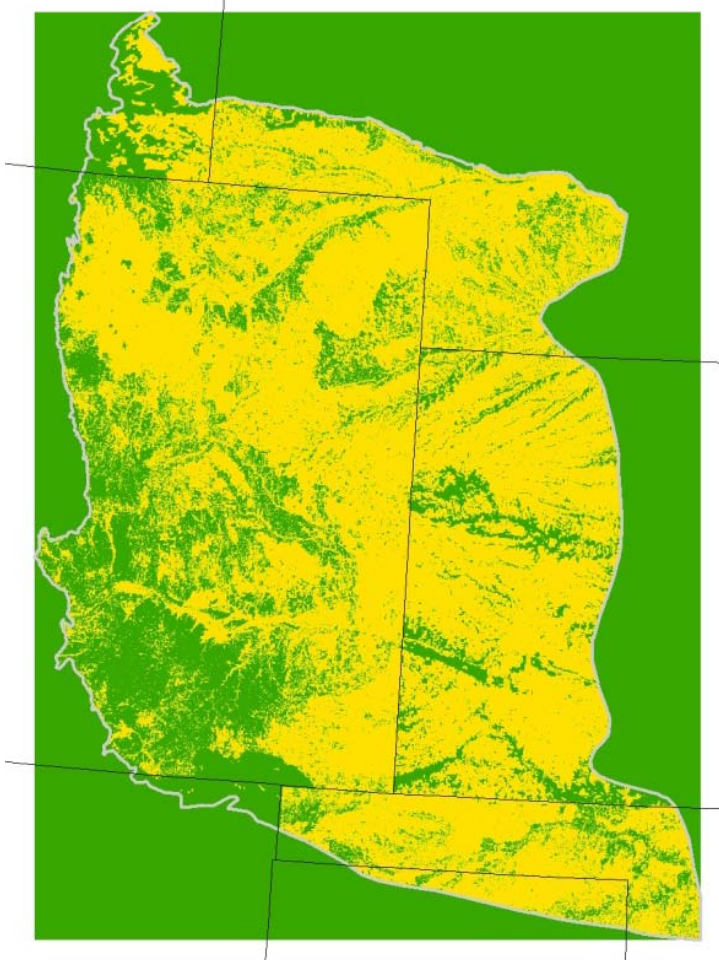
Current Impacts: Residential Housing / Urban Development and Cropland



Current housing / urban development and commercial



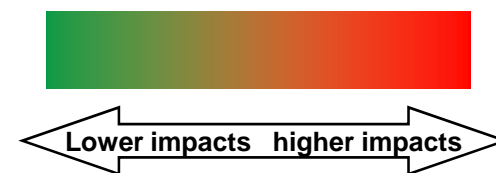
Current cropland



Source: SERGoM (Spatially Explicit Regional Growth Model) version 3 (Theobald) 100m; Cropland from CSP landcover. 30m; cropland map (includes the distance decay buffer).

Current Negative Impact: Roads and Right of Ways Maintenance

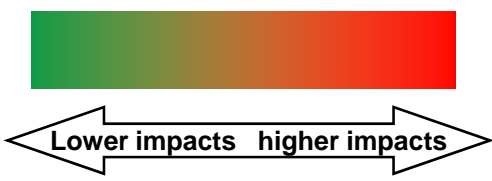
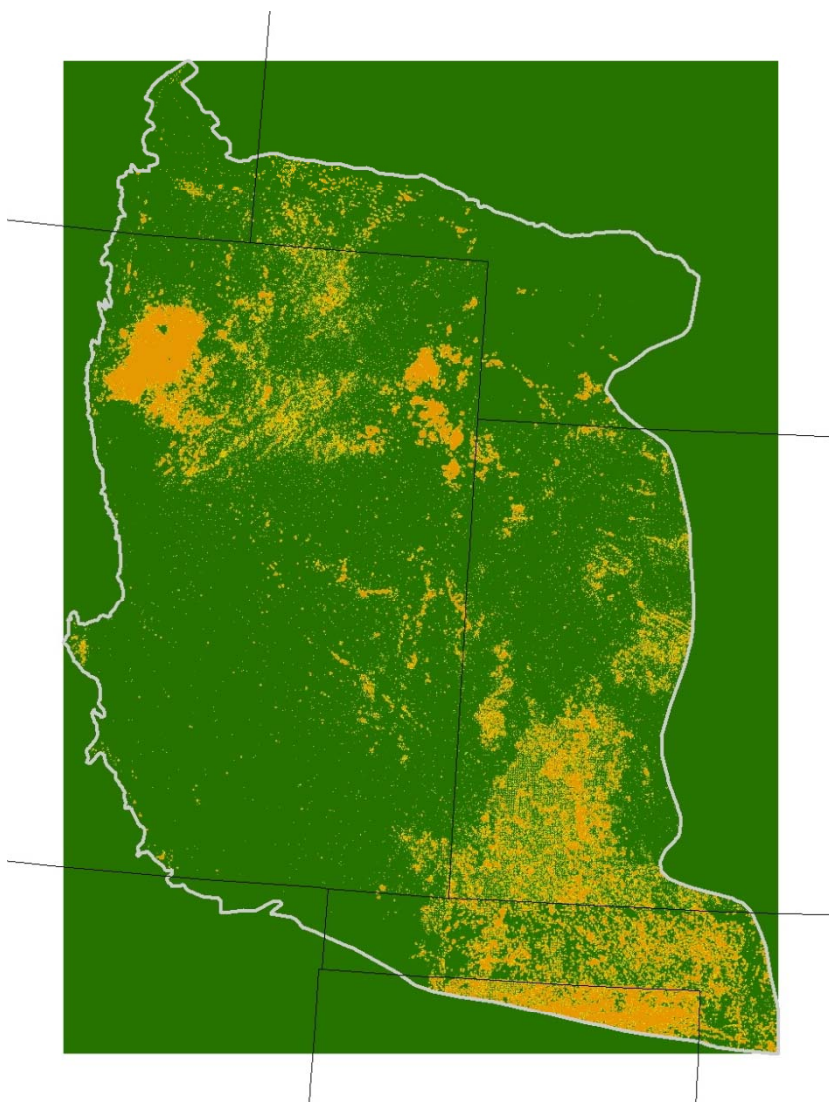
- Different types of roads weighted differently in impacts assessment: primary vs. secondary vs. tertiary (tertiary includes local, rural, 4WD)



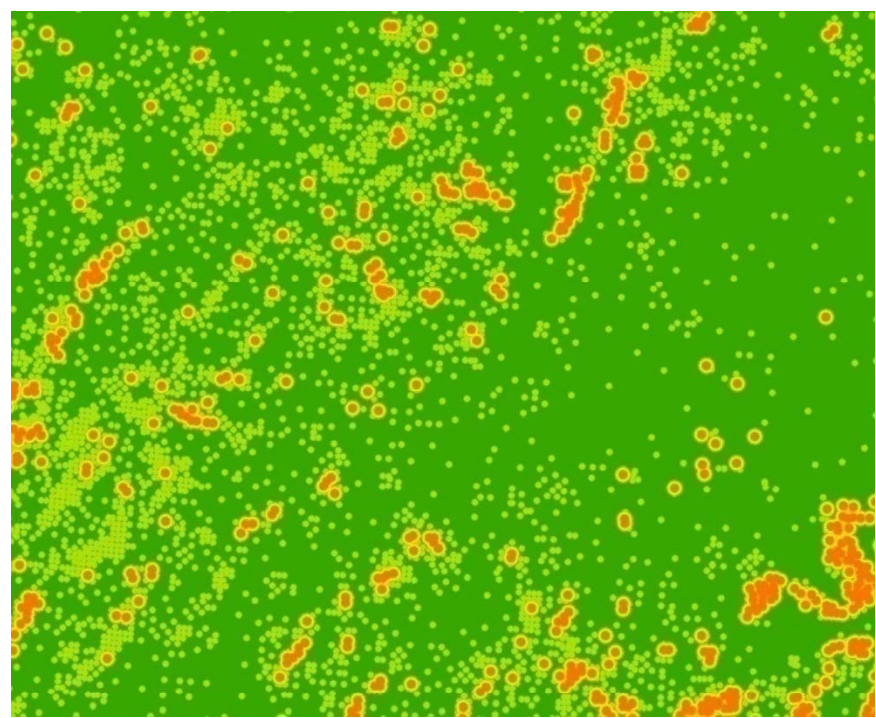
Primary vs. secondary roads



Current Negative Impact: Oil and Gas Wells

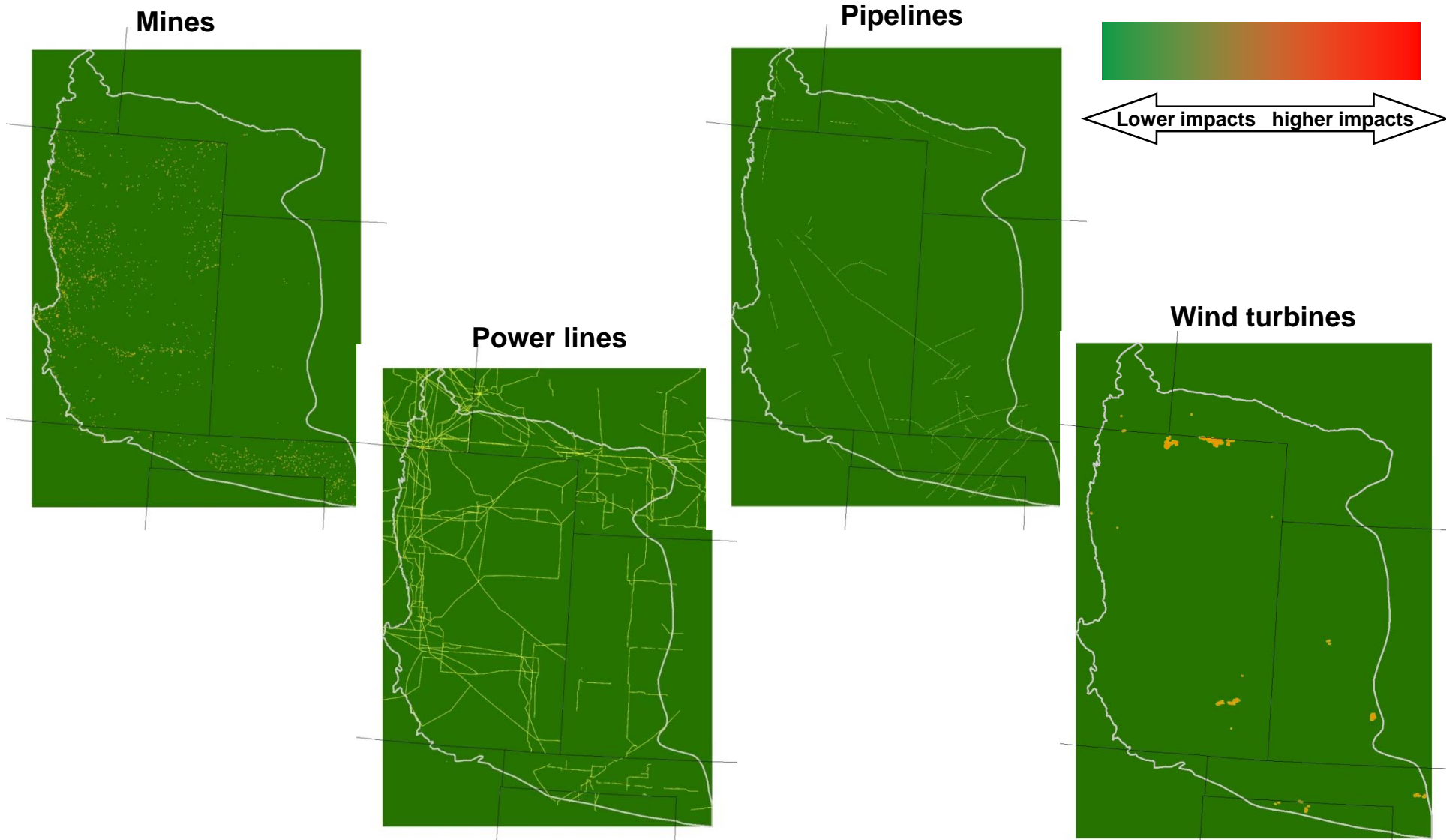


Active wells were weighted heavier than inactive wells



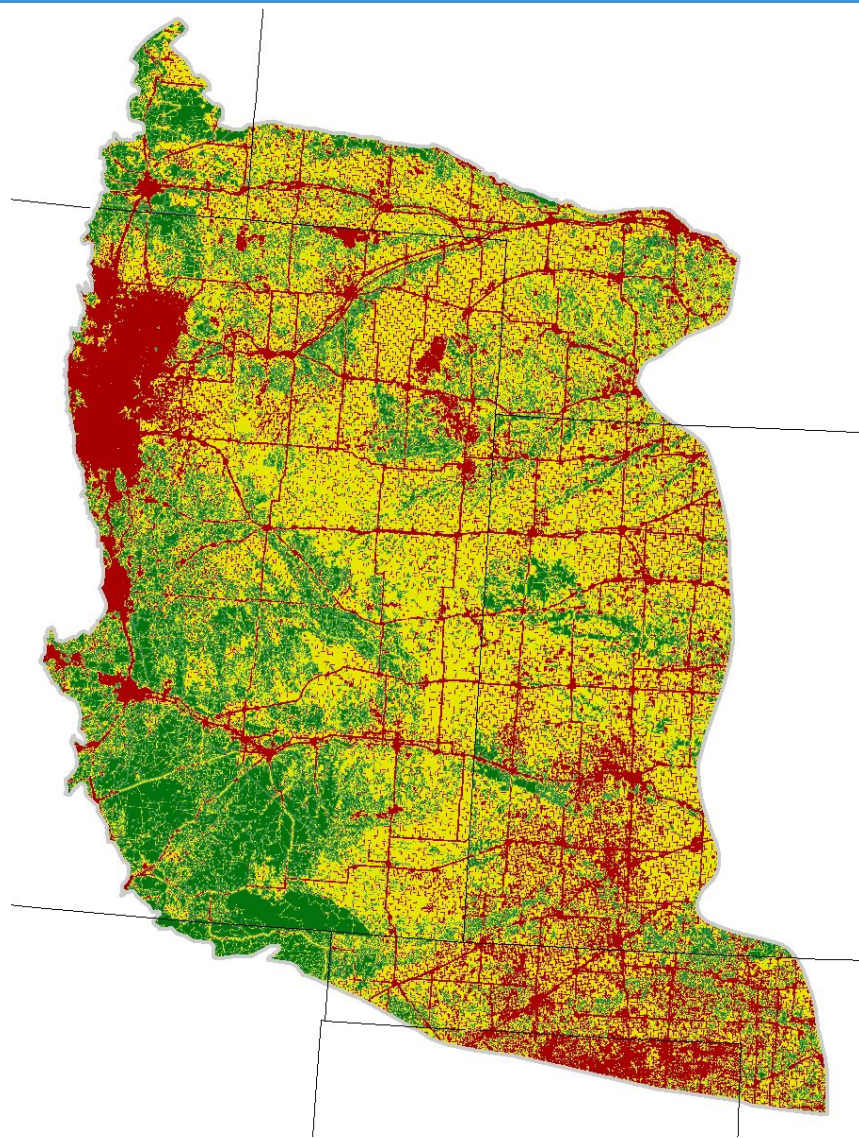
Source: Past and active wells data for all CSP states; includes a buffer radius to represent roads and other energy-related infrastructure. Also includes pipelines from U.S. Census Bureau TIGER/Line and from DIGITAL CHART OF THE WORLD (DCW).

Current Negative Impact: Mining, Electricity, Oil and Gas Pipelines and Wind Turbines



Sources: Mining—Colorado from DMR, national atlas for other states, Wind turbines—CNHP 2008 – existing turbines; also “Obstacles” FAA data; Oil & gas drilling—Past and active wells data for all CSP states; includes a buffer radius to represent roads and other energy-related infrastructure. Also includes pipelines from U.S. Census Bureau TIGER/Line and from DIGITAL CHART OF THE WORLD (DCW).

CSP Cumulative Impacts Assessment



Cumulative impacts (out of 56 million CSP acres)

- **Low or none:** 14.7 million acres (26%)
- **Moderate:** 26.7 million acres (48%)
- **High:** 14.2 million acres (26%)

Impact type included in map (see data sources on next slide)
Cropland: current tilled land, including CRP
Commercial/industrial development
Gas pipelines: current
Housing/urban development: current
Mining (surface only): active, inactive
Oil & gas wells: active, inactive
Roads: primary vs. secondary vs. tertiary (local, rural, 4WD etc.)
Transmission lines: current
Wind turbines (commercial): current

Note: Continuous variables from impacts assessment incorporated into maps of target conservation sites (Appendix A, section 3). Cut-offs for low/moderate/high impacts shown here are arbitrary cut-offs for illustrative purposes only.

Summary of Data Sources for Cumulative Impacts Assessment Maps

Impact prioritized for spatial analysis	Data used for this project	Notes regarding data benefits or limitations
Cropland / conversion to cropland – present	Cropland from CSP landcover. 30m, 2006	Available for entire area; limitations: Land in CRP is classified as agricultural land, which will exclude CRP land from consideration as target priority habitat. However this is appropriate since CRP land is only set aside in short term agreements.
Commercial and industrial development – present	High intensity dev from either SERGoM version 3 (Theobald) 100m, 2008	Available for entire region; Originally from national Land Cover Data (NLCD)
Housing and urban development – present	SERGoM (Spatially Explicit Regional Growth Model) version 3 (Theobald) 100m, 2008	Available for entire region. SERGoM (100m) shows housing density in 12 classes, regardless of landcover type.; Downside: Rural housing density will be same as cropland (#4) in many places.
Housing and urban development – future	SERGoM version 3 (Theobald) 100m	Only real model available; downside: Tied to census block groups = arbitrary areas of different sizes (did not include in analysis)
Mining – present	Colorado from DMR National atlas for other areas, 2005	Point locations only. Accuracy is poor.
Oil & gas drilling and pipelines – present	Past and active wells data for all CSP states; includes a buffer radius to represent roads and other energy-related infrastructure. Also includes pipelines from U.S. Census Bureau TIGER/Line and from DIGITAL CHART OF THE WORLD (DCW). 2008	Usually updated frequently, available for most/all of CSP; downside: Point locations only, roads and other energy-related infrastructure are not included.
Roads & right of way maintenance – present	TIGER/Line (2007)	Available for entire region. Recent update. Includes tertiary roads; Limitations: Does not address maintenance; Variability in quality and which types of roads included. Does not include roads associated with energy development. Data used by 911 would be preferable but are only available for some of the 93 counties in the CSP.
Transmission lines – present	USGS Sage grouse mapping project - Powerline Corridors in the Western United States and Canada 2004 DIGITAL CHART OF THE WORLD (DCW) Utilities layer 1993 (pipelines included in this) US Census Bureau Tiger/Line Shapefiles 2007	
Wind energy – present	CNHP 2008 – existing turbines; also “Obstacles” FAA data, 2008	Point locations. Shows only turbines as of early 2008.

Important Potential Negative Impacts Not Mapped in This Project (1 of 2)

- The following present and future impacts could not readily or reliably be mapped in this project.
- Before funding potential conservation projects, these impacts should be assessed during on the ground due diligence.

Impacts not mapped in this project	Notes
Housing and urban development– future	Team decided not to include future data.
Conversion to cropland – future	Team searched for data without success. EDF is applying for a grant to build such a model but this is a long-term goal.
Natural system modification – present	No data available. Some system modification is addressed by the distance decay function within of the landscape integrity model (Neely et al. 2006).
Roads & Right of Way maintenance – future	CO DOT has annual average daily traffic 20 year projections on existing roads only but other CSP states do not have similar data. Including CO’s data in the spatial analysis would penalize CO by reducing its target priority habitat, without the other CSP states having the same penalty. Therefore, the team concluded that future roads data should be included in a due diligence checklist during ground-assessments of potential projects.
Oil & gas drilling – future	CO Development potential, KS fields, national coverage of basins Can not create uniform layer for entire CSP. CO has a crude map. No data for other CSP states
Mining – future	Data were available for WY and CO but not the other CSP states. Therefore the team decided to exclude this potential impact from this project but recommends that CO’s and WY’s future mining data should be included in on-the-ground due diligence before funding conservation projects. CO’s data do not include sand and gravel mining.


Important Potential Negative Impacts Not Mapped in This Project (2 of 2)


- The following present and future impacts could not readily or reliably be mapped in this project.
- Before funding potential conservation projects, these impacts should be assessed during on the ground due diligence.

Impacts not mapped in this project	Notes
Wind energy – future	<ul style="list-style-type: none"> • Complete up-to-date maps of wind farms do not exist, and maps of wind resource potential are not useful because there are many other factors considered when a decision is made to build or not to build a wind energy facility. • Could not incorporate transmission line data. TNC has spatial data for Colorado for existing wind farms and transmission system but limited by data sharing restrictions. When a project is in due diligence, TNC can check what percent of the site has power lines (have current infrastructure, not planned). • No more recent nationwide dataset for all 7 states in CSP. We could have incorporated higher resolution, more recent data for CO, NE, NM and WY, but the other states would still be lower resolution, so in order to be consistent have used same resolution throughout. • The best predictor of future development in CO are the Generation Development Areas identified in the Senate Bill 91 report prepared by the Colorado Governor's Energy Office, which can be digitized in future phases of work.
Poisoning – present	No data available. To be assessed on the ground before funding conservation projects.
Incompatible grazing management – present	No data available. To be assessed on the ground before funding conservation projects.
Diseases – present	No data available. To be assessed on the ground before funding conservation projects.
Climate variability – present	This analysis was not completed for several reasons- 1) individual species' responses to future climate scenarios will be species specific and may not lend themselves well to analysis within a group of SAR and 2) with historically high variable climatic conditions, we felt confident predicting when a change becomes significant would be highly speculative. Most species in the CSP have experienced short to moderate-term (1-100's of years) climate extremes greater than we have observed since European arrival on the Great Plains.
Climate variability – future	Spatial data at the scale necessary for the integrity of analysis were not easily accessible, and would have necessarily incorporated broad assumptions that we felt would not have confidently improved the results. Team felt pursuing this might detract from other efforts.

Potential Positive Impacts

Potential positive impacts considered but not mapped

 Details on following pages

 See case studies in Appendix B, section 3 and focus group results in Appendix B, section 1

1. Habitat Conversion ¹	2. Habitat Degradation ²	3. Transportation Infrastructure	4. Energy and Mining	5. Harvesting of Biological Resources
<p>A. Conservation Reserve Program (CRP) and other Farm Bill Programs (effective for ~10 years terms)</p> <p>B. Many private and public owners already practicing grazing management compatible with SAR needs</p> <p>C. No-till cropland produces less carbon than other methods</p>	<p>A. Swing pastures: management agreements for managed grazing</p> <p>B. Landowner interest in grassbanking (see focus group results in Appendix B, section 1)</p>	<p>A. CDOT offset mitigation project included changes in roadside management practices to consider needs of rare plants (see SPI case study in Appendix B, section 3)</p>	<p>A. Wind energy development offset mitigation funds (see Horizon case study in Appendix B, section 3)</p> <p>B. Grassbanking: Wind energy leases creating opportunities for exchanging grazing lease discounts for conservation</p>	<p>A. None identified</p>
6. Recreation and Research	7. Pollution	8. Invasive Species	9. Climate Change	
<p>A. Agritourism: potential education and outreach opportunities possible with hunting lodge operators</p>	<p>A. None identified</p>	<p>A. "Livestock for Landscapes:" Training cattle to eat weeds: http://www.livestockforlandscapes.com/</p>	<p>A. Two carbon credit trading programs under development for CSP: may provide incentives for conservation</p>	

Positive Temporary Impact: Conservation Reserve Program (CRP)

CRP CONTRACT EXPIRATION BY YEAR (Acres) from USDA website March 2009

State	2007	2008	2009	2010
Colorado	43,387	23,867	714,636	450,283
Kansas	133,569	49,520	432,293	610,472
Nebraska	92,150	46,370	157,154	180,706
New Mexico	29,843	2,534	38,565	101,511
Oklahoma	90,843	25,487	161,357	209,020
Texas	160,680	113,599	782,748	660,755
Wyoming	11,493	3,443	96,071	74,209

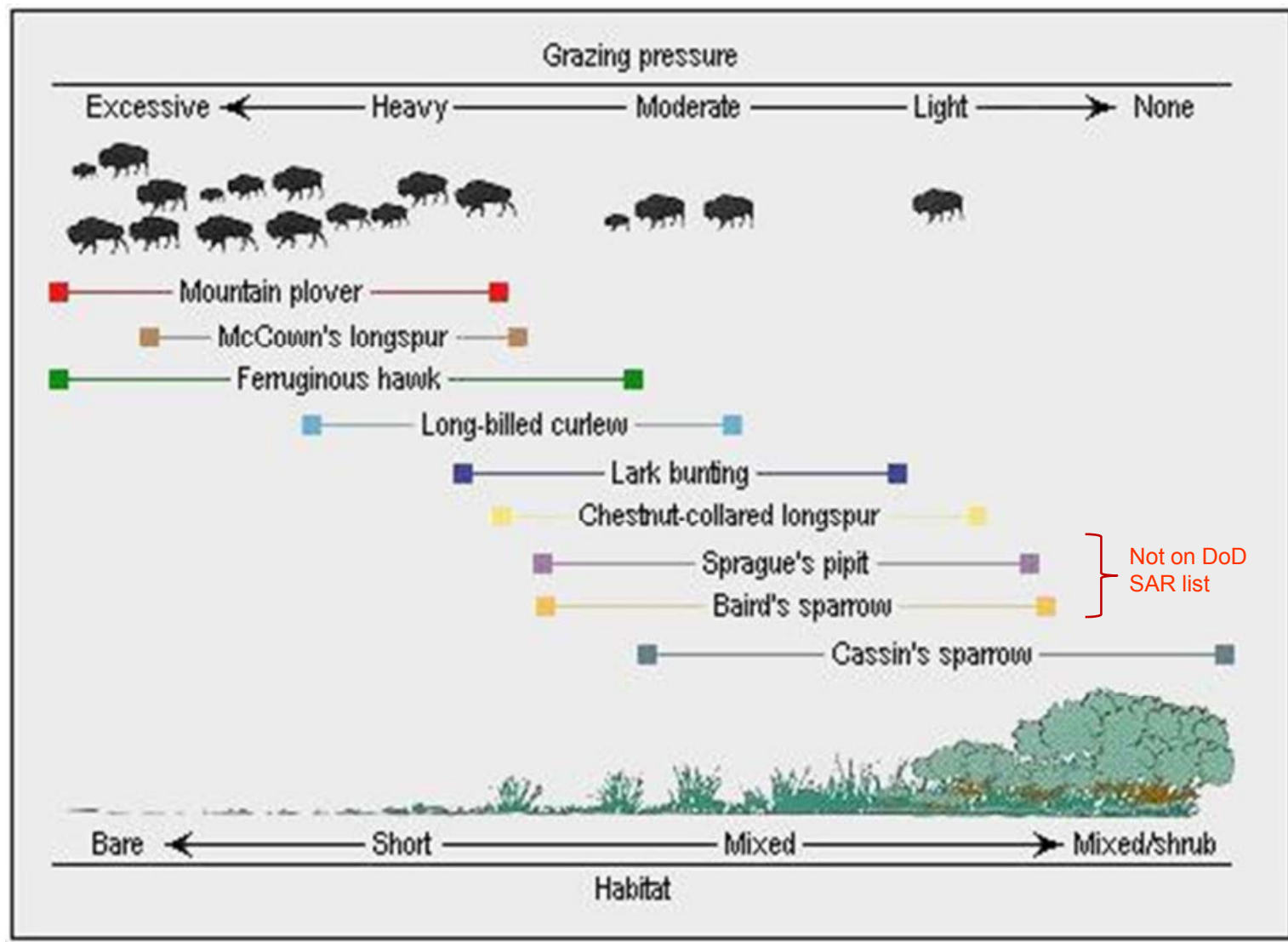
In FY 2009, contracts on substantial CRP acres expire in the shortgrass prairie states. Plowing significant numbers of expired acres will be detrimental to many species.

We were unable to utilize CRP data for our regional analysis so CRP lands are classified with tilled agricultural lands in our data. We recognize that CRP generally provides better wildlife habitat than row crops, but for most native species it is usually poorer habitat than native rangeland. On the other hand, landscapes with significant CRP acres might provide values as large blocks of more suitable habitat (than would be if the CRP is tilled), especially if seed mixes are native to the site.

*** The examples in the table above illustrate that without a new signup for CRP, significant acres under CRP contracts will expire and have the potential to convert back to row crops in the next few years. ***

Positive Impact: Differing Grazing Regimes Create Suitable Conditions For SAR with Differing Habitat Needs

- See next page for examples of different grazing pressures.
- Other SAR not shown on exhibit at right: Burrowing Owl, Swift Fox, Black Tailed Prairie Dog



Moderate to Excessive Grazing Pressures Benefit Shortgrass Community

Excessive pressure



Benefits: Burrowing Owl, Ferruginous Hawk, McCown's Longspur, Mountain Plover

Heavy pressure



Benefits: Long-billed Curlew, Mountain Plover

Heavy/moderate pressure



Benefits: Long-billed Curlew

Moderate pressure

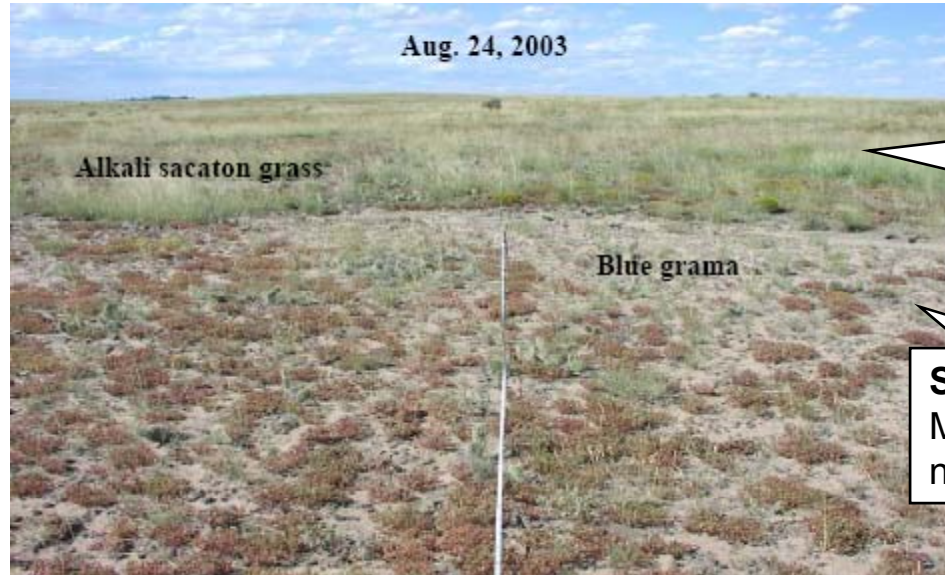


Benefits: Chestnut Collared Longspur, Lark Bunting

Note: Swift fox and prairie dog could inhabit any of the habitats depicted above but the "excessive pressure" photo is of a prairie dog town.

Illustrative Example: Mountain Plover Conservation Needs and Limitations

If existing growth remains through next nesting season (spring)



Too tall to be suitable for Mountain Plover nesting

Suitable for Mountain Plover nesting

Enough bare ground for nesting mountain plover



Not enough bare ground for nesting mountain plover

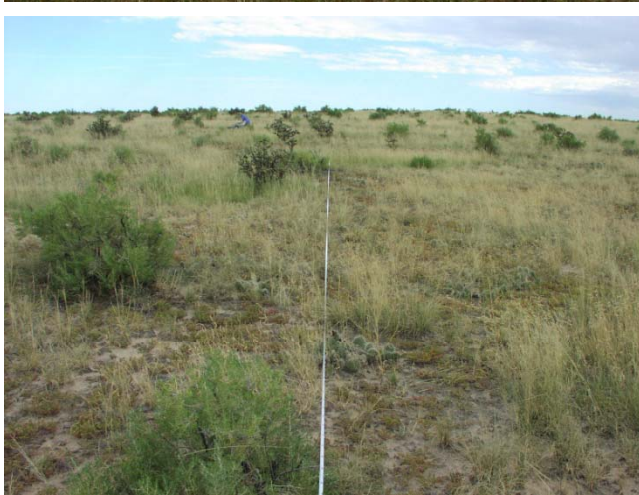
Illustrative Example: Shrubland / Mixed Grass Conservation Needs and Limitations



Not enough shrub cover to support significant numbers of shrubland species.

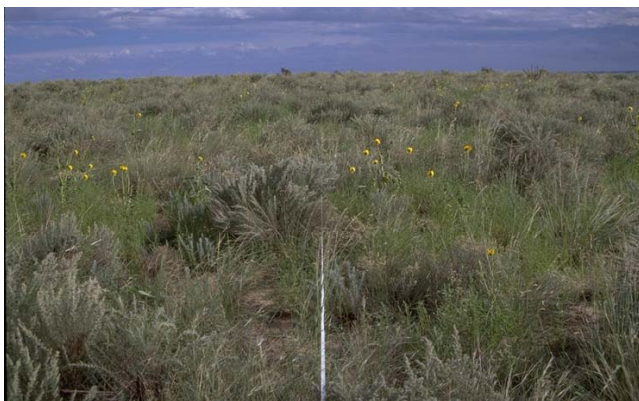
DoD CSP Shrubland / Mixed Grass Community

- Brewer's Sparrow
- Cassin's Sparrow
- Loggerhead Shrike
- Grasshopper Sparrow



Enough shrub cover to support significant numbers of **Cassin's Sparrows** (not Brewer's)

Grazing that maintains or increases shrub cover; no or limited control of shrubs (herbicide, mechanical) and insects; management after fire to allow shrub recovery; fewer fences; >400 meters from roads; no or minimal new road development



Enough shrub cover to support significant numbers of **Brewer's, Cassin's, and Brewer's Sparrows**

Grasshopper Sparrow habitat - needs large patches and grazing that can maintain grass relatively tall (at least 6-10 inches); few or sparse shrubs



Sections 3 and 4: Central Shortgrass Prairie SAR Priority Habitats and Scorecards



Deliverable Scope

AGREED AT 5/3/08 ADVISORY GROUP MEETING

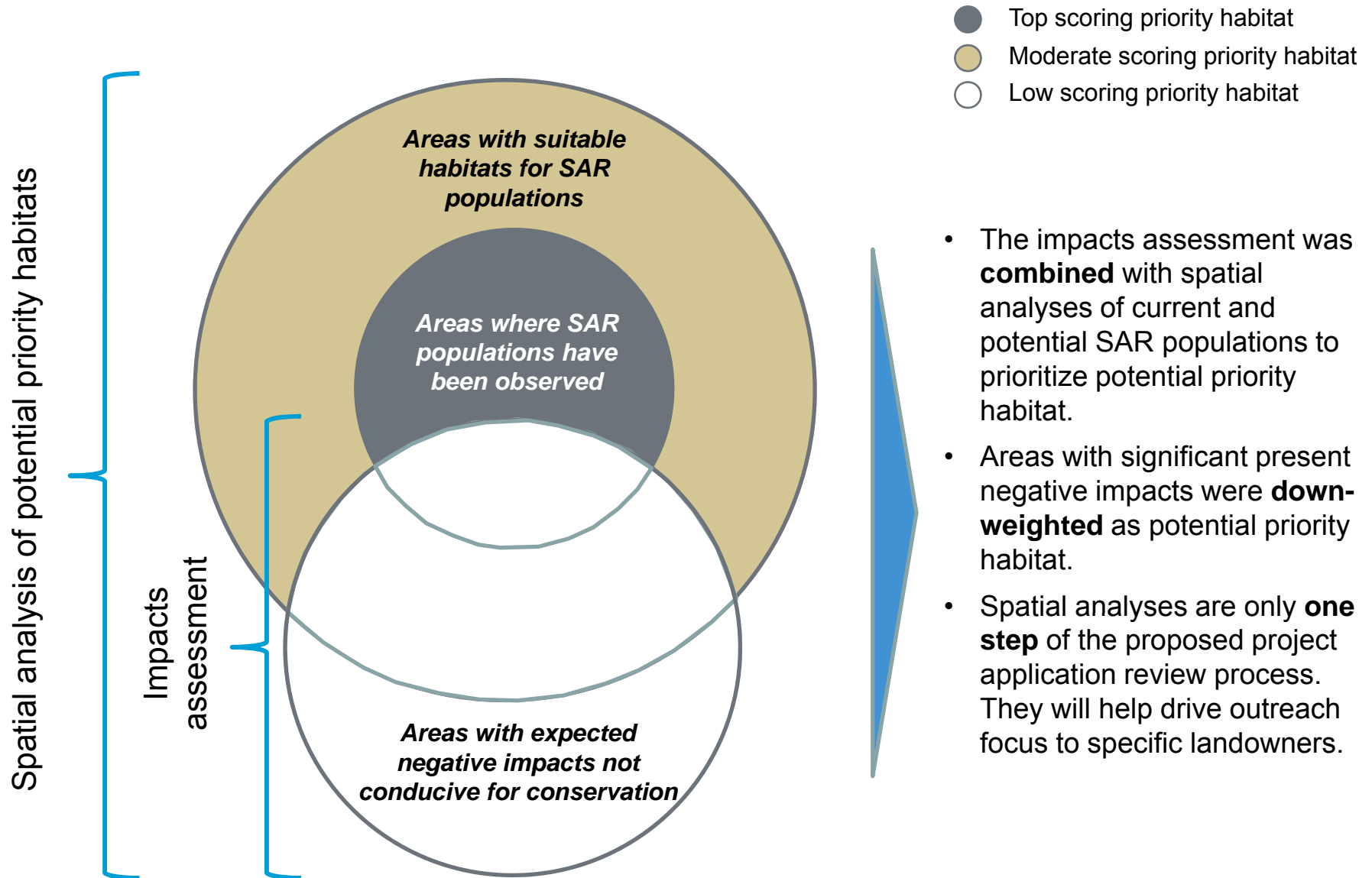
Priority Habitat

- This project will develop proactive recommendations to reduce current and projected negative impacts on SAR and their habitats by **selecting conservation projects**:
 - Through a fair, transparent, and adaptive process based on objective and known criteria that incorporates ecological, social, and economic goals.
 - Using qualitative conservation strategy criteria (e.g. high/medium/low) and broad-scale project area identification in this phase of the project

Scorecard

- *A species at risk scorecard was developed for each of the SAR that establishes the baseline condition of the species. The team also set quantitative, biologically based goals for each species to help measure conservation success. See technical methods section for more details.*
- The maps of priority habitats and scorecards produced in this project are for species at risk (SAR) recommended to the Department of Defense (DoD) in the Central Shortgrass Prairie (CSP). However, the methodology is adaptable to other species in the future.

Priority Habitats Predicted by Combining Impacts Assessment With Population and Habitat Data



Acronyms Used for Species At Risk

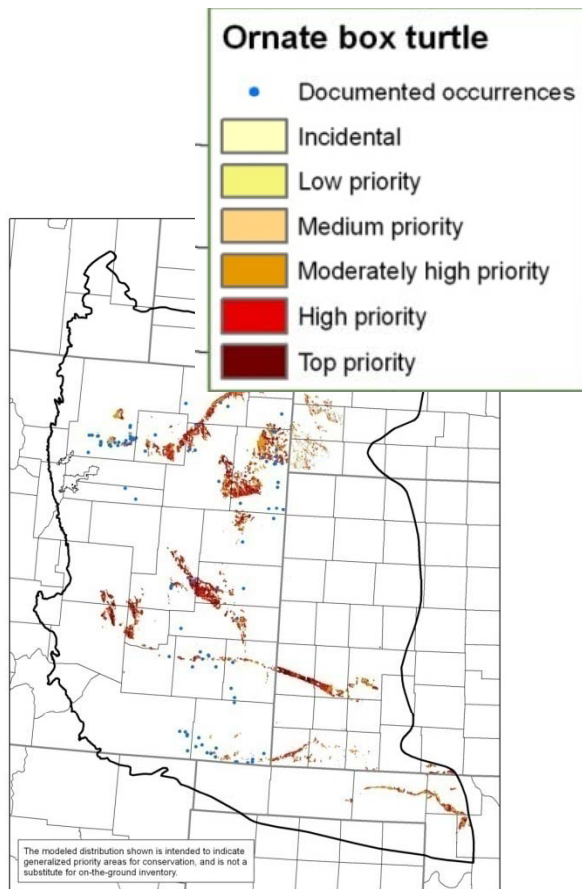
Habitat groupings	Common name	Acronyms used	Global Conservation Status Rank ¹
1. Arkansas Valley Barrens rare plants	1. Arkansas Valley Feverfew	Not necessary	1. G3
	2. Golden Blazing Star		2. G2
	3. Arkansas Valley Evening Primrose		3. G2G3
	4. Pueblo Goldenweed		4. G2
	5. Round-leaf Four O'Clock		5. G2
2. Burrow dependent reptiles group	1. Massasauga Rattlesnake	1. MASS	1. G3G4
	2. Ornate Box Turtle	2. OBT	2. G5
3. Shortgrass Community	1. Burrowing Owl	1. BUOW	1. G4
	2. Chestnut-Collared Longspur	2. CCLO	2. G5
	3. Ferruginous Hawk	3. FEHA	3. G4
	4. Lark Bunting	4. LABU	4. G5
	5. Long-Billed Curlew	5. LBCU	5. G5
	6. McCown's Longspur	6. MCLO	6. G4
	7. Mountain Plover	7. MOPL	7. G3
	8. Prairie Dog (black-tailed)	8. BTPD	8. G4
	9. Swift Fox	9. SWFO	9. G3
4. Shrubland / mixed grass community	1. Brewer's Sparrow	1. BRSP	1. G5
	2. Cassin's Sparrow	2. CASP	2. G5
	3. Grasshopper Sparrow	3. GRSP	3. G5
	4. Loggerhead Shrike	4. LOSH	4. G4

1. Note: Visit www.cnhp.colostate.edu for more information and for global and state imperilment ranks.

Interpretation of Priority Habitats Maps for Each Animal Species at Risk

- For each animal species, a map shows up to six habitat classes. The darker colors on the maps (orange to brown) represent the optimal habitats with low or no impacts while the lighter colors (yellows) show the less optimal, more impacted habitats.
- Documented occurrences are shown in blue where data is available (lack of documentation may mean the site has not yet been field-assessed).

EXAMPLE



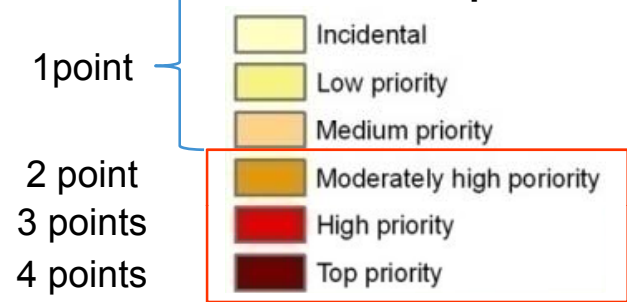
CSP SAR habitat types	Description
Documented occurrences	Shown for comparison with habitat priority model, all occurrences are not necessarily within priority habitat
Incidental	Incidental habitat that might occasionally be used, but only in conjunction with higher priority habitat
Low priority	Low priority habitat. Potentially suitable to some degree, but not in an area of higher species abundance
Medium priority	Good habitat, but not the most important vegetation type(s). Within the higher abundance area, but impacted
Moderately high priority	Optimal habitat, the most important vegetation type(s) within the higher abundance area, but impacted
High priority	Optimal habitat, the most important vegetation type(s) within the higher abundance area, with only low impact
Top priority	Optimal habitat, the most important vegetation type(s) within the higher abundance area, little impact

Priority Habitats: Definitions and Recommended Use

- **Priority habitats areas** are defined as the core areas recommended for effective conservation of the species at risk and their habitats within the CSP.
 - When a land owner applies for funding from the conservation program for a conservation project, the project application will be scored on a range of criteria, one of which will be the location of the property in relation to priority habitats on the target conservation map.¹
 - For example, if the property is in an area rated as top priority habitat, it might receive the maximum number of points for that criteria. If the property is outside any priority habitats areas, it might receive zero points for that criteria. Or, it might receive somewhere between zero and the maximum points for that criteria, depending on the level of target conservation site on which the property is located.
- **Restoration sites:** If there are not enough large optimal habitat patches left to meet conservation goals for a certain species at risk, then restoration sites may need to be considered.

ILLUSTRATIVE SCORING ONLY²

Six habitat classes shown on maps



= "priority habitats"

1. Location on habitat maps is just one criteria. Project applications would also need to demonstrate populations of targeted species at risk are present (or nearby populations, in some cases), that the property is part of a native rangeland patch of at least 3000 acres in size (irrespective of project size), and that the property is in a in landscape where surrounding land is mostly native rangeland (except for grasshopper sparrows and rare plants)

2. This sample application scoring system is illustrative only to show how the location of a property on the habitat maps may determine how many points the application receives for the first of three ecological criteria screens. See deliverable 5b for details on recommended application review process.

All SAR Animal Habitats are Divided into 6 Categories—Top 3 Categories Considered “Priority”

Acres calculated from GIS for each habitat class for each species (except plants) are shown in the table below:

Acres in CSP	Habitat classes								Total all classes (1–6)	Historic ¹ habitat
	Non-priority classes				Priority classes (Colors in table represent how data is shown on habitat maps)					
Species	1. Incidental	2. Low	3. Medium	Total non-priority types (1–3)	4. Med-High	5. High	6. Top	Total priority classes (3–6)		
BRSP	6,148	0	516,126	522,274	0	710,598	234,726	945,324	1,467,598	8,249,281
CASP	3,423,680	581,037	6,412,323	10,417,041	347,969	6,100,551	2,535,617	8,984,138	19,401,178	47,220,143
GRSP	9,408,531	4,038,397	3,122,800	16,569,728	0	2,519,588	476,982	2,996,569	19,566,298	47,983,077
LOSH	6,084,226	4,785,987	3,887,811	14,758,023	669,330	6,149,252	1,337,298	8,155,880	22,913,903	48,357,909
MASS	0	0	0	0	1,579,494	2,089,208	922,654	4,591,356	4,591,356	5,095,449
OBT	0	37,173	144,390	181,562	562,911	880,051	235,829	1,678,790	1,860,353	9,918,020
BTPD-BUOW	0	0	0	0	2,989,296	2,436,733	3,280,297	8,706,326	8,706,326	37,145,281
FEHA	1,021,233	1,365,918	4,885,310	7,272,461	355,125	5,416,558	2,465,442	8,237,125	15,509,586	37,159,828
CCLO	4,079,577	745,586	668,611	5,493,773	83,944	782,034	408,868	1,274,846	6,768,619	9,209,513
MCLO	1,625,410	2,227,260	1,105,756	4,958,426	19,912	1,097,558	481,983	1,599,452	6,557,878	9,737,406
LABU	280,353	226,909	7,083,549	7,590,811	87,770	6,826,334	2,855,746	9,769,850	17,360,661	38,235,471
LBCU	0	133,831	1,672,640	1,806,471	79,811	1,679,302	724,066	2,483,180	4,289,651	21,357,070
MOPL	633,310	2,567,174	796,412	3,996,897	1,031,644	1,872,752	609,321	3,513,717	7,510,614	26,725,323
SWFO	0	9,047,312	0	9,047,312	3,254,753	3,175,995	2,058,601	8,489,349	17,536,661	48,060,269

1 . Historic suitable habitat was calculated using the LANDFIRE Environmental Site Potential dataset (USFS 2006). United States Forest Service [USFS]. 2006. LANDFIRE.ENVIRONMENT_SITE_POTENTIAL. Digital raster data. USDA Forest Service, Missoula MT

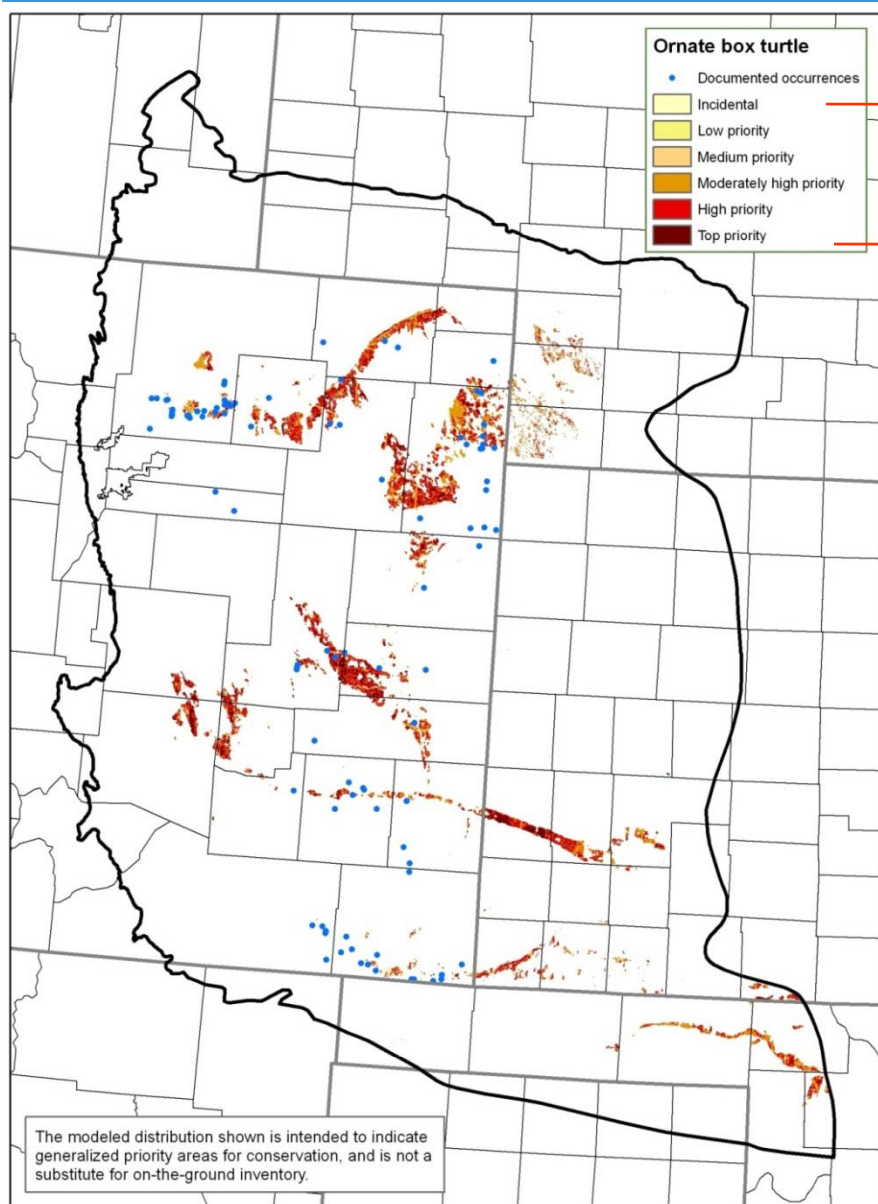
SAR Goals Used in Optimization Models and Scorecard

Species	Birds/ km ²	Population size - # of individuals	Acres to support 1 population	CSP Goal (# of pop- ulations)	SAR GOAL (acres)	Available priority habitat (acres)	Available total (acres)	% of priority habitat needed to meet goal
Brewer's sparrow	3.22	7000	537,183	0.7	376,028	945,324	1,467,598	40%
Cassin's sparrow	9.99	7000	173,146	24	4,155,509	8,984,136	19,401,175	46%
Grasshopper sparrow	34.09	7000	50,740	21	1,065,543	2,996,569	19,566,294	36%
Loggerhead shrike	1.61	7000	1,074,367	3	3,223,101	8,155,880	22,913,903	40%
Massasauga			use % historic	40%	2,038,180	4,591,355	4,591,355	44%
Ornate box turtle			use % current	60%	1,007,274	1,678,790	1,860,352	60%
Black-tailed prairie dog & Burrowing owl*			675,000	1	675,000	8,706,326	8,706,326	8%
Ferruginous hawk	0.08	1600	4,942,088	0.6	2,965,253	8,237,123	15,509,583	36%
Chestnut-collared longspur	1.42	7000	1,218,120	0.7	852,684	1,274,846	6,768,618	67%
McCown's longspur	2.34	7000	739,201	0.7	517,441	1,599,452	6,557,878	32%
Lark bunting	27.23	7000	63,523	41	2,604,442	9,769,848	17,360,658	27%
Long-billed curlew	0.19	3941	5,125,465	0.35	1,793,913	2,483,179	4,289,650	72%
Mountain plover	2.3	7000	752,057	2	1,504,114	3,513,717	7,510,614	43%
Swift fox		53,329 km ²	13,178,058	0.45	6,000,000†	8,489,347	17,536,658	71%
*1.5 x CDOW occupied acre goal to account for total CSP			†Rounded					

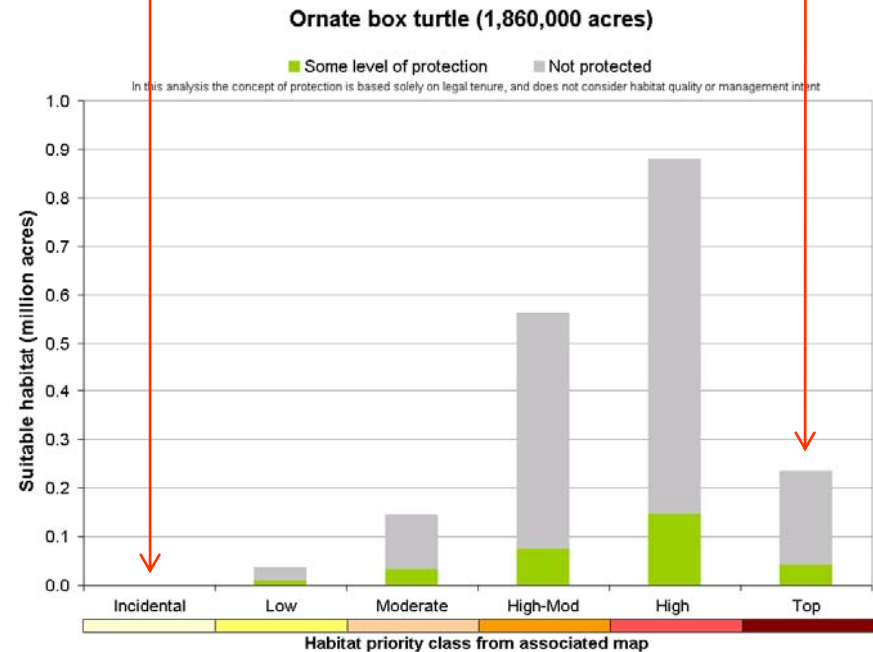
Note: Goals for bird species are based on multiples of the acres needed to support a single stable population, calculated using density estimates from RMBO. Non-bird goals are based on estimated occupied range (BTPD & BUOW, SWFO), proportion of historic range (MASS), or proportion of remaining range (OBT). These acreages are also used to depict the red "Goal" bars on animal species graphs. See technical methods at the end of Appendix A for more detailed information.

Data from Habitat Maps Feeds Into SAR Scorecards

EXAMPLE



Scorecard 1. Habitat Summary



- The purpose of the SAR scorecard is to provide a framework for evaluating effectiveness of the conservation actions and measuring progress towards conservation goals over time.

Note: See next slide for definitions of protected, semi-protected, and not protected.

SAR Scorecards: Definitions and Uses

- For each habitat class, the amount of land under “protected, semi-protected, or not protected” is estimated, as defined below. In this analysis the concept of protection is based solely on legal tenure, and does not consider habitat quality or management intent

Protection category	Definition (GAP+ / level of protection)	How shown on scorecard (see prior slide for example)
1. Protected ¹	GAP+ classes 1, 2a, 2b: 1: Public and Private: permanent protection with main biodiversity focus (RNAs) 2a: Public lands in permanent protection, but some management may degrade (National Parks) 2b: Private lands in permanent protection, but some management may degrade (working lands with conservation easements)	Light green (combined with semi-conserved on habitat summaries and priority habitat scorecards)
2. Semi-protected ²	GAP+ classes 3a, 3b, 4a, 4b: 3a: Public lands in permanent protection, but subject to extractive uses (National Forest lands) 3b: Private lands in permanent protection, but subject to extractive uses (conservation easements) 4a: No known mandates or legally recognized easements, some management protections (CO state stewardship trust lands) 4b: No known mandates or legally recognized easements (State Land Board holdings)	Light green (combined with semi-conserved on habitat summaries and priority habitat scorecards)
3. Not protected ³	All remaining GAP+ classes: 4f: No known mandates or legally recognized easements (most private lands with natural cover) 4g: No known mandates or legally recognized easements (private lands in cropland) 4h: No known mandates or legally recognized easements (private lands in urban and mining) GAP+ 4c = private, short-term protection and 4d = private converted lands under restoration with short term protection, such as Conservation Reserve Program lands, did not have accurate maps available.	Gray on both types of scorecards

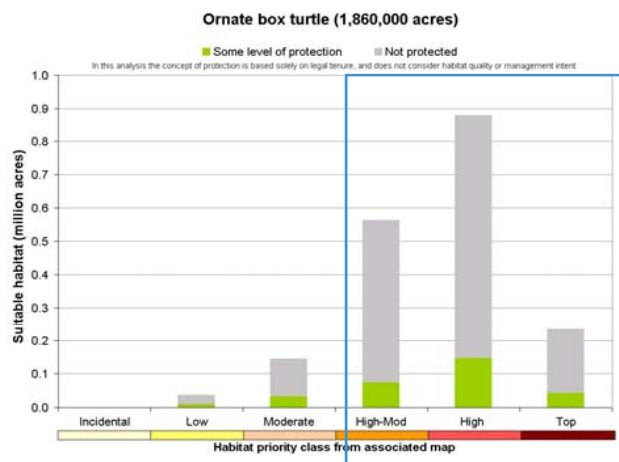
1. CSP Ecoregion Assessment uses “protected”, “semi-protected,” and “not protected.”

2. The National GAP Analysis Program classifies lands according to their biodiversity management status (Scott and Jennings 1997; www.gap.uidaho.edu/handbook). The intent of this system is to indicate the level of management focused on biodiversity conservation for a land unit. GAP status ranks are based on four criteria: (1) Permanence of protection from conversion of natural to unnatural land cover; (2) relative amount of the land unit managed for natural cover; (3) inclusiveness of the management (single species or whole-system focus); and (4) degree to which management allows maintenance of natural processes.

Source: Neely et al., Central Shortgrass Prairie Ecoregional Assessment Final Report November 2006

Interpretation of the Three Types of SAR Scorecards

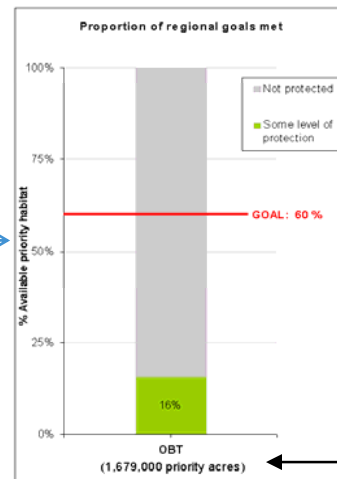
Scorecard 1. Habitat Summary (feeds into Scorecard #2)



A detailed graph on the left half of each species scorecard slide shows the amount of available potential suitable habitat (represented by bar height in each category), and the proportion of each category that has some level of protection or is not protected.

Scorecard 2. Priority Habitat Protection and Goal (feeds into #3 Summary Scorecard for Animals)

EXAMPLE

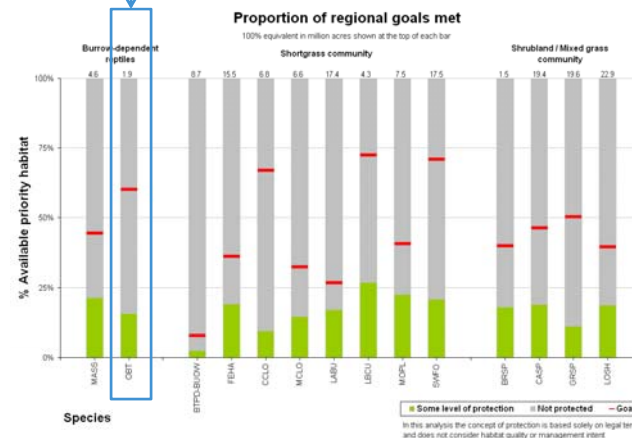


• This graph summarizes the top 3 habitat classes on Scorecard 1 and shows what proportion has some level of protection, against the conservation goal (red line).

• This priority habitat number sums the acres from the top three priority habitats.

Scorecard 3. Summary Scorecard for Animals

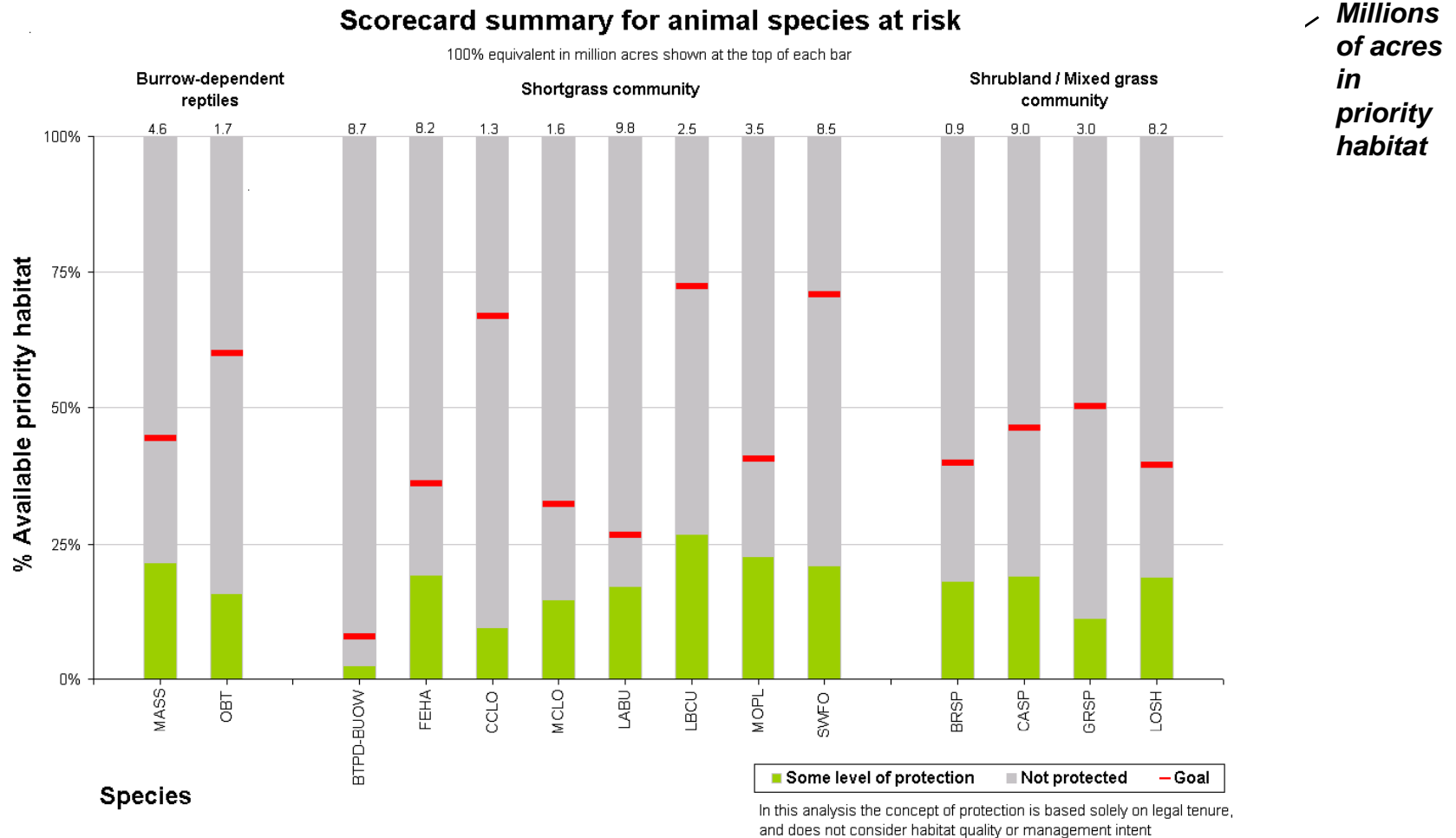
- The Summary Scorecard shows the priority habitat scorecards for each of the animal species at risk.



Note: Protected and Semi-protected are shown as a single class in all graphs because the proportion of protected acreages is less than 1% for all SAR, and can not be adequately displayed. Acreages displayed on graph labels are rounded to the nearest 1,000.

SAR CSP Summary Scorecard For Animals¹

- Each vertical bar below shows the total available priority habitat for each animal species (top 3 classes in habitat maps). The green portions represent the proportion of available priority habitat that has some level of legal protection. Conservation goals for each species are represented by the red lines. The point is to ensure that enough priority habitat remains for each species. Over time, the total amount of acres in available priority habitat should also be reassessed.



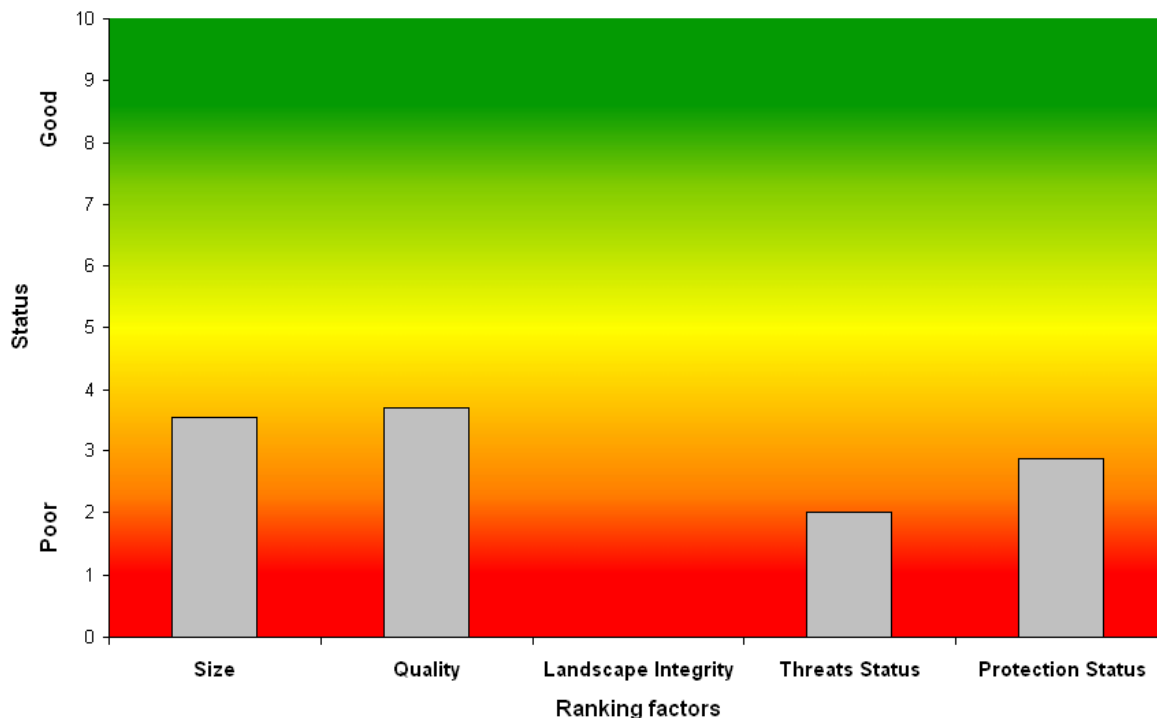
1. See separate summary scorecards for plants on following slide.

SAR Summary Scorecard for Rare Plants¹

This summary scorecard for SAR plants shows the conservation status for each species in the Arkansas Valley Barrens rare plants group. There are five measures of status. Size indicates population size. Quality indicates population condition based on things like evidence of reproduction, multiple age classes, and native/non native species composition. Landscape integrity indicates intactness of surrounding landscape with ½ mile buffer of occurrence. Threats indicate the summary of scope, severity, and immediacy, of the primary threat. Protection status is the amount of land under “protected, or semi-protected” status (in this analysis the concept of protection is based solely on legal tenure).

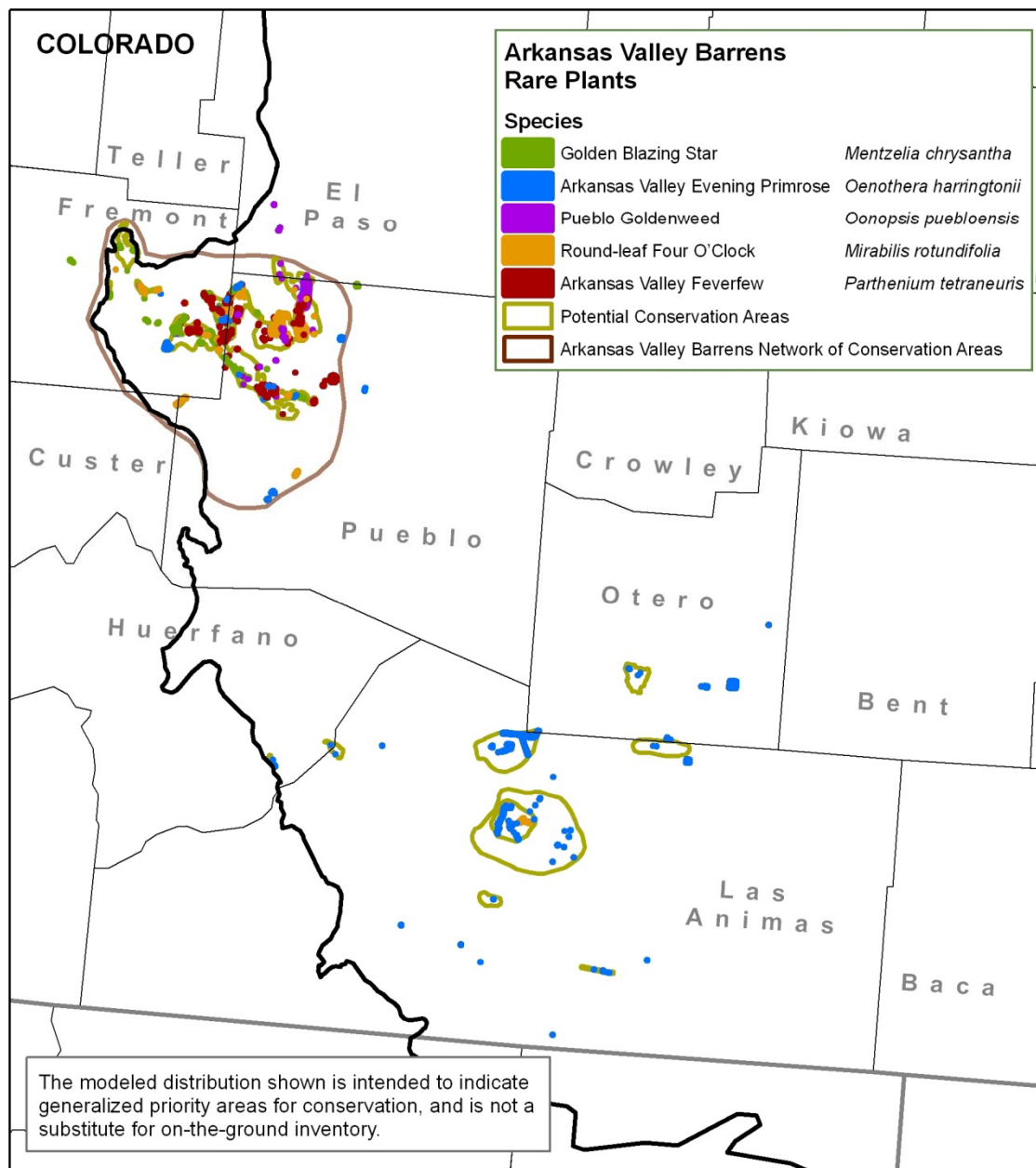
Golden Blazing Star (G2 S2)

Example



1. See separate summary scorecards for animals on prior slide.

Priority Habitats: Arkansas Valley Barrens Rare Plants Group



Arkansas Valley Barrens Rare Plants

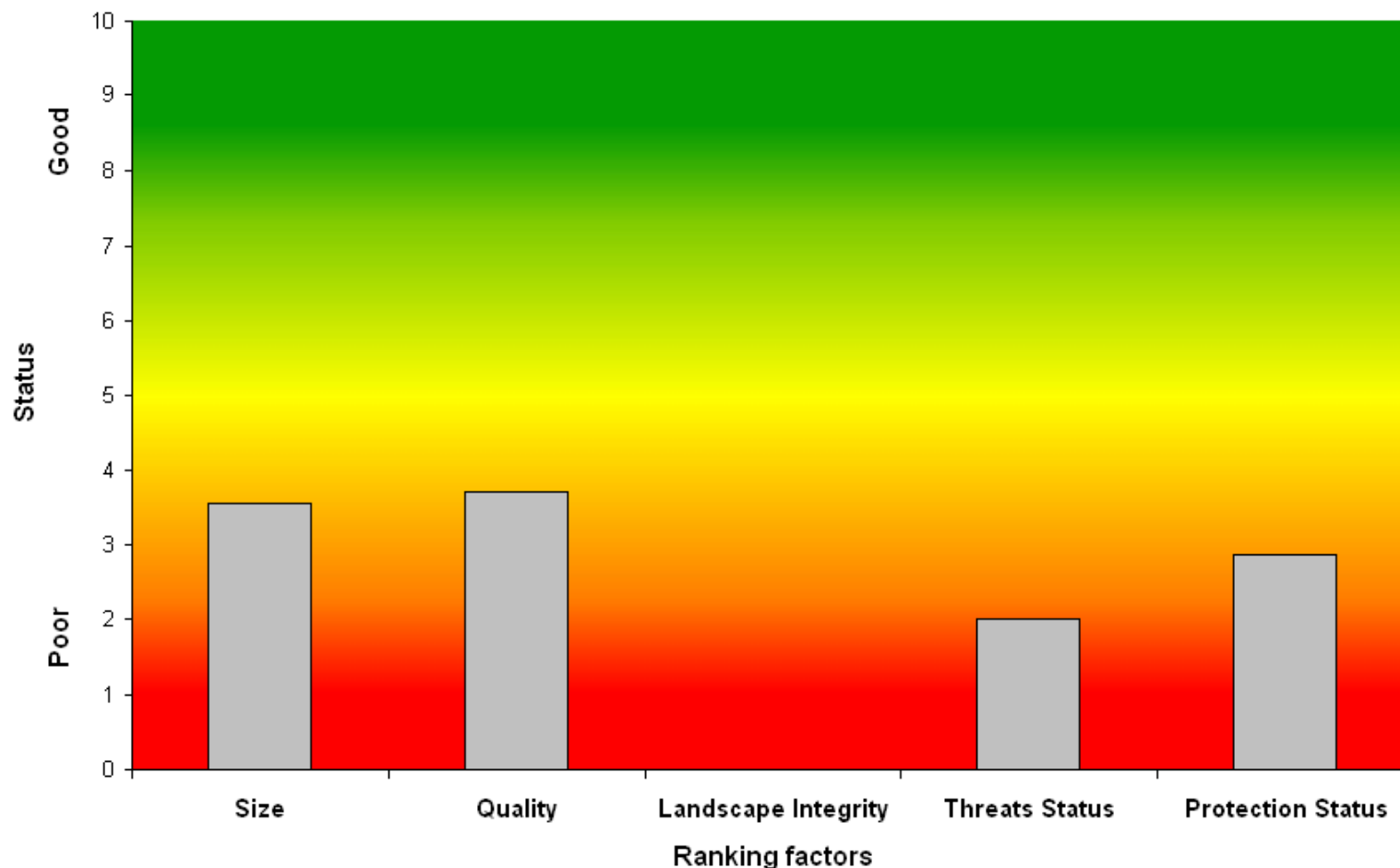
Species at Risk Group: Rare plants

Data Sources and Notes

All data from CNHP (2008)
 Note: Nomenclature is according to USDA-NRCS Plants Database. Some plant species here have more than one common name.
 Photos from CNHP

Arkansas Valley Barrens Rare Plant Scorecard: Golden Blazing Star

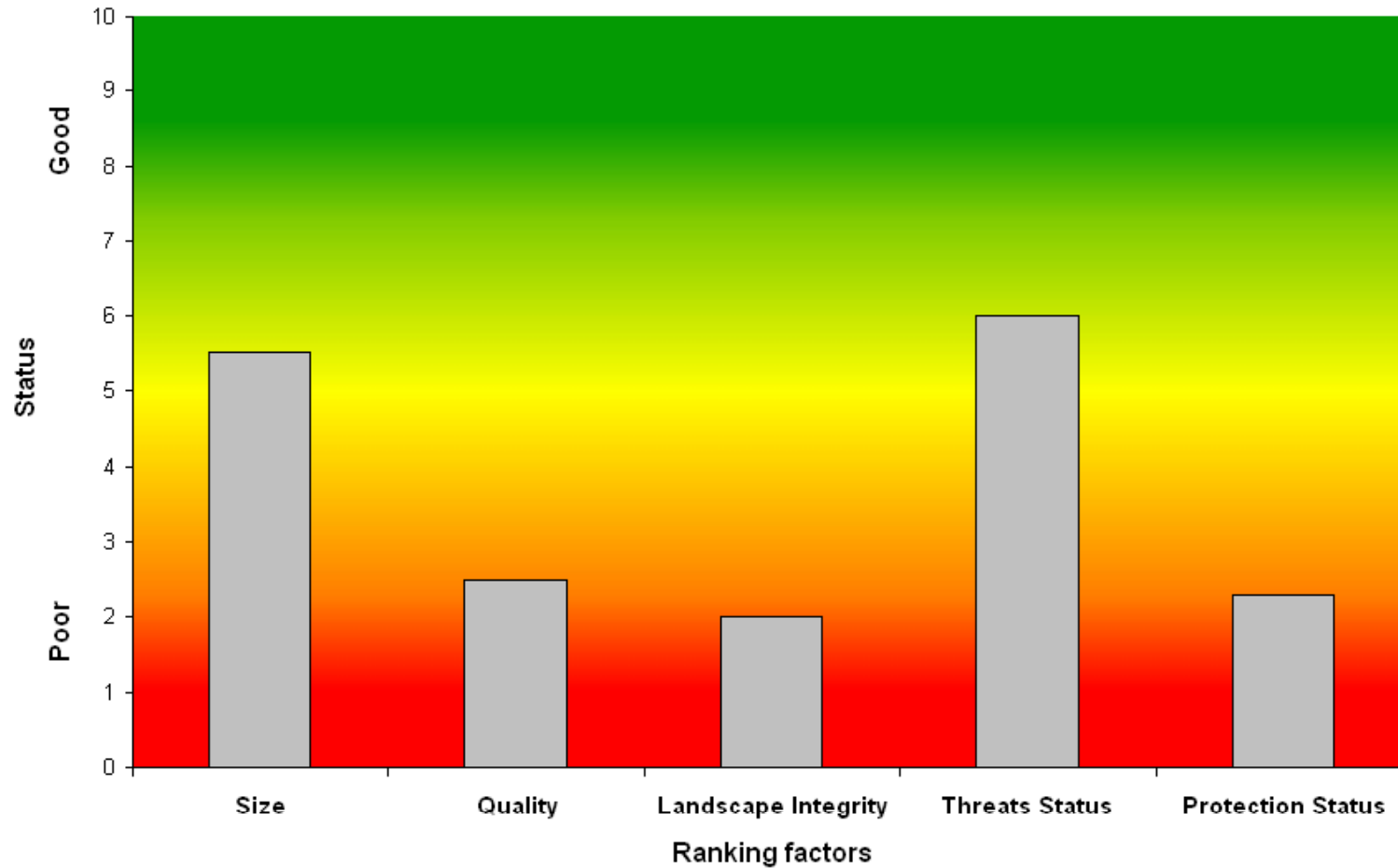
Golden Blazing Star (G2 S2)



Source: All data from CNHP.

