North American Grassland Priority Conservation Areas:

Technical Report and Documentation

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Executive Summary

This report describes the process followed to identify grasslands priority conservation areas (GPCAs) within North America's Central Grasslands, an ecosystem considered among the most threatened in the continent and the world. The area addressed comprises North American short, mixed and desert grasslands. The **goal** of the GPCAs initiative is twofold: to provide guidance of where conservation action is immediately needed due to the trinational importance of the sites; and to offer a geographic rationale for developing a trinational cooperation network of institutions and organizations interested in conserving the grasslands ecosystem as a whole. **GPCAs** are here defined as areas of tri-national importance due to their ecological significance and threatened nature, which are in need of international cooperation for their successful conservation. This initiative is meant to complement ongoing grasslands conservation efforts that identify priorities within each country.

The GPCA selection **process** relied primarily upon two main components: 1) Pre-workshop integration of ca. 120 GIS data layers, including known grasslands priority-setting initiatives, and a gap analysis thereof to identify regions where priority areas are unreasonably lacking; 2) a workshop involving 36 experts from diverse disciplines to identify the GPCAs (November, 2004) assisted by a consensus GIS-based decision support system. The significance of the areas was further ascertained by assessing 20 key grassland bird and mammal species.

At the workshop participants identified and described in total **55 GPCAs:** 26 in the Northern Region, 16 in the Central Region and 13 in the Southern Region, comprising 10.5% of study area. Out of these, 28 were selected by the participants as their top priority GPCAs (6.3% of study area).

This workshop was jointly **organized by** the Commission for Environmental Cooperation of North America (CEC) and The Nature Conservancy (TNC). Identifying priority conservation areas is one of several grasslands related initiatives sponsored by the CEC as part of the Strategic Plan for North American Cooperation in the Conservation of Biodiversity, embraced by Canada, Mexico and the United States.

Resúmen Ejecutivo

Este reporte describe el proceso seguido para identificar las áreas de los pastizales prioritarias para su conservación (GPCAs, por sus siglas en inglés) dentro de los pastizales centrales de América del Norte, considerado como uno de los ecosistemas más amenazados del continente y del mundo. La región geográfica considerada dentro de este reporte incluye los pastizales cortos, mixtos y desérticos. Los **objetivos principales** de la iniciativa GPCA son: proveer elementos para orientar en qué áreas se requieren acciones de conservación debido a su importancia trinacional; y proveer el fundamento geográfico para desarrollar una red para la cooperación entre instituciones y organizaciones interesadas en conservar al ecosistema de los pastizales como un todo. Las **GPCAs** fueron definidas en este reporte como aquellas áreas de importancia trinacional que debido a su importancia ecológica y amenazas necesitan de la cooperación internacional para su exitosa conservación. Esta iniciativa pretende complementar diversos esfuerzos de conservación de pastizales en marcha, en los cuales se identifican prioridades a nivel nacional.

El **proceso** de selección de las GPCAs dependió de dos aspectos. El primero consistió en la integración de cerca de 120 capas de información en SIG, incluyendo áreas prioritarias identificadas por otras iniciativas, y un "análisis de huecos" asociado para identificar regiones donde no se hubieran identificado áreas prioritarias.El segundo consistió de un taller para identificar las GPCAs, el cual contó con la participación de 36 expertos de diversas disciplinas apoyados con un sistema de apoyo para la toma de decisiones con base en el SIG. La importancia de las áreas identificadas se determinó con base en la evaluación de 20 especies clave de aves y mamíferos.

Durante el taller los participantes identificaron y describieron **55 GPCAs** : 26 en la región norte, 16 en la región central y 13 en la región sur, abarcando juntas el 10.5% del área total considerada. Del total de GPCAs, los participantes escogieron 28 áreas consideradas como las de mayor prioridad (abarcando 6.3% del área estudiada).

Este taller fue **organizado** conjuntamente por la Comisión para la Cooperación Ambiental de América del Norte (CCA) y The Nature Conservancy (TNC). La identificación de áreas prioritarias para su conservación es una de varias iniciativas relacionadas con los pastizales, facilitada a través de la CCA como parte de la implementación del Plan Estratégico para la Cooperación en América del Norte para la Conservación de la Biodiversidad, auspiciado por Canadá, México y los Estados Unidos.

Résumé

Le présent rapport décrit le processus que nous avons adopté pour déterminer les aires de conservation prioritaires des prairies (ACPP) dans la région écologique des prairies centrales de l'Amérique du Nord, écosystème qui est considéré comme l'un des plus menacés du continent nord-américain et du monde entier. La zone étudiée est composée de prairies d'herbes courtes, mixtes et désertiques. L'initiative de délimitation des ACPP avait un double **but** : donner des indications sur les aires où des mesures de conservation immédiates s'imposent, en raison de leur importance à l'échelle trinationale; fournir une assise géographique pour la création d'un réseau trinational de coopération réunissant des institutions et des organisations qui s'intéressent à la conservation de l'ensemble de l'écosystème des prairies. Les **ACPP** sont définies dans le présent document comme des aires qui ont une importance trinationale, du fait qu'elles présentent un intérêt écologique majeur et qu'elles sont menacées, et dont la conservation nécessite une coopération internationale. Cette initiative vise à compléter les efforts déjà déployés pour conserver l'écosystème des prairies, et dans le cadre desquels des priorités ont été établies dans chaque pays.

Le **processus** de sélection des ACPP comportait deux grandes étapes : 1) des travaux préparatoires à la tenue d'un atelier, qui ont consisté à intégrer dans un système d'information géographique (SIG) environ 120 couches de données sur la zone étudiée, y compris des renseignements sur les initiatives connues d'établissement de priorités, et à effectuer une analyse de carence afin de déterminer les régions présentant un manque indu d'aires prioritaires; 2) la tenue, en novembre 2004, d'un atelier rassemblant 36 experts issus de disciplines variées, qui ont délimité les ACPP en ayant recours à un système d'aide à la décision par consensus basé sur le SIG. L'importance des aires choisies a été vérifiée au moyen d'une évaluation de 20 espèces clés d'oiseaux et de mammifères des prairies.

Au cours de l'atelier, les participants ont délimité et décrit **55 ACPP :** 26 dans la région du Nord, 16 dans la région du Centre et 13 dans la région du Sud, représentant au total 10,5 % de la zone étudiée. Ils ont ensuite sélectionné 28 de ces aires comme étant des ACPP à priorité absolue (6,3 % de la zone étudiée).

Cet atelier a été **organisé** conjointement par la Commission de coopération environnementale (CCE) et l'organisation *The Nature Conservancy* (TNC). La délimitation d'aires de conservation prioritaires est l'une de plusieurs initiatives concernant les prairies que la CCE soutient dans le cadre de son Plan stratégique concerté pour la conservation de la biodiversité en Amérique du Nord, qui a été adopté par le Canada, les États-Unis et le Mexique.

Preface: toward a grassland conservation network

This report flags the initiation of an initiative jointly facilitated by the **Commission for Environmental Cooperation** (CEC) and **The Nature Conservancy** (TNC) to develop a Conservation Network for the Central Grasslands of North America; a biome considered among the most threatened in the continent and worldwide.

Identifying priority conservation areas (PCAs) is one of several grasslands initiatives developed by Canada, Mexico and the United States through the Commission for Environmental Cooperation (CEC) of North America as part of its *Strategic Plan for North American Cooperation in the Conservation of Biodiversity*.

We have realized the importance of developing a grasslands conservation network over the past several years of managing several collaborative initiatives to conserve the species and ecosystems unique to the short, mixed-and desert grasslands of North America through both our organizations. Given the scope and scale of the Central Grasslands of North America, we believe that this higher level of cooperation is required to protect our shared grassland systems and its wildlife. The network's main purpose will be to enhance and strengthen the conservation of biodiversity in critical habitats within North America's Central grasslands. It is envisioned that this will be accomplished by highlighting biological and socio-economic linkages, promoting information exchange, and by encouraging complimentary regulatory and voluntary conservation approaches.

The information contained within this report offers a solid foundation developed by grasslands experts from NGOs and governments from Canada, Mexico and the United States, who generously offered their knowledge and wealth of experience to identify those areas within our shared grassland biome that, based upon their tri-national ecological significance, are critical for long-term conservation success.

We feel confident that the Grasslands Priority Conservation Areas (GPCAs) herein identified can now serve as initial focal points to demonstrate the value of tri-national cooperation in achieving a common goal, namely conserving healthy ecosystems for the well being of the species we share..

Efforts like these highlight the need to further expand the number and spectrum of organizations collaborating on grassland conservation. Thus, through the network we will constantly strive to involve all key players engaged in conserving North America's central grasslands.

Hans Herrmann, Commission for Environmental Cooperation
Jürgen Hoth, Commission for Environmental Cooperation
Bob McCready, The Nature Conservancy
Bob Unnasch, The Nature Conservancy

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1. Introduction – by Jason Karl and Jürgen Hoth

The central grasslands of North America represent one of the continent's largest biomes and harbor a rich biological diversity as well as many grassland endemic species. Human-dominated disturbances have endangered this ecosystem across its entire range to the point of it currently being considered among North America's most endangered, a category shared worldwide by the grasslands as a biome (Samson and Knopf 1994; World Resources Institute 2000). Scott et al. (2001) found the highly productive soils and relatively gentle terrain of the central grasslands to be one of the least protected landscapes in the United States. Noss et al (1995) classified several of the central grassland types as endangered or threatened ecosystems. While grassland ecosystems have been under pressure from some human disturbances for over 150 years (e.g., livestock grazing, agricultural conversion), other threats are now becoming more pervasive across the biome (e.g., invasive species, urban sprawl/residential development, oil and gas extraction, and wind-power development). These threats are not only resulting in the conversion of native grasslands to other land cover types, but are also degrading the condition of remaining grasslands. In spite of their importance and the level of threat the grasslands as an ecosystem is poorly represented by protected areas compared to other North American ecosystems (Gauthier and Wiken 1998). The case for concentrating cooperation efforts in the grasslands is further supported by recent studies which single out this North American ecosystem, both in a worldwide comparison of the loss of species (Ceballos and Ehrlich 2002), and for its potentially high species' turn-over (sum of colonizations and extinctions) under climate change (Peterson et al. 2002).

Ranging between 20° and 50° latitude, the central short- and mixed-grass prairies are the only continuous terrestrial ecological system to span Canada, the United States, and Mexico. To date, the majority of conservation planning and action has been at local or regional scales and thus has mostly occurred within one nation or around the borders. Increasingly, conservationists are recognizing that bi- or tri-national cooperation, planning, and action is necessary to conserve the full range of the central grassland's elements and processes at all scales (Samson and Knopf, 1994; Gauthier et al. 2003).

Recognizing that conservation of grassland biodiversity could be enhanced by the establishment of bi- and tri- national partnerships, The Commission for Environmental Cooperation (CEC) and The Nature Conservancy (TNC), began coordinating efforts to develop a conservation network for the central grasslands of North America in 2004. The goal of this network is to further grassland conservation by creating and strengthening relationships and encouraging the exchange of information between existing and planned grassland priority areas in Canada, the United States and Mexico as a means to strengthen conservation action for grasslands species and habitats. A first step in building this network is the identification of priority conservation areas of tri-national significance.

Hence over November 8-10, 2004, the CEC and TNC convened a tri-national workshop aimed at identifying grasslands priority conservation areas (GPCAs) throughout North America's central grasslands. This report describes the process of identifying these GPCAs - areas of tri-national importance due to their ecological significance and threatened nature, which are in need of bi- and tri-national cooperative action for their successful conservation

This document, therefore, serves three main purposes: First, it presents a gap analysis based upon previous analyses and priority-setting efforts in the study area; second, it presents the resulting

GPCAs, documenting the process by which they were identified by workshop participants; and lastly, it describes in detail the GIS and tabular data resulting from the workshop.

The GPCAs initiative is complemented by a parallel process promoted through the CEC, aimed at promoting trinational collaboration working with grasslands target species through the *North American Conservation Action Plans* (NACAPs). The initial species considered under the NACAPs are the burrowing owl, the ferruginous hawk and the black tailed prairie dog. Together these area and species-oriented multi-institutional collaborative approaches shall provide a cohesive trinational framework of opportunities to enhance the conservation effectiveness of any single North American country.

2. Geographic and Taxonomic Context – by Jason Karl

2.1 Study Area

The goal of this project was to define priority conservation areas that protect many aspects of biological diversity in central North America's short- and mixed-grass prairies and desert grasslands. While exact boundaries may be subject to interpretation, the short- and mixed-grass prairie regions generally range from the southern portions of Alberta, Saskatchewan, and Manitoba in Canada, through the central US states and down into the Chihuahuan Desert in Mexico. Consistent with other CEC grassland ecosystem projects (e.g., Blancher 2003), the study area for this project was defined by Bird Conservation Regions (US North American Bird Conservation Initiative Committee 2000) delineating the central grasslands of North America (Table 1, Figure 1). Schmidt (1990) defined the Mega-Chihuahuan Desert as including much of the central grasslands and makes a case for considering the central grasslands as a "natural" unit. Total size of the study area was 264,860,000 ha (654,500,000 ac).

Table 1. Bird Conservation Regions (BCRs) comprising the study area for the Grassland Priority Conservation Areas project

BCR Number	BCR Name	Size of BCR (ha)	Amount of native grassland (ha)	% of native grassland
11	Prairie Potholes	87,690,000	13,590,000	15.5%
17	Badlands and Prairies	36,770,000	24,770,000	67.4%
18	Shortgrass Prairie	38,470,000	18,680,000	48.5%
19	Central Mixed Grass Prairie	39,730,000	15,890,000	40.0%
35	Chihuahuan Desert	57,360,000	8,700,000	15.2%
46	Sur Del Altiplano Mexicano	4,850,000	560,000	11.5%

The study area as defined by the central grassland BCRs is intended only as an approximate delineation of the central North American grasslands and a boundary for conducting initial analyses. Participants of the GPCA workshop were asked to concentrate in this study area boundary; however they were not constrained to it but were asked to justify any areas included outside of the boundary.

BCRs, coarse-scale ecological units created to provide a consistent framework for bird conservation in North America, are only one of many possible ecologically-based units for defining the boundaries of North America's short- and mixed-grass prairies, and desert grasslands. The CEC

level 2 ecoregions (CEC 1997) divide the central grasslands into eight ecoregions that roughly correspond to the BCRs used to define the project area (Table 2, Figure 2). Because the GPCAs were intended to represent all aspects of grassland biological diversity, not just birds, and because the Level 2 ecoregions more finely divide the study area (and can be tessellated into finer ecoregions), analysis results in this report will be reported by Level 2 ecoregion where appropriate.

Native Grasslands of various compositions and ecological conditions make up around 57.5% of the study area (Table 3, Figure 3). Lands converted to agricultural uses are the second largest land cover type, comprising 26.0% of the study area. Closed shrublands, occurring primarily in the western and southern portions of the study area, account for approximately 10% of the total area.

Table 2. Level 2 Ecoregions and native grasslands within the study area.

Ecoregion Number	Ecoregion Name	Area (ha)	Ecoregion Hectares in Study Area	% Ecoregion in Study Area	Native/ Natural Grasslands (ha) in Ecoregion	% Native Grassland in Ecoregion
6.2	Western Cordillera	2,029,000	2,029,000	100.0%	1,504,000	74.1%
9.2	Temperate Prairies	77,900,000	48,891,000	62.8%	3,493,000	7.1%
9.3	West-Central Semi-Arid Prairies	86,399,000	79,793,000	92.4%	39,089,000	49.0%
9.4	South-Central Semi-Arid Prairies	96,347,000	71,692,000	74.4%	28,815,000	40.2%
10.4	Chihuahuan Desert	54,435,000	53,875,000	99.0%	7,972,000	14.8%
12.2	Mexican High Plateau	4,979,000	4,474,000	89.9%	479,000	10.7%
13.1	Upper Gila Mountains	1,283,000	1,281,000	99.9%	544,000	42.5%
13.3	Eastern Sierra Madre	5,303,000	1,939,000	36.6%	47,000	2.4%

Table 3. Proportions of general land cover types within the study area from Hansen et al. (1998) 1km AVHRR land cover classification.

Land Cover Type	Hectares in Study Area	Proportion of Study Area
Grassland (native and non-native)	99,279,000	37.5%
Agricultural Lands	68,891,000	26.0%
Closed Shrubland	32,497,000	12.3%
Open Shrubland	29,522,000	11.1%
Wooded Grassland	23,555,000	8.9%
Woodland	6,219,000	2.3%
Water	1,741,000	0.6%
Bare Ground	1,201,000	0.5%
Evergreen Coniferous Forest	820,000	0.3%
Urban/Developed	596,000	0.2%
Mixed Forest	286,000	0.1%
Deciduous Broadleaf Forest	135,000	0.0%
Evergreen Broadleaf Forest	117,000	0.0%

2.2 Grassland Focal Elements and Species

The goal of the GPCA workshop was to identify continental grassland priority areas and begin to build networks and partnerships that will enhance conservation efforts for all aspects of biological diversity and ecological processes in the central grasslands. However, given the complexity of ecological systems it would be impractical, in the context of the GPCA workshop, to consider even

the ranges of all species and communities occurring within the central grasslands let alone their status or viability. Additionally, data are simply not available for many species or other ecosystem elements (e.g., communities, processes). As a result, a list of focal species and ecological elements was developed as surrogates for overall grassland biodiversity (*sensu* Noss et al. 1999). The distribution and, to the extent that data were available, condition of native grasslands was considered a focal element. Level 2 ecoregions were also considered a focal element in so far as proportional representation of each ecoregion in the study area captured the range of ecological processes operating at ecoregional scales. Finally, 20 grassland-dependent species were selected by CEC and TNC as focal species (Table 4, Figure 4). This list represents a combination of species that are considered either as grassland species of tri-national conservation concern, and/or as ecosystem indicators, and/or as umbrella or keystone, and/or emblematic for grasslands conservation by the three North American countries. Some of the species in this list are present in CEC's Species of Common Conservation Concern and TNC's Prairie Wings "Unlucky 13."

Table 4. Grassland-dependent focal species serving as surrogates for biological diversity of North America's central grasslands.

Especie/Species	Common name	Nombre común
1. Charadrius melodus	Piping plover	Chorlito chiflador
2. Charadrius montanus	Mountain Plover	Chorlito llanero
3. Numenius americanus	Long-billed Curlew	Zarapito piquilargo
4. Centrocercus urophasianus	Greater Sage-Grouse	n.a.
5. Tympanuchus phasianellus	Sharp-tailed Grouse	n.a.
6. Tympanuchus pallidicinctus	Greater Prairie-Chicken	n.a.
7. Tympanuchus cupido	Lesser Prairie-Chicken	n.a.
8. Callipepla squamata	Scaled Quail	Codorniz escamosa
9. Buteo regalis	Ferruginous Hawk	Aguililla real
10. Athene cunicularia	Burrowing Owl	Búho llanero
11. Anthus spragueii	Sprague's Pipit	Bisbita de Sprague
12. Lanius ludovicianus	Loggerhead Shrike	Lanio americano, Verdugo
13. Aimophila cassinii	Cassin's Sparrow	Zacatonero de Cassin
14. Ammodramus bairdii	Baird's Sparrow	Gorrión de Baird
15. Spizella wortheni	Worthen´s Sparrow	Gorrión de Worthen
16. Calcarius ornatus	Chestnut-collared Longspur	Escribano cuellicastaño
17. Calcarius mccownii	McCown's Longspur	Escribano de McCown
18. Calamospiza melanocorys	Lark Bunting	Gorrión alipálido
19. Cynomys ludovicianus	Black tailed Prairie dog	Perrito llanero de cola negra
20. Antilocapra americana mexicana	Mexican Pronghorn	Berrendo mexicano

3. Approach and Methods – by Jason Karl, Jürgen Hoth, Hans Herrmann, Bob McCready, Thomas Meredith, and Robert Unnasch

The methodology followed the approach initially developed and applied by the CEC to identify the Marine Priority Conservation Areas in North America's Pacific coast, from the Bering Sea to Baja California, a.k.a. B2B project (Morgan et al., 2005). This approach relies on gathering information related to previous priority setting initiatives and on teaming experts' knowledge with the assistance of a GIS-based decision support system. The GIS included compiling appropriate spatial data sets for North America's Central Grasslands region, and developing a gap analysis.

Hence the two main lines of activities that were pursued were:

1) Pre-workshop data acquisition, integration and gap analysis. In preparation to the workshop all possible and relevant geographic information from Canadian, US and Mexican central grasslands was compiled and integrated into a GIS data base to support the discussions to be held at the workshop. Special attention was placed to gather geographic information related to grasslands related priority-setting initiatives. Moreover, based upon the latter, Jason Karl carried out a GIS gap analysis, presented below.

2) Workshop and expert opinion. Workshop experts were deliberately selected from a wide array of professional backgrounds, thematic interests and geographic regions. The challenge of the workshop was to distill from the wealth of knowledge and perspectives—and from existing information— in four half-day working sessions, a coherent, informed and supportable process to identify priority conservation areas for North America's central grasslands.

Following is a more detailed account of these two main steps.

3.1 GIS Data Collection and Gap Analysis

3.1.1 GIS Data Collection

Ahead of the GPCA workshop, an effort was made to collect all GIS data that would be relevant in defining Ecological Significant Regions (ESRs) and GPCAs[1] at a tri-national scale. In particular the workshop organizers avoided developing a process that would identify new priority grassland conservation areas, and instead existing data was compiled from projects previously carried out by individual organizations. These efforts have been regional in scope and so this effort for the first time, compiled information in an attempt to gather this information across approximately 11 ecoregions (or six Bird Conservation Regions).

Moreover, data was also collected that would assist the experts in answering three workshop questions related to the most important and threatened grassland regions and areas (see section 3.3.)

Data were grouped into major themes according to their use in the project: base layers (e.g., political boundaries, roads), ecoregions, grasslands, species, priority areas, ownership/protected areas, and threats.

All data were formatted to work with the Consensus Mapper program developed by the McGill University Project on Community Based Environmental Decision Support (Meredith 2002). Vector data were converted to shapefiles, and raster data were converted to geo-referenced TIFF images. Data were projected into a continental Lambert azimuthal equal area projection (Table 5).

[1]An **Ecological Significant Region**, or **ESR**, comprises regionally significant grasslands, of high intrinsic biological value with species of tri-/bi-national concern and ecologically rich or unique features and processes; while a **Grasslands Priority Conservation Area**, or GPCA, in addition to comprising regionally significant grasslands, with ecologically rich or unique features, processes, or species of concern and tri-national interest, also plays a significant role at a tri-national scale and could be lost within five years due to impending threats.

Table 5. Lambert azimuthal equal area projection used for the GPCA GIS data.

Projection Parameters	
Projection	Lambert Azimuthal Equal Area
Units	Meters
Datum	North American Datum of 1927
Spheroid	Clarke 1866
Central Meridian	-100.000 degrees
Latitude of Origin	45.000 degrees
False Easting	0.000
False Northing	0.000

Over 120 data layers were compiled in a GIS data catalog. See Appendix A for list of all GIS data. Appendix B lists the references for the collected GIS data. Scale of the data varied greatly, but generally, data pertaining to land ownership and protection status was finer in scale than other ecological data. Many data sets, because they were developed by a country program or as part of a regional effort, covered only a portion of the study area. Those datasets covering large portions of, or the entire study area, were generally of coarser scale than regional data layers. Brief summaries of the data collected are given below.

Although CEC Level 2 ecoregions were used as the standard for analyses in this report, a number of different ecoregion boundaries were collected for the GPCA workshop. This was done so that workshop participants could work with ecoregional boundaries they were familiar with.

The primary grassland data sets used for Canada and the United States in this analysis (Figure 3) were the early-1990's TNC Untilled Landscapes layer (TNC 2001) and the Mexico grassland status circa 2000 layer (Velázquez 2001). Additional grassland layers were collected for Alberta, Saskatchewan, and Manitoba, Canada and made available to GPCA workshop participants but were not used in the analyses presented in this report because of a lack of complete documentation on how the datasets were created and timeliness of receiving the data. Grasslands identified as part of the North America 1km AVHRR land cover classification (Hansen et al. 1998) were also included (See "Gaps in Data Coverage" below).

Definitions of grasslands and mapping/classification techniques varied between datasets. The early-1990's TNC untilled landscapes (TNC 2001) considered landscape-scale areas (> 38 km^2) with largely intact natural or semi-natural vegetation within the grassland biome as untilled landscapes. Thus the TNC untilled landscapes data layer, while predominantly native grasslands, may have included areas that would not typically be considered as grasslands. Untilled landscapes were identified through visual interpretation of Landsat Thematic Mapper (TM) satellite imagery. The Mexico 2000 grassland status layer (Velázquez 2001) had the most restrictive definition of native grasslands – those areas dominated by native grasses, graminoids, and forbs and containing only a minor component of shrubs. Some degree of human use (e.g., livestock grazing) is compatible with Velazquez's definition of native grasslands; however, when areas moved to predominantly exotic species or cultivation, they were classified as "induced or cultivated grasslands." Velazquez mapped native and introduced grasslands through a classification of Landsat Enhanced TM+ imagery. Hansen et al. (1998) mapped 14 land cover classes across North America from a classification of AVHRR satellite imagery. Although they do not provide exact definitions of their categories, for the purposes of this study their grassland and wooded grassland categories were considered as grasslands. While they did map agricultural land as a separate category, it is likely that their grassland category includes significant amounts of exotic and highly disturbed grasslands. With the exception

of the Western Cordillera ecoregion, Hansen et al.'s (1998) data classified much more area as grasslands than either of the other data layers (Table 6, Figure 5). For this reason, we created a composite native grassland layer by combining the best available datasets for each area.

Table 6. Comparison of hectares mapped as grassland in each study area ecoregion by the three data sources used in the grassland priority conservation area project.

Ecoregion Number	Ecoregion Name	Hansen et al. (1998) AVHRR	TNC early-1990's Untilled Landscapes (TNC 2001)	2000 Mexico Native Grasslands Velazquez (2001)	% Difference between Hansen et al. (1998) and others
6.2	Western Cordillera	1,061,800	1,503,500		+41.6%
9.2	Temperate Prairies	12,366,500	3,493,000		-71.8%
9.3	West-Central Semi-Arid Prairies	57,355,900	39,088,900		-31.8%
9.4	South-Central Semi-Arid Prairies	36,563,600	28,372,400		-22.4%
10.4*	Chihuahuan Desert	11,243,700	1,781,200	2,707,300	-60.1%
12.2	Mexican High Plateau	2,244,700		479,200	-78.7%
13.1	Upper Gila Mountains	537,700	40,300		-92.5%
13.3	Eastern Sierra Madre	1,102,900		47,200	-95.7%
	Total	122,476,800	74,279,300	3,233,700	-40.0%

* A portion of the Chihuahuan Desert ecoregion was not mapped by either Velazquez's (2001) Mexico natural grasslands or the early-1990's TNC untilled landscapes (TNC 2001). See "Gaps in Data Coverage" below for more detail.

Data regarding areas protected[2] and managed for biological diversity were also collected (Figure 6). The Conservation Biology Institute's (2001) Protected Areas Database formed the foundation for ownership and protected areas data in the United States. Protected areas and federal ownership in Canada were identified by data layers from each province. While a large portion of government-owned lands in Canada are owned by the provinces, no data were available identifying non-protected provincial lands in Canada (See "Gaps in Data Coverage" below). Federal protected areas in Mexico were identified by data provided by the Comisión Nacional de Áreas Naturales Protegidas (CONANP 2004). As a supplemental dataset, the North American Conservation Areas Database (ERIN 2000) was also included. This database consisted of point (latitude/longitude) locations of each protected area in North America. All other layers were polygon data.

There were several existing conservation planning approaches identifying conservation priorities in portions of the North American central grasslands (Figure 7). GIS layers representing these conservation priorities were collected. The most extensive prioritization efforts to date were TNC's ecoregional assessments and the Important Bird Areas program. All data were obtained in digital format except the important bird areas for the United States which were digitized from a hard copy map at a scale of 1:2,500,000 (American Bird Conservancy 2002) because this data is not yet available in digital format (G. Fenwick, American Bird Conservancy, pers. comm.).

Data were collected on the range, distribution within the range, habitats, and migration patterns of the GPCA focal species (Table 4). Continental ranges for each species were obtained from the

[2] "Protected Areas" included National, State and Provincial Parks, wilderness areas, wildlife refuges, nature preserves and conservation easements

NatureServe Digital Distribution Maps series (Figure 4). More detailed range maps were obtained from various sources for the Sage Grouse (*Centrocercus urophasianus)*, Lesser Prairie-Chicken (*Tympanuchus cupido)*, Black-tailed Prairie Dog (*Cynomys ludovicianus*), and Mexican Pronghorn (*Antilocapra americana mexicana*) (See Appendices B and C for descriptions and sources). A number of useful GIS layers, based on species ranges, analyzing the contribution of the central grasslands with respect to breeding and wintering birds were obtained from Blancher (2003).

Because focal species data was needed only to adequately represent the distribution of a species and its habitats at coarse, continental scales (e.g., 1:5,000,000), only data sources that covered all, or a large portion, of a focal species range were considered. Point location data from the US Fish and Wildlife Service Breeding Bird Survey and the Audubon's Christmas Bird Count formed the foundation for the location records of the focal bird species. A number of additional sources also provided location and habitat data for the focal species. Canadian bird banding and band-recovery data were provided by Blancher (2003). Data on the distribution of Mexican and Sonoran pronghorn were obtained through Valdés and Manterola (in press), and the Instituto del Medio Ambiente y Desarrollo Sustentable del Estado de Sonora (2000), respectively. Results from the 2001 International Piping Plover Census (Ferland and Haig, 2002), and migration data from a study of Ferruginous Hawks (Watson and Banasch, 2003) were also included. The Predator Conservation Alliance provided numerous data layers of Black-tailed Prairie Dog town locations in Proctor et al. (in press, Appendix C).

Data on threats to grassland systems varied greatly in quality and geographic coverage. An effort was made to collect data on the distribution and intensity of commonly recognized threats to grassland ecosystems. Most of the threats layers presented in this report were collected for other grassland conservation projects. Similar to data for the focal species however, much of the data relating to threats existed at scales that were beyond the scope of this project. Additionally threats against grassland ecosystems are constantly changing, with new threats developing and recurrent threats occurring in new areas. Given the effort and time involved in compiling and publishing GIS data at regional, national, or continental scales, the dynamic nature of grasslands threats is difficult to capture effectively. For these reasons, the experts attending the workshop were considered to be the best source of information on threats to grassland ecosystems.

3.1.2 Gaps in Data Coverage

Although many data sets were collected for this project, geographic coverage of the data as well as data quality varied across the study area. Generally speaking, in terms of geographic data coverage, most of the focal species and threats data layers available for Canada and the United States were not available for Mexico. For example, both the Breeding Bird Survey and Christmas Bird Count programs cover the United States and Canada, but have no sites in Mexico (Figure 8). Aside from the general species ranges, there were few focal species datasets that extended into Mexico. For the Worthen's Sparrow (*Spizella wortheni*), a species endemic to the grasslands of Mexico, no data was available other than its general range.

Given the above considerations of data coverage and quality, areas of a species range without any observation locations or other data must be interpreted carefully. With the exception of the Breeding Bird Survey the data collected for this project represent only locations where a species was observed and not all surveyed locations where it wasn't detected. Thus it would be difficult to distinguish between where a species does not occur and where no data on its presence exists..

For a species with only a portion of its range in Mexico, care must be used in interpreting occurrence data so that bias is not given to areas where survey data is available at the expense of unsurveyed – and potentially equal or even better – areas.

Spatial representation of native grasslands within the study area came primarily from two layers; the 2000 Untilled Landscapes layer (TNC 2001) for Canada and the United States, and the 2000 Mexico native grasslands layer (Velazquez 2001). There was an 18.4 million hectare gap in coverage between these two layers (Figure 5). The Untilled Landscapes layer was an ecoregion-based classification that included all of the grassland ecoregions except for the Chihuahuan Desert. The Mexico grassland classification stopped at the US-Mexico border. Hence, there was no detailed grassland coverage for the US portion of the Chihuahuan Desert Ecoregion. Grassland distribution for this area was taken from Hansen et al. (1998) 1-km AVHRR land cover classification of North America.

Data coverage for public ownership, protected areas, and existing priority areas was generally consistent across the study area with one significant exception. Although a large amount of lands in Canada are owned by the provinces, no data sets could be obtained in the timeframe of this project that identify provincial ownership. In the case of at least Manitoba this was partly due to the fact that the provincial ownership data were considered proprietary information and not publicly available. The omission of these data may have affected the results of analysis of existing protected and conservation priority areas and the results presented below should be interpreted with this in mind.

3.2 Results of the gap analysis

3.2.1 Ecoregional Representation

For effective conservation, the network of protected areas and conservation priority areas should be representative of the study area's general ecological conditions (Groves 2003). Ecoregions, because they represent areas with relatively homogenous ecosystem structures, compositions, and processes (Bailey 1998) provide a convenient unit at a continental scale for assessing to what degree existing protected areas and conservation priority areas represent ecological systems. Protected area and conservation priority layers collected for this project were intersected with the CEC Level 2 Ecoregions of North America.

Both the number of protected areas as well as the total hectares per ecoregion was calculated and compared to the total area of the ecoregion (Table 7, Figure 6). In general, protection levels for central grassland ecoregions were very low with only the two smallest ecoregions in the study area having more than 5% of their area as protected areas. The majority of the protected lands in the Chihuahuan Desert ecoregion were from a relatively small number of large protected areas. Protection levels of the other Mexican ecoregions were quite low. These findings were in line with Scott et al. (2001) who found that low to moderate elevation, productive lands were under-represented in protected areas of the United States. Shaffer et al. (2002) estimated the cost of establishing a representative system of habitat conservation areas in the United States at $5 billion to $8 billion USD per year over thirty years. While these numbers are only a fraction of the annual budget for the United States (less than half a percent of the total United States federal budget for 2004 [Whitehouse Office of Management and Budget, www.whitehouse.gov/omb/budget/fy2004/budget.html]), allocation of this kind of money is unlikely. This

suggests that clear conservation priorities must be defined and new and innovative approaches to achieving conservation are needed. Creation of conservation networks may help facilitate the development and exchange of information on novel conservation techniques.

Table 7. Distribution of protected areas* in the CEC Level 2 ecoregions within the study area and amount of native grasslands protected by them. Percent of ecoregion in protection is expressed as the proportion of hectares protected to area of the ecoregion *within the study area* (not the total area of the ecoregion).

Ecoregion	Native grassland (ha)	Number of Protected Areas	Hectares Protected	% Ecoregion in Protection	Native Grasslands in Protected Areas (ha)	% Native Grassland in Protected Areas
6.2 Western Cordillera	1,504,000	33	98,900	5.9%	61,900	4.1%
9.2 Temperate Prairies	3,493,000	910	545,500	1.1%	421,600	12.1%
9.3 West-Central Semi-Arid Prairies	39,089,000	247	1,065,400	1.3%	1,642,600	4.2%
9.4 South-Central Semi-Arid Prairies	28,815,000	174	193,100	0.2%	137,800	0.5%
10.4 Chihuahuan Desert	7,972,000	32	2,127,700	3.9%	220,300	2.8%
12.2 Mexican High Plateau	479,000	3	25,000	0.5%	0	0%
13.1 Upper Gila Mountains	544,000	9	95,200	7.4%	34,200	6.3%
13.3 Eastern Sierra Madre	47,000	1	2,000	0.1%	400	0.9%

* Protected areas included National, State and Provincial parks, Wildlife Refuges, Nature Preserves, etc (as applicable)

Priority areas of eight conservation planning approaches were compared to area of each ecoregion (Table 8, Figure 7). In total, 26.41% of the study area has already been identified as priority for conservation of biological diversity, including 13.4% of remaining native grasslands. With exception of the Upper Gila Mountains and the Mexican High Plateau, between 12.8% and 30.1% of each ecoregion was identified as having priority for conservation of biological diversity. A large portion of the Upper Gila Mountains was identified as conservation priority in both the TNC Ecoregional Assessments and the American Bird Conservancy's Important Bird Areas for the United States. The Upper Gila Mountains was considered as a part of a larger ecoregion for the TNC assessment. It is worth noting the paucity of conservation priority areas for the Mexican High Plateau *vis-à-vis* its availability of native grasslands (see Table 2) may be due to the fact that most of the grassland conservation prioritizations used in this study did not include the Mexican High Plateau in their definition of grassland ecoregions.

Table 8. Distribution of areas identified in existing conservation prioritizations by CEC Level 2 ecoregions within the study area. Approximate total prioritization area per ecoregion was calculated as the maximum non-overlapping extent of priority areas that were converted to 1 sq. km. grid cells. Because the polygon features were converted to grids, area calculations are approximate. Percent of ecoregion in priority areas is expressed as the proportion of hectares protected to area of the ecoregion within the study area (not the total area of the ecoregion).

Ecoregion	Important Bird Areas for Mexico (CONABIO 1999)	Important Bird Areas for Canada (Courtier and Wilcox 2004)	Important Bird Areas for USA (American Bird Conservancy 2002)	TNC Chihuahuan Desert Ecoregional Assessment (Pronatura et al. 2004)	Combined TNC Ecoregional Assessments as of January 30, 2004 (excluding Chihuahua, TNC unpub. data)	TNC Prairie Wings Conservation Prioritization (TNC unpub. data)	The Wildlands Project Sierra Madre Prioirty Areas	USDA Forest Service Special Designation Areas (USDA Forest Service 2000)	Approximate Total Prioritization Area per Ecoregion in Hectares	Percent of Ecoregion in Priority Areas	Total Prioritization Area of Ecoregion in Native Grasslands	Percent of Prioritized Area in Ecoregion in Native Grasslands
6.2 Western Cordillera	N/A	3,500	20,500	N/A	357,300	2,600	N/A	49,600	363,500	21.7%	257,100	12.7%
9.2 Temperate Prairies	N/A	679,600	163,000	N/A	3,596,700	2,075,900	N/A		6,262,800	12.8%	919,000	1.9%
9.3 West-Central Semi-Arid Prairies	N/A	945,800	1,620,601	N/A	16,665,200	6,161,400	N/A	4,500	20,687,500	25.9%	16,681,600	20.9%
9.4 South-Central Semi-Arid Prairies	N/A	N/A	1,683,800	N/A	18,634,400	7,508,400	N/A	2,700	24,455,800	34.1%	14,598,100	20.4%
10.4 Chihuahuan Desert	1,462,600	N/A	1,312,100	948,800	N/A	1,677,400	283,400	N/A	16,468,500	30.6%	2,662,600	4.9%
12.2 Mexican High Plateau	61,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	61,000	1.4%	5,000	0.1%
13.1 Upper Gila Mountains	N/A	N/A	555,000	N/A	462,500	N/A	N/A	41,000	808,100	63.1%	354,100	26.8%
13.3 Eastern Sierra Madre	125,300	N/A	N/A	36,600	N/A	16,800	N/A	0	598,800	30.9%	2,300	1.2%
Total prioritization area in native grasslands	227,500	890,400	2,917,200	2,594,600	29,203,500	2,783,600	14,200	33,300	35,479,800	13.4%	35,479,800	13.4%

Note: No information was obtained from any of the Joint Ventures that would be applicable to this table. Because the USFWS National Wildlife Refuges are included in the US Important Bird Areas (and they're included in the previous table covering protected areas), it was deemed unnecessary to include them as a separate entry. Besides, National Wildlife Refuges don't fit the definition of prioritizations in the sense that the other entries in this table do. The same thing can be said for Tribal lands.

3.2.2 Grassland Representation at a National Scale

The protection status of native/natural grasslands by country was assessed by intersecting the protected areas layers with the 2000 TNC Untilled Landscapes (TNC 2001), 2000 Mexico Grasslands (Velázquez 2001) and the Hansen et al. (1998) 1-km AVHRR land cover classification (Table 9). Canadian protected areas had the highest percentage of grasslands and accounted for the highest proportion of native grasslands occurring in Canada. Protection status for grasslands in the United States and Mexico was quite low; most of the study area in these countries was in private ownership. The 1-km AVHRR layer used in the northern portion of the Chihuahuan ecoregion included many areas that might be considered arid shrub-steppe under a different classification. Within the Canadian portion of the study area, the majority of protected areas were in Native Grasslands. Within the United States a large portion of the protected areas within the study area were in land cover types other than native grasslands. In Mexico, a relatively small portion of the protected areas were in native grasslands.

Table 9. Protection status of native/natural grasslands in the study area by country, based on the 2000 TNC Untilled Landscapes (TNC 2001), Mexico Grasslands circa 2000 (Velázquez 2001) datasets, and 1KM AVHRR Land Cover Classification (Hansen et al. 1998) for the gap between the above data sets.

	Area of Native Grassland (ha)	% of Native Grasslands in Protected Areas	% of Protected Areas in Native Grasslands
Canada	8,655,400	14.95%	89.22%
United States	69,620,600	1.61%	37.87%
Mexico	3,844,300	1.80%	6.61%

The grassland data layers were intersected with each of the conservation prioritizations collected for the project (Table 10). There were a high percentage of native/natural grasslands in defined conservation priority areas. Similar to the low protection status observed for Mexican grasslands, the relatively low percentages of grasslands in the Mexican prioritizations could be due to how grasslands were defined in the Mexican grasslands data layer.

3.2.3 Grassland Fragmentation

The size and fragmentation of grassland patches is clearly not consistent across the study area (Figure 3). While large, unfragmented landscapes offer the best opportunities for preserving functional ecological systems (see Noss and Csuti 1994), a system of ESRs and GPCAs focused only on the largest grassland patches would not fully capture the range of ecological conditions in the study area. Although smaller grassland patches in a fragmented matrix may face higher pressure from certain threats, they may still provide valuable habitat for grassland species (especially migratory birds) and may be important parts of a tri-national grassland network (e.g. Blancher 2003). An understanding of how patch size and fragmentation varies across the study area is necessary to avoid inadvertently biasing the results toward the largest and most intact grassland systems.

Grassland types were aggregated to 10,000km^2 grid cells across the study area (Figure 9) after Hansen et al. (1998) 1-km AVHRR land cover classification. The 1-km AVHRR classification was used for this analysis over other potentially more accurate grassland layers

because it was consistent over the study area and thus eliminated the possibility of differences in cover type definitions or methodologies influencing the results. For each grid cell, the area of grasslands and the number of grassland patches (individual, contiguous polygons mapped as grassland) were calculated. Looking only at area of grasslands per cell, the highest ranked areas of grasslands occur on the margins between the eastern and southern portions of the study area which have fewer, smaller grasslands and the west-central portion which has the most big, unfragmented grasslands. This result suggests that these cells have either some large grasslands interspersed with small grassland patches, or that these cells consist primarily of small, fragmented grassland patches. To overcome this, area of grasslands was divided by the number of patches per cell. Under this scheme, the highest-ranked cells were those with a large area of grasslands and a small number of patches. Conversely, the lowest-ranked cells had both small grassland area and low number of grassland patches. According to this method, the most intact grassland systems were in the north-central portion of the study area. The eastern and southern portions of the study area showed more fragmented grassland landscapes.

Table 10. Percent of each conservation prioritization that is classified as native/natural grasslands based on the TNC Untilled Landscapes (TNC 2001), Mexico Grasslands circa 2000 (Velazquez 2001) datasets, and 1KM AVHRR Land Cover Classification (Hansen et al. 1998) for the gap between the above data sets.

Conservation prioritization initiatives	Native grasslands (ha)	Percent Prioritization in Native Grasslands
Important Bird Ares of Mexico (CONABIO´s AICAS)	227,500	13.69%
Important Bird Areas of Canada (Bird Studies Canada)	890,400	54.54%
Important Bird Areas at the United States (American Bird Conservancy)	2,917,200	54.64%
TNC Chihuahuan Desert Ecoregional Assessment	2,594,600	17.35%
Combined TNC Ecoregional Assessments as of January 30, 2004 (excluding Chihuahua)	29,203,500	72.18%
TNC Prairie Wings Conservation Prioritization	2,783,600	68.89%
The Wildlands Project Sierra Madre Prioirty Areas	14,200	5.10%
USDA Forest Service Special Designation Areas	33,300	33.88%

3.2.4 Focal Species Richness

Given the disparity in coverage of observation data, analysis of focal species across the study area was restricted to comparisons of their ranges. Ranges for each focal species were intersected to create species richness (number of species occurring in a given area) maps (Figure 10). The richness of all species indicated Mexico and Texas as having the most species-rich area in the study area. However, since many of the focal bird species migrate between the southern and northern portions of the study area, richness of breeding and wintering bird ranges should be considered. Canada and the north-central plains states showed the highest richness of breeding birds in the study area. Richness of wintering birds followed closely the results for all species. These results corresponded to Blancher's (2003) analysis of range-richness of all birds dependent on the central grasslands for either breeding or wintering.

The focal species richness maps were intersected with conservation prioritization layers collected for this project. The percent of each richness category (number of species)

captured by at least one conservation priority area was calculated (Figure 11). The results showed that there was little trend toward conservation priority areas being located in areas of high species-richness, and that conservation priority areas were generally evenly distributed with respect to occurrence of the focal species.

While richness maps can be useful for identifying general areas of correspondence among elements of biodiversity, care must be used in interpreting richness-based maps in the context of conservation planning. In none of the richness maps generated for this analysis was there overlap of the ranges of all species. The possibility exists that the majority of a species range could fall outside of a high-richness area. Additionally, richness measures may favor areas of ecological transition where species from two different ecological systems co-occur. These areas may not be representative of the ecological conditions in other parts of a species range and population dynamics in these areas may also be different.

3.3 The GPCA Workshop

Thirty-six grassland experts attended the GPCA workshop – eleven each from Canada and Mexico, and 14 from the United States. Experts were invited based on their knowledge of grassland systems across large regions of North America. Of the total workshop participants, 20 were considered experts on northern grasslands, 29 on central grasslands, and 17 on southern grasslands (participants could be considered an expert for more than one region; see complete directory in Appendix D).

Workshop participants were given three questions to guide them through the process of identifying large ESRs, smaller GPCAs contained within the ESRs, and finally into describing each GPCA´s threat related attributes:

Question 1: Ecologically Significant Areas (ESRs): *What are the most important grassland regions of Central North America in terms of the biodiversity richness, ecological uniqueness, and bi-national/tri-national significance?*

Expected results from this question were broad agreement, based on ecological foundations, on large-scale polygons comprising important tri-national grassland regions and rationale for their selection. Participants were asked to keep in mind the following guiding criteria:

- High importance for migratory and trans-boundary species in terms of breeding, wintering, and migratory habitats
- High native species composition (richness) and or high degrees of endemism
- Polygons in the order of 250,000 km^2 (see Figure 1.)
- Total area encompassed by ESRs was anticipated to be less than or equal to 40% of the total study area.

Question 2: Grassland Priority Conservation Areas (GPCAs): *What areas within the ESRs are conservation priorities for your national/geographic region?* Consider the imminence of threats over a 5-year period and the continent-wide significance of loss of these sites.

Expected results from this question were broad agreement of smaller-scale polygons identified within the ESR with rationales for the entire central grasslands region identified in terms of their ecological importance and threat. Participants were asked to keep in mind the following guiding criteria:

- Areas that could be lost within five years, but of appropriate size to allow for long-term ecological functionality
- Polygons in the order of 10,000 km2 (see Figure 1); however, GPCAs should be sized appropriate to conservation actions and together ensure long-term viability of priority conservation targets.
- Total area delineated as GPCAs should be less than or equal to 10% of the identified ESR area.

Question 3: Selected GPCAs: *What is the relative conservation urgency of resulting GPCAs, based upon their value and the imminence of threat upon them?*

Expected results from this question were an assessment among the GPCAs of their relative importance for migratory and trans-boundary species in terms of breeding, wintering, and migration habitats; and an assessment of the importance of the impending threats over the next five years. Participants were asked to consider the importance of each GPCA in relation to conservation priorities, the imminence of threats upon each GPCA, and opportunities for conservation.

3.3.1 Consensus Mapper

The building of consensus and overlay of information during the workshop relied on a procedure developed by McGill University's project on Community-Based Environmental Decision (CBED). This included the Consensus Mapper GIS software - an easy-to-use GIS designed for non-GIS users— engineered by G. Dias for accessing compiled GIS data and capturing output from the various groups of workshop participants. This software has a simple, yet robust design that supports features such as zooming and panning over base maps, display of various map layers, drawing and editing of new polygon features, calculation of polygon areas, and submission of finished maps, as ESRI shapefiles, to a specified location either on the local computer or over a computer network. Consensus Mapper is a stand-alone GIS package created using ESRI's MapObjects and does not require the installation of any other ESRI GIS products (e.g., ArcView, ArcGIS) to be used. (See Appendix E for the principles behind this procedure and also Balram et al. 2004.)

3.3.2 Spreadsheets for Attribute Capture and Analysis

A series of pre-formatted spreadsheets within a Microsoft Excel Workbook were designed for this workshop by TNC´s Bob Unnasch (see Appendix F) to complement the use of the Consensus Mapper. The spreadsheets were intended to provide an objective, and quantitative method for ranking the ESRs and GPCAs, as well as to record additional information about the users' mapped regions (see Appendix F for detailed description of function of the spreadsheets). Concurrent to mapping ESRs and GPCAs in Consensus Mapper, each workshop group filled out the appropriate descriptive information in the spreadsheets and assessed ESRs and GPCAs in terms of their significance to the focal species/elements (see Grassland Focal Elements and Species above) and threats related to

GPCAs. The spreadsheets were designed to be flexible enough for users to enter comments and modify the lists of focal species/elements and threats. Data from the ESR and GPCA worksheets were automatically transferred to PCA summary worksheet where ESRs and GPCAs were ranked and displayed in relation to each other. Color codes were used on relative rankings of ESRs and GPCAs and PCA threats to aid in interpretation of the combined results. Summary worksheets from all workshop groups could be combined to provide a comprehensive look of the entire study area.

3.3.3 Group dynamics and composition by themes and regions

Each of these questions was discussed in plenary first so that the meaning and intention of the questions, and distinctions between the questions, were clear. When break-out groups were later formed, group members were asked for each question first to discuss the criteria that they would use to establish each of these maps and then to select - by tracing on a base map - the areas they propose.

The full group of participants met first in plenary to discuss background issues, goals, working assumptions and procedures of the workshop. The CMRT procedures were explained and an introduction to Consensus Mapper provided.

The group was then divided into six roughly equal groups based on fields of expertise (see Appendix D). Each group was asked to delineate draft ESRs based on the knowledge of their group. Each group's set of ESR polygons was considered a data layer which captured the group's priorities. These maps were submitted to the facilitators and a combined overlay map was produced. This map was projected on the main screen so that all could see it, consider it, correct errors and comment on their own or other contributions.

For the second iteration of ESRs, groups were changed from being based on the experts' field of expertise to being based on their regional area of expertise. Six new groups were created, two each for the northern, central, and southern grasslands. The ESR overlay map was then returned to each of the workstations and the groups were asked to refine the ESR selections based on the plenary discussions and their regional knowledge. Each region reconciled their ESRs and the results were compiled into the final ESR layer for the workshop.

This cycle could have been continued in a modified Delphi approach until consensus was reached or irreconcilable differences were identified. However, in this case, the process ended at this stage and the resultant map was treated as the group consensus on ESRs. The final map was displayed and discussed by the entire group and the substance of the output as well as the procedure was discussed.

Maintaining the same groups based on geographic knowledge, workshop participants then identified through an iterative process GPCAs within the ESRs and assessed their status and potential future condition. There were two iterations for this for this portion parallel to the second and third iterations of ESR process. First, each region was to produce PCA maps in two separate groups. They were then to compare and discuss their selected GPCAs and create a map of GPCAs together, as a region. The participants in the northern group chose to split up based on nationality, so one group made a map for Canada while the other

mapped GPCAs for the United States. They did not compare and discuss their products to produce a final because they had each mapped exclusive areas. The central groups opted to merge into one group immediately, thus also skipping the second iteration. The southern group followed the original plan.

While mapping GPCAs, information was entered into the data collection spreadsheets that described the relative importance of each GPCA for the species listed in the spreadsheet. In the exercise, the polygons were drawn first and the spreadsheets were filled in to reflect characteristics of the polygons. The spreadsheet information was compiled and the GPCAs were subsequently ranked based on the values calculated from the spreadsheet. In the end, each region identified its top priority GPCAs

3.3.4 Additional Grassland Focal Elements

Workshop participants added three species and one vegetation community to the list of focal elements and targets prepared prior to the workshop. The northern and central groups added bison (*Bos bison*) to their lists. The Central group also added northern bobwhite quail (*Colinus virginianus*). The southern group added the Mexican prairie dog (*Cynomys mexicanus*) and gypsophilous vegetation. None of the workshop participants felt that any of the focal elements and species selected prior to the workshop should not be considered.

4. GPCA Workshop Results

4.1 Ecologically Significant Areas

The overlay of the first iteration ESR maps produced by the groups based on expert's field of expertise showed some areas of definite consensus on tri-national areas of significance (Figure 12). Four general areas were identified by all six groups: 1) the border region between Montana, Saskatchewan, and Alberta; 2) the Thunder Basin and Sandhills area of Nebraska, South Dakota, and Wyoming; 3) the southern prairie region of Oklahoma, Colorado, New Mexico, and Texas; and 4) the El Tokio area of Mexico. The combined ESR layers from all six groups comprised 81.0% of the entire study area (calculated as percent of ESRs within the study area). Areas identified as ESRs by four or more groups comprised 24.0% of the combined ESR area. Areas identified by only one group as ESRs comprised 34.2% of the total combined ESR area.

The first refinement of ESRs where new, geographically arranged groups edited the draft ESRs from the previous step resulted in 19 distinct ESR polygons (Figure 13) that accounted for 47.3% of the study area. After the regional groups had reconciled the differences in their ESR delineations, the final version defined 21 ESRs (Figure 14, Table 11) totaling 40.0% of the study area. See Appendix G for detailed descriptions and rationale for each ESR.

Prior to the workshop, ESRs were anticipated to be on the order of 250,000 km^2 in size. Final ESRs ranged in size from 4,000 to 229,000 km^2. Mean ESR size was 57,000 km^2.

Table 11. Final ESRs with their quantitative ratings (sorted by quantitative rating). Importance of each ESR to the list of focal species is also shown using the following abbreviations: V = Very High, H = High, M = Moderate, L = Low, P = Present/Not Significant. Blank cells indicate that the species is not known to occur in the PCA

ESR Name	ESR Number	ESR Area (Km²)	Expert Rating	Quantitative Rating Based on Focal Species	Mountain Plover	Piping plover	Long-billed Curlew	Ferruginous Hawk	Scaled Quail	Lesser Prairie-Chicken	Greater Prairie-Chicken	Sharp-tailed Grouse	Sage Grouse	Burrowing Owl	Loggerhead Shrike	Sprague's Pipit	Lark Bunting	McCown's Longspur	Baird's Sparrow	Cassin's Sparrow	Chestnut-collared Longspur	Worthen's Sparrow	Black tailed Prairie dog	Mexican Pronghorn	Bison	Northern Bobwhite Quail	Mexican Prairie Dog	Gypsophillim Vegetation
Chihuahua – El Tokio/Mapimi	1	93,563	Very High	13.25	V		H	H	H					V	H	M	V	L	M	V	V	V		V			V	V
Chihuahua - Marfa/Big Bend/Maderas del Carmen	2	81,977	Very High	7.24	L		H	M	H					H	M		H	M	L	M	M							
Sierra Madre Occidental Foothills	3	218,501	Very High	12..48	V		V	V	V					V	H	V	H	M	V	M	H			V				
Southern Prairies	4	229,494	Very High	11.25	V	P	M	V	H	V				H	H	M	M	V	L	V	V		H			M		
Smoky Hills	5	38,298	Moderate	5.42		P	P	M		H	H			M	M	P	M	P	P	L	M		M			M		
Flint Hills	6	32,860	Very High	4.24		L					V			L	M				P		L		L			M		
Arickaree	7	11,647	High	3.16			P	L			M			L	M	L	M			P	P		L					
Pawnee Grasslands	8	17,397	High	5.88	H		L	M			L	M		M	M	P	M	V	P	P	M		L					
Thunder Basin/Conata	9	37,000	Very High	8.66	H		H	M				L	M	H	M		M	M			H		V		H			
Sandhills	10	47,073	High	3.88		P	L	L			M	H		L	L	L	M	P	L		L					P		
Powder River/Big Open	11	76,100	Moderate	6.93			M	M				L	H	M	M		M	H			L		M		H			
Cheyenne Prairie	12	41,700	High	6.64			H	M				M		M	M	P	M				L		H		V			
Prairie Couteau/Sheyenne Delta	13	16,400	Moderate	1.22							P	M		P	L				P		P							
Little Missouri Badlands	14	13,000	Moderate	3.32			L	L				M	P	L	M	P	L				L		L		L			
Agassiz Tallgrass	15	10,700	Very High	2.00							M	L			L				P									
Manitoba Mixed-grass/Towner Sandhills	16	7,400	Moderate	3.02				L				M		P	M	L			L		L							
Carberry Sandhills	17	4,000	Moderate	1.155								M			P				P									
Rocky Mountain Front	18	18,000	Very High	1.89			L	L				L		P	L				P						L			
Missouri Couteau	19	63,000	Very High	7.33		V		L				H		L	M	H	M		H		H							
Medicine Line Mixed-grass	20	108,000	Very High	12.14	H	L	V	H				M	V	H	H	H	H	H	V		V		H		V			
Northern Fescue	21	31,000	High	3.67		H		P				H			L	L			L									

Experts evaluated each ESR with respect to the list of focal elements and species. There were no ESRs with very high importance for three species: loggerhead shrike, northern bobwhite quail, and sharp-tailed grouse. The loggerhead shrike and sharp-tailed grouse are wide-ranging species, occurring on all 21 and 14 ESRs, respectively. The northern bobwhite quail occurred on only 4 ESRs. The northern ESRs were generally rated by the workshop participants as having significance to the fewest number of focal species on the list. This could be due to the fact that many of the focal species spend only their breeding seasons in the northern region, or that significance of northern ESRs was due primarily to grassland conditions and not to focal species.

Experts rated 47.6%, 23.8%, and 28.6% of the final ESRs as very high, high, and moderate in importance, respectively. Quantitative ratings were based on the importance of each ESR to the list of focal elements and species with higher numbers, inferring that an area was relatively more important than those with lower numbers. Areas with a high degree of importance to many species would have higher numbers. Quantitative ratings of ESRs ranged from 1.16 to 13.25. When ESR quantitative ratings were ranked and split into quartiles, all ESRs in the top quartile (8.66 to 13.25) were rated by experts as of very high importance. However, two ESRs in the lowest quartile (1.16 to 3.02) were rated by the workshop participants as very high. Both of these ESRs were rated by workshop participants as having low importance for any of the focal species, suggesting that other factors not adequately captured by the focal elements and species list contributed to their significance.

4.2 Grasslands Priority Conservation Areas

After several iterations, the workshop participants defined in total 55 GPCAs: 26 in the Northern Region (Figure 15), 16 in the Central Region (Figure 16), and 13 in the Southern Region (Figure 17), comprising 10.5% of the study area (calculated as percent of PCAs in the study area) and 22.5% of identified ESRs (Table 12). PCA quantitative ratings calculated by the data entry spreadsheets are shown in Figure 18. See Appendix H for detailed descriptions of each GPCA.

Final GPCAs ranged in size from 834 to 14,821 km^2. Mean GPCA size was 4,852 km^2.

Experts evaluated each GPCA with respect to the list of focal elements and species. Initally seventeen GPCAs identified by the workshop participants had no ratings completed for the list of focal elements and species. Fifteen of these, however, were completed post-workshop through the review process by region. There were no GPCAs with very high importance for four species: sharp-tailed grouse, McCown's longspur, Mexican pronghorn, and northern bobwhite quail. The two GPCAs rated as significant for the northern bobwhite quail were rated as low (Panhandle and Kiowa). The same GPCA (Tokio) was rated as of very high significance for both the Worthen's sparrow and Mexican prairie dog, and was the only GPCA identified as significant for these species.

Regional reviewers of this report were asked to provide species importance ratings for GPCAs that were not attributed before the close of the expert workshop. In some instances, reviewers also suggested changes to the species importance ratings given to individual GPCAs during the workshop. Changing the species importance ratings for a GPCA would change it's quantitative ranking and could also result in a change in its rank order. Because 1)

the purpose of this report was to capture the consensus of experts at the workshop regarding GPCAs; 2) workshop participants made selections of the GPCAs based in part on the presented quantitative scores and rank orders; and 3) not all workshop participants would have had chance to evaluate the suggested changes; species importance ratings for individual GPCAs were not changed according to reviewer comments except to fill in importance ratings for GPCAs not attributed at the workshop.

Quantitative GPCA ratings were based on the importance of each GPCA to the list of focal elements and species with higher numbers inferring an area was relatively more important than those with lower numbers. Areas with a high degree of importance to many species would have higher numbers. Quantitative ratings of ESRs ranged from 1.89 to 12.48. No expert overall ratings were given to GPCAs. Instead, workshop participants were asked to identify their top priority GPCAs for need of conservation action within the next five years. Consequently, workshop participants selected 28 GPCAs as their top priority areas: 13, in the Northern; 8, in the Central, and 7 in the Southern Regions (Figure 19). Selected GPCAs totaled just over 166,000 km2 or 6.3% of the study area.

Workshop participants evaluated the threats affecting each of the GPCAs and the focal elements and species occurring therein with respect to the type of threat, an overall rating of the risks from the threat, and the urgency and trend of the threat. See Appendix H for detailed lists of threats assigned to each GPCA. There could be up to five threats assigned to each GPCA. Fifty three (98.1%) of GPCAs were assigned at least one threat. More than one threat was assigned to 49 (90.7%) GPCAs with 43 (79.6%), 22 (40.7%), and 5 (9.3%) GPCAs receiving three, four, and five threats, respectively. Workshop participants assigned 11 different threats to the GPCAs (Table 13) with habitat disturbance or destruction, habitat fragmentation, altered fire regimes, altered structure or composition, excessive herbivory, and extraordinary predation or parasitism being the most frequently assigned. Threat pressures over GPCAs were overall most commonly rated as high, having very high urgency for addressing the threat, and with threat trends either stable or increasing in magnitude.

Table 12. Final GPCAs with their quantitative ratings and rank order (sorted by quantitative rating)[1]. Importance of each PCA to the list of focal species is also shown using the following abbreviations: V = Very High, H = High, M = Moderate, L = Low, P = Present/Not Significant. Blank cells indicate that the species is not known to occur in the GPCA.