Arkansas Valley Barrens Rare Plant Scorecard: Arkansas Valley Evening Primrose

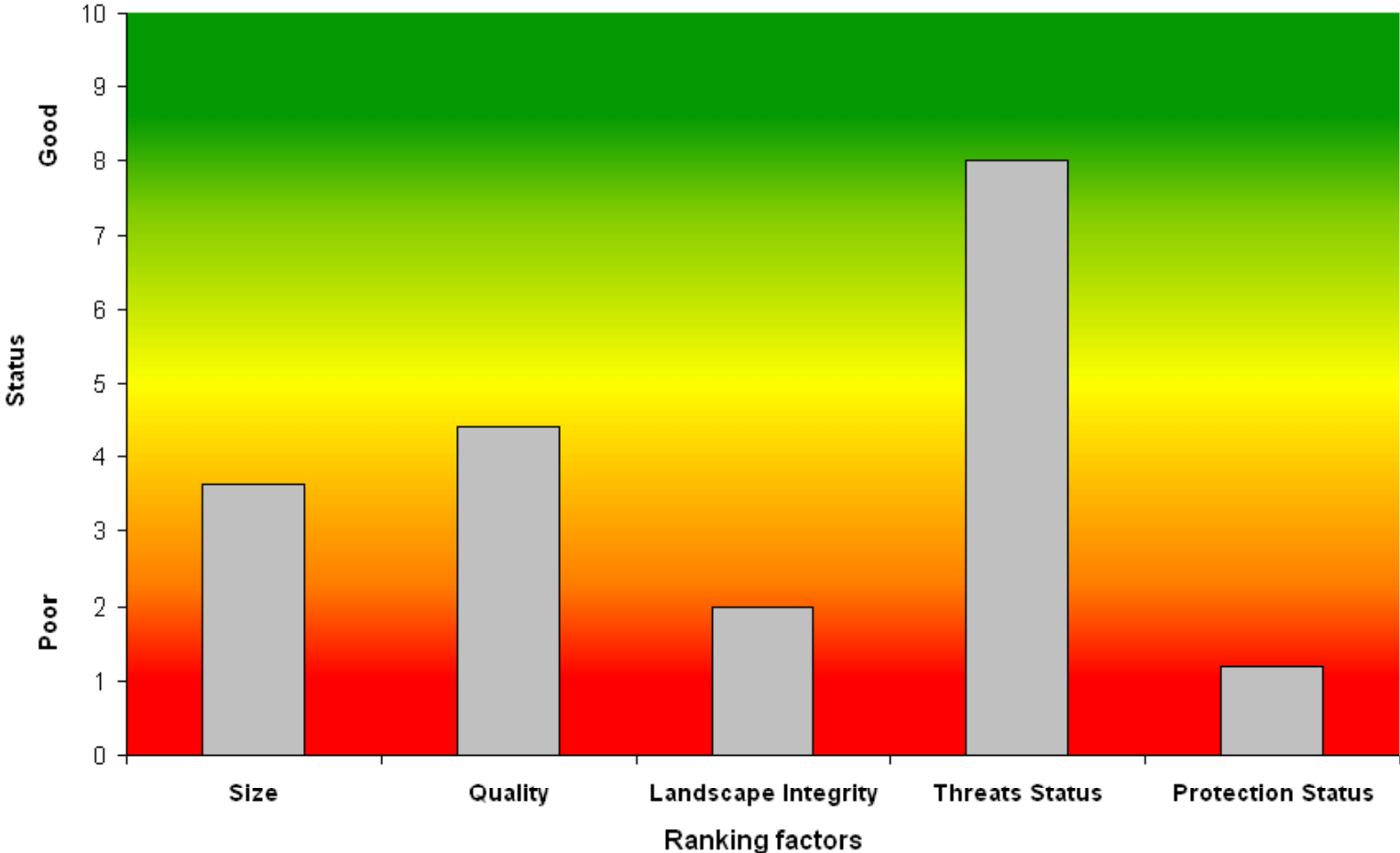
Arkansas Valley Evening Primrose (G2G3 S2S3)



Source: All data from CNHP.

Arkansas Valley Barrens Rare Plant Scorecard: Pueblo Goldenweed

Pueblo Goldenweed (G2 S2)

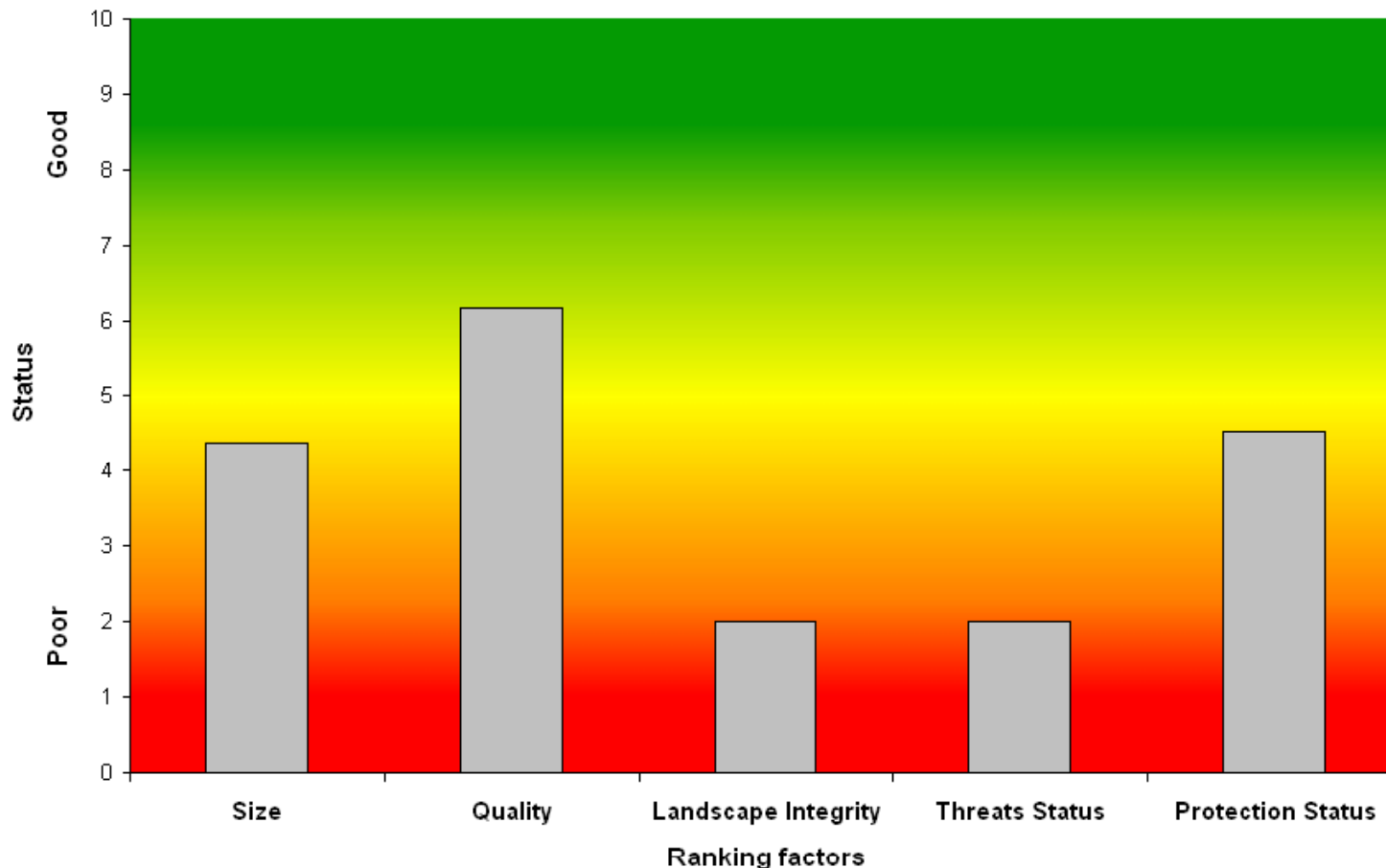


Notes: This species has not be formally recognized in the USDA-NRCS Plants Database but knowledgeable experts consider it a valid species. Source: All data from CNHP.

Arkansas Valley Barrens Rare Plant Scorecard: Round-Leaf Four O’Clock and Arkansas Valley Feverfew

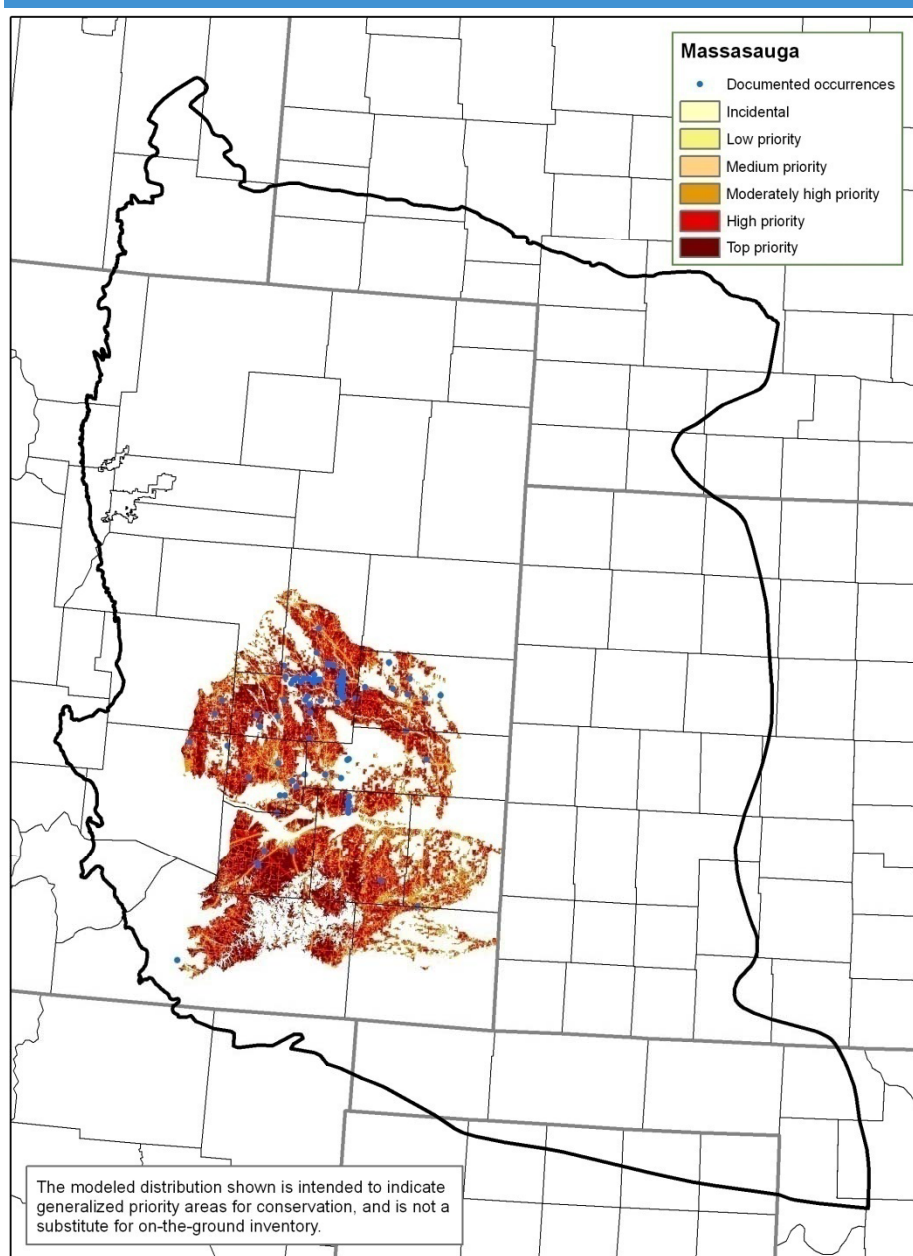
Round-leaf Four O’Clock (G2 S2) and Arkansas Valley Feverfew (G3 S3)

Feverfew was not directly scored, but is included with Round-leaf Four O’Clock because the two species have similar distributions



Notes: Arkansas Valley Feverfew (*Parthenium tetraeuris*) is combined with Round-Leaf Four O’Clock (*Mirabilis rotundifolia*) in the scorecard graph above because they have similar distributions, and *P. tetraeuris*, as a more common species (G3), was not evaluated in the first round of CNHP’s biodiversity scorecard for Colorado rare plants. Source: All data from CNHP.

CSP Priority Habitats: Massasauga Rattlesnake



Interpretation: Six habitat classes are shown on the map. The darker colors (orange to brown) represent the optimal habitats with low or no impacts while the lighter colors (yellows) show the less optimal, more impacted habitats. Documented occurrences are shown in blue where data is available (lack of documentation may mean the site has not yet been field-assessed).



Massasauga Rattlesnake

Species at Risk Group: Burrow Dependent Reptiles

Data Sources and Notes

Priority habitat map data sources:
CDOW (2006), CNHP & TNC (2008b, 2008c)

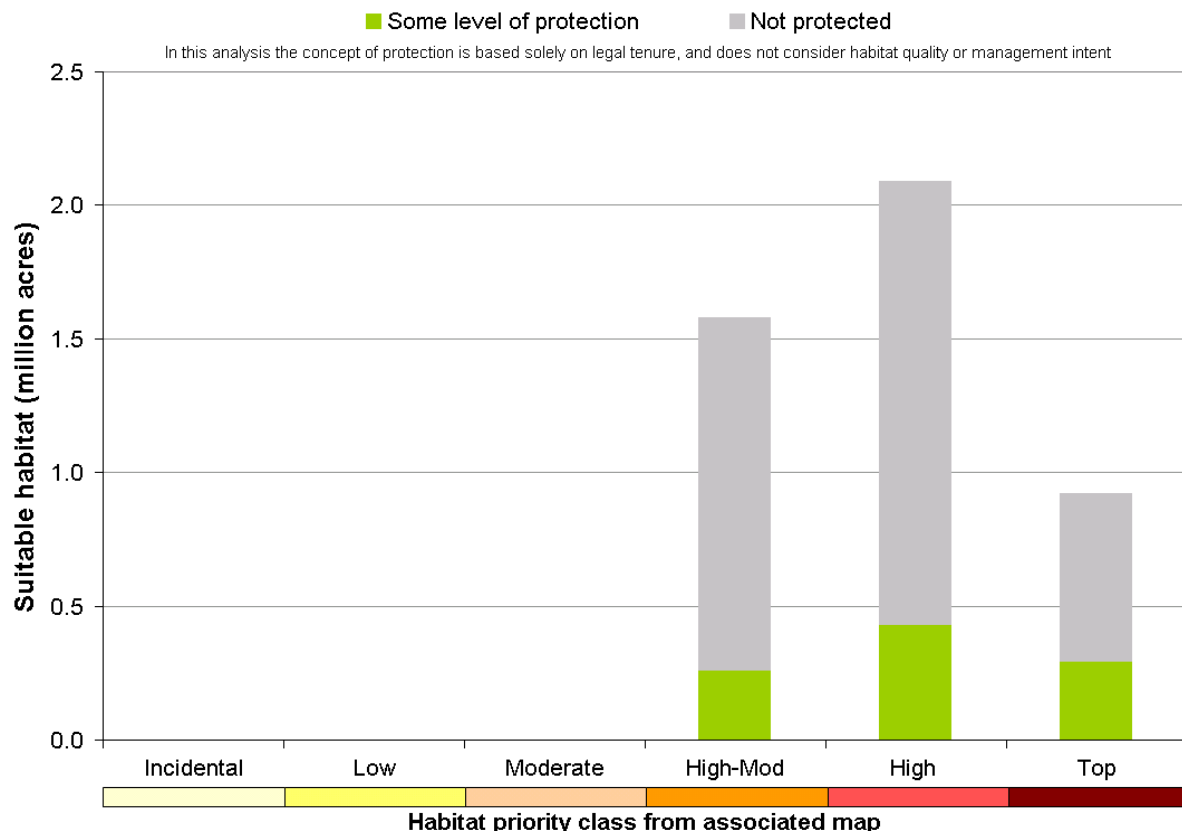
Point data sources:
CSP ecoregional plan (Neely et al., 2006) and CNHP (2008)

CSP Scorecard: Massasauga Rattlesnake

Scorecard 1. Habitat Summary (feeds into Scorecard #2)

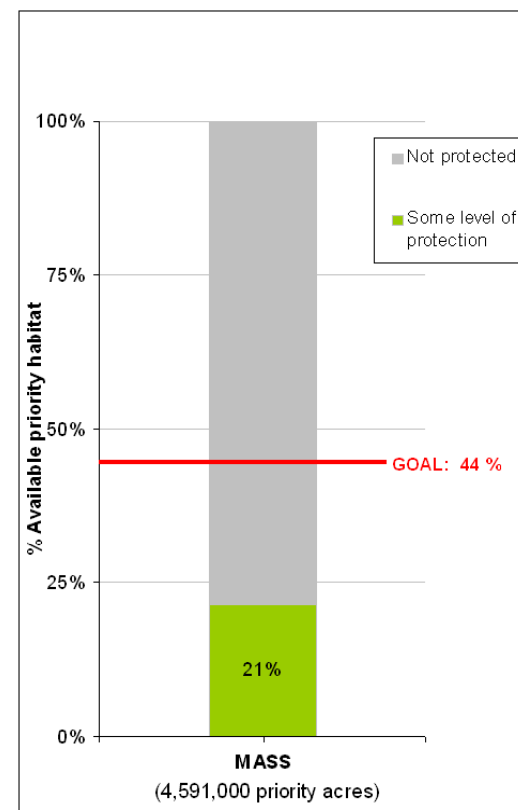
- This graph summarizes the amount of available potential suitable habitat by class (represented by bar heights) and the proportion of each class that is under some level of protection.

Massasauga (4,591,000 acres)



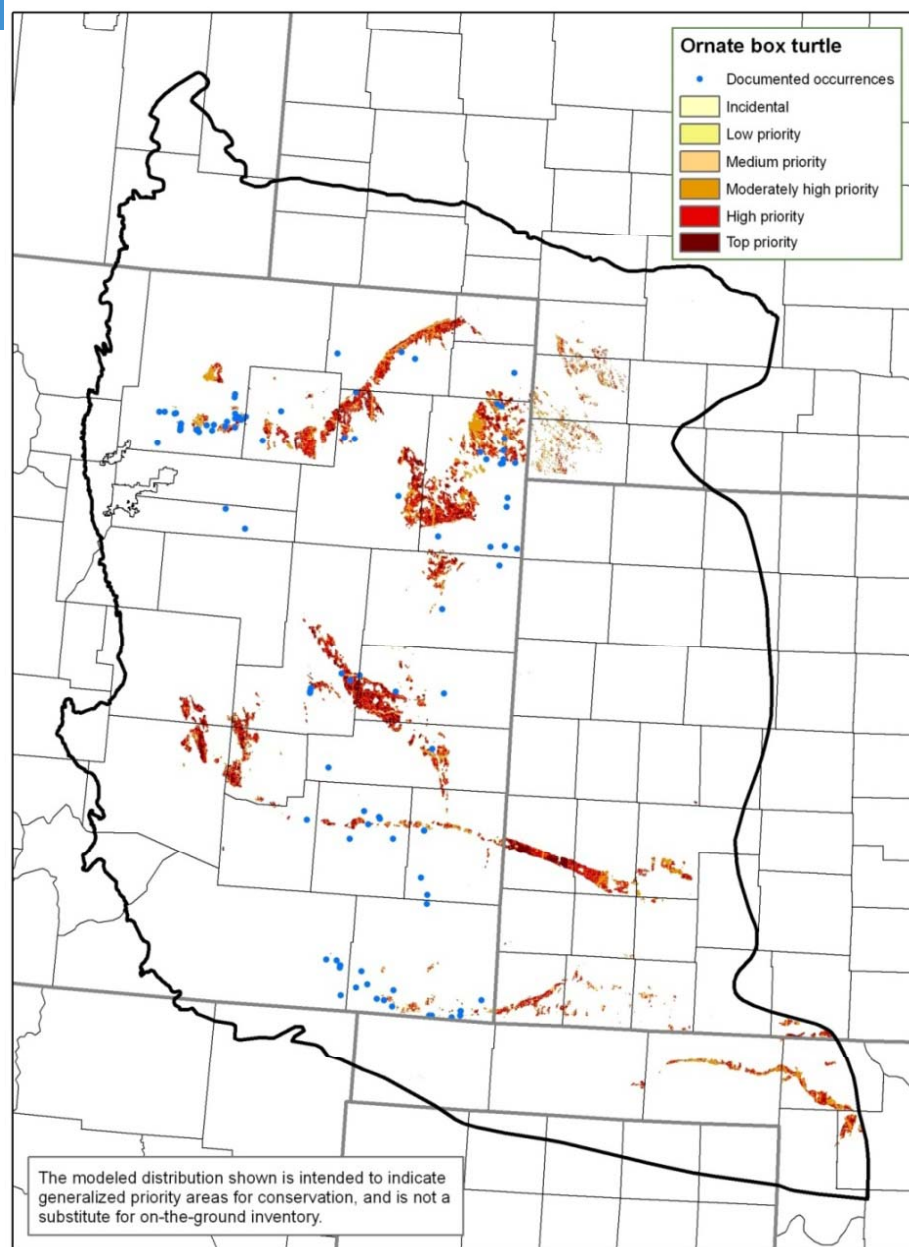
Scorecard 2. Priority Habitat Protection vs. Goal (feeds into Summary Scorecard for Animals)

- This graph summarizes the top 3 habitat classes on Scorecard 1, at left, and shows what proportion is under some level of protection, against the conservation goal of 44%.



Note: Protected = GAP+ classes 1, 2a, 2b; semi-protected = GAP+ classes 3a, 3b, 4a, 4b; no protection = all remaining GAP+ classes. Protected and Semi-protected are shown as a single class in all graphs because the proportion of protected acreages is less than 1% for all SARs, and can not be adequately displayed. Acreages displayed on graph labels are rounded to the nearest 1,000. In this analysis the concept of protection is based solely on legal tenure, and does not consider habitat quality or management intent.

CSP Priority Habitats: Ornate Box Turtle



Interpretation: Six habitat classes are shown on the map. The darker colors (orange to brown) represent the optimal habitats with low or no impacts while the lighter colors (yellows) show the less optimal, more impacted habitats. Documented occurrences are shown in blue where data is available (lack of documentation may mean the site has not yet been field-assessed).



Ornate box turtle
Species at Risk Group: Burrow Dependent Reptiles

Data Sources and Notes

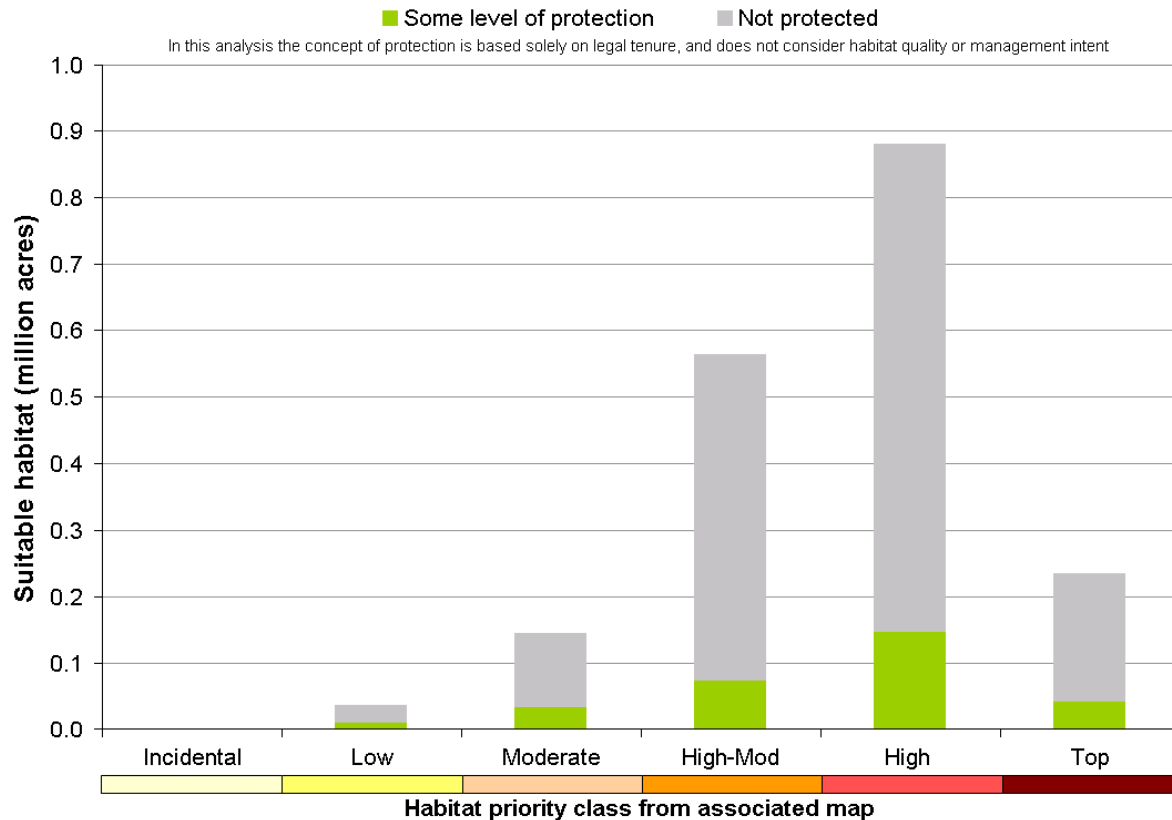
Priority habitat map data sources:
Grunau et al. (2007), CNHP & TNC (2008b, 2008c)
Point data source:
Colorado Herpetofaunal Atlas, 2007.
Note:
No point data were available for outside Colorado, since this species was not a CSP target.

CSP Scorecard: Ornate Box Turtle

Scorecard 1. Habitat Summary (feeds into Scorecard #2)

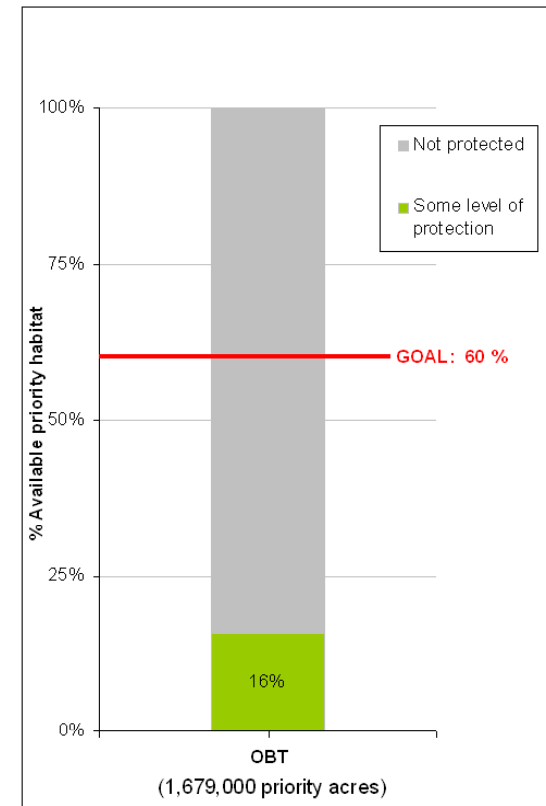
- This graph summarizes the amount of available potential suitable habitat by class (represented by bar heights) and the proportion of each class that is under some level of protection.

Ornate box turtle (1,860,000 acres)



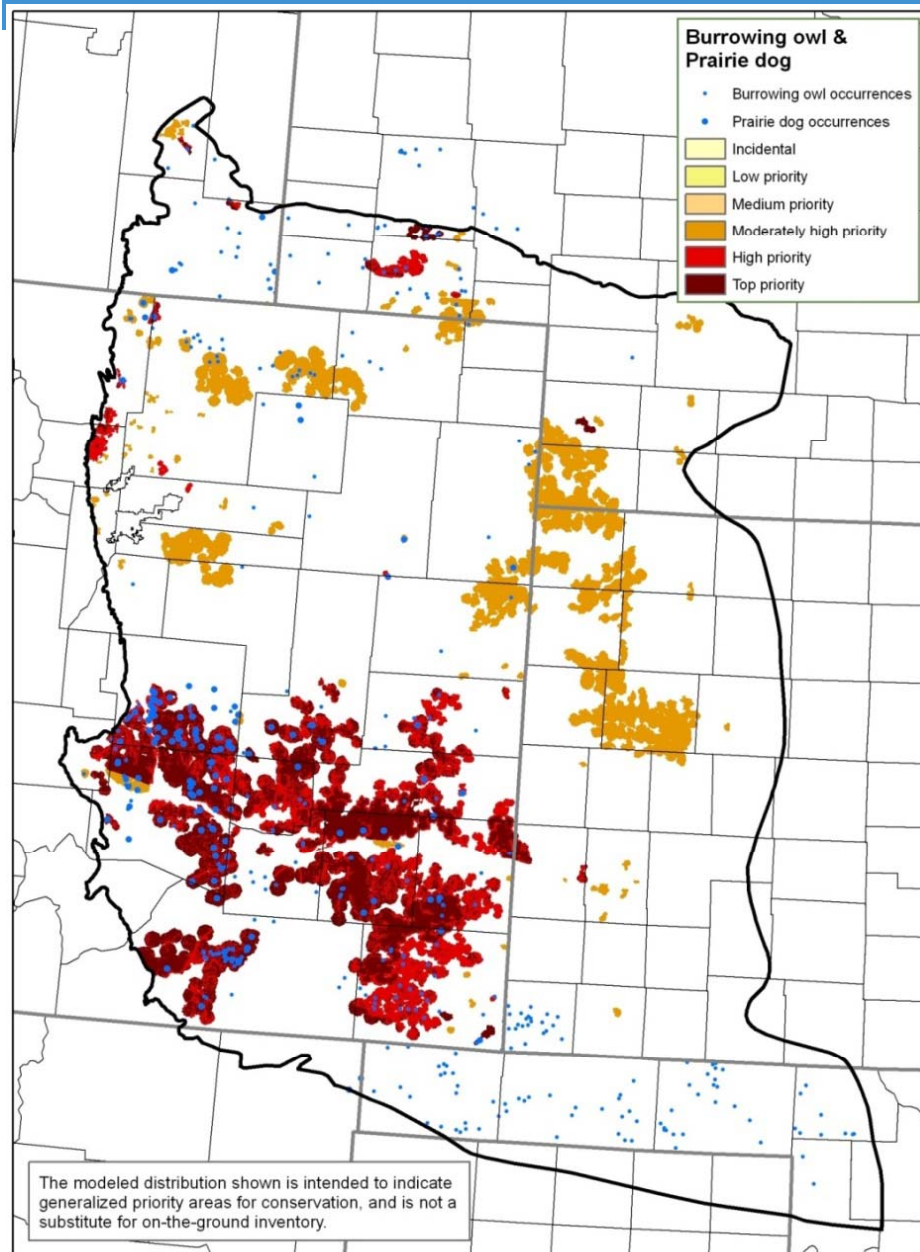
Scorecard 2. Priority Habitat Protection vs. Goal (feeds into Summary Scorecard for Animals)

- This graph summarizes the top 3 habitat classes on Scorecard 1, at left, and shows what proportion is under some level of protection, against the conservation goal of 60%.



Note: Protected = GAP+ classes 1, 2a, 2b; semi-protected = GAP+ classes 3a, 3b, 4a, 4b; no protection = all remaining GAP+ classes. Protected and Semi-protected are shown as a single class in all graphs because the proportion of protected acreages is less than 1% for all SARs, and can not be adequately displayed. Acreages displayed on graph labels are rounded to the nearest 1,000. In this analysis the concept of protection is based solely on legal tenure, and does not consider habitat quality or management intent.

CSP Priority Habitats: Black-Tailed Prairie Dog and Burrowing Owl



Interpretation: Six habitat classes are shown on the map. The darker colors (orange to brown) represent the optimal habitats with low or no impacts while the lighter colors (yellows) show the less optimal, more impacted habitats. Documented occurrences are shown in blue where data is available (lack of documentation may mean the site has not yet been field-assessed).



Burrowing owl and Black-tailed prairie dog Species at Risk Group: Shortgrass community

Data Sources and Notes

Priority habitat map data source:
CSP ecoregional plan (Neely et al. 2006), CNHP & TNC (2008b, 2008c)

Point data sources:
CSP ecoregional plan (Neely et al. 2006) and RMBO (2005)

Note: Burrowing owls in the CSP are not exclusively associated with prairie dog towns but are nearly so. The two species are included together because of their close ecological linkage.

Because habitat shown has already been prioritized as part of CSP ecoregional planning, scores were raised 2 classes, so that all habitat is in moderately high, high, or top priority classes.

CSP Scorecard: Black Tailed Prairie Dog and Burrowing Owl

Scorecard 1. Habitat Summary (feeds into Scorecard #2)

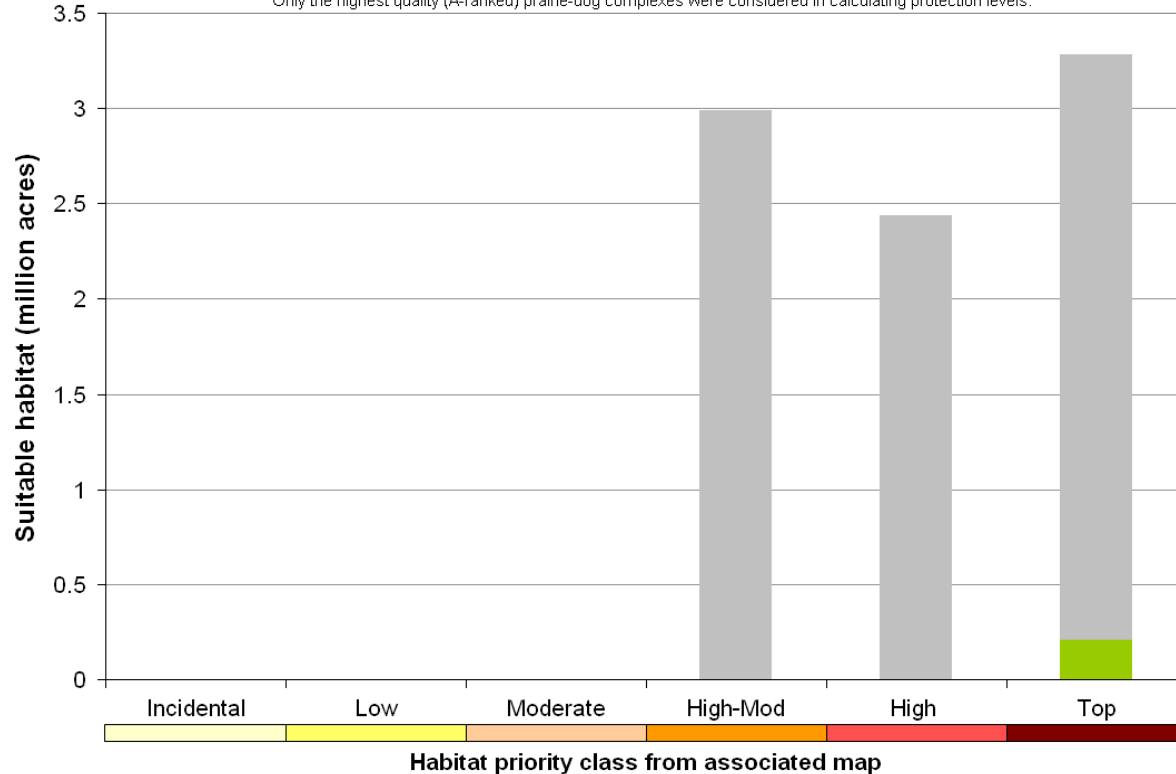
- This graph summarizes the amount of available potential suitable habitat by class (represented by bar heights) and the proportion of each class that is under some level of protection.

Burrowing owl and Black-tailed Prairie dog (8,706,000 acres)

Although burrowing owls can be found away from prairie dog towns, the two species are combined because of their close ecological linkage

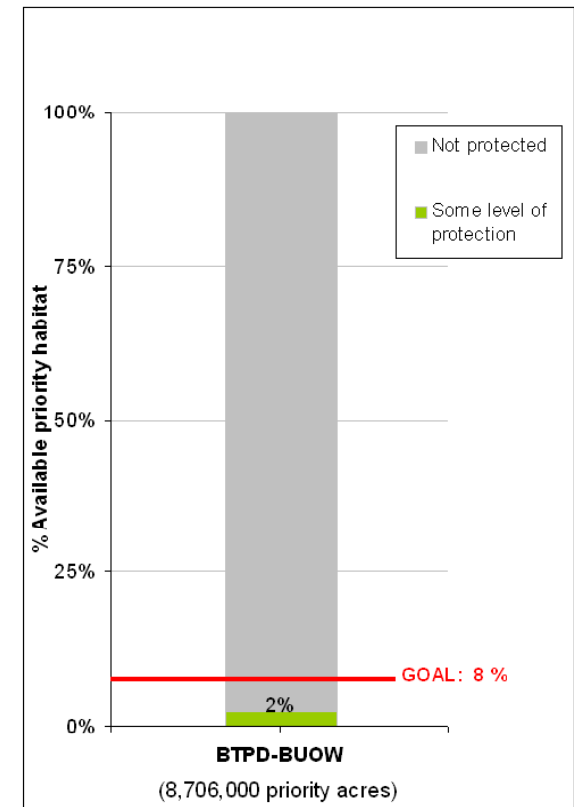
■ Some level of protection ■ Not protected

In this analysis the concept of protection is based solely on legal tenure, and does not consider habitat quality or management intent. Only the highest quality (A-ranked) prairie-dog complexes were considered in calculating protection levels.



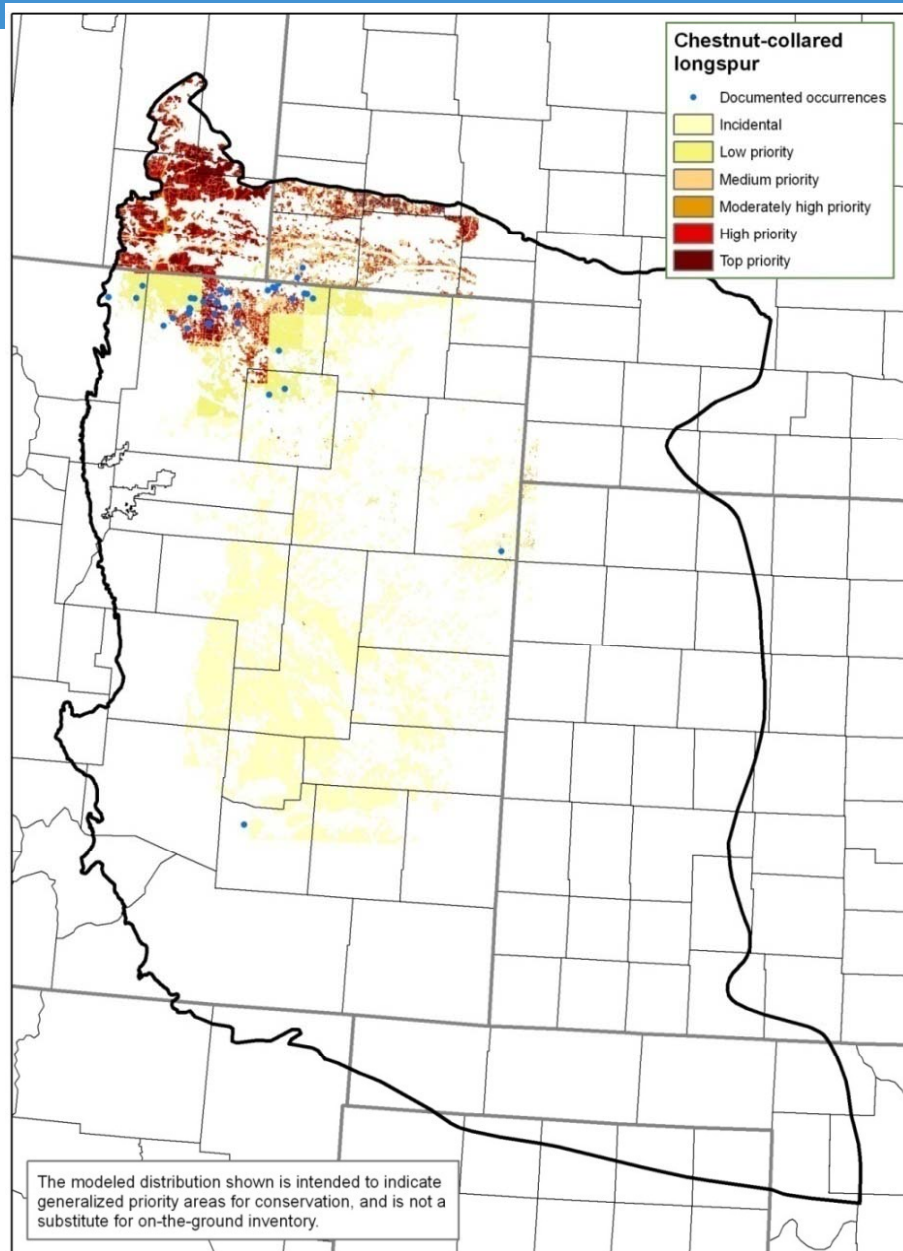
Scorecard 2. Priority Habitat Protection vs. Goal (feeds into Summary Scorecard for Animals)

- This graph summarizes the top 3 habitat classes on Scorecard 1, at left, and shows what proportion is under some level of protection, against the conservation goal of 8%.



Note: Protected = GAP+ classes 1, 2a, 2b; semi-protected = GAP+ classes 3a, 3b, 4a, 4b; no protection = all remaining GAP+ classes. Protected and Semi-protected are shown as a single class in all graphs because the proportion of protected acreages is less than 1% for all SARs, and can not be adequately displayed. Acreages displayed on graph labels are rounded to the nearest 1,000. In this analysis the concept of protection is based solely on legal tenure, and does not consider habitat quality or management intent.

CSP Priority Habitats: Chestnut-Collared Longspur



Interpretation: Six habitat classes are shown on the map. The darker colors (orange to brown) represent the optimal habitats with low or no impacts while the lighter colors (yellows) show the less optimal, more impacted habitats. Documented occurrences are shown in blue where data is available (lack of documentation may mean the site has not yet been field-assessed).



Chestnut-collared longspur

Species at Risk Group: Shortgrass community

Data Sources and Notes

Priority habitat map data sources:
USGS (2004), CNHP & TNC (2008b, 2008c)

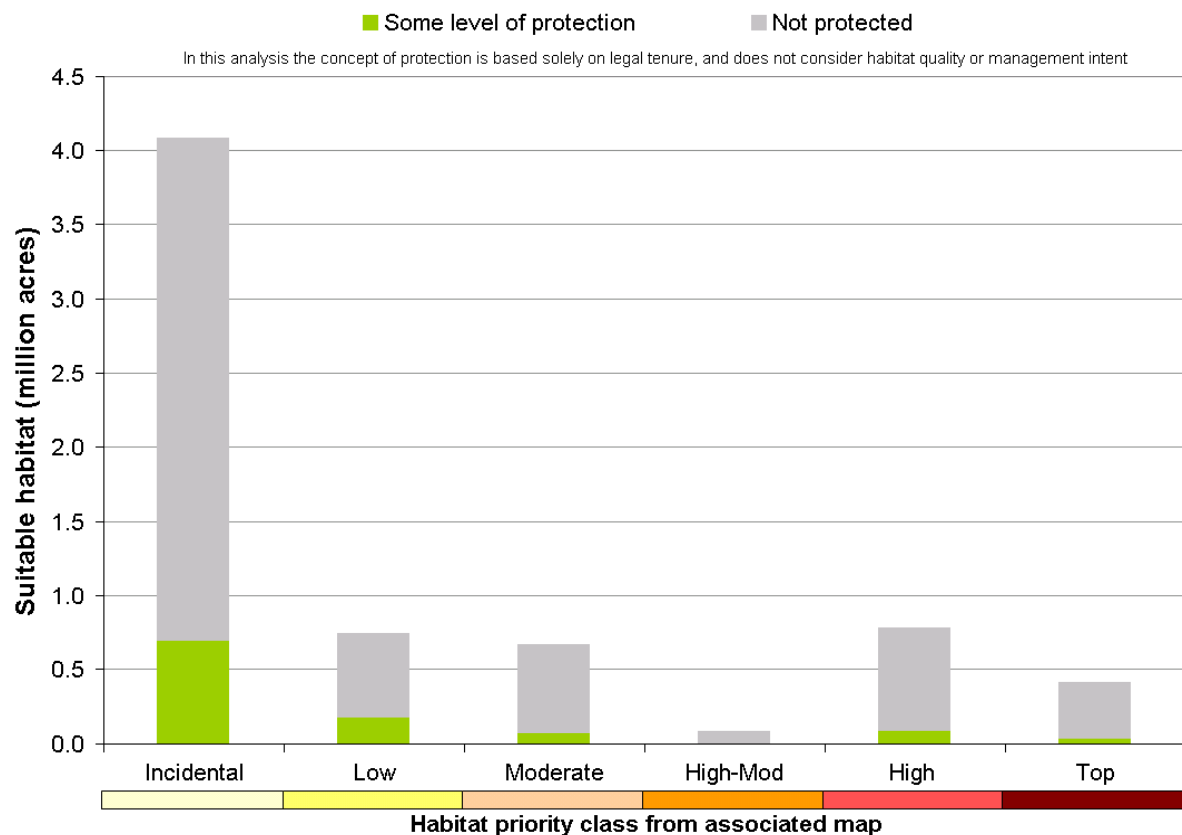
Point data sources:
RMBO (2005) and CNHP (2008)

CSP Scorecard: Chestnut-Collared Longspur

Scorecard 1. Habitat Summary (feeds into Scorecard #2)

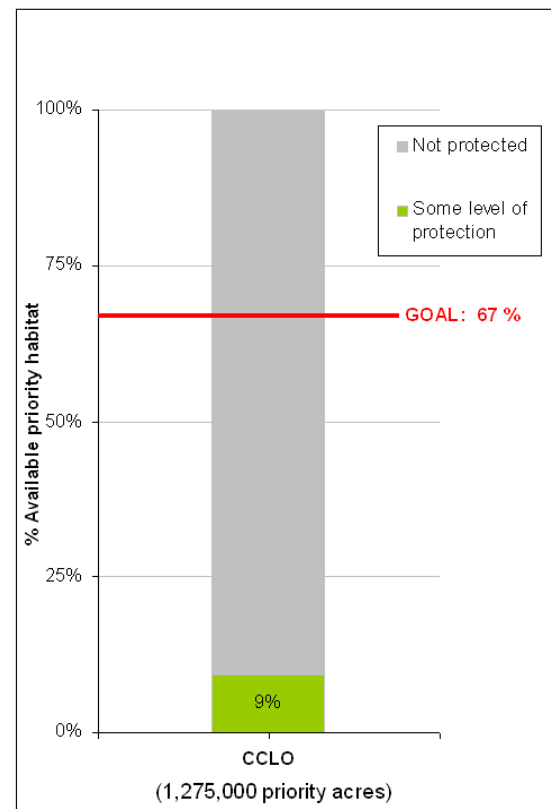
- This graph summarizes the amount of available potential suitable habitat by class (represented by bar heights) and the proportion of each class that is under some level of protection.

Chestnut-collared longspur (6,769,000 acres)



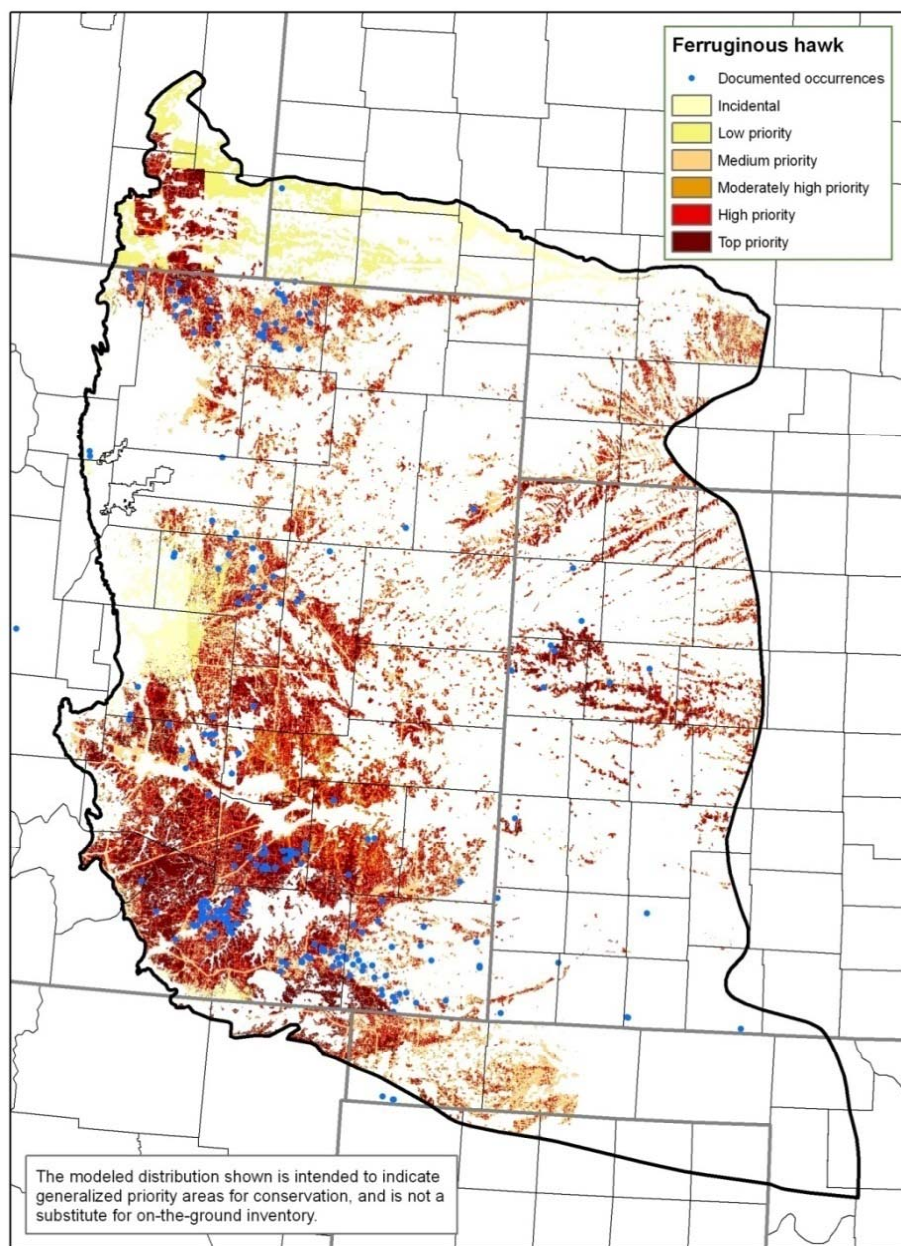
Scorecard 2. Priority Habitat Protection vs. Goal (feeds into Summary Scorecard for Animals)

- This graph summarizes the top 3 habitat classes on Scorecard 1, at left, and shows what proportion is under some level of protection, against the conservation goal of 67%.



Note: Protected = GAP+ classes 1, 2a, 2b; semi-protected = GAP+ classes 3a, 3b, 4a, 4b; no protection = all remaining GAP+ classes. Protected and Semi-protected are shown as a single class in all graphs because the proportion of protected acreages is less than 1% for all SARs, and can not be adequately displayed. Acreages displayed on graph labels are rounded to the nearest 1,000. In this analysis the concept of protection is based solely on legal tenure, and does not consider habitat quality or management intent.

CSP Priority Habitats: Ferruginous Hawk



Interpretation: Six habitat classes are shown on the map. The darker colors (orange to brown) represent the optimal habitats with low or no impacts while the lighter colors (yellows) show the less optimal, more impacted habitats. Documented occurrences are shown in blue where data is available (lack of documentation may mean the site has not yet been field-assessed).



Ferruginous hawk

Species at Risk Group: Shortgrass community

Data Sources and Notes

Priority habitat map data sources:
USGS (2004), CNHP & TNC (2008b, 2008c)

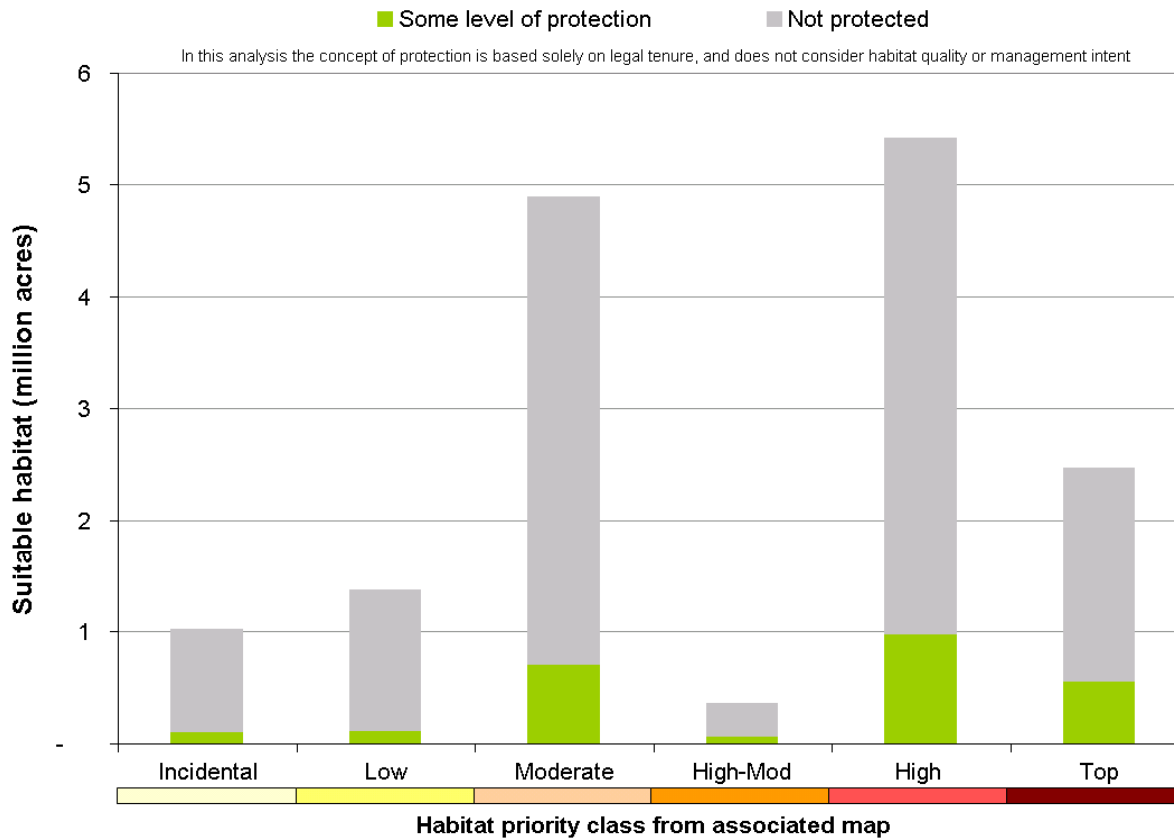
Point data sources:
RMBO (2005) and CNHP (2008)

CSP Scorecard: Ferruginous Hawk

Scorecard 1. Habitat Summary (feeds into Scorecard #2)

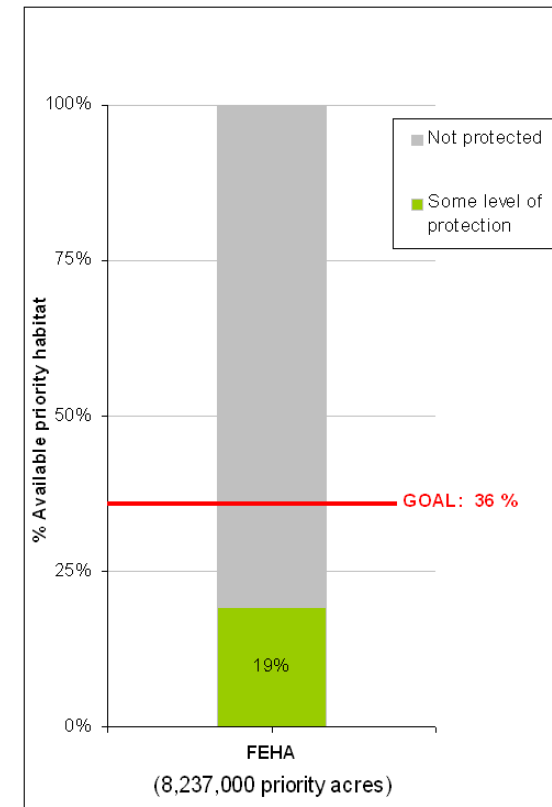
- This graph summarizes the amount of available potential suitable habitat by class (represented by bar heights) and the proportion of each class that is under some level of protection.

Ferruginous hawk (15,510,000 acres)



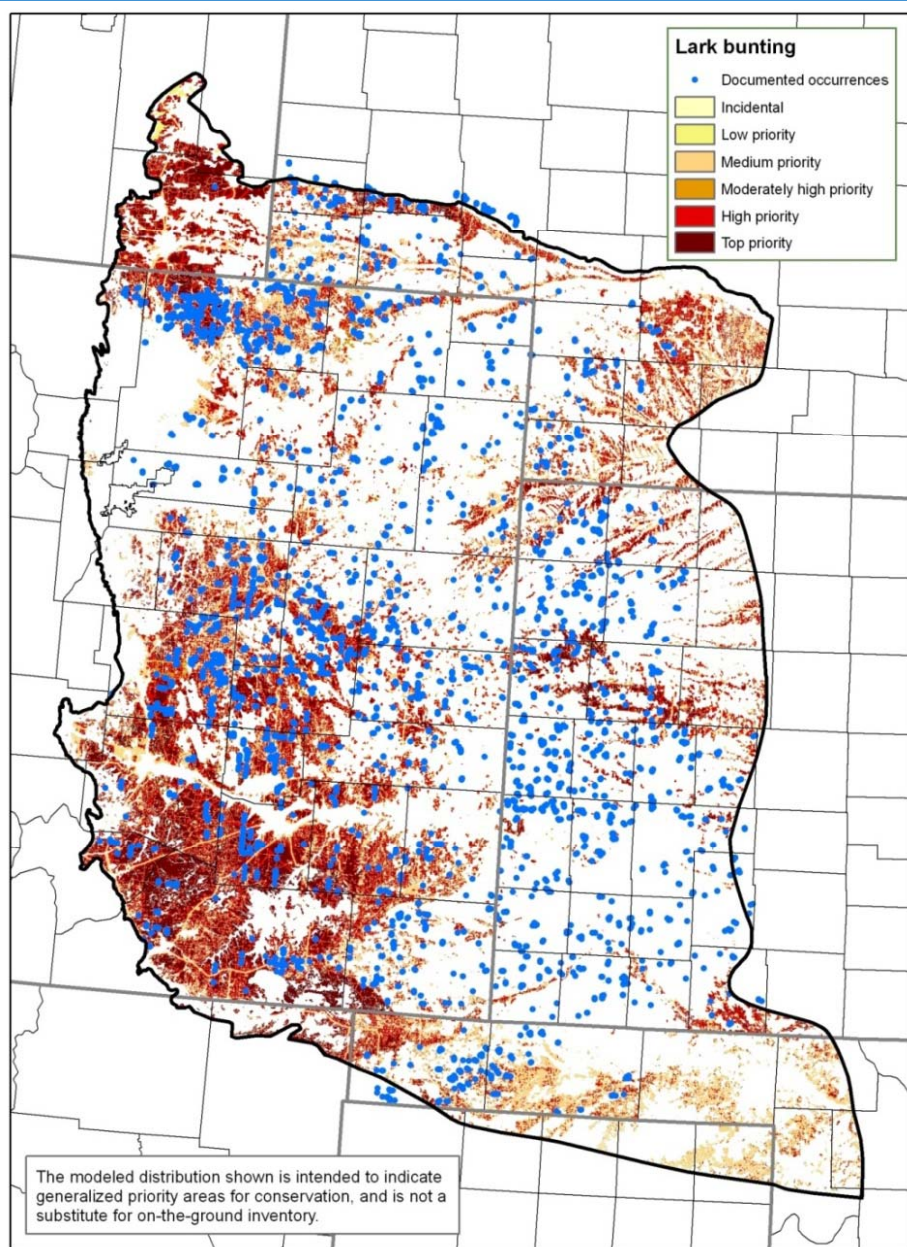
Scorecard 2. Priority Habitat Protection vs. Goal (feeds into Summary Scorecard for Animals)

- This graph summarizes the top 3 habitat classes on Scorecard 1, at left, and shows what proportion is under some level of protection, against the conservation goal of 36%.



Note: Protected = GAP+ classes 1, 2a, 2b; semi-protected = GAP+ classes 3a, 3b, 4a, 4b; no protection = all remaining GAP+ classes. Protected and Semi-protected are shown as a single class in all graphs because the proportion of protected acreages is less than 1% for all SARs, and can not be adequately displayed. Acreages displayed on graph labels are rounded to the nearest 1,000. In this analysis the concept of protection is based solely on legal tenure, and does not consider habitat quality or management intent.

CSP Priority Habitats: Lark Bunting



Interpretation: Six habitat classes are shown on the map. The darker colors (orange to brown) represent the optimal habitats with low or no impacts while the lighter colors (yellows) show the less optimal, more impacted habitats. Documented occurrences are shown in blue where data is available (lack of documentation may mean the site has not yet been field-assessed).



Lark bunting

Species at Risk Group: Shortgrass community

Data Sources and Notes

Priority habitat map data sources:
USGS (2004), CNHP & TNC (2008b, 2008c)

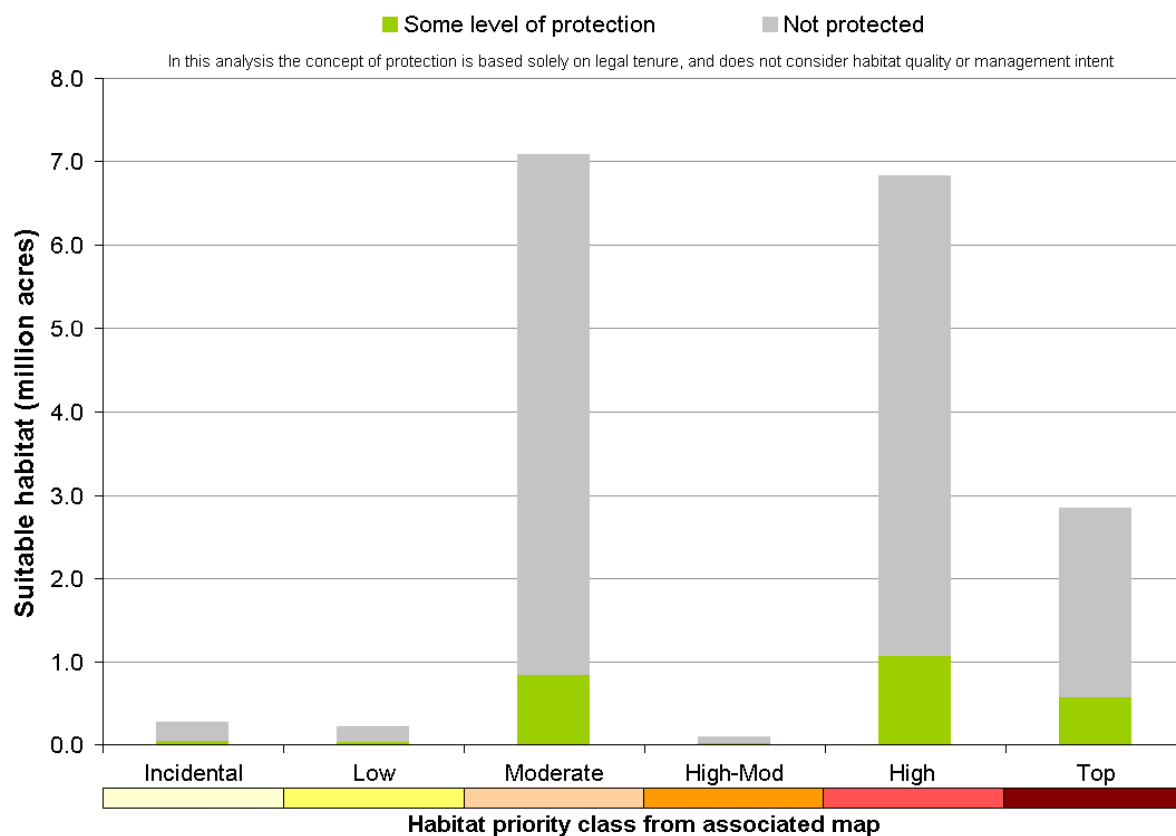
Point data sources:
RMBO (2005)

CSP Scorecard: Lark Bunting

Scorecard 1. Habitat Summary (feeds into Scorecard #2)

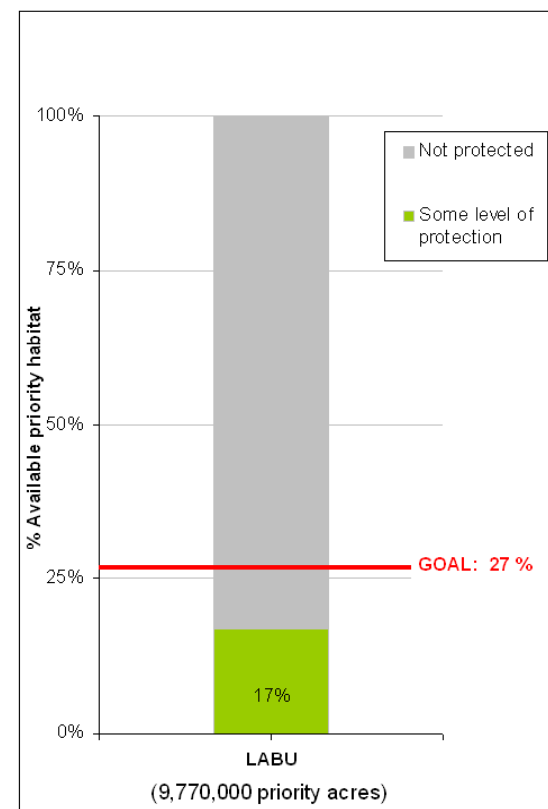
- This graph summarizes the amount of available potential suitable habitat by class (represented by bar heights) and the proportion of each class that is under some level of protection.

Lark bunting (17,361,000 acres)



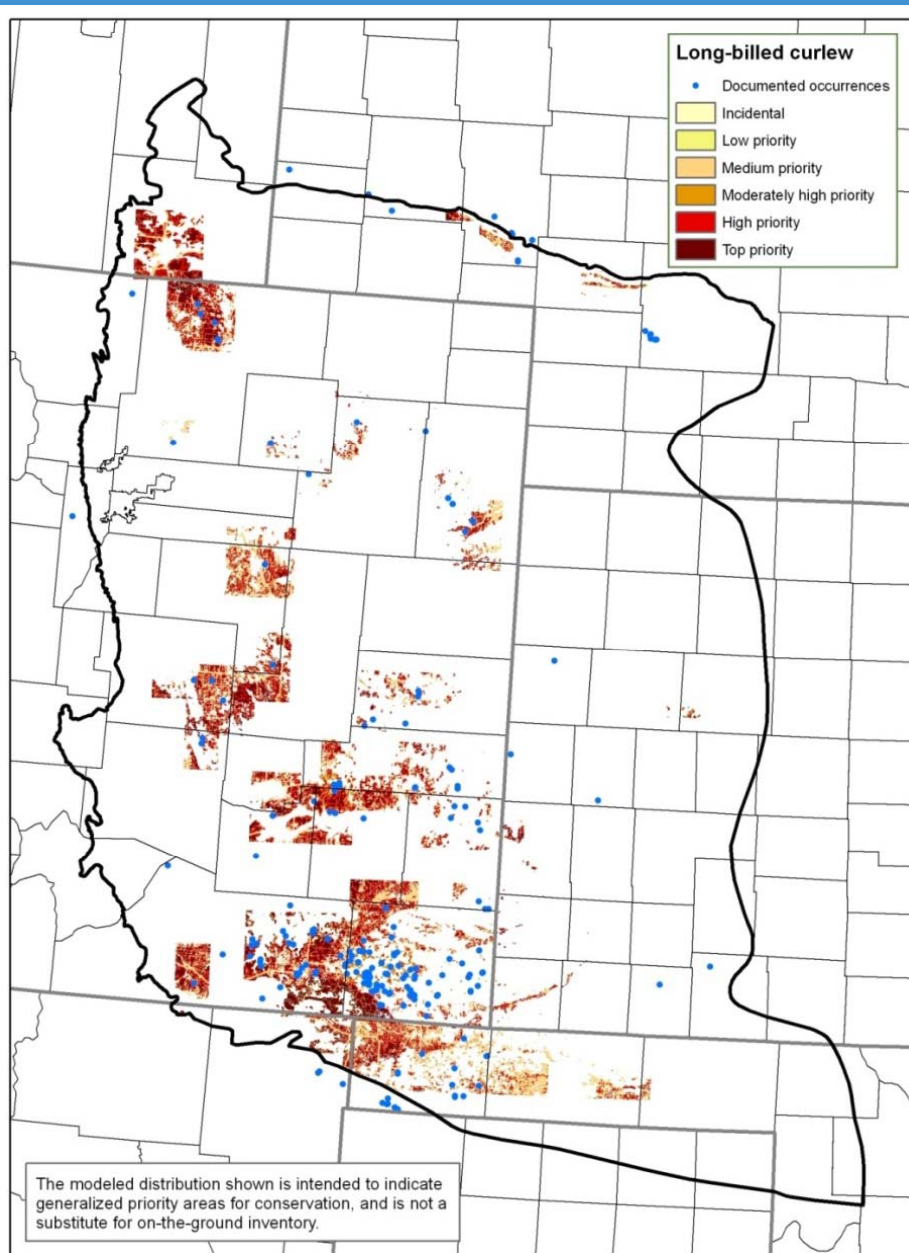
Scorecard 2. Priority Habitat Protection vs. Goal (feeds into Summary Scorecard for Animals)

- This graph summarizes the top 3 habitat classes on Scorecard 1, at left, and shows what proportion is under some level of protection, against the conservation goal of 27%.



Note: Protected = GAP+ classes 1, 2a, 2b; semi-protected = GAP+ classes 3a, 3b, 4a, 4b; no protection = all remaining GAP+ classes. Protected and Semi-protected are shown as a single class in all graphs because the proportion of protected acreages is less than 1% for all SARs, and can not be adequately displayed. Acreages displayed on graph labels are rounded to the nearest 1,000. In this analysis the concept of protection is based solely on legal tenure, and does not consider habitat quality or management intent.

CSP Priority Habitats: Long Billed Curlew



Interpretation: Six habitat classes are shown on the map. The darker colors (orange to brown) represent the optimal habitats with low or no impacts while the lighter colors (yellows) show the less optimal, more impacted habitats. Documented occurrences are shown in blue where data is available (lack of documentation may mean the site has not yet been field-assessed).



Long-billed curlew

Species at Risk Group: Shortgrass community

Data Sources and Notes

Priority habitat map data sources:
USGS (2004), CNHP & TNC (2008b, 2008c)

Point data sources:
RMBO (2005) and CNHP (2008)

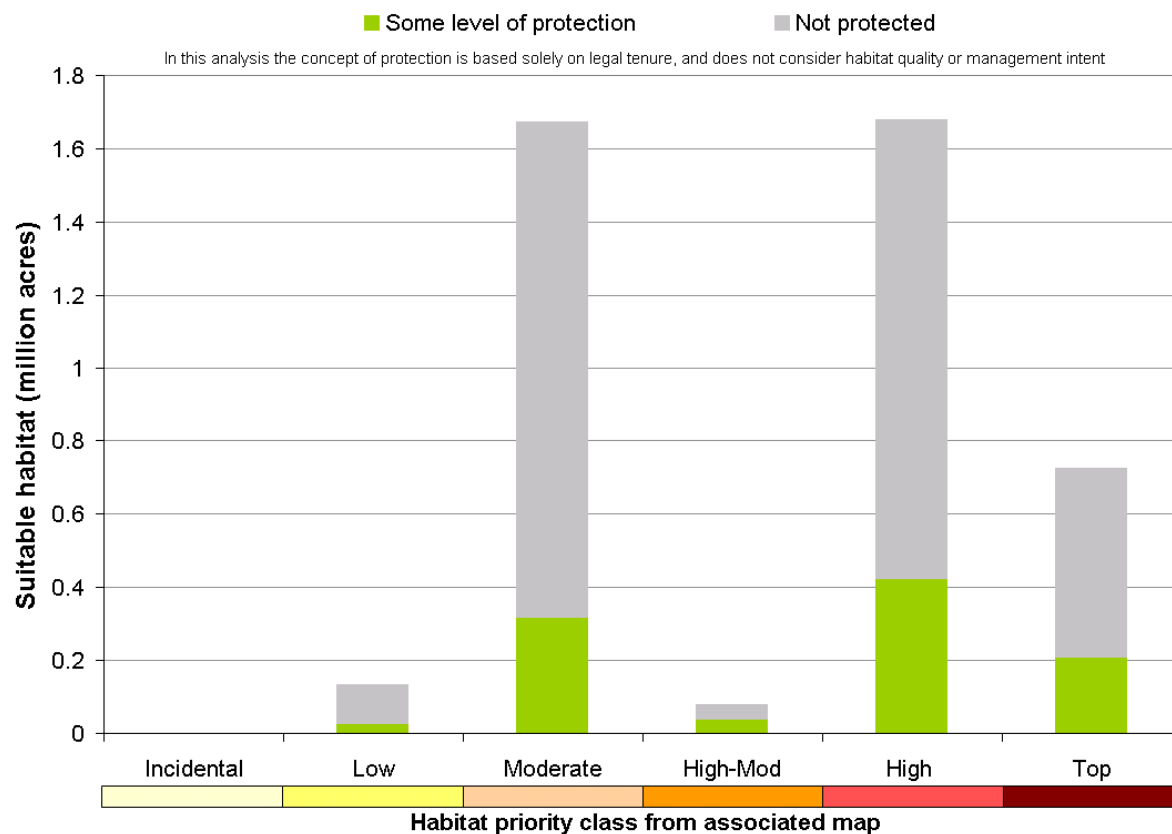
Note: Large rectangles are an artifact of the Breeding Bird Survey data grid.

CSP Scorecard: Long-Billed Curlew

Scorecard 1. Habitat Summary (feeds into Scorecard #2)

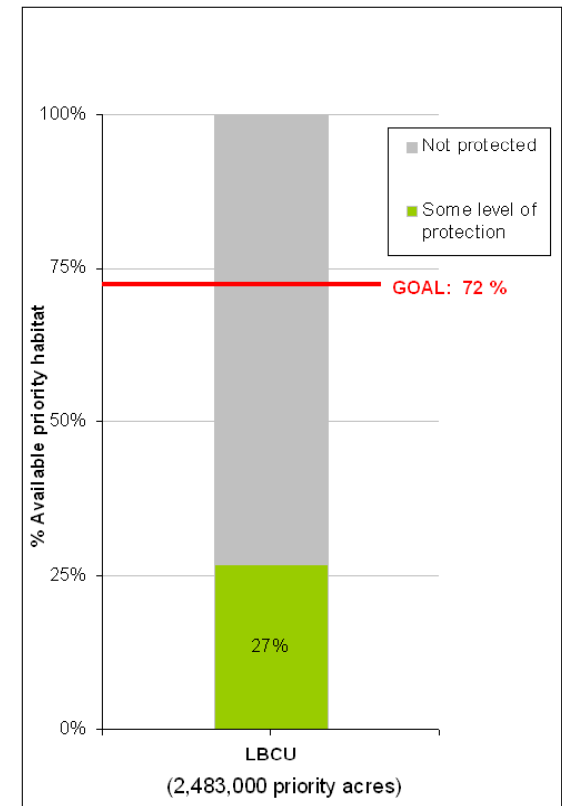
- This graph summarizes the amount of available potential suitable habitat by class (represented by bar heights) and the proportion of each class that is under some level of protection.

Long-billed curlew (4,290,000 acres)



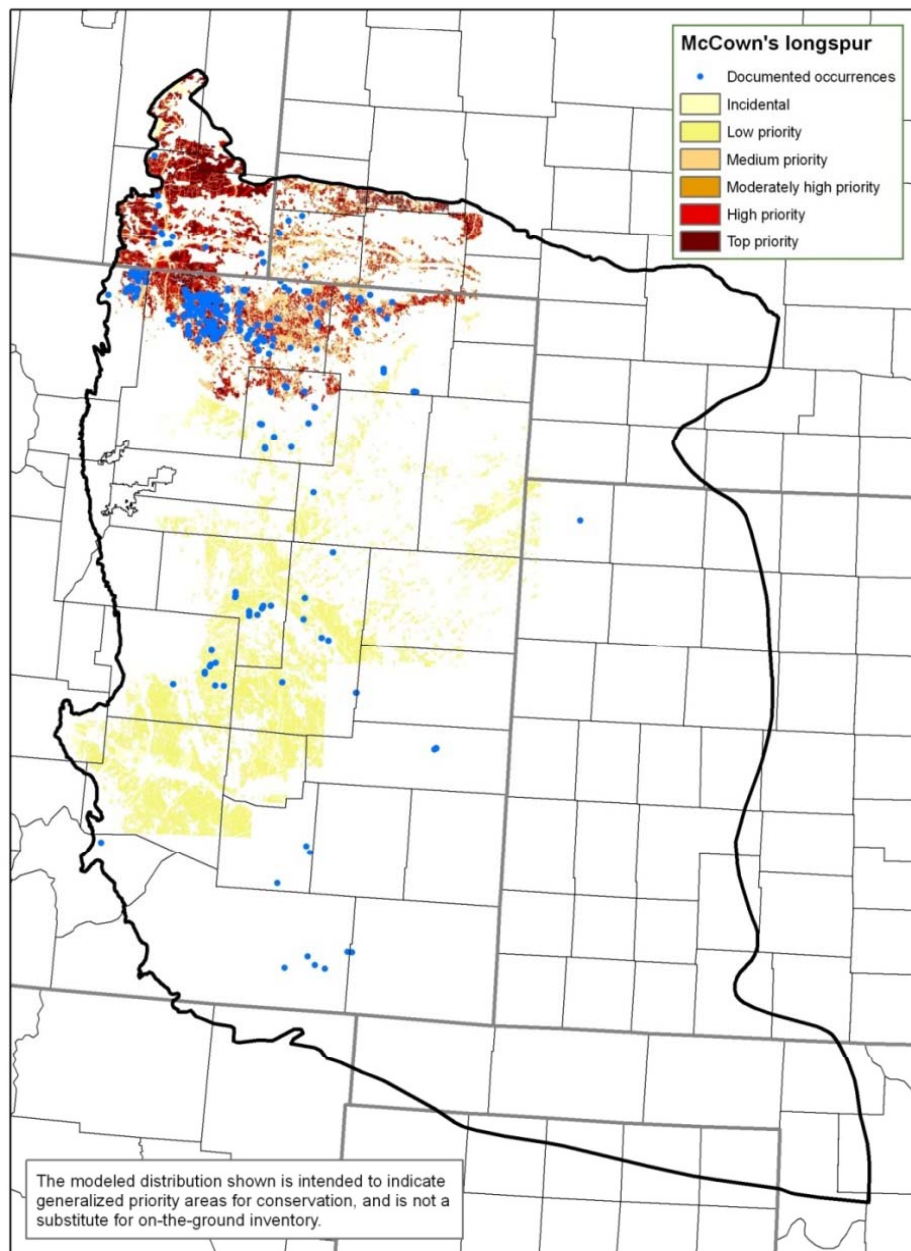
Scorecard 2. Priority Habitat Protection vs. Goal (feeds into Summary Scorecard for Animals)

- This graph summarizes the top 3 habitat classes on Scorecard 1, at left, and shows what proportion is under some level of protection, against the conservation goal of 72%.