ESR	GPCA Name	GPCA Number	GPCA Area (Km²)	GPCA Quantitative Rating[1]	GPCA Rank Order[1]	Mountain Plover	Piping plover	Long-billed Curlew	Ferruginous Hawk	Scaled Quail	Lesser Prairie-Chicken	Greater Prairie-Chicken	Sharp-tailed Grouse	Sage Grouse	Burrowing Owl	Loggerhead Shrike	Sprague's Pipit	Lark Bunting	McCown's Longspur	Baird's Sparrow	Cassin's Sparrow	Chestnut-collared Longspur	Worthen's Sparrow	Black tailed Prairie dog	Mexican Pronghorn	Bison	Northern Bobwhite Quail	Mexican Prairie Dog	Gypsophylous Vegetation
Thunder Basin\Conata	Hole in the Wall	1	2,179	5.48	40	H		H	M				P	M	M	L		L	L			L		H		P			
Thunder Basin\Conata	Thunder Basin	2	1,648	7.51	23	H		H	H				P	P	M	M		M	M			H		V		M			
Thunder Basin\Conata	Conata Basin	3	6,948	5.77	37	P		P	L				L	P	H	L		M	M			H		V		H			
Missouri Couteau	Southern Coteau	4	6,977	2.00	49		P		P				H		P	L	P	M		P		P							
Cheyenne Prairie	Cheyenne River	5	2,550	6.64	31			H	M				M		M	M	P	M				L		H		V			
Missouri Couteau	Chase Lake	6	3,534	6.33	33		V		L				M		P	M	H	M		H		M							
Missouri Couteau	Lostwood	7	1,443	6.32	34		M		L				H			M	V	L		V		M				P			
Medicine Line Mixed-grass	Montana Glaciated Plains	8	11,261	10.59	12	V	P	M	H				H	V	V	M	M	M	H	L		H		V		V			
Agassiz Tallgrass	Aspen Parkland	9	1,781	2.00	49							M	L			L				P									
Medicine Line Mixed-grass	Prairie Montana	10	3,652	7.49	24	P	P	H	M				M	M	P	M	V	M	H	V		V		P		L			
Missouri Couteau	State Line Wetlands	11	1,919	4.67	41		H		P				P		P	L	H	L		H		H							
Agassiz Tallgrass	Tall-grass	12	834	2.00	49							V	M		P	L				P									
Manitoba Mixed-grass\Towner Sandhills	Poverty Plains	13	1,725	3.78	44				M				M				M												
Rocky Mountain Front	Rocky Mountain Front	14	9,189	1.88	52		P	M	M				H		P	L	L	P	L	P		L							
Rocky Mountain Front	Milk River Ridge	15	3,570	1.89	52			L	L				L							P						L			
Missouri Couteau	Cactus Hills/Dirt Hills	16	2,504	7.33	25		H	M	L				M		M	L	H	L	L	H		M							
Medicine Line Mixed-grass	Great Sandhills[2]	17	3,172	3.36	48	P	P	L					H	P	P	M	L	L	P	L		L		P		P			
Medicine Line Mixed-grass	Suffield	18	2,690	9.30			P	H	H				H		M	H	H	H	H	H		H		P					
Medicine Line Mixed-grass	Bow Island	19	5,686	9.04	20	P	P							P												P			
Missouri Couteau	Monet/Matador	20	1,400	7.33	25		P	L	L				M		L	L	H	P	L	H		M							
Rocky Mountain Front	Porcupine Hills	21	4,763	1.89	52			L	L				H			L				P						L			
Northern Fescue	Rumsey Block	22	2,600	3.67	45		H		H				H		H	H	H			H									

ESR	GPCA Name	GPCA Number	GPCA Area (Km²)	GPCA Quantitative Rating[1]	GPCA Rank Order[1]	Mountain Plover	Piping plover	Long-billed Curlew	Ferruginous Hawk	Scaled Quail	Lesser Prairie-Chicken	Greater Prairie-Chicken	Sharp-tailed Grouse	Sage Grouse	Burrowing Owl	Loggerhead Shrike	Sprague's Pipit	Lark Bunting	McCown's Longspur	Baird's Sparrow	Cassin's Sparrow	Chestnut-collared Longspur	Worthen´s Sparrow	Black tailed Prairie dog	Mexican Pronghorn	Bison	Northern Bobwhite Quail	Mexican Prairie Dog	Gypsophylous Vegetation
Northern Fescue	Manitou	23	2,100	3.67	45								H				L			L									M
Northern Fescue	Wainwright/Neutral Hills	24	5,800	3.67	45		M		M				M			M	M	M	M	M		M							
Southern Prairies	Central Red Hills	25	2,956	11.25	4		P		L		H				M	M		P	P		P	L		M		M	H		
Southern Prairies	Western Red Hills	26	3,856	11.25	4		P	P	L		V				M	L	P	L	L		M	L		M			M		
Southern Prairies	Ellis	27	4,210	11.25	4				L		L				L	M					M			L		H	M		
Southern Prairies	Cimarron	28	7,622	11.25	4	H		H	M	M	H				H	M		M	M		H	M		H			M		
Southern Prairies	Mescalero Sands	29	11,595	11.25	4			L	M	H	V				L	M	P	M	M		V	H		L			M		
Southern Prairies	Rita Blanca	30	9,262	11.25	4			L	M	P					M	L	P	L	L		L	H		M			P		
Flint Hills	Flint Hills	31	14,005	4.24	42		L	P				V			P	H						P		P		L	H		
Smoky Hills	Chalk Bluff[2]	32	3,811	5.68	38						M	M			H			H						H					
Southern Prairies	Carrzozo[2]	33	3,445	6.25	35	M		L			P				L	L			L	P	L	M							
Southern Prairies	Thunder Basin, Bill[2]	34	14,821	9.75	14				H						M				M			H		M					
Pawnee Grasslands	Pawnee	35	9,097	6.41	32	H		L	M				L		M	M		M	V		M	M		H		M			
Thunder Basin\Conata	Sioux Box Butte	36	5,229	4.22	43			L	M					H	L	H		H	M			L		L		H	P		
Southern Prairies	Roosevelt[2]	37	3,365	9.50	17	M			H		H				M	M					V			M					
Southern Prairies	Panhandle[2]	38	1,655	10.50	13			H			H										H	H					L		
Southern Prairies	Kiowa[2]	39	855	6.06	36	M					P	P					P	L	L		H	L		P			L		
Southern Prairies	Curry[2]	40	1,368	9.75	14	M			H		H				M	M													
Chihuahua - Tokio/Mapimi	Cuatro Cienegas	41	1,531	9.22	19	P	P	L		M					M	M		L			M								V
Chihuahua - Tokio/Mapimi	Tokio	42	9,364	12.25	2	V		V	V	M					V	H	L	L	L		H		V					V	V
Chihuahua - Tokio/Mapimi	Mapimi	43	6,824	11.75	3	M		H	M	V					H	H	L	V	P	M	V	H							
Sierra Madre Occidental Foothills	Cuchillas de la Zarca	44	5,914	9.71	16				M	M						M	H	L		H	L								
Chihuahua - Marfa/Big Bend/Maderas del Carmen	Valle Colombia	45	4,477	7.24	27																								
Chihuahua - Marfa/Big Bend/Maderas del Carmen	Valles Centrales	46	10,316	12.48	1																								

ESR	GPCA Name	GPCA Number	GPCA Area (Km^2)	GPCA Quantitative Rating[1]	GPCA Rank Order[1]	Mountain Plover	Piping plover	Long-billed Curlew	Ferruginous Hawk	Scaled Quail	Lesser Prairie-Chicken	Greater Prairie-Chicken	Sharp-tailed Grouse	Sage Grouse	Burrowing Owl	Loggerhead Shrike	Sprague's Pipit	Lark Bunting	McCown's Longspur	Baird's Sparrow	Cassin's Sparrow	Chestnut-collared Longspur	Worthen´s Sparrow	Black tailed Prairie dog	Mexican Pronghorn	Bison	Northern Bobwhite Quail	Mexican Prairie Dog	Gypsophylous Vegetation
Chihuahua - Marfa/Big Bend/Maderas del Carmen	Marfa	47	3,123	5.55	39	P		M	L	M					L	M	M	M	L	M	M			L					
Sierra Madre Occidental Foothills	Otero Mesa	48	2,494	7.75	21			L	M	H					M	H	L	M	L	L	M	M		L					
Sierra Madre Occidental Foothills	Sonoita	49	2,998	6.95	29			P	L	H					L	H	M	H	L	M	H	M		P	L				
Sierra Madre Occidental Foothills	Sulphur Springs	50	3,311	7.21	28	L		L	M	H					L	H	L	H	L	M	M	M							
Sierra Madre Occidental Foothills	Janos	51	4,866	10.69	11	V		H	V	M					V	H	H	V	L	L	L	H		V	H				
Sierra Madre Occidental Foothills	New Mexico Bootheel	52	7,547	7.75	21	L		M	M	H					L	V	L	H	L	L	H	H		L	H				
Sierra Madre Occidental Foothills	Armendaris	53	1,500	6.95	29			P	L	H					M	H	L	L	P	L	M	H		L					
Medicine Line Mixed-grass	Sage Creek Milk River	54	6,741	9.30	18	L	P	V	H				M	H	H	H	H	H	H	V	V	V		P		P			
Medicine Line Mixed-grass	Frenchman River - Bitter Creek OMB	55	6,614	11.10	10	P	P	V	H				M	H	H	H	H	H	H	V	V	V		H		H			

1. Regional reviewers of this report were asked to provide species importance ratings for GPCAs that were not attributed before the close of the expert workshop. In some instances, reviewers also suggested changes to the species importance ratings given to individual GPCAs during the workshop. Changing the species importance ratings for a GPCA would change it's quantitative ranking and could also result in a change in its rank order. Because 1) the purpose of this report was to capture the consensus of experts at the workshop regarding GPCAs; 2) workshop participants made selections of the GPCAs based in part on the presented quantitative scores and rank orders; and 3) not all workshop participants would have had chance to evaluate the suggested changes; therefore species importance ratings for individual GPCAs were not changed according to reviewer comments except to fill in importance ratings for GPCAs not attributed at the workshop.

2. Denotes GPCA rankings that were assigned by regional reviewers after the workshop.

Table 13. Threats assigned to final GPCAs and the most commonly assigned values for threat descriptions. See Appendix H for detailed descriptions of threats assigned to each GPCA.

		Value Most Commonly Assigned to GPCAs		
Threat	**Number GPCAs**	**Threat Rating**	**Threat Urgency**	**Threat Trend**
Alteration of Fire Regimes	21	Moderate	Very high; currently happening	Stable in magnitude
Altered Composition/Structure	19	Moderate	Very high; currently happening	Increasing in magnitude
Altered Disturbance Regimes	2	Very High	Very high; currently happening	Stable in magnitude
Electrocution	1	Moderate	Very high; currently happening	Stable in magnitude
Excessive Herbivory	18	High	Very high; currently happening	Stable in magnitude
Extraordinary Predation/Parasitism	11	High	Very high; currently happening	Stable in magnitude
Groundwater Depletion	5	High	Very high; currently happening	Increasing in magnitude
Habitat Disturbance/Destruction	48	High	Very high; currently happening	Increasing in magnitude
Habitat Fragmentation	44	High	Very high; currently happening	Increasing in magnitude
Modification of Water Levels; changes in natural flow patterns	2	High	Moderate; likely within 5 to 10 years	Stable in magnitude
Sedimentation, toxics/contaminants	3	Moderate	Low; possible within 10 to 20 years	Increasing in magnitude

5. Conclusions

Within a two-and-a-half-day workshop, Canadian, Mexican and United States´ experts on North America's central grasslands combined their collective knowledge with best available information on grassland locations, status, and existing conservation priorities. They defined a set of areas with outstanding ecological significance spanning central North America and identified the most pressing conservation priorities across three countries. The purpose of this exercise was to develop from coarse-scale data a set of grassland priority sites that are internationally significant. The many national-, regional-, and local-scale efforts that have identified priority grassland sites are still very important and should not be undervalued in favor of international sites. The GPCAs identified by the workshop experts, are deemed particularly important to the functioning and integrity of North America's Central Grasslands. Furthermore, GPCAs identify diverse communities that are known to be important to the survival of migratory and transboundary species. Some are important as critical wintering areas and other critical as breeding areas, and addition to the ecosystem services they provide such as carbon sequestration and soil and water conservation. Together the GPCAs offered in this report will help build a network of grassland conservation areas and practitioners and will ultimately help lead to preservation of the most significant grassland ecosystems across the whole of central North America.

6. References

American Bird Conservancy. 2002. Important Bird Areas of the United States. http://www.abcbirds.org/iba/

Bailey 1998. Ecoregions: the ecosystem geography of oceans and continents. Springer-Verlag. New York.

Balram, S., S. Dragićević and T. Meredith, 2004. A collaborative GIS method for integrating local and technical knowledge in establishing biodiversity conservation priorities Biodiversity and Conservation, 13: 1195–1208.

Blancher, P. 2003. Importance of North America's grasslands to birds. Report to the Commission for Environmental Cooperation. Montreal, Canada.. www.bsc-eoc.org/grassbirdsrpt.html

Ceballos, G., and P.R. Ehrlich. 2002. Mammal population losses and the extinction crisis. Science 296:904-907.

Commission for Environmental Cooperation (CEC). 2003. Strategic Plan for North American Cooperation in the Conservation of Biodiversity. Commission for Environmental Cooperation. Montreal. 99 pp. http://cec.org/pubs_docs/documents/index.cfm?varlan=english&ID=1088

Commission for Environmental Cooperation (CEC). 1997. Ecological regions of North America: towards a common perspective. Montreal, Quebec, Canada. www.cec.org/pubs_docs/documents/index.cfm?varlan=english&ID=344

Comisión Nacional de Áreas Naturales Protegidas (CONANP). 2004. Áreas Naturales Protegidas Federales de México. México, D.F. http://www.conanp.gob.mx

Conservation Biology Institute. 2001. CBI Protected Areas Database, Second Edition. Corvallis, Oregon, USA. http://www.consbio.org

Couturier, A. and K. Wilcox. 2004. Important bird areas of Canada database, edition 1.0. Bird Studies Canada and the Canadian Nature Federation. Port Rowan, Ontario, Canada.

ERIN Consulting Ltd. 2000. North American Conservation Areas Database. Regina, Saskatchewan, Canada. http://gogratis.cgdi.gc.ca/download/north_america_cad

Ferland, C.L. and S.M. Haig. 2002. 2001 International Piping Plover Census.U.S. Geological Survey, Forest and Rangeland Ecosystem Science Center, Corvallis, Oregon. 293 pp.

Gauthier, D. A. and E. B. Wiken. 1998. The Great Plains of North America. IUCN *PARKS* 8(3): 9-20.

Gauthier, D.A., A. Lafon, T. Toombs, J. Hoth and E.Wiken, 2003. Grasslands: Toward a North American Conservation Strategy. Canadian Plains Research Center, University of Regina, Regina, Saskatchewan, and Commission for Environmental Cooperation (CEC), Montreal, Quebec, Canada. http://cec.org/pubs_docs/documents/index.cfm?varlan=english&ID=1246

Groves, C.R. 2003. Drafting a conservation blueprint: a practitioner's guide to conservation planning for biodiversity. Island Press, Washington, D.C.

Hansen, M., DeFries, R., Townshend, J. R. G. and Sohlberg, R.. 1998. 1 Km Land Cover Classification Derived from AVHRR. College Park, Maryland: The Global Land Cover Facility. http://glcf.umiacs.umd.edu/data/landcover/

Instituto del Medio Ambiente y Desarrollo Sustentable del Estado de Sonora (IMADES), 2000. "Evaluación del ámbito hogareño del Berrendo sonorense (Antilocapra americana sonoriensis)". Extraído del proyecto L112 Evaluación del ámbito hogareño y calidad del hábitat del Borrego cimarrón (Ovis canadensis mexicana), Berrendo sonorense (Antilocapra americana sonoriensis) y Puma (Felis concolor) en la Reserva de la Biosfera El Pinacate y Gran Desierto de Altar. Escala 1:50 000. López Saavedra, Eduardo y Paredes Aguilar, Rafaela. México. El proyecto fue financiado por la Comisión Nacional para el Conocimiento y Uso de la Biodiversidad (CONABIO).

Meredith, T.C. 2002 Using spatial decision support systems in expert workshops. Human Ecology Review 9:72-76.

Morgan, L. S. Maxwell, F. Tsao, T. Wilkinson and P. Etnoyer. 2005. Marine Priority Conservation Areas: Baja California to the Bering Sea. Commission for Environmental Cooperation (CEC) and the Marine Conservation Biology Institute (MCBI). Montreal.

Noss, R.F. and B. Csuti. 1994. Habitat fragmentation. Pp 237-264 *in* Meffe, G.K. and C.R. Carroll. Principles of Conservation Biology. Sinauer Associates, Inc. Sunderland Massachussets, USA.

Noss, R.F., E. Dinerstein, B. Gilbert, M. Gilpin, B.J. Miller, J. Terborgh, and S. Troublulak. 1999. Core areas: where nature begins. Pp 99-128 *in* Soule, M.E. and J. Terborgh, eds. Continental Conservation: Scientific Foundations of Regional Reserve Networks. Island Press, Washington, D.C.

Noss, R.F., E.T. LaRoe III, and J.M. Scott. 1995. Endangered ecosystems of the United States: a preliminary assessment of loss and degradation. US Department of the Interior National Biological Service. Biological Report 28.

Peterson, A.T., Ortega-Huerta, M.A., Bartley, J., Sanchez-Cordero, V., Soberon, J., Buddemeier, R.H., and Stockwell, D.R.B. 2002. Future projections for Mexican faunas under global climate change scenarios. Nature 416:626-629

Proctor, J.D, B. Haskins, and S.C. Forrest. In Press. Focal areas for conservation of prairie dogs and the grassland ecosystem. In Hoogland, J. (ed). Conservation and management of prairie dogs.

Pronatura, The Nature Conservancy, and The World Wildlife Fund. 2004. Ecoregional Conservation Assessment of the Chihuahuan Desert. The Nature Conservancy.

Ridgely, R. S., T. F. Allnutt, T. Brooks, D. K. McNicol, D. W. Mehlman, B. E. Young, and J. R. Zook. 2003. Digital Distribution Maps of the Birds of the Western Hemisphere, version 1.0. NatureServe, Arlington, Virginia, USA.

Samson, F., and F. Knopf. 1994. Prairie Conservation in North America. *Bioscience* 44(6): 418-421.

Schmidt, R.H.. 1990. The Mega-Chihuahuan Desert. Pp. 105-115 *in* Powell, A.M., Hollander, R.R., Barlow, J.C., McGillivray, W.B., and Schmidly, D.J. (eds.). Symposium on Resources of the Chihuahuan Desert Region. Chihuahuan Desert Research Institute.

Scott, J.M., F.W. Davis, R.G. McGhie, G. Wright, C. Groves, and J. Estes. 2001. Nature reserves: do they capture the full range of America's biological diversity? Ecological Applications 11:99-107

Sección Mexicana del Consejo Internacional para la Preservación de las Aves CIPAMEX – Comisión Nacional para el Conocimiento y Uso de la Biodiversidad CONABIO. 1999. "Áreas de Importancia para la Conservación de las Aves". Escala 1:250 000. México. Financiado por CONABIO–FMCN–CCA.

Shaffer, M.L., J.M. Scott, and F. Casey. 2002. Noah's options: initial cost estimates of a national system of habitat conservation areas in the United States. BioScience 52:439-443.

Shipman, J.W. 1996. A Christmas Bird Count Database, Version 4.0. Zoological Data Processing. Socorro, NM. http://www.nmt.edu/~john/

The Nature Conservancy. 2001. Untilled Landscapes of the Great Plains Bioregion. The Nature Conservancy's Midwest Regional Office. Minneapolis, Minnesota, USA.

USGS Patuxent Wildlife Research Center. 2004. The North American Breeding Bird Survey, Route level Data Summaries 1966 - 2003. Version 2004.1. Laurel, MD, USA.

US North American Bird Conservation Initiative Committee. 2000. Bird conservation region descriptions: a supplement to the North American bird conservation initiative bird conservation regions map. US Fish and Wildlife Service, Division of Bird Habitat Conservation. Arlington, Virginia, USA. http://www.nabci-us.org/bcrs.html

Valdés, M. and Manterola, C. In press. "El Berrendo en Chihuahua". Unidos para la Conservación, A.C.

Velázquez, A. 2001. Situación de México con respecto a la conservación de los pastizales abiertos: mapas. Comisión de Cooperación Ambiental (CEC). Universidad Nacional Autónoma de México.

Watson, J.W., and U. Banasch. 2003. A Tri-National investigation of ferruginous hawk migration. Progress Report 1. Washington Department of Fish and Wildlife, Olympia, Washington, USA and Canadian Wildlife Service, Edmonton, Alberta , Canada.

World Resources Institute. 2000. Chapter 2-Taking Stock of Ecosystems-Grassland Ecosystems. Pp. 119-131 In World Resources 2000-2001: People and Ecosystems - The Fraying Web of Life. (Available at http://pubs.wri.org)

List of Acronyms

ABC	American Bird Conservancy
AVHRR	Advanced, Very-High Resolution Radiometer
BCR	Bird Conservation Region
CBED	Community-Based Environmental Decisions
CEC	Commission for Environmental Cooperation
CMRT	Consensus Mapper Round Tables
CONABIO	Comisión Nacional para el Conocimiento y Uso de la Biodiversidad
CONANP	Comisión Nacional de Áreas Naturales Protegidas
ESR	Ecologically Significant Region
ESRI	Environmental Systems Research Institute
GIS	Geographic Information System
GPCA	Grassland Priority Conservation Area
PIF	Partners In Flight
TNC	The Nature Conservancy
USDA	United States Department of Agriculture

Figure 1. The grassland priority conservation areas study area ranges from 20° to 54° north latitude and 93° and 114.5° west longitude. Scale boxes illustrate the approximate anticipated size of ecologically significant regions and priority conservation areas.

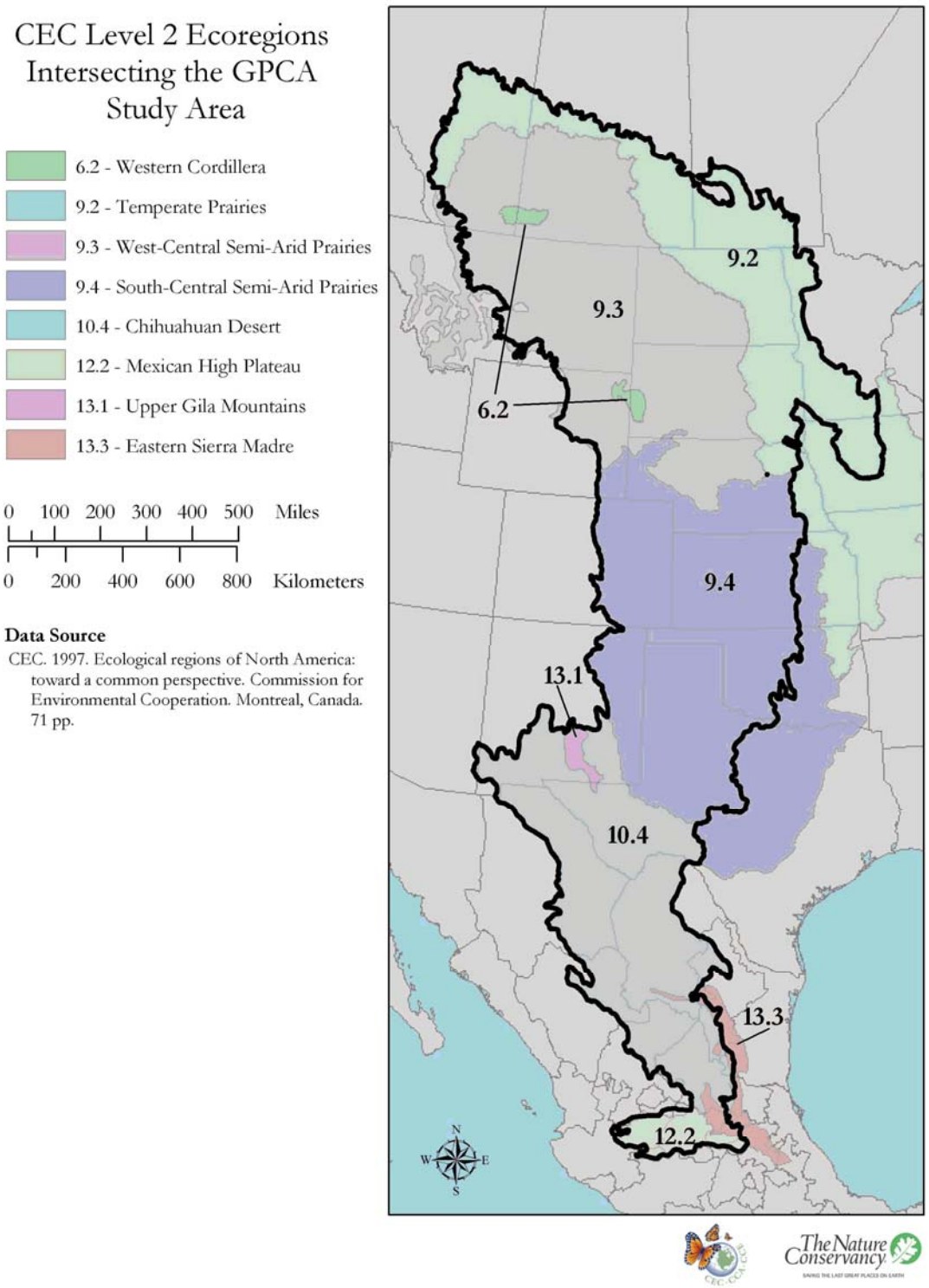


Figure 2. The Commission for Environmental Cooperation's Level 2 Ecoregions within the GPCA study area.

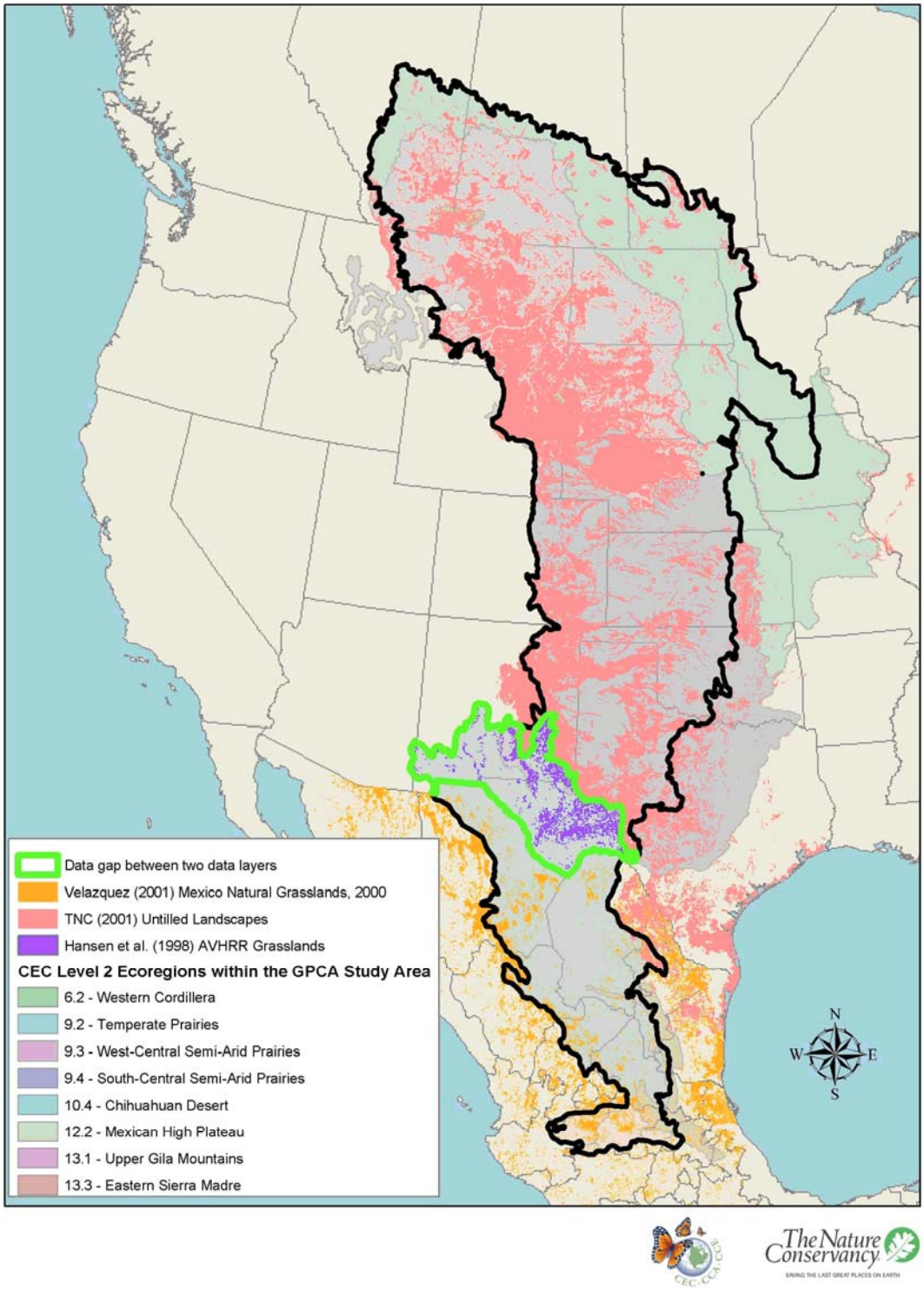


Figure 3. Primary grassland data layers used in the GPCA project. Geographic gap in data coverage between the 2000 TNC untilled landscapes layer (TNC 2001) and Velazquez's (2001) Mexico natural grasslands layer is shown in green outline.

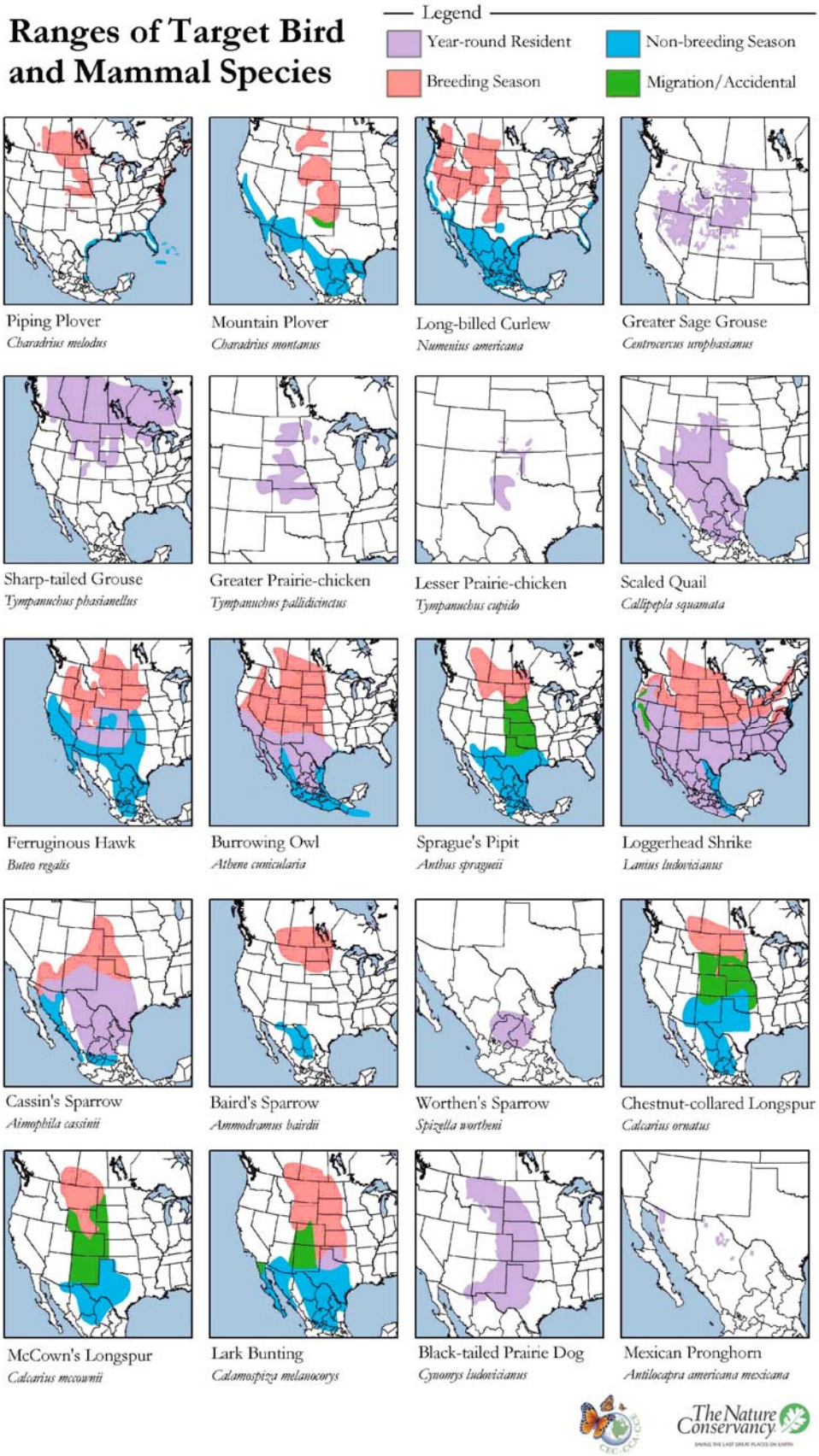


Figure 4. Continental ranges for the twenty GPCA focal species.

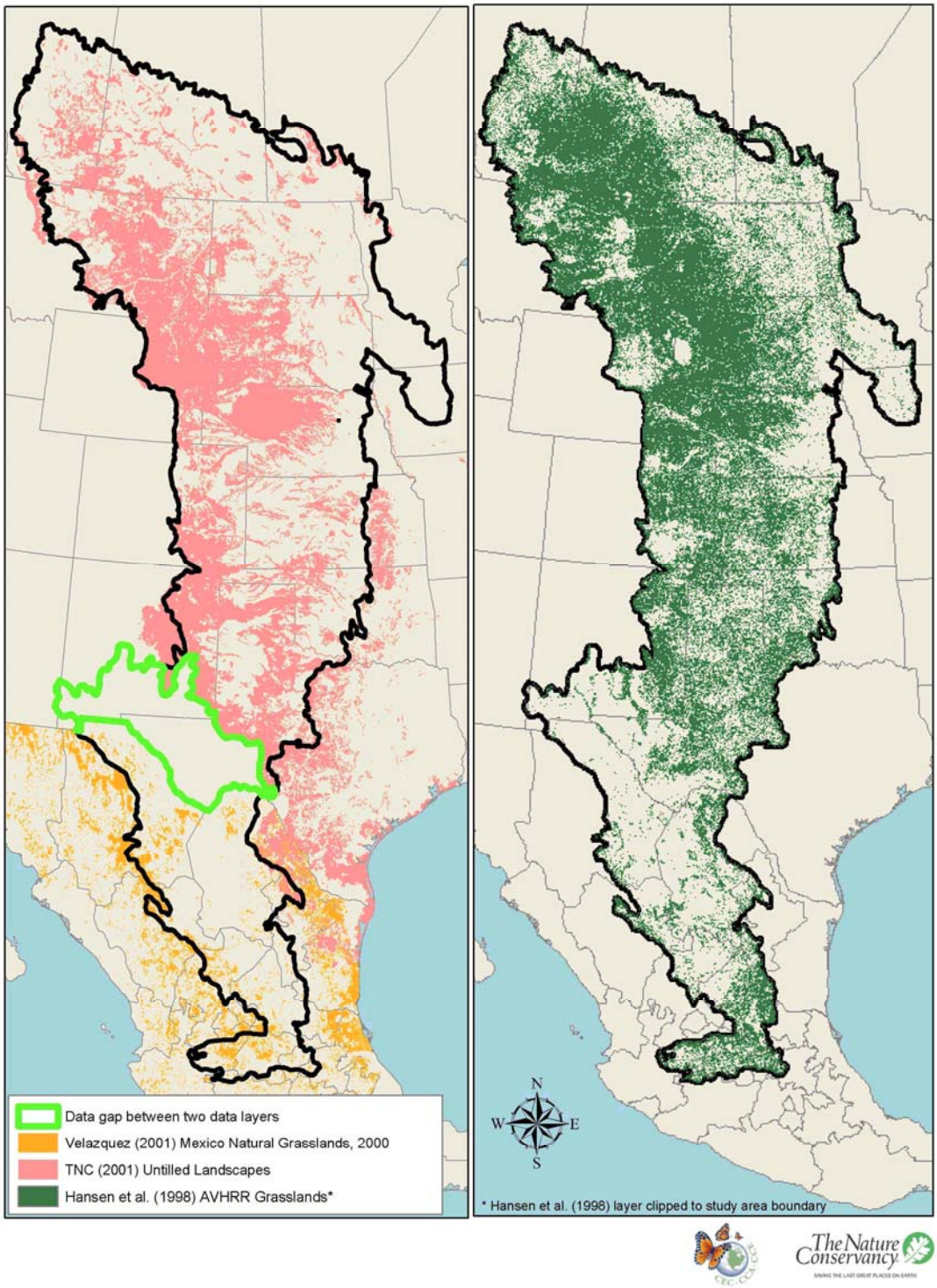


Figure 5. Comparison of the two grassland layers mapping native grasslands (TNC 2001, Velazquez 2001) and Hansen et al.'s (1998) AVHRR classification that considered grasslands as one of 13 land cover types within North America.

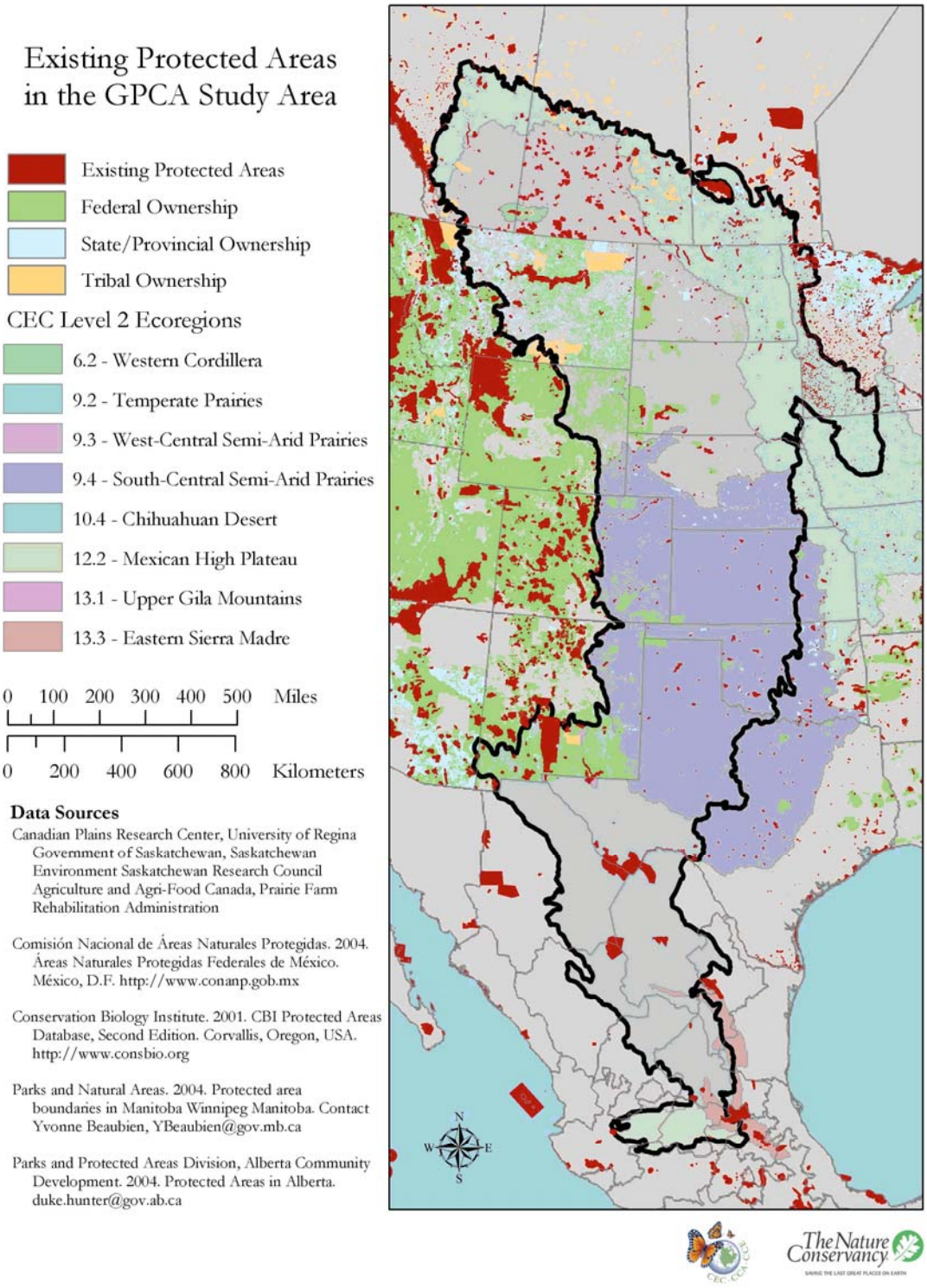


Figure 6. Existing protected areas within the GPCA study area. Protected areas included all lands managed for the long-term maintenance of biological diversity such as national parks, wilderness areas, wildlife refuges, nature preserves and conservation easements.

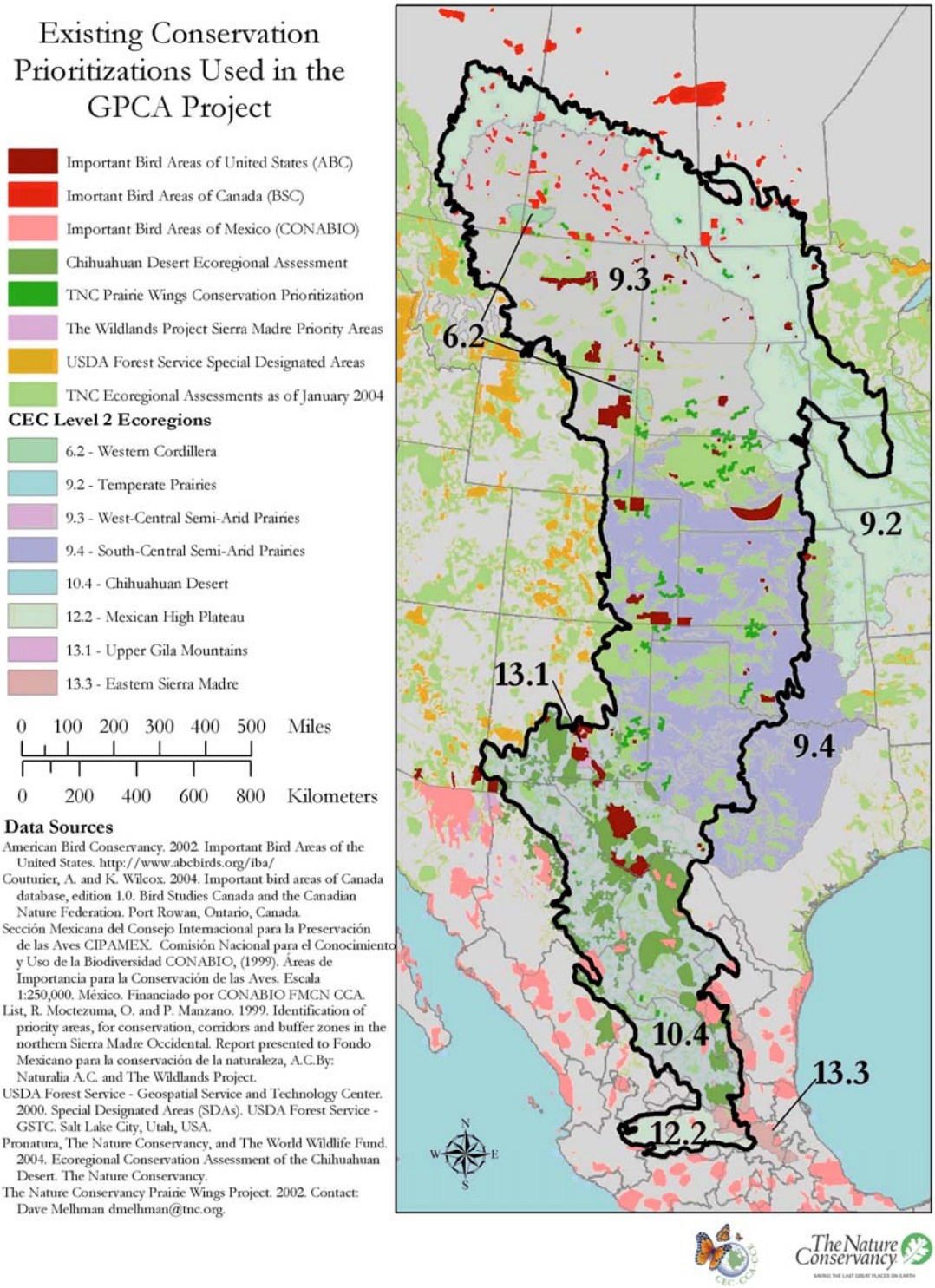


Figure 7. Conservation prioritizations within the GPCA study area used in this study

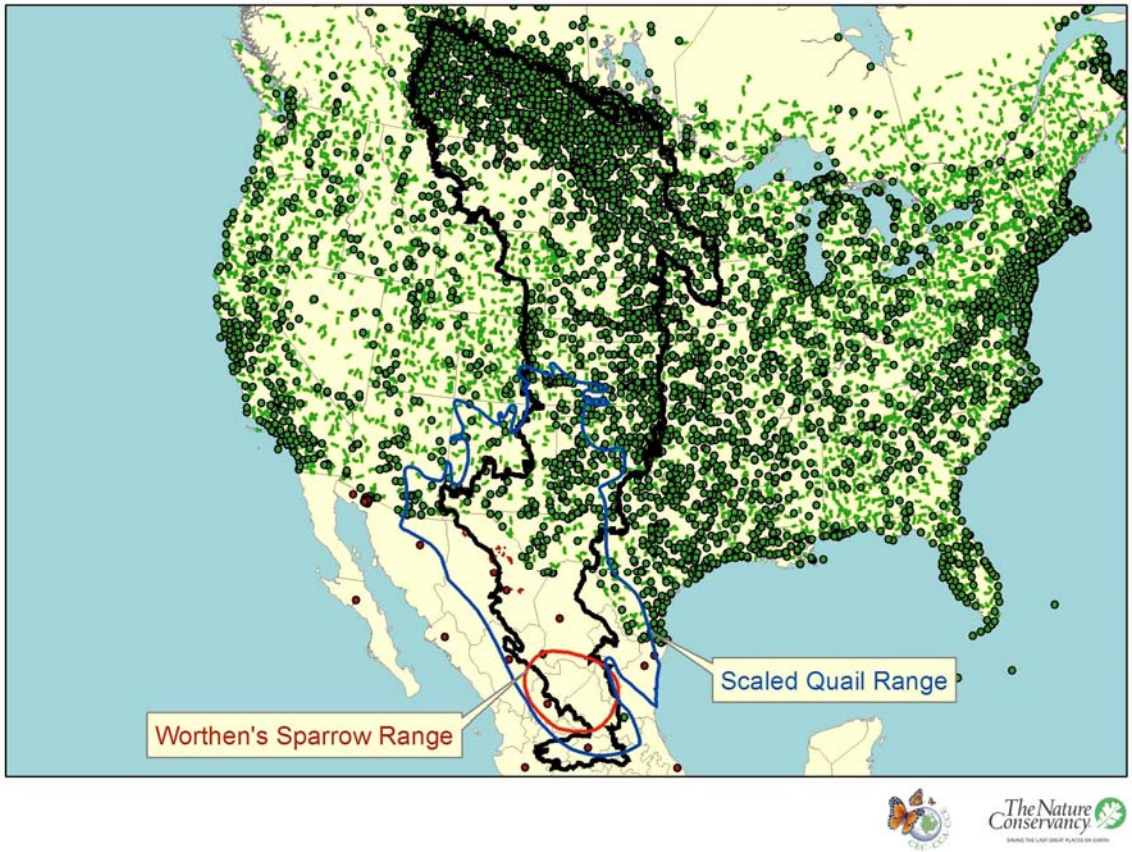


Figure 8. Example of the disparity in data availability between the Canada and the United States and Mexico. For some species like the Worthen's Sparrow, no observation data were available for this project and identification of GPCAs relied on the species range and expert knowledge of the species and its habitats. Some species like the Scaled Quail had observation data for only part of their range. Observation data from Shipman (1996), Blancher (2003), and USGS Patuxent Wildlife Research Center (2004). Species range definitions from Ridgely et al. (2003).

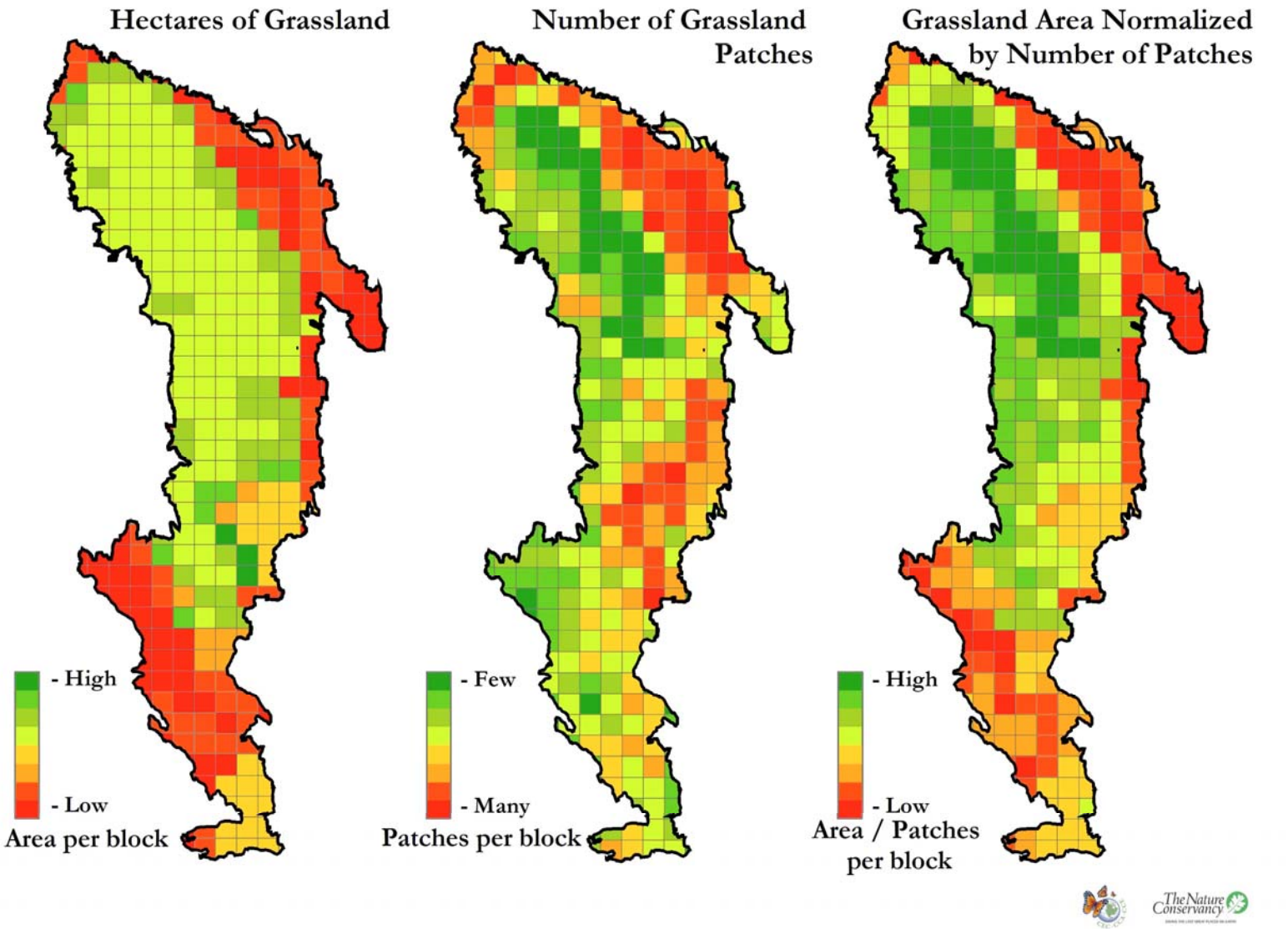


Figure 9. Conservation integrity as represented by grassland area normalized by number of patches. Grassland area normalized by number of patches gives the best representation of patch size and connectivity. Statistics on grassland fragmentation calculated from grasslands as defined by Hansen et al. (1998).

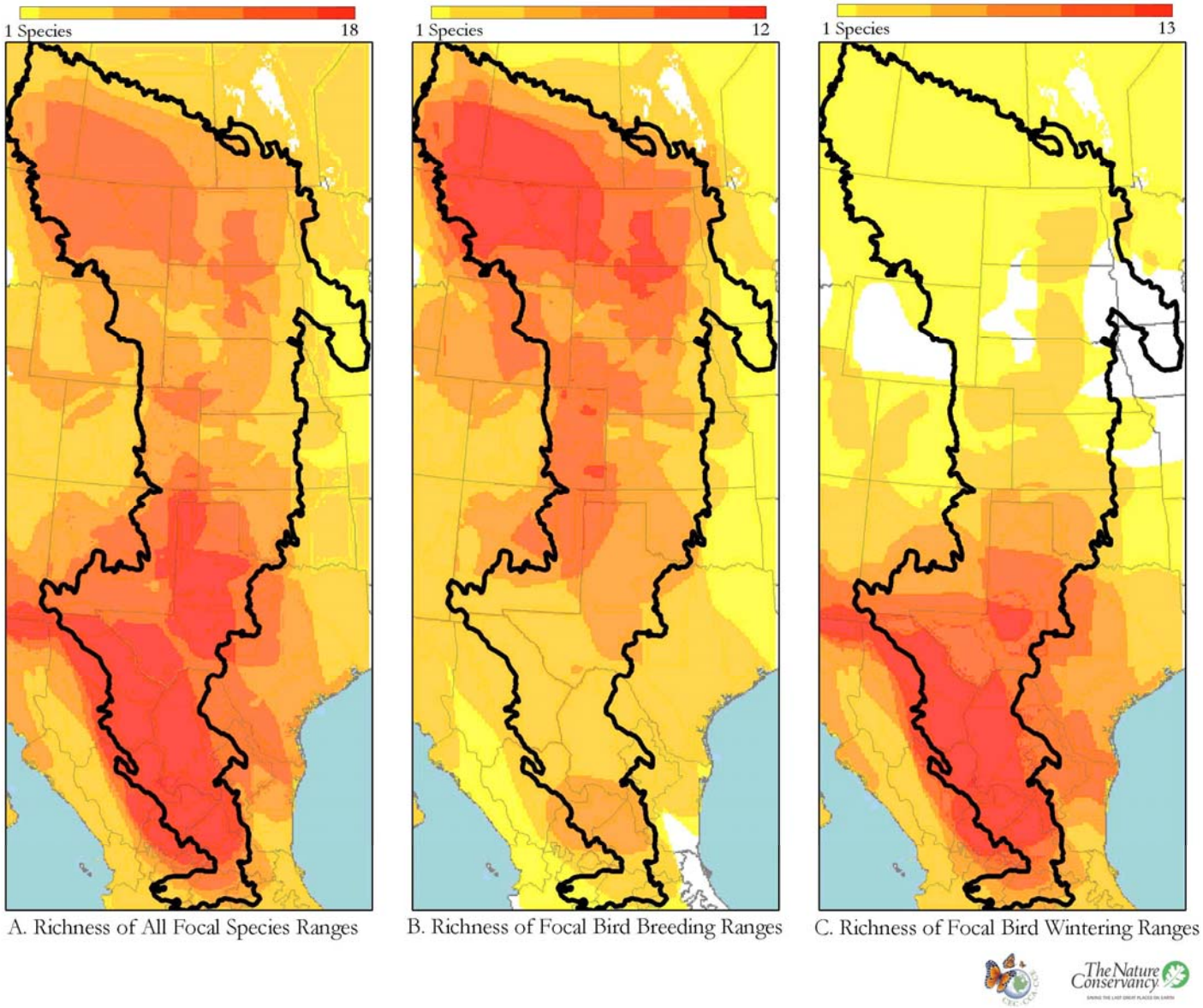
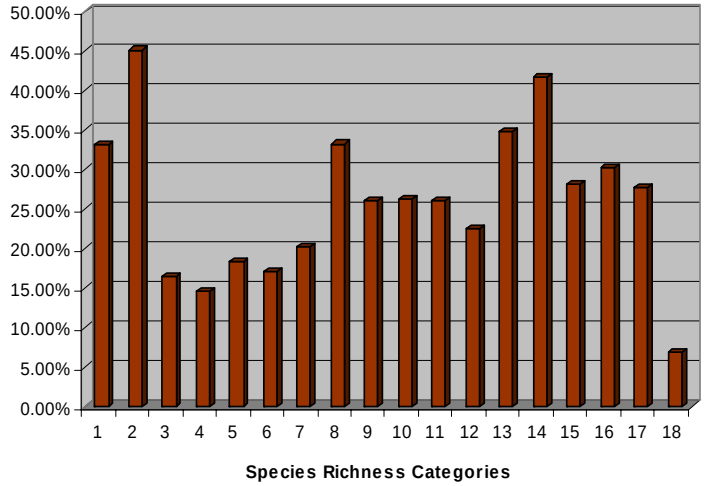
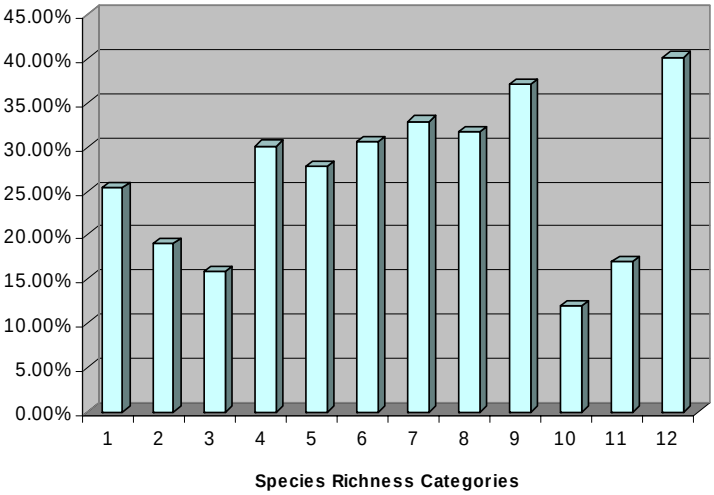


Figure 10. Richness of focal species ranges for a) all focal species (breeding and winter ranges for birds), b) breeding ranges of focal bird species, and c) wintering ranges for focal bird species. Richness expressed in number of species co-occurring in a given location.

A. All Species Richness



B. Breeding Bird Species Richness



C. Wintering Bird Species Richness

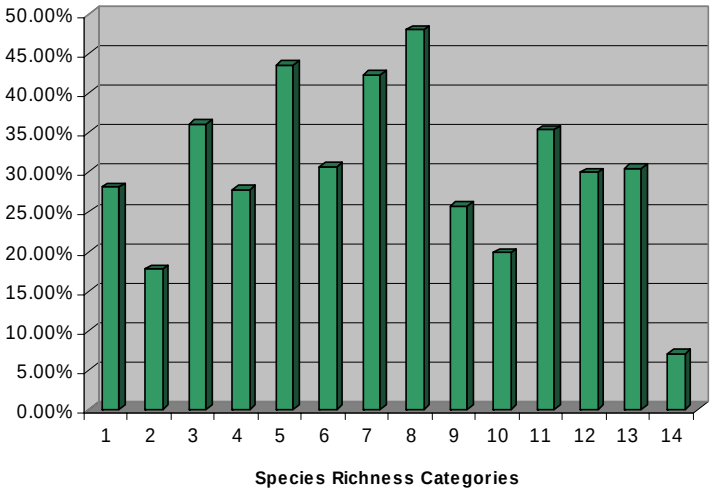


Figure 11. Percent of each focal species richness category that existing priority areas cover for a) all focal species ranges, b) breeding focal bird ranges, and c) wintering focal bird ranges. For example, the priority areas compiled for this project account for approximately 6% of the area occupied by the highest richness (14 species) of wintering birds.

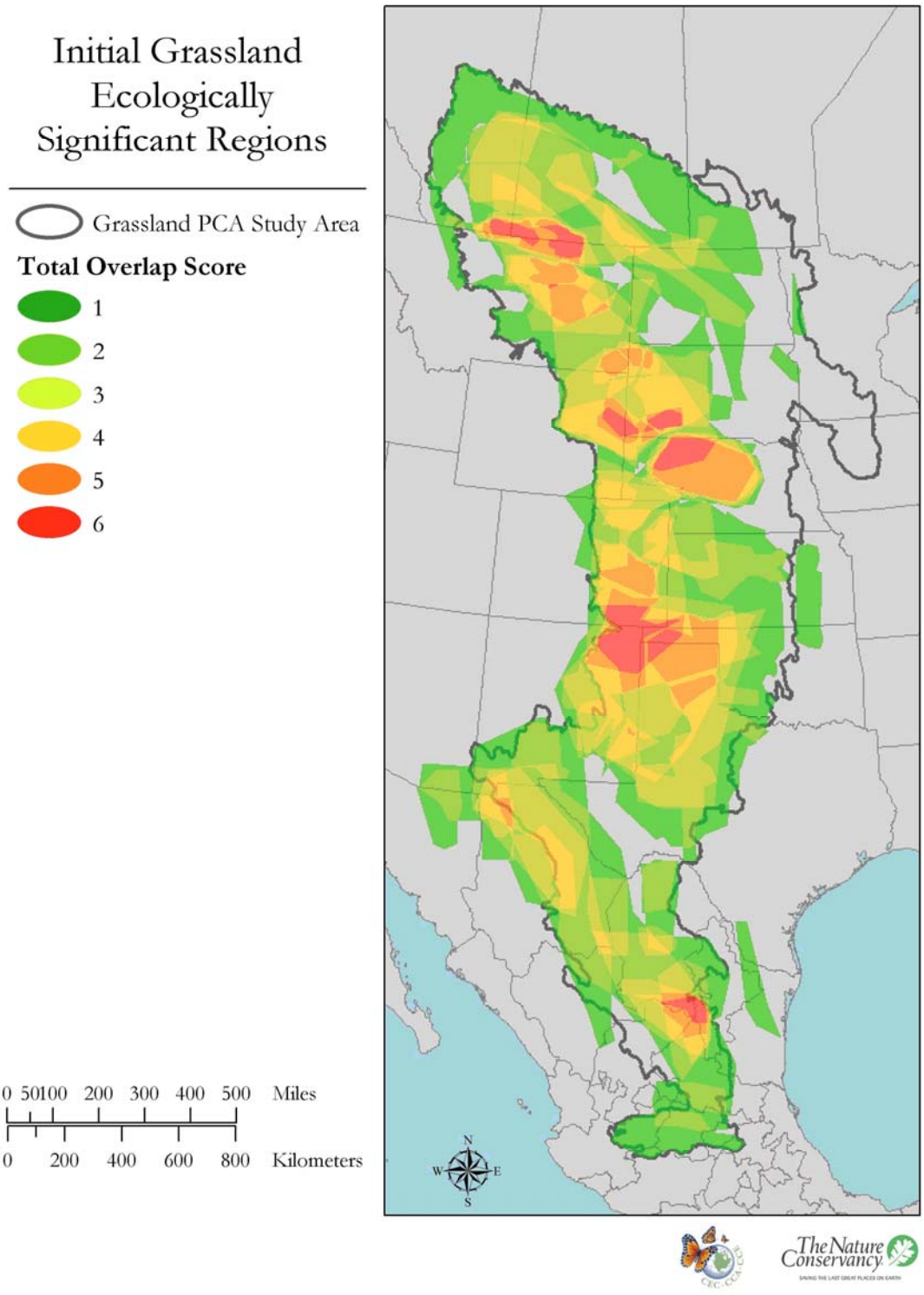


Figure 12. Overlap of ecologically significant regions (ESRs) from six thematically-arranged groups of workshop participants asked to identify ESRs across the entire study area based on their areas of expertise.