Note: Protected = GAP+ classes 1, 2a, 2b; semi-protected = GAP+ classes 3a, 3b, 4a, 4b; no protection = all remaining GAP+ classes. Protected and Semi-protected are shown as a single class in all graphs because the proportion of protected acreages is less than 1% for all SARs, and can not be adequately displayed. Acreages displayed on graph labels are rounded to the nearest 1,000. In this analysis the concept of protection is based solely on legal tenure, and does not consider habitat quality or management intent.

CSP Priority Habitats: McCown's Longspur



Interpretation: Six habitat classes are shown on the map. The darker colors (orange to brown) represent the optimal habitats with low or no impacts while the lighter colors (yellows) show the less optimal, more impacted habitats. Documented occurrences are shown in blue where data is available (lack of documentation may mean the site has not yet been field-assessed).



McCown's longspur

Species at Risk Group: Shortgrass community

Data Sources and Notes

Priority habitat map data sources:
USGS (2004), CNHP & TNC (2008b, 2008c)

Point data sources: RMBO (2005) and CNHP (2008)

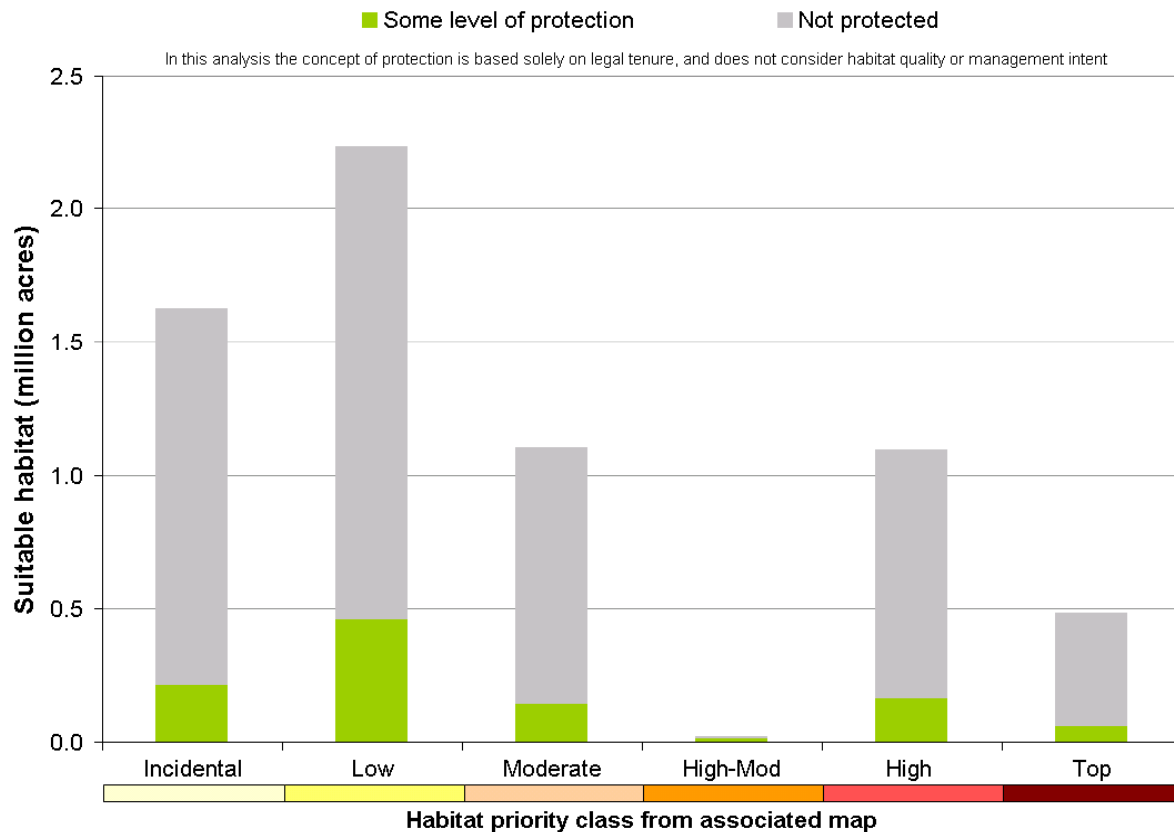
Note: Areas south of the South Platte River were reclassified as incidental (if previously 1-4) or as low priority (if previously 5-6) to better reflect the documented range of the species.

CSP Scorecard: McCown's Longspur

Scorecard 1. Habitat Summary (feeds into Scorecard #2)

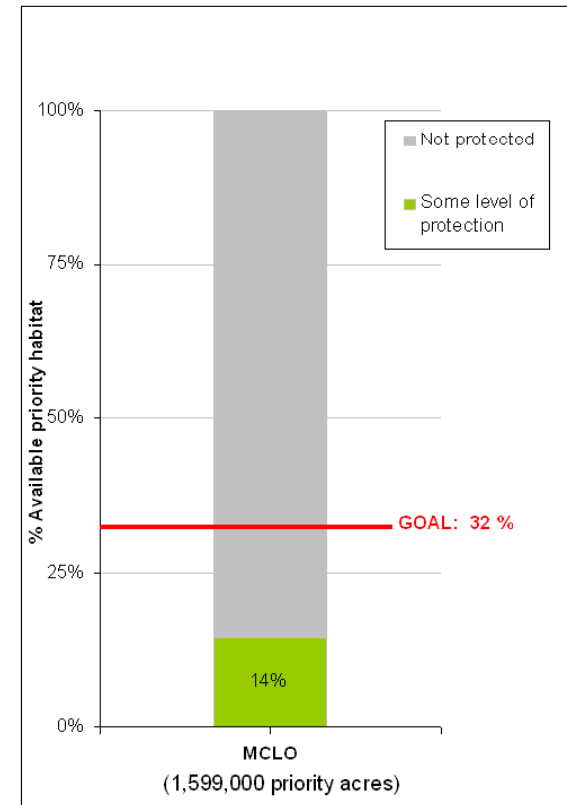
- This graph summarizes the amount of available potential suitable habitat by class (represented by bar heights) and the proportion of each class that is under some level of protection.

McCown's longspur (6,558,000 acres)



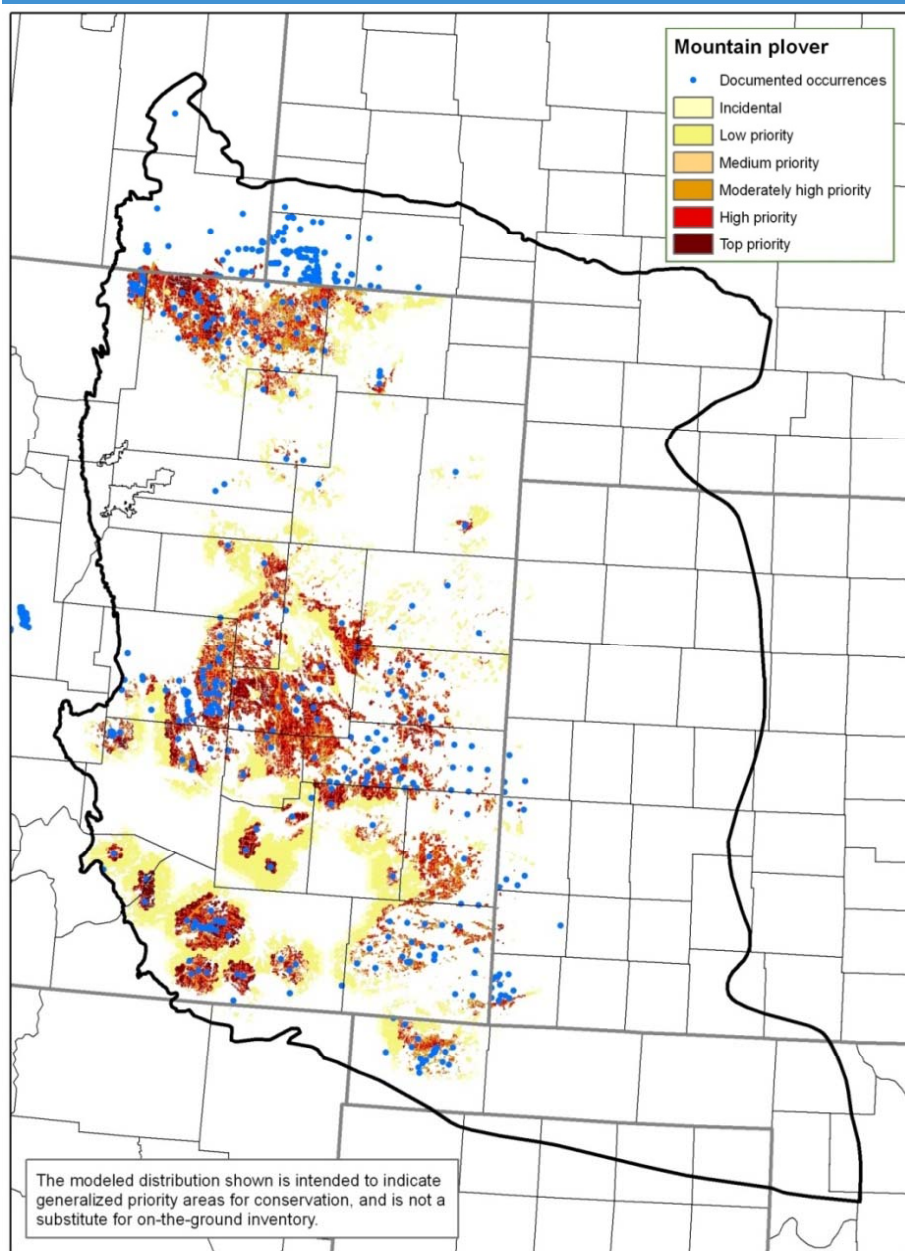
Scorecard 2. Priority Habitat Protection vs. Goal (feeds into Summary Scorecard for Animals)

- This graph summarizes the top 3 habitat classes on Scorecard 1, at left, and shows what proportion is under some level of protection, against the conservation goal of 32%.



Note: Protected = GAP+ classes 1, 2a, 2b; semi-protected = GAP+ classes 3a, 3b, 4a, 4b; no protection = all remaining GAP+ classes. Protected and Semi-protected are shown as a single class in all graphs because the proportion of protected acreages is less than 1% for all SARs, and can not be adequately displayed. Acreages displayed on graph labels are rounded to the nearest 1,000. In this analysis the concept of protection is based solely on legal tenure, and does not consider habitat quality or management intent.

CSP Priority Habitats: Mountain Plover



Interpretation: Six habitat classes are shown on the map. The darker colors (orange to brown) represent the optimal habitats with low or no impacts while the lighter colors (yellows) show the less optimal, more impacted habitats. Documented occurrences are shown in blue where data is available (lack of documentation may mean the site has not yet been field-assessed).



Mountain plover
Species at Risk Group: Shortgrass community

Data Sources and Notes

Priority habitat map data sources:
 CSP ecoregional plan (Neely et al., 2006), CNHP & TNC (2008b, 2008c)

Point data sources:
 CSP ecoregional plan (Neely et al. 2006) and CNHP (2008)

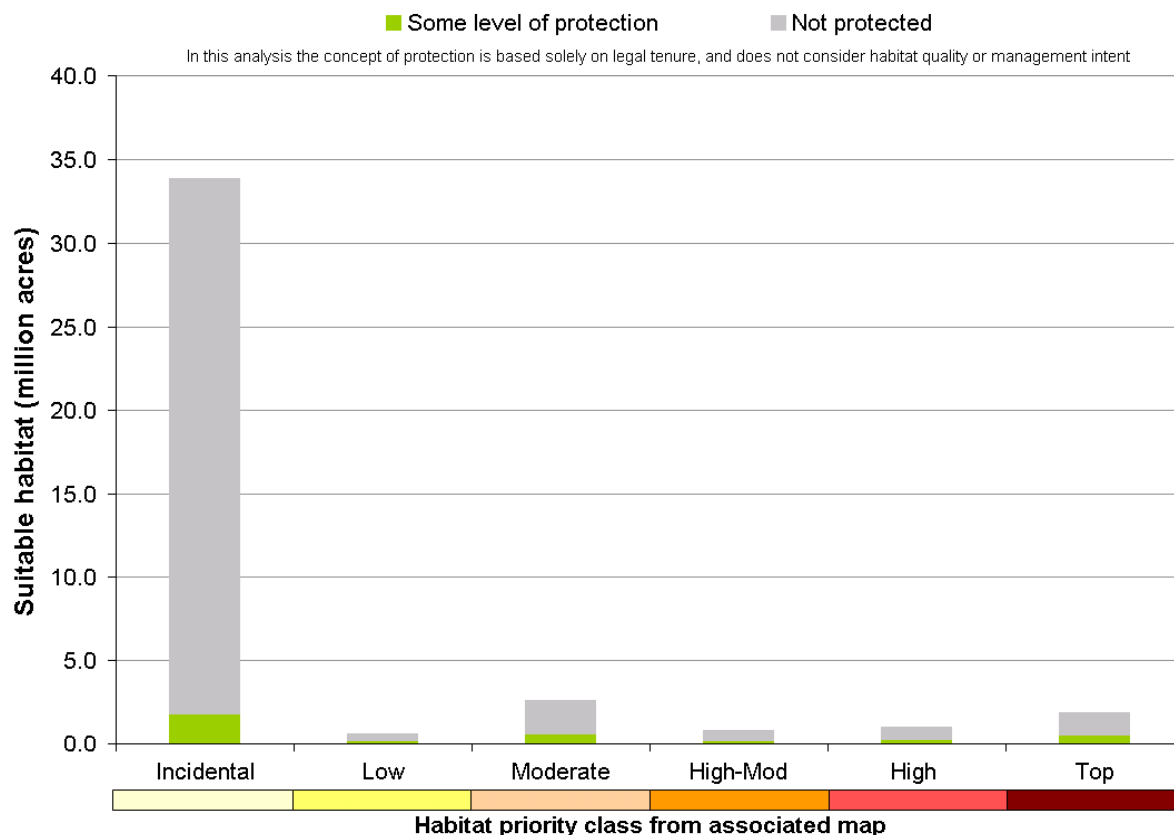
Note: Original CSP data is a kernel density analysis – vegetation type was not explicitly modeled. To better match expert opinion, abundance layer was given higher weight in calculating presumed viable populations. WY and NE habitat does not appear in final model because of impacts from cultivate land (birds are there, but this isn't where we want to concentrate efforts).

CSP Scorecard: Mountain Plover

Scorecard 1. Habitat Summary (feeds into Scorecard #2)

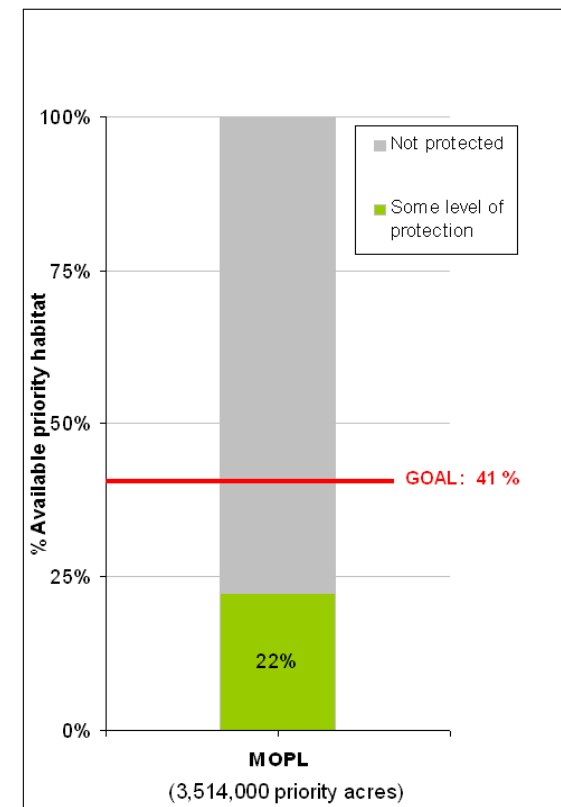
- This graph summarizes the amount of available potential suitable habitat by class (represented by bar heights) and the proportion of each class that is under some level of protection.

Mountain plover (7,511,000 acres)



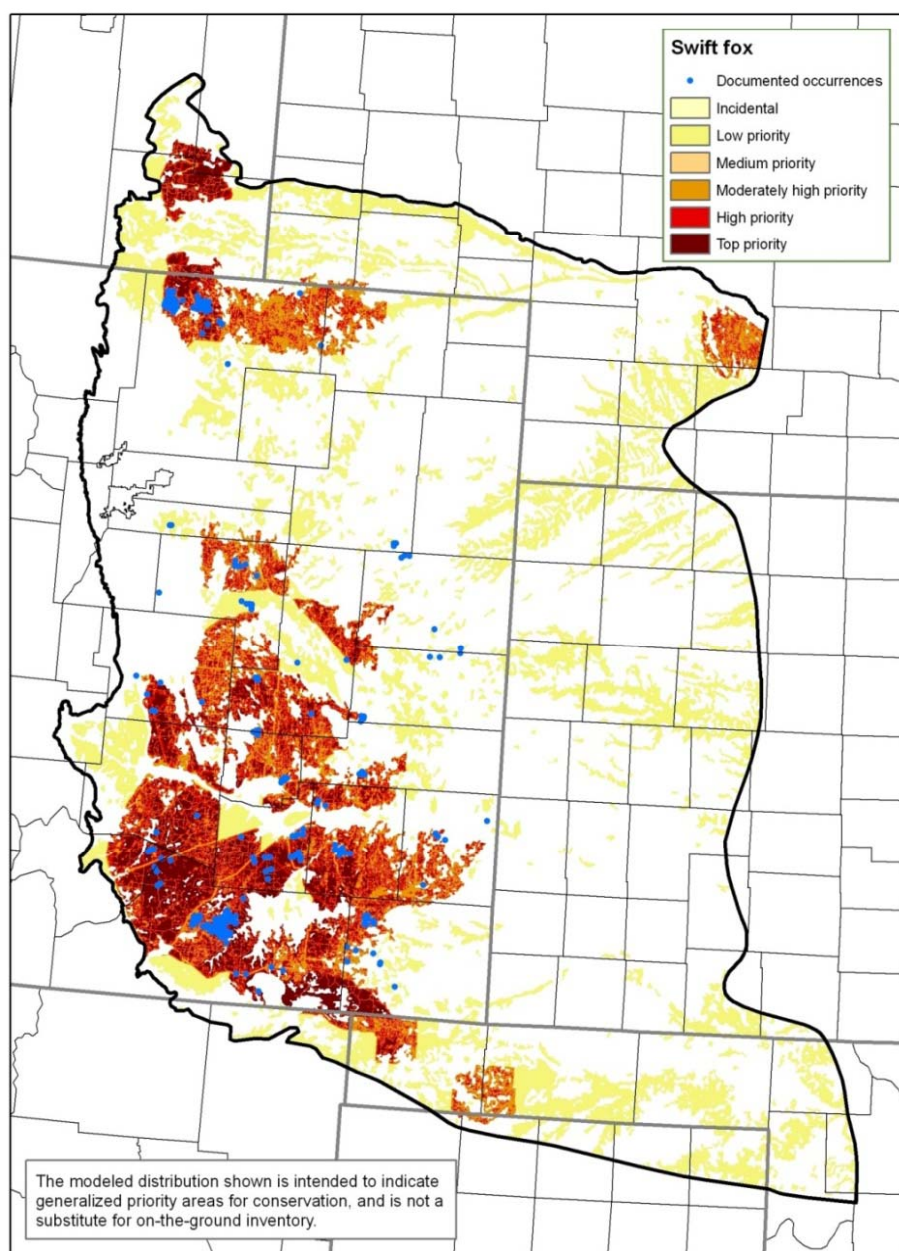
Scorecard 2. Priority Habitat Protection vs. Goal (feeds into Summary Scorecard for Animals)

- This graph summarizes the top 3 habitat classes on Scorecard 1, at left, and shows what proportion is under some level of protection, against the conservation goal of 41%.



Note: Protected = GAP+ classes 1, 2a, 2b; semi-protected = GAP+ classes 3a, 3b, 4a, 4b; no protection = all remaining GAP+ classes. Protected and Semi-protected are shown as a single class in all graphs because the proportion of protected acreages is less than 1% for all SARs, and can not be adequately displayed. Acreages displayed on graph labels are rounded to the nearest 1,000. In this analysis the concept of protection is based solely on legal tenure, and does not consider habitat quality or management intent.

CSP Priority Habitats: Swift Fox



Interpretation: Six habitat classes are shown on the map. The darker colors (orange to brown) represent the optimal habitats with low or no impacts while the lighter colors (yellows) show the less optimal, more impacted habitats. Documented occurrences are shown in blue where data is available (lack of documentation may mean the site has not yet been field-assessed).



Swift fox

Species at Risk Group: Shortgrass community

Data Sources and Notes

Priority habitat map data sources:
CDOW (2006), CNHP & TNC (2008b, 2008c)

Point data source:
CNHP (2008)

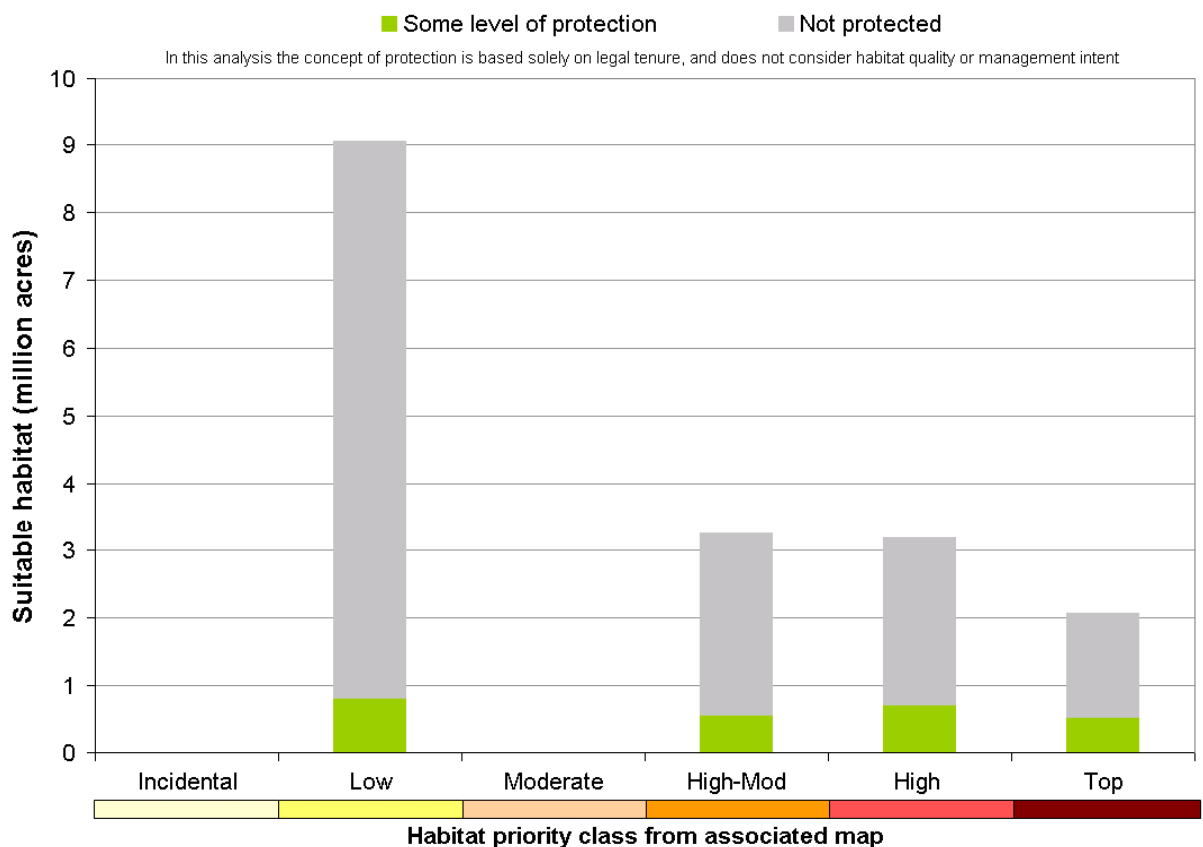
Note: No point data available for other states.

CSP Scorecard: Swift Fox

Scorecard 1. Habitat Summary (feeds into Scorecard #2)

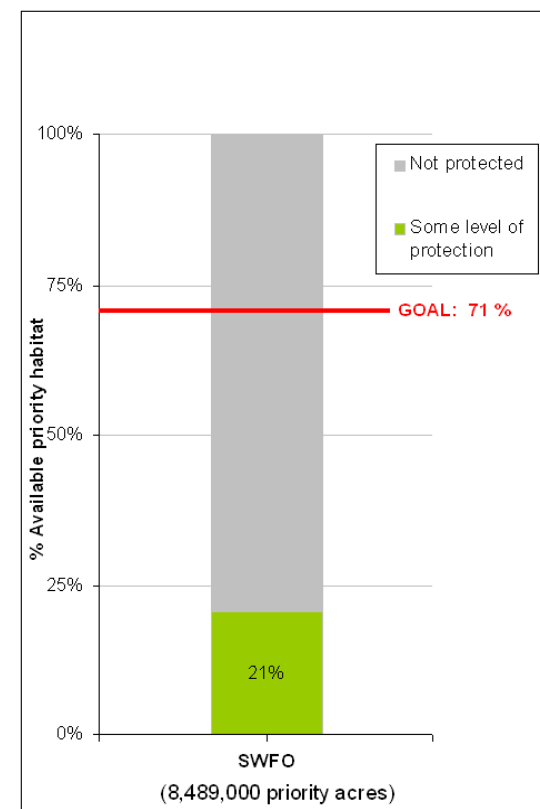
- This graph summarizes the amount of available potential suitable habitat by class (represented by bar heights) and the proportion of each class that is under some level of protection.

Swift fox (17,537,000 acres)



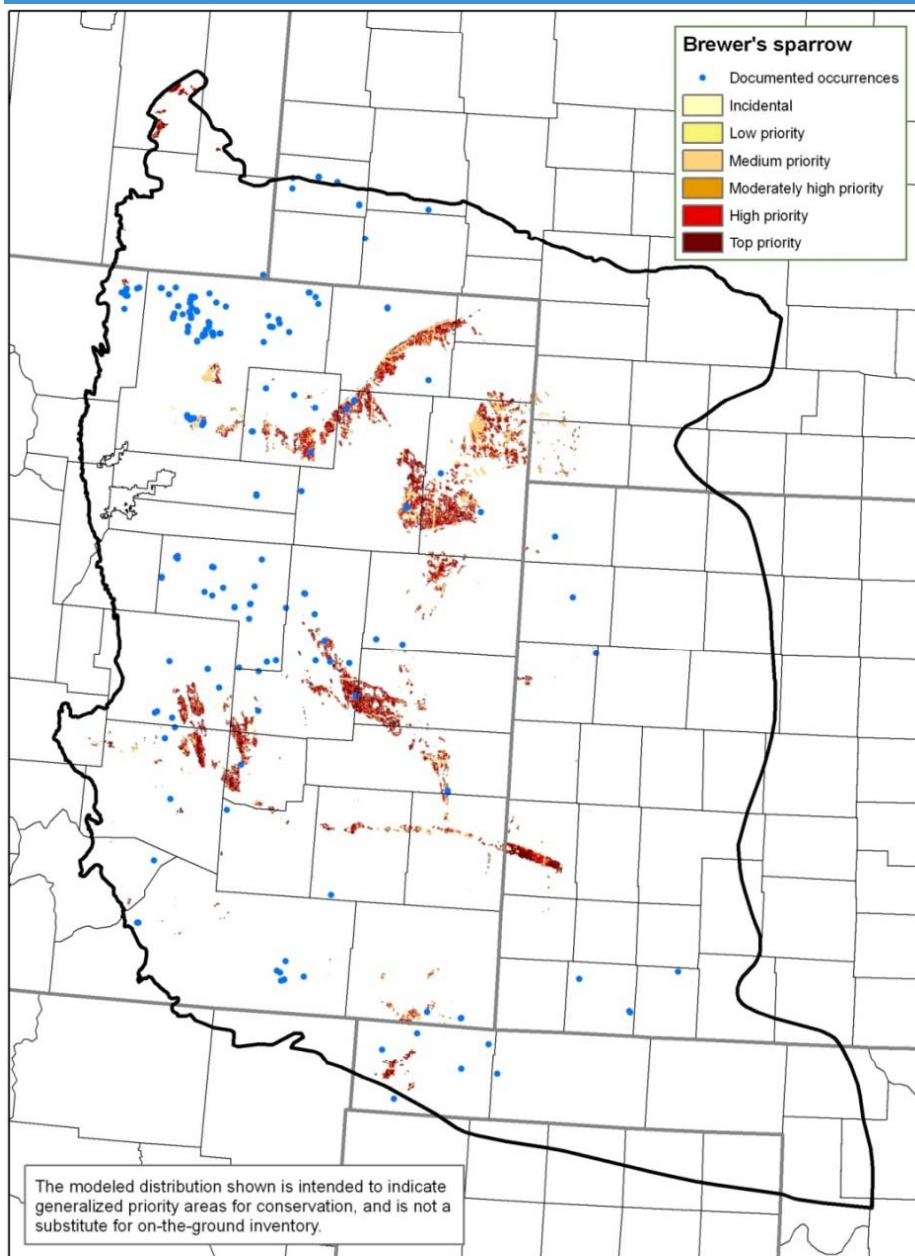
Scorecard 2. Priority Habitat Protection vs. Goal (feeds into Summary Scorecard for Animals)

- This graph summarizes the top 3 habitat classes on Scorecard 1, at left, and shows what proportion is under some level of protection, against the conservation goal of 71%.



Note: Protected = GAP+ classes 1, 2a, 2b; semi-protected = GAP+ classes 3a, 3b, 4a, 4b; no protection = all remaining GAP+ classes. Protected and Semi-protected are shown as a single class in all graphs because the proportion of protected acreages is less than 1% for all SARs, and can not be adequately displayed. Acreages displayed on graph labels are rounded to the nearest 1,000. In this analysis the concept of protection is based solely on legal tenure, and does not consider habitat quality or management intent.

CSP Priority Habitats: Brewer's Sparrow



Interpretation: Six habitat classes are shown on the map. The darker colors (orange to brown) represent the optimal habitats with low or no impacts while the lighter colors (yellows) show the less optimal, more impacted habitats. Documented occurrences are shown in blue where data is available (lack of documentation may mean the site has not yet been field-assessed).



Brewer's sparrow

Species at Risk Group: Shrubland / Mixed grass community

Data Sources and Notes

Priority habitat map data source:
USGS (2004), CNHP & TNC (2008b, 2008c)

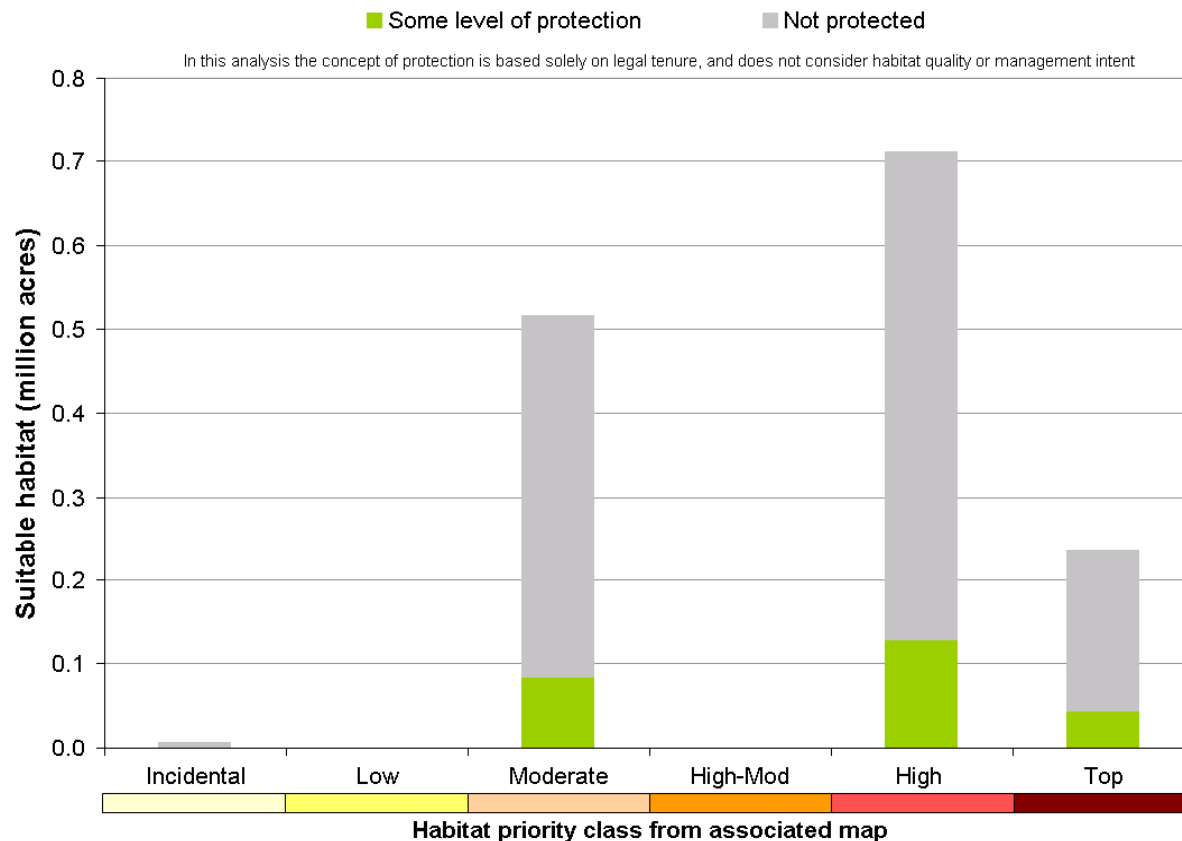
Point data sources:
RMBO (2005)

CSP Scorecard: Brewer's Sparrow

Scorecard 1. Habitat Summary (feeds into Scorecard #2)

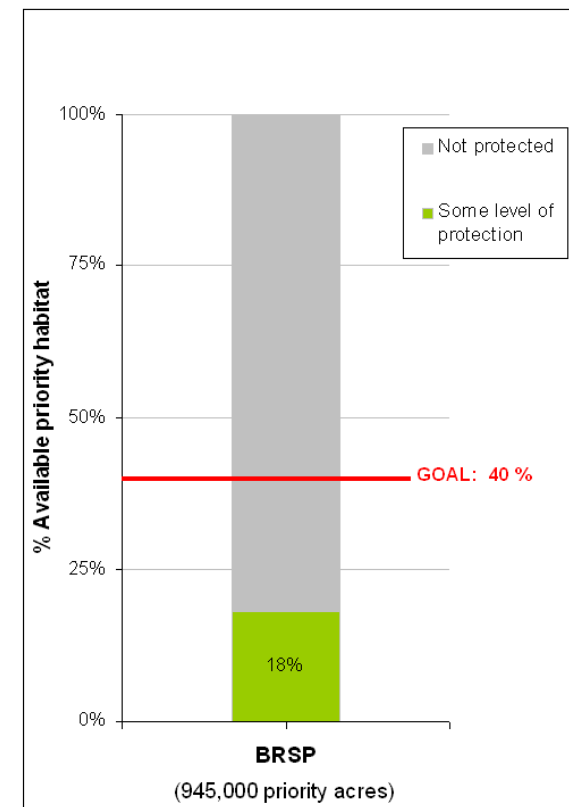
- This graph summarizes the amount of available potential suitable habitat by class (represented by bar heights) and the proportion of each class that is under some level of protection.

Brewer's sparrow (1,468,000 acres)



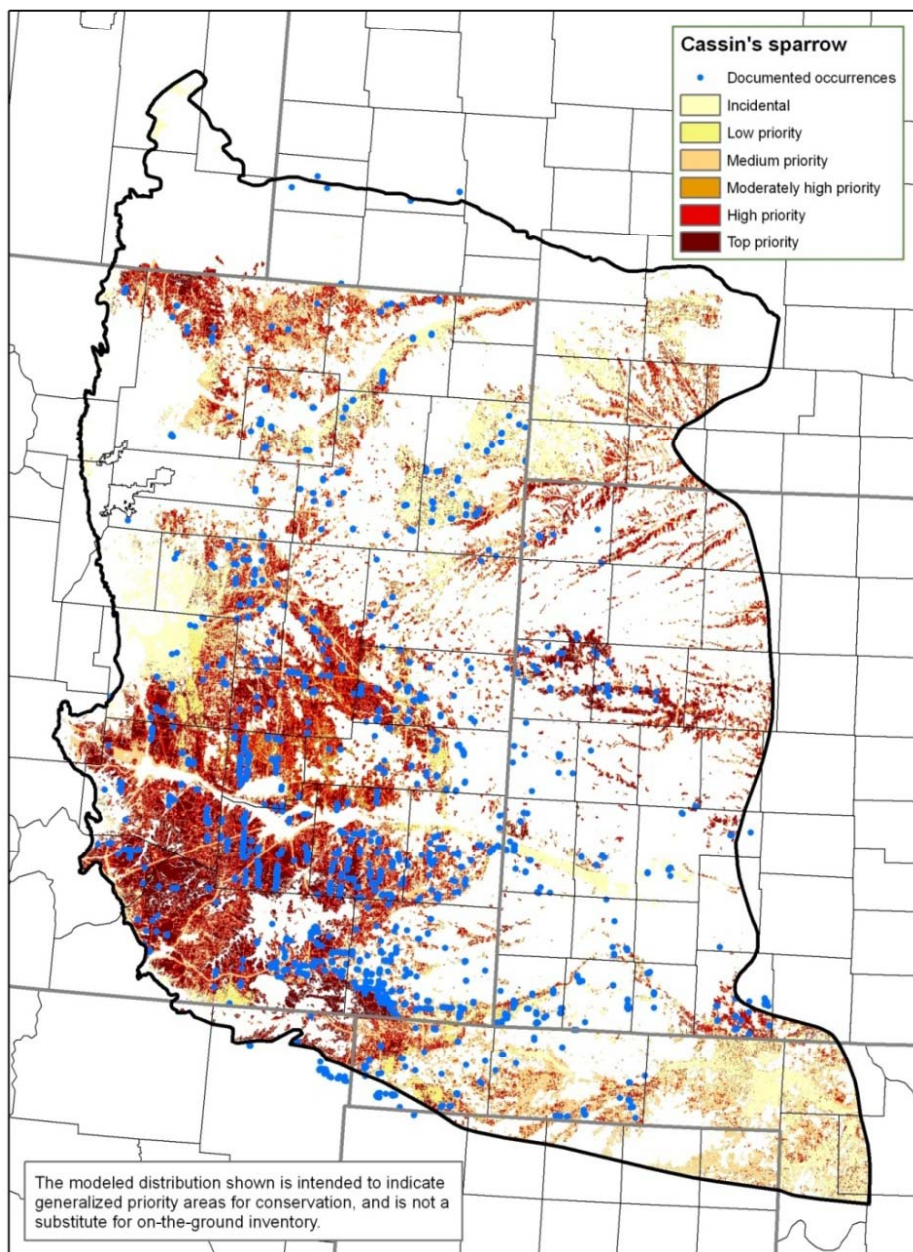
Scorecard 2. Priority Habitat Protection vs. Goal (feeds into Summary Scorecard for Animals)

- This graph summarizes the top 3 habitat classes on Scorecard 1, at left, and shows what proportion is under some level of protection, against the conservation goal of 40%.



Note: Protected = GAP+ classes 1, 2a, 2b; semi-protected = GAP+ classes 3a, 3b, 4a, 4b; no protection = all remaining GAP+ classes. Protected and Semi-protected are shown as a single class in all graphs because the proportion of protected acreages is less than 1% for all SARs, and can not be adequately displayed. Acreages displayed on graph labels are rounded to the nearest 1,000. In this analysis the concept of protection is based solely on legal tenure, and does not consider habitat quality or management intent.

CSP Priority Habitats: Cassin's Sparrow



Interpretation: Six habitat classes are shown on the map. The darker colors (orange to brown) represent the optimal habitats with low or no impacts while the lighter colors (yellows) show the less optimal, more impacted habitats. Documented occurrences are shown in blue where data is available (lack of documentation may mean the site has not yet been field-assessed).



Cassin's sparrow

Species at Risk Group: Shrubland / Mixed grass community

Data Sources and Notes

Priority habitat map data source:
USGS (2004), CNHP & TNC (2008b, 2008c)

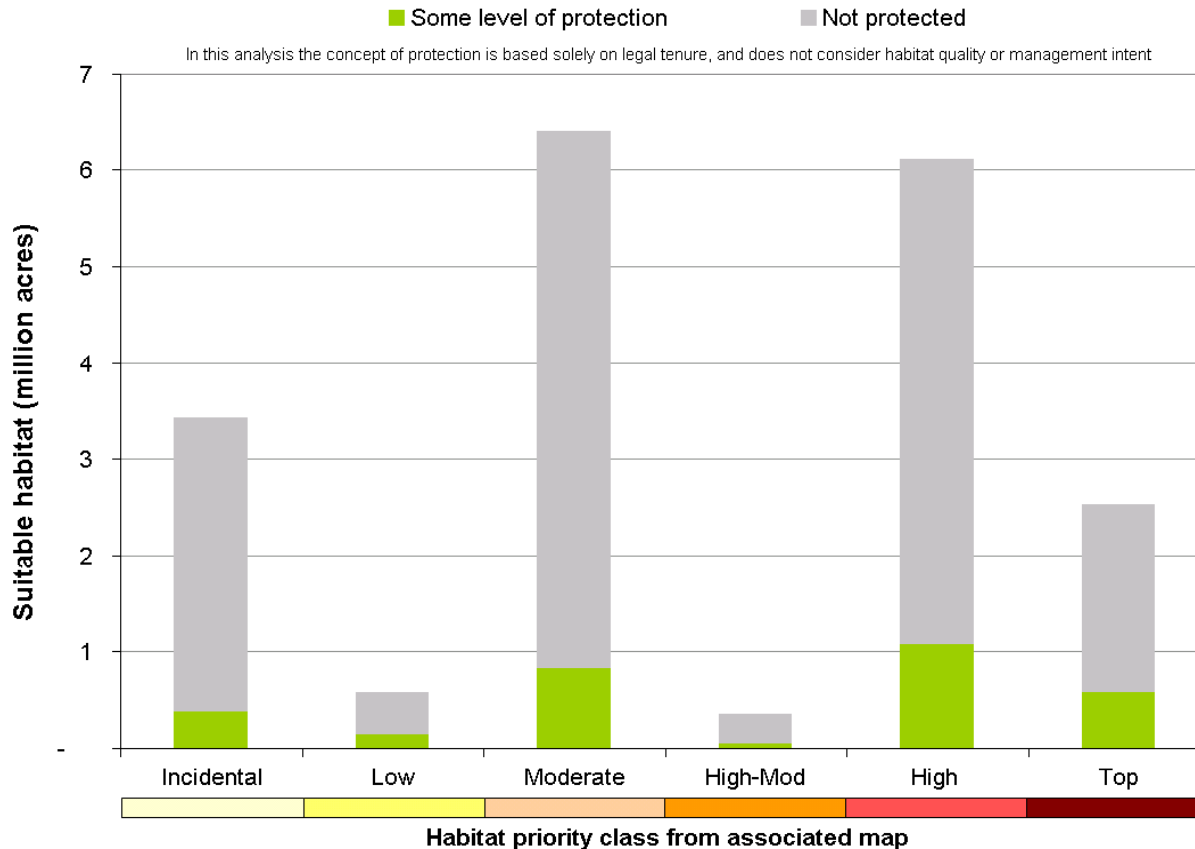
Point data sources:
RMBO (2005)

CSP Scorecard: Cassin's Sparrow

Scorecard 1. Habitat Summary (feeds into Scorecard #2)

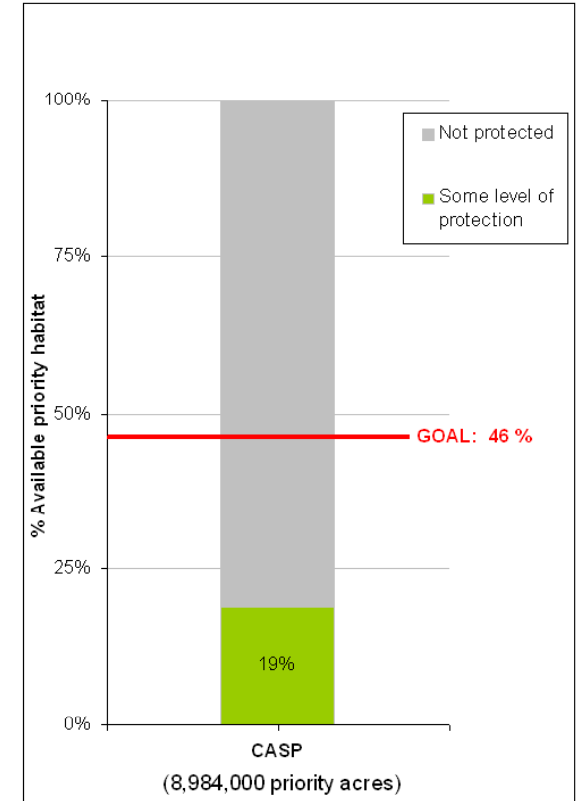
- This graph summarizes the amount of available potential suitable habitat by class (represented by bar heights) and the proportion of each class that is under some level of protection.

Cassin's sparrow (19,401,000 acres)



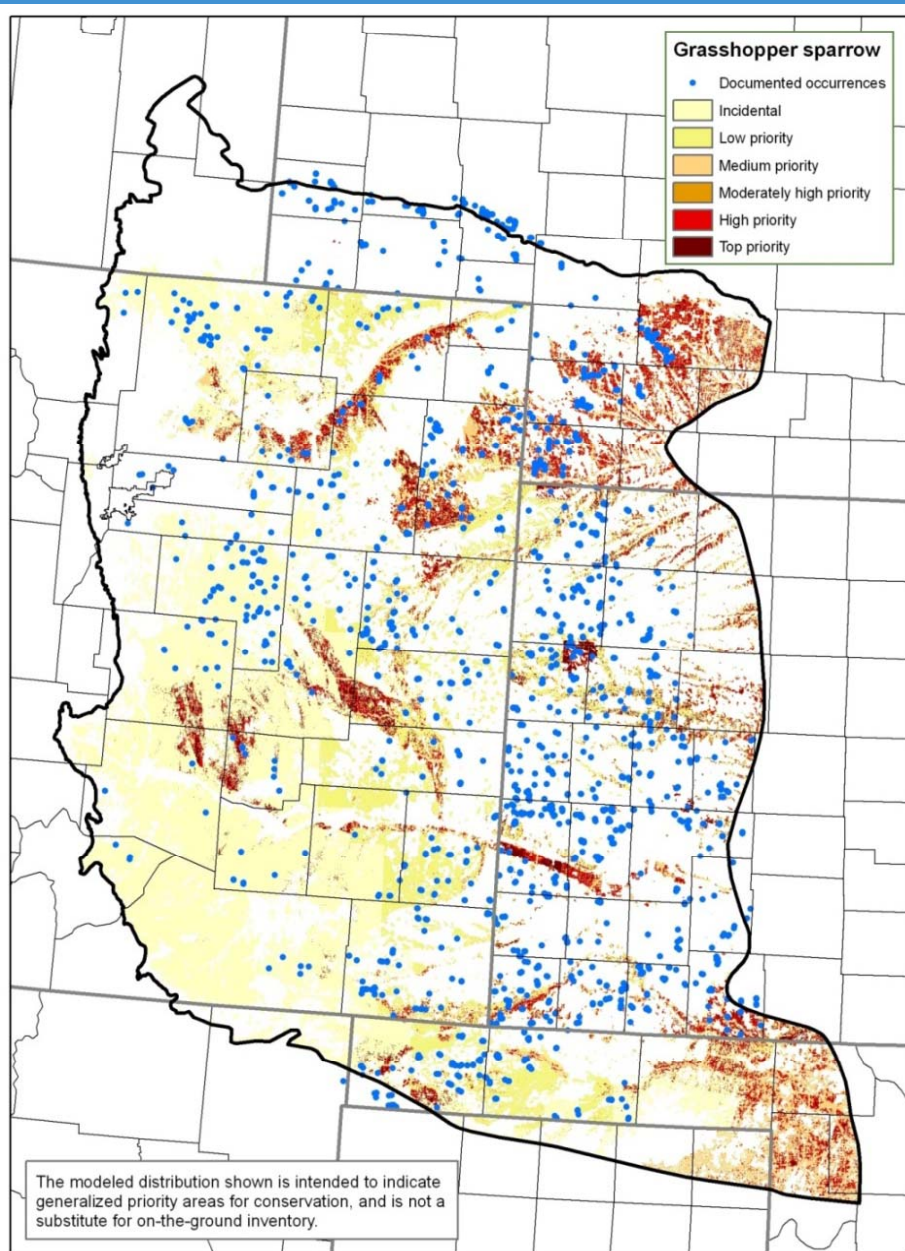
Scorecard 2. Priority Habitat Protection vs. Goal (feeds into Summary Scorecard for Animals)

- This graph summarizes the top 3 habitat classes on Scorecard 1, at left, and shows what proportion is under some level of protection, against the conservation goal of 46%.



Note: Protected = GAP+ classes 1, 2a, 2b; semi-protected = GAP+ classes 3a, 3b, 4a, 4b; no protection = all remaining GAP+ classes. Protected and Semi-protected are shown as a single class in all graphs because the proportion of protected acreages is less than 1% for all SARs, and can not be adequately displayed. Acreages displayed on graph labels are rounded to the nearest 1,000. In this analysis the concept of protection is based solely on legal tenure, and does not consider habitat quality or management intent.

CSP Priority Habitats: Grasshopper Sparrow



Interpretation: Six habitat classes are shown on the map. The darker colors (orange to brown) represent the optimal habitats with low or no impacts while the lighter colors (yellows) show the less optimal, more impacted habitats. Documented occurrences are shown in blue where data is available (lack of documentation may mean the site has not yet been field-assessed).



Grasshopper sparrow
Species at Risk Group: Shrubland / Mixed grass community

Data Sources and Notes

Priority habitat map data source:
USGS (2004), CNHP & TNC (2008b, 2008c)

Point data sources:
RMBO (2005)

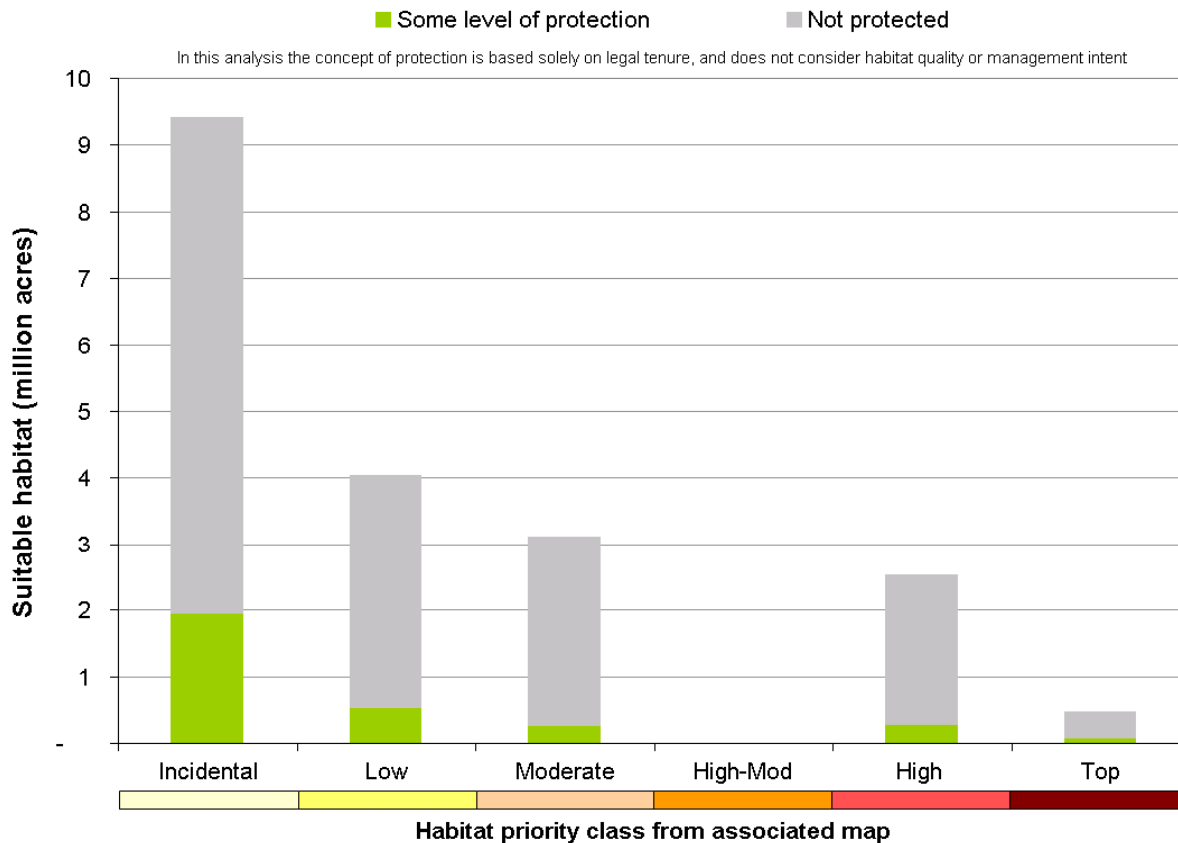
Note: Although CRP lands are suitable habitat for Grasshopper Sparrows, the model does not specifically include CRP since those spatial data were not available.

CSP Scorecard: Grasshopper Sparrow

Scorecard 1. Habitat Summary (feeds into Scorecard #2)

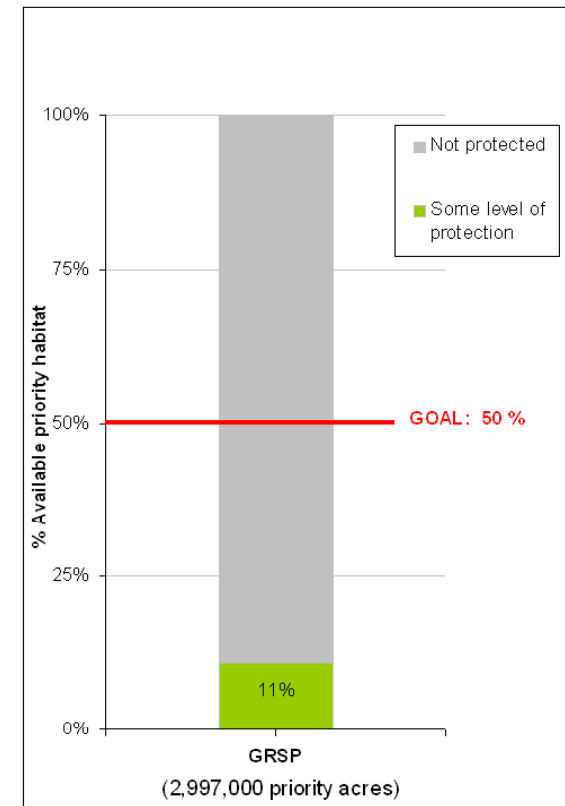
- This graph summarizes the amount of available potential suitable habitat by class (represented by bar heights) and the proportion of each class that is under some level of protection.

Grasshopper sparrow (19,566,000 acres)



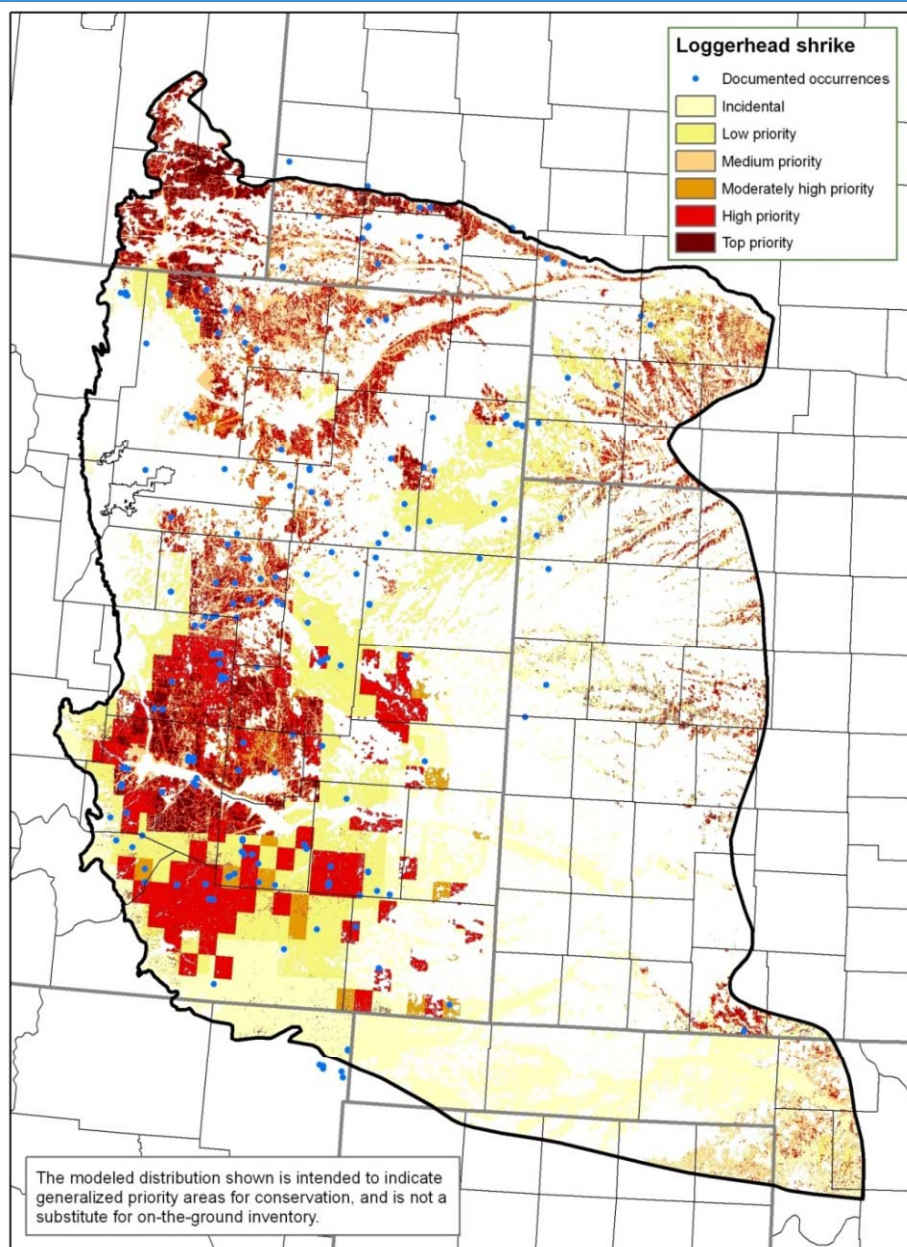
Scorecard 2. Priority Habitat Protection vs. Goal (feeds into Summary Scorecard for Animals)

- This graph summarizes the top 3 habitat classes on Scorecard 1, at left, and shows what proportion is under some level of protection, against the conservation goal of 50%.



Note: Protected = GAP+ classes 1, 2a, 2b; semi-protected = GAP+ classes 3a, 3b, 4a, 4b; no protection = all remaining GAP+ classes. Protected and Semi-protected are shown as a single class in all graphs because the proportion of protected acreages is less than 1% for all SARs, and can not be adequately displayed. Acreages displayed on graph labels are rounded to the nearest 1,000. In this analysis the concept of protection is based solely on legal tenure, and does not consider habitat quality or management intent.

Priority Habitats: Loggerhead Shrike



Interpretation: Six habitat classes are shown on the map. The darker colors (orange to brown) represent the optimal habitats with low or no impacts while the lighter colors (yellows) show the less optimal, more impacted habitats. Documented occurrences are shown in blue where data is available (lack of documentation may mean the site has not yet been field-assessed).



Loggerhead shrike

Species at Risk Group: Shrubland / Mixed grass community

Data Sources and Notes

Priority habitat map data source:
USGS (2004), CNHP & TNC (2008b, 2008c)

Point data sources:
RMBO (2005)

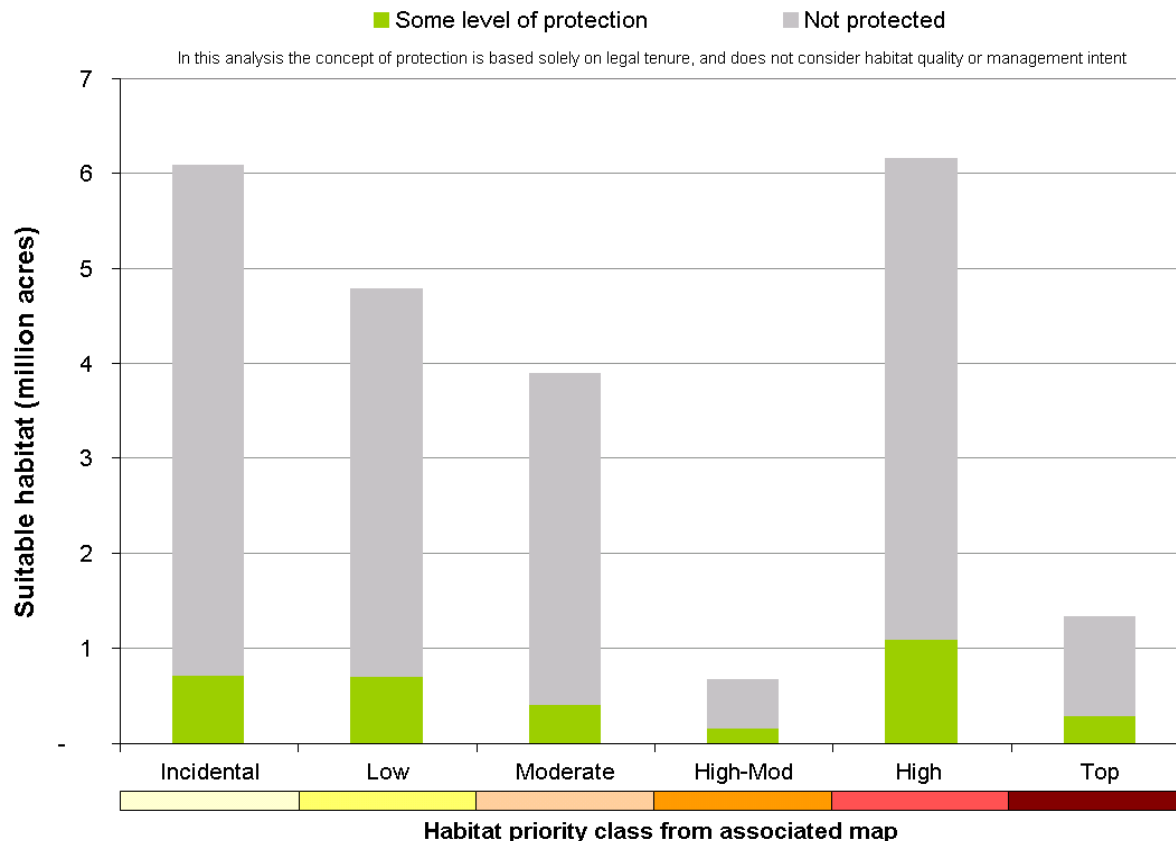
Note: Areas in SE Colorado were reclassified to reflect the data shown in the Colorado Breeding Bird Atlas (hence the topographic quad rectangles)

CSP Scorecard: Loggerhead Shrike

Scorecard 1. Habitat Summary (feeds into Scorecard #2)

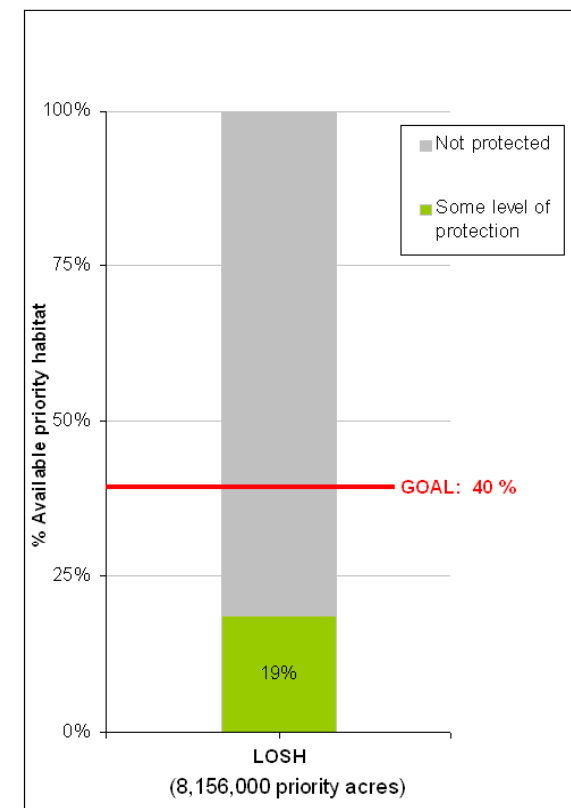
- This graph summarizes the amount of available potential suitable habitat by class (represented by bar heights) and the proportion of each class that is under some level of protection.

Loggerhead shrike (22,914,000 acres)



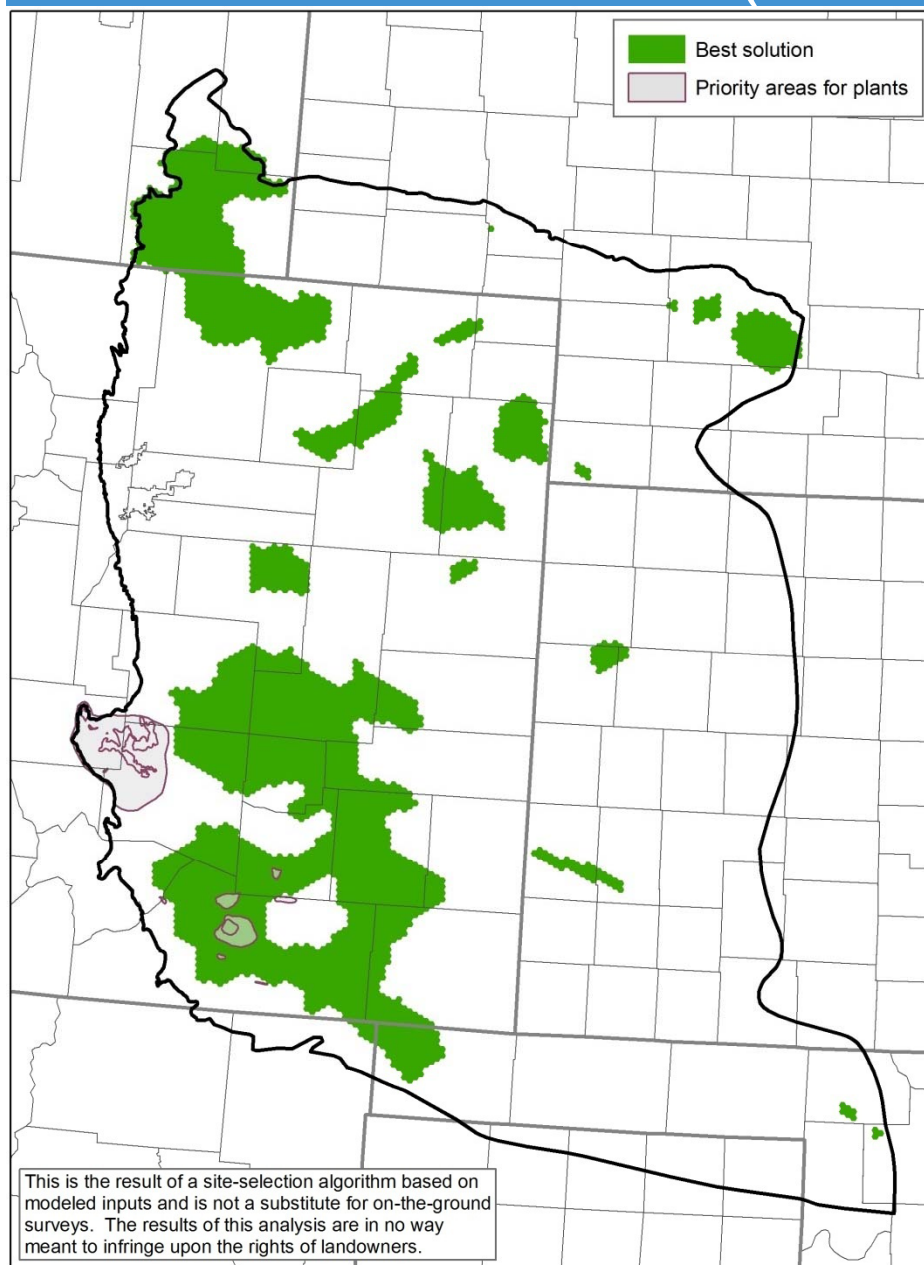
Scorecard 2. Priority Habitat Protection vs. Goal (feeds into Summary Scorecard for Animals)

- This graph summarizes the top 3 habitat classes on Scorecard 1, at left, and shows what proportion is under some level of protection, against the conservation goal of 40%.



Note: Protected = GAP+ classes 1, 2a, 2b; semi-protected = GAP+ classes 3a, 3b, 4a, 4b; no protection = all remaining GAP+ classes. Protected and Semi-protected are shown as a single class in all graphs because the proportion of protected acreages is less than 1% for all SARs, and can not be adequately displayed. Acreages displayed on graph labels are rounded to the nearest 1,000. In this analysis the concept of protection is based solely on legal tenure, and does not consider habitat quality or management intent.

Overall Priority Habitat Map Represents 17% of the CSP (9.8 Million Acres)



Based on map at left

Species at risk	Goal (acres)	Percent of goal met	Acres in final portfolio
OBT	1,007,274	100%	1,008,484
MASS	2,038,180	148%	3,007,422
BTPD	675,000	452%	3,054,289
SWFO	6,000,000	100%	6,000,604
BRSP	376,028	189%	712,487
CASP	4,155,509	103%	4,286,580
CCLO	852,684	100%	852,847
FEHA	2,965,253	141%	4,193,856
GRSP	1,065,543	100%	1,065,452
LABU	2,604,442	164%	4,264,498
LOSH	3,223,101	128%	4,111,010
LBCU	1,793,913	100%	1,794,321
MCLO	517,441	177%	917,125
MOPL	1,504,114	133%	2,003,110
Plants	Occurrences within potential conservation areas		

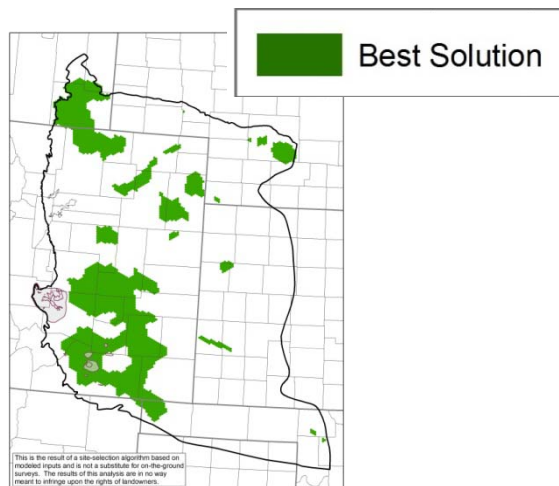
State	Best Solution Acres	%
Wyoming	1,132,855	12%
Nebraska	376,015	4%
Colorado	7,803,533	79%
Kansas	190,226	2%
Oklahoma	284,821	3%
New Mexico	36,639	0%
Texas	0	0%
Total CSP	9,824,090	100%

Plant were analyzed separately and do not factor into goals and acres in these tables. 129

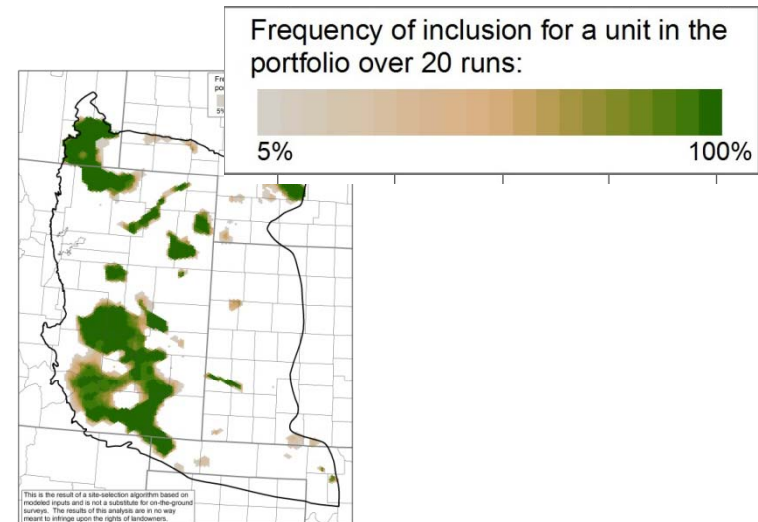
Interpretation of Overall Priority Habitat Map (Excluding Plants)

- One overall habitat map was produced by using a site selection program called SITES (Andelman et al. 1999), an optimization model, to select the least amount of area that still meets conservation goals for all of the animal SAR. We used the same hexagonal planning units that were the basis of the conservation portfolio of Neely et al. (2006). Because habitat quality was already addressed in each of the target species models, the site selection process was focused on the minimum area required to meet goals. Therefore, the base cost was simply the area, in acres, of each planning unit (3,118 ac), and no modifications were made to weight perimeter or shortfall costs. Each site selection session consisted of 20 runs of 5 million iterations each. The run with the lowest cost was chosen as the best overall solution.
- Goals used to run the optimization model are shown again on slide 91. See technical methods section for more details.
- Priority rare plant areas are overlaid on the animal optimization best solution shown on next slide.

The final portfolio, or best solution, from the optimization analysis



The summed scores from 20 runs of the optimization algorithm, showing how often a particular hexagon was chosen for a solution.



SAR Goals Used in Optimization Models and Scorecard

Species	Birds/ km ²	Population size - # of individuals	Acres to support 1 population	CSP Goal (# of pop- ulations)	SAR GOAL (acres)	Available priority habitat (acres)	Available total (acres)	% of priority habitat needed to meet goal
Brewer's sparrow	3.22	7000	537,183	0.7	376,028	945,324	1,467,598	40%
Cassin's sparrow	9.99	7000	173,146	24	4,155,509	8,984,136	19,401,175	46%
Grasshopper sparrow	34.09	7000	50,740	21	1,065,543	2,996,569	19,566,294	36%
Loggerhead shrike	1.61	7000	1,074,367	3	3,223,101	8,155,880	22,913,903	40%
Massasauga			use % historic	40%	2,038,180	4,591,355	4,591,355	44%
Ornate box turtle			use % current	60%	1,007,274	1,678,790	1,860,352	60%
Black-tailed prairie dog & Burrowing owl*			675,000	1	675,000	8,706,326	8,706,326	8%
Ferruginous hawk	0.08	1600	4,942,088	0.6	2,965,253	8,237,123	15,509,583	36%
Chestnut-collared longspur	1.42	7000	1,218,120	0.7	852,684	1,274,846	6,768,618	67%
McCown's longspur	2.34	7000	739,201	0.7	517,441	1,599,452	6,557,878	32%
Lark bunting	27.23	7000	63,523	41	2,604,442	9,769,848	17,360,658	27%
Long-billed curlew	0.19	3941	5,125,465	0.35	1,793,913	2,483,179	4,289,650	72%
Mountain plover	2.3	7000	752,057	2	1,504,114	3,513,717	7,510,614	43%
Swift fox		53,329 km ²	13,178,058	0.45	6,000,000†	8,489,347	17,536,658	71%

*1.5 x CDOW occupied acre goal to account for total CSP †Rounded

Note: Goals for bird species are based on multiples of the acreage needed for a single stable population, calculated using density estimates from RMBO. Animal goals are based on estimated occupied range (BTPD & BUOW, SWFO), proportion of historic range (MASS), or proportion of remaining range (OBT). These acreages are also used to depict the red "Goal" bars on animal species graphs. See technical methods at the end of Appendix A for more detailed information.