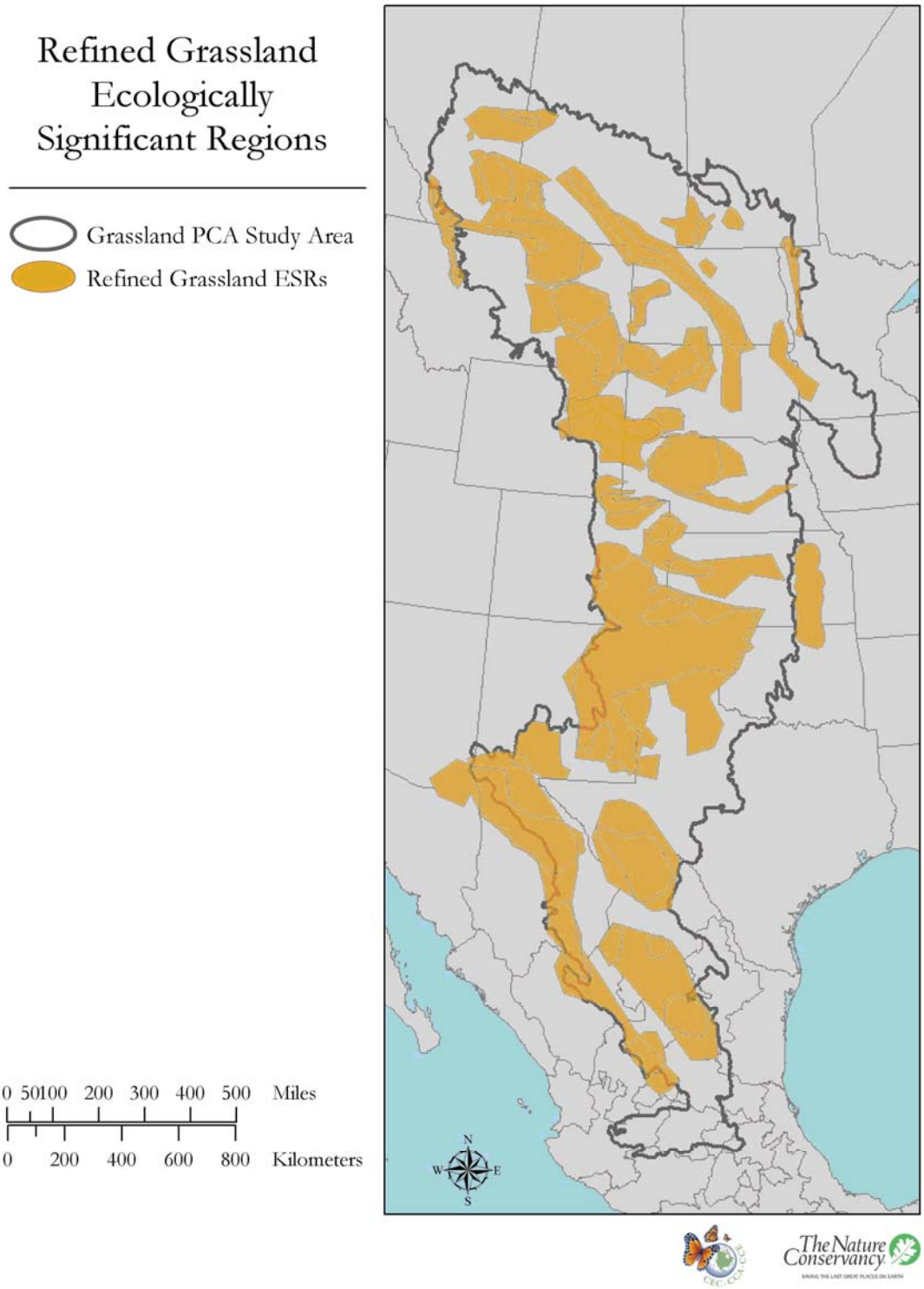


Figure 13. Ecologically significant regions (ESRs) refined from the previous step (overlay of all thematically-generated ESRs) by geographically-arranged groups of workshop participants.

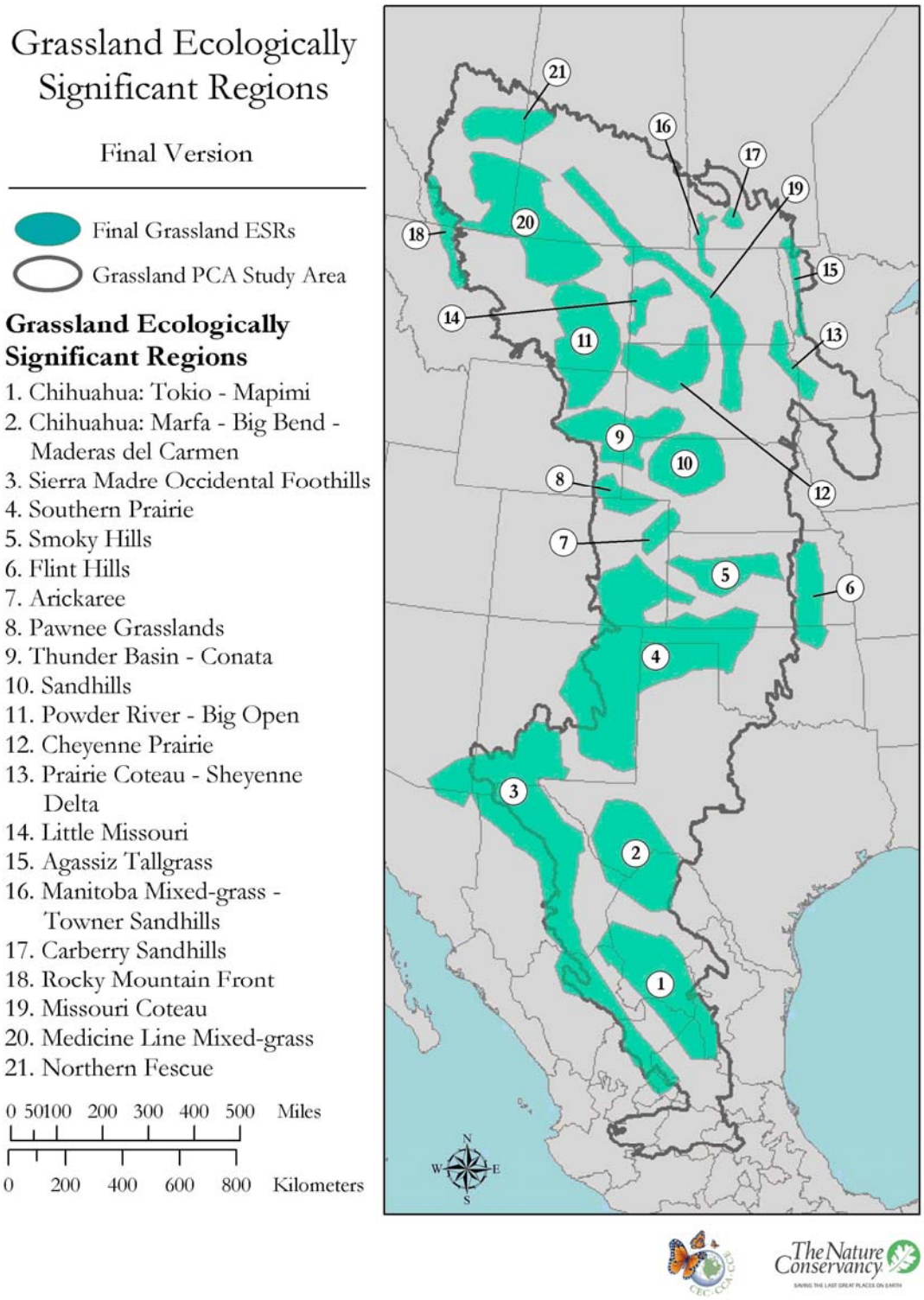
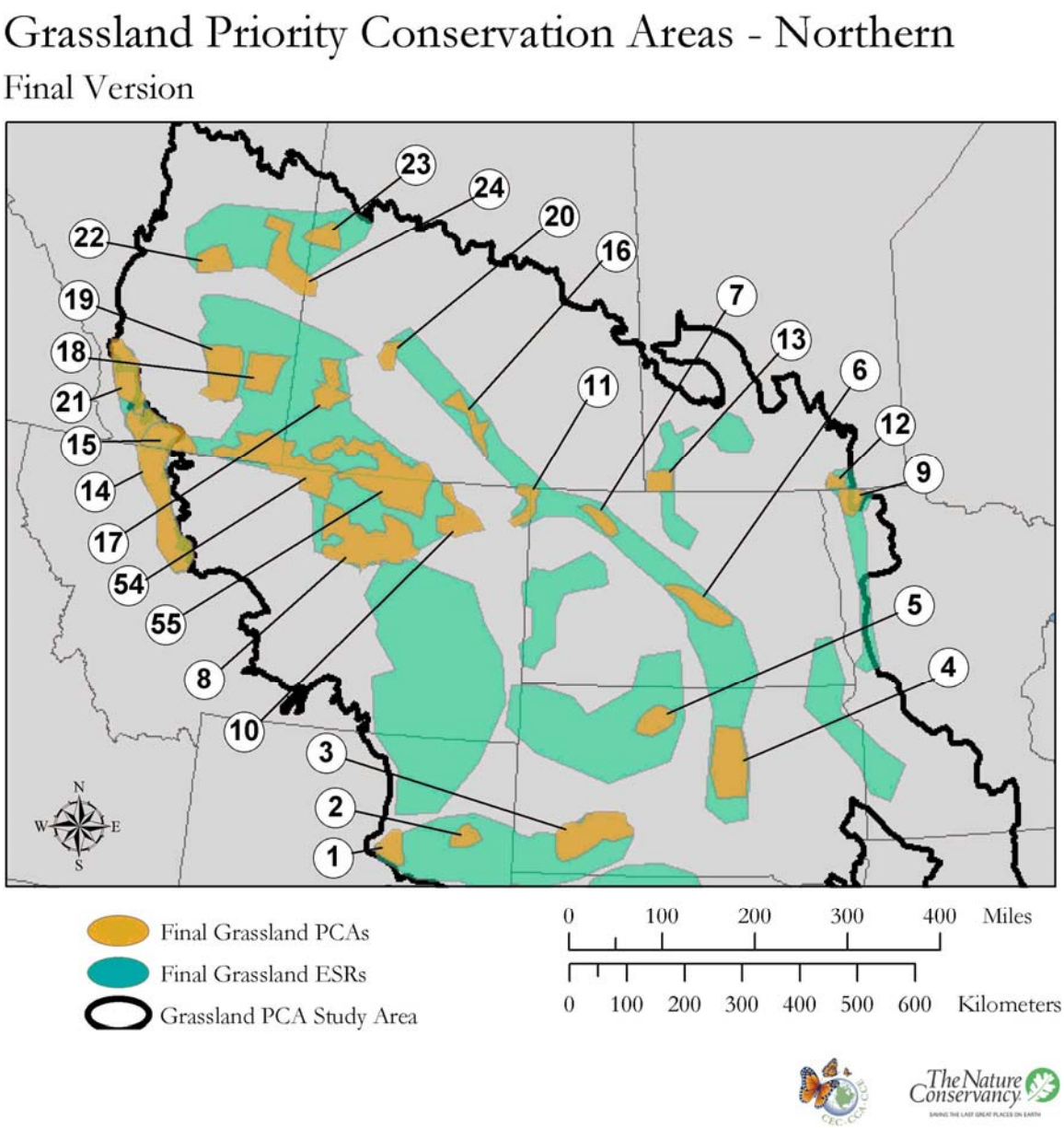
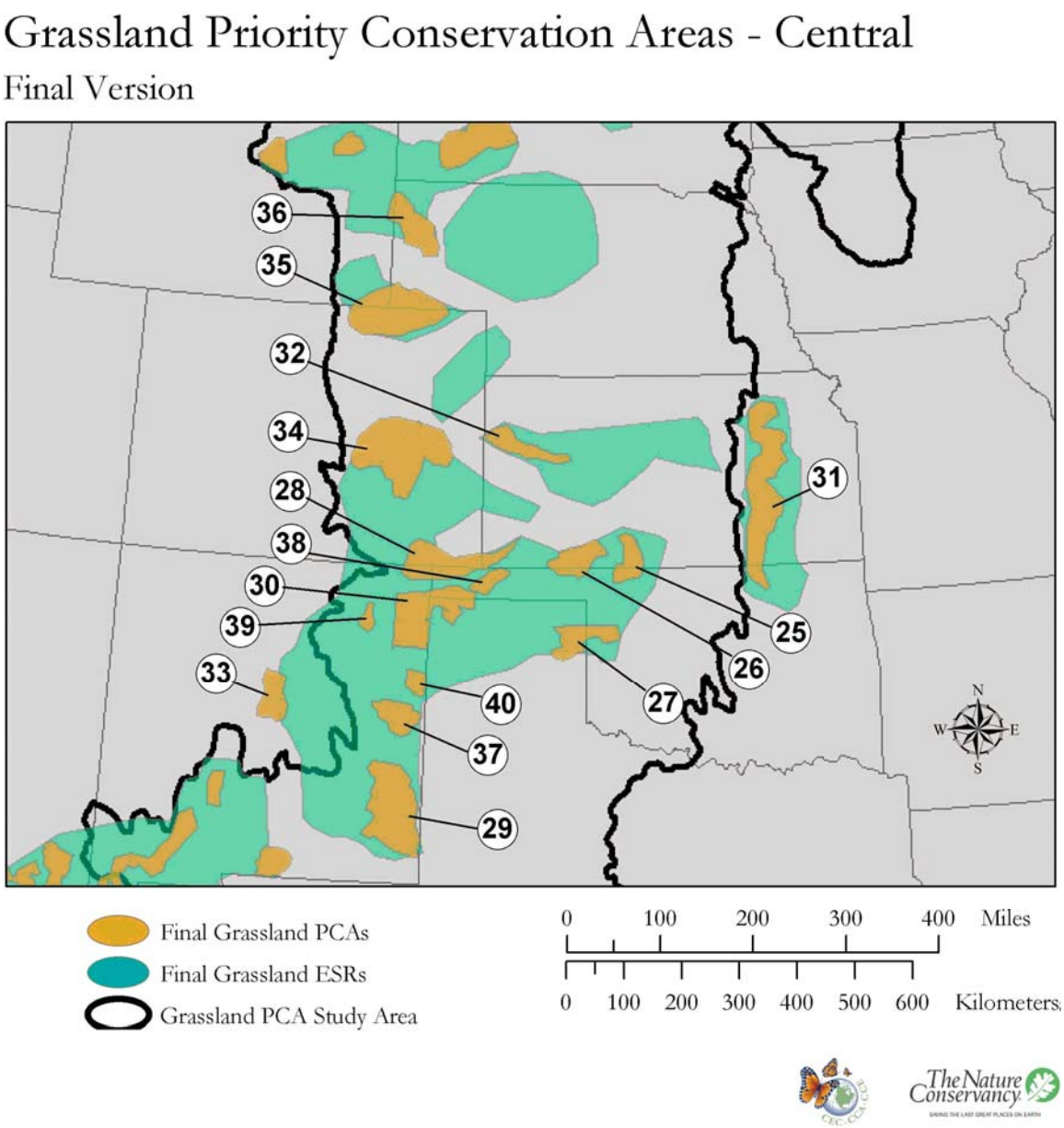


Figure 14. Final Ecologically Significant Regions as defined by workshop participant groups.



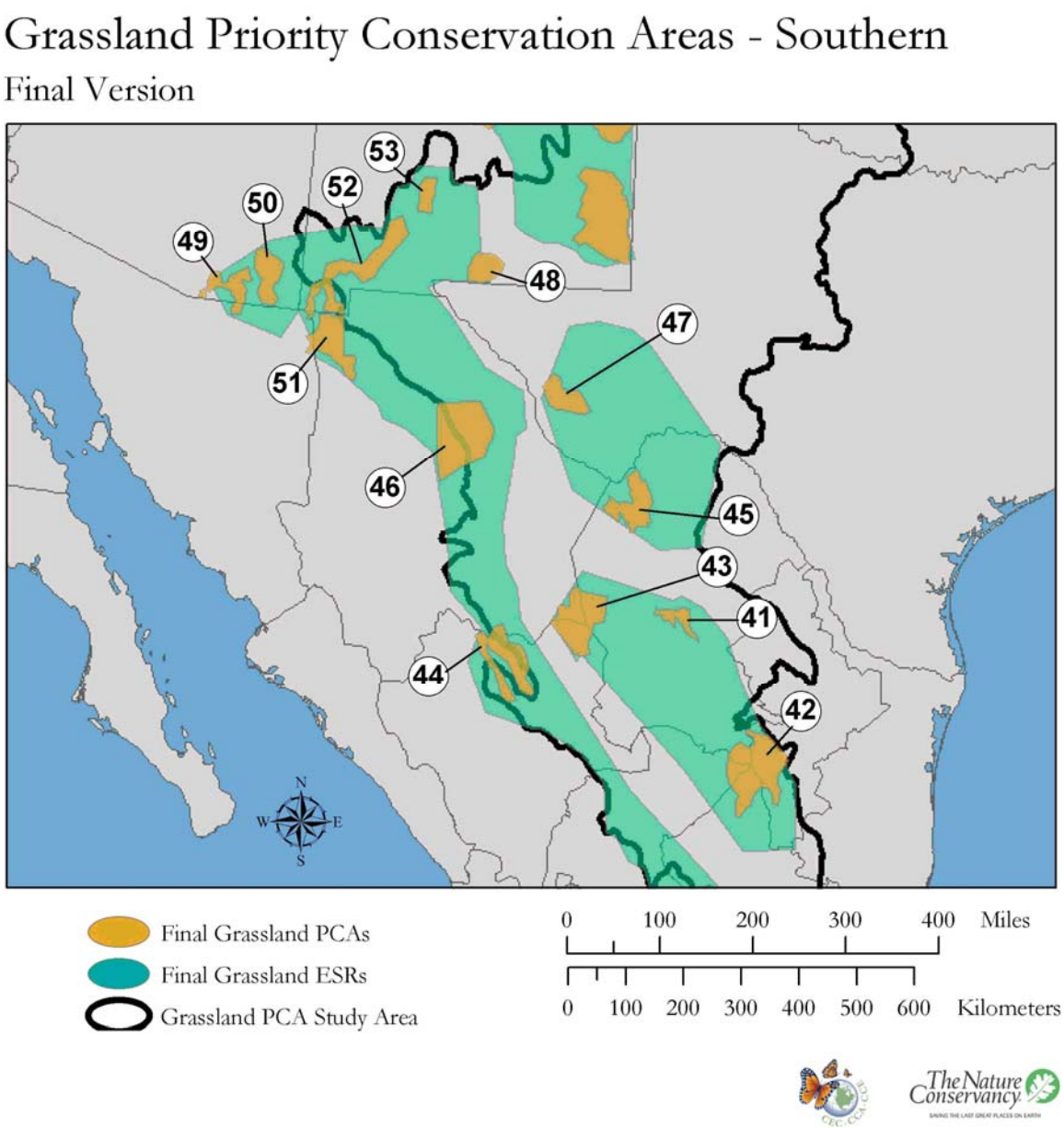
1. Hole in the Wall
2. Thunder Basin
3. Conata Basin
4. Southern Coteau
5. Cheyenne River
6. Chase Lake
7. Lostwood
8. Montana Glaciated Plains
9. Aspen Parkland
10. Prairie Montana
11. State-line Wetlands
12. Tall-grass
13. Poverty Plains
14. Rocky Mountain Front
15. Milk River Ridge
16. Cactus Hills/Dirt Hills
17. Great Sandhills
18. Suffield
19. Bow Island
20. Monet/Matador
21. Porcupine Hills
22. Rumsey Block
23. Manitou
24. Wainwright/Neutral Hills
54. Sage Creek Milk River
55. Frenchman River – Bitter Creek OMB

Figure 15. Final Priority Conservation Areas in the northern region.



25. Central Red Hills
26. Western Red Hills
27. Ellis
28. Cimarron
29. Mescalero Sands
30. Rita Blanca
31. Flint Hills
32. Chalk Bluff
33. Carrzozo
34. Thunder Basin, Bill
35. Pawnee
36. Sioux Box Butte
37. Roosevelt
38. Panhandle
39. Kiowa
40. Curry

Figure 16. Final Priority Conservation Areas for the central region.



41. Cuatro Cienegas
42. Tokio
43. Mapimi
44. Cuchillas de la Zarca
45. Valle Colombia
46. Valles Centrales
47. Marfa
48. Otero Mesa
49. Sonoita
50. Sulphur Springs
51. Janos
52. New Mexico Bootheel
53. Amendaris

Figure 17. Final Priority Conservation Areas for the southern region.

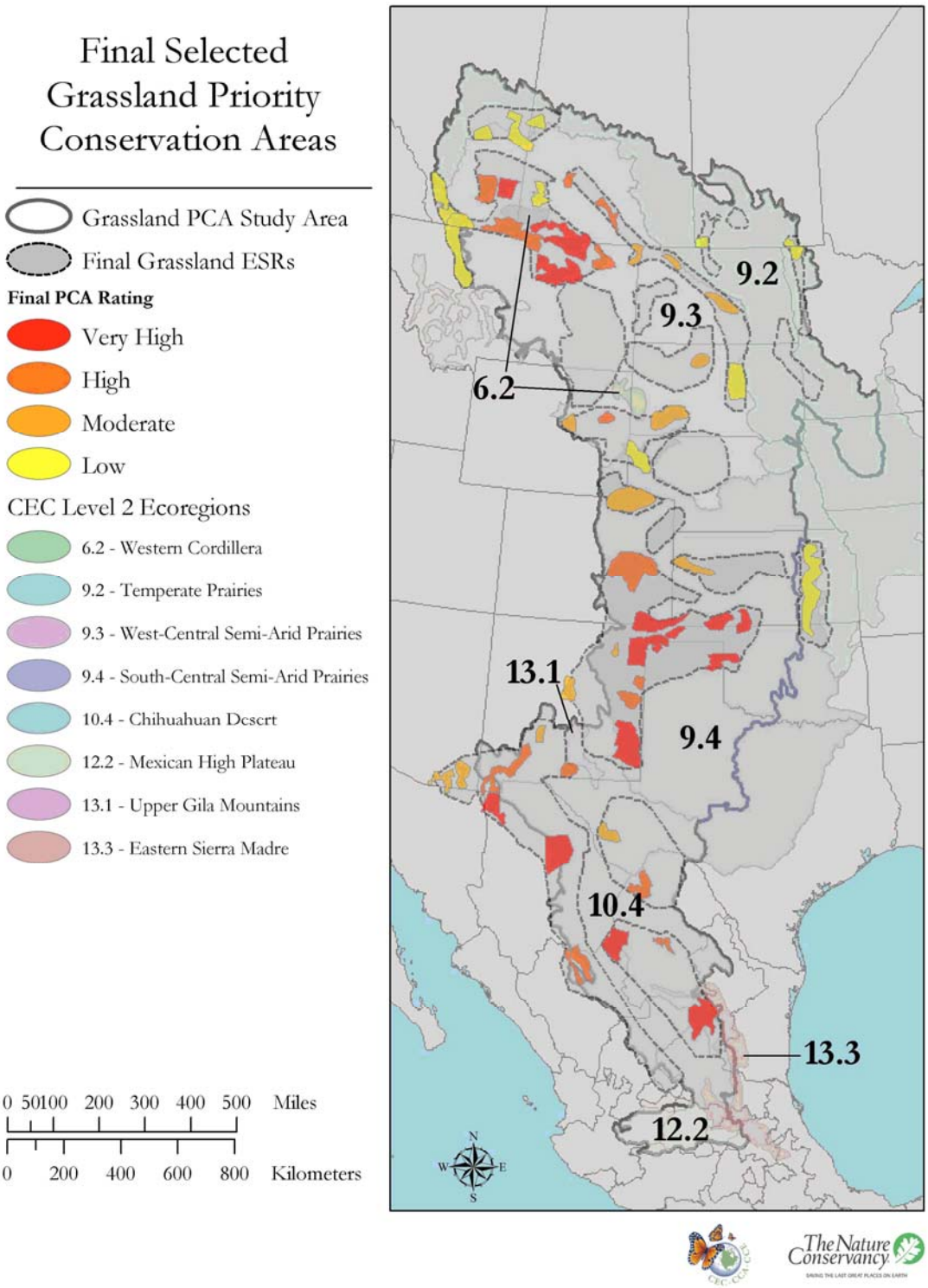


Figure 18. Final quantitative rankings given to priority conservation areas based on the relative importance of each PCA to the focal species assigned by participant groups.

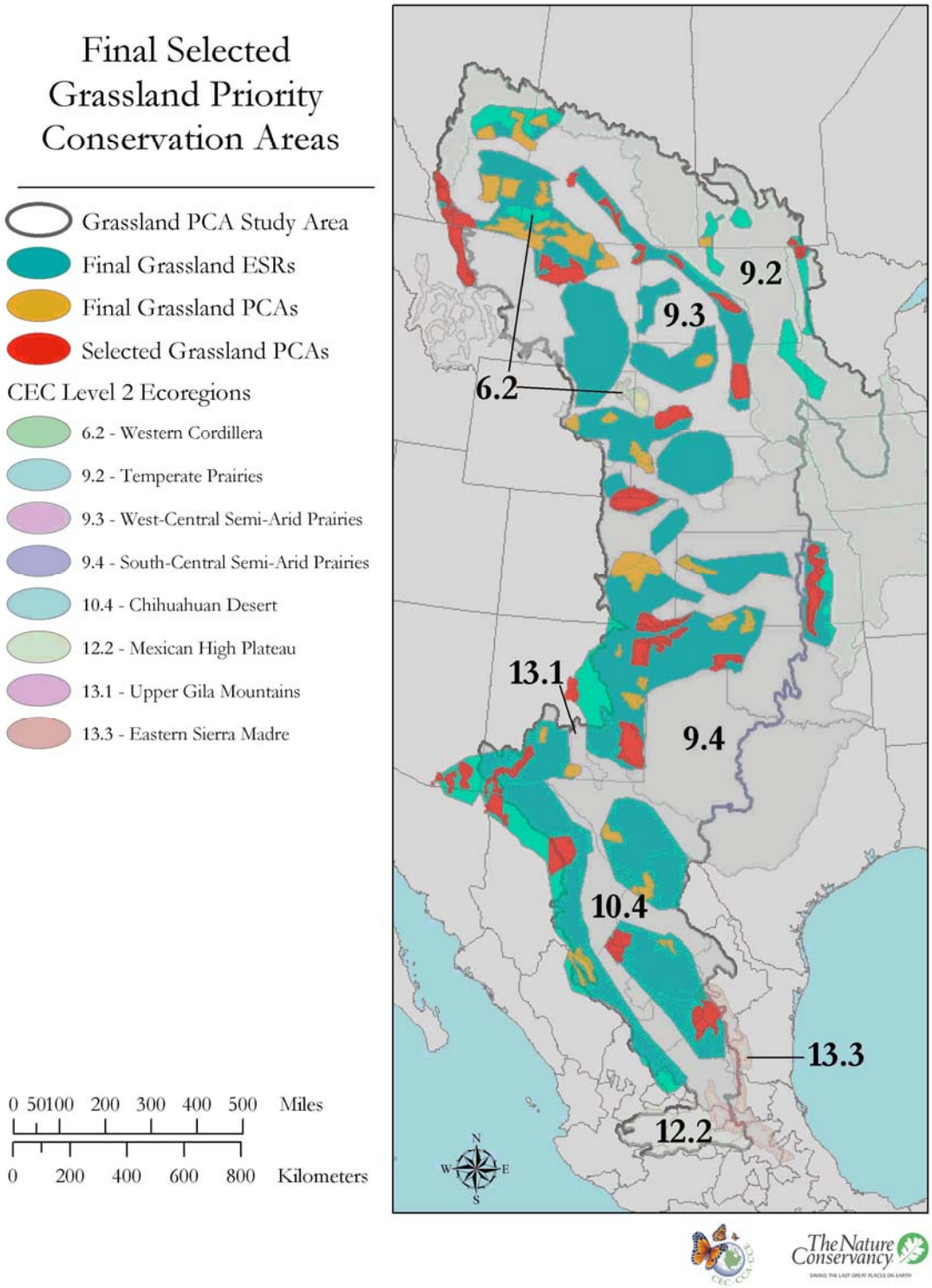


Figure 19. Final priority conservation areas selected by workshop participant groups as the highest conservation priorities over the next five years.