Data Sources Used in Habitat Maps and Scorecards

SPECIES	DATA SOURCES AND NOTES
Plants	
Arkansas Valley Barrens Rare Plants	Priority area map and scorecard data sources: CNHP (2008), and CNHP & TNC (2008a) Point data source: CNHP (2008) Note: Nomenclature is according to USDA-NRCS Plants Database <i>Parthenium tetraeuris</i> is combined with <i>Mirabilis rotundifolia</i> in the scorecard graph because they have similar distributions, and <i>P. tetraeuris</i> , as a more common species (G3), was not evaluated in the first round.
Burrow dependent reptiles	
Massasauga	Priority habitat map data sources: CDOW (2006), CNHP & TNC (2008b, 2008c) Point data sources: CSP ecoregional plan (Neely et al., 2006) and CNHP (2008)
Ornate Box Turtle	Priority habitat map data source: Grunau et al. (2007), CNHP & TNC (2008b, 2008c) Point data source(s): Colorado Herpetofaunal Atlas, 2007. Note: No point data were available for outside Colorado, since this species was not a CSP target.
Shrubland / mixed grass community	
Brewer's sparrow	Priority habitat map data source: USGS (2004), CNHP & TNC (2008b, 2008c) Point data sources: RMBO (2005)
Cassin's sparrow	Priority habitat map data source: USGS (2004), CNHP & TNC (2008b, 2008c) Point data sources: RMBO (2005)
Grasshopper Sparrow	Priority habitat map data source: USGS (2004), CNHP & TNC (2008b, 2008c) Point data sources: RMBO (2005) Note: Although CRP lands are suitable habitat for grasshopper sparrow, the model does not specifically include CRP lands since those spatial data were not available.
Loggerhead Shrike	Priority habitat map data source: USGS (2004), CNHP & TNC (2008b, 2008c) Point data sources: RMBO (2005) Note: Areas in SE Colorado were reclassified to reflect the data shown in the Colorado Breeding Bird Atlas (hence the quad squares)

Data Sources Used in Habitat Maps and Scorecards

Shortgrass prairie	
Burrowing owl & Black-tailed prairie dog	<p>Priority habitat map data source: CSP ecoregional plan (Neely et al., 2006), CNHP & TNC (2008b, 2008c)</p> <p>Point data sources: CSP ecoregional plan (Neely et al., 2006) and RMBO (2005)</p> <p>Note: Because habitat shown has already been prioritized as part of CSP ecoregional planning, scores were raised 2 classes, so that all habitat is in moderately high, high, or top priority classes.</p>
Chestnut-collared longspur	<p>Priority habitat map data sources: USGS (2004), CNHP & TNC (2008b, 2008c)</p> <p>Point data sources: RMBO (2005) and CNHP (2008)</p>
Ferruginous hawk	<p>Priority habitat map data sources: USGS (2004), CNHP & TNC (2008b, 2008c)</p> <p>Point data sources: RMBO (2005) and CNHP (2008)</p>
Lark bunting	<p>Priority habitat map data sources: USGS (2004), CNHP & TNC (2008b, 2008c)</p> <p>Point data source: RMBO (2005)</p>
Long-billed Curlew	<p>Priority habitat map data sources: USGS (2004), CNHP & TNC (2008b, 2008c)</p> <p>Point data sources: RMBO (2005) and CNHP (2008)</p> <p>Note: Large rectangles are an artifact of the Breeding Bird Survey data grid.</p>
McCown's Longspur	<p>Priority habitat map data sources: USGS (2004), CNHP & TNC (2008b, 2008c)</p> <p>Point data sources: RMBO (2005) and CNHP (2008)</p> <p>Areas south of the South Platte River were reclassified as incidental (if previously 1-4) or as low priority (if previously 5-6) to better reflect the documented range of the species.</p>
Mountain plover	<p>Priority habitat map data source: CSP ecoregional plan (Neely et al., 2006), CNHP & TNC (2008b, 2008c)</p> <p>Point data sources: CSP ecoregional plan (Neely et al., 2006) and CNHP (2008)</p> <p>Note: Original CSP data is a kernel density analysis – vegetation type was not explicitly modeled. To better match expert opinion, abundance layer was given higher weight in calculating presumed viable populations. Wyoming habitat does not appear in final model because of impacts from ag. (birds are there, but this isn't where we want to concentrate efforts).</p>
Swift fox	<p>Priority habitat map data sources: CDOW (2006), CNHP & TNC (2008b, 2008c)</p> <p>Point data source: CNHP (2008)</p> <p>Note: No point data available for other states.</p>

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Habitat Priority Class By State: Shrubland Mixed Grass Community

Acres	Habitat types						
Species by state	Non-priority classes			Priority classes			Total
BRSP	Incidental	Low	Medium	Med-High	High	Top	
Wyoming	0	0	5,234	0	13,419	13,423	32,077
Nebraska	5,378	0	12,581	0	7,266	50	25,275
Colorado	769	0	482,569	0	652,836	186,798	1,322,973
Kansas	0	0	10,216	0	23,975	28,082	62,273
Oklahoma	0	0	5,526	0	13,102	6,372	25,000
Texas	0	0	0	0	0	0	0
New Mexico	0	0	0	0	0	0	0
CASP							
Wyoming	34,564	0	8,158	0	15,387	4,685	62,793
Nebraska	513,512	0	376,157	0	280,848	10,399	1,180,916
Colorado	1,694,512	427,686	3,818,632	347,969	4,462,382	2,140,013	12,891,194
Kansas	419,222	22,627	635,971	0	850,473	274,938	2,203,232
Oklahoma	721,606	126,421	1,275,368	0	400,092	49,351	2,572,839
Texas	37,324	2,296	253,619	0	34,893	346	328,479
New Mexico	2,939	2,007	44,416	0	56,475	55,884	161,721
GRSP							
Wyoming	29,893	0	2	0	11	4	29,910
Nebraska	143	6,829	797,925	0	645,507	30,006	1,480,410
Colorado	8,350,813	2,488,993	848,066	0	883,216	221,562	12,792,649
Kansas	38,543	930,281	457,904	0	588,718	189,718	2,205,164
Oklahoma	719,983	583,903	845,781	0	387,500	35,625	2,572,792
Texas	112,554	28,390	173,012	0	14,518	5	328,479
New Mexico	156,600	0	110	0	117	62	156,889
LOSH							
Wyoming	11,010	16,883	211,175	6,566	372,469	335,208	953,310
Nebraska	4,155	589,633	996,837	6,101	712,016	72,969	2,381,712
Colorado	1,899,055	3,988,941	1,919,825	656,663	4,629,916	837,425	13,931,824
Kansas	1,373,033	141,615	275,331	0	345,165	84,887	2,220,031
Oklahoma	2,127,169	47,348	342,784	0	75,851	2,650	2,595,802
Texas	229,688	1,566	140,653	0	11,503	0	383,410
New Mexico	440,115	0	1,206	0	2,331	4,159	447,810

Note: Colors in table above represent how data is shown on habitat maps.

Habitat Priority Class By State: Burrow Dependent Reptiles Group

Acres	Habitat types						Total
	Non-priority classes			Priority classes			
Species by state	Incidental	Low	Medium	Med-High	High	Top	
MASS							
Wyoming	0	0	0	0	0	0	0
Nebraska	0	0	0	0	0	0	0
Colorado	0	0	0	1,579,494	2,089,208	922,654	4,591,355
Kansas	0	0	0	0	0	0	0
Oklahoma	0	0	0	0	0	0	0
Texas	0	0	0	0	0	0	0
New Mexico	0	0	0	0	0	0	0
OBT							
Wyoming	0	0	0	0	0	0	0
Nebraska	0	273	763	66,471	46,863	931	115,301
Colorado	0	28,583	104,288	382,015	663,179	185,695	1,363,760
Kansas	0	8,316	32,427	53,664	120,368	44,550	259,325
Oklahoma	0	2	6,912	60,760	49,641	4,652	121,967
Texas	0	0	0	0	0	0	0
New Mexico	0	0	0	0	0	0	0

Note: Colors in table above represent how data is shown on habitat maps.

Habitat Priority Class By State: Shortgrass Community (1 of 2)

Acres	Habitat types						Total
	Non-priority classes			Priority classes			
Species by state	Incidental	Low	Medium	Med-High	High	Top	
BTPD_BUOW							
Wyoming	0	0	0	27,507	8,385	9,831	45,723
Nebraska	0	0	0	528,885	76,238	66,658	671,781
Colorado	0	0	0	1,259,685	2,334,318	3,175,447	6,769,450
Kansas	0	0	0	1,173,218	17,792	28,360	1,219,370
Oklahoma	0	0	0	0	0	0	0
Texas	0	0	0	0	0	0	0
New Mexico	0	0	0	0	0	0	0
FEHA							
Wyoming	0	495,378	88,046	23,407	185,104	146,993	938,928
Nebraska	402,634	378,107	398,163	0	284,453	9,125	1,472,483
Colorado	552,264	462,605	3,293,925	331,718	3,979,797	1,970,421	10,590,730
Kansas	37,646	4,900	497,443	0	681,225	246,198	1,467,412
Oklahoma	21,847	19,935	521,411	0	215,933	40,457	819,582
Texas	3,239	0	43,715	0	16,178	346	63,479
New Mexico	3,601	4,993	42,605	0	53,867	51,902	156,968
CCLO							
Wyoming	0	6,692	152,937	62,329	359,883	320,228	902,070
Nebraska	56,622	26,426	316,643	0	226,608	42,485	668,784
Colorado	3,980,792	712,468	197,319	21,615	193,739	45,738	5,151,671
Kansas	42,162	0	1,712	0	1,803	416	46,093
Oklahoma	0	0	0	0	0	0	0
Texas	0	0	0	0	0	0	0
New Mexico	0	0	0	0	0	0	0
MCLO							
Wyoming	33,614	1,665	217,219	0	363,442	321,517	937,456
Nebraska	61,100	17,499	245,083	0	204,321	42,131	570,134
Colorado	1,511,069	2,182,802	643,454	19,912	529,794	118,335	5,005,365
Kansas	19,628	25,293	0	0	0	0	44,921
Oklahoma	0	0	0	0	0	0	0
Texas	0	0	0	0	0	0	0
New Mexico	0	0	0	0	0	0	0

Note: Colors in table above represent how data is shown on habitat maps.

Habitat Priority Class By State: Shortgrass Community (2 of 2)

Acres	Habitat types						Total
Species by state	Non-priority classes			Priority classes			Total
LABU	Incidental	Low	Medium	Med-High	High	Top	
Wyoming	0	35,276	217,478	0	364,380	321,638	938,771
Nebraska	28,001	19,741	1,115,544	0	894,513	85,275	2,143,074
Colorado	93,803	140,073	3,852,286	87,770	4,335,975	2,085,267	10,595,173
Kansas	19,117	31,820	580,941	0	794,396	265,406	1,691,680
Oklahoma	112,215	0	1,052,256	0	348,636	44,315	1,557,421
Texas	23,337	0	221,296	0	32,689	346	277,668
New Mexico	3,879	0	43,746	0	55,745	53,500	156,869
LBCU							
Wyoming	0	2,250	73,287	0	105,933	70,987	252,458
Nebraska	0	9,997	32,137	0	30,085	7,207	79,426
Colorado	0	98,948	1,123,479	79,301	1,297,545	573,505	3,172,779
Kansas	0	3,011	17,259	510	29,570	12,103	62,454
Oklahoma	0	8,469	400,611	0	185,614	36,628	631,322
Texas	0	0	0	0	0	0	0
New Mexico	0	11,155	25,866	0	30,556	23,636	91,212
MOPL							
Wyoming	0	79	1,549	6,512	14,987	4,520	27,646
Nebraska	0	0	0	1	1	0	2
Colorado	592,720	2,449,154	757,668	976,764	1,811,389	599,898	7,187,592
Kansas	7,920	19,538	1,563	6,444	12,907	2,565	50,937
Oklahoma	31,000	95,868	35,622	41,923	33,431	2,337	240,182
Texas	0	0	0	0	0	0	0
New Mexico	1,670	2,536	10	0	38	0	4,254
SWFO							
Wyoming	0	553,570	0	67,148	130,336	185,934	936,988
Nebraska	0	1,509,100	0	193,747	95,730	2,133	1,800,710
Colorado	0	3,299,831	0	2,738,255	2,821,317	1,835,210	10,694,614
Kansas	0	1,842,093	0	0	0	0	1,842,093
Oklahoma	0	1,391,010	0	230,739	110,253	25,836	1,757,838
Texas	0	312,172	0	13,591	5,332	157	331,252
New Mexico	0	139,536	0	11,272	13,026	9,330	173,164

Note: Colors in table above represent how data is shown on habitat maps.

Section 5. Technical Methods



Technical Methods

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Methods presented here were developed to execute the stated project objectives relating to 1) impacts assessment, 2) priority habitat maps, and 3) SAR conservation scorecard development. All analyses were carried out in ArcGIS 9.2 and ArcView 3.3 (ESRI 2006, 2002). Animal SAR assessment methods are presented in detail. Plant SAR assessment methods—derived from CNHP and TNC 2008a—are summarized briefly.

Impacts Assessment

The impacts assessment is based on a list developed by the working group of current impacts for which spatial data was available. Results of the spatial impacts assessment were applied to distribution models (incorporating suitable habitat and species density) described below to produce final priority habitat maps.

As a surrogate to measure the quality and connectivity of the landscape, we modeled the location and intensity of anthropogenic disturbances in the landscape, making the broad assumption that these disturbances are affecting the quality and connectivity of the landscape processes, and, by extension, are having an impact on the elements of biodiversity supported by that area. Most data that can be spatially displayed can be used to develop a model with which to evaluate impacts in a landscape context. We used mapped locations of the anthropogenic disturbances listed below, in combination with a spatial analysis method incorporating a decrease in effect of these disturbances with increasing distance from the source (distance decay), to produce a model that is a cumulative, continuous surface of relative impact and not merely a present vs. absent depiction of a particular disturbance.

We included only anthropogenic disturbances thought to be detrimental to landscape integrity, producing models ranging from complete absence of impact (essentially neutral) to very high impact. It would also be possible to incorporate favorable conditions and represent a continuum from excellent to poor habitat using similar techniques if data were available for the entire ecoregion. A variety of functions can be used for distance decay models, including linear, exponential, and sigmoidal. We used a set of s-curves generated by a sigmoid function of the form shown below.

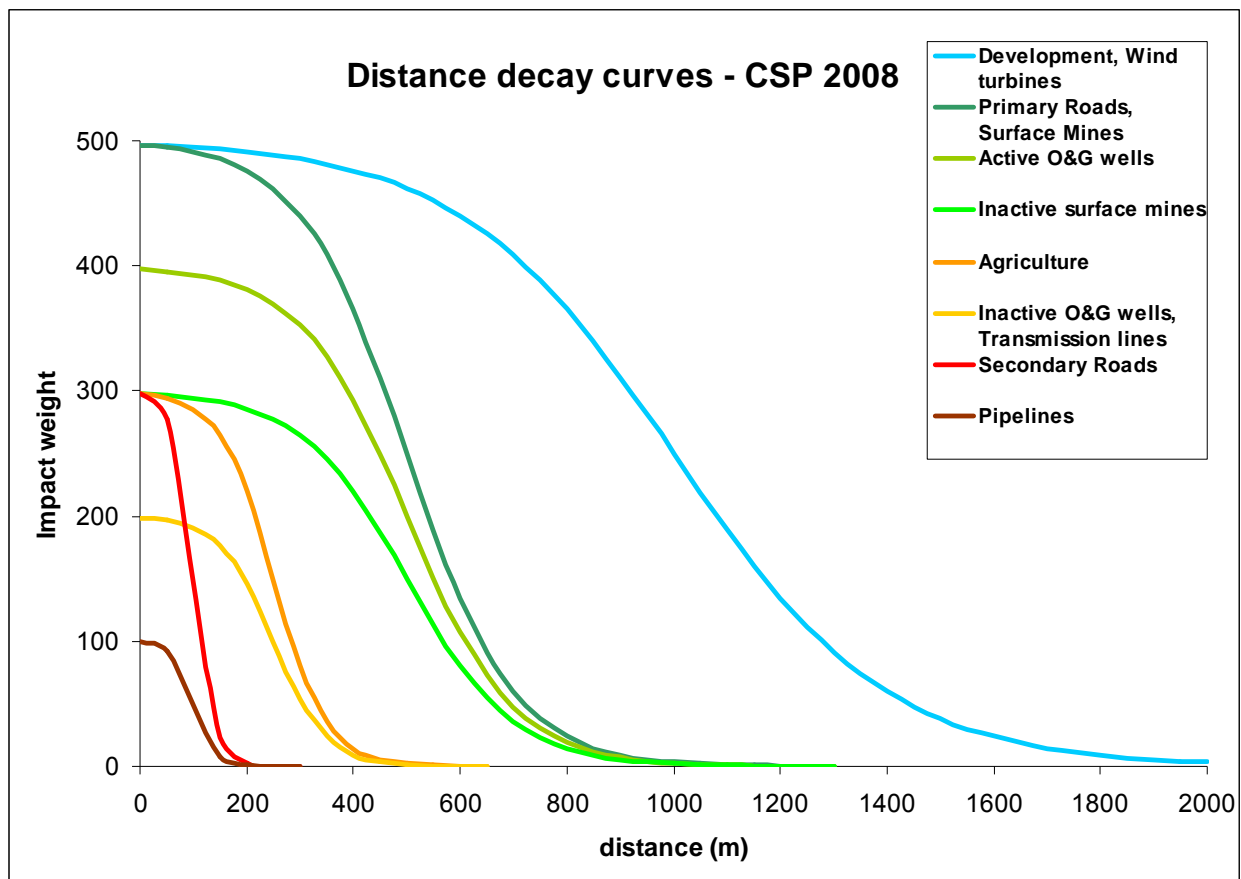
$$y = \frac{1}{1 + \exp(b(\frac{x}{c} - a))} \times w$$

where
a - shifts curve to right or left
b - determines spread of curve, or slope of the rapidly decreasing part of curve.
c - scalar to adjust total distance of interest (=distance in meters divided by 20)
x - distance in meters from threat
w - weight of threat (maximum value)

By adjusting the shift and spread of the curve (*a* and *b*), it can be tailored to specific threats. Different values of *a* and *b* were used to derive four decay curves within a distance of 2000m: abrupt, moderately abrupt, moderate, and gradual. The inflection point of the curve marks the distance where the effect of the threat is reduced by half. These curves are asymptotic at both ends, therefore the results of the equation must be manually adjusted to equal the maximum

weight at zero distance and zero weight at a distance at which the weight becomes essentially zero (“cutoff distance”).

curve type	<i>a</i>	<i>b</i>	inflection pt	cutoff
abrupt	1	5	100m	250m
moderately abrupt	2.5	2	300m	600m
moderate	5	1	500m	1,250m
gradual	10	0.5	1,000m	2,000m



We collected available GIS layers for the CSP depicting types of anthropogenic disturbance. Data sources are shown below. Data sets were reconciled to a common extent and geographic projection. Each disturbance type was assigned a weight or maximum value and one of the four curve types. The selected layers are not mutually exclusive in the threats they represent, but were chosen to compliment one another in order to compensate for incomplete or inaccurate source data.

Impact	Weight	Decay Function Type	Data Source
Housing/urban development	500	gradual	Theobald 2008.
Commercial/industrial dev.	500	gradual	Theobald 2008.
Agriculture	300	mod-abr	CNHP & TNC 2008.

Roads primary & secondary	500	moderate	USCB 2007.
Roads - local & rural, 4WD etc.	300	abrupt	USCB 2007.
Oil & gas wells - active	400	moderate	COGCC 2008, KAGS 2008, NMEMNRD 2008, NOGCC 2008, OKCC 2008, RRC 2006, WYOGCC 2008.
Oil & gas wells - inactive	200	mod-abr	COGCC 2008, KAGS 2008, NMEMNRD 2008, NOGCC 2008, OKCC 2008, RRC 2006, WYOGCC 2008.
Gas pipelines	100	abrupt	USCB 2007.
Transmission lines	200	mod-abr	ESRI 1993, Finn 2004, USCB 2007.
Surface Mines - active	500	moderate	USGS 1998, 2001, 2005.
Surface Mines - inactive	300	moderate	USGS 1998, 2001, 2005.
Wind turbines ¹	500	gradual	CNHP 2008

All data sets were converted to grids with a common cell size (30 m) and identical extent. Each impact layer was used to create a distance grid, with a maximum calculated distance that reflected the pre-defined cut-off point for the curve type selected. The distance grid was used to create a distance decay grid according to the formula given above, using the raster calculation: $[\text{impact score grid}] = 1 / (1 + \text{EXP}(\frac{[\text{distance grid}]}{100} - a) * b)) * \text{weight}$. Resulting NoData cells were replaced with zeros, to represent the distance beyond which the disturbance has no further impact. Finally, cells representing the location of the disturbance itself were replaced with the maximum value for that threat. The individual threat layers were added together to produce a single raster layer representing the cumulative impact to an area from the included land uses.

Priority Habitat Maps

Priority conservation areas were defined by the working group as sites with viable populations of SAR that are expected to remain viable under appropriate conservation management. Viable populations are presumed to be those with sufficient numbers in good quality habitat. Analysis inputs were intended to represent: 1) areas where species occur with highest density or abundance, 2) areas with higher quality habitat, and 3) areas least affected by current impacts. The modeled distribution is intended to indicate generalized priority areas for conservation, and is not a substitute for on-the-ground inventory.

Identifying areas where species occur with highest density

For each animal SAR, expert input was used to choose the best available spatial dataset depicting the range and abundance (or relative abundance) of the species. Data sources are shown below. Methods used to create the final species abundance model (SAM) varied somewhat according to data source, as detailed below.

¹ Because the spatial data for commercial wind turbines sites did not incorporate the road infrastructure regularly traveled to service the turbines and power lines, we adjusted the weight and distance-decay in an attempt to compensate for the likely increased impacts.

Species at Risk	Distribution data source
All birds except Mountain plover and Burrowing owl	Breeding Bird Survey grid (USGS 2004)
Mountain plover	Mountain plover density model. Kindler, Appendix X-57, in CSP ecoregional plan (Neely et al. 2006)
Burrowing owl & Black-tailed prairie dog	CNHP 2005, for CSP ecoregional plan (Neely et al. 2006)
Massasauga	CDOW 2006
Ornate box turtle	Grunau et al. 2007, modified
Swift fox	N/A

For most bird SAR, the Breeding Bird Survey grid was converted to a raster dataset, clipped to the extent of the ecoregion. Relative abundance values associated with each species grid were normalized to a single scale of variation by dividing each score by maximum within the CSP for that species, using raster calculator. The normalized data were then reclassified into five classes (quartiles plus zero), according to the following scheme:

Old value	New value
0	0
0.000001 - .25	1
0.250001 - .50	2
0.500001 - .75	3
0.750001 - 1	4

For Mountain plover, the probability-attributed hexagon layer from the CSP ecoregional plan was converted to a raster dataset and normalized through a similar procedure.

Burrowing owl was regarded as part of the Black-tailed prairie dog model and not modeled separately. The CSP Black-tailed prairie dog species level modeled occurrences and complexes developed for the CSP ecoregional plan were used (CNHP 2005), and cells were assigned an abundance value according to Occurrence rank in the original data (A-rank = 4, B-Rank = 3, C-Rank = 2).

For Ornate box turtle, the medium and high probability areas of the logistic model produced as part of CNHP 2007 were clipped to agree with the range shown in Hammerson (1999), and reclassified (medium probability = 2, high probability = 4).

For Massasauga, the CDOW polygon layer was regarded as being the best available data, and, after conversion to raster format, was used without further processing as the abundance layer for this species. All cells where the SAM indicated Massasauga presence were classified 4.

For Swift fox, no abundance layer was used, although the CDOW (2006) species distribution map was used for visual comparison.

The final result for each species was the SAR_abn raster layer.

Identifying areas with higher quality habitat

We used an updated version of the vegetation layer produced for the CSP ecoregional plan (CNHP and TNC 2008b), which combined data from seven states into a single cross-walked vegetation map using NatureServe ecological systems as the mapping unit. The list of all ecological systems occurring in the CSP was extracted, and used to identify the best habitat types for each SAR. For each SAR, members of the SAR working group ranked vegetation types according to the following criteria:

Rank	Description
4	Optimal/most important ecological system type
3	Also somewhat important ecological system
2	Occasional/incidental use only
1	Unknown
0	Not appropriate, never used, bad etc.

In GIS, the CSP ecological systems raster data set was reclassified for each species, using the ranks assigned (SAR_veg). Minor adjustments to rankings were made after the classified data were examined, in order to correct discrepancies between expected and mapped distributions of some ecological systems. Some suitable vegetation types could not be separated from unsuitable types (e.g., CRP land, areas of “tall structure”). Ranks used are shown below, with the two most important habitat categories highlighted in yellow.

CSP Ecological system / landcover name	OBT	MASS	BTPD	SWFO	BUOW	FEHA	CCLO	MCLO	LBCU	MOPL	LABU	BRSP	CASP	GRSP	LOSH
Agriculture - tilled land	0	0	0	2	0	1	0	0	0	1	0	0	0	0	0
Barren	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Central Mixedgrass Prairie	2	2	4	4	4	4	4	3	2	1	4	1	4	4	4
Developed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Disturbed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Disturbed Herbaceous	0	0	2	0	0	1	0	0	0	1	0	0	0	0	0
Inter-Mountain Basins Active and Stabilized Dune	4	4	1	1	1	2	2	0	0	0	1	0	1	0	0
Inter-Mountain Basins Big Sagebrush Shrubland	2	2	2	2	2	2	1	1	0	0	3	4	3	2	4
Inter-Mountain Basins Big Sagebrush Steppe	2	1	2	2	2	3	2	3	1	2	3	4	3	2	4
Inter-Mountain Basins Greasewood Flat	2	2	2	2	2	2	0	0	0	0	2	4	4	2	4
Inter-Mountain Basins Mixed Salt Desert Scrub	2	2	2	2	2	2	0	0	0	0	2	4	4	2	4
Inter-Mountain Basins Shale Badland	2	2	0	2	0	1	0	0	0	0	1	0	1	1	2
Inter-Mountain Basins Wash	2	2	0	2	1	1	0	0	0	0	1	0	1	0	1
Invasive Southwest Riparian Woodland and Shrubland	2	2	0	0	0	1	0	0	0	0	0	0	0	0	1
Western Great Plains Herbaceous Wetland	2	2	0	2	0	1	0	0	2	0	1	0	0	0	2
North American Warm Desert Wash	2	2	2	2	2	2	0	0	0	0	1	0	0	0	1
Northwestern Great Plains Mixedgrass Prairie	2	2	4	4	4	3	4	4	4	0	4	0	2	2	4
Rocky Mountain Aspen Forest and Woodland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rocky Mountain Foothill Limber Pine - Juniper Woodland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Rocky Mountain Gambel Oak-Mixed Montane Shrubland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Rocky Mountain Lodgepole Pine Forest	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rocky Mountain Lower Montane - Foothill Shrubland	0	0	0	0	0	0	0	0	0	0	0	3	0	0	1
Rocky Mountain Montane Dry-Mesic Mixed Conifer Forest and Woodland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rocky Mountain Montane Mesic Mixed Conifer Forest and Woodland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rocky Mountain Ponderosa Pine Woodland and Savanna	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
Southern Rocky Mountain Juniper Woodland and Savanna	2	0	0	0	0	1	0	0	2	0	0	0	1	0	3
Water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Western Great Plains Canyon (not really mapped)	2	2	0	0	0	1	0	0	0	0	0	0	0	0	0
Western Great Plains Cliff and Outcrop	2	2	0	0	0	1	0	0	0	0	0	0	0	0	0
Western Great Plains Closed Depression Wetland	2	2	2	2	2	2	0	2	4	0	0	0	0	0	1
Big River Floodplain	2	2	0	0	0	1	0	0	0	0	0	0	0	0	0
Western Great Plains Foothill and Piedmont Grassland	2	2	4	3	2	3	2	1	2	0	4	0	3	3	3
Western Great Plains Riparian Woodland, Shrubland, and Herbaceous	2	2	0	0	0	1	0	0	2	0	1	0	1	1	1
Rangeland with Annual and Biennial Forbs (=weedy shortgrass)	0	4	4	4	4	4	2	2	4	3	4	1	4	3	4
Western Great Plains Sand Prairie	4	4	2	3	2	2	3	2	3	1	4	2	3	4	3
Western Great Plains Sandhill Shrubland	4	4	2	3	2	2	2	0	0	0	2	4	3	4	3
Western Great Plains Shortgrass Prairie	2	4	4	4	4	4	3	4	4	4	4	1	4	3	3

In order to extract areas where the best habitat occurs with sufficient density, a moving window analysis was applied to the classified ecological systems for each species. Values of 4 and 3 (representing optimal and important habitat types) were extracted from SAR_veg and reclassified to 1 or 0 (i.e., good habitat present or absent). A focal sum analysis with an approximate one square mile window (53 x 53 30m cells) was applied [SAR_focsum = focalsum([Reclass of SAR_veg], RECTANGLE, 53, 53, DATA)]. For each grid cell, this gives the number of cells in surrounding square

mile that have good habitat present. A cut-off point of $\geq 50\%$ (i.e., $\geq 1,405$ cells) was used to select areas with sufficient habitat density. These areas were reclassified again to 1 or 0, and used to make “patches” [SAR_fsrg = regiongroup([Reclass of SAR_focsum], #, EIGHT)]. Patches were then backfilled by selecting habitat of type 2-4 cells (i.e., any usable habitat) that fell within patch boundaries:

SAR_patch = SETNULL([SAR_veg] < 2, [SAR_fsrg])
 SAR_ptcharea = zonalgeometry(SAR_patch, area) – this table was attached to SAR_patch in ArcView 3
 SAR_hab = ([SAR_veg] + [SAR_patch]) - [SAR_patch]

Patches smaller than 1 ha were removed. The final result (SAR_hab) was used as the habitat layer.

Combining abundance and habitat to identify presumed viable population areas

For all SAR except Swift fox, habitat (SAR_hab) and abundance (SAR_abn) layers were combined according to this matrix, with rules shown below:

Abn	Hab				
	0	1	2	3	4
0	0	0	0	0	0
1	0	0	1	1	2
2	0	0	2	2	3
3	0	0	3	3	4
4	0	0	3	4	4

- Zero abundance trumps any habitat score, since it is presumed out of range of the species.
- If habitat is 0 or 1 – those values are now NoData in patch layer, so become 0
- If habitat is 2, score is = abundance, with max of 3
- If habitat is 3, score is = abundance, with max of 4
- If habitat is 4, score is abundance+1, with max of 4

A nested con statement in raster calculator was used to create the presumed viable populations (SAR_pvp) raster layer:

SAR_pvp = con([SAR_abn] == 0, 0, con([SAR_abn] == 1 & [SAR_hab] < 4, 1, con([SAR_abn] == 1 & [SAR_hab] > 4, 2, con([SAR_abn] == 2 & [SAR_hab] < 4, 2, con([SAR_abn] == 2 & [SAR_hab] > 4, 3, con([SAR_abn] == 3 & [SAR_hab] < 4, 3, con([SAR_abn] == 3 & [SAR_hab] > 4, 4, con([SAR_abn] == 4 & [SAR_hab] > 2, 4, 3))))))))))

For Swift fox, the habitat layer was overlaid with primary and secondary roads to create patches. These patches were prioritized by size: 0-5 km² = 0, 5-800 km² = 2, >800 km² = 4, and used as the presumed viable populations raster layer.

After review by the SAR working group, the following revisions were made:

Species at Risk	Revision notes
Burrowing owl & Black-tailed prairie dog	Because habitat shown has already been prioritized as part of CSP ecoregional planning, scores were bumped up 2 classes, so that all habitat is in moderately high, high, or top priority classes. Although burrowing owls can be found away from prairie dog towns, the two species are combined because of their close ecological linkage.
McCown's Longspur	Areas south of the South Platte River were reclassified as incidental (if previously 1-4) or as low priority (if previously 5-6) to better reflect the documented range of the species.
Mountain plover	Original CSP data is a kernel density analysis – vegetation type was not explicitly modeled. To better match expert opinion, abundance layer was given higher weight in calculating pvp.
Loggerhead shrike	Areas in SE Colorado were reclassified to reflect the data shown in the Colorado Breeding Bird Atlas.

Prioritizing areas least affected by current or future impacts

The potential viable populations raster layer combining abundance and habitat data was combined with the impacts layer to identify six habitat priority classes.

The impacts raster data described above (CNHP and TNC 2008c) was reclassified to give areas with no (0) impact a value of 2, areas with low impact scores (greater than 0 but <=250) a value of 1, and areas with higher impact scores (>250) a value of 0. This data layer was used to augment the scores of areas that were identified as the highest quality in the presumed viable populations (PVP) layer:

PVP score	Impact class	Priority class	Description	Name
4,3	2	6	Optimal habitat, no impact	Top priority
4,3	1	5	Optimal habitat, low impact	High priority
4	0	4	Optimal habitat, impacted	Moderately high priority
3	0	3	Good habitat, impacted	Medium priority
2	Any	2	Low priority habitat	Low priority
1	Any	1	Incidental habitat	Incidental

```
con([SAR_pvp] == 0, 0, con([SAR_pvp] == 1, 1, con([SAR_pvp] == 2, 2, con([SAR_pvp] == 3 & [impacts] == 0, 3, con([SAR_pvp] == 3 & [impacts] == 1, 5, con([SAR_pvp] == 3 & [impacts] == 2, 6, con([SAR_pvp] == 4 & [impacts] == 0, 4, con([SAR_pvp] == 4 & [impacts] == 1, 5, con([SAR_pvp] == 4 & [impacts] == 2, 6, -1))))))))))
```

Zero values were reclassified to NoData, and the resulting raster dataset SAR_final was used as the priority habitat area map.

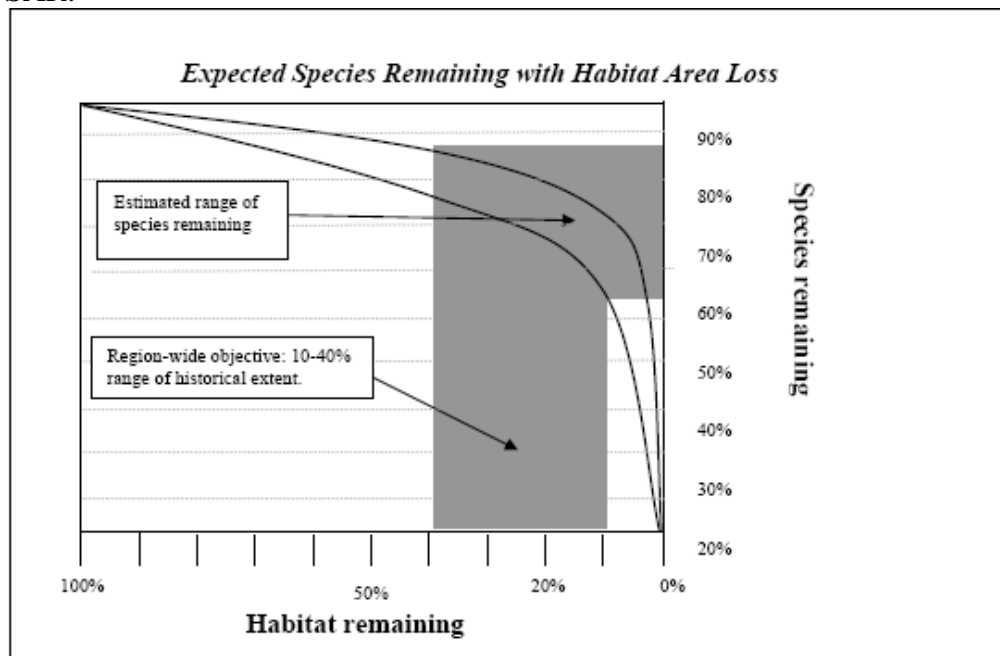
Goals and Summary priority habitat map

Setting biologically based goal

The team developed relatively subjective, biologically based conservation goals (in acres of habitat) for all animal SAR. These acres were used to depict the red “Goal” bars on animal species graphs.

For most of the bird SAR, NatureServe (website accessed April 2009) recommends maintaining 150 occurrences as a qualitative goal for maintaining their range wide status. For this project the team considered a stable population (= occurrence here) as 7000 individuals (Reed et. al. 2003); therefore 150 occurrences of 7000 individuals would result in approximately 1 million total individuals. The CSP goal was arrived at by determining the proportion of the species geographic range represented by the CSP (based only on area, not on any density relationship), and then assuming the same proportion of the 1 million individuals goal. Acres of habitat needed to support that number was the biologically based goal and was calculated using density data from the Rocky Mountain Bird Observatory. The results were higher goals for those species in which the CSP is a greater proportion of their entire range, and lower goals for species in which the CSP is a smaller part of their entire range. This might be looked at as one way to represent the relative “conservation responsibility” of the CSP for an individual species.

Mammal goals were based on estimated occupied range (black-tailed prairie dog and swift fox), and for massasauga and ornate box turtle using information from Dobson (1996) (see text and graph below). Mapped occurrences, potential conservation areas, and the Arkansas Valley Barrens network of conservation areas (CNHP 2008a) were used to indicate priority habitat for the plant SAR.



The species area curve above modified from Dobson (1996) would suggest that coarse-filter representation set at 40% of habitat might conserve approximately 80% of the native species. We used this as a basis for setting goals for 1) massasauga set at 40% of historic habitat extent (because we estimated there had been little loss or permanent conversion of the habitat to date), and 2) ornate box turtle set at 60% of current habitat extent (adjusted upward from the 40% of original habitat because we estimated that a significant amount of the original habitat had already been lost or converted).

Summary priority habitat map

A summary priority habitat map was produced by using a simulated annealing algorithm as implemented in SITES (Andelman et al. 1999) to select the least amount of area that still meets conservation goals for animal species at risk. The top three categories of priority habitat for each SAR were reclassified to a single value and used as input for the selection process. Goals used are shown in red below. We used the same hexagonal planning units that were the basis of the conservation portfolio of Neely et al. (2006). Because habitat quality was already addressed in each of the target species models, the site selection process was focused on the minimum area required to meet goals. Therefore, the base cost was simply the area, in acres, of each planning unit (3,118 ac), and no modifications were made to weight perimeter or shortfall costs. Planning units were not clipped to the CSP boundary. To reduce edge selection bias (either too much or too little), all planning units with their center outside of the CSP were given a base cost of 66% of the interior units (2,058 instead of 3,118). Each site selection session consisted of 20 runs of 5 million iterations each. The run with the lowest cost was chosen as the best overall solution.

Species	Birds/ km ² *	Population size - # of individuals	Acres to support 1 population	CSP Goal (# of pop- ulations)	GOAL (acres)	Available priority habitat (acres)	Available total (acres)	% of priority habitat needed to meet goal
Brewer's sparrow	3.22	7000	537,183	0.7	376,028	945,324	1,467,598	40%
Cassin's sparrow	9.99	7000	173,146	24	4,155,509	8,984,136	19,401,175	46%
Grasshopper sparrow	34.09	7000	50,740	21	1,065,543	2,996,569	19,566,294	36%
Loggerhead shrike	1.61	7000	1,074,367	3	3,223,101	8,155,880	22,913,903	40%
Massasauga		Use % of historic range		40%	2,038,180	4,591,355	4,591,355	44%
Ornate box turtle		Use % current range		60%	1,007,274	1,678,790	1,860,352	60%
Black-tailed prairie dog & Burrowing owl**			675,000	1	675,000	8,706,326	8,706,326	8%
Ferruginous hawk	0.08	1600	4,942,088	0.6	2,965,253	8,237,123	15,509,583	36%
Chestnut-collared longspur	1.42	7000	1,218,120	0.7	852,684	1,274,846	6,768,618	67%
McCown's longspur	2.34	7000	739,201	0.7	517,441	1,599,452	6,557,878	32%
Lark bunting	27.23	7000	63,523	41	2,604,442	9,769,848	17,360,658	27%
Long-billed curlew	0.19	3941	5,125,465	0.35	1,793,913	2,483,179	4,289,650	72%
Mountain plover	2.3	7000	752,057	2	1,504,114	3,513,717	7,510,614	43%
Swift fox		53,329 km ²	13,178,058	0.45	6,000,000†	8,489,347	17,536,658	71%

* From Sparks and Hanni (2006)

**1.5 x CDOW occupied acre goal to account for total CSP

†Rounded

Animal SAR scorecard analysis

The priority habitat maps described above were used in conjunction with mapped land ownership to evaluate the protection status of habitat for each SAR. In this analysis the concept of protection is based solely on legal tenure, and does not consider habitat quality or management intent. The GAP+ Managed/Protected Area and Potential Management Effectiveness for Biodiversity Categories of Neely et al. (2006) were assigned to one of three categories: Protected = GAP+ classes 1, 2a, 2b, Semi-protected = GAP+ classes 3a, 3b, 4a, 4b, No protection = all remaining GAP+ classes. The GAP+/GAP Plus Ranks - Central Shortgrass Prairie Ecoregion raster dataset was reclassified accordingly. The Tabulate Areas function in ArcView 3.3 was used to calculate the number of protected and semi-protected acres in each habitat priority class for each SAR. The results were used in construction of two scorecard graphs for each species summarizing 1) the amount of available potential suitable habitat (represented by bar height in each category), and the proportion of each category that has some level of protection or is not protected, and 2) the proportion of total acres with some protection, in comparison to the goal.

Protected and Semi-protected are shown as a single class in all graphs because the proportion of Protected acreages is less than 1% for all SAR, and can not be adequately displayed. Acres displayed on graph labels are rounded to the nearest 1,000.

Plant SAR scorecard analysis

As part of a Colorado statewide biodiversity scorecard (CNHP and TNC 2008a), four of the five plant SAR had been previously evaluated for conservation status. For this project, Arkansas Valley Feverfew (*Parthenium tetraeuris*) was combined with Round-Leaf Four O'Clock (*Mirabilis rotundifolia*) because they have similar distributions, and *P. tetraeuris*, as a more common species (G3), was not evaluated in the first round of the biodiversity scorecard for Colorado rare plants. Because these plants are endemic to Colorado, and because occurrence mapping for these species is much more detailed than for animal SAR, the Colorado scorecard was used instead of a new analysis. Mapped occurrences, Potential conservation areas, and the Arkansas Valley Barrens network of conservation areas (CNHP 2008a) were used to indicate priority habitat for the plant SAR. The Colorado scorecard analysis scored each SAR in three broad categories; *biodiversity status*, *threat status*, and *protection status*. Possible scores range from zero to ten, where zero represents conditions most at risk and ten least at risk.

Biodiversity status for each species included scores for size, quality, and landscape integrity. These scores are intended to mirror the element occurrence ranking factors of size, condition, and landscape context that are standard components of Natural Heritage methodology. The size score incorporates the number of documented occurrences, known occupied area, and estimated range in Colorado for each plant species. Quality was evaluated as the percentage of occurrences with good viability. Landscape integrity (impacts) was scored for the area within a ¼ mile buffer around each occurrence.

Threat status was evaluated for the primary threat listed in the element ranking record (CNHP 2008). Threat status was evaluated by ranking the scope, severity, and immediacy for the primary threat for each species. Categorical threat scores were calculated from this information, and are intended to reflect the degree to which a species is threatened by the most critical known threat.

Because land ownership status does not necessarily indicate effective management for an individual species, the protection status score is evaluated as land management status. Current land management status was evaluated using the Colorado Ownership, Management and Protection (COMaP) GIS dataset (Wilcox et al. 2007), in conjunction with the Conservation Management Status Measures developed by The Nature Conservancy (Supples et al. 2007). This score represents an overall protection level for the species, and does not indicate which occurrences are best protected.

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Appendix B

1. Recommended Conservation Tools
2. Recommended Framework for Conservation Programs
3. Case Studies of Innovative Conservation Programs
(notes and background information)



Section 1. Recommended Conservation Tools



Recommended Conservation Tools—Summary (1 of 5)

- This section focuses on which conservation tools the project team recommends to the DoD for use in its pursuit of conservation of species at risk (SAR) in the Central Shortgrass Prairie (CSP). The project team began by interviewing conservation experts to inventory the conservation tools known to be in use in the United States. This resulted in a list of 20 different conservation tools, some of which are only applicable to species already federally listed as threatened or endangered (see definitions to follow).
- Since none of the species on the SAR list are federally listed, the team focused on the tools that are applicable to non-federally listed species. Based on expert input, the team generated a list of 27 case studies to investigate how the different conservation tools have been implemented. A list of key criteria for selecting case studies was developed, and preliminary research screened each of the 27 case study candidates.
- Based on the initial screening research, 13 case studies were prioritized for further detailed research in preparation for phone interviews with case study participants. The top 10 most applicable case studies were completed and are included in section 3 of this document.
- Case studies were completed for the following conservation programs:
 1. Cooperative Sagebrush Initiative (CSI)
 2. Ft. Hood Recovery Credit System
 3. Ft. Lewis
 4. Gulf Coastal Plain Ecosystem Partnership (GCPEP)
 5. Horizon / Smoky Hills
 6. Jonah Natural Gas Fields
 7. Matador Ranch
 8. San Diego County Multiple Species Conservation Program
 9. Sandhills Taskforce (STF)
 10. Shortgrass Prairie Initiative (SGPI)

Recommended Conservation Tools—Summary

(2 of 5)

- Upon completion of the case studies, the list of conservation tools was then categorized into the following four groups and presented to the advisory group on October 4, 2008 for discussion:
 - 1. Traditional tools:** These are tools that already in use on a case-by-case basis in the CSP by many different Shortgrass Prairie Partnership members. Advisory group and project team members agreed that these tools are well understood and utilized, and would continue to be used by each partner independently. These are conservation easements, lease agreements, management agreements, restoration agreements, and traditional Farm Bill use (which means a landowner works directly with the USDA without technical support or cost-sharing from conservation partners).
 - 2. Collaborative tools:** These new tools were recently introduced on landscape-scale bases primarily outside of the CSP; the project team and advisory group agreed they warranted further investigation to evaluate if they could be used collaboratively by the SPP. These were: Candidate Conservation Agreement (CCA) , Candidate Conservation Agreement with Assurances (CCAA), conservation banking, grass cooperatives, Farm Bill facilitation (meaning with technical support or cost-sharing from conservation partners), Recovery Credit Systems (RCS), and voluntary offsite mitigation programs. Focus groups were then held with potential conservation partners and private landowners to learn which tools were most preferred in the CSP.
 - 3. Lower priority tools:** These are tools which include changes in land ownership, which is generally not desired by CSP landowners. These tools should still be available and applied at landowner's request but will not be actively promoted. Examples are purchase of rangeland by a non-traditional rancher, NGO, or absentee landowner.
 - 4. Excluded tools:** These are tools which require regulatory triggers or tools, for which other efforts are already underway to implement them in the CSP (carbon credits), or otherwise deemed not well suited to the CSP (e.g., agri-ecotourism).

Recommended Conservation Tools—Summary

(3 of 5)

- As previously mentioned, the advisory group agreed that some Collaborative tools warranted further investigation to determine their usefulness in the CSP. To accomplish this goal, the project team conducted two **focus group** meetings with CSP landowners to test their interest in the different tools. Landowners expressed the most interest in grass cooperatives (86% at least somewhat interested). In second place was recovery credit systems (72%) and CCAAs (70%). The team also held meetings with potential conservation partners, including the DoD, home developers, wind developers, and the USFWS to learn which tools were preferred and what would be required to implement them.
- The results of the focus groups, when combined with other key criteria, allowed the project team to prioritize which of the innovative tools should be introduced in the CSP and recommended to the DoD to pursue. The criteria used to evaluate each innovative tool were:
 1. **Ecological factors:** Does the tool leverage existing science or do new investments in science need to be made before this tool can be implemented?
 - **Results of team evaluation:** Conservation banking and recovery credit systems (RCS) are not ready for implementation based on existing science, because the ecological conditions of the landscape must be translated into units of economic “currency” or transparently-derived values for conservation credits such that the credits can be bought, sold, and exchanged. This is a complex undertaking that other programs have spent years and hundreds of thousands of dollars developing and is currently being tested in a non-regulatory environment for the first time by the Cooperative Sagebrush Initiative.
 2. **Economic factors:** Does the tool offer conservation at a relatively low cost-per-acre-per-year than other tools?
 - **Results of case studies:** Long-term conservation tools like perpetual easements are typically more expensive than short-term tools like temporary management agreements, at least initially. Therefore, conservation banking and voluntary offsite mitigation programs rated lowest on this criteria. Start up costs for recovery credit systems can also be high, due to the need for developing measures of currency as noted above. CCAAs are rated at the same level as RCS since CCAAs also involve an investment in personnel to work with landowner on developing the conservation agreements. Farm Bill Facilitation programs rated second-best because of the ability to leverage federal funding in every conservation project. Although start up costs (i.e. capital to purchase bank) are high, the top-scoring tool on this criteria was grass cooperatives because it’s possible for a grass cooperatives to earn a profit, once the bank has been purchased. In the worst years, the Matador costs \$70,000 per year, but covers ~160,000 offsite acres under temporary conservation agreements, at an annual cost of less than 50 cents per acre.

Recommended Conservation Tools—Summary

(4 of 5)

2. Economic factors (continued):

- b) Is the tool scalable? In other words, can new landowners be added at a low marginal cost or is there an upper limit on how many landowners can be involved?
- a) **Results of case studies:** CCAAs, Farm Bill Facilitation programs, and Recovery Credit Systems are scalable at low marginal costs. Additional landowners can be added and can benefit from the prior investments made in developing the tool. In contrast, with grass cooperatives, conservation banks, and voluntary offsite mitigation programs, the number of participating landowners is limited by the original design.

3. Social factors:

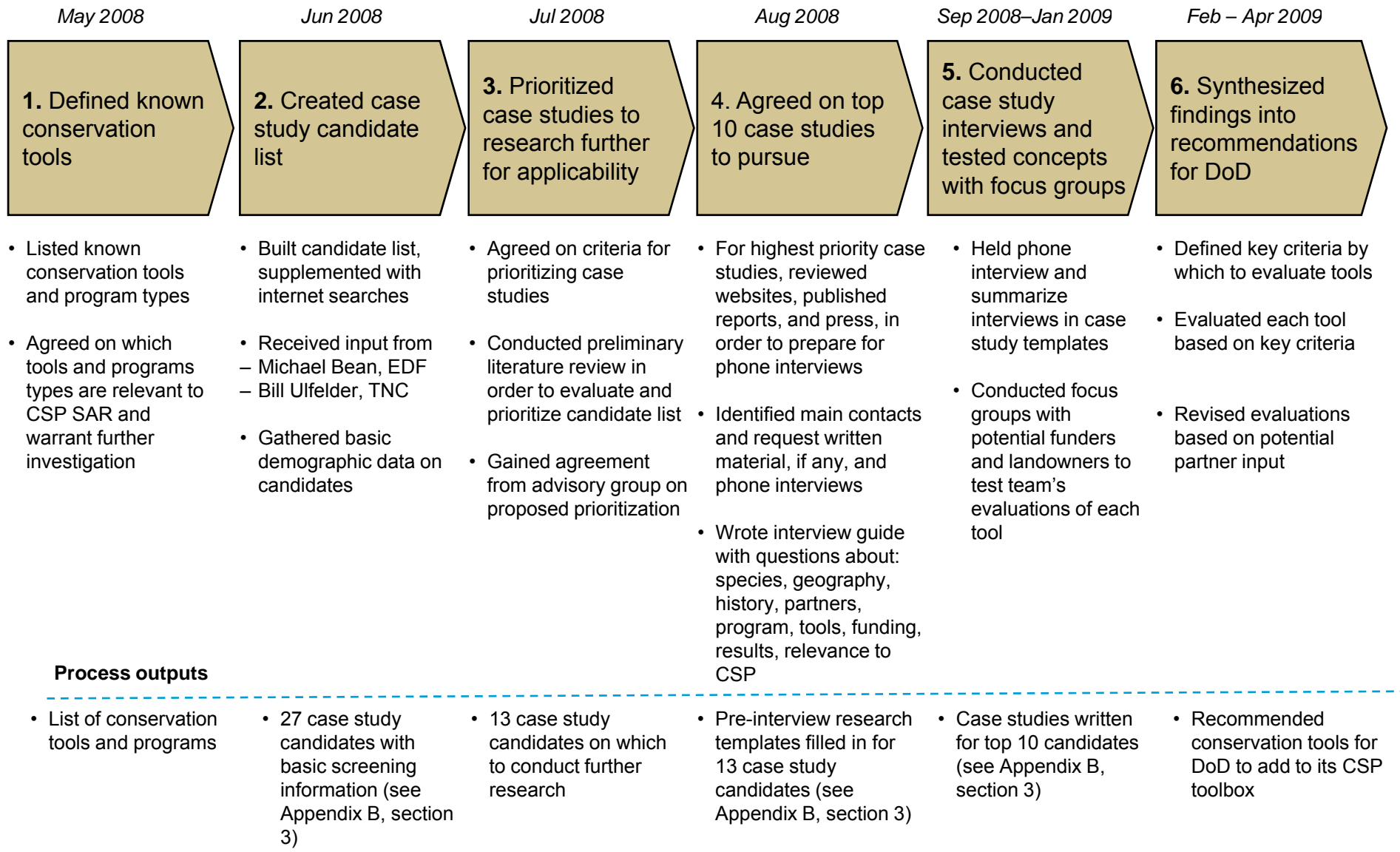
- a) Are CSP landowners interested in participating in a program based on the tool?
- **Results of focus groups:** Landowner interest in each tool was rated based on the results of two focus groups, as previously described. The rating shown for the Farm Bill Facilitation program needs some clarification: most landowners already participate in the Farm Bill, and therefore one might rate this tool high on landowner interest. Instead, the rating shown reflects landowner interest in increasing participation in the Farm Bill, above the level at which the landowner currently participates, including receiving support and funding from conservation partners to make better use of the Farm Bill. Landowners generally reported wanting to try one of the other new tools rather than increasing their use of the Farm Bill.
- b) Has the tool been sufficiently demonstrated in environments where species are not federally listed?
- **Results of case studies:** Conservation banking and recovery credits systems have not been implemented for species that are not federally listed (CSI is currently using USDA CIG funding to try). Voluntary offsite mitigation programs have been implemented for unlisted species; however, in each known example, the funder is responding to some level of regulation or non-voluntary requirement. CCAAs are intended for non-federally listed species, but because they have only recently been implemented, their success is difficult to measure. Grass cooperatives have been implemented for unlisted species, and are well suited to address a variety of species whether they are listed or not.

Recommended Conservation Tools—Summary

(5 of 5)

- Based on our criteria and evaluation, the top scoring tools are CCAAs and grass cooperatives, followed by voluntary offsite mitigation funds and innovative Farm Bill use (as shown in the order below).
 1. **Grass cooperatives:** Not only are grass cooperatives possibly the lowest cost conservation tools but they can also be a vehicle for improving relations between the DoD and private landowners.
 2. **Onsite CCA:** would align management practices across 7 DoD installations totaling ~450,000 acres; could streamline ESA consultation, if necessary, demonstrated within DoD: Ft. Lewis, Eglin AFB (MOU), Camp Blanding, Ft. Benning; Ft. Gordon, Ft. Rucker, Ft. Stewart, Blount Island Command
 3. **Offsite CCAAs:** an investment in developing a CCA for the DoD and other public landowners can be later leveraged to a CCA for private landowners. The Southern Idaho Ground Squirrel Programmatic CCA which has 5 landowners achieved a target of 50,000 acres covered by the CCA).
 4. Although **voluntary offsite mitigation** scored low on some factors (scalability, cost, overall landowner interest) it is still recommended to the DoD because more than 20% of landowners in focus groups reported they were “very interested” in participating, this tool would leverage existing science, and has previously been implemented with success in the Central Shortgrass Prairie.
 5. **Farm Bill Facilitation** also scored well overall, although landowners were generally more interested in other tools. Ultimately, Farm Bill is one of the largest sources of conservation funding and the SPP can help more private landowners access it in ways that meet their—and SAR’s—needs.
- **Conclusion:** Onsite conservation alone is insufficient to reduce the need for SAR list species to be federally listed. Therefore, it is important to develop offsite conservation tools. The DoD already employs a range of conservation tools, both temporary and permanent as well as onsite and offsite. These include Integrated Natural Resource Management Plans (INRMPs), the Readiness and Environmental Protection Initiative (REPI), the Army Compatible Use Buffer programs (ACUB), Sikes Act cooperative agreements, and Title 10 land exchanges. **The project team recommends that the DoD add to its conservation toolkit by adopting new tools such as grass cooperatives (both onsite and offsite, including models that achieve temporary as well as permanent conservation), Candidate Conservation Agreements (CCA) onsite and Candidate Conservation Agreements with Assurances (CCAAs, voluntary offsite mitigation funds, and Farm Bill facilitation.**

Process for Recommending Conservation Tools



Conservation Tools Considered: Definitions (1 of 4)



Included in case studies



Excluded from case studies

Conservation tool (Alphabetical order)

Definition

1. Agri/Eco-Tourism and Hunting

- Private landowners manage their lands in ways compatible to conservation and allow access to their land for tourism or recreation. Fees may either be paid by visitors or a program that compensates landowner for access (with or without guide service).

2. Candidate Conservation Agreement (CCA)

- Voluntary agreement between any landowner (public or private, but typically a federal agency) and the USFWS for currently unlisted species that are candidates for future listing or potential candidates. In the CCA, the landowner agrees to conservation actions for the species. No assurances are provided (see CCAA below), but the participating landowners hope that the CCA, implemented across a landscape, may become a reason for a reduced need to list a species (as has been done).

3. Candidate Conservation Agreement with Assurances (CCAA)

- Voluntary agreement between a non-federal landowner and USFWS for species not currently listed but are candidates for listing or potential candidates. The landowner agrees to conservation actions for the species in return for protection against future increased regulatory restrictions should the species become listed. The landowner receives an “assurance” that is a future authorization for “take,” should the species become listed in the future.

4. Carbon Credits

- Voluntary programs that allow farmers and ranchers to earn revenue for selling carbon credits associated with actions that maintain or increase carbon storage (e.g. no-till crop production, protection from conversion to cropland).
- Companies that desire, or are required to reduce their greenhouse gas emissions can do so by purchasing carbon credits from landowners.
- Not evaluated because two other programs are already planned for CSP

Conservation Tools Considered: Definitions (2 of 4)



Included in case studies



Excluded from case studies

Conservation tool (Alphabetical order)

Definition

5. Conservation Banking

- Regulatory-driven for the funder, voluntary for the land owner; resulting in permanent protection on land in the bank.
- Buyers mitigate for habitat destruction by buying credits from an organization that has already achieved restoration or creation of similar habitat elsewhere (also known as: Wetlands mitigation banking, Conservation banking, Biodiversity banking, Endangered Species Conservation banking, and others).
- Mitigation formulas are often 1:1 ratios (conservation to impact).
- The term “credit” is also used in banking programs as a unit of conservation measure (see USFWS’s Conservation Banking guidelines).

6. Conservation Buyer

- An organization works to match a conservation-minded buyer with a seller of a property to ensure future compatible management on the property.

7. Conservation Easement

- Landowner sells or donates one or more property rights in perpetuity, potentially including any of the "bundle of rights" held by a landowner (e.g., development, water, minerals, grazing, and haying).

8. Farm Bill - Traditional

- Technical assistance, cost-share and/or direct payments for the implementation of a wide variety of conservation measures on private lands (e.g., WHIP, EQIP, CSP).
- Farm bill programs can also provide funding for permanent or temporary conservation easements (e.g. GRP, WRP).
- NRCS works directly with the private landowner.

Conservation Tools Considered: Definitions (3 of 4)



Included in case studies



Excluded from case studies

Conservation tool (Alphabetical order)

Definition

9. Farm Bill Facilitation

- Technical and financial support is provided to agricultural producers and to NRCS to help deliver and implement Farm bill programs to producers. An example is the Colorado Division of Wildlife and Rocky Mountain Bird Observatory “Private Lands Program”. Through this program staff of these organizations provide support to NRCS and private landowners with project design and planning, wildlife management expertise, and project funding.

10. Fee title Purchase

- An organization buys a property outright for conservation purposes

11. Grass Cooperative

- Grazing land is offered in exchange for conservation actions on the participating rancher’s land. Some proposed grass cooperatives are based on the concept of guaranteed access to forage without any reciprocated conservation action, but this is not the type of grass cooperative that was considered in this project.

12. Habitat Conservation Plans (HCPs)

- USFWS program: large-scale mitigation plans usually related to development projects—not applicable to the CSP since none of the SAR are federally listed.

13. Lease Agreement

- Based on a legal contract with an agency or NGO, a landowner abstains from exercising development rights for a set period of time (renewable or not) in exchange for direct payments to landowner

14. Management Agreement

- Based on a legal contract with an agency or NGO, a landowner implements conservation based management practices (e.g., prescribed burning) for a set period of time (renewable or not) or in perpetuity; with direct payments to landowner and/or cost-share.

Conservation Tools Considered: Definitions (4 of 4)



Included in case studies



Excluded from case studies

Conservation tool (Alphabetical order)

Definition

15. Voluntary Offsite Mitigation

- Advanced offsite mitigation for destruction or degradation of habitat expected in the future
- May be referred to as “hybrid mitigation” when onsite conservation is required as well to meet mitigation goals (e.g., (see section 3 of this document for CSI and Jonah Fields case studies).

16. Recovery Credit System (RCS)

- Goal is recovery and net conservation gains (not just zero-sum mitigation and not based on formulas or caps).
- Competitive process on the conservation implementers’ side to drive down costs of conservation.
- Ft. Hood RCS is the only such program in existence. It is modeled after the USDA-NRCS Conservation Reserve Program (see section 3 of this document for case study).

17. Regulatory-Driven Permitting

- Conservation actions required by regulatory processes, such as ESA consultations prior to permitting for new development projects (e.g., residential housing, commercial development, oil and gas development).

18. Restoration Agreement

- Based on a legal contract with an NGO or agency, a landowner directs restores land or habitat for a set period of time (renewable or not) with direct payments to landowner and/or cost-share.

19. Safe harbor agreement

- Similar to a CCAA but used for species that are already federally listed (must be approved by USFWS). None of the SAR in this project are federally listed.

20. Traditional NGO

- A nonprofit organization with the mission of achieving conservation by implementing various tools (e.g., The Nature Conservancy, Environmental Defense Fund, Rocky Mountain Bird Observatory). While NGOs will likely play a role in the project’s recommendations, the recommended program can not rely only on one organization to be successful.

Criteria for Selecting Case Studies

Criteria used to prioritize conservation programs as potential case studies (in the order of importance shown):

1. Participation in the program is **voluntary** by all parties (not regulatory-driven).
2. The program seeks to conserve **multiple species**.
3. The program seeks to implement conservation projects on **multiple scales** (e.g., hundreds of acres for plants but thousands of acres for birds).
4. The program seeks to conserve **similar species** as those on the **SAR list**.
5. The program involves the participation of **multiple agencies and private landowners**.
6. The program employs a **range of conservation tools**.
7. The program is far enough along in its development that **lessons can be learned** from either its success or failure.
8. The program includes **DoD participation**.

Note: The project team did not expect the final 10 case studies to meet each of the above criteria. Rather, the team hoped each case study would meet at least one or more of the above criteria, so that with the final range of case studies, there would be at least one example for each of the above criteria.

Case Study Candidates Screened

1. Agua Fria Multi-Species Conservation Bank (CA)
2. Balcones Canyonlands Conservation Plan (TX)
3. Blackfoot Challenge (MT)
4. Campbell Ranch Conservation Bank (CA)
5. Cooperative Sagebrush Initiative (Western states)
6. East Plum Creek Conservation Bank (CO)
7. Gulf Coastal Plain Ecosystem Partnership (FL)
8. Ft. Hood Recovery Credit System (TX)
9. Ft. Lewis (WA)
10. Hickory Pass Ranch Conservation Bank (TX)
11. Horizon / Smoky Hills
12. Jonah Natural Gas Fields
13. Laikipia (Kenya)
14. Lost Pines Habitat Conservation Plan (TX)
15. Malpai (AZ, NM)
16. Matador Ranch (MT)
17. Mobile County Gopher Tortoise Conservation Bank (AL)
18. Mount Owen Biodiversity Offset (New South Wales)
19. North Carolina Sandhills Conservation Partnership (NC)
20. Prairie Partners Program (CO)
21. San Diego County Multiple Species Conservation Program (CA)
22. Sand Hills Taskforce (NE)
23. Shortgrass Prairie Initiative (CO)
24. Southern Victoria BushTender Project (Australia)
25. Thunder Basin Prairie Grassland Ecosystem Project (WY)
26. Utah Prairie Dog Recovery Credit System (UT)
27. Wildlands Inc. (GA & Pacific NW)

Note: Case studies were only written for the top 10 candidates (see section 3 of this document).

Screening Results of Case Study Candidates Against Evaluation Criteria

Prioritization criteria (in order)	Candidate Name																											
	1. Agua Fria Multi-Species Bank	2. Balcones Canyonlands Plan	3. Blackfoot Challenge	4. Campbell Ranch Bank	5. Cooperative Sagebrush Initiative	6. East Plum Creek Bank	7. Ft. Hood Recovery Credit System	8. Ft. Lewis Conservation Partnership	9. Gulf Coastal Plain Partnership	10. Hickory Pass Conservation Bank	11. Horizon / Smoky Hills	12. Jonah Natural Gas Fields	13. Laikipia	14. Lost Pines Habitat Plan	15. Malpai	16. Matador Ranch	17. Mobile County Tortoise Bank	18. Mount Owen Biodiversity Offset	19. N. Carolina Sandhills Cons Part.	20. Prairie Partners Program	21. San Diego County Program	22. Sand Hills Taskforce	23. Shorgrass Prairie Initiative	24. Southern Victoria Bush Tender	25. Thunder Basin Prairie Project	26. Utah Prairie Dog Credit Exchange	27. Wildlands Inc.	
1. Voluntary participation	?	●	●	●	●	●		○	?	●	○	○	○	○	●	●	●	○	○	○	○	○	○	○	○	○	○	○
2. Multiple species	●	●	○	●	●	●		●	○	○	●	●	●	○	●	●		○	○	○	○	○	○	○	○	○	○	○
3. Multiple scales		●	○	○	○	○		○	○	○	○	○	○	○	○	○												
4. Similar to SAR species	○	○	?	○	?	○		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
5. Multiple agencies & landowners	?	●	●		●			○	?		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6. Range of conservation tools	○	●	○	○	○	○		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
7. Offers lessons learned	?	○	○	○	○	○		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
8. DoD participation	?						●	●							?			○			○							

Note: Case studies were only written for the top 10 candidates (see section 3 of this document).

Completed Case Studies

Completed case studies

- | | |
|---|---|
| 1. Cooperative Sagebrush Initiative (CSI) | 6. Jonah Natural Gas Fields |
| 2. Ft. Hood Recovery Credit System | 7. Matador Ranch |
| 3. Ft. Lewis Conservation Program | 8. San Diego County Multiple Species Conservation Program |
| 4. Gulf Coastal Plain Ecosystem Partnership (GCPEP) | 9. Sandhills Taskforce (STF) |
| 5. Horizon / Smoky Hills Mitigation Program | 10. Shortgrass Prairie Initiative (SGPI) |

Complete summaries in Appendix B, section 3

Case studies researched¹

11. Blackfoot Challenge
12. Malpai Borderlands Group
13. Southern Victoria BushTender Project

Background research in Appendix B, section 3

Case studies screened²

- | | |
|--|---|
| 14. Agua Fria Multi-Species Conservation Bank | 21. Mobile County Gopher Tortoise Conservation Bank, AL |
| 15. Balcones Canyonlands Conservation Plan | 22. Mount Owen Biodiversity Offset |
| 16. Campbell Ranch Conservation Bank | 23. North Carolina Sandhills Conservation Partnership |
| 17. East Plum Creek Conservation Bank, CO | 24. Prairie Partners Program |
| 18. Hickory Pass Ranch Conservation Bank, TX | 25. Thunder Basin Prairie Grassland Ecosystem Project |
| 19. Laikipia | 26. Utah Prairie Dog Recovery Credit System |
| 20. Lost Pines Habitat Conservation Plan (LPHCP) | 27. Wildlands Inc. |

1. While these three candidates would have been interesting and valuable case studies, in order to stay within time constraints and budget, the team limited itself to completing the top ten case studies only.
2. These case studies did not rate highly when the preliminary screening information was evaluated against the team's criteria for prioritization as shown on the prior slide.

Note: See section 3 of this document for case study summaries.

Overview of Case Studies Completed (1 of 3)

Case study	Location	Acres in scope	Species in scope	Relevance to CSP	Differences from CSP
1. Cooperative Sagebrush Initiative (CSI)	Non-coastal Western states	Many million acres	1 (Greater Sage Grouse) + habitat	<ul style="list-style-type: none"> • Dependent on private landowner participation for success • No federally listed or candidate species included 	<ul style="list-style-type: none"> • Focusing only on CCAAs and credit banking systems
2. Ft. Hood Recovery Credit System (RCS)	Texas Hills	? (30 counties)	1 (Golden-Cheeked Warbler)	<ul style="list-style-type: none"> • Fort Hood is a formal partner as a funder and taking management action on-base 	<ul style="list-style-type: none"> • DoD’s participation is driven by a regulatory need for mitigation for a federally listed species
3. Ft. Lewis Conservation Program (including CCAA)	Puget Sound Grasslands, Washington State	? (2 counties)	ACUB ¹ : 4 CCAA ² : 12	<ul style="list-style-type: none"> • Fort Lewis is a formal partner in an ACUB* program, a CCAA, and on-base management (ACUB variation: funds go to off-base management and conservation, not acquisition) • ACUB and CCAA could be expanded to include additional private landowners 	<ul style="list-style-type: none"> • Only one 40-acre private landowner included—animal sanctuary • 12 Candidate species
4. Gulf Coast Plain Ecosystem Partnership (GCPEP)	Western Florida and southern Alabama	1 million acres	11	<ul style="list-style-type: none"> • Eglin AFB is a formal partner with >50% of the land in scope • Eglin AFB utilizes REPI 	<ul style="list-style-type: none"> • Some federally listed or candidate species • No non-corporate private landowner participation

1. Army Compatible Use Buffer Program

2. Candidate Conservation Agreement with Assurances

Note: See section 3 of this document for case study summaries.

Overview of Case Studies Completed (2 of 2)

Case study	Location	Acres in scope	Species in scope	Relevance to CSP	Differences from CSP
5. Horizon / Smoky Hills	Kansas	?	? (none federally listed)	<ul style="list-style-type: none"> • Grasslands • No federally listed species • Wind power development potential • Voluntary mitigation 	<ul style="list-style-type: none"> • Not a species-specific program, based on habitat only
6. Jonah Natural Gas Fields	Southwest Wyoming: Upper Green River Valley	?	9 (none federally listed)	<ul style="list-style-type: none"> • Grassland • No federally listed species • Oil and gas development potential 	<ul style="list-style-type: none"> • None significant
7. Matador Ranch	Montana grasslands	>200k acres	11	<ul style="list-style-type: none"> • Dependent on private landowner participation for success • High overlap in species 	<ul style="list-style-type: none"> • None significant

Note: See section 3 of this document for case study summaries.

Overview of Case Studies Completed (3 of 3)

Case study	Location	Acres in scope	Species in scope	Relevance to CSP	Differences from CSP
8. San Diego Multi-Species Conservation Program (MSCP)	San Diego County	~600k acres (target ~170k for conservation)	>200 (93 “special concern”)	<ul style="list-style-type: none"> • Involves many public and private landowners 	<ul style="list-style-type: none"> • Mostly regulatory driven by need for discretionary permits • Voluntary component based on land acquisition • 5 year planning phase • DoD not involved, though present • ~30% urban, ~45% vacant
9. Sandhills Taskforce (STF)	Nebraska grasslands	12.5 million acres	10+	<ul style="list-style-type: none"> • Dependent on private landowner participation for success • High overlap in species 	<ul style="list-style-type: none"> • Private-landowner driven and run • No DoD involvement
10. Short-grass Prairie Initiative (SGPI)	Central Shortgrass Prairie	Colorado portion of CSP (30k acres conserv.)	38	<ul style="list-style-type: none"> • Same ecoregion in CO; same science methods • Same model of conserving species based on mitigation funder 	<ul style="list-style-type: none"> • CDOT no longer involved at all (one-time funder) • At the time: 4 federally listed and 4 candidate species (fewer now)

Note: See section 3 of this document for case study summaries.

Case Study Interviewees

The generous people below helped the project team understand the conservation programs and tools used in these case studies. Any unintentional errors in the case study summaries are the responsibility of the team and not the interviewees.

Case Study	Interviewee	Organization	Contact information
Cooperative Sagebrush Initiative (CSI)	Michael Bean	Environmental Defense Fund	mbean@edf.org
Ft. Hood Recovery Credit System	David Wolfe	Environmental Defense Fund	dwolfe@edf.org
Ft. Lewis Conservation Partnership	Hannah Anderson	The Nature Conservancy	handerson@TNC.ORG
Gulf Coastal Plain Ecosystem Partnership (GCPEP)	Vernon Compton	The Nature Conservancy	vcompton@TNC.ORG
Horizon / Smoky Hills	Robert Manes	The Nature Conservancy	rmanes@TNC.ORG
Jonah Natural Gas Fields	Joe Kiesecker	The Nature Conservancy	jkiesecker@tnc.org
Matador Ranch	Brian Martin	The Nature Conservancy	bmartin@TNC.ORG
San Diego County Multiple Species Conservation Program	Betsy Miller	City of San Diego	BMiller@sandiego.gov
Sandhills Taskforce (STF)	Jim Van Winkle James Luchsinger	The Nature Conservancy, Sandhills Taskforce	jluchsinger@TNC.ORG; vanwinkle@gpcom.net
Shortgrass Prairie Initiative (SGPI)	Lee Grunau	Colorado Natural Heritage Program	Lee.Grunau@ColoState.EDU

Conservation Tools Used in Case Studies

- ✓ Used in case study
- ✓ Planned or external tools
- red Not applicable to CSP SAR
- Innovative tools further explained on following slides

Completed case studies	1. Agri/eco-tourism & hunting	2. CCA/As	3. Carbon credits	4. Conservation banking	5. Conservation buyers	6. Conservation easements	7. Farm Bill - traditional	8. Farm Bill facilitation	9. Fee title purchase by NGO	10. Grass cooperative	11. Habitat conservation plans	12. Lease agreements	13. Management agreements	14. Voluntary offsite mitigation	15. Recovery credit system	16. Regulatory-driven permitting	17. Restoration agreements	18. Safe harbor agreements	19. Traditional NGO
1. CSI		✓													✓				
2. Ft. Hood RCS													✓	✓	✓				
3. Ft. Lewis		✓				✓			✓				✓	✓			✓		
4. GCPEP						✓			✓				✓	✓					
5. Horizon / Smoky Hills						✓			✓				✓	✓					
6. Jonah Fields						✓			✓				✓	✓					
7. Matador Ranch	✓					✓			✓	✓			✓						✓
8. San Diego MSCP				✓		✓			✓		✓		✓	✓		✓			
9. Sandhills Taskforce						✓		✓				✓	✓						
10. Shortgrass Prairie Initiative						✓							✓	✓					

Note: See section 3 of this document for case study summaries.

Conservation Tool Evaluation: CCA/As

Definition:

- An agreement between the USFWS and one or more **non-federal** property owners or lease holders (an agency or NGO can enter into a programmatic or umbrella CCAA on behalf of multiple private landowners)
- Extends to participating landowners an assurance that, even if a species covered by the CCAA is subsequently listed, that listing will not change the regulatory requirements applicable to the property owner's property, provided the owner continue to implement the conservation actions they agreed to as part of CCAA.
- A signatory to a CCAA can revoke authorization at any time without penalty except for loss of assurance.

History:

- 18 CCAAs thought to be completed (Ft. Lewis awaiting USFWS issuance), with some covering multiple species; some of these are umbrella CCAAs with no private signatories yet (but possible).
- 18 more thought to be currently in progress, with 6 covering multiple species
- DoD has participated in 7 CCAs (Ft. Lewis is also a CCAA)
- A new CCAA in NM has for the first time allowed a private landowner to receive assurances on federally leased land.
- Grayling CCAA for the Big hole River has the largest number of private landowners: 30.

Pro's:

- Would align management practices across 7 DoD installations in CSP covering ~450k acres
- DoD is already experienced with CCAs, two of which resulted in removals of candidate statuses
- Assurances provide a powerful incentive for non-federal landowners to reduce risk, even on federally-leased lands
- Particularly appropriate when a landowner fears that conservation actions will increase populations of at-risk species and thus cause more of a landowner's activities to be at risk from potential federal listing,
- May be most applicable to the rare plants SAR group which occur mainly on DoD land

Con's:

- Appear to require 1 – 2 years of concerted team effort to create
- It's believed that later CCAAs have become more complex than earlier ones

Known Examples of CCAAs (1 of 2)

Name	USFWS Region	Year issued	Species	Signatories ¹ (other than USFWS)	Notes
1. Idaho Department of State Lands Spotted Frog CCAA	1	2006	Frog, Columbia spotted	IDFG and IDL	
2. ODFW Columbian-Sharp Tailed Grouse	1	2000	Grouse, Columbian sharp-tailed	Oregon Department of Fish and Wildlife	
3. Soulen Ranch Southern Idaho Ground Squirrel CCAA	1	2002	Squirrel, Southern Idaho ground	Soulen Livestock, Inc., the Idaho Department of Fish and Game, and the Idaho Governor's Office of Species Conservation	
4. Southern Idaho Ground Squirrel Programmatic	1	2005	Squirrel, Southern Idaho ground	Private Landowners, Idaho Department of Fish and Game, Idaho Office of Species Conservation	5 private properties ~50k acres total
5. Tagshinney Tree Farm	1	2004	Frog, Oregon spotted, Goshawk, northern, Trout, coastal cutthroat, Bat, Pacific Townsend's big-eared, Myotis, long-eared , Myotis, long-legged, Flycatcher, olive-sided, osprey, woodpecker, Pileated, Turtle, northwestern pond , salamander, Van Dyke's, Heron, great blue,		No signatories noted on USFWS website as of 3/27/09
6. Three Mile Canyon Farms Multi Species CCAA	1	2004	Squirrel, Washington ground , Hawk, ferruginous , Sparrow, Bell's sage , Shrike, Loggerhead ,	The Nature Conservancy	
7. Candidate Conservation Agreement with Assurances for Lesser Prairie-chicken between Texas Parks and Wildlife Department and U.S. Fish and Wildlife Service	2	2006	Prairie-chicken, lesser	Texas Parks and Wildlife Department	
8. Eastern massasauga rattlesnake CCAA for Rome State Nature Preserve, Ashtabula County, Ohio	3	2006	Massasauga (=rattlesnake), eastern,	No info	

Known Examples of CCAAs (1 of 2)

Name	USFWS Region	Year issued	Species	Signatories ¹ (other than USFWS)	Notes
9. Adams Cave Beetles CCAA	4	2005	Cave beetle, lesser Adams , Cave beetle, greater Adams -	Southern Conservation Corporation, Kentucky State Nature Preserves Commission	
10. Robust redhorse - Ocmulgee River, GA	4	2002	Redhorse, robust -	GA DNR, GA Power	
11. Yellowcheek Darter, Upper Little Red River Watershed, Programmatic CCAA	4	2007	Darter, yellowcheek -	Arkansas Game and Fish Commission, Natural Resources Conservation Service, The Nature Conservancy	
12. Alexander	6	2002	Prairie-chicken, lesser -	No info	
13. Grayling CCAA for the Big hole River	6	2006	Arctic Grayling, Fluvial	Montana Fish, Wildlife and Parks, Natural Resources Conservation Service, Montana Department of Natural Resources and Conservation, and USFWS	33 private land with 164,182 acres which equals 51% of the private ground in the 320,000 acre project area
14. Gunnison Sage-grouse Umbrella CCAA	6	2006	sage grouse, Gunnison -	Colorado Division of Wildlife	
15. State of Montana Umbrella Agreement for Westslope Cutthroat trout	6	2004	Trout, westslope cutthroat -	Montana Fish, Wildlife & Parks. Potential Partners include any private citizen who desires a certificate of inclusion to the CCAA.	
16. Three Forks	6	2002	Trout, Colorado River cutthroat	PFFW, CDOW, WGFD	
17. Green Diamond Resource Co. Aquatic (formerly Simpson Resource Co.)	8	2007	Salamander, southern torrent -	No info	

DoD Participation in CCAs

Name	USFWS Region	Year issued	Species	Signatories ¹ (other than USFWS)	Notes
1. Flat-tailed horned lizard	2 & 8 (CA, AZ)	1997	Lizard, flat-tailed horned	BLM-CA Desert and Yuma; BurRec Yuma; Navy-EI Centro Naval Air Facility, Marine Corp-Yuma Air Stn. ; AZ Game and Fish; CDFG; CA Dept. of Parks and Rec. (signed on 6/9/97)	
2. Louisiana pine snake -- federal land (USFS and DoD)	2 & 4 (LA, TX,	2003	Snake, Louisiana pine	U.S. Forest Service's Southern Research Station; U.S. Forest Service Kisatchie National Forest; U.S. Forest Services's National Forests and Grasslands in Texas; Department of Defense , Fort Polk Military Installation; Texas Parks and Wildlife Department; Louisiana Department of Wildlife and Fisheries; U.S. Fish and Wildlife Service, Southwest Region, and U.S. Fish and Wildlife Service, Southeast Region	
3. White Sands pupfish	2 (NM)	1994	Pupfish, White Sands	US Army-White Sands Missile Range	Removed need to list
4. Stones River bladderpod (Lesquerella stonensis)	4 (TN)	1999	Bladderpod, Stones River	TN Dept. of Environment, TN Wildlife Resources Agency, US Army Corp of Engineers	Basis for removal from candidate status
5. Barneby's milkvetch	7 (AK)	1996	Milk-vetch, Barneby -	BLM, USAir Force, Elmendorf AFB	
6. San Clemente Island Fox	8 (CA)	2003	Fox, San Clemente Island	Department of the Navy	
7. Puget Sound Prairie Species	8 (WA)	Not yet issued (signed 2008)	12 species	WDFW, WDNR, Fort Lewis, The Nature Conservancy, Thurston County, and Wolf Haven (private)	Also a CCAA, 1 private property
8. Gopher Tortoise, Eastern Population	?	Not yet issued (signed 2008)	Gopher Tortoise, Eastern Population	Army, Navy, Air Force, Marine Corps, USFS, Alabama Department of Conservation and Natural Resources, Florida Fish and Wildlife Conservation Commission, Georgia Department of Natural Resources, South Carolina Department of Natural Resources, Poarch Band of Creek Indians, American Forest Foundation	

Conservation Tool Evaluation: Conservation Banking

Definition:

- A parcel of land containing natural resource values that are conserved and managed **in perpetuity**, through a conservation easement held by an entity responsible for enforcing the terms of the easement, for specified listed species and used to offset impacts occurring elsewhere to the same resource values on non-bank lands.

History:

- While many conservation banks exist for federally- listed species, none are known to exist for candidates for which no regulatory requirements exist for those creating impacts to buy credits.
- Cooperative Sagebrush Initiative is currently implementing a 3-year \$1 million grant from NRCS to develop and test conservation banking for a non-listed species

Pro's:

- Result in permanent protection of the lands in the conservation bank
- Creates tradable credits that can be bought and sold with transparency with regards to values

Con's:

- Calculating credit values is always difficult, scientifically, and the complexity is exacerbated by covering multiple species.
- Never implemented in non-regulatory environments

Conservation Tool Evaluation: Farm Bill

Definition:

- The Farm Bill is a large piece of legislation, renewed every 5 years, that provides many government assistance programs (Commodity payments, school lunch programs, rural development etc...) . Particularly pertinent to the SPICE effort are the programs under Title II, the Conservation Title.
- Two of the main types of programs in Title II are: 1: Land Conservation Programs: Wetlands Reserve Program (WRP), Conservation Reserve Program (CRP), Grasslands Reserve Program (GRP) and Farm & Ranchland Protection Program (FRPP) which provide an easement type agreement either term or perpetual. 2: Working Lands Programs: Environmental Quality Incentive Program (EQIP), Conservation Stewardship Program (CSP), and Wildlife Habitat Improvement Program (WHIP) which provide a cost share to landowners to develop and or manage ground for wildlife habitat . There may also be incentive payments with EQIP

History:

- In the past 5 years, over \$2 million has been available in CO ANNUALLY for wildlife conservation under the working lands programs with only 1/3 of that being spent annually. In addition there is a lack of technical knowledge on how to apply these \$'s on-the-ground for SAR. In some cases the funds may be expended on projects that are counter productive to the needs of SAR species (tree plantings, shrub removal etc...). At least 10 times this amount is available annually for conservation actions related to habitat needs of SAR species.
- Capacity is needed to add biologists who can provide sound TA for SAR species utilizing FB Programs

Pro's:

- Farm Bill programs are the largest source of conservation dollars in the US.
- Programs address a wide variety of resource concerns including rare wildlife habitat.
- Farm Bill is widely utilized and accepted source of funding among landowners.
- Framework is in place to implement a TA and project delivery program.
- It will likely remain as a long-term source of conservation funding.

Con's:

- Some producers (many ranchers) refuse to receive government subsidies for Ag. Operations.
- In the past project impacts have been difficult to monitor (i.e. lack of funding) to know what the impacts or effects are on SAR.

Conservation Tool Evaluation: Grass Cooperatives

Definition:

- Grazing land is offered in exchange for ranchers' voluntary commitments to conservation measures on home ranches.
- Leases can vary in duration depending on conservation values and the extent of trusted relationships between the grass cooperative owner and the grass cooperative users (ranchers).

History:

- Only a handful of grass cooperatives believed to be in existence (see next slide)

Pro's:

- Reduced grazing fees are a powerful incentive for private landowners to improve ranch profitability (or maintain status quo even with additional conservation practices)
- Low annual out-of-pocket costs to secure management commitments.
- Based on management and restoration agreements, which are favored tools by CSP private landowners.

Con's:

- Would require intensive management in coordination, implementation, and monitoring

Known Examples of Grass Banks/Cooperatives

Grass bank /cooperative name (year established)	Location	Grass Cooperative owner	Grass Cooperative size (total acres, owned and leased)	Number of participating ranches	Total size of home ranches covered by conservation agreements (acres, owned and leased)
Matador Ranch (2002)	Northeastern Montana	The Nature Conservancy	60,000	10—16 (varies by year)	160,000 temporary agreements
Gray Ranch (1994)	Southern Arizona/New Mexico	Malpai Borderlands Group	310,000	4	25,000 permanent easements
Valle Grande (1997)	New Mexico	Conservation Fund	36,240	7 grazing associations	Not available
Vina Plains (2001)	Northern California	The Nature Conservancy	4,600	1	500
Heart Mountain (2001)	Wyoming	The Nature Conservancy	15,137	3	170,000
Rocky Mountain Front (2001)	Montana	2 contiguous private landowners	380	1	5780
Eberts-Elkhorn (still planning in 2008)	North Dakota	U.S. Forest Service (under challenge)	23,200	Not yet established	Not yet established

Grass Cooperative can be Started with or without Land Acquisitions

Start-Up Method	Status	Examples	Descriptions
Purchased by nonprofit	Used successfully	<ul style="list-style-type: none"> • Matador Ranch • Valle Grand • Heart Mountain • Vina Plains 	A nonprofit entity purchases property and designates it as a grass cooperative
Leased by producer—grazing rights compensated	Used successfully	Gray Ranch	A nonprofit entity fundraised to compensate a landowner for giving his grazing rights to neighboring landowners in exchange for participating ranchers' willingness to take conservation action on the home ranches
Leased by producer—grazing rights donated	Used successfully	Rocky Mountain Front	A nonprofit entity facilitated the leasing of grazing rights on a privately-held property to a private lessee
Publicly-owned	In development (with challenges)	Eberts-Elkhorn (former home of Theodore Roosevelt)	U.S. Forest Service challenged by Medora Grazing Association to keep historical grazing allocations
Donated to nonprofit	Not used?	None known	Identify an entity willing to donate land (fee title) for use as a grass cooperative
Cooperatively purchased by lessees	In development	None known	Bring together a group of neighboring producers who would donate conservation easements on their home ranches, generating tax credits which can be used to pool resources to purchase a grass cooperative property, to be run as a corporation jointly owned by lessees. Potentially leverage the Grasslands Reserve Program (GRP) and the Farm and Ranch Protection Program (FRPP) as potential funding sources along with private and other public sources.

Shortgrass Prairie Partnership Already Pursuing Some Possible Grass Cooperative Opportunities

Name of possible grass cooperative opportunity	CSP geographic location	Possible grass cooperative property owner	Status
Wind-lease model	Southeastern Colorado	Producer with land leased to wind farm	SPP already in discussion with a landowner who may wish to lease out his grazing since he is no longer grazing cattle since wind turbines have been installed on his ranch.
Cooperative Ownership Model	Southeastern Colorado	Cooperative ownership by lessees and conservation group	SPP already in discussion with neighbors near a ranch currently listed for sale pursuing a cooperative ownership model
Matador Admirers	Eastern Colorado	To be determined	SPP already in discussion with cattlemen’s association that visited Matador Ranch
State-owned	Eastern Colorado	Colorado State Land Board or Cimmaron Lesser Prairie-Chicken group	<ul style="list-style-type: none"> • Several state agencies already SPP partners—need to explore interests
Federally-owned	Northeastern or southeastern Colorado	U.S. Forest Service (Pawnee and Comanche grasslands); DoD (Warren and Shriever AFB, Pueblo Chemical Depot)	<ul style="list-style-type: none"> • Need to initiate discussion with USFS; landowners have expressed interest • Discussed onsite grass cooperatives with DoD in CSP and small opportunities may exist; landowners have expressed interest
Private Wyoming	Southeastern Wyoming	To be determined	Need to identify opportunity with local landowners

Conservation Tool Evaluation: Voluntary Offsite Mitigation

Definition:

- A conservation fund provided by an entity that expects to have environmental impacts due to development (e.g., oil and gas, wind, pipeline, roads, housing, etc.).
- The funding is usually used to buy conservation easements on properties with similar ecological profiles to the land that will be impacted (i.e., same habitat, same target species). In the best programs, there is also funding set aside for long term management and monitoring.
- The funding may also be used to pay for restoration or management agreements.
- If it is found that there is not enough land to conserve that would mitigate for the expected impacts, then onsite mitigation may be required as well as offsite.

History:

- Three offsite mitigation programs are believed to exist (see Appendix B, Section 3 for case study summaries):
 1. Shortgrass Prairie Initiative (SGPI); funder: Colorado Department of Transportation
 2. Horizon / Smoky Hills; funder: Horizon Wind Energy in Kansas
 3. Jonah Fields; funder: BP and Encana in Wyoming

Pro's:

- Since conservation easements are usually used in voluntary offsite mitigation programs, permanent conservation results.
- There is an ecological match between lands that are impacted and lands that are conserved.
- Mitigation funders have the opportunity to leverage the program into positive public relations.
- A proposal to offer voluntary offsite mitigation funds may help a developer win an RFP process and expedite permitting approvals.

Con's:

- The programs can take a long time to implement (SGPI took 9 years).
- Once the mitigation fund is spent, the program is for the most part over, except for long term management responsibilities (i.e., SGPI project team is defunct).
- Voluntary offsite mitigation programs require more funding than other tools that use temporary conservation.

Conservation Tool Evaluation: Recovery Credit System

Definition:

- A voluntary natural resource management program providing technical assistance/funding to private landowners with qualifying lands that support habitat for listed species (have been term agreements to date but can be permanent).
- Mechanism allows federal agencies to offset adverse effects of harming or destroying listed species habitat on their land if they purchase recovery credits from private landowners who agree to protect or conserve species habitat
- Private landowners with endangered species habitat can sell credits to promote recovery of listed species
- Credits are held in a bank for use to offset impacts to target species' habitat

History:

- Ft. Hood established RCS to offset habitat losses for endangered golden-cheeked warbler on DoD land modeled after CRP; landowners voluntarily participate in a conservation program in exchange for technical guidance and cost share assistance; landowners enter into 10-30 year contracts (they are currently in a 3 year proof of concept phase); project considering incorporating conservation easements in the future
- In July 2008, USFWS released final guidance on RCS designed to help federal agencies conserve species on non-fed lands

Pro's:

- Provides landowners with incentives for to manage habitat to offset activities that could damage existing habitat for endangered species.
- Provides a good tool for public agencies and private landowners to work together to conserve species
- Federal agencies can shift emphasis and burden of species recovery to private lands or less controversial public lands as long as it improves species conservation status.
- Builds measurable conservation benefits leading to recovery goals for listed species.
- Good for species with small ranges and specific habitat needs
- Incentives, i.e., funding for management, attract landowners to participate
- Provides tool to enhance habitat, not just maintain status quo

Con's:

- Term lease commitments represent only temporary security for species
- May be difficult in areas with lots of public land surrounded by small amounts of private lands (but this is not case in the CSP)
- Species with large distributions and complex landownership may be challenging
- Public oversight is limited as landowner privacy protected
- Some say feds are shifting management of listed species to private lands where gov't has limited control

Preliminary Evaluation of Conservation Tools Based on Case Studies

Interpretation of next slide

- As described earlier, the project team started with a list of 20 different conservation tools. Based on case studies and other literature review, the project team divided these 20 tools into four categories.
 - Traditional tools:** These are tools that already in use on a case-by-case basis in the CSP by many different Shortgrass Prairie Partnership members. Advisory group and project team members agreed that these tools are well understood and utilized and would continue to be used by each partner independently. Some of these tools are short-term in nature, such as lease agreements, management agreements, and use of Farm Bill program. The DoD may wish not to use these temporary tools although other members of the SPP will.
 - Collaborative tools:** These new tools were recently introduced on landscape-scale bases primarily outside of the CSP (with the exception of Farm Bill facilitation and voluntary offsite mitigation programs). The project team and advisory group agreed they warranted further investigation to evaluate if they could be used collaboratively by the SPP.
 - Lower priority tools:** These are tools that include changes in land ownership, which is generally not desired by CSP landowners (92% private). These tools should still be available and applied at landowner's request but will not be actively promoted. Examples are purchase of rangeland by a non-traditional rancher, NGO, or absentee landowner.
 - Excluded tools:** These are tools which require regulatory triggers or tools, for which other efforts are already underway to implement them in the CSP (carbon credits), or otherwise deemed not well suited to the CSP (e.g., agri-ecotourism).
- These categories were shared with the project advisory group in October 2008, and all agreed that only the 2nd category, "collaborative tools" required further investigation. These are the tools that the team explored with land owners at focus group meetings. However, the project team decided not to evaluate conservation banking during focus groups because, in the interest of time, the project team felt that landowners' interest in conservation banking could be extrapolated from their responses to recovery credit systems (RCS) and voluntary offsite mitigation programs. The main difference between an RCS and a conservation bank is that an RCS is based on temporary conservation agreements while a conservation bank is based on permanent, conservation easements. Landowner interest in permanent conservation easements was covered in the discussions of voluntary offsite mitigation programs which are also based on the use of conservation easements.

Preliminary Evaluation of Conservation Tools Based on Case Studies

Initial categorization of conservation tools considered for DoD and partners to implement in the CSP: ■ Tested demand in focus groups with CSP private landowners

Include	Might include	De-prioritize	Exclude
1. Conservation easements	6. Candidate Conservation Agreement (CCA) / Candidate Conservation Agreement with Assurances (CCAAs)	12. Conservation buyers (private)	14. AgriEco-tourism and hunting ¹
2. Lease agreements	7. Conservation banking ²	13. Fee title purchase by NGO / agency	15. Carbon credits ³
3. Management agreements	8. Grass banking		16. Habitat conservation plans
4. Restoration agreements	9. Farm Bill Facilitation use		17. Safe harbor agreements
5. Traditional Farm Bill use	10. Recovery Credit Systems (RCS)		18. Traditional NGO
	11. Voluntary offsite mitigation		19. Regulatory-driven permitting

1. The project team decided not to evaluate conservation banking during focus groups because, in the interest of time, the project team felt that landowners' interest in conservation banking could be extrapolated from their responses to recovery credit systems (RCS) and offsite mitigation programs. The main difference between an RCS and a conservation bank is that an RCS is based on temporary conservation agreements while a conservation bank is based on permanent, conservation easements. Landowner interest in permanent conservation easements was covered in the discussions of offsite mitigation programs which are also based on the use of conservation easements.
2. Ultimately excluded from evaluation after CSP experts concluded that CSP species do not lend themselves to agri-ecotourism the way that charismatic mega-fauna do in other parts of the world, such as in Africa and Asia.
3. Not evaluated because two other programs already planned for CSP

Preliminary Evaluation of Conservation Tools Based on Case Studies

Initial categorization of conservation tools considered for DoD and/or partners to implement in the CSP:

 *Tested demand in focus groups with CSP private landowners*

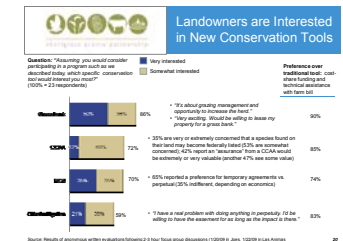
Include	Might include	De-prioritize	Exclude
<ol style="list-style-type: none"> 1. Conservation easements 2. Lease (agreements) 3. Management agreements 4. Restoration agreements 5. Traditional Farm Bill use 	<ol style="list-style-type: none"> 6. Candidate Conservation Agreement (CCA) / Candidate Conservation Agreement with Assurances (CCAA) 7. Conservation banking¹ 8. Grass banks/cooperatives 9. Farm Bill facilitation 10. Recovery Credit Systems (RCS) 11. Voluntary offsite mitigation 	<ol style="list-style-type: none"> 12. Conservation buyers (private) facilitated by NGO 13. Fee title purchase by NGO / agency 	<ol style="list-style-type: none"> 14. Agri/Eco-tourism and hunting² 15. Carbon credits³ 16. Habitat conservation plans 17. Safe harbor agreements 18. Traditional NGO 19. Regulatory-driven permitting

1. The project team decided not to evaluate conservation banking during focus groups because, in the interest of time, the project team felt that landowners' interest in conservation banking could be extrapolated from their responses to recovery credit systems (RCS) and voluntary offsite mitigation programs. The main difference between an RCS and a conservation bank is that an RCS is based on temporary conservation agreements while a conservation bank is based on permanent conservation easements. Landowner interest in permanent conservation easements was covered in the discussions of voluntary offsite mitigation programs which are also based on the use of conservation easements.
2. Ultimately excluded from evaluation after CSP experts concluded that CSP species do not lend themselves to agri/eco-tourism the way that charismatic mega-fauna do in other parts of the worlds, such as in Africa and Asia.
3. Not evaluated because two other programs already planned for CSP

Landowner Focus Group Summary Narrative

Interpretation of next slide

- While the case studies helped the project team better understand the innovative conservation tools under investigation, the team could not assess whether any of these new tools would be welcomed by landowners in the Central Shortgrass Prairie. To do just this, the team held two focus group meetings—one in northeastern Colorado and one in southeastern Colorado—during the month of January 2009. While the first focus group included 8 landowners who were each already interested in conservation, the second focus group was part of a broader agenda of a local cattlemen’s association meeting, and therefore also included landowners not particularly interested in formal conservation.
- At the focus groups, project team members read the scenarios found on the next 3 pages. The landowners then gave their general reactions, asked clarifying questions, and participated in an interactive discussion about each tool with the project team members. Each focus group meeting lasted about 3 hours with 20-30 minutes devoted to each of the 5 innovative conservation tools tested. At the end of each focus group, landowners filled out an anonymous questionnaire evaluating each of the new tools. The results of these evaluations are shown in this document following the scenarios.
- The written questionnaire asked landowners: “Assuming you would consider participating in a program such as we described today, which specific conservation tool would interest you most?” The results of the questionnaires show that grass cooperatives are the innovative tool in which most landowners would consider participating. Fifty percent of respondents reported that they would be “very interested” in participating with an additional 36% of respondents saying they were “somewhat interested.” These results put grass cooperatives far in the lead. Two other tools came in at close second and third positions: interest in CCAAs slightly exceeded interest in recovery credit systems with overall “very or somewhat interested” rates reported at 72% vs. 70%. Only 59% of respondents reporting any interest in voluntary offsite mitigation, largely due to landowner wariness of perpetual conservation easements on which voluntary offsite mitigation programs are based.
- Since most CSP landowners do already participate in various Farm Bill programs, the evaluation question regarding this program differed slightly than for the new tools introduced. For the Farm Bill, respondents were asked to compare their interest in one of the new tools versus their preference for expanding their participation in the Farm Bill, but with additional support and cost-sharing provided by conservation partners. Most respondents (74–90%) reported that they were more interested in one of the new tools versus increasing their use of the Farm Bill. These results mirrored the general discussion during the Farm Bill portion of the focus group. Many respondents stated that they were not satisfied with their Farm Bill participation because they found themselves participating in programs that did not meet their needs or expectations and found it difficult to work with the federal government.

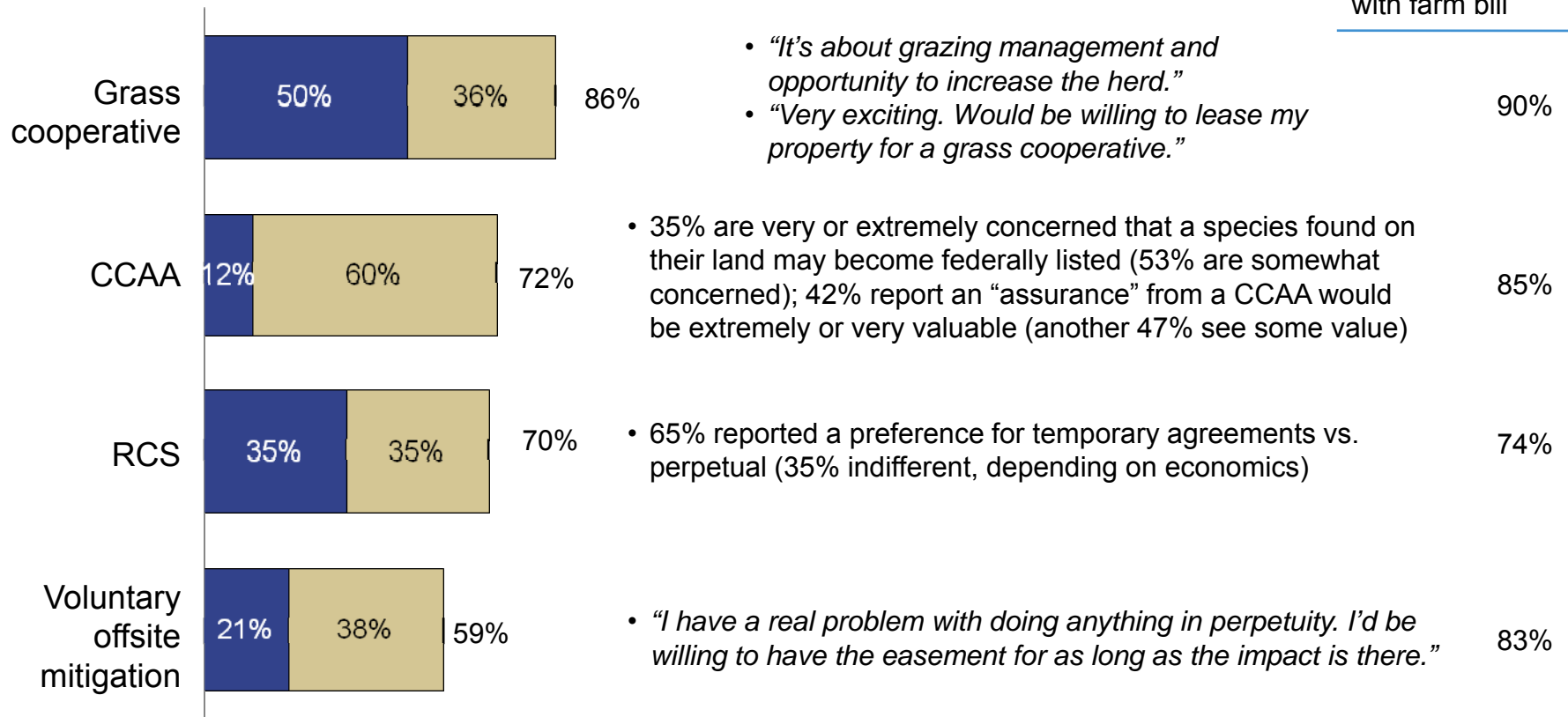


Landowners are Interested in New Conservation Tools

Question: “Assuming you would consider participating in a program such as we described today, which specific conservation tool would interest you most?”
(100% = 23 respondents¹)

- Very interested
- Somewhat interested

Preference over traditional tool: cost-share funding and technical assistance with farm bill



1. Since only 23 private landowners participated in the two focus groups, these results should not be interpreted as significantly representative of the entire Central Shortgrass Prairie. Still, 93% of participants (shown later in Section 2 of this Appendix) reported that they were at least somewhat interested in exploring conservation for their properties. Therefore, the team believes that the positive responses received in the focus groups are important and indicative of the likely success of these new tools in the CSP.

Source: These are the results of anonymous written evaluations following 2-3 hour focus group discussions (1/20/09 in Joes, 1/22/09 in Las Animas)

Note: See prior slides for narrative interpretation of this chart and scenarios used in focus groups to describe different conservation tools.

Focus Group Topics

	Case studies	Select details
1. Grass cooperative	<ul style="list-style-type: none"> • Matador Ranch (Montana) 	<ul style="list-style-type: none"> • ~60k acres permanently conserved • ~150k acres under temporary management agreements at an annual cost of \$70k
2. Candidate Conservation Agreement with Assurances (CCAA)	<ul style="list-style-type: none"> • Fort Lewis (Washington State) 	<ul style="list-style-type: none"> • DoD one of 6 signatories to a CAA/A (one private landowner) • Development funded by DoD Legacy Program
3. Voluntary offsite mitigation program	<ul style="list-style-type: none"> • Shortgrass Prairie Initiative (CDOT) 	<ul style="list-style-type: none"> • Almost 30k acres permanently conserved at a cost of almost \$4 million, with \$400k set aside for monitoring • Designed to streamline the ESA consultation process for CDOT should future listing of target species occur.
4. Recovery credit system	<ul style="list-style-type: none"> • Fort Hood (Texas) • Utah Prairie Dog Habitat Exchange System 	<ul style="list-style-type: none"> • Only two such examples exist, each for a federally listed species • Ft. Hood: Almost \$1 million spent to secure 15-20 year contracts on ~8k acres (average land values of \$3k/acre, high development potential)
5. Farm Bill – innovative	<ul style="list-style-type: none"> • Rocky Mountain Bird Observatory (RMBO)¹ 	<ul style="list-style-type: none"> • Provide technical assistance to landowners so that they can better select the Farm Bill programs that would meet their needs • Provide funding for the landowners share of the project; advise landowner on project implementation

1. Since RMBO was a member of the project team, a case study was not created as the program was well understood by project team members. Note: See section 3 of this document for case study summaries.

Focus Group Scenarios (1 of 2)

ILLUSTRATIVE ONLY

1. Grass cooperative¹

- You own a 3,000 acre property in Baca County in the Central Shortgrass Prairie. You would like to add another 100 head of cattle to your ranching operation but your own property is fully stocked.
- Nearby is a 15,000 acre ranch that is currently for sale by an absentee landlord. Previously the property was planned for housing development, but given the market slump, the owner needs to offload the property quickly. The State Land Board plans to purchase the ranch and lease it out to neighboring ranchers for grazing. The SLB asks a conservation organization to help administer the arrangements.
- Your partner from a conservation organization approaches you with the following offer:
 - If you want to add to your herd by leasing forage on the Baca County property, you could pay as little as 50% of the market value of the grazing leases if you commit to certain management practices on your home ranch, such as foregoing sodbusting of native grass and adjusting timing and intensity of grazing.
 - You could enter into a one-year contract initially with the option of renewing the contract for five years or more if the initial relationships goes well.

2. Candidate Conservation Agreement with Assurances (CCAA)²

- You own 5,000 acres of grassland in the Central Shortgrass Prairie. This ranch provides habitat to black-tailed prairie dog, which is not currently listed as federally endangered or threatened. A lawsuit has recently required the USFWS to consider listing this species (this is true). Your partner from a conservation organization approaches you about an opportunity to participate in a Candidate Conservation Agreement with Assurances (CCAA).
 - If you wanted to join the CCAA, then you would agree with USFWS on the acreage of prairie dog colonies that you would commit to having on your property: for example, 500 acres of colonies that already exist on your land, which is large enough to support mountain plovers.
 - In return for these commitments, you would be assured (on paper) that if the species becomes listed in the future, you will not have to have any more than the 500 acres to which you committed. If the colony grows beyond 500 acres, even if the species is listed, you can control the excess population.
 - If you change your mind, you can cancel the CCAA at any time. As long as you participate in the CCAA, you would receive technical assistance and potentially funding for non-traditional habitat protection costs.

1. See Matador Ranch case study in Appendix B, Section 3 for full description of this tool in practice.
 2. See Fort Lewis case study in Appendix B, Section 3 for full description of this tool in practice.

Focus Group Scenarios (2 of 2)

ILLUSTRATIVE ONLY

3. Voluntary offsite mitigation program¹

- You own 5,000 acres of grassland in the Central Shortgrass Prairie. Your property is about 2 miles away from where a wind energy farm will be built in 2015.
 - The developer wants to offset the environmental impacts of the turbines by paying for conservation easements in the surrounding area. Landowners that accept funding for conservation easements (about 30-40% of the value of your land) would no longer be allowed to subdivide or further develop the property (with homes or wind farms).
 - Also, a management agreement would require certain habitat protections, with additional funding set aside for all new habitat protections costs (such as adding raptor shields to power poles). Technical assistance would be provided by a conservation partner.

4. Recovery credit system²

- You own a 5000 acres of grassland in the Central Shortgrass Prairie. Your partner from a conservation organization approaches you to tell you that a new natural gas pipeline is going to be built connecting Wyoming to New Mexico and will run through the Central Shortgrass Prairie about 5 miles from your property. While the pipeline is being built, there will be significant habitat disturbance for about 5 years. After that time, the land above the pipeline will be restored, which should take about 10 years.
- Your contact asks you if you would be interested in applying for participation in a 15-year management agreement. You would offer a bid for how much funding you require and how much land would be included in the agreement. The least costly bids that best meet conservation goals would be funded (the biggest bang for the buck). You would be offered support in developing and submitting your bid by a conservation partner.

5. Farm Bill - Innovative

- We've introduced you to four new innovative cooperative conservation tools that we are considering developing. However, this would be at the expense of investing more money in traditional tools such as those available through the Farm Bill, ranging from programs with incentive payments and cost-share opportunities to those with payments for perpetual conservation.
- For example, you wish to apply for EQIP funding to conserve the leopard frog which is in abundance on your property. You would remove tamarisk, build new riparian fencing, and create an alternate water source. You estimate all this would cost you \$50,000. EQIP will pay for \$25,000 of the investment and also pay you incentives of \$50 per acre affected for three years. You will do the work of installing the fence and extending the pipeline, but you need funding for the remaining \$25,000 of supplies required.
- Seth Gallagher from RMBO approaches you to tell you about a new funding source that provides cost-sharing for Farm Bill proposals. Seth could help you develop your Farm Bill application and provide technical assistance to help you conserve species at risk.

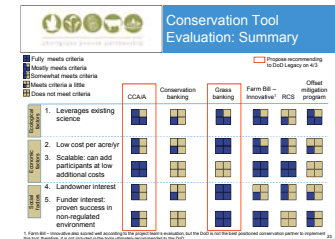
1. See three case studies in Appendix B, Section 3 for full description of this tool in practice: Horizon / Smoky Hills, Jonah Fields, Shortgrass Prairie Initiative
 2. See Fort Hood case study in Appendix B, Section 3 for full description of this tool in practice.

Conservation Tool Evaluation: Summary Narrative

(1 of 2)

Interpretation of chart following :

- While it was important to the project team to determine whether CSP landowners would welcome any of the new conservation tools under consideration, landowner interest was only one criteria that was considered in the team's evaluation of the new tools. The complete set of criteria used to evaluate each new tool were:
 - Ecological factors:** Does the tool leverage existing science or do new investments in science need to be made before this tool can be implemented?
 - Economic factors:**
 - Does the tool offer conservation at a relatively low cost-per-acre-per-year compared to other tools?
 - Is the tool scalable (i.e., can one add new landowners at a low marginal cost) or is there an upper limit on how many landowners can be involved after the size of the program is decided?
 - Social factors:**
 - Are CSP landowners interested in participating in a program based on the tool? (focus group results)
 - Could there be ready funders for this new tool, (i.e., has the tool been sufficiently demonstrated as successful in environments where species are not federally listed as threatened or endangered?)
- Each of the five innovative tools still under evaluation were evaluated by each of the five criteria above. The legend on the summary chart explains how to interpret each rating. Squares with four blue quadrants indicate that the tool shown rated highly against the criteria, and vice versa for squares comprised of four brown quadrants.
- Ecological factors:** Two of the five tools under evaluation are not ready for implementation based on existing science: conservation banking and recovery credit systems (RCS). In both cases, before these tools can be implemented, the ecological conditions of the proposed landscape must be translated into units of "currency" or transparently-derived values for conservation credits such that the credits can be bought, sold, and exchanged. This is a non-trivial exercise that other programs have spent years and millions of dollars developing.
- Economic factors:**
 - Cost-per-acre-per year:** conservation based on perpetual easements is always more expensive than conservation based on temporary management agreements. Therefore, conservation banking and voluntary offsite mitigation programs rated lowest on this criteria. Recovery credit systems are also relatively expensive because of the necessary scientific investment in developing a currency as noted above. CCAAs are rated at the same level as RCS since CCAAs also involve an investment in personnel to work with landowner on developing the conservation agreements. Farm Bill Facilitation programs rated second-best because of the ability to leverage federal funding in every conservation project. The top-scoring tool on this criteria was grass cooperative because it is possible for a grass cooperative to actually turn a profit in the best grass growing years, as evidenced by the Matador Ranch in Montana. Even in the worst years, the Matador only costs \$70,000 per year, but covers ~160,000 acres under temporary conservation agreements—at a cost of less than 50 cents per acre per year.



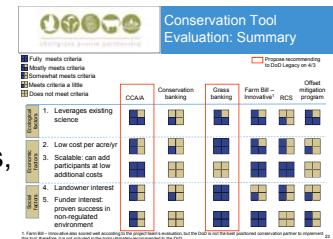
Conservation Tool Evaluation: Summary Narrative

(2 of 2)

Interpretation of chart following (continued):

• Economic factors (continued):






- **Scalable:** CCAAs, Farm Bill facilitation programs, and Recovery Credit Systems are fully scalable at low marginal costs, meaning additional landowners can always be added and these landowners benefit from the prior investments made in developing these tools. On the opposite spectrum are grass cooperatives, conservation banks, and voluntary offsite mitigation programs, where the number of landowners who may participate is limited by the size of the grass cooperative, the size of the conservation bank, or the size of the voluntary offsite mitigation fund.

































• Social factors:

- **Landowner interest:** Landowner interest in each tool was rated based on the results of two focus groups, as previously described. The rating shown for the Farm Bill Facilitation program needs some clarification: most landowners already participate in the Farm Bill, and therefore one might rate this tool high on landowner interest. Instead, the rating shown reflects landowner interest in increasing participation in the Farm Bill, above the level at which the landowner currently participates, including receiving support and funding from conservation partners to make better use of the Farm Bill.
- **Proven success in non-regulated environment:** Conservation banking and recovery credits systems have never been implemented in ecoregions with no federally listed species. Therefore, these tools were rated lowest for this criteria. Voluntary offsite mitigation programs have been implemented in ecoregions with no or few federally listed species; however, in each known example, the funder is responding to some level of regulation or non-voluntary requirement. CCAAs are designed specifically for non-federally listed species (including non-Candidates). However, because use of this tool is relatively new, it is difficult to measure success. Grass cooperatives have been implemented in ecoregions without federally listed species and well suited for such environments.
- **Summary:** overall, taking all five evaluation criteria into account, the top scoring tools are CCAAs and grass cooperatives.
 - **Grass cooperatives:** Not only are grass cooperatives possibly the lowest cost conservation tools but they can serve as a vehicle for improving relations between the DoD and private landowners who are wary of working with federal agencies.
 - **Onsite CCA:** Would align management practices across 7 DoD installations in the CSP totaling ~450,000 acres; could streamline ESA consultation, if necessary
 - **Offsite CCAAs:** an investment in developing a CCA for the DoD and other public landowners can be leveraged to a CCA for private landowners. Target goals would need to be biologically meaningful and significant to warrant committing resources towards this tool.
 - Although **voluntary offsite mitigation** scored low on some factors (scalability, cost, overall landowner interest) it is still recommended to the DoD because more than 20% of landowners in focus groups reported they were “very interested” in participating, this tool would leverage existing science, and this approach has previously been implemented with success in the Central Shortgrass Prairie.
 - **Farm Bill – Innovative** also scored well according to the project team’s evaluation, but the DoD is not the best positioned conservation partner to implement this tool. Therefore, it is not included in the tools ultimately recommended to the DoD.

Conservation Tool Evaluation: Summary

-  Fully meets criteria
-  Mostly meets criteria
-  Somewhat meets criteria
-  Meets criteria a little
-  Does not meet criteria

-  Top scoring new tools for CSP
-  2nd tier new tools for CSP

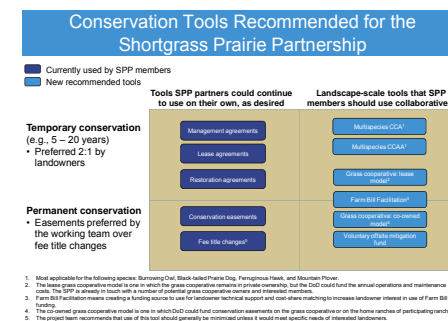
		CCA/A	Conservation banking	Grass cooperative	Farm Bill Facilitation ¹	RCS	Voluntary offsite mitigation
Ecological factors	1. Leverages existing science						
	Economic factors	2. Low cost per acre/yr					
		3. Scalable: can add participants at low additional costs					
Social factors	4. Landowner interest						
	5. Proven success in non-regulated environment						

Note: See prior slides for narrative interpretation of this chart.

Conservation Tools Recommended for the Shortgrass Prairie Partnership

Interpretation of chart following:

- This project was funded by the DoD Legacy Program, and this team makes recommendations specific to the DoD (see prior slide), However, the DoD is also a member of the Shortgrass Prairie Partnership, and as the findings of this team are also relevant to the SPP, this team also makes recommendations to specific to the SPP, as shown on the next slide.
- Just as the DoD may have a conservation toolbox from which to select the best tool for each conservation opportunity, the SPP may also have its own toolbox at its disposal, with each member deciding for itself which tools from that toolbox it wishes to use, individually or collaboratively. For the SPP, the team recommends a set of 11 conservation tools as shown on the next slide. These tools are divided into two categories (vertical columns):
 1. Traditional tools that are already in use in the CSP and that each SPP partner can continue to use on its own, if desired. These tools do not necessarily require cross-SPP collaboration for effective implementation.
 2. Innovative, landscape-scale tools that are not commonly used in the CSP (Farm Bill facilitation and voluntary offsite mitigation funds are the only tools of the six in this category that have ever been used in the CSP). Implementation of these tools offers an opportunity for SPP partners to work together to achieve landscape-scale success above the level that each partner would be able to achieve on its own.
- These tools are further divided into two categories (horizontal rows): tools that result in temporary conservation versus those that result in permanent conservation. Some tools are categorized under temporary—such as CCAAs and grass cooperatives—because landowners may discontinue their involvement in these tools if so desired, but these tools are not necessarily temporary by definition and it is possible that participating landowners may wish to participate in such programs indefinitely.



Conservation Tools Recommended for the Shortgrass Prairie Partnership

- Currently used by SPP members
- New recommended tools

Traditional tools that SPP partners could continue to use on their own, as desired

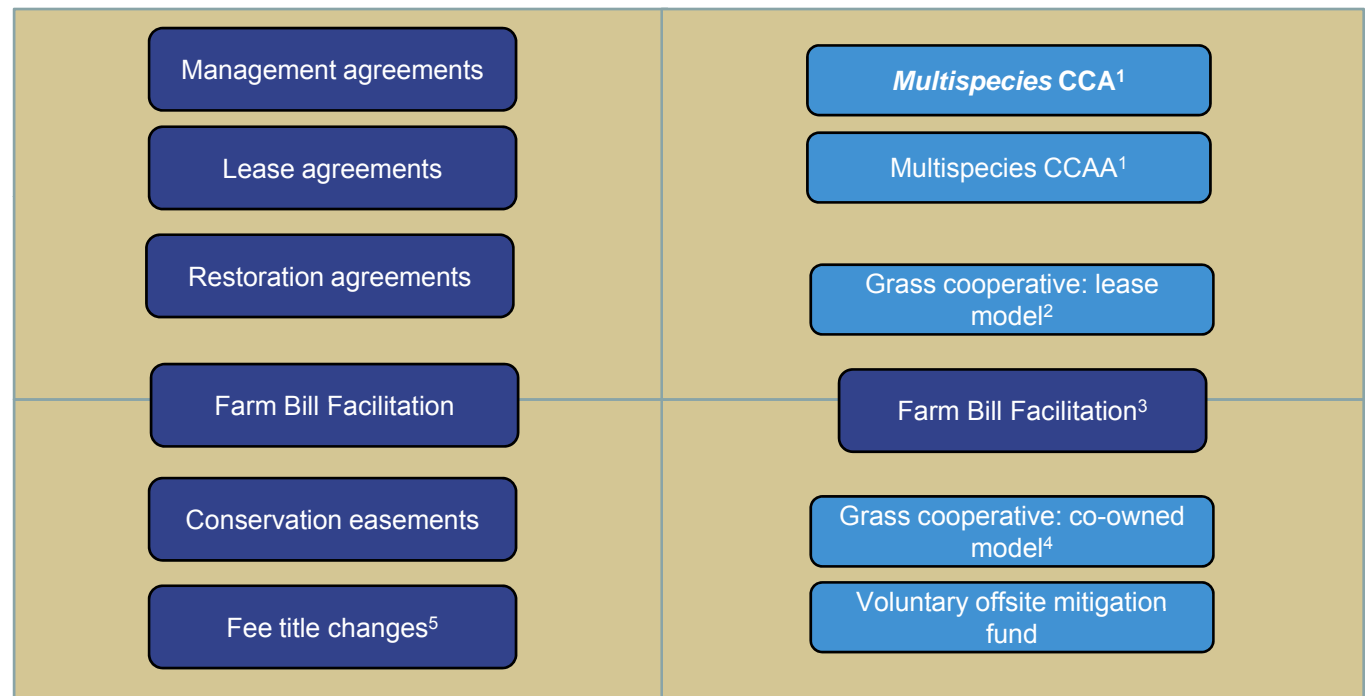
Innovative, landscape-scale tools that SPP members should use collaboratively

Temporary conservation (e.g., 5 – 20 years)

- Preferred 2:1 by landowners

Permanent conservation

- Easements preferred by the working team over fee title changes

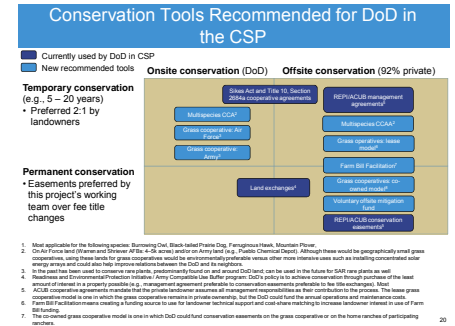


1. Most applicable for species with the greatest risk of being listed.
2. The lease grass cooperative model is one in which the grass cooperative remains in private ownership, but the DoD could fund the annual conservation operations and maintenance costs. The SPP is already in touch with a number of potential grass cooperative owners and interested members.
3. Farm Bill Facilitation means creating a funding source to provide landowner technical support and cost-share to increase landowner interest and utilizations of existing Farm Bill programs both temporary and permanent. While there are current efforts in the SPP to implement Farm Bill Programs additional partners and resources would increase the capacity of utilizing Farm Bill to benefit SAR species
4. The co-owned grass cooperative model is one in which DoD could fund conservation easements on the grass cooperative or on the home ranches of participating ranchers.
5. The project team recommends that use of this tool would not be actively promoted but might be utilized if it would meet specific needs of interested landowners.

Conservation Tools Recommended for DoD in the CSP

Interpretation of chart following:

- One of the goals of this project was to make recommendations to the DoD on new conservation tools it might consider implementing in the CSP. However, the project team recognizes that the DoD already uses a range of conservation tools. Therefore, the chart on the next slide represents the conservation toolbox that the project team recommends for the DoD. The tools shown in dark blue are the ones that DoD already uses, and the tools shown in light blue are the new tools that the project team recommends that the DoD consider adding to its toolbox.
- The tools are categorized on a matrix with two dimensions. The first dimension (the vertical columns) shows whether each tool is applicable onsite, offsite, or both. The second dimension (the horizontal rows) shows which tools result in temporary conservation versus those that result in permanent conservation. Some tools are categorized under temporary—such as CCAAs and grass cooperatives—because landowners may discontinue their involvement in these tools if so desired, but these tools are not necessarily temporary by definition and it is possible that participating landowners may wish to participate in such programs indefinitely.



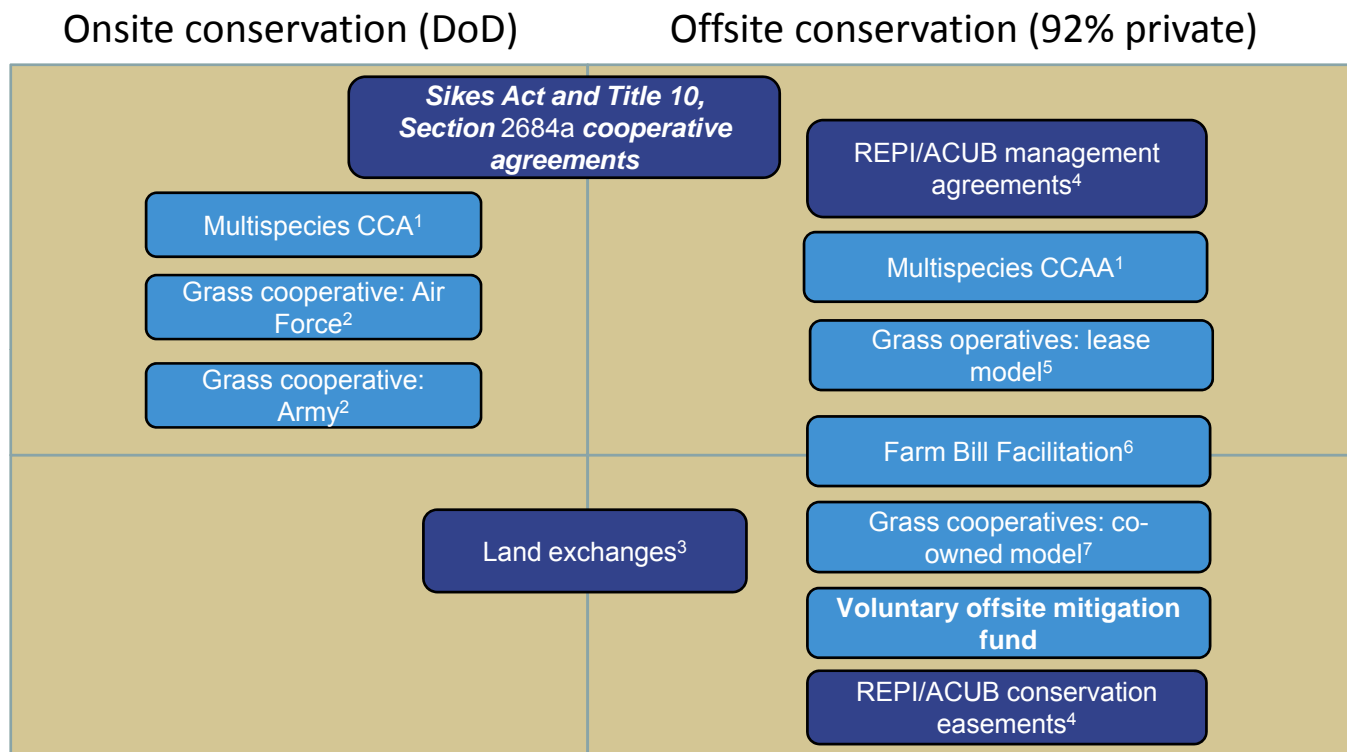
Conservation Tools Recommended for DoD in the CSP

- Currently used by DoD in CSP
- New recommended tools

Temporary conservation (e.g., 5 – 20 years)

- Preferred 2:1 by landowners

•Permanent conservation easements preferred by this project’s working team over fee title changes

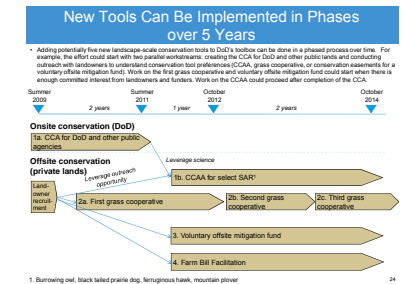


1. Most applicable for species with the greatest risk of being listed.
2. On Air Force land (Warren and Shriever AFBs: 4–5k acres) and/or on Army land (e.g., Pueblo Chemical Depot). Although these would be geographically small grass cooperatives, using these lands for grass cooperatives would be environmentally preferable to other more intensive residential or commercial uses and could also help improve relations between the DoD and its neighbors.
3. In the past has been used to conserve rare plants, predominantly found on and around DoD land; can be used in the future for SAR rare plants as well
4. Readiness and Environmental Protection Initiative / Army Compatible Use Buffer program: DoD’s policy is to achieve conservation through purchase of the least interest possible in a property necessary to achieve their goals. Fort Lewis example where offsite management is funded as part of a CCAA on state lands and other protected lands (TNC owned).
5. ACUB cooperative agreements mandate that the private landowner assumes all management responsibilities as their contribution to the process. The lease grass cooperative model is one in which the grass cooperative remains in private ownership, but the DoD could fund the annual conservation operations and maintenance costs.
6. Farm Bill Facilitation means creating a funding source to provide landowner technical support and cost-share to increase landowner interest and utilizations of existing Farm Bill programs both temporary and permanent to benefit SAR species.
7. The co-owned grass cooperative model is one in which DoD could fund conservation easements on the grass cooperative or on the home ranches of participating ranchers.

New Tools can be Implemented in Phases over 5 Years

Interpretation of chart following :

- As shown on an earlier slide of the conservation toolbox recommended for the DoD, the project team found that five major categories of new tools would be appropriate and beneficial in the CSP and should be considered by the DoD for implementation: CCA, CCAA, grass cooperatives (in various forms), voluntary offsite mitigation funds, and Farm Bill facilitation. The team does not recommend that the DoD or SPP try to introduce all these tools into the CSP at one time. This would dilute resources and reduce the likelihood of successfully implementing any of the new tools. Instead, a phased approach is recommended.
- The natural first step for the DoD would be to start with the CCA, which is intended for onsite conservation. This tool would align management practices (mostly already outlined in INRMPs) across the DoD's CSP installations (and any other federal landowners that may wish to participate, such as the USFS). The DoD is already well versed in the use of CCAs and the successful use of CCAs by the DoD (and others) has led to the removal of some species from candidate statuses.
- Once the DoD has taken what steps it can to conserve SAR onsite, it can then turn its attention to what it can accomplish offsite, since 92% of the CSP is held privately. Since grass cooperatives are the new tool that most interested landowners in focus groups, the team recommends that this tool receive the second-highest priority for implementation (after CCA). The first step in implementing a grass cooperative is recruiting interested participants, both landowners that own a property that might become a grass cooperative as well as landowners wishing to access additional forage in exchange for conservation commitments. During the landowner outreach / recruitment process, the DoD and its partners may identify landowners that are more interested in other recommended tools (e.g., CCAAs, voluntary offsite mitigation, and Farm Bill facilitation). If this is the case, relationships with these landowners should be developed and maintained so that when the DoD or SPP is ready to implement the other recommended tools, the relationships with landowners already exist.
- After successful implementation of the CCA and the first grass cooperative, then the DoD might consider implementing the other three tools recommended in this project: CCAAs, voluntary offsite mitigation, and Farm Bill facilitation. Development of the CCAA would follow naturally after the CCA is complete, since much of the science can be leveraged. Finally, additional grass cooperatives can be launched based on lessons and tools from the first. This way, it is possible that all five recommended new tools may be implemented in the CSP within five years.



New Tools can be Implemented in Phases over 5 Years

- Adding potentially five new landscape-scale conservation tools to DoD’s toolbox can be done in a phased process over time. For example, the effort could start with two parallel workstreams: creating the CCA for DoD and other public lands and conducting outreach with landowners to understand conservation tool preferences (CCAA, grass cooperative, or conservation easements for a voluntary offsite mitigation fund). Work on the first grass cooperative and voluntary offsite mitigation fund could start when there is enough committed interest from landowners and funders. Work on the CCAA could proceed after completion of the CCA.

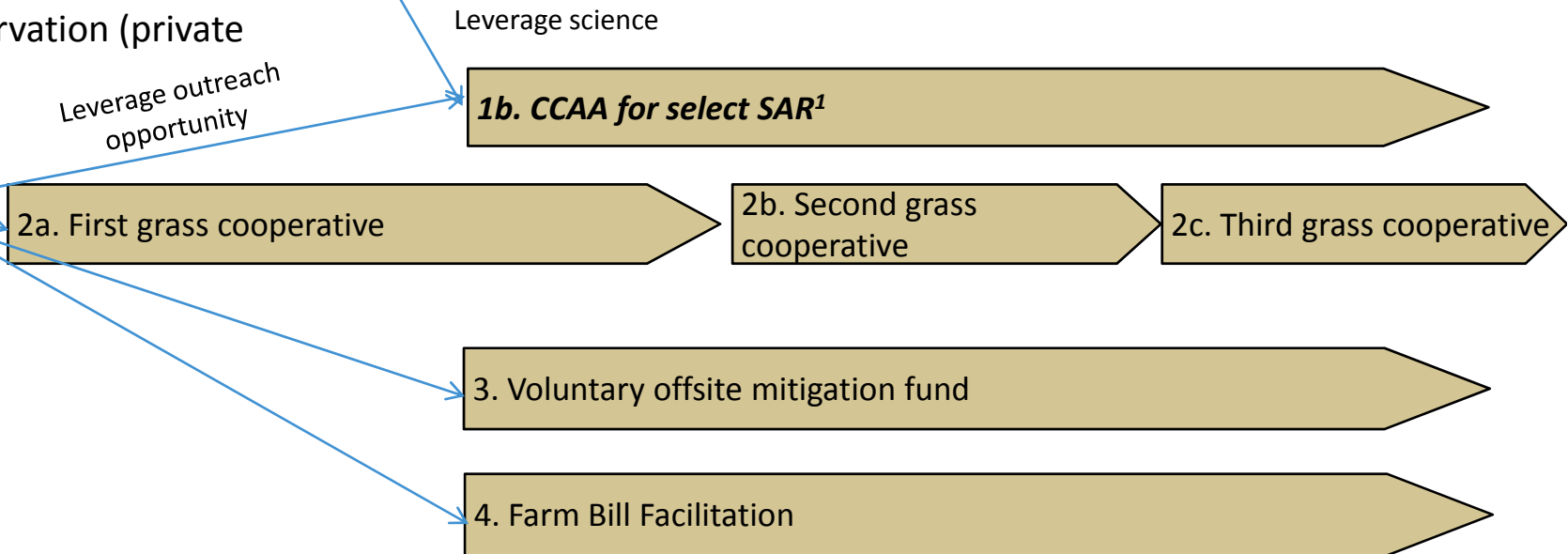


Onsite conservation (DoD)

1a. CCA for DoD and other public agencies

Offsite conservation (private lands)

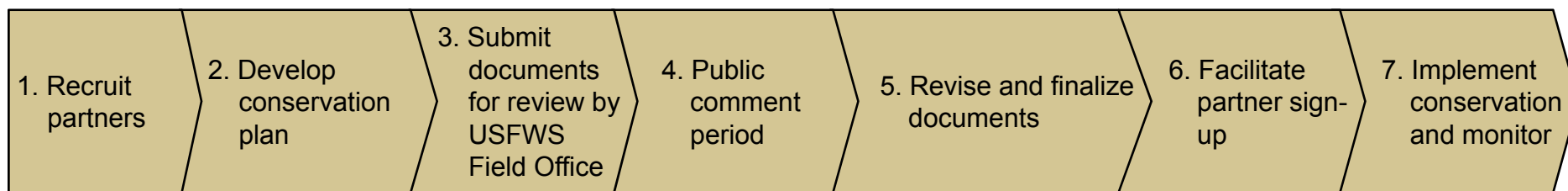
Land-owner recruitment



1. for species with the greatest risk of being listed

Possible Plan for Developing CCA/As

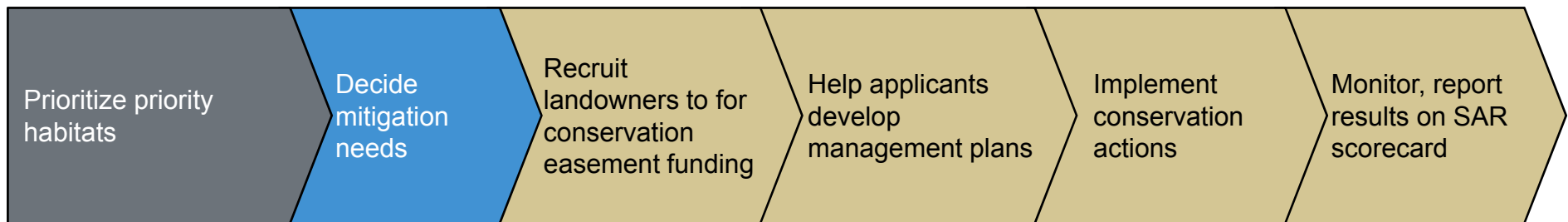
- Below is the USFWS recommended process for developing a CCAA. Process with DoD and other public partners could take 1– 2 years, while a similar process with private landowners CCAA might take 2+ years



- | | | | | | |
|--|--|--|---|--|---|
| <ul style="list-style-type: none"> • DoD and other public agencies for the onsite CCA • Private and state land for the offsite CCAA • USFWS Field Office • Supporting partners | <ul style="list-style-type: none"> • Demonstrate that proposed actions, in conjunction with permitted take, would preclude need to list if implemented across range • Draft environmental assessment | <ul style="list-style-type: none"> • Regional office and solicitor review documents, and if signed, then submit to Federal Register | <ul style="list-style-type: none"> • Outreach meetings | <ul style="list-style-type: none"> • Finalize either a Finding of No Significant Impact (FONSI) or a “findings and recommendations” document • Field Office signs a Biological Opinion and drafts terms and conditions for incidental take • Field office submits all documents to Regional Office which creates the incidental take permit | <ul style="list-style-type: none"> • Create management plans for each signatory and determine implementation funding needs |
|--|--|--|---|--|---|

Possible Plan for Launching a Farm Bill Facilitation Program

- The Farm Bill, administered by the USDA-NRCS has unprecedented funding for conservation efforts both temporary and permanent in nature. The limiting factor to utilizing this existing funding for the SAR is the lack of expertise and biologists on the ground with a knowledge for both SAR habitat needs and programmatic implementation.
- Funders interested in seeing their funds leveraged by existing, under-utilized federal funds in the Farm Bill could provide support to existing partnership efforts to fund biologist positions to work with agricultural producers to utilize these funds to benefit SAR habitat needs

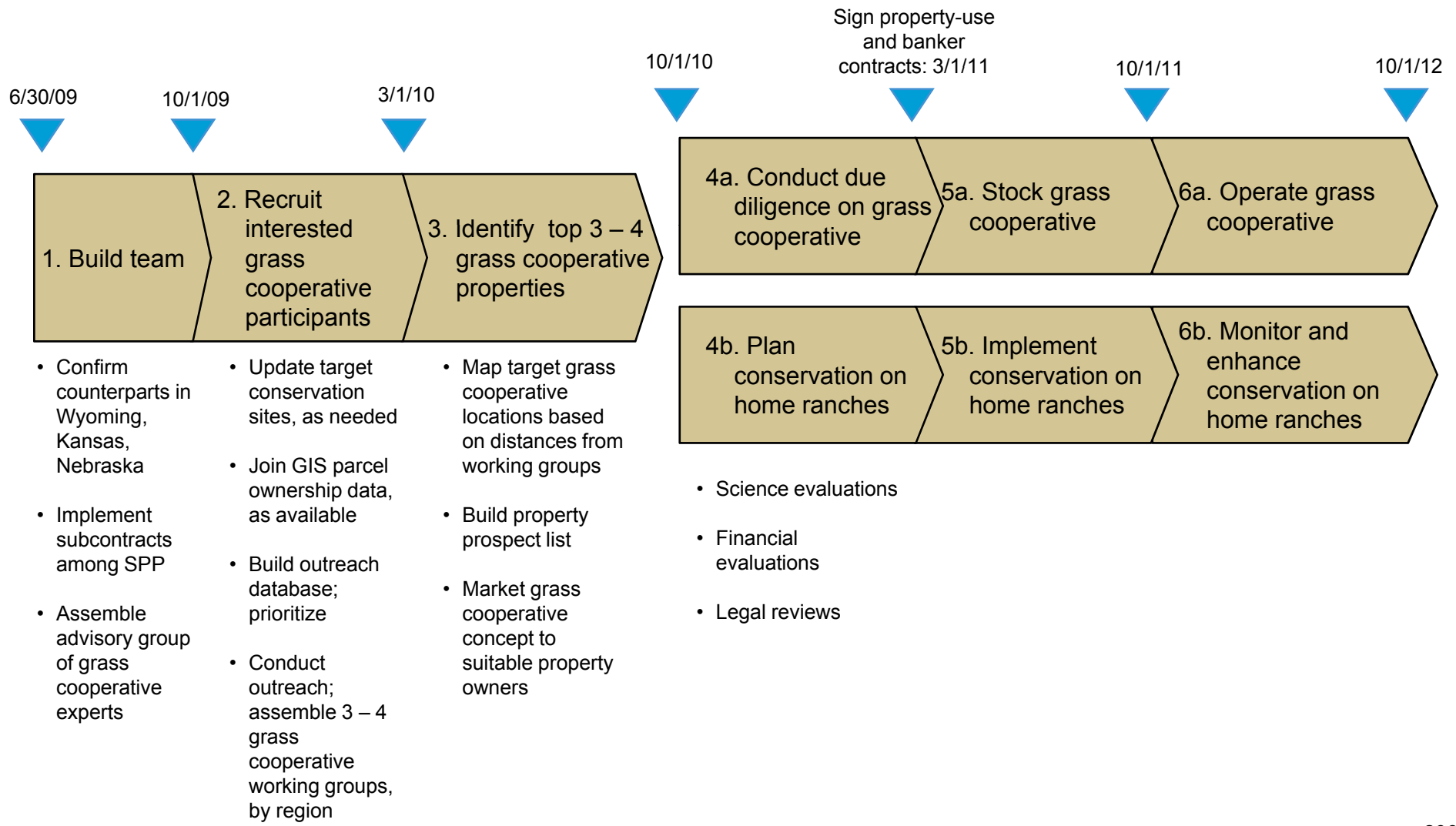


• Completed in this project

• Recommended next steps

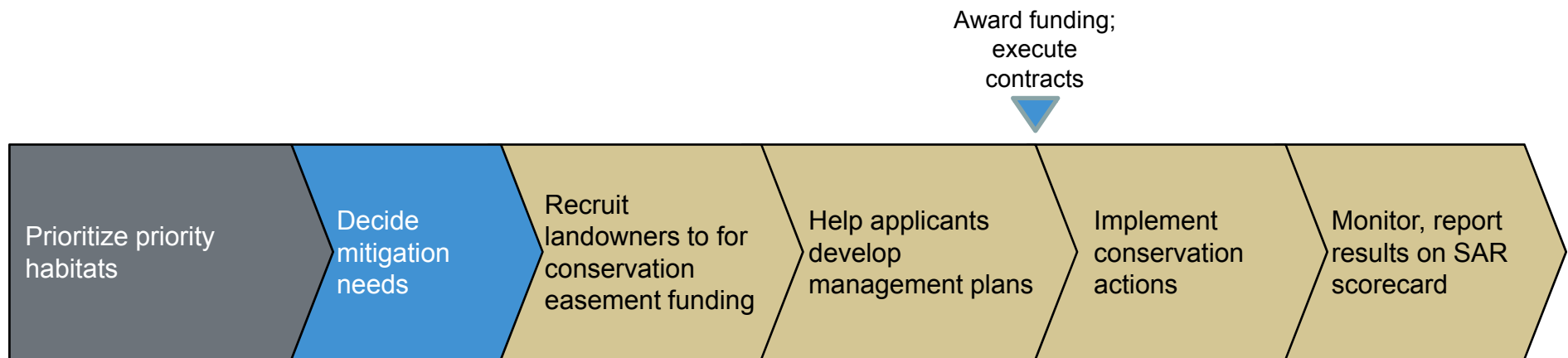
Possible Plan for Launching a Grass Cooperative

Below is one example of how a conservation program could go about launching the first grass cooperative in the CSP. However, as noted previously, the Shortgrass Prairie Partnership is already in discussion with several interested landowners, so the process could be significantly shorter than shown below.



Possible Plan for Launching a Voluntary Offsite Mitigation Fund

- Shortgrass Prairie Initiative with CDOT took 9 years from start to finish—two years for science, two more years for most of the conservation easements, with five more years until completion)
- DoD is already several years into the process with the science largely completed and a program ready to launch if funding is identified.



- Completed in this project

- Recommended next steps

- 20% of focus group participants reported they were “very interested” in conservation easements as part of a voluntary offsite mitigation program

Section 2. Recommended Framework for Conservation Program



Recommended Conservation Program: Strategy Summary

- The project team recommends that the DoD help lead a conservation program focused on Species at Risk (SAR) in the Central Shortgrass Prairie (CSP). The contents in this section are intended to help the DOD design and construct such a program, should funding become possible. Launching a new program requires addressing many key questions in three broad areas: program **strategy**, program **processes**, and program **organization**.
- The conservation program's **strategy** should document program goals, geographic scope, and guiding principles.
 - The recommended program **goal** is to reduce the need for species at risk to be listed as federally threatened or endangered so that private and public landowners may continue to use their lands in accordance with their private interests or public missions while reducing the risk of additional regulatory burdens in the future.
 - The DOD's **geographic scope** for the program should be the Central Shortgrass Prairie ecoregion, which total 30 million acres, encompass more than half of the CSP and 95% of the best priority habitats for conserving the DOD's species at risk. The project team recommends starting in the CO and WY portions of the Central Shortgrass Prairie and transferring applicable tools and programs to the other five states in the ecoregion.
 - The proposed **guiding principles** for the conservation program are that it tie conservation goals to funders' expected impacts (when appropriate), be completely voluntary for all participants with tangible benefits to each, include multiple conservation partners, include many private landowners, and include both temporary and permanent conservation tools.
 - The program strategy also specifies which conservation **tools** should be used. The DoD already uses multiple conservation tools, both temporary and permanent as well as onsite and offsite. These include Integrated Natural Resource Management Plans (INRMPs), Readiness and Environmental Protection Initiatives (REPI), Army Compatible Use Buffer programs (ACUB), Sikes Act cooperative agreements, and Title 10 land exchanges. The project team recommends that the DOD add to its conservation toolkit by adopting new tools such as grass cooperatives (both onsite and offsite, including models that achieve temporary as well as permanent conservation), Candidate Conservation Agreements (CCA) onsite and Candidate Conservation Agreements with Assurances (CCAAs) offsite, and voluntary offsite mitigation funds. The project team also recommends that the Shortgrass Prairie Partnership explore and potentially implement tools such as a voluntary offsite mitigation fund, grass cooperative (through a lease model and co-op model), CCA and CCAA, and Farm Bill facilitation (where additional funding is used to provide more technical staff and on-the-ground support).

Recommended Conservation Program: Funding Strategy Summary

- The recommended conservation program also recommends a **funding strategy**.
 - By conducting research on ten case studies, the project team has learned that most collaborative conservation programs achieving landscape-scale conservation operate on an average of half of a million dollars per year with at least ½ to 1 full time equivalent staff member. The recommended CSP program could launch with **minimal funding of \$250,000 per year** but to be successful should over time target funding levels of one million dollars per year.
 - As evidenced by the case studies, a wide range of **funding sources** may be appropriate for the conservation program in the Central Shortgrass Prairie and potentially include the DoD, corporations, in-kind staffing from participating organizations, state agencies, NGO fundraising, the USDA-NRCS (either Farm Bill funding or other programs such as national or state Conservation Innovation Grants), private landowners through donations or cost-sharing, the U.S. Fish & Wildlife Service, city agencies, county agencies, EPA settlements, grants, and income from endowments.
 - The program would cost less if it **focused on one program first and then grew in scope over time**. For example:
 - The program could launch with only one funder (e.g., perhaps the DoD), other funders should be recruited as well.
 - If DoD is the first funder, then the program should focus on the four species groups identified in Appendix A, section 1, but this SAR list should be expanded to meet the needs of other funders as recruited.
 - The program should first target private landowners who make up more than 90% of the CSP ecoregion, but conservation landowners can later be expanded to include State Land Boards and county lands.
 - The program could start by focusing on the Colorado portion of the CSP and can expand to Wyoming and potentially other CSP states as funding and capacity allows.
 - A memorandum of understanding (MOU) could serve as the legal basis for the program

Recommended Conservation Program: Process Summary

- The conservation program's **process** should document what conservation sites should be prioritized, how mitigation funding levels should be determined, how conservation applicants should be recruited, how conservation applications should be developed, how conservation applications should be evaluated for funding, how conservation results should be monitored and reported, and how can the program's continuous improvement be ensured.
 - **SAR habitats should be prioritized** based on spatial analyses of current and expected impacts to habitats, current population distributions of species at risk, and priority viable habitats for these species. This step has already been completed for the selected SAR occurring on DoD lands (see Appendix A, sections 2 and 3).
 - **Mitigation funding levels should be determined** in partnership between mitigation funders and conservation biologists who can help translate onsite expected impacts into offsite conservation needs. This is the recommended next step for the DOD.
 - **Conservation applicants should be recruited** through a hybrid top-down / bottom-up process by which existing relationships are leveraged with gaps in priority habitats filled in through targeted geographic outreach.
 - **Conservation applications should be developed** with the hands-on support of conservation organizations who can help landowners translate conservation visions into practical and high-potential proposals for funding.
 - **Conservation applications should be evaluated** for funding based on a transparent, qualitative system including ecological, economic, social, and political screens. Evaluations should be conducted by a panel made up of internal program leaders as well as external expert advisors.
 - **Conservation results should be monitored and reported** using the SAR scorecard developed for the DOD as part of this project (see Appendix A, section 4).
 - **The program's continuous improvement** should be ensured through collaborative commitments by participating partners and implementation of an adaptive management cycle where (1) the program leadership repeatedly sets the conservation strategy, (2) implements conservation according to that strategy, (3) monitors progress and reports on it annually, (4) and adapts the strategy and conservation actions based on progress made towards conservation goals.

Recommended Conservation Program: Organization Summary

- The conservation program's **organization** includes how the program would meet the needs of all participants: partners, facilitators, and landowners.
 - The program should meet the needs of **conservation funders** by offering risk management from a reduced need to federally-list species at risk, potential regulatory assurances for non-federal partners, potentially greater ease in regulatory negotiations and project permitting processes, improved public relations through corporate good will, and conservation efficiency through an arm's length "one-stop shopping" experience.
 - **Conservation facilitators** would benefit from attracting new funding sources, achieving conservation efficiency from collaboration adding up to "more than the sum of the parts," and from the ability to focus specifically on the CSP.
 - The program would benefit **conservation landowners** who would receive risk management from the reduced need to federally list species, potential regulatory assurances, economic returns from potential payments for conservation easements, reduced grazing fees, incentive payments for conservation or CCAA participation, and technical assistance to achieve conservation and ranching goals
- The conservation program's organization should document how the program should be structured, what functional roles are required in the program, and what organizations should be included in the program in specific roles.
 - The program should be **structured**, at a high level, with conservation facilitators bringing together funders and landowners. An external review panel should guide the program leadership, which would in turn delegate day-to-day responsibilities to a program manager and staff. The program could be covered by an MOU with a designated fiscal agent facilitating the transfer of funds from conservation partners to landowners.
 - The functional **roles** required in the program include program staff with expertise in fundraising, education and outreach, science (including priority habitat mapping, on the ground habitat assessment, application review, and conservation monitoring and reporting), and landowner support (including outreach, application development, funding / legal contracting support, and conservation implementation support).
 - The **organizations** that should be included in the program in specific roles are as follows: the expert review panel should include the Working Landscapes Advisory Group (a part of the SPP); grazing and farmers' associations, Colorado State University, other academics and external stakeholders, as interested. Program leadership can be provided by the SPP, of which the DOD is a member. Fiscal agency and project management may be provided by a member of the SPP with rotating responsibilities over time. The project staff in fundraising, outreach, science, and landowner support roles should include the Colorado Division of Wildlife, the Colorado Natural Heritage Program, the Environmental Defense Fund, the Rocky Mountain Bird Observatory, the Nature Conservancy, and the U.S. Fish & Wildlife Service, all members of the project team that makes these recommendations.

Elements of a Conservation Program for DOD in the Central Shortgrass Prairie (CSP)

Key program element questions addressed in this section

Program Strategy

1. What are the goals, geographic scope, and guiding principles of the program?
2. On which species and habitats should the program focus?
3. What tools should the program employ?
4. What funding is required and from what potential sources?
5. How could the program focus first then grow in scope over time?

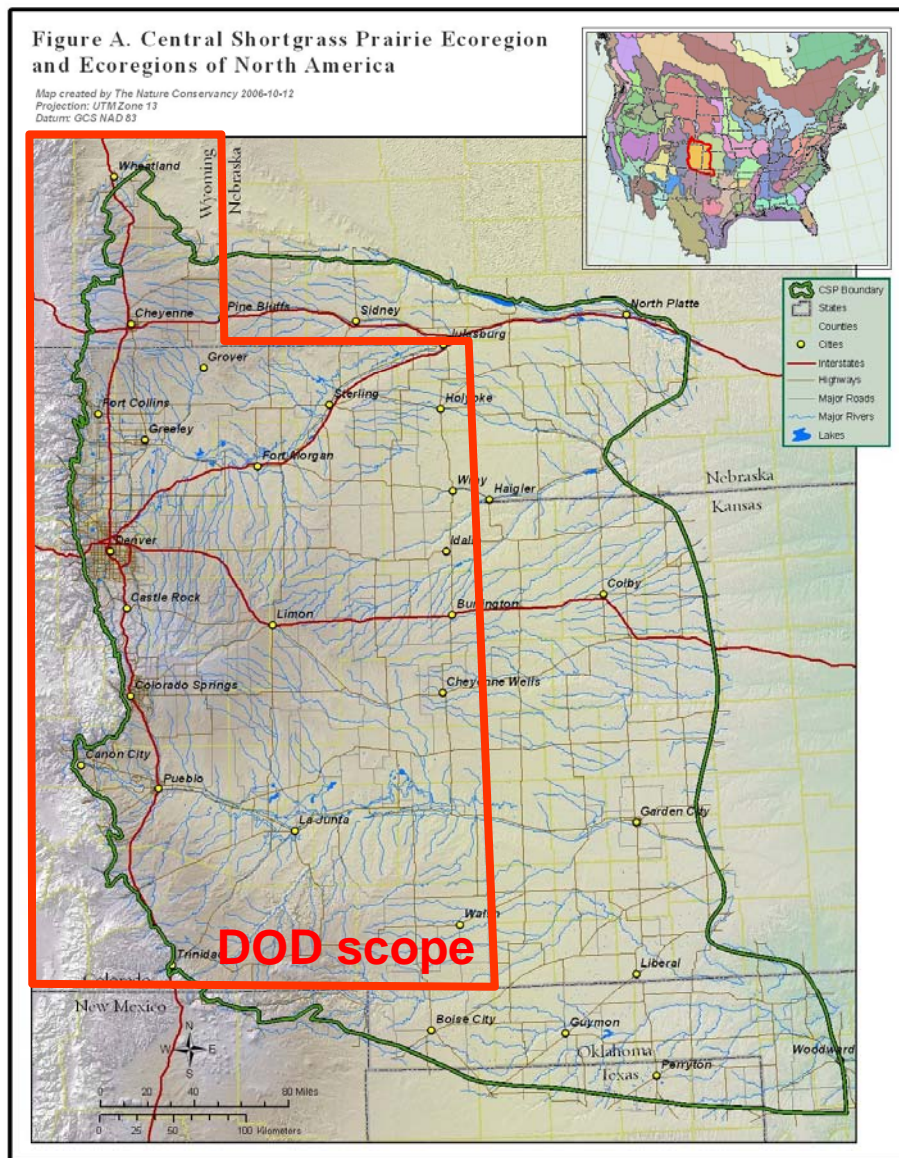
Program Processes

6. How should potential conservation sites be prioritized?
7. How should required mitigation funding levels be determined?
8. How should conservation applicants be recruited?
9. How should conservation applications be developed?
10. How should conservation applications be evaluated for funding?
11. How should conservation results be monitored and reported?
12. How can the program's continuous improvement be ensured?

Program Organization

13. How would the program meet the needs of participants?
14. How should the program be structured?
15. What functional roles are required in the program?
16. What organizations should be included in the program, in what roles?

Program Goals and Geographic Scope



Short-term goal

- Fund and facilitate actions to **conserve species at risk and their habitats** in the **Central Shortgrass Prairie (CSP)**¹ above the combined level that each SPP partner (including DoD) would be able to achieve on its own.

Long-term goal

- **Reduce the need for species at risk to be listed as federally threatened or endangered** so that private and public landowners may **continue to use their lands** in accordance with their private interests or public missions while **reducing the risk of additional regulatory burdens in the future.**

Geographic scope

- Efforts to meet the DoD's goal of conserving species of risk that exist on or near its military installations should focus on the Colorado and Wyoming portions of the CSP, encompassing more than half of the ecoregion and 95% of SAR-related priority habitats. Long-term scope is the entire CSP.

1. Strategy: Guiding Principles of a Conservation Program

Guiding principles	Details
Ecoregion-level conservation goal	<ul style="list-style-type: none"> The project team recognizes that even with successful implementation of the recommended conservation program, the species at risk (SAR) may still decline from current conditions. The recommended conservation goal of this program is that no SAR declines to the point that a federal listing is triggered.
Project-level conservation goal	<ul style="list-style-type: none"> The project-by-project conservation goal for this program is that conservation efforts by mitigation funders results in no net loss to any SAR. In other words, any funder to the program should be required to do an impacts assessment for its own lands and then consequently fund the necessary level of conservation that would completely mitigate for those impacts.
Voluntary participation for mutual benefits	<ul style="list-style-type: none"> The project team intends for this conservation program to be 100% voluntary for all parties with tangible benefits for participation. It is possible that a funder would be required to do conservation, but no funder should be required to participate in this program over other available conservation actions.
Multiple conservation partners	<ul style="list-style-type: none"> While this program is currently designed with the needs of the DOD (this project's funder) in mind, the recommended program is adaptable to other potential partners such as USDA, CDOT, wind energy developers, home developers, oil & gas pipeline developers, and any funder wishing to mitigate for environmental impacts. The intent is that the proposed centralized program management structure results in organizational efficiencies among multiple funders, in effect providing "one stop shopping" for conservation needs. .
Many conservation landowners	<ul style="list-style-type: none"> This program is primarily intended for conservation on private lands since 92% of the CSP is privately owned. However, it is possible that public landowners such as the Colorado State Land Board may wish to participate and this program is adaptable to include other land types as appropriate.
Varying conservation timeframes	<ul style="list-style-type: none"> The project team acknowledges that in order to meet the needs of private landowners in the CSP, term-limited conservation opportunities should be offered in addition to tools that require permanent commitments such as perpetual easements.