Appendix A. Available GIS data and sources for the grassland priority conservation areas workshop

Theme	Description	Layer Name	Source	Approximate Scale Denominator	Question 1. Ecological Significant Regions	Question 2. Priority Conservation Areas	Question 3. Assessment: status and Future
1. Base Layers							
	Bird Conservation Regions making up the study area boundary	Grassland_PCA_Study_Area_BCRs	2.3*	1,000,000			
	Generalized study area boundary	Grassland_PCA_Study_Area	2.3*	1,000,000			
	1km resolution digital elevation model	elevation	1.2	2,500,000			
	1km resolution b/w shaded relief	hill_shd	1.2	3,000,000			
	1km resolution painted relief layer	paint_relief	1.4	3,000,000			
Mexico	Major cities of Mexico	Major_Cities	1.2	1,000,000			
	Major lakes of Mexico	Major_Lakes	1.2	3,000,000			
	Major rivers of Mexico	Major_Rivers	1.2	3,000,000			
	Major roads in Mexico	Major_Roads	1.2	1,000,000			
	Mexican states	States	1.2	3,000,000			
	Mexican municipalities (counties) with 1996 population	Mx_municipalities	1.6	1,000,000			
	Detailed rivers coverage for Mexico	MX_rivers_CONABIO	1.5	4,000,000			
Canada	Detailed cities and town points	Medium Cities	1.2	1,000,000			
	Canada major cities	Major_Cities	1.2	1,000,000			
	Major roads in Canada	Major_Roads	1.2	1,500,000			
	Provincial boundaries	Province	1.2	50,000			
	Canada railroad lines	Railroad_Lines	1.2	4,000,000			
	Canada regional municipalities - county equivalents	Regional_Municipalities	1.2	50,000			
	Major lakes and ocean	Water	1.2	100,000			
	Major rivers of Canada	Canada_Rivers	1.1	1,000,000			
USA	US County boundaries with population attributes	counties	1.2	3,000,000			
	Detailed cities and town points	Detailed_Cities	1.2	2,000,000			
	Detailed lakes and reservoirs	Detailed_Lakes	1.2	1,000,000			
	Detailed rivers and canals	Detailed_Rivers	1.2	1,000,000			
	State routes, interstate routes and highways	Detailed_Roads	1.2	5,000,000			

Appendix A. Available GIS data and sources for the grassland priority conservation areas workshop

	US highways	Interstates	1.2	250,000			
	US major cities	Major_Cities	1.2	250,000			
	US major lakes	Major_Lakes	1.2	5,000,000			
	US major rivers	Major_Rivers	1.2	5,000,000			
	US major roads	Major_Roads	1.2	50,000			
	US state boundaries	States	1.2	100,000			
2. Ecoregion Data:							
	Level 1 Ecoregions	Level1_Eco	2.2	3,168,000	Yes	Yes	Yes
	Level 2 Ecoregions	Level2_Eco	2.2	3,168,000	Yes	Yes	Yes
	Level 3 Ecoregions	Level3_Eco	2.2	3,168,000	Yes	Yes	Yes
	Bird Conservation Regions	Bird_Conservation_Regions	2.3	1,000,000	Yes	Yes	Yes
	TNC Ecoregions for the US	TNC_US_Ecoregions_2001	2.1	500,000	Yes	Yes	Yes
	Saskatchewan Prairie ecozone	saskatchewan_prairie_ecozone	2.4	500,000	Yes	Yes	Yes
	Saskatchewan Prairie ecoregions	saskatchewan_prairie_ecoregions	2.4	500,000	Yes	Yes	Yes
	Landscape areas in the Saskatchewan ecozone	saskatchewan_prairie_landscape_areas	2.4	500,000	Yes	Yes	Yes
	Alberta natural subregions	grasslands_natreg	2.5	500,000	Yes	Yes	Yes
3. Grassland Data:							
	mexico grassland status circa 2000	mx_2000Grasslands	3.4	250,000	Yes		
	mexico grassland status circa 1976	mx_1976Grasslands	3.4	250,000	Yes		
	comparison of mexico grassland status from 1976 to 2000	mx_1976-2000_grasslands_merge	3.4	250,000	Yes		
	1km AVHRR Land Cover classification for North America	na_lndcov_1km	3.2	1,000,000	Yes		
	Untilled landscapes layer for North America	TNC_Untilled_Landscapes	3.1	250,000	Yes		
	Playas as identified by the Playa Lakes Joint Venture - covering the southern portion of BCRs 18 and 19	Playas_South	3.3	24,000	Yes		
	Playas as identified by the Playa Lakes Joint Venture - covering the northern portion of BCRs 18 and 19	Playas_North	3.3	24,000	Yes		
	Native Dominant Grassland Layer for Sasketchewan Prairie Ecozone	ndg60m	3.5	250,000	Yes		
	Alberta Native Praririe Vegetation by 1/4 section	natpr_75	3.6	100,000	Yes		
	Alberta Native Plant Commmunities	albnatveg	3.7,3.8	100,000	Yes		Yes
4. Ownership Data of Protected Areas							
	Protected Areas from Manitoba and	PAD_Canada	4.1	100,000		Yes	

Appendix A. Available GIS data and sources for the grassland priority conservation areas workshop

	Sasketchewan				
	Protected areas for Alberta	Alberta_Protected_Areas	4.3	20,000	Yes
	Points identifying protected areas in North America	NA_Conservation_Areas_Database	4.2	1,000,000	Yes
	Protected Areas for the central US	PAD_USA	4.1	100,000	Yes
	Project Sites from certain central US states	Select_TNC_Ownership	4.6	500,000	Yes
	Protected conservation areas within the Sasketchewan Prairie Ecozone	Saskatchewan_Prairie_Ecozone_Conservation Areas	4.4	50,000	Yes
	Point locations for provincial lands designated under the Wildlife Protection Act	Saskatchewan_wlf_prot_act_lands	4.4	50,000	Yes
	Point locations for provincial lands protected through the Wildlife Development Fund	Saskatchewan_Wlf_Dev_Fund	4.4	50,000	Yes
	Administrative boundaries of Canadian federal lands	Canadian_Crown_Lands	4.5	500,000	Yes
	Federally protected areas in Mexico (Áreas Naturales Protegidas Federales de México)	anps_Mexico	4.7	250,000	Yes
	Manitoba protected areas	Manitoba_protected_areas_july_2004	4.8	100,000	Yes
	Manitoba wildlife conservation lands	Manitoba_conservlands	4.9	100,000	Yes
5. Data Related to Conservation Priority Setting Initiatives					
	USFS Special Designation Areas	USFS_SDA	5.6	100,000	Yes
	USFWS Refuge ownership boundaries	USFWS_Refuge_Boundaries	5.5	100,000	Yes
	Mexico's AICAs (IBAs)	CONABIO_AICAs	5.3	250,000	Yes
	Primary portfolio sites from Chihuahuan Desert ERA	Chihuahuan_Desert_Portfolio_Primary	5.7	500,000	Yes
	Secondary portfolio sites from Chihuahuan Desert ERA	Chihuahuan_Desert_Portfolio_Secondary	5.7	500,000	Yes
	Merged layer of all conservation areas from all TNC ecoregional assessments through January 2004	TNC_Ecoregional_assessments_jan04	5.7	500,000	Yes
	Prairie Wings project conservation areas for all priority grassland bird species	PW_analysis_all_feb02	5.8	500,000	Yes
	Prairie Wings project conservation areas for all grassland priority bird species except prairie-chickens	PW_analysis_nopc_feb02	5.8	500,000	Yes
	American Bird Consevancy's Important Bird Areas for the US	ABC_US_IBAs	5.1**	2,500,000	Yes
	Bird Studies Canada's Important Bird Areas	BSC_Canada_IBAs	5.2	250,000	Yes
	Priority conservation areas in the northern Sierra Madre Occidental	TWP_Sierra_Madre_Priority_Areas	5.4	500,000	Yes
	Top 10 potential core areas for conservation identified by the Northern Prairie Conservation Network	Top_10_NPCN.TIF	5.9	2,000,000	Yes

Appendix A. Available GIS data and sources for the grassland priority conservation areas workshop

	Top 10 prairie dog conservation sites identified by the Northern Prairie Conservation Network	Top_10_btpd.tif	5.9	2,000,000		Yes
	Top 10 prairie dog conservation sites identified by the Northern Prairie Conservation Network with known prairie dog towns	Top_10_btpd_w_towns.tif	5.9	2,000,000		Yes
6. Species Data:						
	General range maps for grassland species of interest	<species_name>_Range	6.1, 6.2	1,000,000	Yes	
	Count abundance of brids along Breeding Bird Survey routes	<species_name>_BBS_RteAbun	6.3	100,000	Yes	
	Population trend grid for birds detected in breeding bird survey	<species_name>_BBS_GrdTrend	6.3	1,000,000	Yes	
	Breeding Bird Survey routes	BBS_Routes	6.3	100,000	Yes	
	Breeding Bird Survey analysis grid	BBS_Grid	6.3	1,000,000	Yes	
	Christmas Bird Count locations where species of interest have been sighted between 1960 and 1997	<species_name>_CBC_data	6.4	500,000	Yes	
	CEC Black-tailed Prairie Dog Habitat Model	cec_pb_habitat	6.11	250,000	Yes	
	Black-tailed Prairie dog range from CEC study	Prairie_Dog_Range	6.11	5,000,000	Yes	
	Black-tailed Prairie dog town locations from various locations and years	various names	6.11***	100,000	Yes	
	Migration routes from tracked Ferruginous Hawks	migration_Lines	6.5	1,000,000	Yes	
	Current known locations of pronghorn in Chihuahua	chihuahua_pronghorn_current	6.9**	5,000,000	Yes	
	Current distribution of pronghorn in Mexico	pronghorn_current_distribution_mx	6.9**	5,000,000	Yes	
	Historic distribution of Sonoran and Mexican pronghorn in Mexico	pronghorn_historic_distribution_mx	6.9**	5,000,000	Yes	
	Habitat quality surface - results of a study of Sonoran pronghorn habitat	Sonoran_pronghorn_habitat_quality	6.10	100,000	Yes	
	Homeranges as estimated in a study of Sonoran pronghorn in Mexico	Sonoran_pronghorn_homeranges	6.10	100,000	Yes	
	Sampling sites used to derive home ranges and habitat quality for study in Mexico	Sonoran_pronghorn_sampling_sites	6.10	100,000	Yes	
	Species richness of breeding landbirds in the central north american grasslands displayed by 1-degree grid	grassland_breeding_landbird_richness	6.7	5,000,000	Yes	
	Species richness of wintering landbirds in the central north american grasslands displayed by 1-degree grid	grassland_winter_landbird_richness	6.7	5,000,000	Yes	
	weighted distribution of breeding grassland birds in summer	breed_grass_bird_weighted_dist_summer	6.7	5,000,000	Yes	
	weighted distribution of breeding grassland	breed_grass_bird_weighted_dist_winter	6.7	5,000,000	Yes	

Appendix A. Available GIS data and sources for the grassland priority conservation areas workshop

	birds in winter					
	Weighted distribution of wintering grassland birds in winter	winter_grass_bird_weighted_dist_winter	6.7	5,000,000	Yes	
	Weighted distribution of wintering grassland birds in summer	winter_grass_bird_weighted_dist_summer	6.7	5,000,000	Yes	
	Distribution of average PIF population trend scores, breeding season	PIF_Avg_Dist_Breeding	6.7	5,000,000	Yes	
	Distribution of average PIF population trend scores, non-breeding season	PIF_Avg_Dist_Winter	6.7	5,000,000	Yes	
	Bird banding data from within the grassland regions of Canada	Prairie_Canada_Bird_Band	6.7	1,000,000	Yes	
	Recovery locations of birds banded within the grassland region of Canada	Canada_Bird_Band_Recoveries	6.7	1,000,000	Yes	
	Historic distribution of sage grouse	Sage_Grouse_Historic_Distribution	6.6	2,000,000	Yes	
	Current distribution of sage grouse	Sage_Grouse_Current_Distribution	6.6	2,000,000	Yes	
	Survey locations for the 2001 international piping plover census	piping_plover_census_2001	6.8	500,000	Yes	
	Current range of the Lesser Prairie-Chicken	lepchi_current_range	6.12	500,000	Yes	
	Historic range of the Lesser Prairie-Chicken	lepchi_historic_range	6.12	500,000	Yes	
	Rocky Mountain Bird Observatory Bird Detections for BCR 18	<various_names>_BCR18_points	6.13	24,000	Yes	
	Major migration routes/fly-ways for North American birds	bird_migration_routes	6.14	5,000,000	Yes	
7. Threats-related Data:						
	US Dept of Agriculture Ag Census by County	us_ag_census	7.3	2,000,000		Yes
	Coal Fields and their minig potential in the US	us_coal_fields	7.2	5,000,000		Yes
	US Oil Fields	oil_fields	7.4	1,000,000		Yes
	Underground oil pipelines in the US, Canada, and Mexico	underground_pipelines	7.4	1,000,000		Yes
	Aboveground oil pipelines in the US, Canada, and Mexico	aboveground_pipelines	7.4	1,000,000		Yes
	Powerlines in the US, Canada, and Mexico	powerlines	7.4	1,000,000		Yes
	Cost surface for the PW SITES analysis	pw_analysis_cost_surface_jan02	7.4	500,000		Yes
	Potential for wind energy generation across the US	US_Wind_Potential	7.1	1,000,000		Yes

* This layer created by JWK for this project by extracting data from the listed source

** Digital data not available for this project. Digitized from paper map source by JWK

*** See Appendix C for full listing of Black-tailed Prairie Dog town GIS data references

Appendix B. Data source references for grassland PCA GIS data

1. Base Data Layers:

1.1. Environmental Systems Research Institute. 1992. Digital Chart of the World. ESRI. Redlands, California, USA. http://www.esri.com/data/catalog/esri/dcw_fact.html

1.2. Environmental Systems Research Institute: 2002. ESRI Data and Maps. CD-ROMs. ESRI. Redlands, California, USA

1.3 Maderey-R, L. E. y Torres-Ruata, C. (1990), "Hidrografía e hidrometría", IV.6.1 (A). Atlas Nacional de México. Vol. II. Escala 1: 4 000 000. Instituto de Geografía, UNAM. México.

1.4 EROS Data Center. 2003. North America Shaded Relief. US Geological Survey. Reston, Virginia, USA. http://nationalatlas.gov/atlasftp.html

1.5 Maderey-R, L. E. y Torres-Ruata, C. (1990), "Hidrografía e hidrometría", IV.6.1 (A). Atlas Nacional de México. Vol. II. Escala 1: 4 000 000. Instituto de Geografía, UNAM. México.

1.6 CIESIN. GIS Coverage of Mexican States,Municipalities, and Islands, prepared by CIESIN. http://www.ciesin.org/download_data.html

2. Ecoregion Data:

2.1 The Nature Conservancy. 2001. Ecoregions of the United States of America. Arlington, Virginia, USA. http://gis.tnc.org

2.2 Commission for Environmental Cooperation. 1997. Ecological regions of North America: towards a common perspective. Montreal, Quebec, Canada. www.cec.org/pubs_docs/documents/index.cfm?varlan=english&ID=344

2.3 US North American Bird Conservation Initiative Committee. 2000. Bird conservation region descriptions: a supplement to the North American bird conservation initiative bird conservation regions map. US Fish and Wildlife Service, Devision of Bird Habitat Conservation. Arlington, Virginia, USA. http://www.nabci-us.org/bcrs.html

2.4 Canadian Plains Research Center, University of Regina Government of Saskatchewan, Saskatchewan Environment Saskatchewan Research Council Agriculture and Agri-Food Canada, Prairie Farm Rehabilitation Administration

2.5 Public Lands and Forests Division, Alberta Sustainable Resource Development. 2004. Alberta natural subregions. Data provided by Public Lands and Forests Division, Alberta Sustainable Resource Development for the "Priority Grasslands" meeting hosted by the Commission for Environmental Cooperation, Nov 7-10, Sheperdstown, West Virginia. Permission must be obtained in writing, to use the data for applications other than this workshop. http://www.cd.gov.ab.ca/preserving/parks/anhic/nr_sr_2004_map.asp

Appendix B. Data source references for grassland PCA GIS data

3. Grassland Data:

3.1 The Nature Conservancy. 2001. Untilled Landscapes of the Great Plains Bioregion. The Nature Conservancy's Midwest Regional Office. Minneapolis, Minnesota, USA.

3.2 Hansen, M., DeFries, R., Townshend, J. R. G. and Sohlberg, R.. 1998. 1 Km Land Cover Classification Derived from AVHRR. College Park, Maryland: The Global Land Cover Facility. http://glcf.umiacs.umd.edu/data/landcover/

3.3 Playa Lakes Joint Venture. 2004. Playas GIS data. US Fish and Wildlife Service, Grand Island, Nebraska, USA.

3.4 Velazquez, A. 2001. Situacion de Mexico con respecto a la conservacion de los pastizales abiertos: mapas. Comision de Cooperacion Ambiental (CEC). Universidad Nacional Autonoma de Mexico.

3.5 Canadian Plains Research Center, University of Regina Government of Saskatchewan, Saskatchewan Environment Saskatchewan Research Council Agriculture and Agri-Food Canada, Prairie Farm Rehabilitation Administration

3.6 Alberta Prairie Conservation Forum. 2004. Alberta native prairie vegetation coverage. Alberta natural subregions. Data provided by Public Lands and Forests Division, Alberta Sustainable Resource Development for the "Priority Grasslands" meeting hosted by the Commission for Environmental Cooperation, Nov 7-10, Sheperdstown, West Virginia. Permission must be obtained in writing, to use the data for applications other than this workshop. http://www.albertapcf.ab.ca/background.htm

3.7 LandWise Inc., 1998. Soil series and Soil Landscape Model correlation for SCAs 1, 2, 3, 4, 5, 6, 8 and 16. Prepared for Alberta Public Lands. Lethbridge, Alberta. Data provided by Public Lands and Forests Division, Alberta Sustainable Resource Development for the "Priority Grasslands" meeting hosted by the Commission for Environmental Cooperation, Nov 7-10, Sheperdstown, West Virginia. Permission must be obtained in writing, to use the data for applications other than this workshop.

3.8 McNeil, R.L., 2003. Ecological/range sites and potential plant communities of southern Alberta, derived from AGRASID 3.0. Prepared by LandWise Inc. for the Integrated Resource Management Branch, Alberta Environment. Data provided by Public Lands and Forests Division, Alberta Sustainable Resource Development for the "Priority Grasslands" meeting hosted by the Commission for Environmental Cooperation, Nov 7-10, Sheperdstown, West Virginia. Permission must be obtained in writing, to use the data for applications other than this workshop.

4. Ownership Data:

Appendix B. Data source references for grassland PCA GIS data

4.1 Conservation Biology Institute. 2001. CBI Protected Areas Database, Second Edition. Corvallis, Oregon, USA. http://www.consbio.org

4.2 ERIN Consulting Ltd. 2000. North American Conservation Areas Database. Regina, Saskatchewan, Canada. http://gogratis.cgdi.gc.ca/download/north_america_cad

4.3 Parks and Protected Areas Division, Alberta Community Development. 2004. Protected Areas in Alberta. duke.hunter@gov.ab.ca

4.4 Canadian Plains Research Center, University of Regina Government of Saskatchewan, Saskatchewan Environment Saskatchewan Research Council Agriculture and Agri-Food Canada, Prairie Farm Rehabilitation Administration

4.5 Surveys Division, Geomatics Canada, Natural Resources Canada. 2004. National Framework Canada Lands Administrative Boundaries Level 1. http://geogratis.cgdi.gc.ca/clf/en?action=geobase

4.6 The Nature Conservancy Prairie Wings Project. 2002. Contact: Dave Melhman dmelhman@tnc.org.

4.7 Comisión Nacional de Áreas Naturales Protegidas. 2004. Áreas Naturales Protegidas Federales de México. México, D.F. http://www.conanp.gob.mx

4.8 Parks and Natural Areas. 2004. Protected area boundaries in Manitoba Winnipeg Manitoba. Contact Yvonne Beaubien, YBeaubien@gov.mb.ca

4.9 Manitoba Department of Conservation, Wildlife Branch. 1997. Manitoba administrative boundaries. Winnipeg, Manitoba. Contact Dan Teillet, dteillet@gov.mb.ca

5. Priority Conservation Areas Data:

5.1 American Bird Conservancy. 2002. Important Bird Areas of the United States. http://www.abcbirds.org/iba/

5.2 Couturier, A. and K. Wilcox. 2004. Important bird areas of Canada database, edition 1.0. Bird Studies Canada and the Canadian Nature Federation. Port Rowan, Ontario, Canada.

5.3 Sección Mexicana del Consejo Internacional para la Preservación de las Aves CIPAMEX – Comisión Nacional para el Conocimiento y Uso de la Biodiversidad CONABIO, (1999). "Áreas de Importancia para la Conservación de las Aves". Escala 1:250 000. México. Financiado por CONABIO–FMCN–CCA.

5.4 List, R. Moctezuma, O. and P. Manzano. 1999. Identification of priority areas, for conservation, corridors and buffer zones in the northern Sierra Madre

Occidental. Report presented to Fondo Mexicano para la conservación de la naturaleza, A.C.By: Naturalia A.C. and The Wildlands Project.

5.5 USFWS, Region 9, Information Technology Management, Branch of Data and Systems Services. 2001. USFWS, Revised Refuge Boundaries (Interactive mapping version). http://www.fws.gov/data/gishome.html

5.6 USDA Forest Service – Geospatial Service and Technology Center. 2000. Special Designated Areas (SDAs). USDA Forest Service – GSTC. Salt Lake City, Utah, USA.

5.7 Pronatura, The Nature Conservancy, and The World Wildlife Fund. 2004. Ecoregional Conservation Assessment of the Chihuahuan Desert. The Nature Conservancy.

5.8 The Nature Conservancy Prairie Wings Project. 2002. Contact: Dave Melhman dmelhman@tnc.org.

5.9 Forrest, S.C., H. Strand, W.H. Haskins, C. Freese, J. Proctor and E. Dinerstein. 2004. Ocean of Grass:A Conservation Assessment for the Northern Great Plains. Northern Plains Conservation Network and Northern Great Plains Ecoregion, WWF-US, Bozeman, MT.

6. Species Data:

6.1 Ridgely, R. S., T. F. Allnutt, T. Brooks, D. K. McNicol, D. W. Mehlman, B. E. Young, and J. R. Zook. 2003. Digital Distribution Maps of the Birds of the Western Hemisphere, version 1.0. NatureServe, Arlington, Virginia, USA.

Data provided by NatureServe in collaboration with Robert Ridgely, James Zook, The Nature Conservancy — Migratory Bird Program, Conservation International — Center for Applied Biodiversity Science, World Wildlife Fund — US, and Environment Canada — WILDSPACE.

6.2 Patterson, B. D., G. Ceballos, W. Sechrest, M. F. Tognelli, T. Brooks, L. Luna, P. Ortega, I. Salazar, and B. E. Young. 2003. Digital Distribution Maps of the Mammals of the Western Hemisphere, version 1.0. NatureServe, Arlington, Virginia, USA.

Data provided by NatureServe in collaboration with Bruce Patterson, Wes Sechrest, Marcelo Tognelli, Gerardo Ceballos, The Nature Conservancy – Migratory Bird Program, Conservation International – CABS, World Wildlife Fund – US, and Environment Canada – WILDSPACE

6.3 USGS Patuxent Wildlife Research Center. 2004. The North American Breeding Bird Survey, Route level Data Summaries 1966 - 2003. Version 2004.1. Laurel, MD, USA.

http://www.pwrc.usgs.gov/bbs/geographic_information/geographic_information_products.htm

6.4 Shipman, J.W. 1996. A Christmas Bird Count Database, Version 4.0. Zoological Data Processing. Socorro, NM. http://www.nmt.edu/~john/

6.5 Watson, J.W., and U. Banasch. 2004. A Tri-National investigation of ferruginous hawk migration. Progress Report 1. Washington Department of Fish and Wildlife, Olympia, Washington, USA and Canadian Wildlife Service, Edmonton, Alberta , Canada.

6.6 Schroeder, M. A., et al. 2004. Distribution of Sage-grouse in North America. Condor 106:363-376.

6.7 Blancher, P. 2003. Importance of North America's grasslands to birds. Report to the Commission for Environmental Cooperation. Montreal, Ouebec.

6.8 Ferland, C.L. and S.M. Haig. 2002. 2001 International Piping Plover Census.U.S. Geological Survey, Forest and Rangeland Ecosystem Science Center, Corvallis, Oregon. 293 pp.

6.9 Valdés, M. and Manterola, C. In press. "El Berrendo en Chihuahua". Unidos para la Conservacion, A.C.

6.10 Instituto del Medio Ambiente y Desarrollo Sustentable del Estado de Sonora (IMADES), (2000). "Evaluación del ámbito hogareño del Berrendo sonorense (Antilocapra americana sonoriensis)". Extraído del proyecto L112 Evaluación del ámbito hogareño y calidad del hábitat del Borrego cimarrón (Ovis canadensis mexicana), Berrendo sonorense (Antilocapra americana sonoriensis) y Puma (Felis concolor) en la Reserva de la Biosfera El Pinacate y Gran Desierto de Altar. Escala 1:50 000. López Saavedra, Eduardo y Paredes Aguilar, Rafaela. México. El proyecto fue financiado por la Comisión Nacional para el Conocimiento y Uso de la Biodiversidad (CONABIO).

6.11 Proctor, J.D, B. Haskins, and S.C. Forrest. In Press. Focal areas for conservation of prairie dogs and the grassland ecosystem. In Hoogland, J. (ed). Conservation and management of prairie dogs.

6.12 Data obtained from Stephanie Harmon, US Fish and Wildlife Service. Stephanie_Harmon@fws.gov.

6.13 Hanni, D. J., and M. McLachlan. 2004. Section-based Monitoring of Breeding Birds within the Shortgrass Prairie Bird Conservation Region (BCR 18). Brighton, CO: Rocky Mountain Bird Observatory. 178 pp.

6.14 Data obtained from Ed Wikken, Wildlife Habitat Canada, ewikken@whc.org. Source unknown.

Appendix B. Data source references for grassland PCA GIS data

7. Threats-related Data:

7.1 Elliot, D.L., C.G. Holladay, W.R. Barchet, H.P. Foote, and W.F. Sandusky. 1986. Wind energy resources of the United States. U.S. Department of Energy, Pacific National Laboratory. Richland, Washington, USA.

7.2 Tully, J. 2001. Coal fields of the United States. US Geological Survey Eastern Energy Team. Reston, Virginia, USA. http://www.nationalatlas.gov

7.3 U.S. Geological Survey. 2000. Agricultural census of the United States. US Geological Survey. Reston, Virginia, USA. http://www.nationalatlas.gov

7.4 The Nature Conservancy Prairie Wings Project. 2002. Contact: Dave Melhman dmelhman@tnc.org.

Appendix C. Data source references for Black-tailed Prairie Dog town locations from Proctor et al. (in press).

GIS Layer Name	Description	Year	Source	Scale
pd2000badriver.shp	Prairie dog towns on Turner's Bad River Ranch in S. Dakota, 2000	2000	Turner Ranches	not known
pd2000blm.shp	Prairie dog towns on BLM lands in Phillips Co., MT in 2000	2000	US Bureau of Land Management	1:24,000?
pd2000cmr.shp	Prairie dog towns on C.M. Russell NWR in MT in 2000	2000	US Fish and Wildlife Service	1:24,000
pd2001badlands.shp	Prairie dog towns on the Badlands National Park in 2001	2001	US National Park Service	1:24,000?
pd2001windcave.shp	Prairie dog towns on the Wind Cave National Park in 2001	2001	US National Park Service	1:24,000?
pd2001zbar.shp	Prairie dog towns on Turner's Z-Bar Ranch in Kansas	unknown	Turner Ranches	not known
pd79cmr.shp	Prairie dog towns on C.M. Russell NWR in MT in 1979	1979	US Fish and Wildlife Service	1:24,000
pd84cmr.shp	Prairie dog towns on C.M. Russell NWR in MT in 1984	1984	US Fish and Wildlife Service	1:24,000
pd88blm.shp	Prairie dog towns on BLM lands in Phillips Co., MT in 1988	1988	US Bureau of Land Management	1:24,000?
pd88cmr.shp	Prairie dog towns on C.M. Russell NWR in MT in 1988	1988	US Fish and Wildlife Service	1:24,000
pd88wy.shp	Black-tailed and white-tailed prairie dog towns in Wyoming in 1988, from Wyoming Fish and Game aerial photo survey	1988	Wyoming Natural Diversity Database, University of Wyoming	not known
pd89ftbelknap.shp	Prairie dog towns on the Ft. Belknap Indian Reservation in MT in 1989	1989	US Bureau of Indian Affairs	1:24,000?
pd89ncheye.shp	Prairie dog towns on the Northern Cheyenne Indian Reservation in MT in 1989	1989	US Bureau of Indian Affairs	1:24,000?
pd90crow.shp	Prairie dog towns on the Crow Indian Reservation in MT in 1990	1990	US Bureau of Indian Affairs	1:24,000?
pd90ftbelknap.shp	Prairie dog towns on the Ft. Belknap Indian Reservation in MT in 1990	1990	US Bureau of Indian Affairs	1:24,000?
pd90ncheye.shp	Prairie dog towns on the Northern Cheyenne Indian Reservation in MT in 1990	1990	US Bureau of Indian Affairs	1:24,000?
pd93phl.shp	Prairie dog towns in Phillips Co., MT in 1993	1993	US Fish and Wildlife Service and Bureau of Land Management	1:24,000?
pd94ftbelknap.shp	Prairie dog towns on the Ft. Belknap Indian Reservation in MT in 1994	1994	US Bureau of Indian Affairs	1:24,000?
pd94ncheye.shp	Prairie dog towns on the Northern Cheyenne Indian Reservation in MT in 1994	1994	US Bureau of Indian Affairs	1:24,000?
pd95cmr.shp	Prairie dog towns on C.M. Russell NWR in MT in 1995	1995	US Fish and Wildlife Service	1:24,000?
pd95ncheye.shp	Prairie dog towns on the Northern Cheyenne Indian Reservation in MT in 1995	1995	US Bureau of Indian Affairs	1:24,000?

Appendix C. Data source references for Black-tailed Prairie Dog town locations from Proctor et al. (in press).

GIS Layer Name	Description	Year	Source	Scale
pd96ftbelknap.shp	Prairie dog towns on the Ft. Belknap Indian Reservation in MT in 1996	1996	US Bureau of Indian Affairs	1:24,000?
pd96ncheye.shp	Prairie dog towns on the Northern Cheyenne Indian Reservation in MT in 1996	1996	US Bureau of Indian Affairs	1:24,000?
pd97ftbelknap.shp	Prairie dog towns on the Ft. Belknap Indian Reservation in MT in 1997	1997	US Bureau of Indian Affairs	1:24,000?
pd97ncheye.shp	Prairie dog towns on the Northern Cheyenne Indian Reservation in MT in 1997	1997	US Bureau of Indian Affairs	1:24,000?
pd97troos.shp	Prairie dog towns on the Theodore Roosevelt National Park in 1997	1997	US National Park Service	1:24,000?
pd98blm.shp	Prairie dog towns on BLM lands in Phillips Co., MT in 1998	1998	US Bureau of Land Management	1:24,000?
pd98gnp.shp	Pairie dog towns near Grasslands National Park, Saskatchewan	unknown	Grasslands National Park	not known
pd98ncheye.shp	Prairie dog towns on the Northern Cheyenne Indian Reservation in MT in 1998	1998	US Bureau of Indian Affairs	1:24,000?
pd99cmr.shp	Prairie dog towns on C.M. Russell NWR in MT in 1999	1999	US Fish and Wildlife Service	1:24,000
pd99crow.shp	Prairie dog towns on the Crow Indian Reservation in MT in 1999	1999	US Bureau of Indian Affairs	1:24,000?
pd99ftbelknap.shp	Prairie dog towns on the Fort Belknap Indian Reservation in MT in 1999	1999	US Bureau of Indian Affairs	1:24,000?
pd99mtpoly.shp	Prairie dog towns in Montana. Assembled from data that ranges from 1995-1998. Caution: some polygons missing or distorted, and some have horzontal datum errors.	1995-1998	Montana Natural Resources Information System (Cedron Jones)	variable
pd99mtpt.shp	Prairie dog occurrence points in Montana, includes occurrence records from 1997 through 1998	1997-1998	Montana Natural Resources Information System (Cedron Jones)	variable
pd99ncheye.shp	Prairie dog towns on the Northern Cheyenne Indian Reservation in MT in 1999	1999	US Bureau of Indian Affairs	1:24,000?
pdco.shp	Prairie dog towns in Colorado, 1976-2000	2000	Colorado Dept. of Natural Resources	1:100,000
pdgrslndcur.shp	Prairie dog towns on National Grasslands, current as of mid-1990s	@ 1995	U.S. Forest Service Region Two	not known

Appendix C. Data source references for Black-tailed Prairie Dog town locations from Proctor et al. (in press).

GIS Layer Name	Description	Year	Source	Scale
pd98wyhigh.shp	Prairie dog towns along high density aerial transects within locations historically occupied by prarie dogs in Wyoming, 1998	1998	John Sidle's study, obtained from Wyo. Game and Fish Dept.	not known
pd98wylow.shp	Prairie dog towns along low density aerial transects within locations not historically occupied by prairie dogs in Wyoming, 1998	1998	John Sidle's study, obtained from Wyo. Game and Fish Dept.	not known
pd_wy_hist.shp	Areas of historic occupation by prairie dogs in Wyoming	ming	John Sidle's study, obtained from Wyo. Game and Fish Dept.	not known
park2000.shp	Prairie dog towns within Grasslands National Park, Saskatchewan, 2000	2000	Grasslands National Park, SK	not known
serm2000.shp	Prairie dog towns near National Grasslands, Saskatchewan, 2000	2000	Grasslands National Park, SK	not known
pd_ne.shp	Point data representing prairie dog towns to nearest township, range and section in Nebraska; time period of data not known, data released in 2002.	published 2002	Nebraska Game and Parks Commission	not known
pdmtvercuervo.shp	Mt. Vercuervo prairie dog towns, Janos municipality, Chihuahua, Mexico. Collected 1999-2000	2000	UNAM - Instituto de Ecología	not known
pdgavilane.shp	Gavilane prairie dog towns, Janos municipality, Chihuahua, Mexico. Collected 1999-2000	1999-2000	UNAM - Instituto de Ecología	not known
pdperritos.shp	Prairie dog towns, Janos municipality, Chihuahua, Mexico. Collected 1999-2000	1999-2000	UNAM - Instituto de Ecología	not known
pdpvillaw.shp	Pvillaw prairie dog towns, Janos municipality, Chihuahua, Mexico. Collected 1999-2000	1999-2000	UNAM - Instituto de Ecología	not known

Appendix D. Directory of participants in the GPCA Workshop.