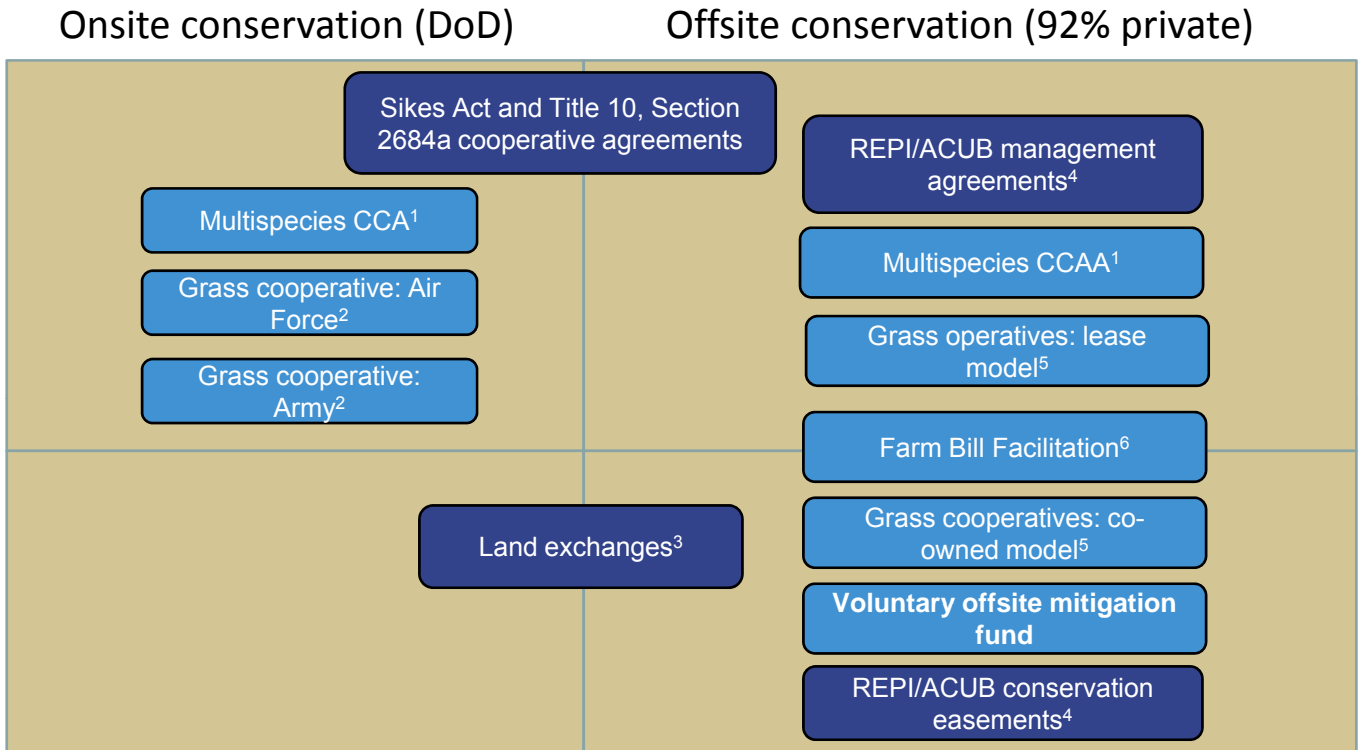
Conservation Tools Recommended for DoD in the CSP

- Currently used by DoD in CSP
- New recommended tools

Temporary conservation (e.g., 5 – 20 years)

- Preferred 2:1 by landowners

- Permanent conservation easements preferred by this project’s working team over fee title changes



1. Most applicable for species with the greatest risk of being listed.
2. On Air Force land (Warren and Shriever AFBs: 4–5k acres) and/or on Army land (e.g., Pueblo Chemical Depot). Although these would be geographically small grass cooperatives, using these lands for grass cooperatives would be environmentally preferable to other more intensive residential or commercial uses and could also help improve relations between the DoD and its neighbors.
3. In the past has been used to conserve rare plants, predominantly found on and around DoD land; can be used in the future for SAR rare plants as well
4. Readiness and Environmental Protection Initiative / Army Compatible Use Buffer program: DoD’s policy is to achieve conservation through purchase of the least interest possible in a property necessary to achieve their goals. Fort Lewis example where offsite management is funded as part of a CCAA on state lands and other protected lands (TNC owned). ACUB cooperative agreements mandate that the private landowner assumes all management responsibilities as their contribution to the process. The lease grass cooperative model is one in which the grass cooperative remains in private ownership, but the DoD could fund the annual conservation operations and maintenance costs.
5. The lease model is one in which DoD could fund management of a grass cooperative that does not have a conservation easement. The co-owned grass cooperative model is one in which DoD could fund conservation easements on the grass cooperative or on the home ranches of participating ranchers as well as operations of the grass cooperative.
6. Farm Bill Facilitation means creating a funding source to provide landowner technical support and cost-share to increase landowner interest and utilizations of existing Farm Bill programs both temporary and permanent to benefit SAR species.

3. Strategy: Staffing and Funding— Case Studies (1 of 2)

Case study	Dedicated program staff	Annual funding beyond in-kind staffing ¹	Years in existence	Results to date
1. Cooperative Sagebrush Initiative (CSI)	0 (All part-time volunteer staff and members)	Expected budget \$250k per year (Won \$1m 3-yr CIG grant to design credit program)	2	Just getting off ground: 3 projects funded
2. Ft. Hood RCS	Not disclosed	\$0.5 million per year	2	~8,000 acres under contract (~1,000 currently occupied by species)
3. Ft. Lewis	~2 (1 TNC employee, one DOD employee, not full-time?)	Not disclosed (~\$8 million raised)	2.5	~25,000 acres covered by CCAA
4. GCPEP	4 currently, varies with annual funding levels	Not disclosed	12	Not disclosed
5. Horizon / Smoky Hills	~2 (1 RTF staff, ½ TNC staff, ½ other partners, including USFWS)	Not disclosed, but estimated at several million dollars total over less than 20 years	1	None yet, but plan to cover ~20,000 acres under conservation easements or restoration agreements

1. Information not available on what percentage of cash spending went into on-the-ground conservation versus staff time above that provided in-kind by participating organizations.

Note: See section 3 of this document for case study summaries.

3. Strategy: Staffing and Funding— Case Studies (2 of 2)

Case study	Dedicated program staff	Annual funding beyond in-kind staffing ¹	Years in existence	Results to date
6. Jonah Fields	Not disclosed	\$24.65 million total over life of project	2	None yet, but plan to cover ~80,000 acres under conservation easements or restoration agreements, offsite and onsite
7. Matador Ranch	2 NGO + donated labor of ranchers	Ranges from ~\$70,000 funding deficit to ~\$50,000 profit per year	6	250,000 acres covered by management agreements
8. Multi-Species Conservation Program (MSCP)	4 city employees (down from 7 in past)	\$2.25 million per year in private grants	11	~85,000 acres conserved (50% of goal)
9. Sandhills Taskforce (STF)	Not disclosed but estimated 1+ (executive director + in-kind)	\$0.5 million spent on projects in 2007	12	~15-20 projects per year (total to date: 7k wetland/riparian/ wet meadow acres restored; 38,000 upland acres enhanced, 7 stream miles restored)
10. Shortgrass Prairie Initiative (SGPI)	No longer in existence, but ~3 during implementation (from mix of part-time team members)	~\$4.0 million total over 7 years	7 (closed)	30,000 acres conserved

1. Information not available on what percentage of cash spending went into on-the-ground conservation versus staff time above that provided in-kind by participating organizations.

Note: See section 3 of this document for case study summaries.

4. Strategy: Potential Funding Sources Narrative

(Based on Case Studies)

Interpretation of next slide

- The case studies researched by the project team make use of many different funding sources, in total.
- The most commonly-observed funding sources are: corporations and in-kind staffing by participating program organizations.
- The next most commonly-observed set of funding sources are: the DOD, state agencies, NGO fundraising, the USDA-NRCS (either Farm Bill funding or other programs such as national or state Conservation Innovation Grants [CIG]), private landowners through donations or cost-sharing, and the U.S. Fish & Wildlife Service.
- Other funding sources observed less commonly but that could still be considered as options for the CSP conservation program include city agencies, county agencies, EPA settlements, grants, and interest from cash balances.
- The program with the most diverse set of funding sources is Sandhills Taskforce which is structured as an independent 501(c)(3) nonprofit: not only does this program receive funding from many sources, but it also has a significant cash balance that returns interest income. Another case study candidate researched but not completed—Blackfoot Challenge—is also a landowner-run nonprofit that enjoys a diverse set of funding sources including corporations, grants, interest from cash balances, NGO fundraising, private landowner cost-shares or donations, state agencies, USDA-NRCS, and USFWS.

Potential Funding Sources for CSP Conservation Program (Based on Case Studies)

✓ checked case study
 ✗ not confirmed but likely possible

Case study	Funding sources												
	1. Corporations	2. County/State	3. DOD/USDA	4. EPA	5. EPA Settlements	6. EPA Grants	7. EPA Grants	8. EPA Grants	9. EPA Grants	10. EPA Grants	11. EPA Grants	12. EPA Grants	13. EPA Grants
1. CSP	✓												
2. Ft. Hood RCS													
3. Ft. Lewis													
4. GCPKP													
5. Hadden / Simsbury Hills													
6. Jonah Falls													
7. Mentor Ranch													
8. San Diego MSCP													
9. Sandhills Taskforce	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
10. Shortgrass Prairie Initiative													

Note: See Introduction to the case study summaries.

4. Strategy: Funding Sources Used in Case Studies

- ✓ Used in case study
- ? Not confirmed but likely possible

Funding sources

Case study	1. City agencies	2. Corporations	3. County agencies	4. DOD ACUB	5. DOD Legacy	6. DOD Wildlife Program Ops.	7. EPA settlements	8. Farm Bill	9. Grants (e.g., Ford, GOCO)	10. In-kind staffing	11. Interest from cash balances	12. NGO fundraising	13. Private land-owners (donations or cost-share)	14. State agencies	15. Other USDA-NRCS (e.g., CIG, other)	16. USFWS
1. CSI		✓								✓					✓	
2. Ft. Hood RCS						✓		?		✓			✓		✓	
3. Ft. Lewis				✓	✓	✓						✓		✓		✓
4. GCPEP					✓					✓		✓				✓
5. Horizon / Smoky Hills		✓								✓						
6. Jonah Fields		✓								✓						
7. Matador Ranch												✓	✓			
8. San Diego MSCP	✓	✓	✓						✓	✓						
9. Sandhills Taskforce		✓					✓	?	✓	✓	✓		✓	✓	✓	✓
10. Shortgrass Prairie Initiative										✓				✓		

Note: See section 3 of this document for case study summaries.

4. Strategy: Results of Focus Groups with Potential Conservation Partners

Discussion status

Oil and gas

Wind

Home
Builder

CDOT

DOD

NRCS

USFWS

- Discussions in progress with the Shortgrass Prairie Partnership (SPP), and between TNC (Energy by Design Conservation Framework) and industry representatives.

- Green-oriented builders not interested in offsite conservation because they want to invest conservation dollars onsite where residents can enjoy the results.
- Traditional builders might be interested if offsite conservation expedites permitting approvals; relationship with homebuilders' association initiated and welcomed to continue.

- Not explored in this project—the SPP will investigate further interest beyond CDOT's prior involvement in Shortgrass Prairie Initiative (see section 3 of this document for case study).

- DOD Legacy Program has funded development of CCAA in the past, as in Ft. Lewis (see section 3 of this document for case study).
- Other funding sources available internal to DOD (applied for by individual bases).

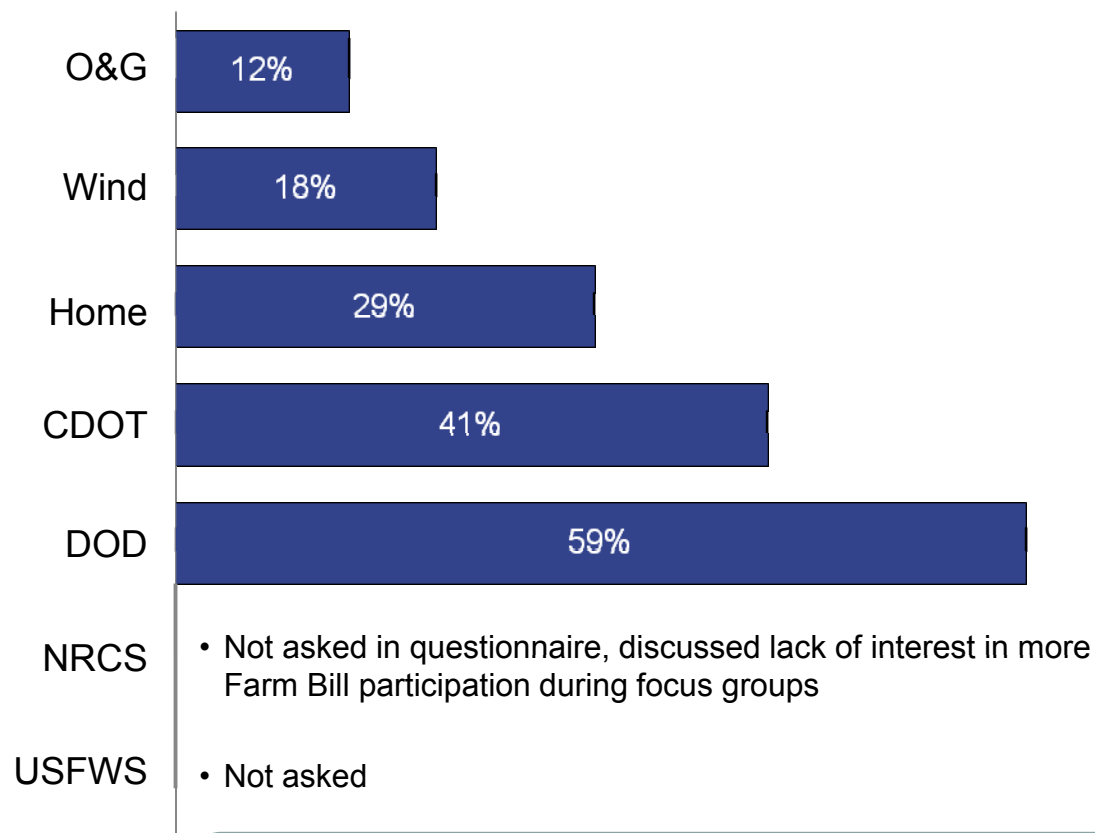
- Project team applied for national CIG and will also may apply for state CIG (can use the state award as bridge funding for developing a winning national proposal for 2010).

- Supportive of CCA/A's but no funding available
- Other funding opportunities not yet explored, but USFWS funded 3 case studies (see prior slide).

4. Strategy: Landowners Wary of Some Funders— Indicates Role for Conservation Intermediaries

Question: “Are there potential funders with which you would not feel comfortable participating in the same conservation program? (circle all that apply)”

(100% = 23 respondents)



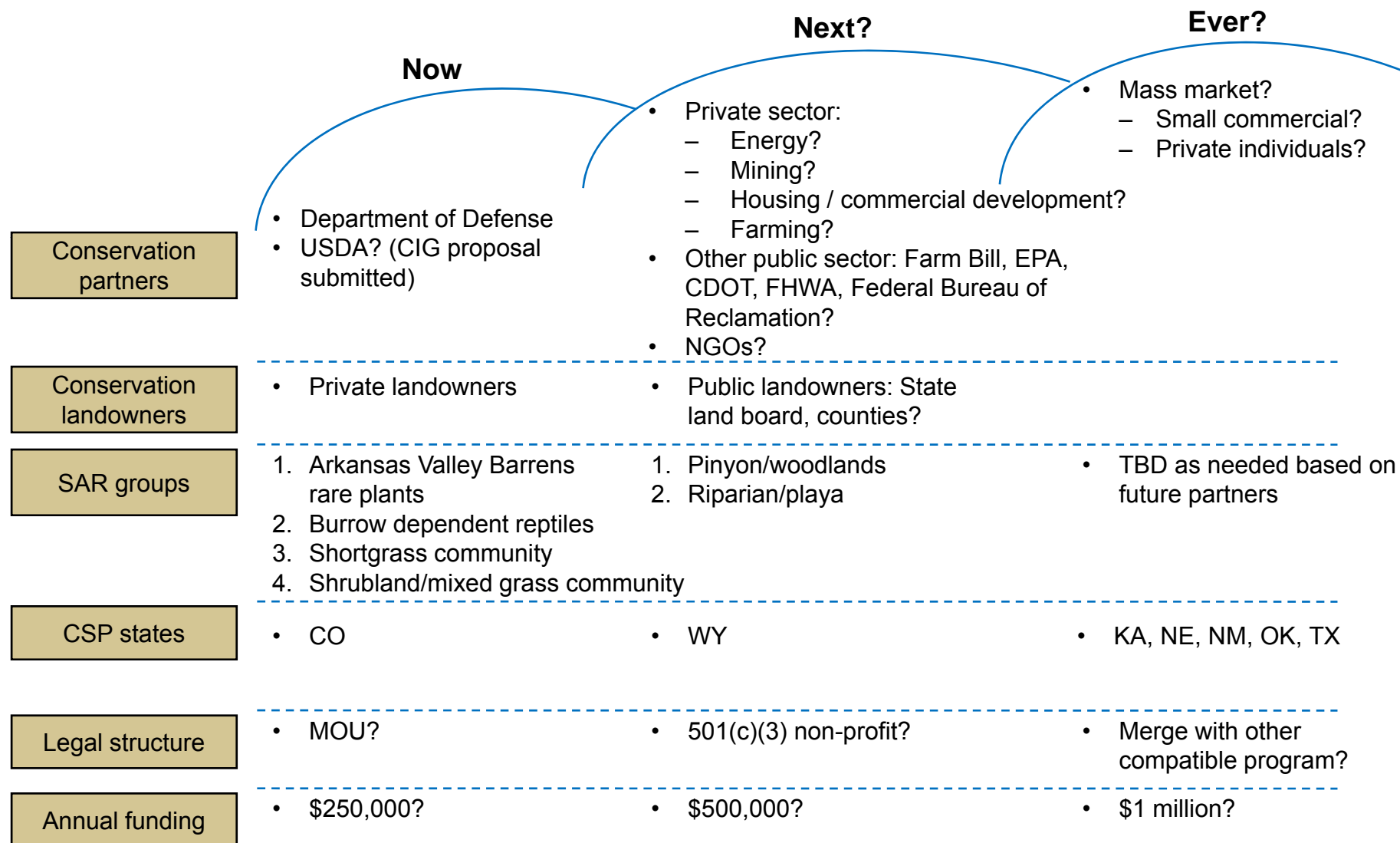
- “I favor a cost share system that is not Farm Bill / NRCS run and funded. I favor non-traditional funders with “on the ground” management from local professionals.”
- No: “Sierra Club or PETA”

Landowner written comments

Private landowner focus group results speak to the importance of building a multi-partner conservation program where funding from different partners is commingled and landowners receiving funding are not tied to particular funders.

5. Strategy: Focus First Then Grow in Scope Over Time

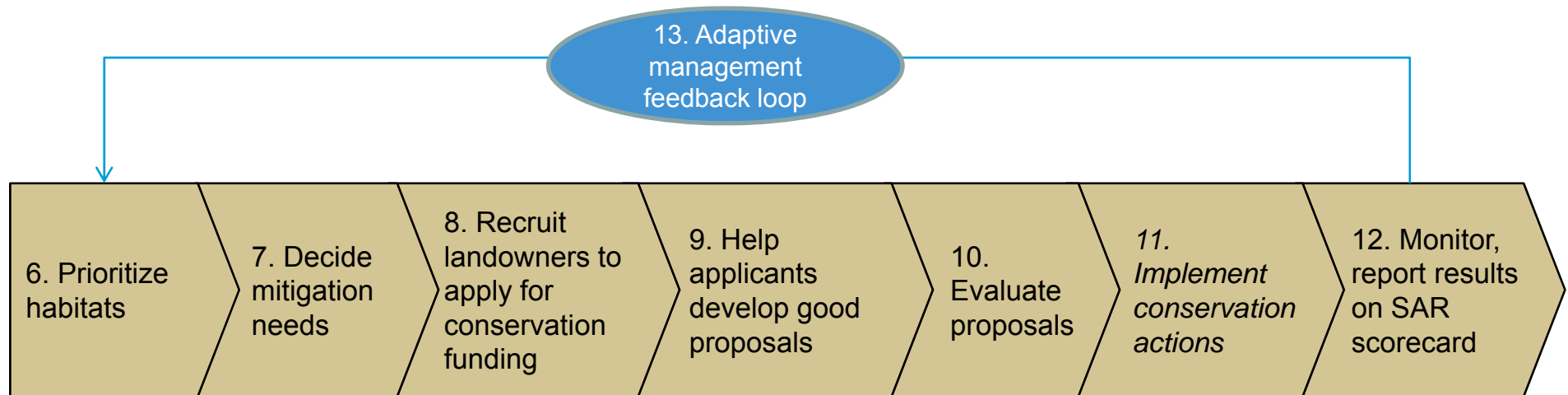
Proposed approach: Build the CSP conservation program in manageable and affordable pieces, then scale over time as success is demonstrated.



6-13. Recommended Conservation Process

Recommended conservation process

OVERVIEW: DETAILS ON FOLLOWING SLIDES

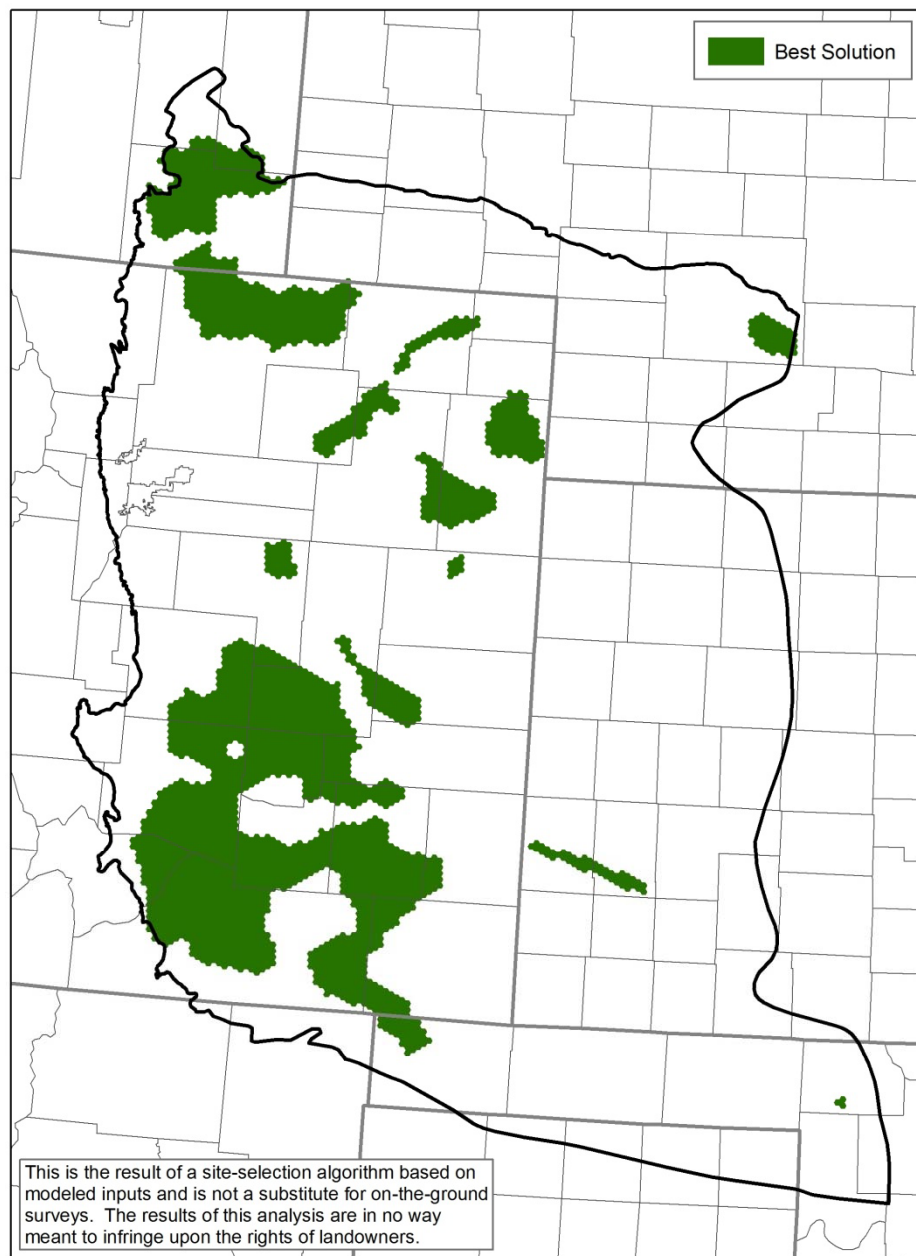


- Completed for selected SAR on DoD land (see Appendix A sections 2 and 3)
- Should be updated every 5 years or as needed
- Recommended next steps for DOD
- The Shortgrass Prairie Partnership has the opportunity to follow up with interested focus group attendees
- Hands on support to landowners can be provided by Shortgrass Prairie Partnership members
- Desktop ecological review using remotely sensed data followed by ground assessment
- Should take ecological, economic, and social goals into account
- Should include an internal / external evaluation panel
- Hands on support to landowners provided to SPP members
- **Scorecard already completed for selected SAR on DoD lands in the CSP as part of this project (see Appendix A, section 4)**

Note: Numbers preceding process phases refer to program element questions on prior slide.

6. Process: Prioritized Habitats

(See Appendix A, section 3 for Details)



State	Best Solution Acres	%
Wyoming	797,388	9%
Nebraska	132,660	2%
Colorado	7,551,516	86%
Kansas	140,329	2%
Oklahoma	126,530	1%
Texas	0	0%
New Mexico	0	0%
Total CSP	8,748,423	100%

- In conserving SAR in the CSP, the DOD may focus only on Colorado on Wyoming and cover 95% of the “best solution” (predicted).

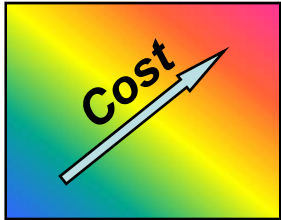
Methodology: Summary habitat maps were produced by using a computer program called SITES (Andelman et al. 1999) to select the least amount of area that still meets conservation goals for species of concern. We used the same hexagonal planning units that were the basis of the conservation portfolio of Neely et al. (2006). Because habitat quality was already addressed in each of the target species models, the site selection process was focused on the minimum area required to meet goals. Therefore, the base cost was simply the area, in acres, of each planning unit (3,118 ac), and no modifications were made to weight perimeter or shortfall costs. Each site selection session consisted of 20 runs of 5 million iterations each. The run with the lowest cost was chosen as the best overall solution. 225

7. Process: Mitigation Funding Based on Degree and Duration of Expected Impacts

Mitigation funding costs

ILLUSTRATIVE

Duration of impact (e.g., years)	Forever	\$\$	\$\$\$	\$\$\$\$	\$\$\$\$
	Moderate	\$	\$\$	\$\$\$	\$\$\$\$
	Short	\$	\$	\$ (low likelihood)	\$\$\$\$ (low likelihood)
		Minor (e.g., foot trails)	Moderately impacted (e.g., vehicle traffic), results in reduction of population, acres of suitable habitat density or lowered recruitment	Severely impacted (e.g., dirt roads), major impacts to natural, but rehabilitation still possible	Complete conversion (e.g., paved roads), permanently converted to unsuitable— unlikely or impossible to rehabilitate
		Degree of expected impact			

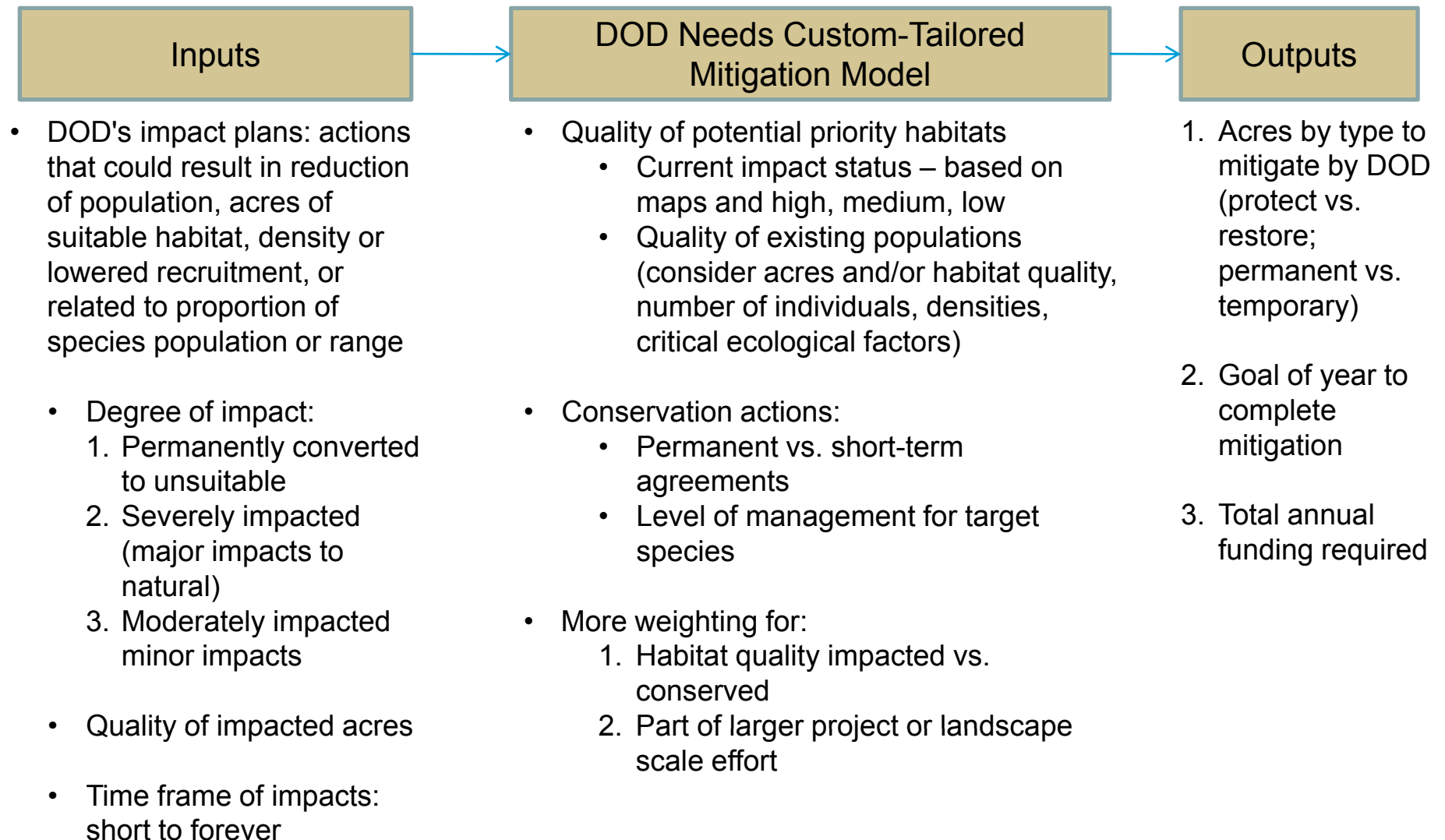


- This is an illustrative framework for how the Shortgrass Prairie Partnership proposes working with potential mitigation funders to estimate mitigation needs. For example, if the DOD were planning a training exercise for foot soldiers that would only generate short-term impacts, mitigation funding requirements would be much lower than if the DOD were going to pave over an area of native habitat permanently.
- Also need to consider proportion of species population or range (size of impact), quality of existing populations (consider acres and/or habitat quality, number of individuals, densities, critical ecological factors) and current impact/condition status, lengths of conservation agreements, and level of management for target species
- Sample Algorithm:
 - Uses impact score + degree of conservation (management intensity + tenure)
 - $F(\text{severity} + \text{tenure of impact}) = \text{Impact score} + f(\text{conservation outcome of proposed activity})$

7. Process When DOD is Ready to Measure Its Expected Impacts, A Corresponding Conservation Plan Can Be Developed

Proposed Process for Establishing Mitigation Goals

ILLUSTRATIVE




8. Process: Landowner Outreach

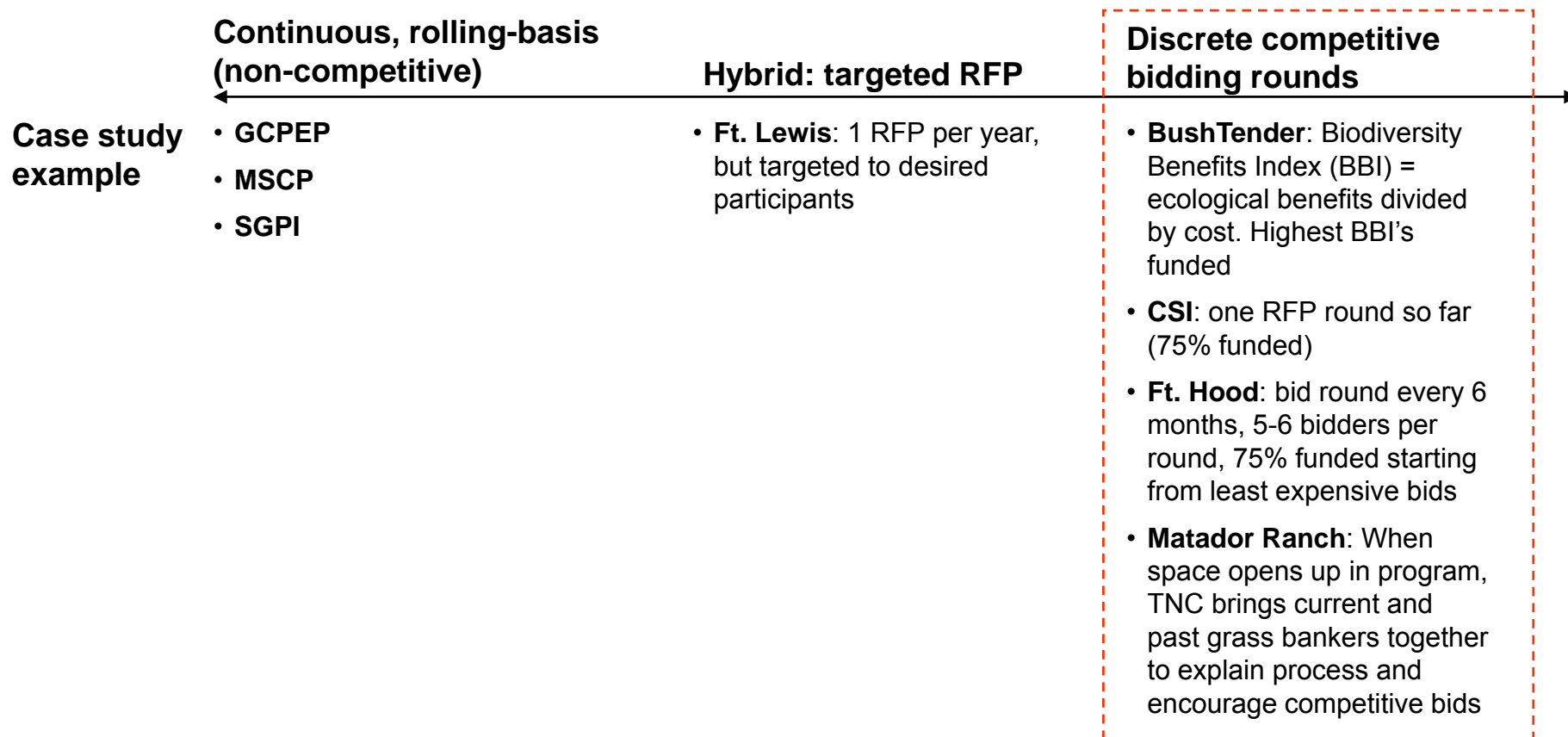
 Recommended approach

	← Top-down	Hybrid	Bottom-up →
Description	<ul style="list-style-type: none"> • Prioritize habitats, then proactively approach specific landowners • Use GIS parcel ownership data to build outreach list • Leverage existing relationships and ranching associations 	<ul style="list-style-type: none"> • Conduct outreach to specific landowners based on spatial analyses of priority habitats • Leverage existing Shortgrass Prairie Partnership relationships, especially cattlemen's and farmers' associations, conservation districts, watershed association • Augment with public notices, workshops, GIS ownership analyses as needed 	<ul style="list-style-type: none"> • Define general geographic scope, then put out general RFP, targeted to any landowner in the region • Rely on public notices, workshops, and mailings by zip codes
Case study example	<ul style="list-style-type: none"> • Ft. Hood: GIS ownership data and access through ranching association leveraged • Ft. Lewis: program has worked mainly with organizations or agencies, except for one small private landowner • GCPEP: has worked only with organizations and agencies • MSCP (voluntary portion): if a high conservation value property is not expected to come through discretionary permitting process, the staff proactively approach landowner • Matador: all outreach done through current grass bankers and ranching association 	<ul style="list-style-type: none"> • Shortgrass Prairie Initiative (SGPI) 	<ul style="list-style-type: none"> • Not observed in case studies

Note: See section 3 of this document for case study summaries.

9. Process: Requesting Applications for Funding

 Recommended approach



Note: See section 3 of this document for case study summaries.

9. Process: Application Development Support¹

(Based on Case Studies)

- ✓ Used in case study
- ? Role unclear or not yet in effect

Members of the Shortgrass Prairie Partnership can help provide application development support to private landowners in the CSP

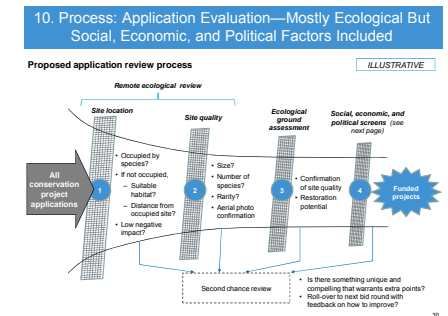
Case study	1. Cattlemen's Association	2. CNHP	3. EDF	4. Graduate students	5. NPS	6. Other NGO	7. Other state agency	8. Private subcontractors	9. State wildlife agency	10. TNC	11. University groups (eg extension departments)	12. USFS	13. USFWS
1. CSI	?	?	?			?	?		?		?	?	?
2. Ft. Hood RCS	✓		✓				✓		✓	✓	✓		?
3. Ft. Lewis								?	?	✓			
4. GCPEP (not applicable)							✓		✓	✓			
5. Horizon / Smoky Hills	✓								✓	✓			
6. Jonah Fields	✓							✓	✓	✓	✓		✓
7. Matador Ranch										✓			
8. San Diego MSCP													
9. Sandhills Taskforce	✓									✓			✓
10. Shortgrass Prairie Initiative		✓					✓		✓	✓			

1. Includes outreach, habitat assessment, recruitment, application writing and analysis
 Note: See section 3 of this document for case study summaries.

10. Process: Application Evaluation—Mostly Ecological But Social, Economic, and Political Factors Included

Interpretation of chart following :

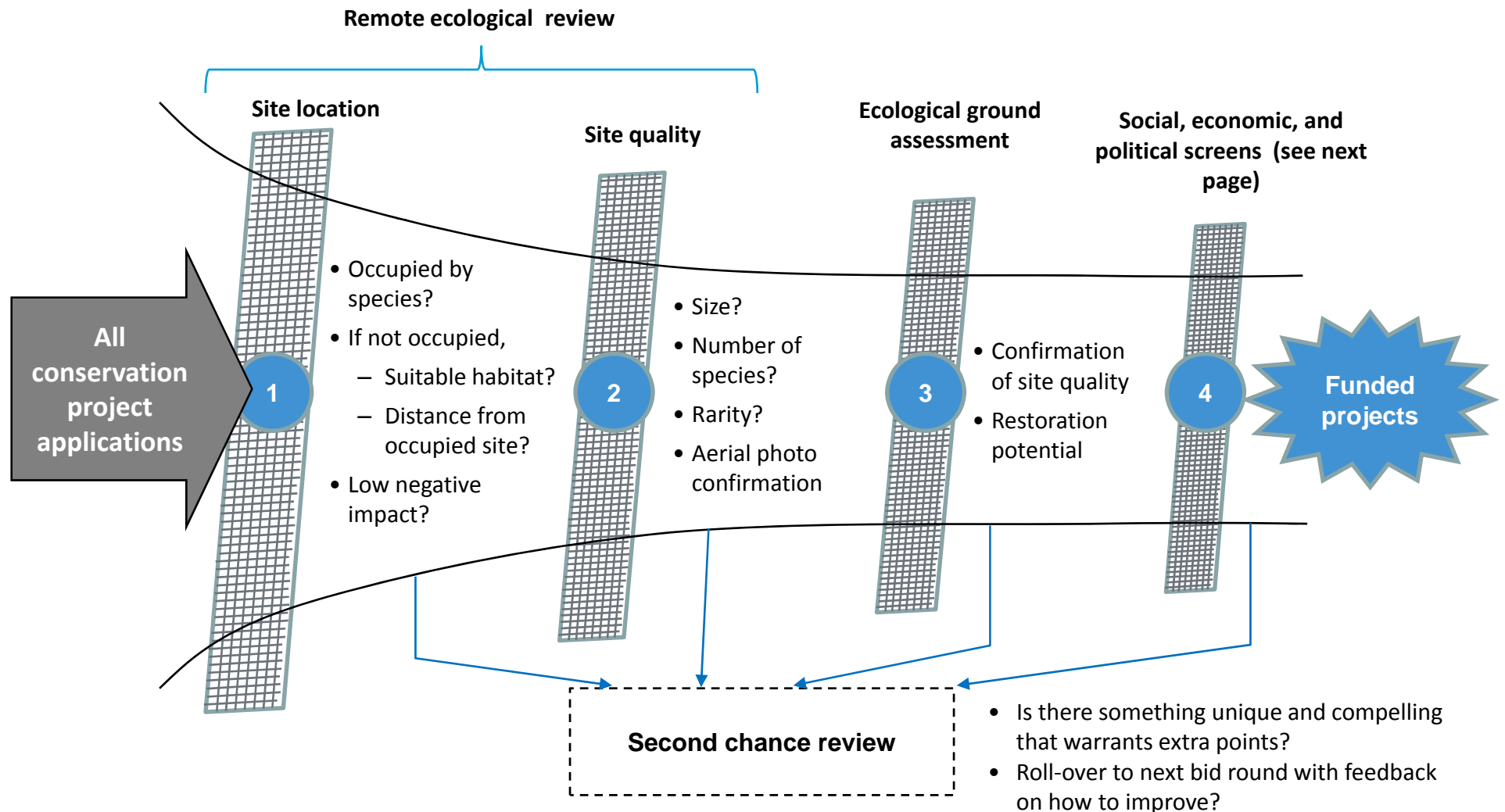
- Many different criteria may be taken into account when evaluating applications of conservation projects for potential funding, including ecological, social, economic, and political factors. The team recommends four sets of evaluation screens, with the first three being ecological screens of finer granularity.
- The first screen should be based on site location, meaning does the application involve a property that is shown as priority habitat on the SAR maps generated in this project. Factors that determined whether a location was defined as priority habitat included (1) if the habitat is known to be occupied by SAR based on field observations, or (lacking field observations) (2) if the location is classified as suitable habitat in terms of vegetation coverage, (3) if the property is near to other occupied locations, and finally, (4) if the location is known to have low negative impacts based on the impact assessment completed in this project.
- If a project application meets these location-based ecological criteria, then it would be passed through the first screen to the second level of ecological review, which is based on site quality. Quality could be measured by the size of the project site (the larger the better), the number of SAR that could use the habitats conserved by the project (the more the better), the rarity of the species that would benefit from the project, whether aerial imagery confirms that the site is not impacted (as assumed by the high-level impacts assessment), or others.
- If the project application passes this second screen, then it would then be evaluated for ecological quality with an on-the-ground assessment. If the property passes the ecological ground assessment, then the final screen would be evaluating the application for social, economic, and political factors. Such factors are defined on the slide following the chart with the four screens.
- This proposed application evaluation process should be used as consistently, transparently, and objectively as possible so that project applicants know what factors will determine whether or not a project gets funded. However, the team recognizes that there may special circumstances that warrant exceptions. Before any applications are rejected for funding, a member of the project evaluation committee should take a second look at the application to see if there are special circumstances that warrant consideration even if other recommended criteria are not met.



10. Process: Application Evaluation—Mostly Ecological But Social, Economic, and Political Factors Included

Proposed application review process

ILLUSTRATIVE



10. Process: Social, Economic, and Political Factors Should Be Considered

“All else being equal ecologically...”

Social Factors

1. **Timeframe** of the proposed project: the longer conservation timeframe a landowner proposes for the project, the more points that application will receive (i.e., perpetual easement proposals will get more points than temporary easement proposals).
2. **Neighbor support:** applications that demonstrate support of neighboring landowners would receive more points than those that don't.

Economic Factors

1. **Conservation cost per acre:** the lower the average cost per acre of conservation, the more points that application might receive.
2. **Ranching synergies:** the more the conservation actions proposed will also improve ranching profitability, the more points that application will receive (e.g., rotational grazing practices, removing fencing).
3. **Outside funding:** the more a project is likely to attract outside or matching funding, the more points that application will receive (e.g., precedence for another funding source for that type of application).
4. **Landowner cost-sharing:** the higher the percentage of cost sharing the landowner is willing to bear, the more points that application might receive (including in-kind contributions of labor).

Political Factors

1. Can the proposed conservation project be implemented without too much political resistance (e.g., county commissioners, adjacent landowners)
 1. E.g., Impact of conservation easements on property taxes?
 2. E.g., Impact of lower ranch profitability on state income taxes?
 3. E.g., Does the project meet or conflict with other political goals?

10. Process: Project Funding Decision-Making

 Recommended approach

← *Mostly external* → *Mostly internal*

Case study examples

External panel

- **MSCP:** USFWS and California Department of Fish and Game review and accept sub-area plans

External / internal committee

- **Ft Lewis:** 1 representative from each partner and 2 university representatives

Funder only

- **Ft Hood:** final approval made by DOD based on budget and project rankings (least costly projects funded first)
- **Matador:** internal NGO decision on which ranchers can join grass bank

Internal committee¹

- **SGPI:** subset of working team trusted with decision-making
- **Sandhills Task Force:** If landowner and neighbors approve, then funding likely, but if there are concerns, decision made by NRCS range specialist and 2 biologists from USFWS (board seats)

Internal consensus

- **GCPEP:** 100% consensus by steering committee with equal representation regardless of partner size

1. Can have some external representation as well
 Note: See section 3 of this document for case study summaries.

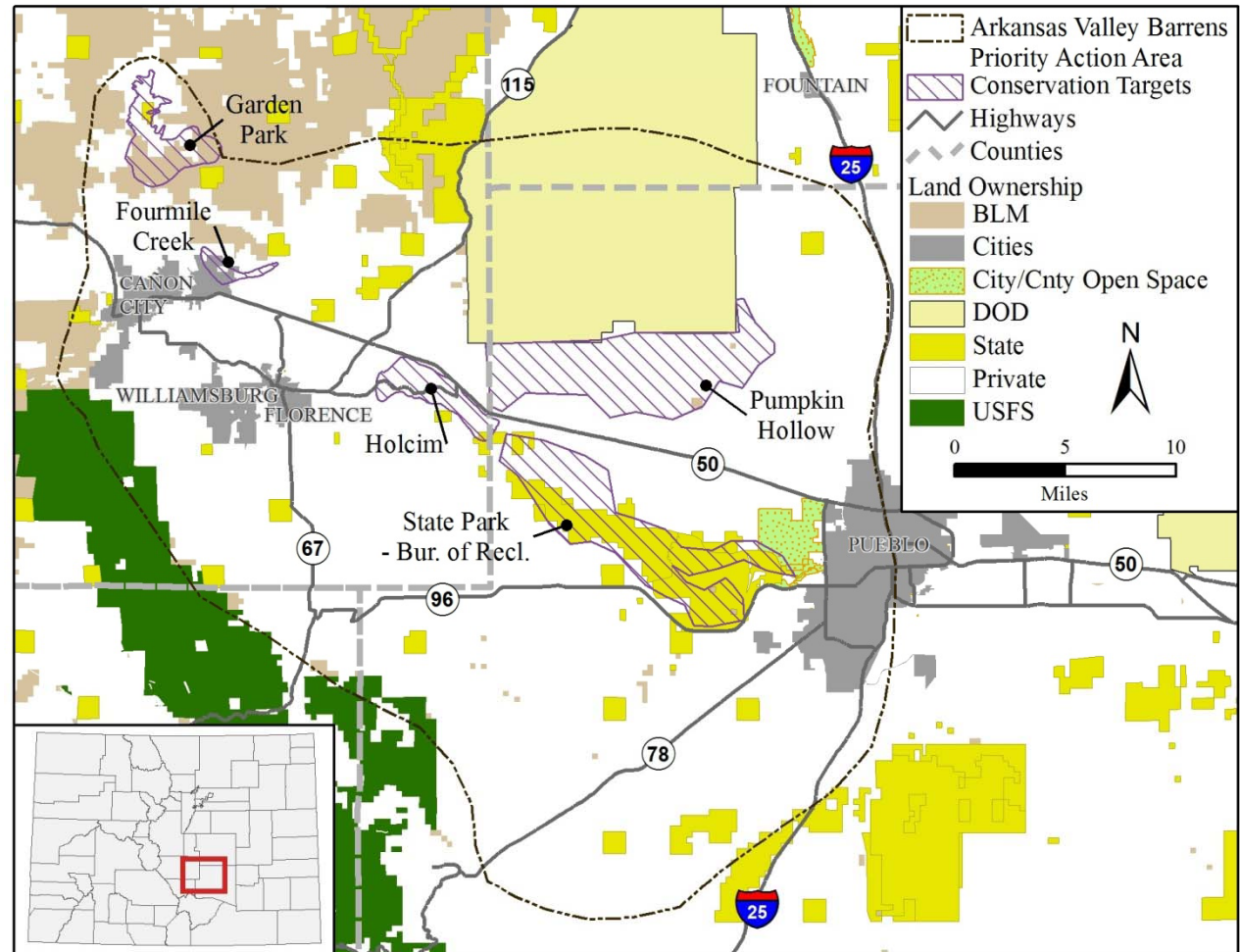
11. Process: Implementing Conservation—Arkansas Valley Barrens Rare Plants General Conservation Agreement Needs and Limitations

Parcels within the Arkansas Valley Barrens Priority Action Area, higher priority areas lie within the Conservation Targets areas occurring within blocks of native rangeland

Needs: Protection of plant populations from direct surface disturbance outside of that associated with accepted livestock grazing practices and ranch infrastructure, limited use of herbicides.

DoD Plant SAR Group:

- Arkansas Valley feverfew
- golden blazing star
- Arkansas Valley evening primrose
- Pueblo goldenweed
- Round-leaf four o'clock



11. Process: Implementing Conservation—Burrow Dependent Reptiles Habitat Needs and Limitations

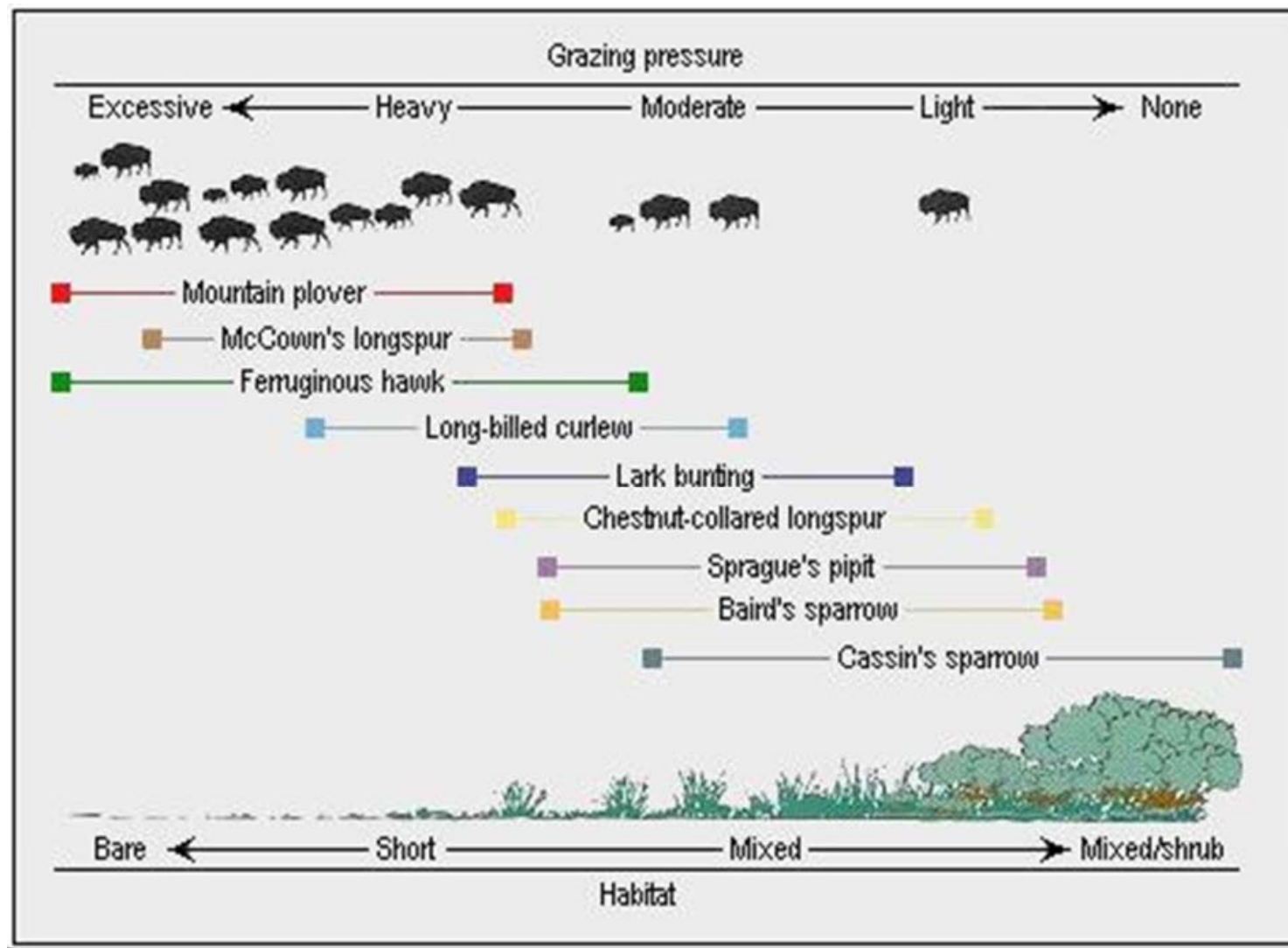
- Parcel within the species range
- Sandy soils (sands, loamy sands) with some other patches of finer textured soils
- Dominated by native grassland within 1.2-2.5 miles
- In large tracts of at least 2500 acres
- 400 meters away from well traveled public and private roads

Burrow Dependent Reptiles Group

1. Massasauga Rattlesnake
2. Ornate Box Turtle



11. Process: Implementing Conservation—Shortgrass Community Habitat Needs and Limitations



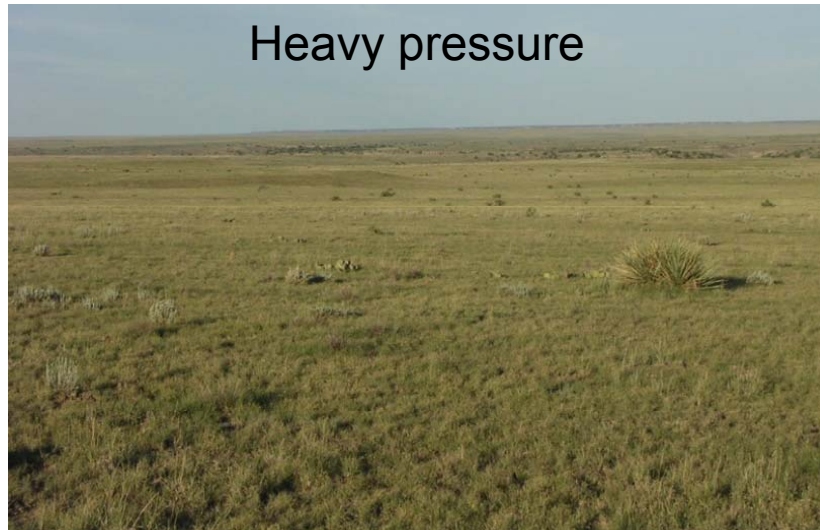
11. Process: Implementing Conservation—Shortgrass Community Habitat Needs and Limitations (2 of 2)

Excessive pressure



Benefits: Burrowing Owl, Ferruginous Hawk, McCown's Longspur, Mountain Plover

Heavy pressure



Benefits: Long-billed Curlew, Mountain Plover

Heavy/moderate pressure



Benefits: Long-billed Curlew

Moderate pressure

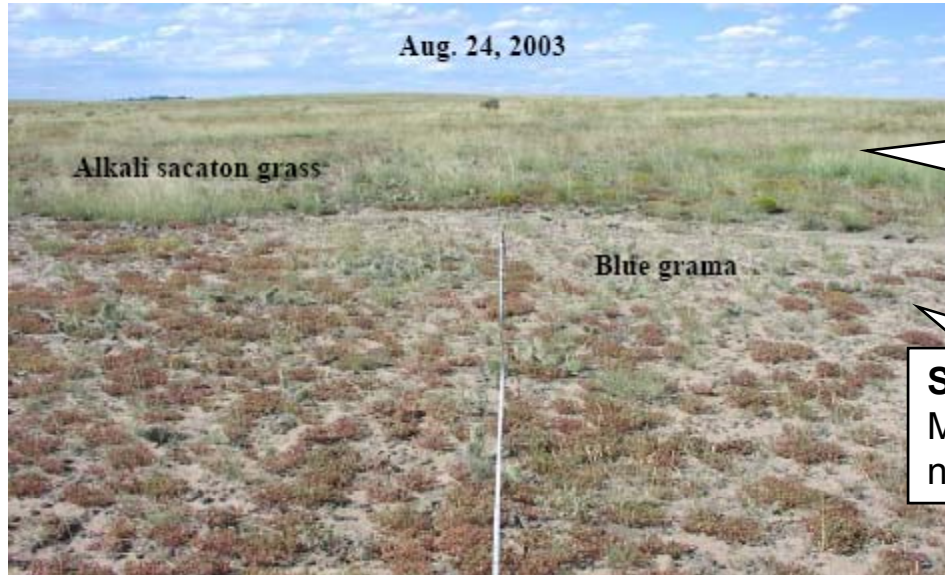


Benefits: Chestnut Collared Longspur, Lark Bunting

Note: Swift Fox and Prairie Dog-Black Tailed could inhabit any of the environments depicted above but the "excessive pressure" photo is of a prairie dog town.

11. Process: Implementing Conservation—Mountain Plover Habitat Needs and Limitations

If existing growth remains through next nesting season (spring)



Too tall to be suitable for Mountain Plover nesting

Suitable for Mountain Plover nesting

Enough bare ground for nesting mountain plover



Not enough bare ground for nesting mountain plover

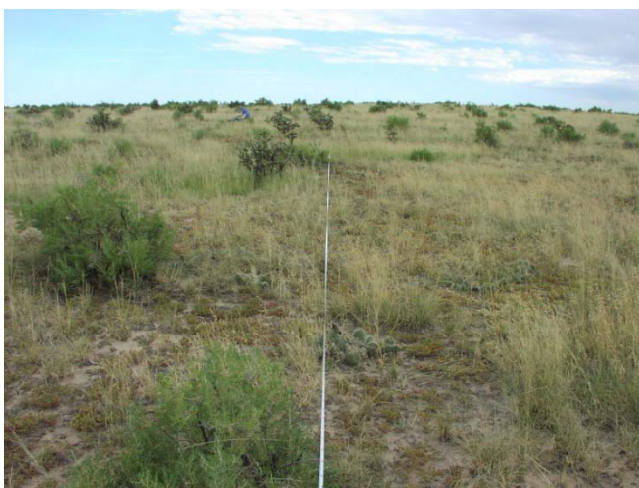
11.Process: Implementing Conservation—Shrubland / Mixed Grass Community Habitat Needs and Limitations



Not enough shrub cover to support significant numbers of shrubland species.

DOD CSP Shrubland / Mixed Grass Community

- Brewer’s Sparrow
- Cassin’s Sparrow
- Loggerhead Shrike
- Grasshopper Sparrow



Enough shrub cover to support significant numbers of **Cassin’s Sparrows**

Grazing that maintains or increases shrub cover; no or limited control of shrubs (herbicide, mechanical) and insects; management after fire to allow shrub recovery; fewer fences; >400 meters from roads; no or minimal new road development



Enough shrub cover to support significant numbers of **Brewer’s, Cassin’s, and Brewer’s Sparrows**

Grasshopper Sparrow habitat - needs large patches and grazing that can maintain grass relatively tall (at least 6-10 inches); few or sparse shrubs



11. Process: Implementing Conservation—Transitioning from Grass Dominated to Shrubland Slow and Costly

- These two pictures show the same ecological site, but on different sides of a county road and under different management.
- In this case #1 appears to be currently suitable for species requiring short vegetation and little structure (the shortgrass species group). Conversely #2 appears suitable to the shrubland bird group.
- If the goal is managing for the shrubland bird species moving from a plant community with no shrubs (#1) to one with enough shrub cover to support the shrubland birds (#2) would be very difficult (take a long time, or significant inputs) and consequently, would probably not be the best conservation investment under this project.
- Instead, existing shrubland land should be conserved where possible rather than restored from grassland.

1 – Grass dominated



2 – Four-wing saltbush-sacaton dominated, on the opposite side of the road from #1



11. Process: Implementing Conservation—Examples of Habitat Management Decision-Making

Management actions for SAR target conservation sites

- 1) Is the habitat within a SPICE identified conservation priority area and currently suitable for the target species?
- 2) have the species been documented from the site or nearby area?
- 3) are other known limiting conditions absent or insignificant?

YES, proceed with project

NO, can management likely create desired conditions or negate limiting factors relatively quickly?

If NO stop.

If YES, consult NRCS or other range specialists to determine what level of management and input would be needed, and how long it would be expected to take to see results.

Land manager - Are needed management actions and costs acceptable to the landowner?

Offset funder - Is the timeframe for restoration in line with timeframe for offset needs?

If NO, stop.

If YES, proceed with application.

Is the shrub cover suitable for the target species and other limiting condition absent or insignificant?

YES, proceed with project application

NO, can short term management increase shrub cover to desired levels or negate limiting factors in an acceptable time frame?

If NO stop.

If YES, consult NRCS or other range specialists to determine what type and level of management would be needed, and how long it would be expected to take to see results.

Are needed management actions acceptable and affordable (can I build additional fencing or water infrastructure, alter the number of animals or grazing period, inter-seed shrubs, etc)?

If NO, stop.

If YES, proceed with application.

Other resources:

1. Integrating Bird Conservation into Range Management. 2004. Tammy VerCauteren and Scott W. Gillihan, Rocky Mountain Bird Observatory. www.rmbo.org
2. Colorado Natural Areas Program. 1998. Native Plant Revegetation Guide for Colorado. Colorado Natural Areas Program, Colorado State Parks, Colorado Department of Natural Resources. Denver, Colorado. 272 pages.
3. Colorado Natural Heritage Program Ecological Systems ranking specifications (http://www.cnhp.colostate.edu/projects/eco_systems/eco_systems.html 242

12. Process: Program Success To Be Measured Against SAR Scorecard

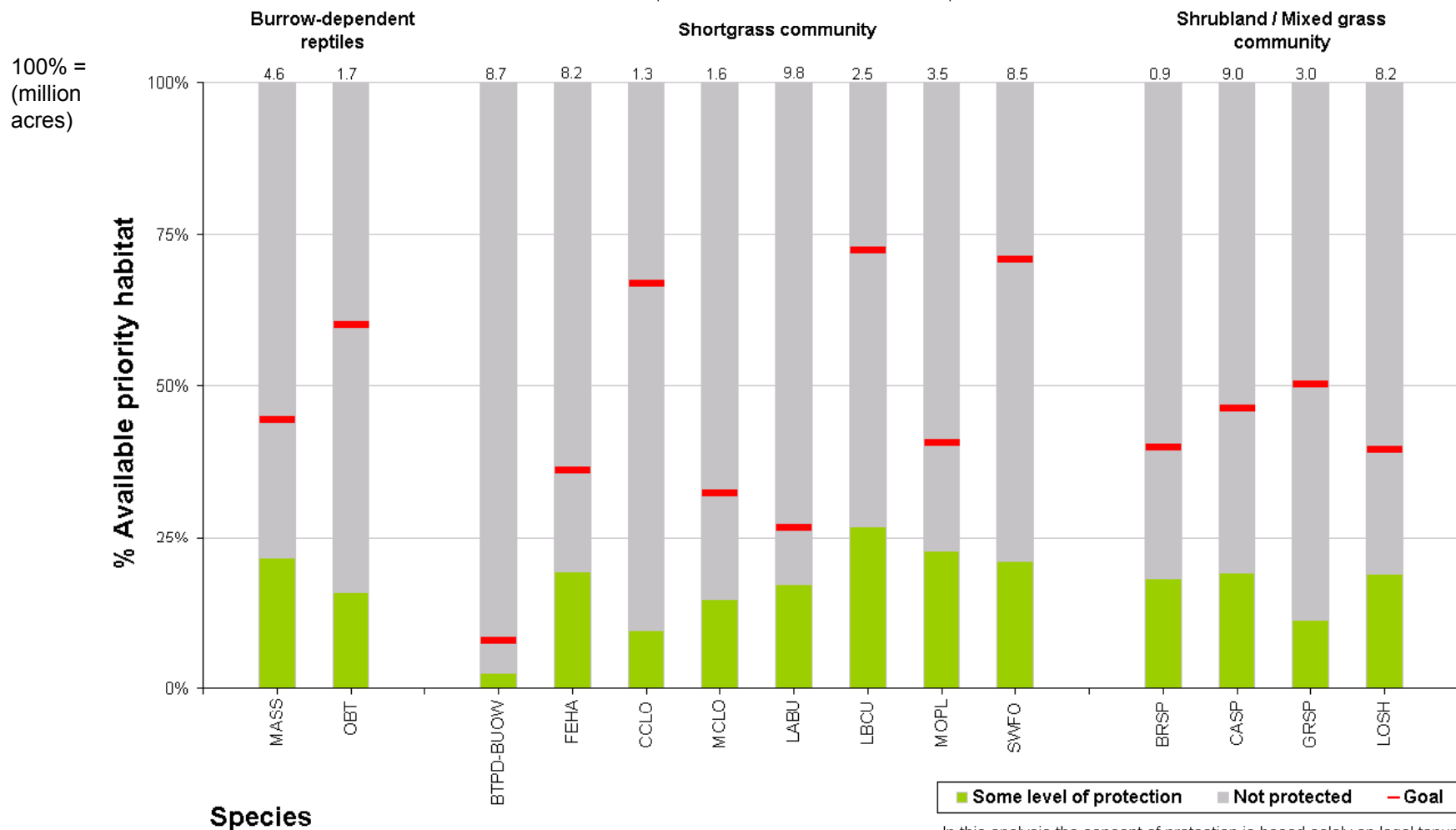
(See Appendix A, sections 3 & 4 for Details)

- This summary scorecard shows the proportion of priority habitat (top 3 classes in habitat maps) that has some level of protection (green bars) against the conservation goals for each species (red lines).

Scorecard summary for animal species at risk

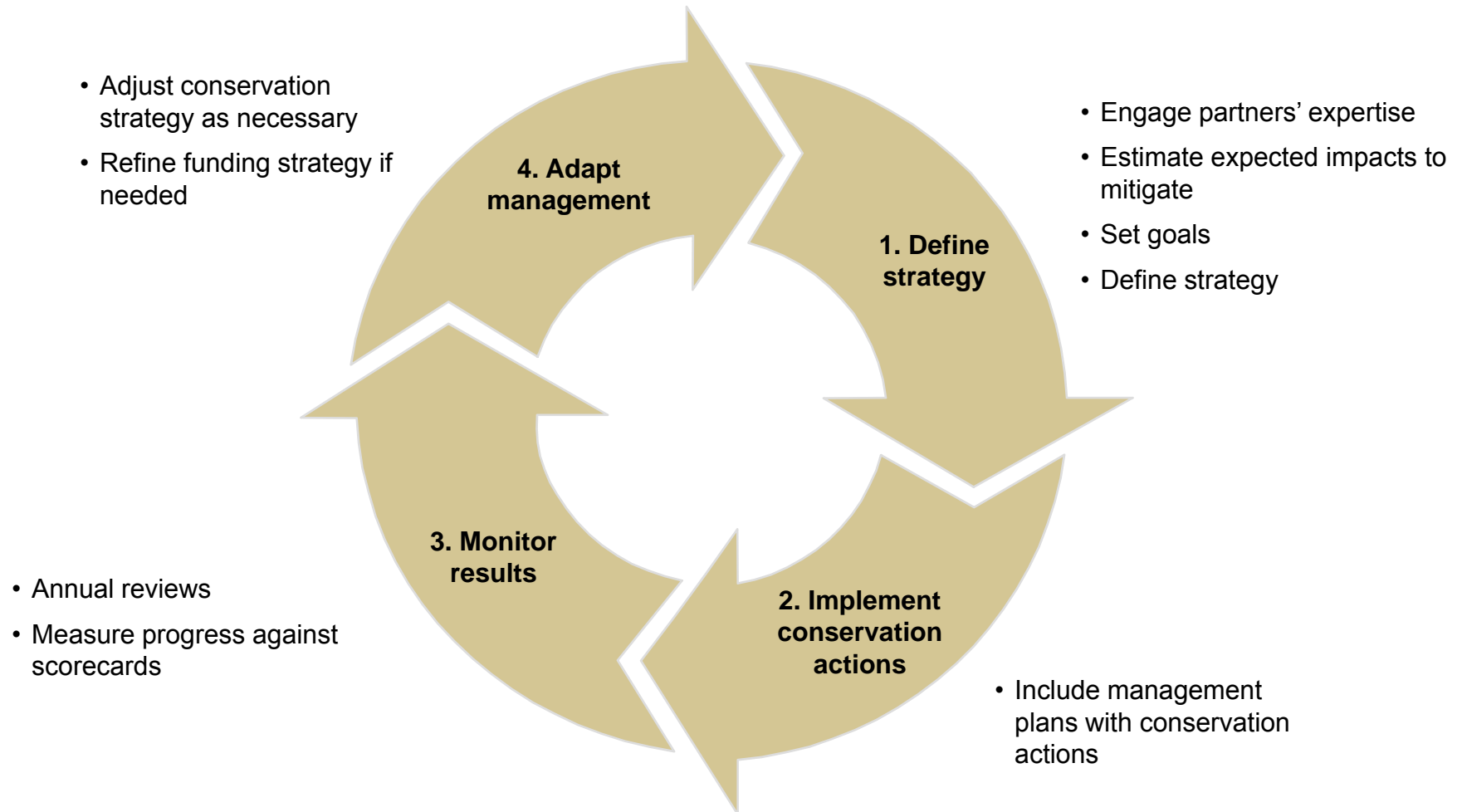
PLANTS NOT SHOWN

100% equivalent in million acres shown at the top of each bar

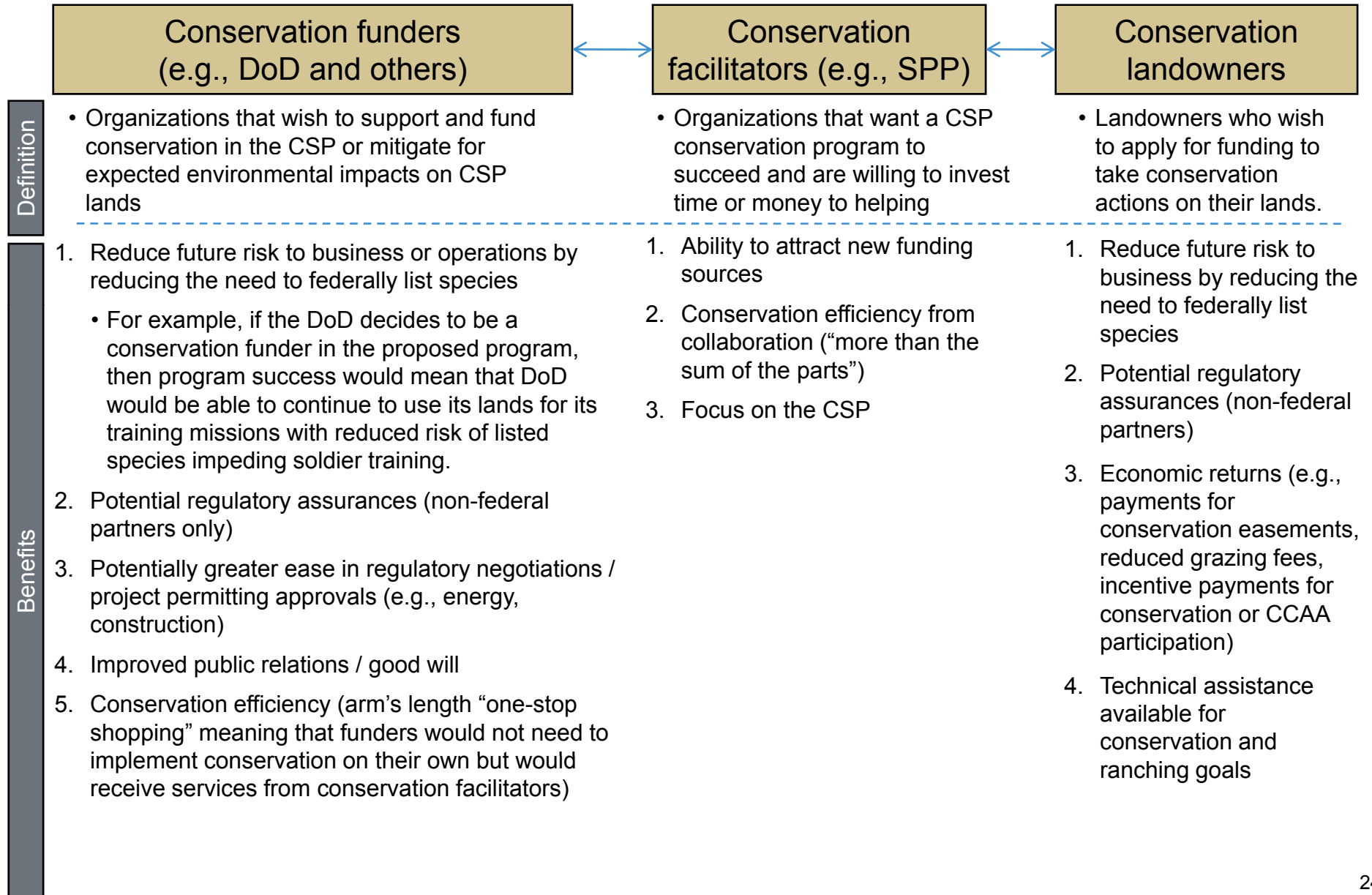


In this analysis the concept of protection is based solely on legal tenure, and does not consider habitat quality or management intent

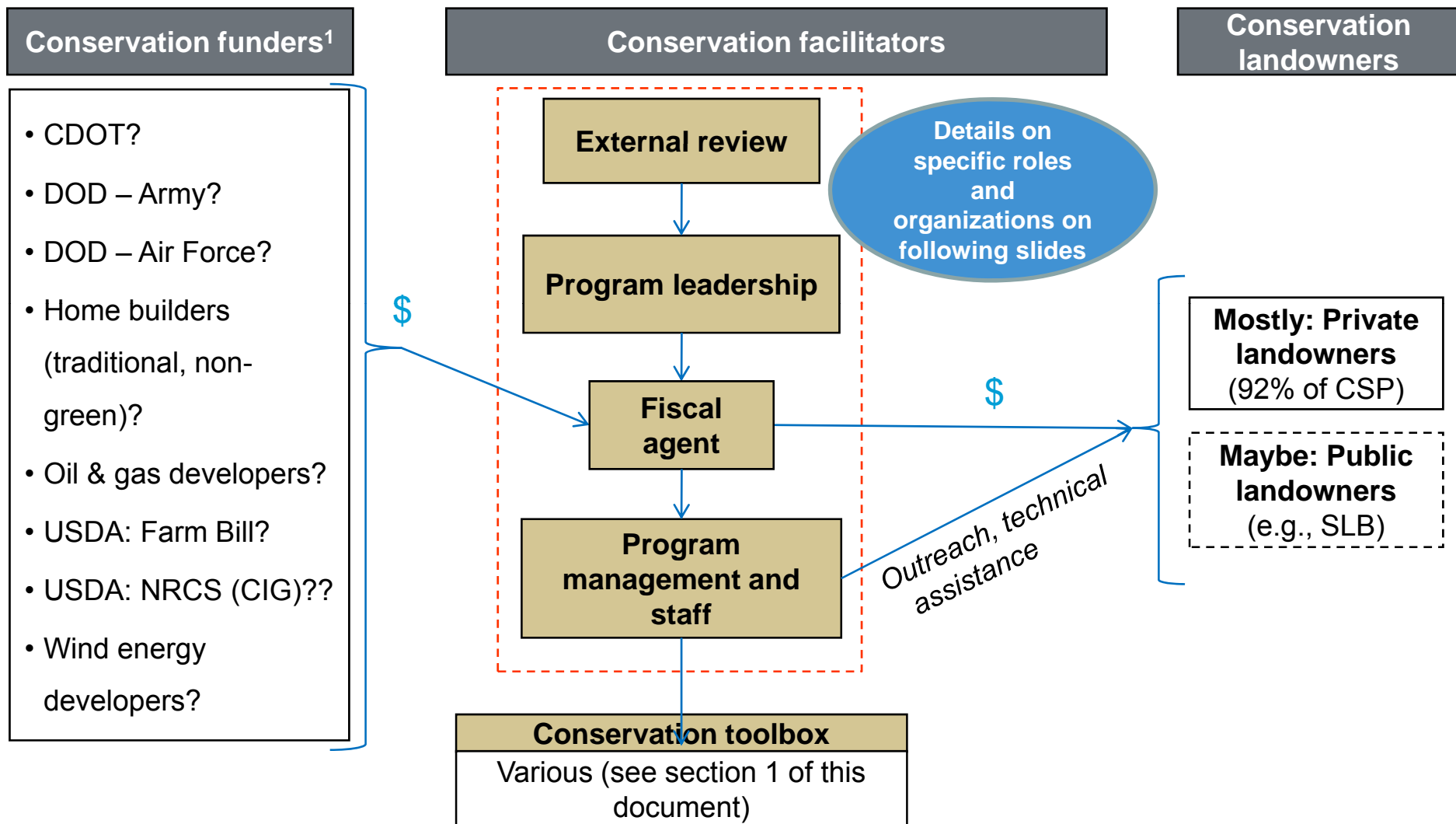
13.Process: Adaptive Management Feedback Loop



14. Organization: Benefits for Program Participants



15. Organization: Recommended Program Structure



1. The organizations and industries shown under conservation funders are proposed only. The project team does not presume that any of these organizations or industries will ultimately decide to participate, but the team does believe that each would benefit from participation, as shown on a prior slide. During this project, the team met with representatives from most of these potential conservation funders and received positive feedback for the proposed program.

15. Organization: Legal Structure

 Recommended approach

Legal structure options

Case study examples

1. One-to-one contracts between public and private organizations and individuals

- **Ft Lewis:** ACUB Partners, CCAA partners, DoD/TNC on-site collaboration
- **Ft Hood, SGPI:** One-to-one contracting relationships, one or more fiscal agents

2. One MOU between public and private organizations

- **GCPEP:** MOU took a long time to complete, but proved worthwhile. Has been updated once in 12 years and has been useful in quickly and efficiently adding new partners or removing old ones.

3. New 501(c)(3)

- **Cooperative Sagebrush Initiative (CSI)**
- **Sandhills Task Force:** landowner-driven
- **Blackfoot Challenge:** landowner-driven¹

4. Existing NGO

- **Matador Ranch:** this program is just one of many that TNC in Montana runs

5. Government program

- **MSCP:** San Diego City Planning Department
- **BushTender:** Australian government (federal?)¹

6. Merge with other existing program?

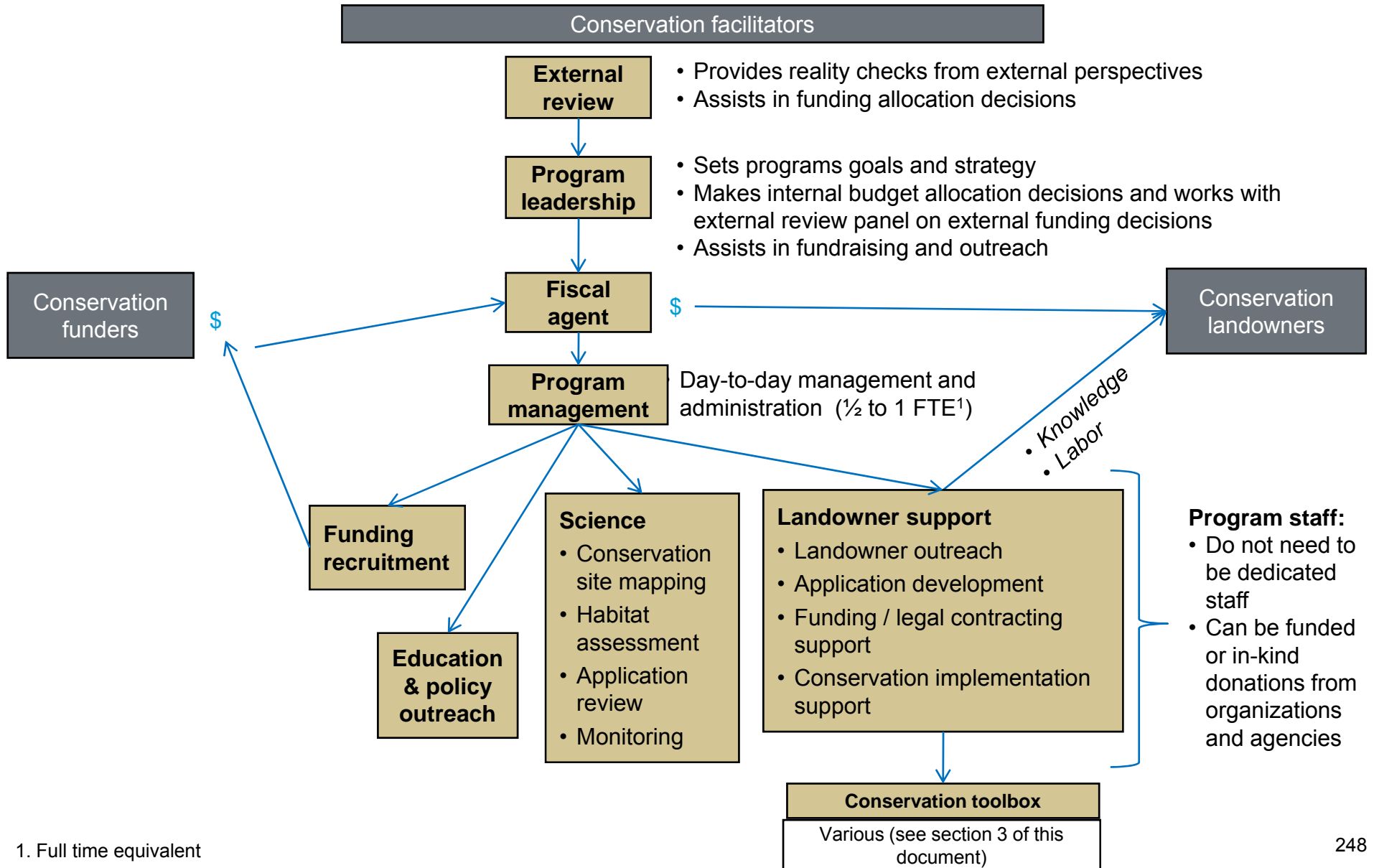
- Not observed in case studies, but could be considered with SGPI, CSI, Prairie Partners?
- Would allow both programs to leverage organizational and operational efficiencies

Recommendation:
Leverage existing MOU of Shortgrass Prairie Partnership (SPP)²

1. Blackfoot Challenge and BushTender case studies were not prioritized as part of top 10 case studies completed for this project, but preliminary research is provided in Appendix 2.
2. An MOU does not allow the SPP to handle funding as one entity, but one member of the SPP can volunteer to act as the fiscal agent for each funding source until such time as forming a nonprofit entity for the SPP makes sense.

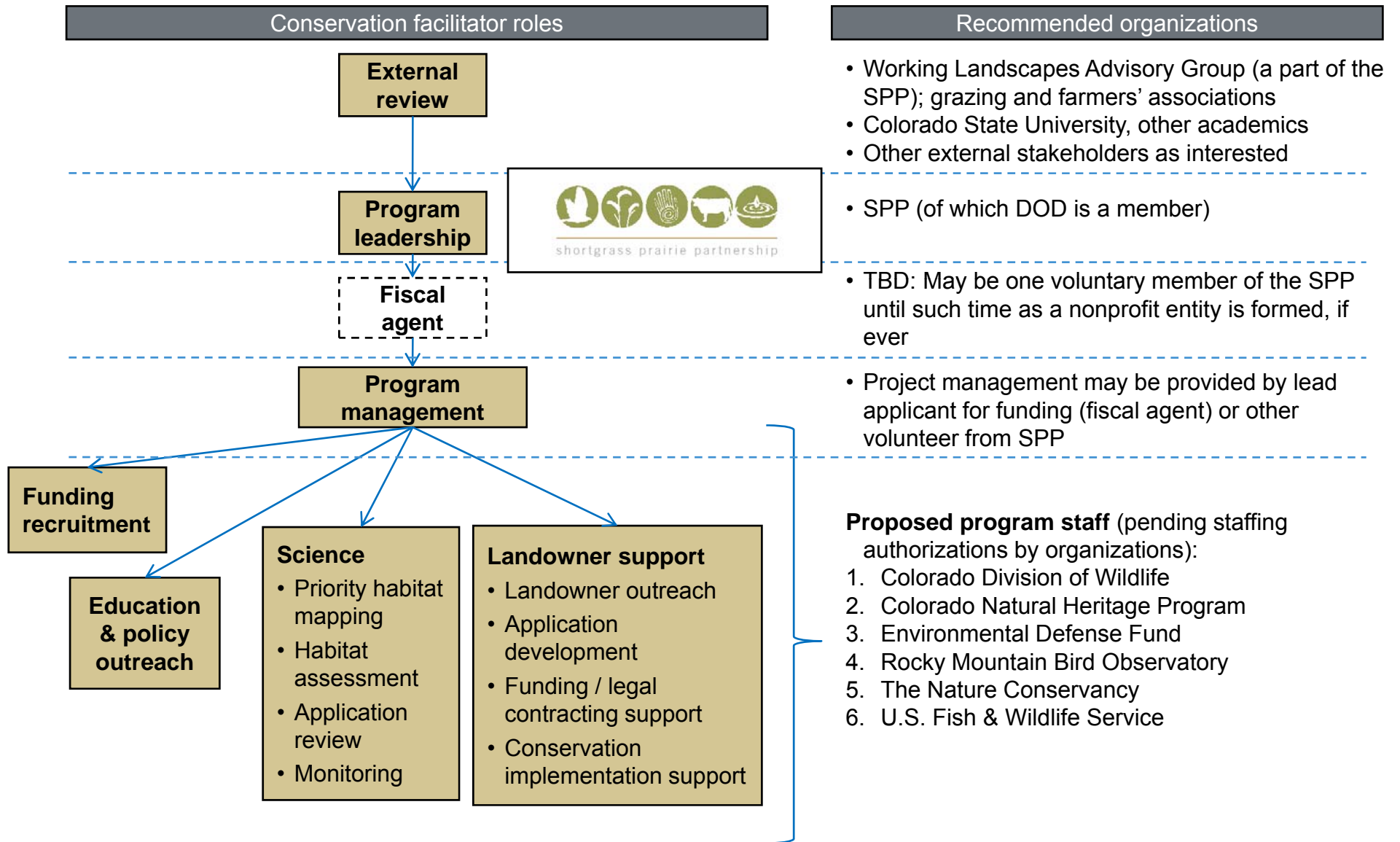
Note: See section 3 of this document for case study summaries.

16. Organization: Functional Roles



1. Full time equivalent

17. Organization: An Initiative Led by the Shortgrass Prairie Partnership (SPP)



17. Organization: Shortgrass Prairie Partnership Vision

The Shortgrass Prairie Partnership provides landowners and managers, public agencies and private organizations the opportunity to **collaboratively work together to ensure the long-term viability of the native species, natural communities and ecosystems of the Central Shortgrass Prairie (CSP) ecoregion while promoting the continued existence of economically productive landscapes** that sustain local communities.

Guiding principles:

- Best available science to guide conservation action
- Consensually reached, measurable conservation goals
- Prioritized geographic conservation areas
- A baseline for measuring progress and trends
- Collaborative implementation to conserve the CSP
- Ability and desire to raise unprecedented public and private resources to achieve goals



17. Organization: Shortgrass Prairie Partnership Members

Shortgrass Prairie Partnership (SPP) Members

1. Colorado Association of Conservation Districts (CACD)
2. Colorado Division of Wildlife (CDOW)
3. Colorado Natural Heritage Program (CNHP)
4. Colorado Open Lands
5. Colorado State Land Board (SLB)
6. Department of Defense (DoD) – U.S. Army
7. Department of Defense (DoD) – U.S. Air Force
8. Department of Defense (DoD) – Partners in Flight
9. Environmental Defense Fund (EDF)
10. Environmental Protection Agency (EPA)
11. Natural Resources Conservation Service (NRCS)
12. The Nature Conservancy (TNC)
13. Palmer Land Trust (PLT)
14. Playa Lakes Joint Venture (PLJV)
15. Rocky Mountain Bird Observatory (RMBO)
16. U.S. Fish & Wildlife Service (USFWS)
17. U.S. Forest Service (USFS)

SPP Working Landscapes Advisory Group

1. Bruce Flickenscher, Eads, CO
2. Elaine White, Olney Springs, CO
3. JD Wright, Olney Springs, CO
4. Jeff Thornton, Limon, CO
5. Kay Lynn Helfey, Walsh, CO
6. Kenny Rogers, Yuma, CO
7. Koger Propst, Lakewood, CO
8. Laura Negley, Eads, CO
9. Leonard Ball, Briggsdale, CO
10. Nate Tanner, Yoder, CO
11. Nathan Andrews, Kirk, CO
12. Pat Karney, Las Animas, CO
13. Steve Wooten, Kim, CO
14. Tom Lauridson, Eads, CO

Section 3. Case Studies of Innovative Conservation Programs (notes and background information)



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1. Cooperative Sagebrush Initiative (CSI)—Part 1 of 4

Location	<ul style="list-style-type: none"> • Much of the West: Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming
Species	<ul style="list-style-type: none"> • Greater sage grouse, sagebrush habitat and associated species across the US West
Goals	<p>“A citizen-led conservation effort:</p> <ol style="list-style-type: none"> 1. To conserve the western sagebrush landscape in its full diversity and richness... 2. through a collaborative, coordinated, and cost-effective public-private partnership... 3. built upon incentives for landowners, local communities, and private industry to invest in habitat restoration and other conservation actions... 4. resulting in long-term, verifiable recovery of the greater sage-grouse and improvement of other species of concern in the sagebrush range.”
History	<ul style="list-style-type: none"> • Current conservation investments by the energy industry and government are not performing as they should; energy companies are not getting the returns they need to keep the sage grouse off the ESA list and citizens are not getting the conservation of land, water, and wildlife they expect from government. Current conservation in the range of the sage grouse is piecemeal, non-strategic, uncoordinated, and ultimately inefficient. • Over the course of the summer months of 2006, leaders from EnCana Oil & Gas (USA) met with representatives from USFWS, USGS, BLM and Sand County Foundation to discuss a new approach to these problems. Together, this small group created a concept which has led to the Cooperative Sagebrush Initiative. • The Cooperative Sagebrush Initiative (CSI) is an altogether different conservation model. It is citizen and industry-led; it is comprehensive and strategic; it is collaborative; it is performance based; and it is about producing measurable results for sage grouse and other species of concern made possible by a private sector conservation fund. “ • Conducted first project RFP in 2007
Partners	<ul style="list-style-type: none"> • NRCS recently granted \$1 million – Conservation Innovations Grants (CIG) program to create the credit trading system component • Major funders: BP America; Devon Energy Corporation; EnCana Oil & Gas (USA); Fidelity Exploration and Production Company; Peabody Coal Company; Questar Exploration and Production; Shell, Ultra Resources, Inc.; • Additional funding from Sand County Foundation; Fish and Wildlife Foundation; The Nature Conservancy. • In-kind support from Independent Petroleum Association of the Mountain States; American Petroleum Institute; Environmental Defense; North American Grouse Partnership; US Institute for Environmental Conflict Resolution; US Fish and Wildlife Service; Idaho Office of Species Conservation and the Western Association of Fish and Wildlife Agencies. • Other partners who are involved but exact role is unknown include: Landowners in Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming; Boone & Crockett Club; Bureau of Land Management; Colorado Division of Wildlife; EOG Resources; National Wildlife Federation; Natural Resources Conservation Service; Rio Tinto Energy America; Rocky Mountain Elk Foundation; Sonoran Institute; Texas A & M; Thunder Basin Grasslands Prairie Ecosystem Association; USDA Forest Service, US Department of the Interior, US Geological Survey; Western Governor’s Association; Wildlife Management Institute; and Wyoming Game & Fish Department • Plan to expand the base of industry players among electric utilities, electric transmission and pipeline companies, and others.

1. Cooperative Sagebrush Initiative (CSI)—Part 2 of 4

Tools
prioritized
for imple-
mentation

- **CCAAs:** Regulatory assurances are intended to ensure that “individuals and groups who invest time and money into voluntary improvements in habitat for species will not suffer additional regulatory and operational burdens should one or more species become listed in the future.”
 - The process is envisioned to work as follows:
 - The landowner would propose a management plan in a CCAA and negotiate it with the USFWS.
 - If the CCAA is approved, the USFWS would issue the landowner a permit to authorize the incidental taking of the sage grouse. This permit would only be effective upon federal listing of the species.
 - If the species is listed, as long as the landowner abides by the terms in the CCAA, there will be no new obligations in addition to those agreed to in the CCAA.
 - CSI would not be a party to the CCAA, but would help develop them by explaining the tool to landowners, negotiating with the USFWS on the landowner’s behalf, acting as an intermediary, and providing technical and policy assistance.
 - CSI has worked with the USFWS to develop guidelines regarding the use of CCAA on mixed-ownership landscapes. Specifically, the new guidelines allow CCAA to include private land as well as federal land covered by a private landowners’ grazing rights. Previous CCAAs have always excluded federal land in any form from receiving assurances (instead, federal lands previously entered into only CCAs).
 - There have not yet been any examples of a private/federal ownership mix in a CCAA but having the ability to receive assurances on land covered by grazing rights is an important incentive for private landowners to participate in conservation.
 - Caveat: if a landowner takes conservation actions on behalf of an entity required to mitigate, then the landowner can not include those actions in the CCAA. However, it may be permissible for the landowner to receive some goodwill compensation from any interested party (such as CSI, although not planned) for entering into a CCAA, such as the USFWS pays for some safe harbor agreements and farm bill conservation programs.
- **Banking credit systems:** The hope is that private landowners can be rewarded for taking conservation actions on behalf of an organization (e.g., energy company) that is required to mitigate for its environmental impacts.
 - The process is envisioned to work as follows:
 - The landowner would take conservation action that would result in a certain number of banking credits (formula to be determined).
 - The credits would be made available in a conservation bank for mitigators to purchase.
 - When those credits are purchased, the landowner would receive cash compensation based on the credit valuation formula and the mitigator would receive a permit for incidental “take” commensurate with the number of credits purchased.
 - “The Achilles’ Heel for the use of this tool by CSI is that the sage grouse is not federally listed, so there is not regulatory requirement for those who impacts sage grouse habitat to buy conservation credits.
- **Conservation easements:** “CSI doesn’t have the capacity or budget to acquire conservation easements. We are entirely staffed by volunteers. However, if capacity were not an issue, facilitating conservation easement transactions would not ruled out. CSI would not become a land trust.”

Tools
considered

1. Cooperative Sagebrush Initiative (CSI)—Part 3 of 4

Program

- CSI is legally structured as a 501(c)(3) organization.
- It is led by a Board of Directors called the [Partnership Council](#), which is charged with making necessary decisions on behalf of all the CSI partners. This Council is made up of members representing the major interest groups, and is charged with establishing necessary committees, and managing any funds associated with CSI. It meets at least one or two times per year.
- There is not yet funding available to staff an executive director, but the executive director of the Sand County Foundation is acting as executive director of CSI for now.
- Operations are conducted by 3 working groups which meet on an as-needed basis, usually remotely, occasionally in-person:
 1. [CSI Assurances and Incentives Working Group](#): This group is responsible for identifying the opportunities and devising the mechanisms for incentivising conservation investment and action, including developing a conservation banking methodology and developing CSI positions and responses on issues related to regulatory assurances that facilitate participation in sagebrush conservation activities. It will be charged with ensuring that there is broad agreement among the CSI partners for these positions and responses. The committee will coordinate communication of these positions and information with relevant agencies, officials, and other partners.
 2. [Projects Working Group](#): The Projects Working Group will work to identify the opportunities and criteria for habitat conservation and restoration, and develop a system for monitoring outcomes.
 3. [Partnership and Outreach Working Group](#): This group is responsible for identifying and communicating with critical partners for the CSI, as well as developing an outreach strategy to inform key audiences of the Initiative's purpose and achievements. CSI publishes a periodic newsletter with which to communicate with the general public.
- There are weekly conference calls for the chairs of each working group and other actively engaged “core” CSI team members. This is the main way in which CSI leadership communicate and stay abreast of results and issues.
- There is also one annual meeting open to all members and interested partners and private landowners.

Science

- The credit methodology is being developed by an independent contractor out of Idaho.
- The science methodology behind the CCAA initiative was not discussed but presumably the fish and wildlife agencies are integral in this process. Other science support is likely provided by NGOs, but not confirmed.

Funding

- See funding partners above
- \$250,000 expected annual budget

1. Cooperative Sagebrush Initiative (CSI)—Part 4 of 4

Results

- **CCAAs:** CSI helped the USFWS develop its Summer 2008 guidelines on CCAAs for private/federal mixed ownership landscapes.
- **Banking credit system:**
 - Hired an independent contractor to developed a sagebrush conservation credit metric framework and a draft credit methodology (Haufler, et.al.)
 - Conducted first project RFP in 2007 focusing initially on a few regions. The CSI project committee evaluated all proposals and conducted site visits with four project teams in Colorado and Wyoming before making a recommendation to the CSI Partnership Council. Three projects were approved, a fourth being monitoring associated with an approved project: “CSI will test its theoretical credit valuation methodology with these first 3 demonstration projects. We’re not expecting to make any trades of credits until we’ve tested the methodology with this 3-year CIG grant.”
 - “There are a lot of energy companies participating, but there has been little commitment evidenced in following through and making crediting work.

Success Factors

- There has been a great deal of volunteer involvement and energy. The executive director of the Sand County Foundation is instrumental in keeping the program running even as it struggles for funding for formal staffing.

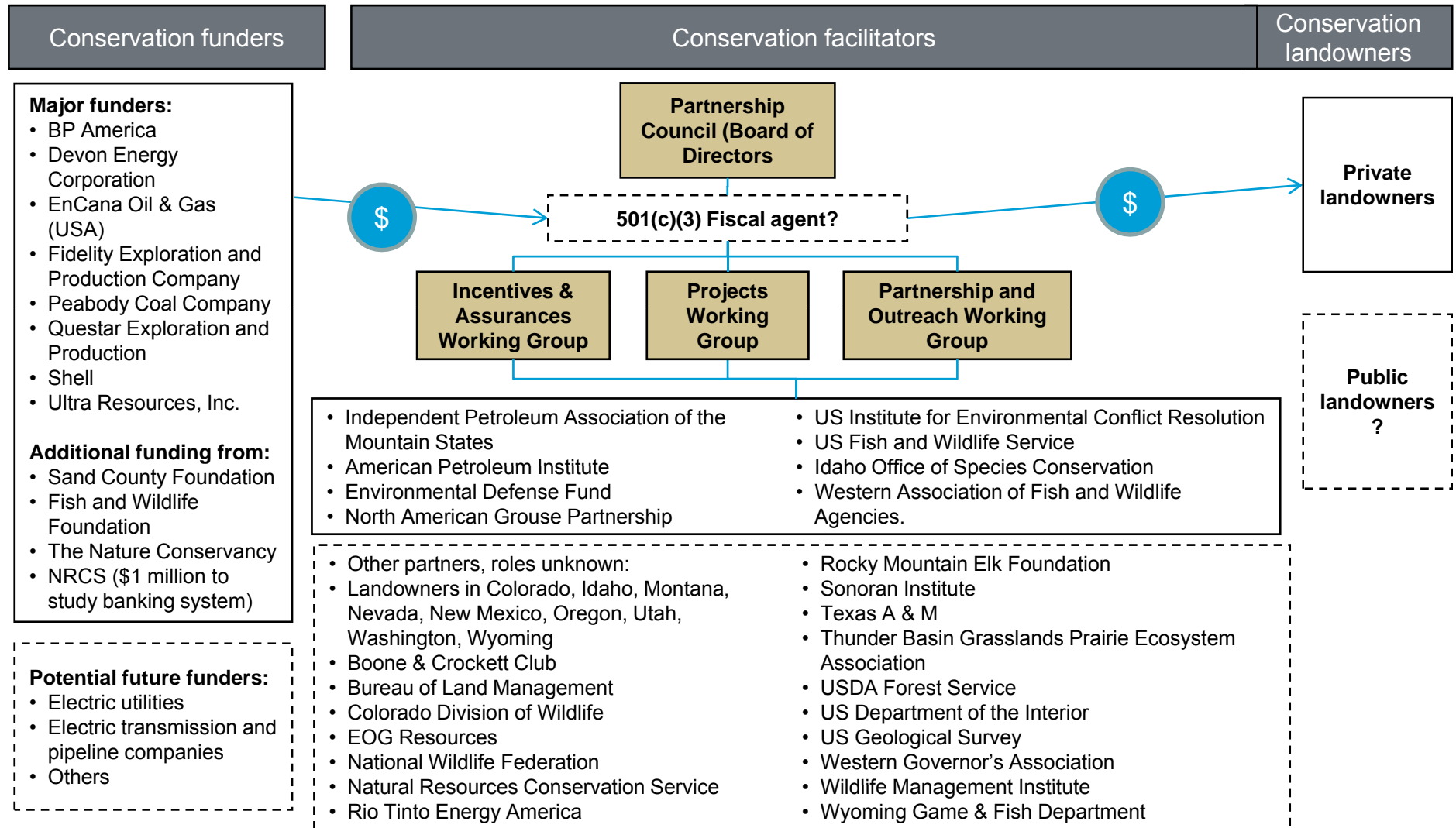
Challenges

- **On the banking credit system:** “We’re groping in the dark here. Calculating the common currency for credits is very challenging scientifically, and then we’re also challenged by the lack of regulatory requirement for impacters to buy conservation credits. However, there is a chance that the sage grouse could become federally listed, in which case the banking system would have a market.
- **On funding:** “Our initial ambition in generating funding has not been realized. The budget pays for the annual meeting and some ad-hoc meetings but not much else. All our staffing is by volunteers, but there is no one charged with spending more than half their time on this.”
- Participating **NGOs** are not formally obligated to the program through contracts or MOU. They serve based on the initiative, interest, and availability of the NGO’s staff members. There is not a mechanism for organizational stability as individuals change jobs. The government agencies are more tied in since they would play formal roles in the CCAA process and “have more of a vested interest.”

Lessons for CSP

- **Banking Credit System:** rather than duplicate the use of expensive resources on this issue, SPICE should wait for CSI to finish its research on the best scientific and valuation methodology to use.
- **Assurances:** SPICE can use CCAAs on the SAR species even though none are officially candidates. However, given the expense and difficulty of creating CCAAs (only 17 in existence so far), SPICE should consider using CCAAs on species that are (1) realistically likely to be listed, (2) are encountered most frequently on private land in the CSP, (3) well understood in terms of what conservation actions would be required and effective in conservation the species. It is possible to create a CCAA for multiple species, but this complicates the development and approval process greatly.

1. Cooperative Sagebrush Initiative (CSI)—Organization



2. Ft. Hood Recovery Credit System (RCS)—Part 1 of 4

Location	<ul style="list-style-type: none"> • Ft. Hood, near Killeen, TX
Species	<ul style="list-style-type: none"> • Golden-Cheeked Warbler (GCW) only (Black-Capped Vireo may be added in the future if additional funders are also added)
Goals	<ul style="list-style-type: none"> • Short-term: Help preserve the Golden-cheeked warbler and the black-capped vireo (both birds are listed on under the Endangered Species Act (ESA) while continuing Ft. Hood’s training and leasing of land for cattle grazing. • Long term: eliminate the need for listing of these species: “The goal is recovery and improvement, not just maintaining the status quo.”
History	<ul style="list-style-type: none"> • 1987—Black-capped Vireo listed under ESA (~30% of known occurrence in Ft. Hood) • 1990—Golden-Cheeked Warbler listed under ESA (~70% of known occurrences in Ft. Hood) • 1990—Ranchers were restricted in their management of Ashe Juniper trees (Warbler habitat). Central Texas Cattlemen’s Association formed a group that would restore habitat while keeping production. This led to the formation of the Leon River Restoration Project. • 2005—U.S. Fish & Wildlife Service released Biological Opinion recommending off-site conservation for threatened and endangered species. • 2006—Black-capped Vireo and Golden-Cheeked Warblers found at Ft. Hood. Ft. Hood lost 119 days of live-fire training due to restricted operation under ESA. 80 ranchers who lease ~190,000 acres of Ft. Hood for grazing were also affected. . • 2006—The Army agreed to join with other organizations and agencies to establish a credit system to protect the Golden-cheeked warbler. This Recovery Credit System (RCS) is currently in the middle of a three year proof of concept phase. This project was originally modeled after the USDA’s Conservation Reserve Program as it includes a modest lease payment to ranchers. “It took 18 months to get from the first discussion of the RCS to the first project implementation.”
Partners	<ul style="list-style-type: none"> • Funders: Department of Defense and U.S. Army, United States Department of Agriculture-Natural Resource Conservation Service, National Fish & Wildlife Foundation. • Texas A&M Institute of Renewable Natural Resources: program administrator • Texas Watershed Management Foundation: field implementation • Habitat assessment, recruitment and outreach: Environmental Defense , Texas Wildlife Association • These organization are also listed on project website, but roles are not defined: Texas Parks & Wildlife Department, The Nature Conservancy, U.S. Fish & Wildlife Service (FWS), Texas & Southwestern Cattle Raisers Association and the Texas Farm Bureau.
Tools	<ol style="list-style-type: none"> 1. Habitat Management Program: provides management planning and cost-share for habitat management (minimum 25% cost share required) 2. Habitat Crediting Program: provides annual payment for securing suitable habitat in a market-based system that considers landscape context and distribution for meeting the overall recovery goals. Reports state that local landowners would not even consider easements because “Why would you want to pay for a permanent solution to a temporary problem”, Steve Manning TWMF. However, Ft. Hood is currently working on incorporating permanent conservation into the system to account for permanent take. 3. Landscape-level management such as cowbird removal on-base and off-base (spurred by prior success shown on-base) 4. Monitoring System: provides effectiveness/validation monitoring and a decision-support for adjusting the program

Source: project website <http://rcs.tamu.edu/>, “Working with a Recovery Credit System” document; http://www.cnlm.org/cms/index.php?option=com_content&task=view&id=100&Itemid=134; <http://irn.r.tamu.edu/news/RCSExecutiveSummary.pdf>; http://dukespace.lib.duke.edu/dspace/bitstream/10161/305/1/MP_jab54_a_052007.pdf; interview with program participant in Fall 2008.

2. Ft. Hood Recovery Credit System (RCS)—Part 2 of 4

Program

- **Administration and funding:** RCS is administered by the Texas A&M Institute of Renewable Natural Resources under contract from the Department of Defense and U.S. Army. The RCS is considering adding additional funders, such as the Texas Department of Transportation and wind energy development companies. As new funders are added, new target species may also be added, as appropriate. Money from each funder would go to projects that specifically meet their own mitigation needs.
- **Outreach:** Environmental Defense and Texas Wildlife Association do habitat assessment, recruitment and outreach. They also help landowners put together their bids so that they are environmentally sound and well-priced. Private landowners then work with local specialists to determine the terms and management practices for the maintenance and enhancement of suitable Golden-cheeked warbler habitat: “We use remote imagery to target the largest patches of habitat. Then we overlay ownership data to determine which landowners we want to work with. We leverage the Cattlemen’s Association to get access to the landowners. If we don’t have contacts in the area, we use workshops.”
- **Terms:** Private landowners with qualifying habitat bid for entry into the program and then enter into contracts from 10 years to 25 years (27% have 25 year contracts): “Ft. Hood preferred temporary contracts because they plan to do some forest thinning for foot traffic training for only the next 5 – 7 years. Then there will be a forest recovery period. Ft. Hood buys credits to cover the impact timeframe plus the recovery timeframe. The foot traffic will not cause as much damage as tanks. The GCW is not expected to vacate the property, but maybe productivity will be suppressed...We’re now also exploring options for permanent protection. Three options we are evaluating are: (1) purchasing conservation easements on private land, (2) conservation easements on state land with GCW habitat that does not have a conservation mission (e.g., State Land Board), and (3) funding for management on state lands with GCW habitat that do have a conservation mission (e.g., Parks) but not enough money to perform the required management. This is the most controversial option since these conservation-mission lands should already be doing the right kind of management themselves. People believe that Ft. Hood’s money would be better spend on state land without a conservation mission.”
- **Application review:** Credit points are developed through a formula with weighting factors including available acreage of suitable habitat, proximity to known populations of golden-cheeked warblers, the extent of surrounding golden-cheeked warbler habitat and recovery region: “Ranchers that are willing to offer more than the minimum 25% cost share receive more points in the application review process. Ranchers have to have existing occupied habitat in order to participate. Ft. Hood provides project funding in blocks. Once a pool of 5 to 6 landowners have submitted bids, Ft. Hoods starts by funding the lowest cost projects and continues funding projects until the money for that bid round runs out. About 75% of projects are funded. Ft. Hood makes the final funding decisions because its their money.”
- Credits are held in a “bank” for use by Fort Hood to offset impacts to Golden-cheeked warbler habitat.
- **Field implementation** is conducted through a sub-contract partnership agreement with the Texas Watershed Management Foundation.

Source: project website <http://rcs.tamu.edu/>, “Working with a Recovery Credit System” document; http://www.cnlm.org/cms/index.php?option=com_content&task=view&id=100&Itemid=134; <http://irn.r.tamu.edu/news/RCSExecutiveSummary.pdf>; http://dukespace.lib.duke.edu/dspace/bitstream/10161/305/1/MP_jab54_a_052007.pdf; interview with program participant in Fall 2008.

2. Ft. Hood Recovery Credit System (RCS)—Part 3 of 4

Science

- There is a specific recovery plan for the target species with specific recovery actions identified, including ranching management practices. The plan considers the entire breeding range of the GCW which encompasses 30 counties in central Texas: “Areas that require the most recovery attention are awarded higher levels of credits per acre so that we can direct resources to where they are needed most. It doesn’t matter to Ft. Hood if the credit comes from 200 miles away at the far edge of the range. We direct the money where it would have the greatest impact on recovery... There are minimum participation criteria such as at least 250 acre patch sizes.”
- “We do site reviews but we also use satellite and aerial photos for the initial screen before going out to the ranch.”
- Data is made available, but the confidentiality of the participants is protected.

Funding

- Total Investment to date (over two years): \$725,687 with an additional \$151,613 from Landowner Cost Share: “Two-thirds of our funding goes to on-the-ground management and cost-sharing. Most of the other third goes to fund monitoring by graduate students, and the remaining modest amount of funding goes to administration.
- Funding from the DOD (U.S. Army) and USDA firsts goes to the Texas Cooperative Extension which is responsible for implementation and outreach, and the Texas Agricultural Experimental Station, responsible for monitoring, validation, and research.
- Funds are then provided to Texas Watershed Management Foundation (TWMF), which negotiates and contracts with landowners and manages the system.

Results

- They are still in the 3-year pilot proof of concept phase so results are limited: “The jury is still out on if we are getting the productivity increases we hoped for. We’re not sure if we can see the results we need in three years to tell us whether to continue past the pilot phase. We’ll have economic guidance about the cost of the program, but we won’t have ecological results yet. In a short time period like 3 years, there could be external factors that affect our results, such as weather patterns. It will really take more like 8 to 10 years to know whether productivity has increased.”
- Since July 2006, four bid rounds have been conducted resulting in the completion of eleven landowner contracts. 2 rounds of bidding planned per year. Seven of the contracts received funding from the Department of Defense (DoD) and U.S. Army and four were funded by USDA-NRCS, while the upcoming fifth bid round will be funded through the National Fish and Wildlife Foundation (NFWF).
 - Area Under Contract 7158 acres (\$101/acre)
 - Existing occupied GCW Habitat Under Contract: 1174 acres (\$618/acre)

2. Ft. Hood Recovery Credit System (RCS)—Part 4 of 4

Success Factors

1. “Ranchers are motivated to participate because some of the management practices required for the GCW also benefit ranching operations and profitability. For example, reducing deer herd levels is not only good for the GCW whose habitat is eaten by deer, but it also improves the health of the herd and size of individual deer, which allows ranchers to increase hunting fees. The listing of the GCW was a key motivator for the DoD, but a relatively minor issue for private landowners. Most are in it for the technical and financial assistance. They want to manage their habitats better for wildlife health and hunting.”
2. “Ft. Hood was willing to take the risk of investing in a pilot program of a brand-new concept that may or may not ultimately work out.”
3. “The Commissioner of Agriculture was a great believer in private landowner incentives and was willing to be the whip-cracker in the process in terms of getting people to meetings, cajoling the USFWS. She was motivated to see this system created and high enough up in politics to have influence on others.”
4. “The private landowner community responded well to the incentives. The cost-sharing turned the GCW argument on its head from being seen as a liability to being seen as an asset. There used to be bad blood between Ft. Hood and the 85 families that lost their land when Ft. Hood was created. Relations are repairing from the incentives provided.”
5. “Landowner group participation was key in getting connections to private landowners in the landscape. The Central Texas Cattlemen’s Association explained the program to its members and dispelled fears. Once a few private landowners became involved, this opened doors to others. Landowners acting as media representatives has been key.”
6. “Before the RCS started, Texas A&M University had conducted a survey of landowners across six counties to learn attitudes towards species and different conservation tools in order to learn what would work. This was incredibly valuable information, since we learned that only 10% were willing to consider permanent conservation easements. However, we’re finding that after landowners enter into term easements, some become interested in permanent easements.”

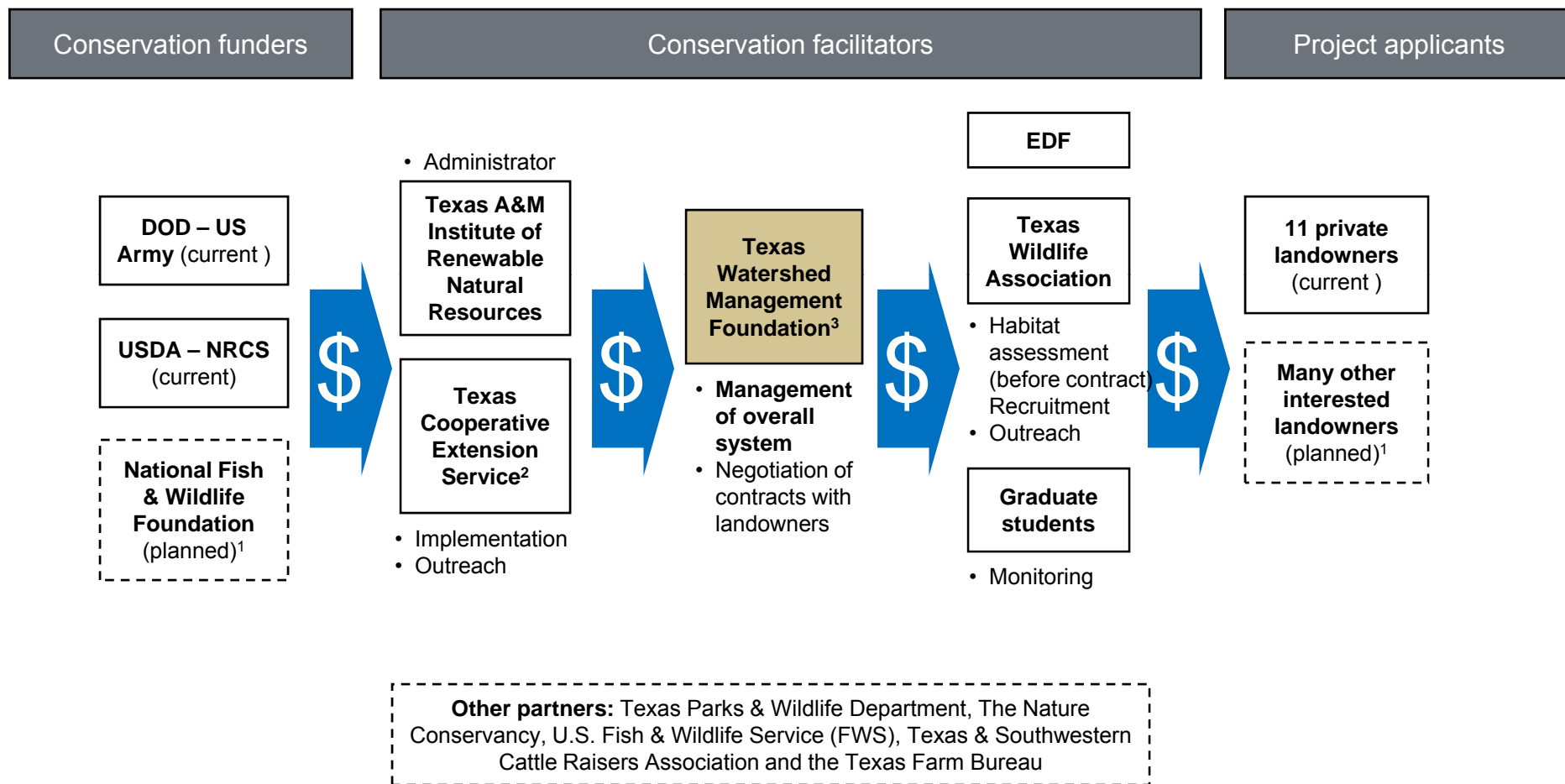
Challenges

- A Fort Hood Director stated that they were going to need to find more donors and donors were going to be the limiting factor, not the number of participants.
- “Now that we’re moving into trying to implement permanent conservation options, we’re finding that the contracting and negotiation process gets harder.”

Lessons for CSP

- This project is an example of DOD-private landowner cooperation and therefore is quite appropriate for SAR.
- Program designed to easily add other conservation credit buyers in the future

2. Ft. Hood Recovery Credit System (RCS)—Organization



1. A Fort Hood Director stated that they were going to need to find more donors and donors were going to be the limiting factor, not the number of participants.
 2. Texas AgriLife Extension Service offers practical, how-to education based on university research available to any resident of Texas
 3. A local group with ranching interests that helped devise the program
 Sources: project website <http://rfs.tamu.edu/>, "Working with a Recovery Credit System" document

3. Ft. Lewis Conservation Partnership—Part 1 of 3

Location

- Southern Puget Lowlands of western Washington State (Pierce and Thurston Counties, grasslands)

Species Targeted

- This partnership includes three related activities focusing on different sets of species.
 - The Army Compatible Use Buffer (ACUB) portion of the program focuses on 4 federal candidate species: 1. Western Pocket Gopher, 2. Streaked Horned Lark, 3. Mardon Skipper, 4. Taylor’s Checkerspot
 - The Candidate Conservation Agreement (CCA) portion of the program focuses on 12 species, 4 of which are candidates, the rest of which are rare.
 - On-base management and restoration focuses on many state-listed species as well as common species, recognizing their importance to the ecosystem: “Managers at Fort Lewis are very forward-thinking about common species.”

Goals

The Ft. Lewis Conservation Partnership is a combination of three related sets of activities: 1. Army Compatible Use Buffer (ACUB) program, 2. Candidate Conservation Agreement (CCA), and 3. On-base management and restoration.

- The goals of the ACUB program are:
 1. Prevent future training restrictions that could occur if candidate prairie species were listed under the ESA by taking proactive, regional conservation actions for these species.
 2. Recover candidate prairie species in the southern Puget Lowlands, as per the 25-year goals of the Installation Sustainability Program.
 3. Prevent incompatible development and associated training restrictions along a portion of the southern boundary of the installation.
 4. Provide suitable lands to act as a conservation “lifeboat” for Fort Lewis, allowing the installation to help recover candidate species away from current prime training lands, and with reduced impacts on training.
- The goals of the CCA are to manage and restore habitats on lands enrolled in the CCA in common ways that are positive for the target species. The CCA provides assurances to non-federal landowners that should any of the target species become federally listed as threatened or endangered, the land management requirements would not be any more burdensome than those spelled out in the CCA.
- The goals of on-base management and restoration are to generally achieve environmentally sustainable stewardship of the grasslands on the military base while still achieving military training goals.

History

- The Nature Conservancy (TNC) has been working closely with Ft. Lewis for over 15 years. They have a formal contract for TNC to help with on-base restoration and management on Ft. Lewis. That relationship evolved to the formation of the ACUB program and the CCA, and expanded to include additional partners
- ACUB program background:
 - In 2002-U.S. Fish & Wildlife Service designated as candidates for Endangered Species Act protection four species that are found on the Ft. Lewis military base [see species, above], which has thousands of acres of native prairie used extensively for military training..
 - In 2004 Congress first authorized the Defense Department to pay for conservation projects surrounding military installations

(continued on next page)

3. Ft. Lewis Conservation Partnership—Part 2 of 3

History (continued)

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- In 2005 the Army submitted a proposal under ACUB. The proposal was accepted and in ~2006 the Defense Department began funding the Ft. Lewis ACUB Partners (through TNC) to help ensure the survival off-post of the four species.
- Traditionally, ACUB program funding has been used to purchase lands surrounding military installations to act as lifeboats for rare species. In a new innovation to the ACUB program, at Fort Lewis, army funds are **used for land management and habitat restoration** on lands adjacent to Ft. Lewis instead of land acquisition. Most of the adjacent land that has had projects under the ACUB program is public or owned by TNC. The only private land included to date are 40 acres belonging to Wolf Haven, a private animal rehabilitation center and an ACUB partner.

Partners

- Five ACUB partners: DOD (Ft. Lewis Military base), the Nature Conservancy, Washington State Department of Fish and Wildlife (WDFW), Washington State Department of Natural Resources (WDNR), and Wolf Haven (40 acre private sanctuary)
 - The benefits to DOD as stated in the ACUB proposal are that: “Fort Lewis can reduce the likelihood of candidate species becoming listed under ESA. Even if these species do become listed, a well-targeted ACUB program will reduce the effects of listing on training by shifting part of the burden of species recovery to off-post lands. Second, the Army has a stewardship obligation on its lands, both under AR200-3 and through the Installation Sustainability Program, which commits Fort Lewis to work with regional partners to protect prairie habitat and recover listed and candidate species.”
- Six CCAA partners: WDFW, WDNR, Fort Lewis, The Nature Conservancy, Thurston County, and Wolf Haven (private)
- Although private landowners (other than Wolf Haven) have not been involved in the ACUB or CCA, they are not specifically excluded. Some of the land around Ft. Lewis is privately owned, so opportunities to work with more private land owners may arise in the future: “There is no reason we couldn’t work with private landowners, programmatically.”

Tools

- **Land acquisition and conservation:** TNC has purchased land adjacent to Ft. Lewis
- **Habitat maintenance and restoration:** several projects focus on controlling invasive vegetation that prohibits occupation by candidate species and enhancing native vegetation by growing and outplanting native grasses and forbs; most of this has been done on Washington State and Thurston County land
- **Increasing the size and numbers of candidate species’ populations:** captive rearing efforts for both candidate butterflies with the goal of reintroduction on currently unoccupied lands outside Ft. Lewis.
- **Monitoring, planning, and research:** both habitat quality and species status is monitored. Action plans are in development for each ACUB property
- **Candidate Conservation Agreement (CCA):** outside the ACUB Program, a formal agreement with the USFWS signed by participating partners [see above] that voluntarily commit to implementing specific actions that will remove or reduce the threats to these species, thereby contributing to stabilizing or restoring the species so that listing is no longer necessary. Assurances are given to all signing partners except DoD, as a federal agency.
- Ft. Lewis also has a separate FSC certified timber program.
- On-base management: outside of the ACUB program, Fort Lewis spends \$100,000 each year on prairie management on-base

3. Ft. Lewis Conservation Partnership—Part 3 of 3

Science

- A 5 year implementation plan exists with conservation actions identified. Projects are selected by consensus of all partners and follow logical, temporally and spatially explicit, species-specific strategies to achieve recovery.

Program

- The partnership activities are coordinated by a formal group of representatives from each partner (1 – 3 reps each), which meets quarterly to make funding decisions and re-visit strategies for target species. These interactions are facilitated by a lead representative from TNC and a lead representative from Ft. Lewis, working together as program co-managers.
- A science panel meets twice each year for a half-day to score project applications and review progress on previously-approved projects. The panel includes one representative from each partnering entity (ACUB coordinators) and two additional university partners from outside the Ft. Lewis ACUB and CCA partnerships.
- The Nature Conservancy receives the ACUB funding, manages the overall effort, and distributes funding to project subcontractors.
- The WA State Department of Fish and Wildlife biologists do much of the work on the ground (species reintroductions, etc).
- The partners put out an RFP once per year, but it's not a traditional RFP process. Instead, the partners lay out a plan for recovery of the target species. They then identify the land-owning entity that could best be part of the solution (looking mainly at public land agencies) and approach that entity to solicit proposals. A template for a proposal is provided to project applicants.

Funding

- ACUB:
 - DOD/ACUB funding of an expected ~\$2.05 million is used for program management and conservation actions on land adjacent to Ft. Lewis.
 - Non-military partners provide funds for some land purchase: The State of Washington would contribute \$6.11 million towards land acquisition, outside of ACUB. (These funds come from grants from Washington Wildlife and Recreation Program (WWRP), Endangered Species Conservation Fund (managed by the USFWS) and Washington Department of Natural Resources (WDNR). For example, the Washington Wildlife and Recreation Program (WWRP) funded an easement on a parcel in the ACUB previously owned by TNC and then sold to the State Fish & Wildlife.
 - TNC raises private funds.
 - In-kind support: The Army, WDFW and WDNR contribute staff time (est. \$275K per year).
- CCA: The DOD Legacy program funded the creation of the CCA.

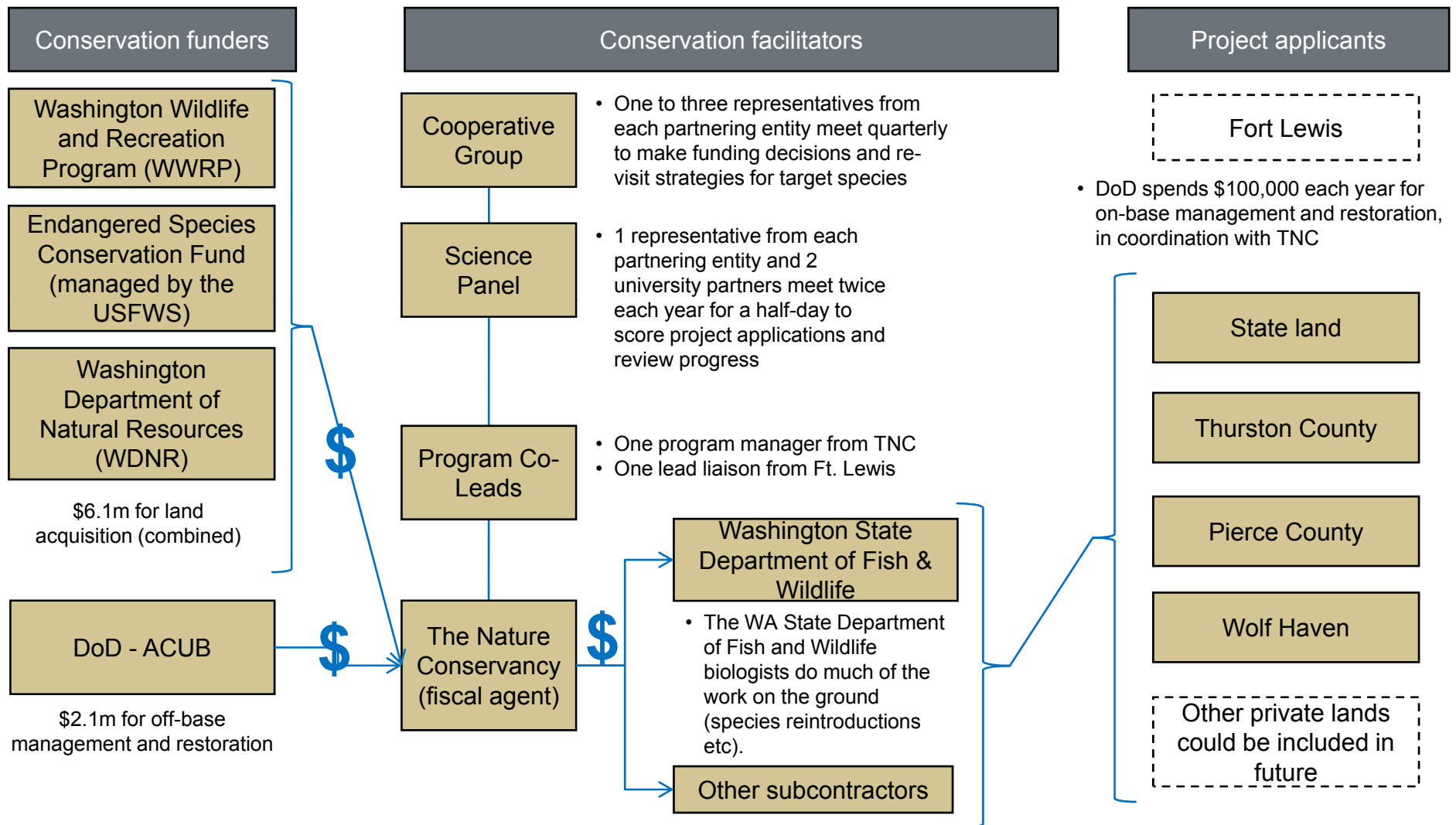
Results

- Land adjacent to Ft. Lewis has been purchased
- A captive breeding program for the Taylor's Checkerspot has been established

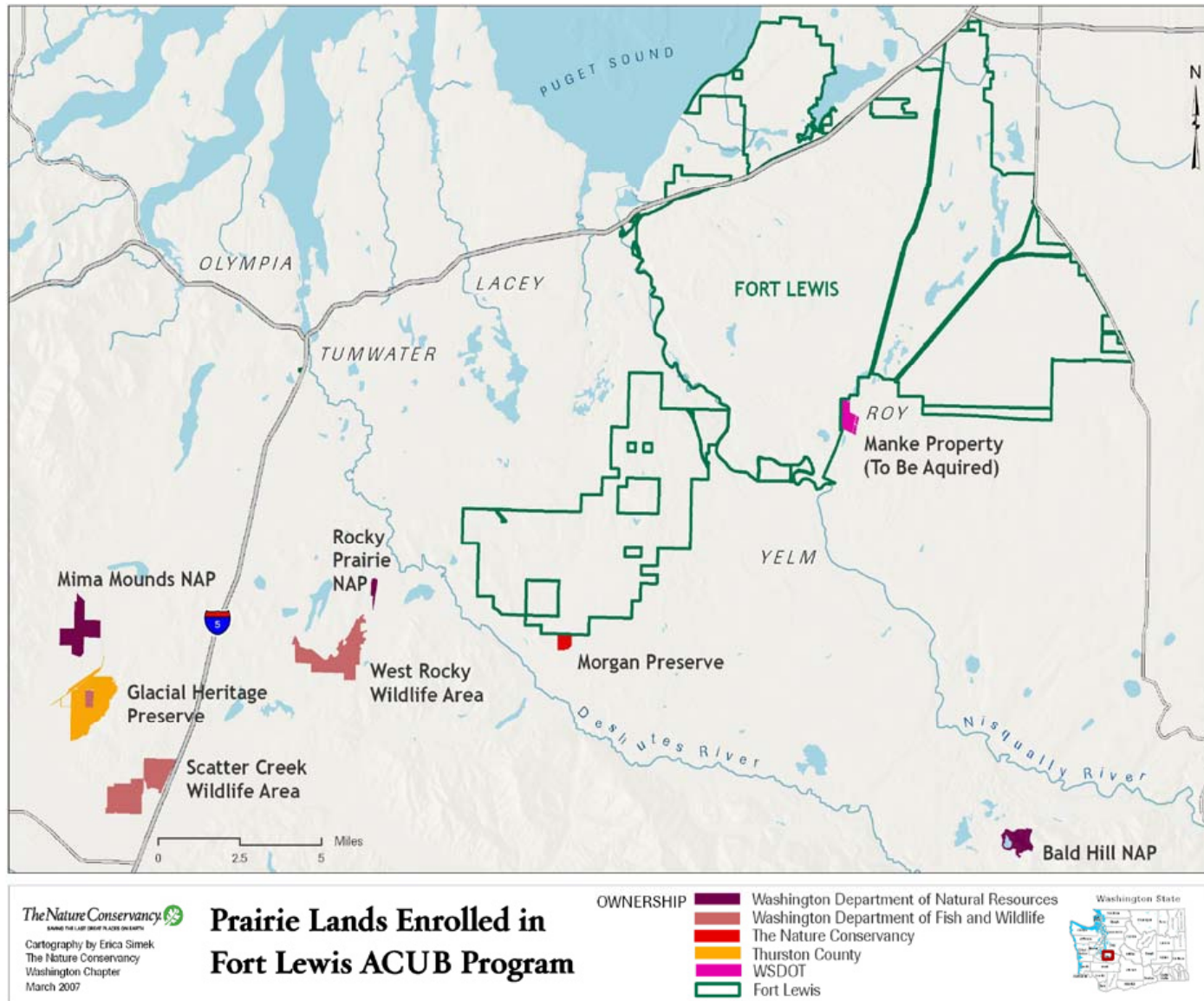
Lessons for CSP

- The Ft. Lewis Conservation Partnership is extremely relevant to the Central Shortgrass Prairie (CSP) because the program uses a project application system that could be adapted to the CSP. Although individual private landowners (other than Wolf Haven) have not participated yet, the overall program is designed so that private landowners could participate, as makes sense, in the future.
- Fort Lewis might have the only population of Taylor's checkerspot left. Their approach to recovering this species may be relevant to what Fort Carson might do to recover the rare plants found mainly on-base.

3. Ft. Lewis Conservation Partnership—Organization



3. Ft. Lewis Conservation Partnership—ACUB Geographic Scope



3. Ft. Lewis Conservation Partnership—CCAA Scope

Entity	Enrolled Properties	Acres	
		Property	Party Total
CCA			
	Military Reservation	20,352	20,352
CCAA			
Otis & Arline Cavness	Cavness property	466	466
The Nature Conservancy	TNC	13	316
	TNC Bluff	116	
	TNC Boots Satterlee	20	
	TNC Morgan Prairie	122	
	TNC Shotwell's Landing	45	
	Glacial Heritage Preserve	1,155	1,155
Washington Department of Fish and Wildlife	WDFW Scatter Creek Wildlife Area	931	1,951
	WDFW Wildlife Area	85	
	WDFW Wildlife Area	105	
	WDFW West Rocky Wildlife Area	830	
Washington Department of Natural Resources	WDNR Mima Mounds Natural Area Preserve (NAP)	628	973
	WDNR Rocky Prairie NAP	35	
	WDNR Bald Hill NAP	309	
Wolf Haven International	Wolf Haven Property	38	38
CCA(A) Total			25,250

4. Gulf Coastal Plain Ecosystem Partnership (GCPEP)—Part 1 of 3

Location	<ul style="list-style-type: none"> Northwest Florida and south Alabama
Species Targeted	<ul style="list-style-type: none"> GCPEP focuses on eleven conservation targets, all of which are candidates or already listed by Florida or Alabama as threatened or endangered (some are listed or candidates federally) : 1. Red-cockaded Woodpecker, 2. Bald Eagle, 3. Oskaloosa Darter, 4. Gopher Tortoise, 5. Florida Bog Frog, 6. Flatwoods Salamander, 7. White-top Pitcher Plant, 8. Panhandle Lily, 9. Florida Black Bear
Goals	<ul style="list-style-type: none"> The goal is to conserve and restore the dwindling longleaf pine ecosystem and unique aquatic resources of northwest Florida and southern Alabama. GCPEP works to protect and manage exceptional biodiversity across the GCPEP landscape, while remaining consistent with the partners' individual and diverse missions. The Steering Committee's mission is: (1) to develop a set of long-term strategies to abate the critical threats and to improve regional ecosystem health, (2) to restore and protect large, connected, functional examples of native ecosystems; (3) and to provide ecosystem goods and services compatible with the above to surrounding communities.
History	<ul style="list-style-type: none"> In the 1980s, Eglin lost a military test mission due to a jeopardy opinion from the USFWS regarding two endangered species. In 1996 a multi-party MOU was signed joining 7 major conservation entities on the Gulf Coast in Florida and Alabama. On November 12, 2003, the state of Florida, the U.S. Department of Defense (DoD) and The Nature Conservancy signed a Memorandum of Partnership to establish a 100-mile protected corridor that connects Eglin Air Force Base and the Apalachicola National Forest. This program is included in the GCPEP. There are more than 1,000,000 acres of land covered under GCPEP, including the majority of the world's remaining old growth longleaf pine ecosystem. Almost half of this land is owned by the DoD. The next largest landowner is the Florida Division of Forestry, followed by the NW Florida Water Management Districts. All GCPEP partners own and manage land within the GCPEP.
Partners	<ul style="list-style-type: none"> Currently nine public and private partners: Department of Defense (Eglin Air Force Base, Naval Air Station-Pensacola and Naval Air Station-Whiting), Florida Division of Forestry, Northwest Florida Water Management District, National Forests in Alabama, Florida Department of Environmental Protection, International Paper, Nokuse Plantation, National Park Service, the Florida Fish & Wildlife Conservation Commission, and The Nature Conservancy International Paper used to also be a partner, but they recently sold their land holdings in the GCPEP area (some of the land was sold to TNC and timber investment management organizations (TIMO). Two of the new landowners want to become partners: Conservation Forestry (TIMO with TNC roots) and a private mitigation company. Although a county is actively involved in executing conservation easements as part of the Army Compatible Use Buffer (ACUB) program, it is not an official GCPEP partner.
Tools	<ul style="list-style-type: none"> Conservation buyers: Land adjacent to military insulations has been purchased as part of the Army Compatible Use Buffer Program (ACUB). For example, TNC purchased ~42,000 acres in one year and is now in the process of transferring that land to various agencies. On-base conservation/restoration-based management by various agencies and organizations, including multi-agency efforts at restoration across large areas (e.g., fire management, invasive species management, aquatic best management practices) Conservation management agreements have been made with private landowners. Conservation easements: have been used only marginally, for example on the Nokuse Plantation, which is a GCPEP partner and conservation buyer, and is a key corridor targeted for restoration (non-productive land).

Sources: <http://www.gcpeepartners.com/index.aspx>; "Role of Public-Private Partnership in Restoration: A Case Study," Vernon Compton, J. Bachant Brown, M. Hicks, and P. Penniman, The Nature Conservancy, Jay Florida Office, The Gulf Coastal Plain Ecosystem Partnership of Jay, Florida 32565; "Gulf Coastal Plain Ecosystem Partnership" bulletin; phone interview with program participant in Fall 2008.

4. Gulf Coastal Plain Ecosystem Partnership (GCPEP)—Part 2 of 3

Science

- The program is guided by a **Conservation Action Plan** (CAP, a TNC methodology). Originally, the program included 18 conservation targets, which was difficult for program managers to map and monitor. When the CAP was updated, the total targets was reduced to 11, and most of the now-excluded targets became “nested” anyway in natural communities with the remaining targets, so their conservation needs may still be met by the program without focusing explicitly on them.
 - Early in the partnership process—but after conservation targets were prioritized—the GCPEP staff met with each partner and the partners’ scientists and managers to individually conduct threats analyses for the targets that occurred on the lands each partner manages. The GCPEP staff combined each of the individual partner target threat analyses into an overall GCPEP target threat analysis.
 - The GCPEP staff also selected ten strategies considering all of the partners’ conservation objectives, issues, and challenges, and their ability to abate threats to the identified 18 conservation targets as explained through the threats analyses. Each strategy was broken down into conservation actions, that were prioritized by the GCPEP partners.

Program

- The Partnership is guided by a **steering committee** which is composed of two representatives from each of the partner organizations, one primary and one alternate. The committee meets for a full day once per year to agree on what projects to pursue for the year based on recommendations from three subcommittees (Prescribed Fire, Invasive Species, and Aquatic).
 - The steering committee operates by consensus. If there is minority dissent, the majority is charged with finding an alternative solution acceptable to all.
- After struggling to make progress for a few years, the steering committee recognized that the program needed dedicated staff to work with partners on projects prioritized by the steering committee. **Program staffing** is provided entirely by TNC, which gives professional and administrative support to the partnership, scientific and professional assistance and expertise in prescribed burning, biodiversity conservation, monitoring, and assistance with critical land acquisitions (see next slide for organization structure and roles).
 - Other partners provide staffing for on-the-ground projects as needed, but not for program management and administration: “The local GCPEP staff has received tremendous additional support from the partners’ regional offices, providing assistance in numerous areas including conservation science, land protection, government relations, communications, and operations.”
 - Staffing levels vary with grants raised, but have been as high as **nine people**. Today, staffing includes a program manager, a terrestrial ecologist, an aquatic ecologist, and a half-time administrator. These staff members may not be 100% dedicated to GCPEP as they are also work on another landscape-level TNC program.
- There are also three subcommittees which are due to meet twice per year, but this doesn’t always happen.

Funding

- **Funding** for GCPEP comes from 1. the DoD Legacy program, 2. private grants raised by TNC to fund staff positions, and 3. TNC programmatic funding. Funding for land acquisition (and some conservation easements) has been funded by Florida Forever, a \$300 million / year program. GCPEP had also received at one time \$20,000 from the USFWS and \$45,000 from another agency. Program representatives report: “Having the partnership in place has made us more competitive in winning funding.”

4. Gulf Coastal Plain Ecosystem Partnership (GCPEP)—Part 3 of 3

Results

- The partnership stated that they have stabilized endangered red-cockaded woodpecker populations, increased prescribed fire as a management tool, and restored thousands of acres of longleaf pine
- They have completed land deals that have protected tens of thousands of acres immediately adjacent to the three DoD installations.
- They have created an Ecosystem Support Team for on-the-ground management. The team conducts ecological monitoring of key natural communities, has assisted with more than 39,000 acres of prescribed burning on GCPEP lands, and helped the partners with Hurricane Ivan relief.
- With GCPEP assistance, Eglin has started a native plant initiative at the base, including a native plant demonstration area and native plantings in base housing and along roads and streams for erosion and biodiversity restoration.
- Eglin fire management personnel have burned approximately 105,000 acres and counting during the Fiscal Year 2008 prescribed fire season

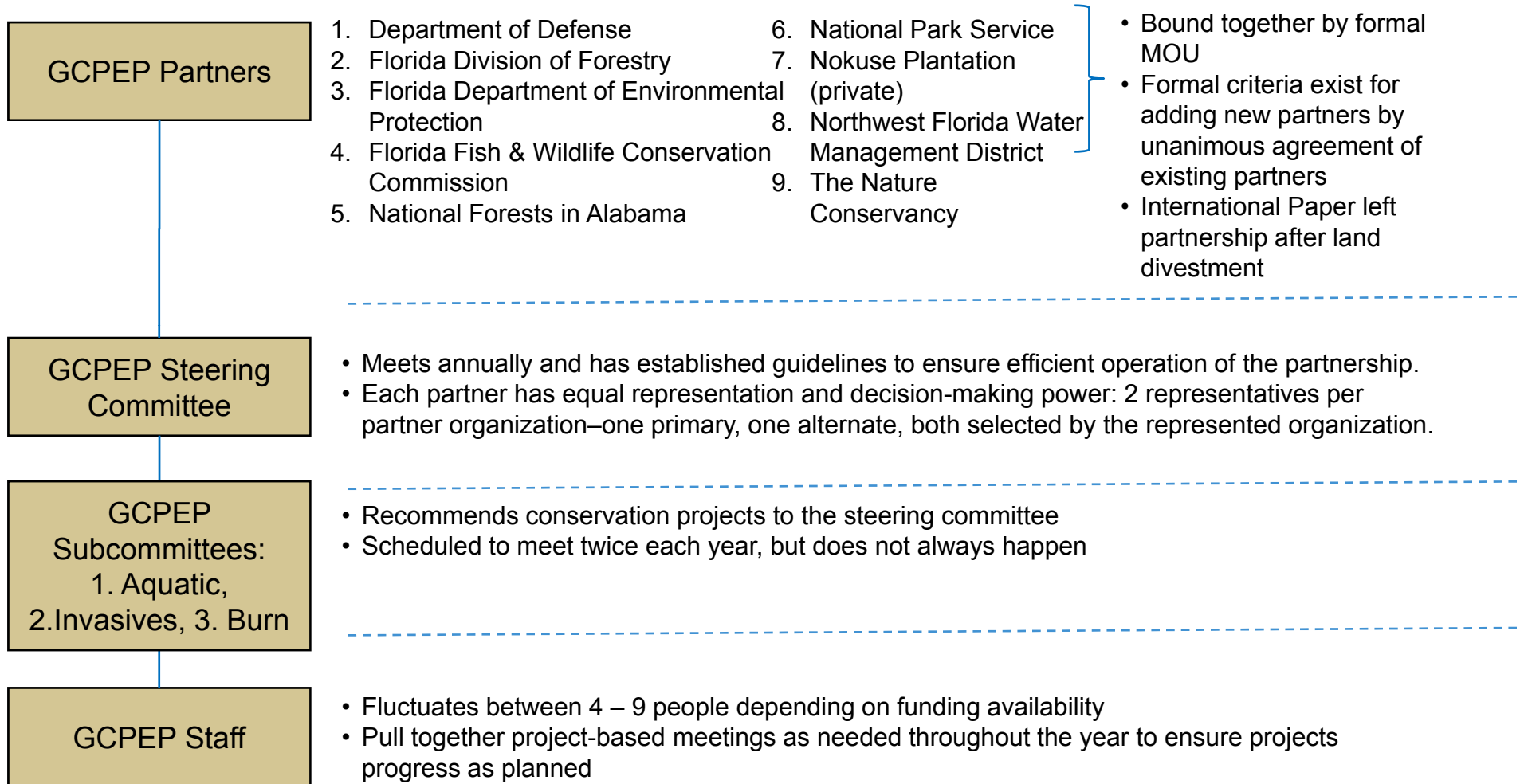
Key Success Factors

- Program representatives believe that GCPEP would not have gotten off the ground without the regulatory incentives, since those burdens led to the initial meetings between Eglin Air Force Base and the Nature Conservancy (TNC).
- **Steering committee structure:** Smaller partners were concerned about larger partners such as TNC and DoD having more control and bullying smaller partners, but the equal representation on the steering committee with consensus based decision making forced partners to treat one another equitably. A key to GCPEP's success in forming was finding common ground and learning to trust the other partners. For example, at first International Paper did not want to enter into a partnership with any of the regulatory agencies, such as USFWS or EPA, but eventually relinquished on this demand.
- **Staff continuity and support:** "There have been a lot of changes in partnership representation on the steering committee. Having a consistent program staff helps smooth the transitions.
- **Education and outreach:** "We now have a tremendous education effort aimed at community leaders and politicians. In the beginning, we made a mistake being too aggressive about some projects when the landowners or politicians were not ready. We needed a more aggressive education and outreach campaign first."
- "It is easy to help and work with the DoD because after their mission-loss, they brought in outstanding resource managers, and they're very transparent in their management about what they do well and what they don't do well." research" into messages for stakeholders.

Challenges

- One of the hardest periods of getting the GCPEP off the ground was working through the MOU and getting partners on the same page. It was difficult working through the legal systems of each of the partners. TNC was mainly in charge of keeping that process going. The MOU has already changed since its original 1996 version (updated last in 2005-2006).
- Currently, GCPEP's biggest challenge is finding consistent, long-term funding. DOD Legacy funding is an annual award, not a long-term commitment, although GCPEP has received this funding for 8 out of 11 years. In the years when DOD Legacy funding was not awarded, the DoD still funded some conservation projects, but did not make up the missing funding 100%. It is difficult to fund program management and administration functions with grants, which are usually meant for on-the-ground conservation. TNC tries to fill in gaps as much as possible. A long-term funding strategy still needs to be developed and implemented.
- It is difficult to "translate the good science that was done based on an amazing amount of research" into messages for stakeholders.

4. Gulf Coastal Plain Ecosystem Partnership (GCPEP)—Organization



Sources: <http://www.gcpeepartners.com/index.aspx>; "Role of Public-Private Partnership in Restoration: A Case Study," Vernon Compton, J. Bachant Brown, M. Hicks, and P. Penniman, The Nature Conservancy, Jay Florida Office, The Gulf Coastal Plain Ecosystem Partnership of Jay, Florida 32565; "Gulf Coastal Plain Ecosystem Partnership" bulletin; phone interview with program participant in Fall 2008.

4. Gulf Coastal Plain Ecosystem Partnership (GCPEP)— Geographic Scope



GCPEP Partnership Lands <<click to enlarge>>

Sources: <http://www.gcpepartners.com/index.aspx>; "Role of Public-Private Partnership in Restoration: A Case Study," Vernon Compton, J. Bachant Brown, M. Hicks, and P. Penniman, The Nature Conservancy, Jay Florida Office, The Gulf Coastal Plain Ecosystem Partnership of Jay, Florida 32565; "Gulf Coastal Plain Ecosystem Partnership" bulletin; phone interview with program participant in Fall 2008.

5. Horizon / Smoky Hills—Part 1 of 4

Location

- Smoky Hills region of Kansas: mostly central mixed-grass prairie, some central shortgrass prairie (CSP)

Species

- The project considers the entire ecosystem rather than any list of specific species: “We’re not protecting a species or even a habitat, but looking at the ecosystem impacts. There is no legal nexus to protect an ecosystem, but [working on an ecosystem-basis instead of a species-specific basis] is the most successful way to do conservation.”
- There are no federally- or state-listed species or candidate species in the Smoky Hills, but the prairie chicken has become the iconic symbol of the ecosystem and its needs: “It is a proxy for a healthy ecosystem.”

Goals

- Mitigate for environmental damage caused by wind energy development: “However “mitigation” is not the right word since it is believed that one can not mitigate for damage to a large intact landscape.”

History

- 2000 – TNC first began engaging with wind energy players
- 2003—2005: TNC began more vigorously trying to raise awareness and educate industry players on collision-related mortality associated with wind turbines, especially their detrimental effects on rare bird populations, staging areas, and vegetation roosting bats due to habitat abandonment from the introduction of the tall structure turbines.
- 2006—2008: TNC established dialog with all types of wind energy players: wind power developers, the transmission system developers, and the utilities—within Kansas and outside—that would enter into power purchase agreements (PPAs) with wind energy developers.
 - Transmission players were willing to dialog with TNC but were mainly sitting back to see how the process played out.
 - The key player to influence turned out to be the utilities that would purchase wind power. Utilities reported that they wanted to buy wind energy because it was supposed to be “green.” Utilities said they wanted to buy wind energy produced on ecologically benign sites. In the absence of any state or federal regulations, the utilities held all the power in terms of requiring their wind providers to mitigate for their impacts.
 - At TNC’s urging, Westar Energy (a utility) put out a request for proposals (RFP) which included the requirement that the wind energy production sites had to be ecologically benign. Westar allowed TNC to help evaluate the proposals submitted before the final selection was made. Some but not all of the proposals received addressed the ecological issues. Horizon Wind Energy proposed its Meridian Way / Smoky Hills project and said they would mitigate for environmental damage, especially abandonment.
 - After Horizon was selected by Westar, Horizon put out an RFP for a mitigation partner. TNC and its local partner, the Ranchland Trust of Kansas (RTK), were the only respondents and were selected.

5. Horizon / Smoky Hills—Part 2 of 4

Partners

- Horizon Wind Energy: main funder
- Ranchland Trust of Kansas (RTK): fiscal agent and future holder of related conservation easements. They are obligated to conduct monitoring on the mitigation site for 20 years.
- The Kansas Chapter of the Nature Conservancy (TNC): conservation facilitator, also obligated to conduct monitoring if RTK is unable.
- Other contributors:
 - USFWS: some funding and in-kind labor
 - Kansas Division of Wildlife: some funding and in-kind labor
 - Pheasants Forever: some funding, in-kind labor, and signatory to cooperative management agreements with private landowners
 - State of Kansas: signatory to cooperative management agreements with private landowners

Tools

1. **Restoration agreements** between the State of Kansas, Pheasants Forever, and participating private landowners (7,000 acres). The required mitigation actions include tree removal and fire regime restoration (which often means tree removal as well). Both of these activities are compatible with better ranching profitability since habitat improvement leads to a better grazing environment. On a case-by-case basis, a landowner may be required to contribute to the cost of the restoration.
2. **Conservation easements**: Significant payments will be made to landowners (13,000 acres) to keep land intact for future generations and prevent parcel subdivision by inheritors (this landscape is not under threat of urban development, but subdivision is more of a threat). The planned mitigation site is also a prime wind development site. Therefore, the conservation easements will buy all wind energy development rights.

Science

- The project will install about 100 new turbines, resulting in a mitigation target of 20,000 acres. It is assumed that each turbine will create an avoidance zone of 1 mile around each tower (based on the scientific literature).
- The mitigation ratio ultimately agreed to was one-to-one with 13,000 acres of a similar intact landscape put under permanent conservation easement while another 7,000 acres would require restoration through management agreements. While habitat improvement would take place on all 20,000 acres, using only the 13,000 acres permanently conserved, the mitigation ratio would be 1 to 0.6.
- The planned mitigation site is 100 miles away from the impact site.

5. Horizon / Smoky Hills—Part 3 of 4

Program

- There is no one formal organization [e.g., 501 (c)(3)] that runs this project. Instead, there is an MOU between RTK and TNC regarding cooperation on securing conservation easements. There is also a second MOU between Horizon, TNC, and RTK regarding the overall Meridian Way project.
- The program is collectively run by one person from RTF, about half of one person's time at TNC, and some time donated by USFWS and other partners. Horizon does not actively manage the program or participate other than funding the program and providing some expertise as needed.
- Horizon provides the mitigation funding to RTK over a multi-year schedule. If conservation easement opportunities present themselves ahead of when Horizon's funding is made available, then TNC is obligated to make a loan to RTK to cover the easement purchases. This loan would be repaid when Horizon's funding is made available, according to an agreed-upon schedule.

Funding

- The terms of the financial agreement between Horizon and RTK are confidential, but the amount of the mitigation fund is believed to be in the range of a few million dollars over less than 20 years. Each turbine costs \$2 to 3 million to acquire (not even to install), so with a \$200-300+ million wind energy development project, the amount of the mitigation fund is only a small fraction of Horizon's project costs.
- "When a landowner sells his or her wind development rights, he or she may receive around \$300 per acre up front. If they allowed wind development, they would receive \$5,000 per turbine per year over 30 years. The average landowner could accommodate 40-60 turbines." Thus a landowner can make a lot more money from wind development than they can from conservation easements.

Results

- "It is way to early to declare victory. It's too soon in the process. There are no acres under conservation easement yet."

Success Factors

1. Westar was committed to not offer a power purchase agreement (PPA) to any company that would not agree to off-site mitigation.
2. Horizon had an internal leader that wanted to "do wind energy right." Although this person is no longer with Horizon, his or her successor has a similar inclination.
3. Establishing the relationship between TNC, RTK, Westar, and Horizon was the most important key to success.
4. After dialog was established, it was critical to exchange information on wildlife impacts: "We needed science in order to persuade our partners."

5. Horizon / Smoky Hills—Part 4 of 4

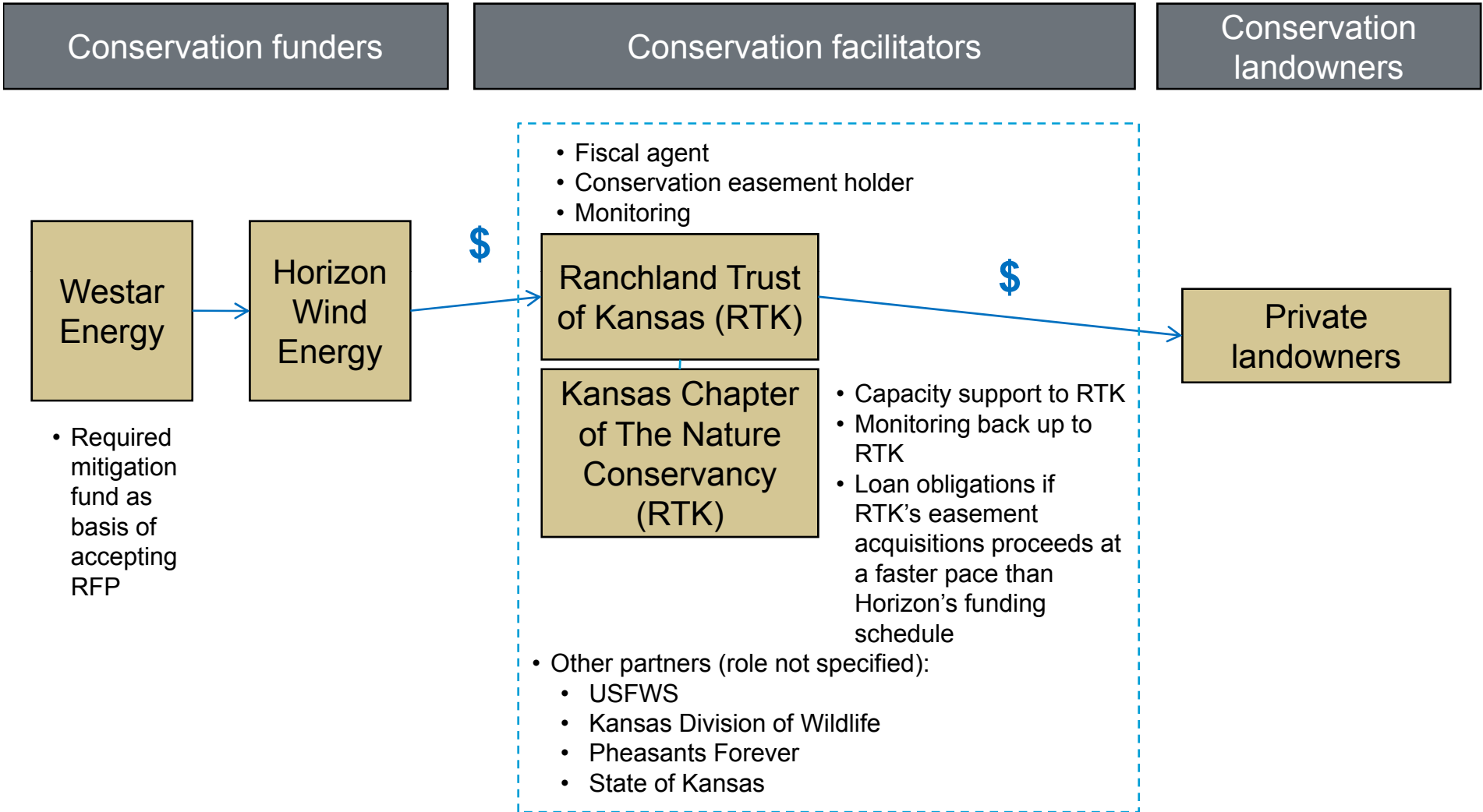
Challenges

- “We face the difficult question: if development impacts were to occur in a fragmented landscape, do we engage with the wind developers anyway, take the money, and do the best we can with it? If this Meridian Way project were not in a pristine area, we wouldn’t have touched it. Are there ecological features on the landscape where there can be no effective mitigation, should we work to keep development out of the area rather than accept money for mitigation?”