Name	Thematic expertise	Region	Title	Organization	Address	Tel	Email
Barry Adams	rangeland	Northern	Range Mgt Specialist / Adjoint Associate Professor. Faculty of Env. Design . University of Calgary	Alberta Lands & Forest Division Rangeland Mgt Branch	Agriculture Centre No. 100, 5401- 1st Ave South, Lethbridge, AB T1J 4V6, Canada	403 381 6207	barry.adams@gov.ab.ca
Michael Bradstreet	birds	Northern	Regional Director	Nature Conservancy of Canada	54 20 Hway 6 North. R.R. No. 5	519 835 0657	michael.bradstreet@nature.conservancy.ca
Nicholas DeGama-Blanchet	rangeland, large ecosystems	Nothern	Land Securement Coordinator, Alberta Region	Nature Conservancy of Canada	Suite 830, 1202 Centre Street SE	403 262 5546	nic.degamablanchet@natureconsevancy.ca
Pauline Erickson	birds	Northern-Central	Head, Ecosystem Management	Canadian Wildlife Service, Environment Canada	Room 200, 4999 - 98 Avenue	780 951-8677	pauline.erickson@ec.gc.ca
Pat Fargey	birds, mammals, large ecosystems	Northern-Central	Species At Risk Specialist	Parks Canada Agency	Grasslands National Park PO Box 150	3067 298 4400	pat.fargey@pc.gc.ca
David Gauthier	large ecosystems, rangeland, landscapes	Northern-Central	Director	Canadian Plains Research Center	340, 10 Research Drive University of Regina	306 585-4758	david.gauthier@uregina.ca
Time Sopuck	birds	Northern	Manager of Operations	The Manitoba Habitat Heritage Corporation	200 - 1555 St-James Street	204 284 2904	tsopuck@mhhc.mb.ca
Lowell Strauss	birds	Norhtern	Conservation Planner	Nature Conservancy of Canada	301 1777 Victoria Ave	306 836 4466	lowell.strauss@natureconservancey.ca
Jeff Thorpe	rangeland	Northern	Research Scientist	Saskatchewan Research Council	125 - 15 Innovation Blvd	306-933-8172	thorpe@src.sk.ca
Ed Wiken	large ecosystem	Northern, Central Arid, Southern	Director, Science and Policy	Wildlife Habitat Canada	1750 Courtwood Crescent, Suite 310	613 291 3109	ewiken@whcorg edwiken@rogers.com
Walter Willms	rangeland	Northern	Research Scientist (Ecology)	Agriculture and Agri Food Canada	P.O. Box. 3000	403 381 9404	willms@agr.gc.ca
Mauricio Cotera Correa	birds, mammals	Central Arid-Southern	Profesor Titular A	Facultad de Ciencias Forestales	Carretera Nacional Km 145	011 52 821 212 7434	mcotera@fcf.uanl.mx
Miguel Angel Cruz Nieto	birds	Mexico-Central Arid	M. Sc	Pronatura Noreste, A.C.	Loma Larga No. 235 Col. Loma Larga	011 52 818 349 6512	mcruz@pronaturane.org
Rafael Fierros	range management	Central Arid-Southern		COTECOCA - SAGARPA	Av Zarco 3801	011 52 614 414 1254	ucotecoca@chh.sagarpa.gob.mx
Francisco González-Medrano	Ecosystem	Central Arid-Southern	Investigador Titular	Universidad Autónoma Metropolitana. Xochimilco	Calz. Del Hueso 1100, Col. Villa Quietud	011 52 555 644 6308	fgmedrano@yahoo.com.mx

Appendix D. Directory of participants in the GPCA Workshop.

Name	Thematic expertise	Region	Title	Organization	Address	Tel	Email
Rurik List	mammals	Central Arid-Southern	Investigador Titular	Instituto de Ecología UNAM	3er Circuito Exterior S/N, Ciudad Universitaria	011 52 722 216 6416	rlist@prodigy.net.mx
Alacia Melgoza	rangeland, large ecosys	Central Arid-Southern	Investigador Titular	INIFAP - SAGARPA	Av. Homero 3744	011 52 614 413 7001	melgoza.alicia@inifap.gob.mx
Jorge Nocedal	birds	Central Arid-Southern	Investigador Titular	Instituto de Ecología	KM. Carretera Durango Mazatlan	011 52 618 827 1972	nocedal@prodigy.net.mx
Marisela Pando-Moreno	Ecosystem	Central Arid-Southern	Profesora-investigadora de tiempo completo	Facultad de Ciencias Forestales Universidad Autónoma de Nuevo León	Carretera Nacional Km 145	821 212 3714	mapando@fcf.uanl.mx
Laura Scott-Morales	birds	Central Arid-Southern	Investigador Titular	Facultad de Ciencias Forestales, Universidad Autónoma de Nuevo León	Carretera Nacional Km.	011 52 821 212 7434	lscott@fcf.uanl.mx
Roberto Wolf	mammals	Central Arid-Southern	Jefe del Departamento de Control de Poblaciones Perjudiciales y Centros de Fomento	Dirección General de Vida Silvestre, SEMARNAT	Av. Revolución No. 1425, Nivel 9. Col. Tlacopac	011 52 555 418 0169	roberto.wolf@semarnat.gob.mx
Bill Busby	birds	Central Arid	Associate Scientist	Kansas Biological Survey	2101 Constant Avenue	785 594 6644	wbusby@ku.edu
Bruce Durtsche	large ecosystem	Central	Wildlife Biologist	USDI - Bureau of Land Management	Denver Federal Center, Bldg 50 P.O. Box 25047	303 932 1199	bdurtsch@bim.gov
Steve Forrest	large ecosystem	Northern-Central	Senior Program Officer	World Wildlife Fund	P.O. Box 7276	406 587 6167	scforrest@earthlink.net
David Hanni	birds	Central-Northern	Monitoring Division, Deputy Director	Rocky Mountain Bird Observatory	230 Cherry St	790 482 1707	david.hanni@rmbo.org
Stephanie Harmon	birds, mammals	Central Southern	Lesser Prairie-Chicken; Endangered Species Recovery / Grassland Ecosystems	U. S. Fish and Wildlife Service R2	222 S. Houston, Suite A.	(918) 581-7458 ext. 229	Stephanie_Harmon@fws.gov
William Howe	birds	Central Arid-Southern	Nongame Bird Coordinator	US Fish and Wildlife Service, Region 2 (Southwest)	P.O. Box 1306		bill_howe@fws.gov
Stephanie Jones	birds	Central-Northern	Nongame Migratory Blvd Coordinator	Fish & Wildlife Service Region 6	P.O. Box 25486 DFC	303-236-4409	Stephanie_Jones@fws.gov
Jason Karl	birds	Central	GIS Manager	TNC	P. O. Box 4814	208 578 9316	jkarl@tnc.org
Brian Martin	birds, large ecosystem	Central-Northern	Eastern MT Director of Science	The Nature Conservancy	32 South Ewing, Suite 215		bmartin@tnc.org
Bob McCready	birds, mammals	Northern, Central Arid, Southern	Director, Prairie Wings, Migratory Bird Program	The Nature Conservancy	4889 Eagle Harbor Dr.	206 780 1102	bmccready@tnc.org

Appendix D. Directory of participants in the GPCA Workshop.

Name	Thematic expertise	Region	Title	Organization	Address	Tel	Email
Patricia Mehlhop	mammals, birds, large ecosystem	Central-Northern	Grassland Coordinator	U.S Fish and Wildlife Service Region 6	P.O. Box 25486	303 870 8120	Pat_Mehlhop@fws.gov
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Chris Pague	birds, mammals, ecosystem	Central Arid-Southern	Conservation Science	TNC CO	2424 Spruce Street	720 974-7017	cpague@tnc.org
Jonathan Proctor	mammals	Northern-Central	Northern Plains Program Director	Predator Conservation Alliance	2900 East 23rd Avenue, Gate 7	303 870 9601	jonathan@predatorconservation.org
Joe Truett	mammals	Central Northern	Senior Biologist	Turner Endangered Species Fund	P.O. Box 211	505 539 2178	jotruett@gilanet.com
Jürgen Hoth	landscape	Northern, Central, Southern		Commission for Environmental Cooperation	393, rue St-Jacques Ouest, Bureau 200, Montreal, Quebec, Canada H2Y 1N9	514-350-4307	jhoth@cec.org
Thom Meredith	landscape		Professor of Geography	Department of Geography, McGill University	805 Sherbrooke Street Westm Montreal, Quebec, Canada, H3A 2K6	514-398-4219	Meredith@felix.Geog.McGill.CA
Tara Wilkinson	landscape		Consultant	Conservation of Biodiversity		514-457-4506	
Bob Unnasch	landscape	Central Northern	Senior Ecologist	The Nature Conservancy	1109 Main Street, Suite 333	208 860 0780	bunnasch@tnc.org

Appendix E. Principles behind the CBED decision support procedure – by Thomas Meredith, George Dias and Leah Wilson

Environmental degradation is the root of so many problems -- ranging from loss of health, livelihood and quality of life, to loss of ecological heritage and environmental security. The need for better forms of environmental protection must be taken as urgent. CBED is conducting research on "environmental decision support," that is, on what sort of procedures lead to fairer, more efficient and more effective environmental choices. The focus is two promising, closely linked, avenues of research: one is to make better use of existing information resources (both scientific and traditional), the other is to include more people, with a wider array of backgrounds and experiences, in environmental decision making. Mechanisms for consensus-building are essential.

Canada, the US and Mexico, represent "Afrontline" questions in the dialogue on global environmental and sustainable development issues. Biodiversity loss is, amongst all environmental issues, perhaps the most irreversible, and the one with the strongest social dimension. For these reasons, researchers at CBED were anxious to engage with the CEC to explore questions of information management in North American biodiversity conservation decision making and, most recently, to participate in defining grassland priority conservation sites.

Measures to protect biodiversity are typically initiated "in the public interest" but, to be effective, must be site-specific in their application. The potential for conflict amongst stakeholders is high. Effective conservation strategies must include mechanisms for dealing with the human dimensions, specifically with information dissemination and conflict resolution. Species mobility, ecosystem interconnectedness, and issues of scale in determining representation suggest that biodiversity conservation goals cannot be effectively defined at a micro scale but should ideally be assessed in harmonized local, regional, national and continental programs. This challenges conventional techniques of consultation and consensus-building.

Part of the challenge is in the trade-offs between complexity and accessibility, and between simplicity and accuracy. How complex can data management be and still be accessible? Is there a hierarchic structure that allows consistent decision-support at a level of detail proportional to the users' needs and capabilities? Working in a three day meeting requires that enough information be introduced to ensure accurate outcomes, but that information is accessible enough that it can be communicated between interest groups, that detail can be adjusted to ensure momentum within the meeting, and that the goals and purpose remain achievable.

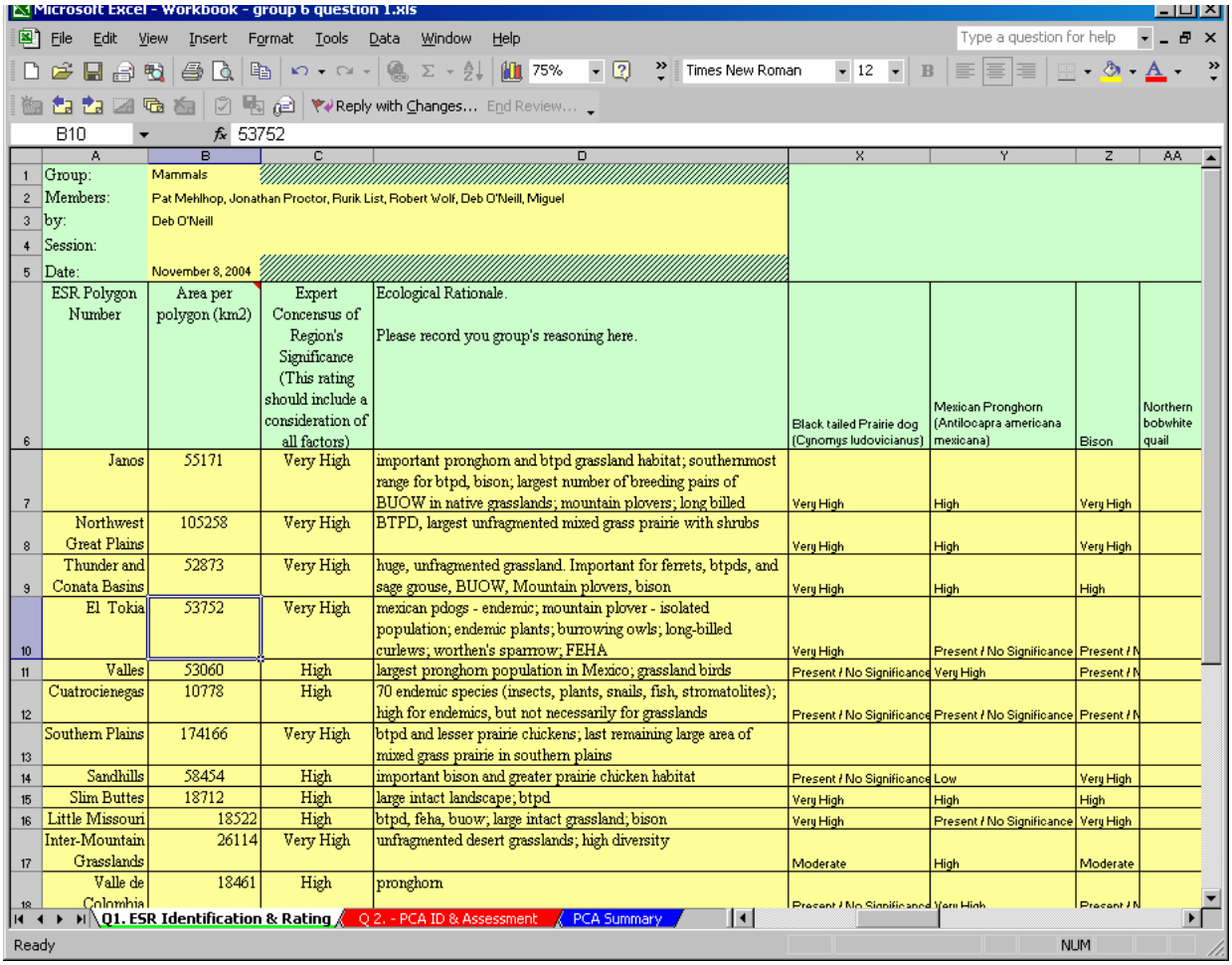
The CBED procedure involves ***Consensus Mapper***, a geographic information system (GIS) that allows collaborative exploration of spatial data, discussion of decision priorities, and mapping of environmental values or concerns. The Consensus Mapper is used in a Round Table meeting that permits stakeholders to participate in an open discussion about spatial understandings or priorities, but also to have independent means of expressing their own views. This allows groups with shared interests to clarify their common understandings and groups with divergent interests to clarify points of disagreement and perhaps work toward compromise. Consensus Mapper Round Tables (CMRT) are about person-to-person communication of ideas. Networked computers with an interactive GIS support communication, but only as and when it is appropriate to facilitate inclusive communication and clarity in spatial decisions. This requires that the GIS be transparent to the users, not an obstacle or a force that dominates proceedings. This, in turn, requires strong technical support and open and adaptive facilitation. Clear and sound ideas are the ends, group discussion is the means and maps and computers are the aids.

Appendix F. Guidelines and use of the *Identification, Assessment, and Ratings Workbook* – by Robert Unnasch and Jason Karl

Pre-formatted Microsoft Excel Workbooks were provided to each workshop group for the purposes of capturing in a standardized format the rationale for identifying ecologically significant areas (ESRs) or grassland priority areas (GPCAs), assessing the contribution of each ESR and GPCA to conservation of focal species and ecosystem elements, and providing a means by which to compare ESRs and GPCAs based on quantitative scores. The workbook consisted of three worksheets: ESR Identification and Rating, GPCA Identification and Assessment, and GPCA Summary. Users were asked to fill-in, where appropriate, all cells colored yellow. Extensive use was made of drop-down menus with pre-formatted entries to standardize information across spreadsheets.

ESR Identification and Rating Worksheet

This worksheet was used to capture basic information about the group and the descriptions, rationale for identification, and importance to focal species and elements of the ESRs. For each ESR, group members entered in the number (or name) given to that ESR in the Consensus Mapper software and recorded the area of the polygon as well. This provided the link between the spatial data created in Consensus Mapper and the attributed entered in this workbook. Group

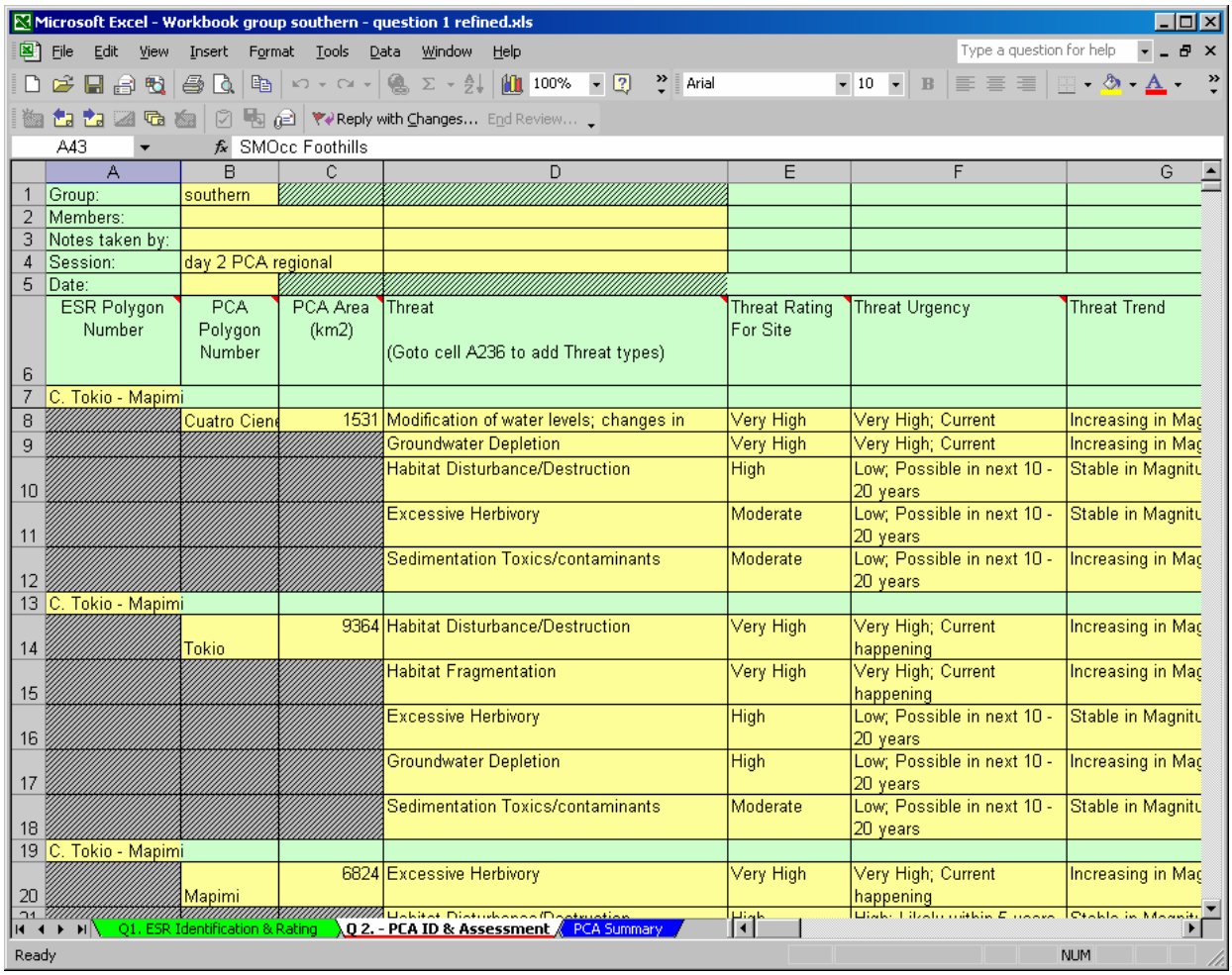


members were then asked to provide their expert, consensus opinion regarding the overall significance of that ESR to tri-national grassland conservation (very high, high, or moderate). Decisions regarding overall significance were to be guided by a consideration of all factors,

including the biodiversity richness, ecological uniqueness, and bi-national/tri-national significance of the ESR. Rationale for designating the ESR was to be captured as free text. Group members then rated the ESR as to its significance to conservation of each focal species or element (very high, high, moderate, low, or present/not significant). Group members could name additional focal species or elements besides those provided to them. Species significance ratings were used to calculate the quantitative scores and rankings of the ESRs.

GPCA Identification and Assessment Worksheet

This worksheet was used to capture basic information on each GPCA, to allow the group members to rate the significance of each GPCA to the focal species and elements, and to record the threats affecting the GPCA. Ratings of significance of the GPCA to the focal species and elements were used to calculate GPCA quantitative scores and rankings and followed the method used for rating ESRs. Participants could assign a maximum of five threats to each GPCA. A



Microsoft Excel - Workbook group southern - question 1 refined.xls

File Edit View Insert Format Tools Data Window Help — Type a question for help

Reply with Changes... End Review...

A43 SMOcc Foothills

	A	B	C	D	E	F	G
1	Group:	southern					
2	Members:						
3	Notes taken by:						
4	Session:	day 2 PCA regional					
5	Date:						
6	ESR Polygon Number	PCA Polygon Number	PCA Area (km2)	Threat (Goto cell A236 to add Threat types)	Threat Rating For Site	Threat Urgency	Threat Trend
7	C. Tokio - Mapimi						
8		Cuatro Cien	1531	Modification of water levels; changes in	Very High	Very High; Current	Increasing in Mag
9				Groundwater Depletion	Very High	Very High; Current	Increasing in Mag
10				Habitat Disturbance/Destruction	High	Low; Possible in next 10 - 20 years	Stable in Magnitu
11				Excessive Herbivory	Moderate	Low; Possible in next 10 - 20 years	Stable in Magnitu
12				Sedimentation Toxics/contaminants	Moderate	Low; Possible in next 10 - 20 years	Increasing in Mag
13	C. Tokio - Mapimi						
14		Tokio	9364	Habitat Disturbance/Destruction	Very High	Very High; Current happening	Increasing in Mag
15				Habitat Fragmentation	Very High	Very High; Current happening	Increasing in Mag
16				Excessive Herbivory	High	Low; Possible in next 10 - 20 years	Stable in Magnitu
17				Groundwater Depletion	High	Low; Possible in next 10 - 20 years	Increasing in Mag
18				Sedimentation Toxics/contaminants	Moderate	Low; Possible in next 10 - 20 years	Stable in Magnitu
19	C. Tokio - Mapimi						
20		Mapimi	6824	Excessive Herbivory	Very High	Very High; Current happening	Increasing in Mag

Q1. ESR Identification & Rating | Q 2. - PCA ID & Assessment | PCA Summary

Ready NUM

standardized list of threats was prepared prior to the workshop and, while group members could specify additional threats, they were encouraged to use the standardized lists unless a specific threat was not included. Threats were rated as to their intensity (very high, high, moderate, or low), urgency (very high – current, high – likely within 5 years, moderate – likely within 5 to 10 years, or low – possible within 10 to 20 years), and trend (increasing in magnitude, stable in

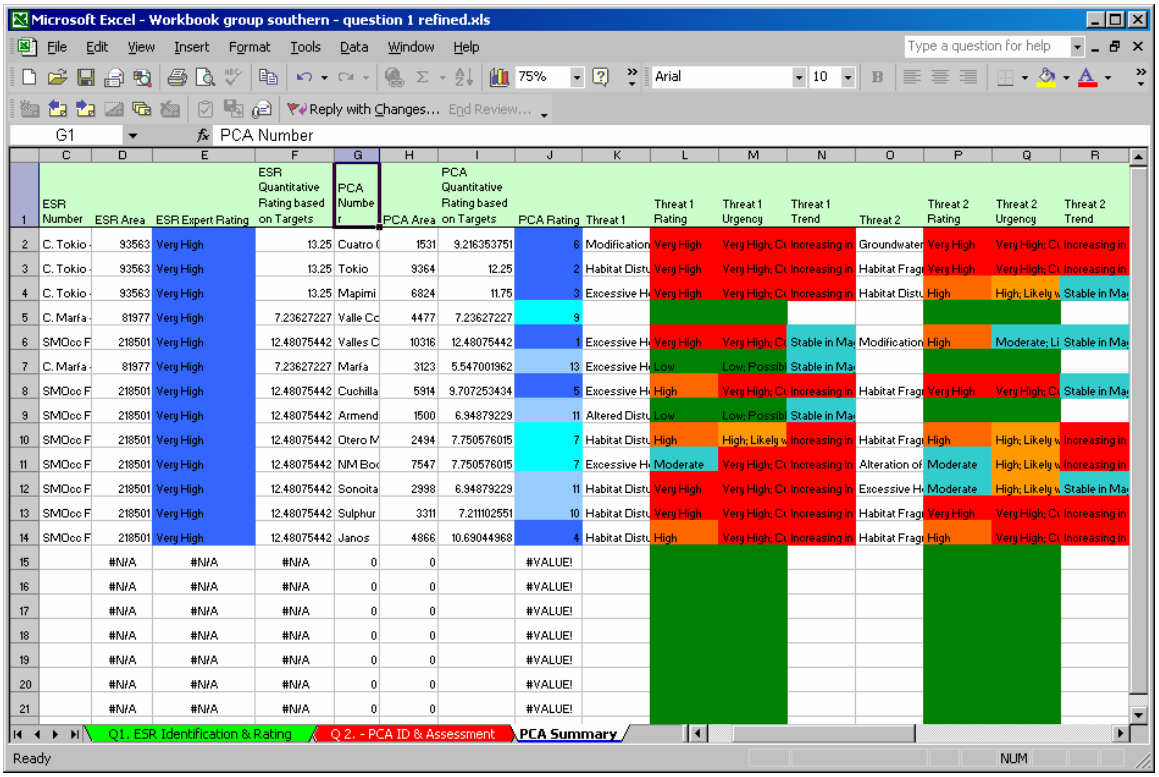
magnitude, decreasing in magnitude, or unknown). Finally, group members provided a brief text description of the rationale of their judgment of the threats to the GPCA.

PCA Summary Worksheet

The purpose of this worksheet was to summarize all of the user-entered information on ESRs and GPCAs and facilitate comparison between GPCAs. This worksheet aggregated all of the information entered on the previous worksheets. All cells in their worksheet were calculated from the first two worksheets – participants did not enter any information on this worksheet. Some columns in the worksheet are color-coded to aid in interpretation of the results. GPCA rankings were colored in shades of blue with the darkest blue for high and the lightest blue for low. Threats were coded red for very high, orange for high, blue for moderate, and green for low. Columns A through E, G, H, and L through AD were taken directly from the ESR and GPCA worksheets. Columns F and I, quantitative ratings based on targets for ESRs and GPCAs, respectively, were calculated as:

$$R = \frac{\left(\sum_{n}^{i=1} V_i\right)}{n} \bullet \sqrt{n}$$

where R is the quantitative rating, V_i is the value for each species and site (ESR or GPCA) pair, and n is the number of species found at the site. Column J, GPCA ranking, was calculated as the rank order of the GPCA quantitative scores in column I.