Lessons for CSP

- This case study is extremely relevant to the CSP and similar efforts can be made to work with utilities to insert environmental considerations into RFPs for wind energy development.
- The Shortgrass Prairie Partnership needs to be mindful of other efforts going on or should seek to leverage those efforts regarding wind power development so that any such existing efforts are not duplicated or degraded. For example, wind energy developers are currently in discussion with state regulators to enter into a regulatory framework for wind power development.

5. Horizon / Smoky Hills—Organization



6. Jonah Natural Gas Fields—Part 1 of 3

Location

- Jonah Natural Gas Fields in southwest Wyoming's Upper Green River Valley, a high-desert sagebrush ecosystem (part of the Greater Yellowstone Ecosystem)

Species

- Wildlife Habitat and/or Species (conservation goals): Burrowing Owl (34k acres), Cedar Rim Thistle (8.5k acres), Mountain Plover (3k acres), Sage Grouse Leks (6 leks) and habitat (52k acres), Pronghorn Migration (19k acres), Pygmy Rabbit (18k acres), Sage Sparrow (22k acres), White-tailed Prairie Dog (4k acres), Wyoming Big Sagebrush (56k acres).
- No federally listed species on the target list.

Goals

- Using a step-by-step process, TNC scientists identified a series of wildlife goals that need to be captured offsite in order to mitigate for what's been lost on the Jonah Natural Gas Fields (see acreage goals by species or habitat under "species," above).
- Offsite site selection process: 1. Assemble team of experts, 2. Compile key species list, 3. Set goals, 4. Run model, 5. Validate results, 6. Report results / track progress.
- Conservation goal: "no net loss," which required onsite as well as offsite mitigation to meet offset goals of 76k hectares.

History

- Jonah Natural Gas Fields is one of the largest energy development areas in the nation with an estimated 7 to 10 trillion cubic feet of natural gas. Currently, ~500 well pads and infrastructure cover more than 30,000 acres of the 60,000 acres in the field.
- 2006: Bureau of Land Management (BLM) granted regulatory approval to infill the existing developed portion of the field with an additional 3,100 wells. As a requirement of the infill project, an offsite mitigation fund of \$24.5 million was established.
- There are mixed opinions on whose idea it was to create the mitigation fund or how voluntary BP's participation was. BP would say that they volunteered to create the mitigation fund, but the regulatory agencies might say that they required it. One opinion is that BP knew that there would be a mitigation fund required and so they proactively volunteered to create one: "The operators recognized that they would have significant impact and voluntarily stepped up. BP as an international company has more of an environmental reputation to maintain than a smaller, regional company would. It's also not a huge amount of money to do the science and the conservation."
- British Petroleum (BP) "expressed the need for a structured framework to guide the disbursement of mitigation funds and invited The Nature Conservancy to design such a plan." They first contacted the Measures team at the worldwide office of TNC and asked "how can we measure that we're getting our money's worth?" It later emerged that BP also needed a tool to guide site selection as well as valuing and measuring progress. BP had already committed to the off-site mitigation fund before TNC got involved, but TNC introduced the concept of "no net loss" to BP.
- Since the work on Jonah, the relationship between TNC and BP has deepened. In the case of the 1.1 million acres Continental Divide-Creston (CDC) gas fields, BP brought TNC in before the environmental impact statement process.

Source: "A Framework for Implementing Biodiversity Offsets: Selecting Sites and Determining Scale," by Joseph M. Kiesecker, Holly Copeland, Amy Pocewicz, Nate Nibbelink, Bruce McKenney, John Dahlke, Matt Holloran, and Dan Stroud, 7/22/08; phone interview with program participant in December 2008.

6. Jonah Natural Gas Fields—Part 2 of 3

Partners

- **BP America Production Company:** mitigation and science team funder
- **Encana:** mitigation funder
- **Jonah Interagency Reclamation and Mitigation Office (JIO):** fiscal agent for the mitigation fund and decision-makers regarding where important wildlife habitat might be conserved. Manage call for projects and also do proactive outreach based on conservation maps. The JIO is staffed by state and federal agencies, including BLM and the Department of Agriculture: “It is a unique organization created specifically to support mitigation. Some of the \$24.5 million mitigation fund is used to staff this office.”
- **Science team:** The Nature Conservancy, Wyoming Game and Fish Department, Department of Environmental Quality, Department of Agriculture. Bureau of Land Management, US. Fish and Wildlife Service, universities, biological consulting firms, and local agricultural production community representatives.
- **Planned conservation easement holders:** Upper Green Valley Land Trust, Wyoming Department of Fish and Game, stockgrowers association. (TNC is purposely staying out of funding and easement holding. It will partner on some projects, but not take the lead.)

Tools

1. **Offsite mitigation:**
 1. **Conservation easements** with management plans and additional stewardship funding for long-term management monitoring: “Land threatened by development has a higher value in our mitigation formulas than land not threatened. “We will have better quality easements because of the management plans with conservation objectives tied to targets.”
 2. **Restoration agreements:** “Restoration has a sliding scale in potential for success: some project have greater potential for success than others. We’re pushing the envelope a little. We didn’t value restoration high in our mitigation formula, but we still wanted to do some restoration in order to learn from it. Some restoration agreements are simply new grazing management plans.”
2. **Onsite mitigation:** “At Jonah field, we knew there would be limited value in investing in onsite conservation. There is already significant impact. The returns from onsite mitigation would be too small from a conservation perspective. Also, directional drilling from existing well pads would have been too expensive.”
3. **CCAA:** Program partners are considering CCAs going forward, but not as part of this offset mitigation project.

Science

- Team used the biological target list from the Wyoming Basins Ecoregional Plan (Freilich et al. 2001) crossed-walked with information gathered as part of the Environmental Impact Assessment (U.S. Department of Interior 2006). All ecoregional conservation targets identified within the bounds of the field area were selected as a biological target to be included in the offset design.
- Team selected nine species and one ecological system to represent the biodiversity on the Jonah Field.
- Marxan algorithm used to select areas representing the biology of the Jonah Field.
- Mitigation formula assumes a 30-50 year impact on Jonah fields: “Some of the footprint will be reclaimed somewhat, but there will also be some residual impacts in perpetuity. We don’t expect any acreage to be completely paved over, and the operators can’t do any new drilling until some minimum restoration is done on old drilling sites. Complete habitat loss makes it easier to calculate offsets.”

Program

- The program is entirely managed by the JIO.
- The Science Team that was in place for the site selection process is no longer an active team.

Source: “A Framework for Implementing Biodiversity Offsets: Selecting Sites and Determining Scale,” by Joseph M. Kiesecker, Holly Copeland, Amy Pocewicz, Nate Nibbelink, Bruce McKenney, John Dahlke, Matt Holloran, and Dan Stroud, 7/22/08; phone interview with program participant in December 2008.

6. Jonah Natural Gas Fields—Part 3 of 3

Funding

- BP and Encana provided \$24.5 million in offsite mitigation funds. Some of this funding is for long-term management and monitoring by BLM and the Wyoming Department of Game & Fish.
- BP also funded the science team with \$150k to develop the conservation site selection process.

Results

- Offset goals totaled 76,517 hectares. However, the team could not identify enough suitable offsite mitigation sites to meet this goal. Therefore, mitigating impacts onsite became necessary to achieve a no-net loss goal.
- JIO has an active call out for project applications. They are also proactively approaching landowners based on the target conservation maps. They are about finished in allocating the funds. Funding for two conservation easements is already allocated, and about 30 projects are in consideration.

Success Factors

1. **Benefits to funders:** Project participants believe that the energy industry can benefit from funding mitigation offsets because there would be “a higher likelihood that permission would be granted from regulators for new operations, greater societal support for development projects, and the opportunity to more effectively manage environmental risks.”
2. **Pro-energy culture:** “Wyoming is unique in that it is culturally open to oil and gas development. There is a willingness to partner with developers.”

Challenges

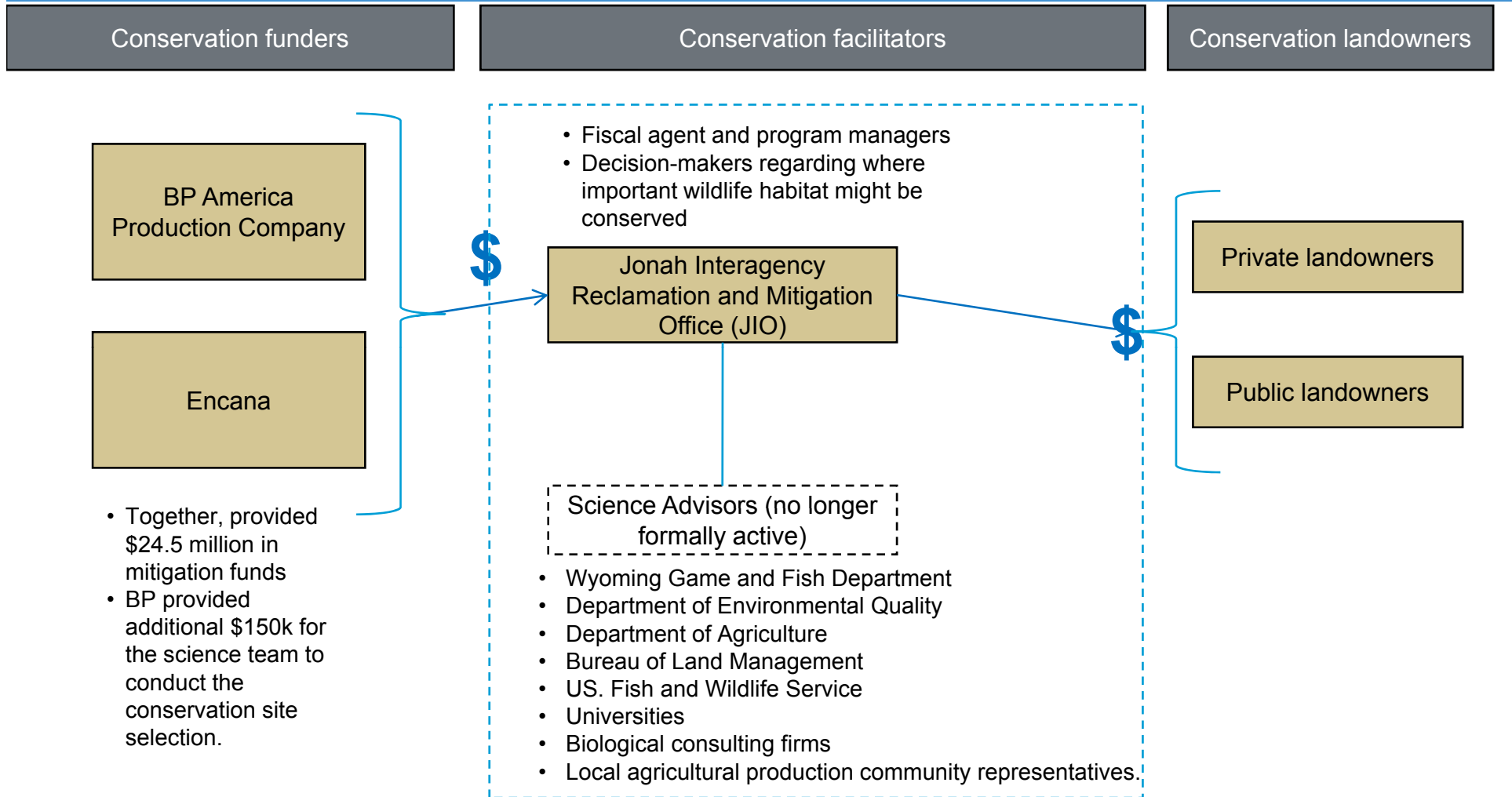
1. **Mitigation formula:** Team still needs to “develop an appropriate currency (i.e. area, habitat quality) to ensure that offsets have been sufficient....[M]ost offset programs methods for assessing currency are in their infancy. The exception is wetland offsets, for which methodological developments has been ongoing for more than two decades... [E]stimates of the number of available wetland assessment methods range upwards of 100 individual tools....[A]ll are subject to criticism and few are actually utilized due the high cost and complexity of application. [O]f over 200 wetland mitigation banks throughout the United States, over 60 percent of banks defined credits simply by acreage....[G]iven the lessons of wetland mitigation banking, assessment tools will need to balance time and cost with scientific rigor.”
2. **Agreeing on mitigation scale:** “there was a tension in selecting the scale of conservation sites. We could have achieved no net loss for less than the \$24.5 million in the mitigation fund if we had looked at a wider scale in our site selection process. BP was open to achieving the best science at the lowest required cost. However, other constituents—BLM and the local ranching community—wanted the conservation funding to be invested locally by focusing on the Upper Green, specifically within BLM’s field office boundaries, even if that resulted in lower conservation returns for a given investment level.
3. **Conservation-wary culture:** “While Wyoming is open to partnering with oil and gas developers, from the agricultural community’s perspective, TNC’s involvement was a sticky issue. TNC didn’t have great relationships with the agricultural community. It took a lot of meetings to build trust.”

Lessons for CSP

- Like the CSP, this program does not target any federally-listed species.
- CSP program partners can pursue a similar strategy with oil and gas developers in Colorado

Source: “A Framework for Implementing Biodiversity Offsets: Selecting Sites and Determining Scale,” by Joseph M. Kiesecker, Holly Copeland, Amy Pocewicz, Nate Nibbelink, Bruce McKenney, John Dahlke, Matt Holloran, and Dan Stroud, 7/22/08; phone interview with program participant in December 2008.

6. Jonah Natural Gas Fields—Organization



Source: "A Framework for Implementing Biodiversity Offsets: Selecting Sites and Determining Scale," by Joseph M. Kiesecker, Holly Copeland, Amy Pocewicz, Nate Nibelink, Bruce McKenney, John Dahlke, Matt Holloran, and Dan Stroud, 7/22/08; phone interview with program participant in December 2008.

7. Matador Ranch Case Study—Part 1 of 4

Location	<ul style="list-style-type: none"> Northern Montana Prairie region: south Phillips County , north of the Missouri River Breaks
Species	<ul style="list-style-type: none"> Black-tailed prairie dogs, Swift fox, Pronghorn, Black-footed ferret, Mountain plovers, Burrowing owls, Ferruginous hawks, Sprague's pipits, Chestnut-collared and McCown's longspurs, Long-billed curlews
Goals	<ul style="list-style-type: none"> “Maintain ecologically diverse prairie habitat on Matador Ranch while managing an economically productive livestock operation“ Encourage conservation on adjacent private ranches Develop system of economic gain for cooperative conservation work
History	<ul style="list-style-type: none"> 1882: Ranch started by Granville Stuart 2000: TNC purchased half of the Matador Ranch from the Tranel family to demonstrate how conservation and ranching could work hand in hand 2002: Tranel family sells the other half of Matador to TNC The idea for turning Matador Ranch into a grass bank came up during a severe drought year. TNC didn't just want to lease the ranch out. They wanted to leverage the ranch's grass resources into achieving net conservation gains on and off the ranch. Neighboring ranchers were motivated to work with TNC because otherwise some would have had to reduce their herd sizes, which would have hurt profitability.
Partners	<ul style="list-style-type: none"> The Nature Conservancy – land owner and manager of the 60,000 acre ranch Matador Grazing Group: currently 10 private ranchers with 150,000 acres of other privately held ranch land. – graze their cattle on Matador ranch and do some of the cattle management activities on the ranch. The ranchers involved in the Matador grazing program all have prairie dogs, sage grouse or grassland birds on their own ranches. "One of the criteria we used for allowing ranchers into the program was that they support biological diversity on their home ranches," said Linda Poole, the Conservancy's former northern Montana prairies program manager based at the Matador. Ranchers are able to grow their cattle operations beyond what their own land might support. They also can improve ranching profitability through reduced lease costs. BLM & Montana Division of State Lands (state land board): The Matador Ranch is only 31,000 deeded acres but comes with rights to lease 29,000 acres of grazing land. The portion that is leased from the state comes up for re-bidding every 10 years, and theoretically, TNC could be outbid one day. Montana Division of Fish, Wildlife and Parks: not involved in the grass bank, but is a partner to TNC on its hunting access program.

Sources: <http://www.nature.org/wherework/northamerica/states/montana/preserves/art10062.html>; <http://www.nature.org/wherework/northamerica/states/montana/preserves/art15839.html>; <http://www.compatibleventures.com/grassbank.html>; notes from project team member's on-site visit to Matador Ranch in Summer 2008, phone interview with program participant in Fall 2008.

7. Matador Ranch Case Study—Part 2 of 4

- **Conservation buyer:** TNC purchased the Matador Ranch outright for conservation (31,000 deeded acres, 29,000 leased)
- **Grass banking:** the exchange of forage for conservation practices. Participating ranchers graze their cattle on the Matador. In exchange for lowered grazing fees, the participating ranchers agree to a variety of conservation practices on their home ranches. These practices include weed control, maintaining certain levels of prairie dogs, no plowing of native prairie and stewardship certification through the "[Undaunted Stewardship](#)" program.
 - All grass bankers are required to:
 - Graze their herds in common. For this, they receive an automatic \$2 per AUM discount off the full market value for the forage of \$21 per AUM.
 - Agree to forego sodbusting of native grass for an additional discount of \$0.40 per unplowed but plowable acre of private land. If a grass banker ever breaks native sod, they are permanently expelled from the grass bank.
 - Agree to weed prevention, control and monitoring for an additional discount of \$0.50 per AUM.
 - Additional optional opportunities to earn discounts (and make bid more competitive):
 - Sustainable range management and monitoring: discount of \$0.10 per acres of private land certified through Undaunted Stewardship, a program administered through Montana State University, Montana Department of Agriculture, and Montana Stockgrowers.
 - Prairie dog habitat: \$5-8 per acre of occupied prairie dog town (\$4 for towns with value primarily to prairie dogs and lesser concern to ranchers (<100 acres); \$6 for towns with additional values for owls, hawks and plovers; \$8 for towns with value for ferrets; \$8 per acre for towns within category 1 or 2 complexes). Grass bankers are not responsible for acts of nature such as plague in a protected prairie dog town.
 - Sage grouse habitat: \$0.125 per acre of private land lying within 2 miles of active sage grouse leks; for each full grouse habitat circle, the landowner would receive a \$1,000 discount.
 - Prescribed fire, riparian or wetland fencing and other management practices that cost producers grass while leading to conservation: negotiated discounts.
 - Noxious tree control and prevention: Base rate of \$100/yr for prevention/monitoring; \$10/tree cut and treated; cap of \$1,000/yr; for people to receive prevention fee, would allow no salt cedar, and Russian olives only in house shelterbelts.
 - All grass bankers have to pay at least \$10.50 per AUM after all discounts (50% of market rates).
 - There are no direct payments to private landowners.
- **Collaborative management:**
 - TNC requires grass bankers to run their herds in common. More than half of the ranch's 60,000 grazing acres are divided into pastures at least 3,000 acres in size. TNC did not want to build cross-fences or re-fence existing pastures. Ranchers didn't want to run their herds in common, but TNC made this mandatory. Ranchers are required to help move the herds according to the agreed-upon grazing rotation schedule.
 - To protect the health of the herds, TNC only allows ranchers to run cattle on Matador that have been in the ranchers' herds for a while. TNC also requires trichinosis tests on bulls. Grass bankers designate a lead rancher to compile health records of all the herds on the Matador.
 - Grass bankers are responsible for organizing themselves to work together, for example, on deciding which bulls to breed with which cows. The grass bankers have their own meetings outside of TNC involvement.
- **Conservation easements:** moving towards permanent protection options. "It's a bit of a leap but a matter of time. It takes a few years to pull the trigger. If we do these, it would be separate from the grass bank operations.

7. Matador Ranch Case Study—Part 3 of 4

Science

- TNC uses its standard Conservation Action Planning (CAP) methodology in the way it runs Matador Ranch.

Program

- **Outreach:** in the beginning, leading area ranchers helped to identify other potential grass bankers. Over time, TNC has actively tried to improve the quality of the grass bank participants in terms of the conservation values that exist on the grass bankers' lands. For example, early on, there were grass bankers in the program who had no conservation values (i.e., their ranches were basically feedlots). These grass bankers simply paid market rates for the grazing leases and were awarded no discounts for conservation actions. Over time, these types of participants were replaced in the grass bank by ranchers with better conservation values (feedlot owners were given 2 years notice).
- **Number of participants** has been as high as 16 and is now 10. There are limits on the number of cows that each grass banker can have on Matador so that TNC gets geographic distribution and rancher diversity and is not dependent on the participation of one or two larger ranches. Some ranchers enter and exit the program each year dependent on grass growing conditions. When Matador is understocked, TNC might accept grass bankers from outside the target conservation area, but it always gives current and past bankers the right to increase their herds on Matador before accepting out-of-area ranchers or ranchers with no conservation values.
- **Lease durations:** Some leases are 1 year leases while others are 5 year leases, depending on conservation values and the history of a trusted relationship between the rancher and TNC.
- TNC is considering starting another grass bank in southern Montana focused on sage grouse habitat. TNC already has another grass bank in Wyoming.
- Half of the grass bankers are also in the Stewardship Alliance program, but this is not required by TNC.

Funding

- Funding varies from year to year based on grass growing conditions. Matador Ranch has experienced annual revenue losses of up to \$70,000 in one year but has also made profits of \$50,000 in another year: "We have to be realistic that this program is not about breaking even."
- In addition to its grass bank fees, the Matador also earns some income from 2,400 acres of hay meadow. The Matador offers a limited number of free permits each week for hunting access: "It would be political suicide in Montana to charge for hunting access."
- TNC pays for some cowhands to check on herd health, move salt, and move animals small distances (for big moves based on the agreed-upon grazing rotation schedule, the grass bankers are required to help).
- 2 full time equivalent staff members work on the Matador ranch.

Sources: <http://www.nature.org/wherewework/northamerica/states/montana/preserves/art10062.html>; <http://www.nature.org/wherewework/northamerica/states/montana/preserves/art15839.html>; <http://www.compatibleventures.com/grassbank.html>; notes from project team member's on-site visit to Matador Ranch in Summer 2008, phone interview with program participant in Fall 2008.

7. Matador Ranch Case Study—Part 4 of 4

Results (as of 2006)

- 67,010 private acres protected against sodbusting for lease duration (~23k on Matador)
- 246,582 public, private and tribal acres of weed prevention, control, and monitoring (~60k on Matador)
- 79,351 private acres certified as sustainably managed through MSU's Undaunted Stewardship Program (~31k on Matador)
- 3,524 private, tribal, and public acres of prairie dog habitat protected (1,358 on Matador)
- 27,734 private acres of sage grouse habitat protected (~13k on Matador)
- "Grassbank partnerships opened the door for development of community-driven conservation plan for rare wildlife and other natural resources spanning more than a million acres"
- Ranchers state that they are feeling more connected to each other than ever before because they work together on Matador doing cattle management

Success Factors

- TNC facilitates a conference call between all the grass bankers once each month. "We have continuous contact with our grass bankers. There is open communication."
- "We have also demonstrated success in ranching performance. For example, ranchers are concerned that breeding is suppressed in larger herds, but that has not proven to be the case on the Matador. We have the highest ever number of yearlings right now—more than 1000—and our 90% conception rate is as good as any of the results on the home ranches."

Challenges

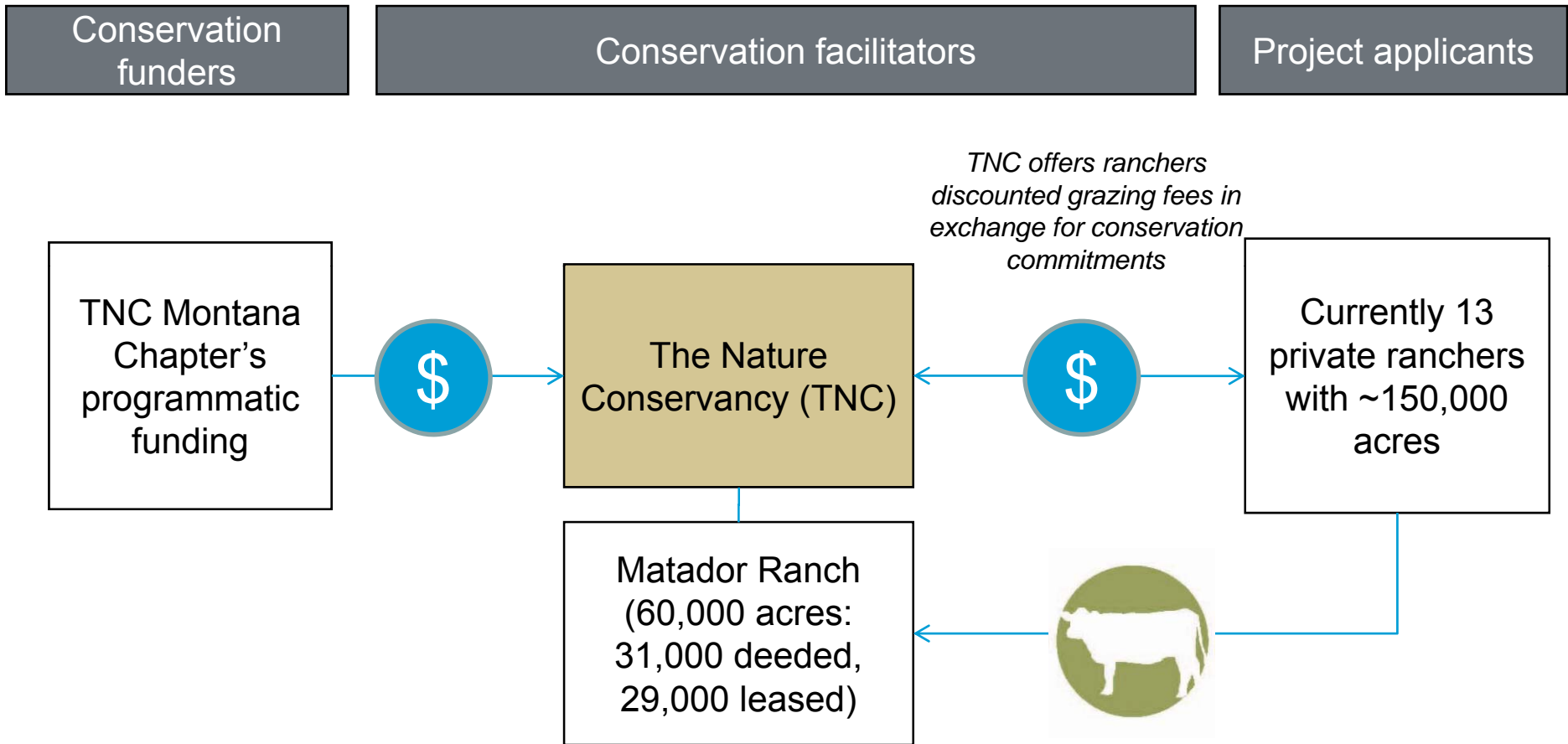
- Continued operation of this grassbank hinges on quickly retiring several million dollars of land debt, and securing funds to cover annual revenue losses: "We're never sure that this will last. Ranchers can change their minds at any time."
- Other challenges include developing equitable values for conservation discounts, and effectively managing large herds of mixed-ownership cattle that are grazed in common.

Lessons for CSP

- Some DOD land in Colorado is presently being grazed. Interviewee knows of no reason why DoD can't turn its grazing land into a grass bank. USFS already has grass banks for prescribed burn programs.

Sources: <http://www.nature.org/wherewework/northamerica/states/montana/preserves/art10062.html>; <http://www.nature.org/wherewework/northamerica/states/montana/preserves/art15839.html>; <http://www.compatibleventures.com/grassbank.html>; notes from project team member's on-site visit to Matador Ranch in Summer 2008, phone interview with program participant in Fall 2008.

7. Matador Ranch Case Study—Organization



Sources: <http://www.nature.org/wherewework/northamerica/states/montana/preserves/art10062.html>; <http://www.nature.org/wherewework/northamerica/states/montana/preserves/art15839.html>; <http://www.compatibleventures.com/grassbank.html>; notes from project team member's on-site visit to Matador Ranch in Summer 2008, phone interview with program participant in Fall 2008.

8. San Diego MSCP—Part 1 of 3

Location	<ul style="list-style-type: none"> • San Diego, CA permitting on lands not conserved in exchange for sale of land to county
Species	<ul style="list-style-type: none"> • Over 200 species are included with a specific focus on 48 animal and 45 plant species of special concern (93 total “of special concern”)
Goals	<p>The program aims to stream-line the coordination of development with conservation programs and regulatory agencies. Its goals are:</p> <ol style="list-style-type: none"> 1. To conserve multiple species and their habitats simultaneously 2. Preserve entire Coastal Sage Scrub ecosystem 3. Protect and ensure recovery of 85 identified species within the Multi-habitat planning area (MHPA) 4. Protect watersheds and water quality 5. Streamline the permitting for development process 6. Ensure compliance with ESA and State of California Natural Communities Conservation Act
History	<ul style="list-style-type: none"> • 1992 – 1997 Draft plan and organization • Plan completed in 1997 to established large areas of interconnected native lands (~ 6% of total San Diego County lands) • Formal agreement signed by City of San Diego, California Fish & Game, US Fish & Wildlife and other partners listed below
Parti- pants	<ul style="list-style-type: none"> • Cities of: San Diego, Poway, Chula Vista, Santee, El Cajon, La Mesa, Lemon Grove, Imperial Beach, National City and a portion of San Diego County's unincorporated area: each jurisdiction has a subarea plan and implementation agreement with MSCP. • County of San Diego: also has subarea plans with MSCP. • USFWS and CA Dept. of Fish and Game: Reviews and accepts Subarea plans as part of Federal and State Endangered Species Acts. The wildlife agencies also conduct biological monitoring • Private land developers with land in MSCP area must be in conformance with MSCP if they have site development plans that require discretionary permits from the City of San Diego or a public hearing. In return for a permit approval, private land owners must comply with one of 4 exaction options. • Other private landowners (not developers): for private land in MSCP area that is not likely to be developed, the MSCP conducts a purely voluntary program of land conservation. • Mitigation banks: “These are usually set up by private for-profit entities. They buy an unconserved property in the MSCP area, set up the bank, get approvals from state, federal, and local governments, sell the credits, then deed the land to the city for conservation.”
Not involved	<ul style="list-style-type: none"> • DoD is not involved in MSCP although it has a great deal of land in the MSCP area. There is not much information flow between DoD and MSCP on the conditions of DoD species populations. • Other public agencies are not signatories to the MSCP but have separate Habitat Conservation Plans (HCPs): school districts, gas & electric utilities, water authority.

Sources: <http://www.sdcounty.ca.gov/dplu/mscp/index.html>; http://pubs.usgs.gov/sir/2007/5016/pdf/sir_2007-5016.pdf; <http://www.sdcounty.ca.gov/dplu/mscp/>; <http://www.sandiego.gov/planning/mscp/pdf/implagree.pdf>; phone interview with program participant in Fall 2008.

8. San Diego MSCP—Part 2 of 3

Tools

1. **Regulatory driven tool: easy-to-navigate permitting system** for lands not critical to MSCP where discretionary permits are granted in return for one of four conservation actions on other land owned by the developer that is critical to the MSCP habitat goals: “Some applicants could go through the city, state, or federal permitting system, and they voluntarily choose to come through the city because it’s easier than going through the USFWS process. Sometimes we propose the conservation plan for the permit approval, and the applicant will turn down our proposal. Then they have to go to the state or the feds to get their take, and when they hear what’s required there, they come running back to us.”
2. **Voluntary tools:** For land with habitats critical to the MSCP that is not likely to be developed and never come to MSCP through the permitting process, the program funds land acquisition from willing sellers.
 - **Land acquisition:** . These lands become County protected areas
 - **Conservation easement:** All conservation easements have management plans included in the agreement.
3. **Management agreements:** local, county, state and federal agencies with land in the MSCP area have signed implementation agreements and submitted management plans.
4. **Mitigation banks** operate in the MSCP but are run privately, not by the MSCP (see participants)

Science

- “The science took place 15 years ago. We mapped the study area for vegetation and species. We sat at the table with stakeholders to determine core areas and corridors. A scientific advisory panel provided input. We mapped the ecosystem first and then selected which species could be covered by the preserve, based on their habitats and occurrences. We did 98% of the negotiations with developers and environmentalists before setting up the program and signing the planning document. We’re now in implementation mode.”
- A Habit Management and Technical Committee functions as a coordination forum for technical issues. Members include members of each jurisdiction and they work with the wildlife agencies who provide information and advice on habitat management and biological monitoring.
- The USGS has published a report titled “San Diego Multiple Species Conservation Program (MSCP) Rare Plant Monitoring Review and Revision” which proposes changes in the plant monitoring of MSCP

Funding

- Funding for land conservation management is paid for entirely by the City and County: “This was a mistake to not include other funding sources. We’re now looking at regional funding sources, such as supporting a ballot measure for a ½ cent gas tax.”
- MSCP received \$25 million in grants, most of which was used to fund land acquisition of land in the MSCP area that would not be expected to come through the permitting process. Some funding went to updating monitoring protocols and creating the science panel.
- Although the permit applicant pays the transaction costs for the required land exaction, the landowner is not required to fund conservation easements that may be put on the lands they must give up to the County in exchange for permit approval.
- **Staffing:** “We had as many as 7 people in the past, but we’re not 4, all of whom are city employees. MSCP staff are in the City planning department, which manages no land.
- The federal, state and local agencies are required to fund the management of conserved lands in their jurisdictions.
- Funding for biological monitoring is the joint responsibility of local jurisdictions and wildlife agencies.

Sources: <http://www.sdcounty.ca.gov/dplu/mscp/index.html>; http://pubs.usgs.gov/sir/2007/5016/pdf/sir_2007-5016.pdf;
<http://www.sdcounty.ca.gov/dplu/mscp/> ; <http://www.sandiego.gov/planning/mscp/pdf/implagree.pdf>; phone interview with program participant in Fall 2008.

8. San Diego MSCP—Part 3 of 3

Program

- The program area covers ~582,0000 acres and is based on a joint public-private plan for conservation, land stewardship and smart growth development. New program areas North and East of San Diego are planned to be included as part of MSCP
- Any land owned by a developer that is located in the Multi-Habitat Planning Area (MHPA) must mitigate for take. In return for participating in the MSCP, the landowner is allowed to develop no more than 25% of their land in the MHPA. The rest is taken for conservation as an exaction; it is not a sale. The landowner has three options: (1) they can deed us the land, (2) they can allow a conservation easement to be put on it, (3): they can allow a covenant of easement, which is similar to a conservation easement. Some landowners would rather not own the exacted land than have to be responsible for land with a conservation easement.
- The plan has a voluntary aspect, but participation is required for certain types of development in the program area (see tools).
- The MSCP assesses and manages the habitats and species within the MSCP lands for maximum conservation and expansion of the 85 listed species.
- Signatory agencies/districts administer their portions of the MSCP through subarea plans and implementing agreements (IA).
- An implementation Coordinating Committee has one representative from each jurisdiction, wildlife agencies, and environmental groups, with one representative for small land owners, and one representative for large land owners.
- Each jurisdiction participates in the Habitat Management Technical Committee

Results

1. More than ½ way to goals of establishing 172,000 acres interconnected preserve system across many jurisdictions
2. Open space becoming major community draw
3. Created San Diego Wildlife Refuge
4. New voluntary land acquisitions through 2007: Federal Agencies 8,134.8 acres, State Agencies 18,646.8 acres, County of San Diego 4,720.29 acres

Success Factors

- Fairness and transparency: “All interested stakeholders know what they’re getting. There is a compromise between the different interests.”
- Program participant commitment: “We’ve preserved huge chunks of land in perpetuity because people have stuck with it.”
- The coordination across several jurisdiction allows for the planning of connected conserved areas

Challenges

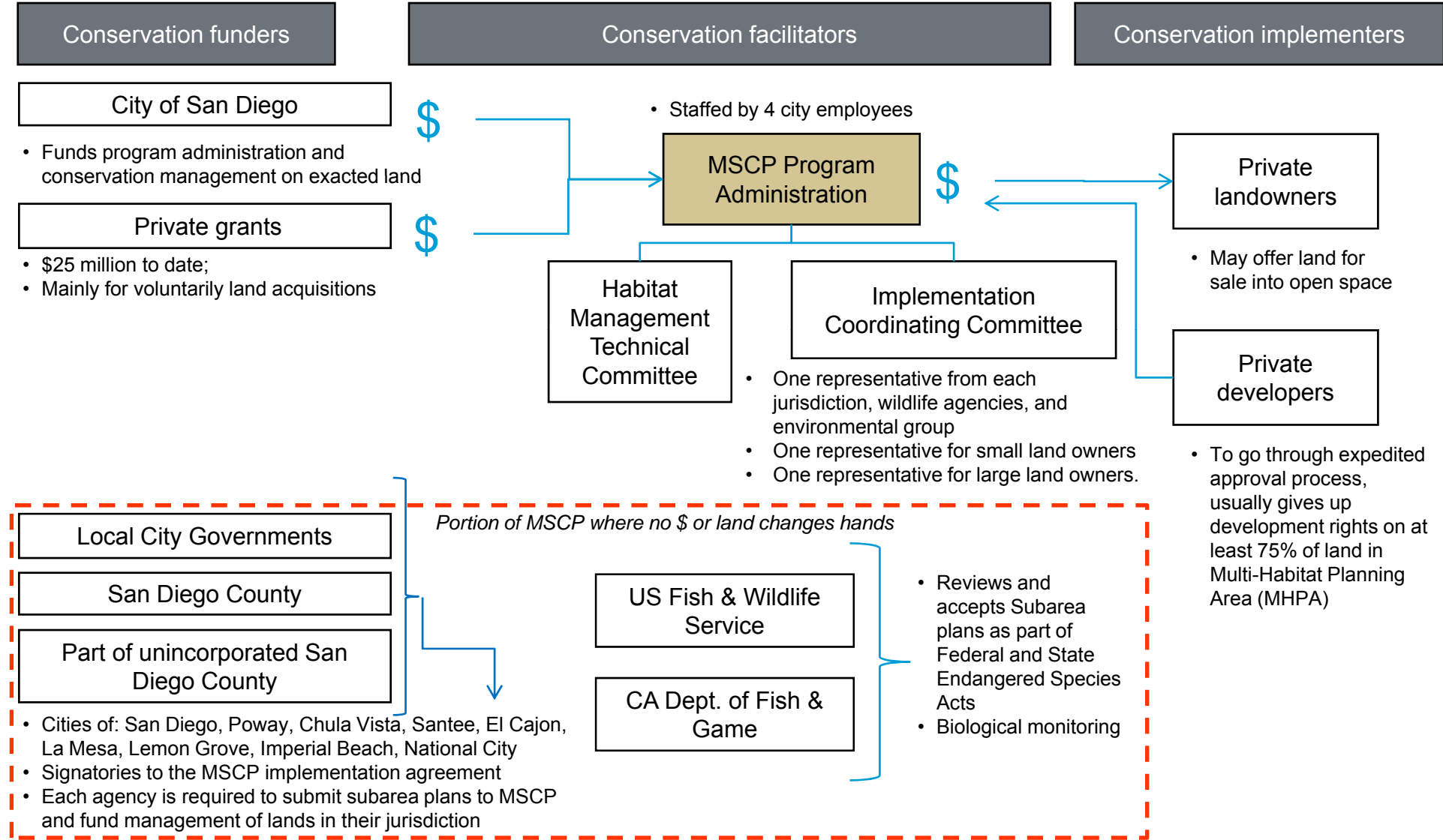
- Funding: “The funding issue has been huge and tough. There are unmet obligations all around. All the parties are writing grant applications. We need grants for land management and monitoring.”
- There was some concern from some environmental groups including EarthJustice that the “no surprises” policy where conservation needs are predicted for as much as 50 years can lead to a lack of protection of certain species.

Lessons for CSP

- This program is a valuable model for the CSP because it focuses on many species and their habitats
- This program is less applicable to the CSP than others because:
 - Most of the program is based on regulatory-driven conservation exactions based on the need for discretionary permits.
 - The voluntary part of the program relies heavily on land purchase by public agencies for conservation.
 - The MSCD study area is ~30% Urban and ~44% vacant lands (in 1997) whereas CSP is mostly agricultural.

Sources: <http://www.sdcounty.ca.gov/dplu/mscp/index.html>; http://pubs.usgs.gov/sir/2007/5016/pdf/sir_2007-5016.pdf; <http://www.sdcounty.ca.gov/dplu/mscp/>; <http://www.sandiego.gov/planning/mscp/pdf/implagree.pdf>; phone interview with program participant in Fall 2008.

8. San Diego MSCP—Organization



Sources: <http://www.sdcounty.ca.gov/dplu/mscp/index.html>; http://pubs.usgs.gov/sir/2007/5016/pdf/sir_2007-5016.pdf; <http://www.sdcounty.ca.gov/dplu/mscp/>; <http://www.sandiego.gov/planning/mscp/pdf/implagree.pdf>; phone interview with program participant in Fall 2008.

9. Sandhills Task Force (STF)—Part 1 of 4

Location	<ul style="list-style-type: none"> Sandhills of Nebraska, a 19,000 sq. mile continuous grassland (or 12.5 million acres)
Species	<ul style="list-style-type: none"> Mountain plover, McCown’s longspur, Ferruginous hawk, Long-billed curlew, Lark bunting, Chestnut-collared longspur, Sprague’s pipit, Baird’s sparrow, Cassin’s sparrow (listed in exhibit in annual report), likely others as well. Recent projects focused on Long-billed Curlew, American burying beetle,
Goals	<ul style="list-style-type: none"> The goal of the Sandhills Task Force (STF) is to enhance the sandhills wetland-grasslands ecosystem in a way that sustains profitable private ranching, wildlife and vegetative diversity, and associated water supplies. Task Force Principal: “Good land stewardship sustains prosperous ranching operations while supporting native plant and animal communities.”
History	<ul style="list-style-type: none"> The creation of the Sandhills Task force was mainly rancher-driven. In 1991, one USFWS was challenged to impact conservation in the Sandhills. He brought in the Nebraska Cattlemen’s Association, and that organization selected ranchers to participate in the task force: “it was a hot time, then. Ranchers felt threatened by federal and state action and felt disenfranchised from the wildlife community. The original task force was composed of 8 ranchers and 5 organizations, and they developed a Sandhills Management Plan, a landscape level partnership between landowners, nonprofit groups, private entities, and state and federal governments. The approach not only considered wildlife but also the health and well being of people, land, and water. In 1993, the plan was signed by each member of the group and the FWS and the Sandhills Task Force moved forward to implement the plan. By 1996, the group became a non-profit corporation in the state of Nebraska and became instrumental in obtaining funds to finance conservation projects on privately owned lands, grazing workshops, and research projects.
Partners	<ul style="list-style-type: none"> Private ranchers: majority of Board seats (9 out of 17); also serve as ranching mentors to beginning ranchers funded by the STF Nebraska Cattlemen: Board seat The Nature Conservancy (TNC): Board seat Natural Resource Districts: Board seat County Commissioner: Board seat USFWS: funder and board seat Natural Resource Conservation Service: funder and board seat Other funders: Nebraska Game and Parks Commission (NGPC), Nebraska Environmental Trust Fund (NETF), EPA, Department of Environmental Quality (DEQ), Nebraska Board of Educational Lands and Funds (NBELF), Northern Shortgrass Prairie Partnership (NSPP) Roles unspecified: Nebraska Association of County Officials: Ducks Unlimited, University of Nebraska,

Source: <http://www.sandhillstaskforce.org/>; “Sandhills Task Force: Where People and Land are One,” Annual Report; phone interview program participants in Fall 2008.

9. Sandhills Task Force (STF)—Part 2 of 4

Tools

1. **Management and restoration agreements:** 10 year agreements outlining a conservation strategy by which landowner will manage their property for wildlife, grasslands health and diversity, and improvement of water quality and quantity. Financial and technical assistance provided to establish grazing systems, wetland restoration, and wildlife enhancement projects. The greater the wildlife benefits, the greater will be the amounts of cost-share to the landowner. E.g.,
 - Bartak Project includes cross fencing, a pipeline system, cedar removal, drilling a new well, all of which will allow landowner to implement a planned grazing system, calling for short periods of use followed by long periods of rest.
 - Ferguson Project splits a 1,100 acre ranch into small grazing units where timing, duration, and stock density can be used to boost range conditions and discourage tree growth.
2. **Conservation easements:** some have been purchased and held by the STF, but this is not their main tool as it can cause tension with other ranchers, but it can be a win-win for the ranchers and STF: “There is lots of opposition to easements. The Board vote unanimously not to pursue them, so we’re not actively soliciting. They require too much funding. There is less controversy if STF holds the easement [vs. a land trust or agency], but too many easements can have a backlash on STF credibility with the ranching community. A scenario under which we might do an easement is if a site is unique or we want to help a young family get anchored on the land by bringing down the cost of the land.”
3. **Fee title purchase:** “STF struggles with change-of-ownership decisions. We never want to take this step. We want to empower the ranchers, not compete with them. Ranchers are cautious about purchases or easements. Fee title is a list ditch tool for high priority land, if an easement is not possible. Our preferred tools are management agreements.
4. Education and outreach:
 - e.g., \$5,000 to the Grazing Land Coalition to expand a mentoring program focused on multi-species grazing and beginning ranchers;
 - Partial tuition costs for Sandhills ranchers interested in applying the “Total Grazing Manager” (TGM) to their operations (a software program designed to simulate forage production and animal demand).
 - STF staff on selection committee for Leopold Stewardship awards.
 - Beginning Ranchers program: e.g., TNC arranged a five-year lease with the option to buy for a ranching family with ranching mentoring provided by STF board members and a former TNC employee

Science

- Each project is given an individualized management, conservation, or restoration plan. From the rancher/board perspective, there are not scientific goals that drive the projects – projects are done at a landscape level in order to focus on landscape mgmt rather than the mgmt of a species that occurs in the landscape. The ecological / scientific methods are established by the agencies which then bring possible projects to the Board for funding consideration.

Program (see next)

- The STF is a formal **non-profit organization** governed by a 17-member **Board of Directors** which meets 4 times per year and is comprised of 9 ranchers and 8 representatives from government and nonprofits: “Voting rights on the Board were structured so that the number of ranchers outnumbered the agency/non-profit Board members. The role of board members is to serve in an advisory capacity rather than being involved in projects on the ground. The board sets the policy and establishes credibility for the task force in the Sandhills community. They ensure that all projects meet our dual criteria of addressing species and ranching. They look at the landscape as a landscape and look for common goals.”

9. Sandhills Task Force (STF)—Part 3 of 4

Program (cont.)

- There is one dedicated staff member, the Projects Coordinator.
- Sandhills Resource Conservation Fund allows the STF to facilitate payments to landowners and to assume responsibility of overseeing the completion of the projects funded.
- The program has a reliable system for measuring results by acres restored or enhanced per land or water type. As a nonprofit, financial statements are audited annually.
- **Outreach process:** “We pick a site by networking and through individual contacts. We don’t knock on doors. Our NRCS range person may make a recommendation, or the NE Game and Parks biologist will see an opportunity. We set up a booth at the Cattlemen’s Association annual meeting, and also rely on word-of-mouth and neighbor referrals.”
- **Project development process:** “It’s a rather unique process. We have good participation from the leading private lands people at the USFWS who help get the project proposal into a written form.”
- **Project review process:** “The landowner is the first to approve the project. Then the proposal goes to the rancher board member who owns land closest to the proposed project. That person can unilaterally say no or yes in which case the project goes straight to funding—we can move fast because we have cash available. However, the board member can also say “Yes, but needs to be discussed by Executive Board” in which case a NRCS range specialist and 2 biologists from USFWS and NE Games & Parks must review the proposal. We pick projects that funders will like.”

Funding

- In 2007, STF coordinated 14 projects with \$573k in total budgets (average budgets of \$40,000, range: \$6k to \$103k), with landowners contributing 30% of the costs (range: 17% to 49%, no minimum required, but have always had cost-share). STF contributed 14% of the total costs. NGPC provided 10%, NRCS provided 31%, and other funders (Department of Environmental Quality, Nebraska Board of Educational Lands and Funds, Northern Shortgrass Prairie Partnership) contributed 15% altogether.
- **Burlington Northern Santa Fe (BNSF)** railroad recently agreed to provide funding (\$32k in 2007) for wetland restoration projects that would positively impact the endangered American burying beetle. BNSF’s goal is to mitigate wetland acres associated with the endangered American Burying Beetle. This funding has not been used yet. Earlier in the relationship, STF refused to accept BNSF’s offer to purchase a conservation easement at 2-3x the value of the land. We believed they were trying to spread money around to get out of some litigation, and we didn’t want to drive up local land prices. By saying no to holding the easement for free, we stayed true to our mission. from BNSF that was priced at offer to purchase a conservation easement due to the fact that their motivations for purchasing the small easement were not parallel to the mission of the STF. We don’t want to be perceived as enabling bad behavior by taking mitigation money. Funders need to fund the full effect of their impacts. There are public relations issues to accepting funding from those forced to mitigate.”
- **Herbst Construction** will provide the STF funding for riparian restoration projects on the North Loup River (this funding is part of a settlement between Herbst Construction and the EPA. New cooperative agreement signed with EPA in 2007 earmarks funding to restore riparian areas
- Other 2007 funding sources and amounts: STF holds CDs worth \$675k that generated income of \$32k; Cooperative Agreements and grant funding (\$128k), Nebraska Environmental Trust Fund (\$250k), Private Stewardship Grants Program (\$45k), USFWS (\$20k through Partners for Fish and Wildlife), Nebraska Game and Parks Commission (NGPC, \$20k in funding through Habitat Stamps Funds).
- Program expenses in 2007: \$36k for habitat enhancement projects, \$3k for education and outreach, \$7k for research, and \$68k for operations.

9. Sandhills Task Force (STF)—Part 4 of 4

Results

- Since 2000, the STF has worked on approximately 15-20 projects per year, the majority of which address grazing plans, restoration projects, and education.
- Since program inception: 1,104 wetlands acres restored; 1,839 riparian acres restored; 38,187 upland acres enhanced; 7 stream miles restored; 3,942 wet meadow acres enhanced.

Success Factors

- **Landowner engagement:** The Cattlemen engaged private landowners that had proven leadership in the Sandhills community rather than engaging with extremes where there wouldn't be successful partnerships.
- **Focus on common ground:** The STF works on projects that provide the best overlap for conservation and ranching goals. "What's good for the birds is good for the cows. We're looking for the point where conservation meets economic viability. Now landowners are less fearful of working with endangered species. They don't see it as a threat, but as an opportunity. But we're not in the economic development business. We don't fund projects that only benefit ranching. Every project has to have conservation priorities that meet muster. We emphasize projects that have more wildlife benefit than ranching benefit. We occasionally have funded projects that only have conservation benefits with no ranching benefits, but those are not the most successful projects."
- **Move slow to build trust:** "We're taking nibbles at doable projects and have seen a far ranging spiderweb of results from working together. Our partners' overlap in goals has increased over the past 15 years as trust has built one project and one person at a time. Everyone's respectful of one another's opinions, even one voice in the wilderness. It's a tedious but unifying process."
- **Avoid controversy around public land:** "There is a lot of public land in the Sandhills where there are some controversial policies, and we've just stayed out of it. As a task force, we've limited our actions to 100% private land. We don't want to get bogged down in issues and fighting. But we have agency partners on the Board, so the task force won't be snuck up on my policy or regulations that won't be talked about at length by partners. There are no surprises, which is a big advantage."
- **Rancher-driven Board with legwork by agency / nonprofit partners:** "We have a mix of ranchers providing direction and policy, but they are full time employed on their ranches and don't do a lot of legwork for STF. Our nonprofit and agency partners do the legwork, like the science, but the landowners have the final authority"

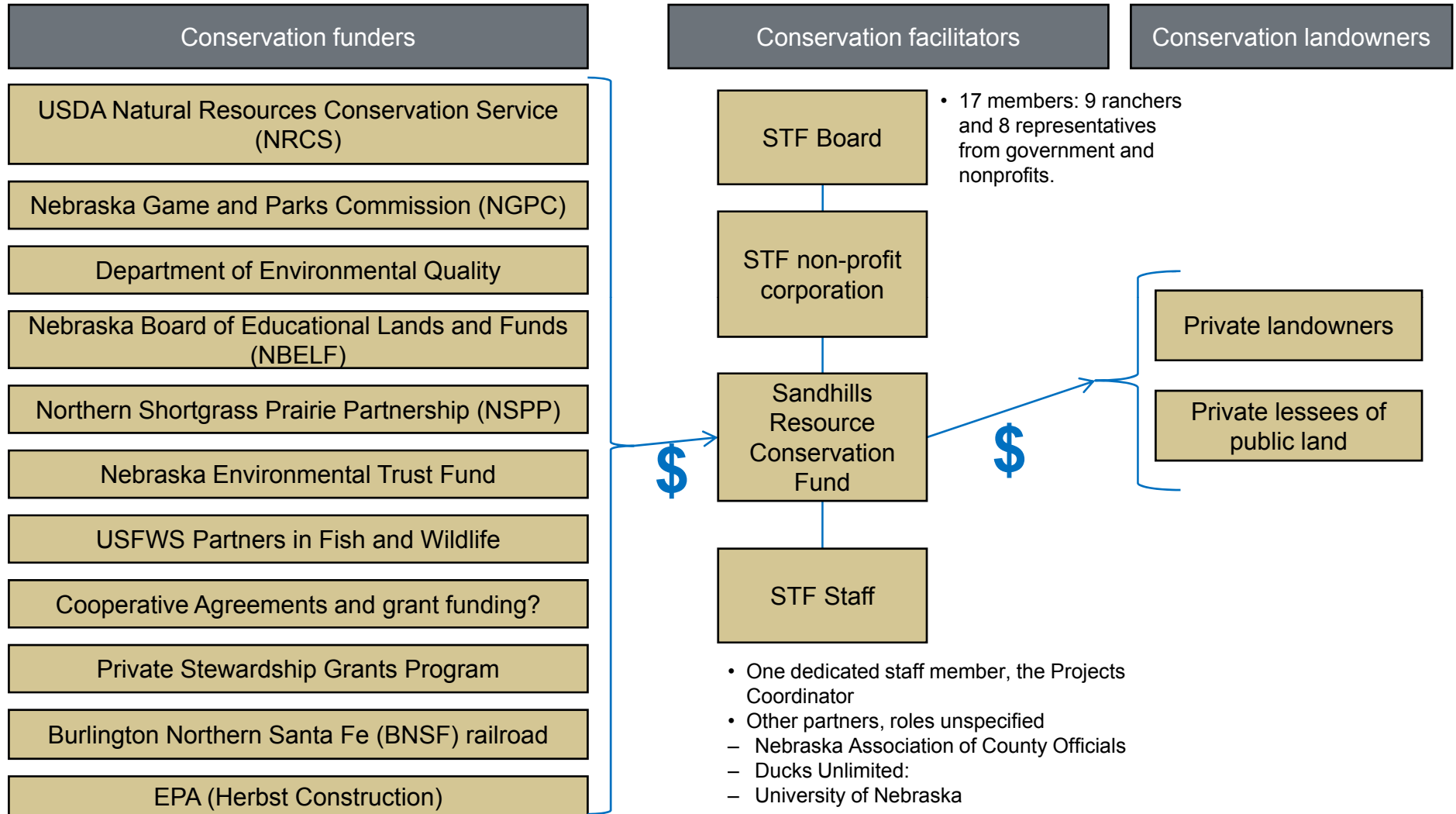
Challenges

- From an agency perspective, it can be sometimes difficult for agencies and non-profits to see the benefit to working through the task force, as sometimes it can be a cumbersome and long process to see results; however, there is more to gain by working together than by trying to achieve conservation as individual entities. The partnership allows each individual entity to accomplish things they could not do on their own.
- "Board members need to commit to the quarterly meetings and we don't reimburse for travel or even provide lunch!"

Lessons for CSP

- STF targets many of the same species as in the CSP.
- The majority of the programs and tools implemented by the STF are primarily to implement grazing methods as a means to reverse over grazing and to protect riparian areas. They do have success in working with landowners to create a baseline bird study, in which they too saw declining number of some CSP SAR bird species.

9. Sandhills Task Force (STF)—Organization



Source: <http://www.sandhillstaskforce.org/>; "Sandhills Task Force: Where People and Land are One," Annual Report; phone interview program participants in Fall 2008.

10. Shortgrass Prairie Initiative (SGPI)—Part 1 of 4

Location	<ul style="list-style-type: none"> Colorado portion of the Central Shortgrass Prairie ecoregion, modified to include all segments of I-25 within Colorado but outside of CSP (~27.5 million acres).
Species Targeted	<ul style="list-style-type: none"> 38 species targeted based on (1) species that occur on highway right of ways, (2) species have potential to be adversely impacted by CDOT activities, (3) there were reasonable expectations that the species could meet criteria for federal listing within the next 20 years without some level of conservation effort, and (4) partner needs and interests (e.g., species already listed). Species with federal status: Bald eagle (listed threatened at the time), interior least tern (federally endangered), piping plover (federally threatened), Colorado butterfly plant (federally threatened). Federal candidates: lesser prairie chicken, black tailed prairie dog (at the time), Arkansas darter, Mountain plover (proposed for listing at the time).
Goals	<ol style="list-style-type: none"> Streamline the “project-by-project” ESA Section 7 consultation process through advanced off-site habitat off-sets. Redirect resources from project-by-project clearance efforts (with generally low environmental values for prairie species) to a comprehensive, large-scale and pro-active species conservation effort. Alleviate the need for future Colorado prairie species listings under the ESA. Provide predictability in transportation project delivery, thereby creating efficiencies and cost-savings. Develop and utilize a scientific impact assessment methodology focused on habitat (rather than species individuals) and estimated potential impacts using the best available data and expert opinion. Conserve enough high-quality prairie habitat through perpetual conservation easements to offset permanent habitat loss. Secure a favorable and cost-effective mitigation ratio for CDOT, while providing higher conservation benefits than project-by-project on-site mitigation.
History	<ul style="list-style-type: none"> 2000: CDOT led a coalition of partners to create a pilot project to respond to complex regulatory and project management needs requiring the attention of 3 FTEs at CDOT and USFWS. CDOT feared that listing of even one additional species would cause costly project delays and increase staffing needs by another 25%. Furthermore, CDOT realized that the existing project-by-project consultation and mitigation approach was resulting in small-scale habitat projects of questionable environmental value. SGPI was launched and team members began approaching landowners with whom TNC already had relationships. 2002: Impact assessment completed. 2003: Impact assessment, programmatic biological assessment (i.e., defined under NEPA), and conservation strategy document submitted to USFWS Between May 2003 and July 2004: USFWS issued their biological opinion that said they agreed with SGPI’s assessment and conservation strategy ~2004(?): CDOT issued RFP for conservation services; TNC applied; both parties entered into agreement to implement conservation strategy with CDOT funding. Then TNC was responsible for acquiring, managing, and monitoring the easements. 2008: almost all conservation easement transactions completed, except for a prairie chicken easement still to be signed. SGPI disbanded as a working team.

10. Shortgrass Prairie Initiative (SGPI)—Part 1 of 4

Partners

- The Federal Highway Administration (FHWA), Colorado Department of Transportation, US Fish and Wildlife Service (USFWS), The Nature Conservancy (TNC), Colorado Division of Wildlife (CDOW), Colorado Natural Heritage Program (CNHP), Venner Consulting (project lead), Colorado Department of Natural Resources (advisors), and Rocky Mountain Bird Observatory (advisors).

Tools

- **Hybrid mitigation efforts including both off-site mitigation and on-site best management practices:** From the beginning, the project partners anticipated that the conservation strategy would be based primarily on perpetual conservation easements on private lands. However, this strategy wasn't considered feasible or effective for some target species (e.g., foothills species where land values were too high for conservation easements to be feasible for CDOT's budget; fishes and other aquatic species where control of water may be needed for full conservation). Therefore, best management practices were incorporated into the program to address the needs of species for whom conservation may not be reliably achieved through easements on terrestrial habitats.

Science

- Calculated acres of "presumed presence" for species and impact by CDOT using spatial GIS analysis (using CNHP and TNC data). Maps were reviewed by experts for quality and corrected, as advised. Team assumed total habitat loss in CDOT's right-of-ways and calculated the number of acres of presumed habitat lost per species over the next 20 years (assumed 22% of all acres impacted in the future = 15,160 acres). Team agreed on a one-to-one mitigation ratio for easements on suitable habitat. Team assumed that all suitable habitat was occupied and that all suitable habitat in the ROW would be lost (over-estimate, since all habitat is not occupied and some impacts would be temporary). CDOT accepted these conservative assumptions to ensure that they would meet mitigation needs.

Program

- During the course of the project, the core working team was made up of representatives of each participating organization. There was no steering committee or advisory group as each team member individually reported back to his or her organization for approval as needed.
- The regulatory team was formed to investigate the question of the use of assurances for species not listed or candidates.
- The site identification panel created the criteria that should be met by landowners wanting to participate in the program. The team decided not to put out an RFP and create a competitive process, and instead work within existing relationships with private landowners.
- The formal partnership team is no longer in existence in the form that it took during the impact analysis and development of the conservation strategy. At that time, there was a core project team, a regulatory team, and a Site Identification Panel (see diagram on slide 4). Now that conservation easement transactions are almost completed (the Lesser Prairie-chicken easement is nearing completion), the program is essentially comprised of an on-going monitoring and reporting relationship among CDOT, TNC, CNHP, and USFWS (mainly one-to-one interactions with TNC ultimately responsible for easements and CDOT ultimately responsible for impacts tracking and reporting to USFWS).
- CNHP has been contracted by TNC to conduct annual vegetation monitoring on the easements, and TNC reports on condition of habitats to USFWS annually. Once adequate baseline data are collected and monitoring methods finalized, it is anticipated that future easement monitoring and reporting may become less frequent than annually.
- Aside from project impact reporting to the USFWS, CDOT basically stepped out of a direct, on-going role in the "mitigation" component of the program. Once CDOT had delivered the cash to complete the conservation service transactions, TNC became the entity responsible for maintaining the viability of the habitat and have an ongoing relationship with USFWS.

10. Shortgrass Prairie Initiative (SGPI)—Part 1 of 4

Funding

- CDOT funded (1) all the easement acquisitions (~\$3.7 m), (2) a stewardship fund for management and monitoring (\$400K) which TNC uses to subcontract to CNHP, (3) CNHP's impact assessment, expert consultation, site visits, evaluations, documentation, and general project participation (\$209,000), and Venner Consulting for project management (once project lead left CDOT for private practice).
- CDOT also funds one FTE at USFWS but that is not completely related to SGPI
- TNC provided significant in-kind support in staff time, as did other partners to lesser extents

Results

- The project provided USFWS programmatic clearance for CDOT road-widening and maintenance activities on the existing road network in the eastern plains through 2022.
- Project secured conservation easements on 29,880 acres (not including the Lesser Prairie-chicken site, which is currently still in negotiation)
- Project also defined on-site best management practices and created management plans per species, as needed.
- Biological opinion received from USFWS for efforts for Bald Eagle (no longer in effect, since species was de-listed). If any of the other target species become listed, then the biological opinion would come back into effect. CDOT benefits from the existence of the biological opinion because they can proceed with the maintenance and ROW work required without the need for additional consultation or review.
- If any of the species come up for discussion for listing in the future, the existence of this conservation program would be taken into account by the USFWS in the decision of whether listing is warranted. USFWS agreed that CDOT will not have to do additional species surveys or impact analysis if a species under the agreement is listed. They did not agree that off-site mitigation efforts in the SGPI would off-set future mitigation requirements.
- Relationships with private landowners who did not end up participating in this project continue to grow, opening the door for additional conservation opportunities in the future.

Success factors

- **Committed, passionate team members:** CDOT, Federal Highway Administration (FHWA), and USFWS representatives on the team were passionate about the project's goals and willing to try to innovate new tools for declining species that were not yet candidates or listed as endangered or threatened. USFWS tried hard to get CDOT formal assurances, which kept CDOT interested in the project. CDOT did not end up getting formal assurances from USFWS but CDOT was willing to work around those uncertainties because of the goodwill that was generated from working together on trying to innovate assurances for conservation of non-candidate and non-listed species.
- **TNC's pre-existing relationships and expertise in working with private landowners:** the project did not have to start from scratch in approaching private landowners for participation. TNC staff are skilled in simplifying the complex biodiversity and scientific underpinnings of the project so as to communicate well with landowners.
- **Project agreements and regulatory documents carefully anticipated the needs of all the parties – agencies, landowners and implementing partners, and had the right people from each organization at the table:** The project made sure that agencies were assured adequate benefits for participation; landowners were adequately insulated from federal contact and regulations; while implementing partners were adequately empowered to pursue conservation outcomes while protected from undue liability for unforeseeable impediments to success. However, landowners were not given formal assurances.
- **Use of sound science methodology and conservative assumptions:** This convinced the team participants that the project would meet its goals.
- **The project helped meet an imperative agency goal** (streamlining ESA compliance) for CDOT.

10. Shortgrass Prairie Initiative (SGPI)—Part 1 of 4

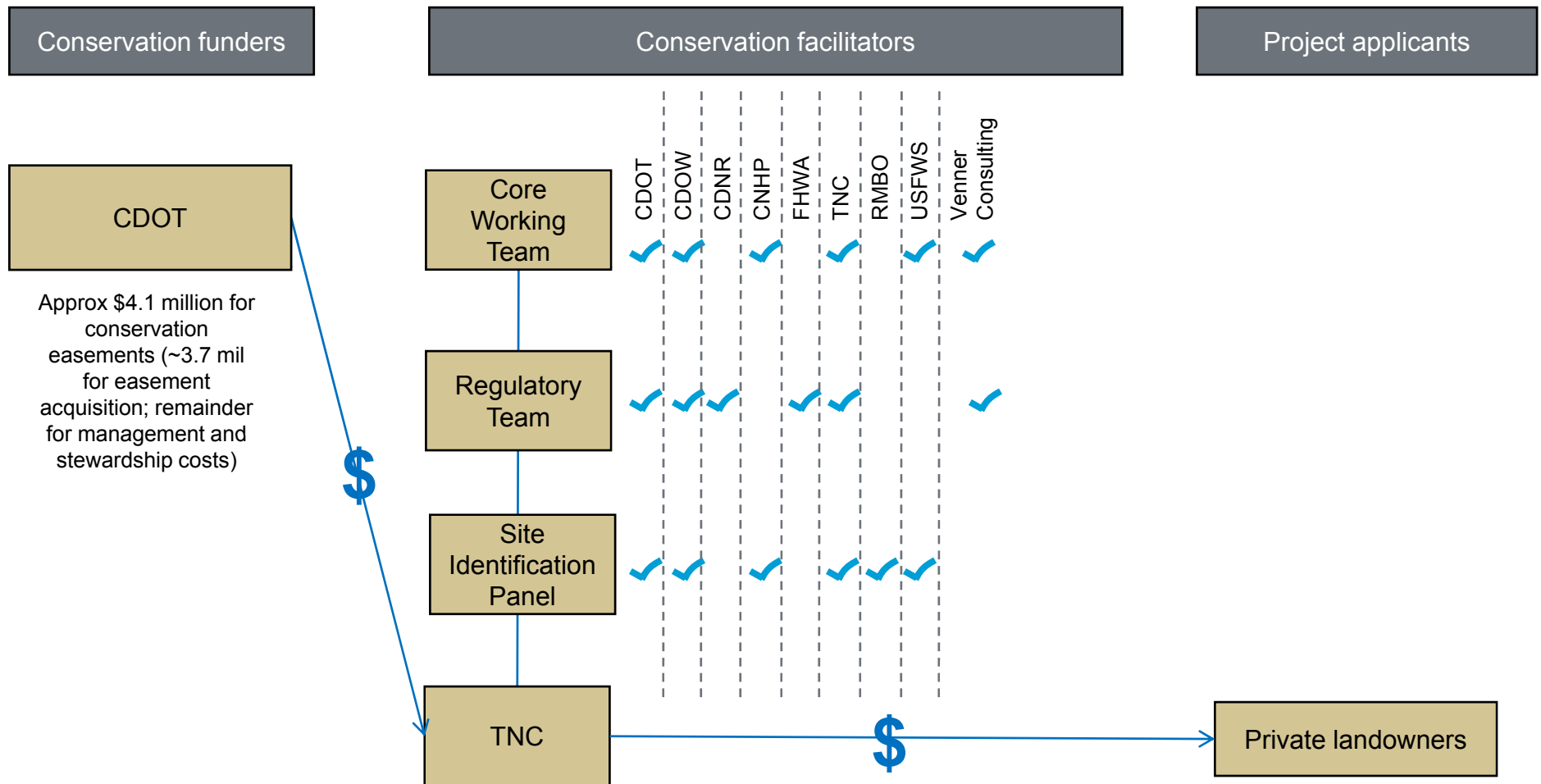
Challenges

- **Management agreements and extended timelines were barriers for some landowners:** Interested landowners were not only asked to put conservation easements on their land but they were also asked to comply with management plans. This factor, combined with lengthy and complex negotiations, caused some landowners to back out of conservation easements.
- **It is extremely important to pick the right organization to manage the landowner relationships in each geographic region.**
 - “The SGPI had a significant early failure with the Beamon prairie dog easement. This parcel was an outstanding prairie dog conservation opportunity of statewide significance. CDOT and CDOW felt that a wildlife easement purchased with CDOT funds should fall under their mutual purview. Unfortunately neither CDOT nor CDOW had experience working with landowners in Bent County, where prairie dog conservation is extremely controversial. CDOW and CDOT held a public forum about their plan to purchase an easement on the Beamon parcel, alarming the local community and putting the landowner in an untenable position. Not only did the transaction fall apart, but the County Commissioners were so alarmed that they passed a resolution fining landowners thousands of dollars for every prairie dog that crossed onto a neighboring property and established residency.”
 - In a different region: “...in some communities The Nature Conservancy is a threatening and unwelcome presence, whereas CDOT is very neutral. It would have been beneficial to use CDOT’s name in newspaper ads TNC ran to solicit interested landowners, and then later introduced TNC as an implementing partner. Likewise, CDOW has more expertise than TNC in some single-species issues such as Lesser prairie chickens. Yet TNC did not actively engage local DOW personnel in helping to identify Lesser prairie chicken parcels until very late in the project. However, in other situations, CDOW, as with the USFWS, is very threatening to landowners and should not be visible at all.”

Lessons for CSP

- Many of the species targeted for conservation in this CDOT project are also on the SPICE SAR list. Therefore a great deal of the science from the impacts assessment and biodiversity scorecard may be leveraged (except for the Plains Leopard Frog, the swift fox, and the Woodlands bird group which are included in SPICE).
- Voluntary, pro-active program very similar to SPICE. CDOT did not receive official credit or CCAA but rather a “deposit in the bank of goodwill” (nothing legal)
- Since the rare plants in the SPICE project mainly occur on Fort Carson, there may be lessons from the hybrid approach used by SGPI which included both off-site mitigation and on-base best management practices.
- CDOT originally hoped to complete all the science analysis and secure all conservation easements by one year. Instead, the analysis took two years and securing the conservation easements is still not finished.
- The project team tried to innovate the USFWS assurances for CDOT for non-candidate and non-listed species but were not successful. The project did not attempt to secure formal assurances for private landowners.

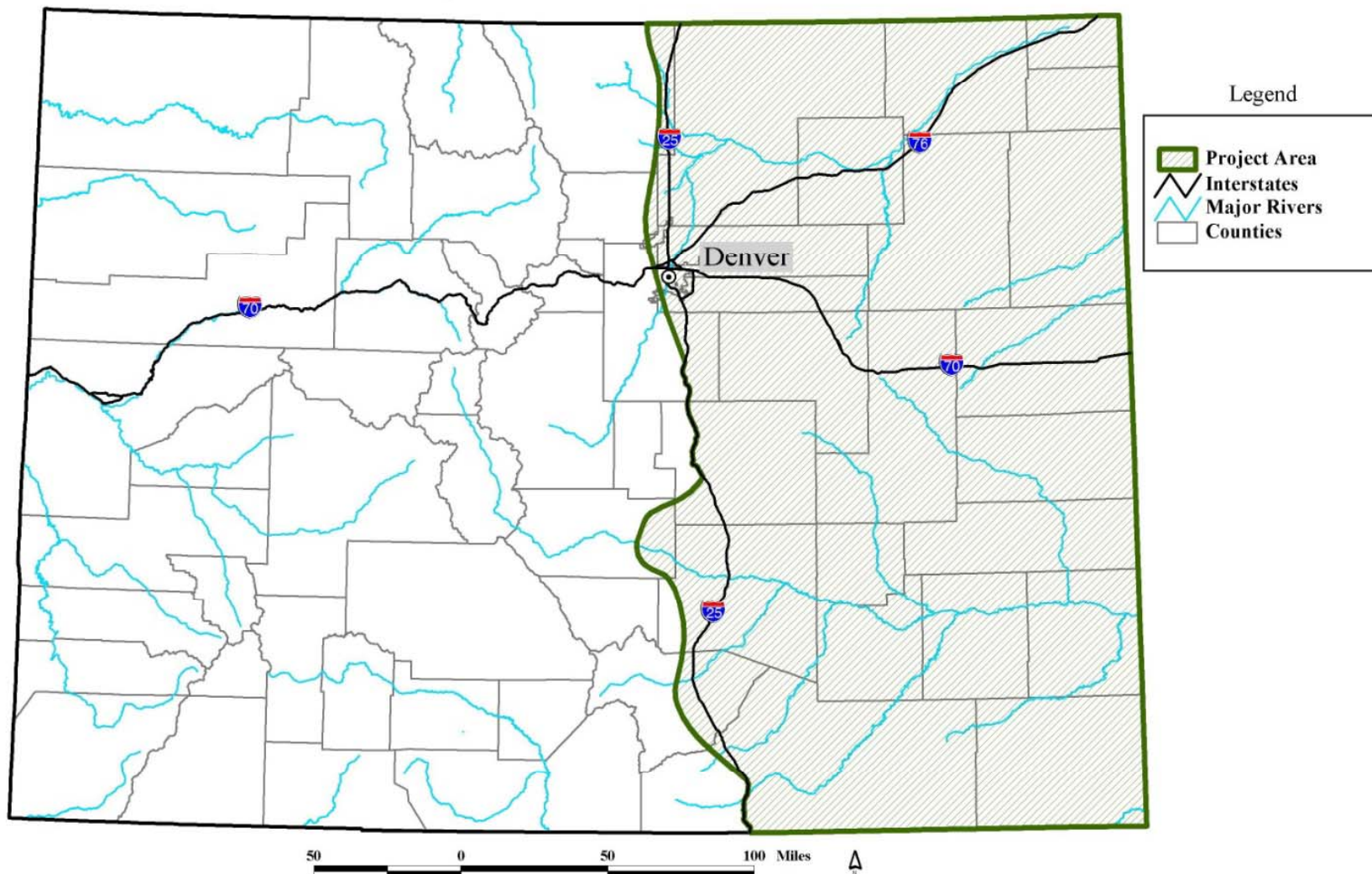
10. Shortgrass Prairie Initiative (SGPI)—Organization



Sources: Colorado Department of Transportation Shortgrass Prairie Initiative Lessons Learned —External Partners Document (by Nancy Smith, TNC); interview with program participant in Fall 2008.

10. Shortgrass Prairie Initiative (SGPI)—Geographic Scope

Project Area in Colorado



Sources: Colorado Department of Transportation Shortgrass Prairie Initiative Lessons Learned —External Partners Document (by Nancy Smith, TNC); interview with program participant in Fall 2008.

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Appendix C

Acronyms



Acronyms (1 of 2)

- ACUB = Army Compatible Use Buffer program
- AFA = Air Force Academy
- BAFB = Buckley Air Force Base
- BMC = Beh Management Consulting
- BOCC = Birds of Conservation Management Concern
- BRSP = Brewer's Sparrow
- BTPD = Black-tailed Prairie Dog
- BUOW = Burrowing Owl
- CACD = Colorado Association of Conservation Districts
- CASP = Cassin's Sparrow
- CCAA = Candidate Conservation Agreement with Assurances
- CCA = Candidate Conservation Agreement
- CCALT = Colorado Cattlemen's Agricultural Land Trust
- CCLO – Chestnut Collared Longspur
- CDOA = Colorado Department of Agriculture
- CDOT = Colorado Department of Transportation
- CDOW = Colorado Division of Wildlife
- CFB = Colorado Farmers Bureau
- CIG = Conservation Innovation Grant
- CNHP = Colorado Natural Heritage Program
- CO = Colorado
- COL = Colorado Open Lands
- CRP = Conservation Reserve Program
- CSI = Cooperative Sagebrush Initiative
- CSP = Central Shortgrass Prairie
- CSU = Colorado State University
- DECAM = Directorate of Environmental Compliance and Management
- DoD = Department of Defense
- EDF = Environmental Defense Fund
- EPA = Environmental Protection Agency
- ESA = Endangered Species Act
- FEHA = Ferruginous Hawk
- FTC = Fort Carson
- GCPEP = Gulf Coast Plains Ecosystem Partnership
- GIS = Geographic Information Systems
- GRSP = Grasshopper Sparrow
- INRMP = Integrated Natural Resource Management Plans
- KS = Kansas
- LABU = Lark Bunting

Acronyms (2 of 2)

- LABU = Lark Bunting
- LBCU = Long-Billed Curlew
- LOSH = Loggerhead Shrike
- MASS = Massassauga
- MB = Migratory Bird program
- MCLO = McCown's Longspur
- MOPL = Mountain Plover
- MOU = Memorandum of Understanding
- MSCP = San Diego Multi-Species Conservation Program
- NGO = Non-governmental organization
- NE = Nebraksa
- NM = New Mexico
- NPS = National Park Service
- NRCS = Natural Resources Conservation Service
- O&G = oil and gas
- OBТ = Ornate Box Turtle
- OK = Oklahoma
- PCD = Pueblo Chemical Depot
- SWFO = Swift Fox
- PCMS = Pinon Canyon Maneuver Site
- PLJV = Playa Lakes Joint Venture
- PLT = Palmer Land Trust
- RCS = Recovery Credit System
- REPI = Readiness and Environmental Protection Initiative
- RMFU = Rocky Mountain Farmers Union
- RMBO = Rocky Mountain Bird Observatory
- RFP = Request for Proposal
- SAFB = Schriever Air Force Base
- SAR = Species at Risk
- SLB = State Land Board
- SGPI = Shortgrass Prairie Initiative
- SPP = Shortgrass Prairie Partnership
- STF = Sandhills Task Force
- TNC = The Nature Conservancy
- TX = Texas
- USDA = U.S. Department of Agriculture
- USFS = U.S. Forest Service
- USFWS = U.S. Fish & Wildlife Service
- WAFB = Warren Air Force Base
- WAP = Wildlife Action Plan
- WY = Wyoming