ESRS of the Northern Region

ESR Name Prairie Couteau/Sheyenne Delta

ESR Number 13

ESR Area (sq. km) 16,400

Expert Consensus of Region's Significance Moderate

Quantitative ESR Rating 1.22

Ecological Rationale Two species of Skipper, Sharp-Tailed Grouse, Loggerhead Shrike, Tallgrass Prairie, wetland waterbirds

Region's Significance to Grassland Focal

Mountain Plover:	
Piping plover:	
Long-billed Curlew:	
Ferruginous Hawk:	
Scaled Quail:	
Lesser Prairie-Chicken:	
Greater Prairie-Chicken:	Present / No
Sharp-tailed Grouse:	Moderate
Sage Grouse:	
Burrowing Owl:	Present / No
Loggerhead Shrike:	Low
Sprague's Pipit:	
Lark Bunting:	
McCown's Longspur:	
Baird's Sparrow:	Present / No
Cassin's Sparrow:	
Chestnut-collared Longspur:	Present / No
Worthen´s Sparrow:	
Black tailed Prairie dog:	
Bison:	

ESRS of the Northern Region

ESR Name Little Missouri Badlands

ESR Number 14

ESR Area (sq. km) 13,000

Expert Consensus of Region's Significance Moderate

Quantitative ESR Rating 3.32

Ecological Rationale Sharp-tailed Grouse, Loggerhead Shrike, Black-tailed Prairie Dog, Ferruginous Hawks

Region's Significance to Grassland Focal

Mountain Plover:	
Piping plover:	
Long-billed Curlew:	Low
Ferruginous Hawk:	Low
Scaled Quail:	
Lesser Prairie-Chicken:	
Greater Prairie-Chicken:	
Sharp-tailed Grouse:	Moderate
Sage Grouse:	Present / No
Burrowing Owl:	Low
Loggerhead Shrike:	Moderate
Sprague's Pipit:	Present / No
Lark Bunting:	Low
McCown's Longspur:	
Baird's Sparrow:	
Cassin's Sparrow:	
Chestnut-collared Longspur:	Low
Worthen´s Sparrow:	
Black tailed Prairie dog:	Low
Bison:	Low

ESRS of the Northern Region

ESR Name Powder River/Big Open

ESR Number 11

ESR Area (sq. km) 76,100

Expert Consensus of Region's Significance Moderate

Quantitative ESR Rating 6.93

Ecological Rationale Sage Grouse, Ferruginous Hawk, Black-tailed Prairie Dog, Long-billed Curlew

Region's Significance to Grassland Focal

Mountain Plover:	
Piping plover:	
Long-billed Curlew:	Moderate
Ferruginous Hawk:	Moderate
Scaled Quail:	
Lesser Prairie-Chicken:	
Greater Prairie-Chicken:	
Sharp-tailed Grouse:	Low
Sage Grouse:	High
Burrowing Owl:	Moderate
Loggerhead Shrike:	Moderate
Sprague's Pipit:	
Lark Bunting:	Moderate
McCown's Longspur:	High
Baird's Sparrow:	
Cassin's Sparrow:	
Chestnut-collared Longspur:	Low
Worthen´s Sparrow:	
Black tailed Prairie dog:	Moderate
Bison:	High

ESRS of the Northern Region

ESR Name Cheyenne Prairie

ESR Number 12

ESR Area (sq. km) 41,700

Expert Consensus of Region's Significance High

Quantitative ESR Rating 6.64

Ecological Rationale Black-tailed Prairie Dog, Black-footed Ferret. Long-billed Curlew, Sprague's Pipit, Chestnut-collared Longspur, Baird's Sparrow, Burrowing Owl

Region's Significance to Grassland Focal

Mountain Plover:	
Piping plover:	
Long-billed Curlew:	High
Ferruginous Hawk:	Moderate
Scaled Quail:	
Lesser Prairie-Chicken:	
Greater Prairie-Chicken:	
Sharp-tailed Grouse:	Moderate
Sage Grouse:	
Burrowing Owl:	Moderate
Loggerhead Shrike:	Moderate
Sprague's Pipit:	Present / No
Lark Bunting:	Moderate
McCown's Longspur:	
Baird's Sparrow:	
Cassin's Sparrow:	
Chestnut-collared Longspur:	Low
Worthen´s Sparrow:	
Black tailed Prairie dog:	High
Bison:	Very High

ESRS of the Northern Region

ESR Name Thunder Basin/Conata

ESR Number 9

ESR Area (sq. km) 37,000

Expert Consensus of Region's Significance Very High

Quantitative ESR Rating 8.66

Ecological Rationale Black-tailed Prairie Dog, Black-footed Ferret, Mountain Plover, Ferruginous Hawk, Burrowing Owl, Long-billed Curlew

Region's Significance to Grassland Focal

Mountain Plover:	High
Piping plover:	
Long-billed Curlew:	High
Ferruginous Hawk:	Moderate
Scaled Quail:	
Lesser Prairie-Chicken:	
Greater Prairie-Chicken:	
Sharp-tailed Grouse:	Low
Sage Grouse:	Moderate
Burrowing Owl:	High
Loggerhead Shrike:	Moderate
Sprague's Pipit:	
Lark Bunting:	Moderate
McCown's Longspur:	Moderate
Baird's Sparrow:	
Cassin's Sparrow:	
Chestnut-collared Longspur:	High
Worthen´s Sparrow:	
Black tailed Prairie dog:	Very High
Bison:	High

ESRS of the Northern Region

ESR Name Rocky Mountain Front

ESR Number 18

ESR Area (sq. km) 18,000

Expert Consensus of Region's Significance Very High

Quantitative ESR Rating 1.89

Ecological Rationale Interface between Rocky Mountains and grasslands. Grizzly. Sharp-tailed Grouse, Feruginous Hawk, Sprague's Pipit, Loggerhead Shrike?, Long-billed Curlew,

Region's Significance to Grassland Focal

Mountain Plover:	
Piping plover:	
Long-billed Curlew:	Low
Ferruginous Hawk:	Low
Scaled Quail:	
Lesser Prairie-Chicken:	
Greater Prairie-Chicken:	
Sharp-tailed Grouse:	Low
Sage Grouse:	
Burrowing Owl:	Present / No
Loggerhead Shrike:	Low
Sprague's Pipit:	
Lark Bunting:	
McCown's Longspur:	
Baird's Sparrow:	Present / No
Cassin's Sparrow:	
Chestnut-collared Longspur:	
Worthen´s Sparrow:	
Black tailed Prairie dog:	
Bison:	Low

ESRS of the Northern Region

ESR Name Northern Fescue

ESR Number 21

ESR Area (sq. km) 31,000

Expert Consensus of Region's Significance High

Quantitative ESR Rating 3.67

Ecological Rationale Northern limit of fescue and associated species, at least half of species but abundances not always high

Region's Significance to Grassland Focal

Mountain Plover:	
Piping plover:	High
Long-billed Curlew:	
Ferruginous Hawk:	Present / No
Scaled Quail:	
Lesser Prairie-Chicken:	
Greater Prairie-Chicken:	
Sharp-tailed Grouse:	High
Sage Grouse:	
Burrowing Owl:	
Loggerhead Shrike:	Low
Sprague's Pipit:	Low
Lark Bunting:	
McCown's Longspur:	
Baird's Sparrow:	Low
Cassin's Sparrow:	
Chestnut-collared Longspur:	
Worthen´s Sparrow:	
Black tailed Prairie dog:	
Bison:	

ESRS of the Northern Region

ESR Name Missouri Couteau

ESR Number 19

ESR Area (sq. km) 63,000

Expert Consensus of Region's Significance Very High

Quantitative ESR Rating 7.33

Ecological Rationale Wetland associated species, many of the focal species breed, good upland habitat

Region's Significance to Grassland Focal

Mountain Plover:	
Piping plover:	Very High
Long-billed Curlew:	
Ferruginous Hawk:	Low
Scaled Quail:	
Lesser Prairie-Chicken:	
Greater Prairie-Chicken:	
Sharp-tailed Grouse:	High
Sage Grouse:	
Burrowing Owl:	Low
Loggerhead Shrike:	Moderate
Sprague's Pipit:	High
Lark Bunting:	Moderate
McCown's Longspur:	
Baird's Sparrow:	High
Cassin's Sparrow:	
Chestnut-collared Longspur:	High
Worthen´s Sparrow:	
Black tailed Prairie dog:	
Bison:	

ESRS of the Northern Region

ESR Name Medicine Line Mixed-grass

ESR Number 20

ESR Area (sq. km) 108,000

Expert Consensus of Region's Significance Very High

Quantitative ESR Rating 12.14

Ecological Rationale Largest Intact block of mixed grass semi arid prairie,. Plover, Curlew, Grouse, Sage Grouse, Ferruginous Hawk, Bison, Swift Fox, Ferret, Prairie Dog, Burrowing Owl, etc., great annual variation of LB

Region's Significance to Grassland Focal

Mountain Plover:	High
Piping plover:	Low
Long-billed Curlew:	Very High
Ferruginous Hawk:	High
Scaled Quail:	
Lesser Prairie-Chicken:	
Greater Prairie-Chicken:	
Sharp-tailed Grouse:	Moderate
Sage Grouse:	Very High
Burrowing Owl:	High
Loggerhead Shrike:	High
Sprague's Pipit:	High
Lark Bunting:	High
McCown's Longspur:	High
Baird's Sparrow:	Very High
Cassin's Sparrow:	
Chestnut-collared Longspur:	Very High
Worthen´s Sparrow:	
Black tailed Prairie dog:	High
Bison:	Very High

ESRS of the Northern Region

ESR Name Manitoba Mixed-grass/Towner Sandhills

ESR Number 16

ESR Area (sq. km) 7,400

Expert Consensus of Region's Significance Moderate

Quantitative ESR Rating 3.02

Ecological Rationale Ferruginous Hawk, Baird's Sparrow, Loggerhead Shrike, Sprague's Pipit, Sharp-Tailed Grouse, Dakota Skipper

Region's Significance to Grassland Focal

Mountain Plover:	
Piping plover:	
Long-billed Curlew:	
Ferruginous Hawk:	Low
Scaled Quail:	
Lesser Prairie-Chicken:	
Greater Prairie-Chicken:	
Sharp-tailed Grouse:	Moderate
Sage Grouse:	
Burrowing Owl:	Present / No
Loggerhead Shrike:	Moderate
Sprague's Pipit:	Low
Lark Bunting:	
McCown's Longspur:	
Baird's Sparrow:	Low
Cassin's Sparrow:	
Chestnut-collared Longspur:	Low
Worthen´s Sparrow:	
Black tailed Prairie dog:	
Bison:	

ESRS of the Northern Region

ESR Name Carberry Sandhills

ESR Number 17

ESR Area (sq. km) 4,000

Expert Consensus of Region's Significance Moderate

Quantitative ESR Rating 1.15

Ecological Rationale Largest area of mixed Grass in Manitoba; disjunct Shink. Loggerhead Shrike, Sprague's Pipit

Region's Significance to Grassland Focal

Mountain Plover:	
Piping plover:	
Long-billed Curlew:	
Ferruginous Hawk:	
Scaled Quail:	
Lesser Prairie-Chicken:	
Greater Prairie-Chicken:	
Sharp-tailed Grouse:	Moderate
Sage Grouse:	
Burrowing Owl:	
Loggerhead Shrike:	Present / No
Sprague's Pipit:	
Lark Bunting:	
McCown's Longspur:	
Baird's Sparrow:	Present / No
Cassin's Sparrow:	
Chestnut-collared Longspur:	
Worthen´s Sparrow:	
Black tailed Prairie dog:	
Bison:	

ESRS of the Northern Region

ESR Name Agassiz Tallgrass

ESR Number 15

ESR Area (sq. km) 10,700

Expert Consensus of Region's Significance Very High

Quantitative ESR Rating 2.00

Ecological Rationale Last, largest northern tallgrass prairie, Greater Prairie Chicken, Sharp-tailed Grouse, Loggerhead Shrike, Western P-f Orchid, butterflies

Region's Significance to Grassland Focal

Mountain Plover:	
Piping plover:	
Long-billed Curlew:	
Ferruginous Hawk:	
Scaled Quail:	
Lesser Prairie-Chicken:	
Greater Prairie-Chicken:	Moderate
Sharp-tailed Grouse:	Low
Sage Grouse:	
Burrowing Owl:	
Loggerhead Shrike:	Low
Sprague's Pipit:	
Lark Bunting:	
McCown's Longspur:	
Baird's Sparrow:	Present / No
Cassin's Sparrow:	
Chestnut-collared Longspur:	
Worthen´s Sparrow:	
Black tailed Prairie dog:	
Bison:	

ESRS of the Central Region

ESR Name Southern Prairies

ESR Number 4

ESR Area (sq. km) 229,494

Expert Consensus of Region's Significance Very High

Quantitative ESR Rating 11.25

Ecological Rationale Huge unfragmented shortgrass prairie, most of lesser prairie-chickens, sand dune lizard, Chinnery oak, center of distribution of Cassin's sparrow, critical stopover for some high priority grassland targets and wintering grounds for ferruginous hawk

Region's Significance to Grassland Focal

Mountain Plover:	Very High
Piping plover:	Present / No
Long-billed Curlew:	Moderate
Ferruginous Hawk:	Very High
Scaled Quail:	High
Lesser Prairie-Chicken:	Very High
Greater Prairie-Chicken:	
Sharp-tailed Grouse:	
Sage Grouse:	
Burrowing Owl:	High
Loggerhead Shrike:	High
Sprague's Pipit:	Moderate
Lark Bunting:	Moderate
McCown's Longspur:	Very High
Baird's Sparrow:	Low
Cassin's Sparrow:	Very High
Chestnut-collared Longspur:	Very High
Worthen´s Sparrow:	
Black tailed Prairie dog:	High
Bison:	
Bobwhite Quail:	Moderate

ESRS of the Central Region

ESR Name Arickaree

ESR Number 7

ESR Area (sq. km) 11,647

Expert Consensus of Region's Significance High

Quantitative ESR Rating 3.16

Ecological Rationale Large riparian forest for migratory stopover, sand sage prairie, viable population of greater prairie chickens

Region's Significance to Grassland Focal

Mountain Plover:	
Piping plover:	
Long-billed Curlew:	Present / No
Ferruginous Hawk:	Low
Scaled Quail:	
Lesser Prairie-Chicken:	
Greater Prairie-Chicken:	Moderate
Sharp-tailed Grouse:	
Sage Grouse:	
Burrowing Owl:	Low
Loggerhead Shrike:	Moderate
Sprague's Pipit:	Low
Lark Bunting:	Moderate
McCown's Longspur:	
Baird's Sparrow:	
Cassin's Sparrow:	Present / No
Chestnut-collared Longspur:	Present / No
Worthen´s Sparrow:	
Black tailed Prairie dog:	Low
Bison:	
Bobwhite Quail:	

ESRS of the Central Region

ESR Name Smoky Hills

ESR Number 5

ESR Area (sq. km) 38,298

Expert Consensus of Region's Significance Moderate

Quantitative ESR Rating 5.42

Ecological Rationale breeding area for ferruginous hawks, Black-tailed prairie dogs east of the plague line, important for both species of prairie chickens, contains prairie fragments in the east, large patches of unfragmented mixed-grass prairie, high restoration potential for mixed grass, moderate importance as a linkage (mix of residents, summer residents, and migrants/winter residents.

Region's Significance to Grassland Focal

Mountain Plover:	
Piping plover:	Present / No
Long-billed Curlew:	Present / No
Ferruginous Hawk:	Moderate
Scaled Quail:	
Lesser Prairie-Chicken:	High
Greater Prairie-Chicken:	High
Sharp-tailed Grouse:	
Sage Grouse:	
Burrowing Owl:	Moderate
Loggerhead Shrike:	Moderate
Sprague's Pipit:	Present / No
Lark Bunting:	Moderate
McCown's Longspur:	Present / No
Baird's Sparrow:	Present / No
Cassin's Sparrow:	Low
Chestnut-collared Longspur:	Moderate
Worthen´s Sparrow:	
Black tailed Prairie dog:	Moderate
Bison:	
Bobwhite Quail:	Moderate

ESRS of the Central Region

ESR Name Flint Hills

ESR Number 6

ESR Area (sq. km) 32,860

Expert Consensus of Region's Significance Very High

Quantitative ESR Rating 4.24

Ecological Rationale Peak importance for breeding Henslow's Sparrows, important for all (western-most site) midwestern birds, key area for other PIF species, largest intact tallgrass prairie in North America, very important for greater prairie chickens, highly intact grassland, low linkage importance, some bison restoration.

Region's Significance to Grassland Focal

Mountain Plover:	
Piping plover:	Low
Long-billed Curlew:	
Ferruginous Hawk:	
Scaled Quail:	
Lesser Prairie-Chicken:	
Greater Prairie-Chicken:	Very High
Sharp-tailed Grouse:	
Sage Grouse:	
Burrowing Owl:	Low
Loggerhead Shrike:	Moderate
Sprague's Pipit:	
Lark Bunting:	
McCown's Longspur:	
Baird's Sparrow:	Present / No
Cassin's Sparrow:	
Chestnut-collared Longspur:	Low
Worthen´s Sparrow:	
Black tailed Prairie dog:	Low
Bison:	
Bobwhite Quail:	Moderate

ESRS of the Central Region

ESR Name Pawnee Grasslands

ESR Number 8

ESR Area (sq. km) 17,397

Expert Consensus of Region's Significance High

Quantitative ESR Rating 5.88

Ecological Rationale Very important breeding for Mountain Plover and McCown's longspur, moderate size patches of intact short/mixed-grass prairie, raptor nesting sites, northern edge of ferruginous hawk wintering.

Region's Significance to Grassland Focal

Mountain Plover:	High
Piping plover:	
Long-billed Curlew:	Low
Ferruginous Hawk:	Moderate
Scaled Quail:	
Lesser Prairie-Chicken:	
Greater Prairie-Chicken:	Low
Sharp-tailed Grouse:	Moderate
Sage Grouse:	
Burrowing Owl:	Moderate
Loggerhead Shrike:	Moderate
Sprague's Pipit:	Present / No
Lark Bunting:	Moderate
McCown's Longspur:	Very High
Baird's Sparrow:	Present / No
Cassin's Sparrow:	Present / No
Chestnut-collared Longspur:	Moderate
Worthen´s Sparrow:	
Black tailed Prairie dog:	Low
Bison:	
Bobwhite Quail:	

ESRS of the Central Region

ESR Name Sandhills

ESR Number 10

ESR Area (sq. km) 47,073

Expert Consensus of Region's Significance High

Quantitative ESR Rating 3.88

Ecological Rationale Excising the Platte river corridor; important for migratory shorebirds/waterfowl, bison present. important American bittern breeding area, unique vegetation, important for prairie grouse

Region's Significance to Grassland Focal

Mountain Plover:	
Piping plover:	Present / No
Long-billed Curlew:	Low
Ferruginous Hawk:	Low
Scaled Quail:	
Lesser Prairie-Chicken:	
Greater Prairie-Chicken:	Moderate
Sharp-tailed Grouse:	High
Sage Grouse:	
Burrowing Owl:	Low
Loggerhead Shrike:	Low
Sprague's Pipit:	Low
Lark Bunting:	Moderate
McCown's Longspur:	Present / No
Baird's Sparrow:	Low
Cassin's Sparrow:	
Chestnut-collared Longspur:	Low
Worthen´s Sparrow:	
Black tailed Prairie dog:	
Bison:	
Bobwhite Quail:	Present / No

ESRS of the Southern Region

ESR Name Chihuahua – El Tokio/Mapimi

ESR Number 1

ESR Area (sq. km) 93,563

Expert Consensus of Region's Significance Very High

Quantitative ESR Rating 13.25

Ecological Rationale Tokio, gypsum outcrops (gypsophilous grasslands), Nerysirenia, Frankenia gypsophylla and Frankenia margaritae, Flaveria spp. (endemic to the region), Juniperus relicts. Main stronghold of Mexican prairie dog present, owls, ferruginous hawk, biodiversity. High endemism in the Cuatrocienegas Region. Endemic fish families.

Region's Significance to Grassland Focal

Mountain Plover:	Very High	**Mexican Prairie Dog:**	Very High
Piping plover:		**Gypsophilous Vegetation:**	Very High
Long-billed Curlew:	High		
Ferruginous Hawk:	High		
Scaled Quail:	High		
Lesser Prairie-Chicken:			
Greater Prairie-Chicken:			
Sharp-tailed Grouse:			
Sage Grouse:			
Burrowing Owl:	Very High		
Loggerhead Shrike:	High		
Sprague's Pipit:	Moderate		
Lark Bunting:	Very High		
McCown's Longspur:	Low		
Baird's Sparrow:	Moderate		
Cassin's Sparrow:	Very High		
Chestnut-collared Longspur:	Very High		
Worthen´s Sparrow:	Very High		
Black tailed Prairie dog:			
Mexican Pronghorn:	Very High		

ESRS of the Southern Region

ESR Name Chihuahua - Marfa/Big Bend/Maderas del Carmen

ESR Number 2

ESR Area (sq. km) 81,977

Expert Consensus of Region's Significance Very High

Quantitative ESR Rating 7.24

Ecological Rationale Good condition of grasslands in northern part, some ungrazed areas in southern part. Pronghorn populations, potential habitat for prairie dogs, burrowing owls, ferruginous hawks, mountain plover, black/capped vireo. Transition zone between Chihuahuan Desert and Tamaulipan Region. Transition zone between Yuca and Dasilirion and Nolina and the grasslands.

Region's Significance to Grassland Focal

Mountain Plover:	Low	**Mexican Prairie Dog:**	
Piping plover:		**Gypsophillic Vegetation:**	
Long-billed Curlew:	High		
Ferruginous Hawk:	Moderate		
Scaled Quail:	High		
Lesser Prairie-Chicken:			
Greater Prairie-Chicken:			
Sharp-tailed Grouse:			
Sage Grouse:			
Burrowing Owl:	High		
Loggerhead Shrike:	Moderate		
Sprague's Pipit:			
Lark Bunting:	High		
McCown's Longspur:	Moderate		
Baird's Sparrow:	Low		
Cassin's Sparrow:	Moderate		
Chestnut-collared Longspur:	Moderate		
Worthen´s Sparrow:			
Black tailed Prairie dog:			
Mexican Pronghorn:			

ESRS of the Southern Region

ESR Name Sierra Madre Occidental Foothills

ESR Number 3

ESR Area (sq. km) 218,501

Expert Consensus of Region's Significance Very High

Quantitative ESR Rating 12.48

Ecological Rationale Whole distribution of black-tailed prairie dogs, only wild bison population in Mexico and south-western US, isolated pronghorn populations in the southern part, stable pronhorn population in the lower bootheel area and Animas Valley, year round populations of mountain plover, burrowing owl, greater diversity and center of diversification of genus Muhlembergia and Bouteloa grasses.

Region's Significance to Grassland Focal

Mountain Plover:	Very High	**Mexican Prairie Dog:**	
Piping plover:		**Gypsophillic Vegetation:**	
Long-billed Curlew:	Very High		
Ferruginous Hawk:	Very High		
Scaled Quail:	Very High		
Lesser Prairie-Chicken:			
Greater Prairie-Chicken:			
Sharp-tailed Grouse:			
Sage Grouse:			
Burrowing Owl:	Very High		
Loggerhead Shrike:	High		
Sprague's Pipit:	Very High		
Lark Bunting:	High		
McCown's Longspur:	Moderate		
Baird's Sparrow:	Very High		
Cassin's Sparrow:	Moderate		
Chestnut-collared Longspur:	High		
Worthen´s Sparrow:			
Black tailed Prairie dog:	Very High		
Mexican Pronghorn:	Very High		

GPCAs of the Northern Region

PCA Name **Porcupine Hills**

PCA Number **21**

ESR Name Rocky Mountain Front

PCA Area (sq. km) 4,763 **PCA_Quantitative Rating** 1.89

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	N/A	**Sharp-tailed Grouse**	High	**Baird's Sparrow**	Present / No
Piping plover	N/A	**Sage Grouse**	N/A	**Cassin's Sparrow**	N/A
Long-billed Curlew	Low	**Burrowing Owl**	N/A	**Chestnut-collared Longspur**	N/A
Ferruginous Hawk	Low	**Loggerhead Shrike**	Low	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	N/A	**Black tailed Prairie dog**	N/A
Lesser Prairie-Chicken	N/A	**Lark Bunting**	N/A	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	N/A	**Bison**	Low

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Disturbance/Destruction	Very High	Very High; Current happening	Increasing in Magnitude	Country residential, conventional energy and coal bed methane
Habitat Fragmentation	Very High	Very High; Current happening	Increasing in Magnitude	Country residential, conventional energy and coal bed methane
Altered Composition/Structure	Very High	Very High; Current happening	Increasing in Magnitude	Country residential, conventional energy and coal bed methane; exotic invasion
Alteration of Fire Regime	Moderate	Very High; Current happening	Stable in Magnitude	fire suppression

GPCAs of the Northern Region

PCA Name **Milk River Ridge**

PCA Number **15**

ESR Name Rocky Mountain Front

PCA Area (sq. km) 3,570 **PCA_Quantitative Rating** 1.89

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	N/A	**Sharp-tailed Grouse**	Low	**Baird's Sparrow**	Present / No
Piping plover	N/A	**Sage Grouse**	N/A	**Cassin's Sparrow**	N/A
Long-billed Curlew	Low	**Burrowing Owl**	N/A	**Chestnut-collared Longspur**	N/A
Ferruginous Hawk	Low	**Loggerhead Shrike**	N/A	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	N/A	**Black tailed Prairie dog**	N/A
Lesser Prairie-Chicken	N/A	**Lark Bunting**	N/A	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	N/A	**Bison**	Low

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Disturbance/Destruction	Moderate	Moderate; Likely 5 - 10 years	Increasing in Magnitude	conventional energy
Habitat Fragmentation	Moderate	Moderate; Likely 5 - 10 years	Increasing in Magnitude	conventional energy
Altered Composition/Structure	Moderate	Moderate; Likely 5 - 10 years	Increasing in Magnitude	conventional energy; exotic invasion
Alteration of Fire Regime	Moderate	Very High; Current happening	Stable in Magnitude	fire suppression

GPCAs of the Northern Region

PCA Name **Monet / Matador**

PCA Number **20**

ESR Name Missouri Couteau

PCA Area (sq. km) 1,400 **PCA_Quantitative Rating** 7.33

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	N/A	**Sharp-tailed Grouse**	Moderate	**Baird's Sparrow**	High
Piping plover	Present / No	**Sage Grouse**	N/A	**Cassin's Sparrow**	N/A
Long-billed Curlew	Low	**Burrowing Owl**	Low	**Chestnut-collared Longspur**	Moderate
Ferruginous Hawk	Low	**Loggerhead Shrike**	Low	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	High	**Black tailed Prairie dog**	N/A
Lesser Prairie-Chicken	N/A	**Lark Bunting**	Present / No	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	Low	**Bison**	N/A

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Disturbance/Destruction	Low	Very High; Current happening	Decreasing in Magnitude	conversion to cultivation
Habitat Fragmentation	Low	Very High; Current happening	Decreasing in Magnitude	conversion to cultivation
Altered Composition/Structure	High	Very High; Current happening	Increasing in Magnitude	exotic invasion related to fragmentation; locally overgrazing

GPCAs of the Northern Region

PCA Name Cactus Hills/ Dirt Hills

PCA Number 16

ESR Name Missouri Couteau

PCA Area (sq. km) 2,504 **PCA_Quantitative Rating** 7.33

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	N/A	**Sharp-tailed Grouse**	Moderate	**Baird's Sparrow**	High
Piping plover	High	**Sage Grouse**	N/A	**Cassin's Sparrow**	N/A
Long-billed Curlew	Moderate	**Burrowing Owl**	Moderate	**Chestnut-collared Longspur**	Moderate
Ferruginous Hawk	Low	**Loggerhead Shrike**	Low	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	High	**Black tailed Prairie dog**	N/A
Lesser Prairie-Chicken	N/A	**Lark Bunting**	Low	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	Low	**Bison**	N/A

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Disturbance/Destruction	Low	Very High; Current happening	Decreasing in Magnitude	conversion to cultivation
Habitat Fragmentation	Low	Very High; Current happening	Decreasing in Magnitude	conversion to cultivation
Altered Composition/Structure	High	Very High; Current happening	Increasing in Magnitude	exotic invasion related to fragmentation; locally overgrazing

GPCAs of the Northern Region

PCA Name **Great Sandhills**

PCA Number **17**

ESR Name Medicine Line Mixed-grass

PCA Area (sq. km) 3,172 **PCA_Quantitative Rating** 3.36

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	Present / No Significance	**Sharp-tailed Grouse**	High	**Baird's Sparrow**	Low
Piping plover	Present / No Significance	**Sage Grouse**	Present / No Significance	**Cassin's Sparrow**	N/A
Long-billed Curlew	Low	**Burrowing Owl**	Present / No Significance	**Chestnut-collared Longspur**	Low
Ferruginous Hawk	N/A	**Loggerhead Shrike**	Moderate	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	Low	**Black tailed Prairie dog**	Present / No Significance
Lesser Prairie-Chicken	N/A	**Lark Bunting**	Low	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	Present / No Significance	**Bison**	Present / No Significance

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Fragmentation	Very High	Very High; Current happening	Increasing in Magnitude	gas drilling with exotic invasion
Altered Composition/Structure	Moderate	Very High; Current happening	Increasing in Magnitude	gas drilling with exotic invasion

GPCAs of the Northern Region

PCA Name **Suffield**

PCA Number **18**

ESR Name Medicine Line Mixed-grass

PCA Area (sq. km) 2,690 **PCA_Quantitative Rating** 9.30

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	N/A	**Sharp-tailed Grouse**	High	**Baird's Sparrow**	High
Piping plover	Present / No Significance	**Sage Grouse**	N/A	**Cassin's Sparrow**	N/A
Long-billed Curlew	High	**Burrowing Owl**	Moderate	**Chestnut-collared Longspur**	High
Ferruginous Hawk	High	**Loggerhead Shrike**	High	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	High	**Black tailed Prairie dog**	Present / No Significance
Lesser Prairie-Chicken	N/A	**Lark Bunting**	High	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	High	**Bison**	N/A

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Disturbance/Destruction	High	Very High; Currently happening	Increasing in Magnitude	Oil and Gas; military maneuvers; grass fires
Habitat Fragmentation	Moderate	Very High; Currently happening	Increasing in Magnitude	Oil and gas
Altered Composition/Structure	Moderate	Very High; Curretnly happening	Increasing in Magnitude	crested wheat grass invasion; potential for noxious spp e.g. leafy spurge

GPCAs of the Northern Region

PCA Name **Rumsey Block**

PCA Number **22**

ESR Name Northern Fescue

PCA Area (sq. km) 2,600 **PCA_Quantitative Rating** 3.67

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	N/A	**Sharp-tailed Grouse**	High	**Baird's Sparrow**	High
Piping plover	High	**Sage Grouse**	N/A	**Cassin's Sparrow**	N/A
Long-billed Curlew	N/A	**Burrowing Owl**	High	**Chestnut-collared Longspur**	N/A
Ferruginous Hawk	High	**Loggerhead Shrike**	High	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	High	**Black tailed Prairie dog**	N/A
Lesser Prairie-Chicken	N/A	**Lark Bunting**	N/A	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	N/A	**Bison**	N/A

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Disturbance/Destruction	Moderate	High; Likely within 5 years	Increasing in Magnitude	conventional energy; coal-bed methane
Habitat Fragmentation	Moderate	High; Likely within 5 years	Increasing in Magnitude	conventional energy; coal-bed methane
Altered Composition/Structure	Moderate	High; Likely within 5 years	Increasing in Magnitude	conventional energy; exotic invasion
Alteration of Fire Regime	Low	Very High; Current	Stable in Magnitude	fire suppression; tree encroachment

GPCAs of the Northern Region

PCA Name **Wainwright/Neutral Hills**

PCA Number **24**

ESR Name Northern Fescue

PCA Area (sq. km) 5,800 **PCA_Quantitative Rating** 3.67

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	N/A	**Sharp-tailed Grouse**	Y	**Baird's Sparrow**	Y
Piping plover	Y	**Sage Grouse**	N/A	**Cassin's Sparrow**	N/A
Long-billed Curlew	N/A	**Burrowing Owl**	N/A	**Chestnut-collared Longspur**	Y
Ferruginous Hawk	Y	**Loggerhead Shrike**	Y	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	Y	**Black tailed Prairie dog**	N/A
Lesser Prairie-Chicken	N/A	**Lark Bunting**	Y	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	Y	**Bison**	N/A

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Disturbance/Destruction	Moderate	High; Likely within 5 years	Increasing in Magnitude	military training, conventional energy
Habitat Fragmentation	Moderate	High; Likely within 5 years	Increasing in Magnitude	military training, conventional energy
Altered Composition/Structure	Moderate	High; Likely within 5 years	Increasing in Magnitude	military training, conventional energy
Alteration of Fire Regime	Low	Very High; Current happening	Stable in Magnitude	fire suppression, but some prescribed burning

GPCAs of the Northern Region

PCA Name **Manitou**

PCA Number **23**

ESR Name Northern Fescue

PCA Area (sq. km) 2,100 **PCA_Quantitative Rating** 3.67

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	N/A	**Sharp-tailed Grouse**	High	**Baird's Sparrow**	Low
Piping plover	N/A	**Sage Grouse**	N/A	**Cassin's Sparrow**	N/A
Long-billed Curlew	N/A	**Burrowing Owl**	N/A	**Chestnut-collared Longspur**	N/A
Ferruginous Hawk	N/A	**Loggerhead Shrike**	N/A	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	Low	**Black tailed Prairie dog**	N/A
Lesser Prairie-Chicken	N/A	**Lark Bunting**	N/A	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	N/A	**Bison**	N/A

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Disturbance/Destruction	Moderate	Very High; Current happening	Stable in Magnitude	conventional energy
Habitat Fragmentation	Moderate	Very High; Current happening	Stable in Magnitude	conventional energy
Alteration of Fire Regime	Moderate	Very High; Current happening	Stable in Magnitude	fire suppresion

GPCAs of the Northern Region

PCA Name **Sage Creek Milk River**

PCA Number **54**

ESR Name Medicine Line Mixed-grass

PCA Area (sq. km) 6,741 **PCA_Quantitative Rating** 9.30

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	Low	**Sharp-tailed Grouse**	Moderate	**Baird's Sparrow**	Very High
Piping plover	Present / No Significance	**Sage Grouse**	High	**Cassin's Sparrow**	Very High
Long-billed Curlew	Very High	**Burrowing Owl**	High	**Chestnut-collared Longspur**	Very High
Ferruginous Hawk	High	**Loggerhead Shrike**	High	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	High	**Black tailed Prairie dog**	Present / No Significance
Lesser Prairie-Chicken	N/A	**Lark Bunting**	High	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	High	**Bison**	Present / No Significance

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Disturbance/Destruction	High	Very High; Current happening	Increasing in Magnitude	Oil and Gas primarily, small amount of agricultural cultivation
Altered Composition/Structure	Moderate	Very High; Current happening	Increasing in Magnitude	crested wheat grass invasion; potential for noxious spp e.g. leafy spurge

GPCAs of the Northern Region

PCA Name **Frenchman River - Bitter Creek OMB**

PCA Number **55**

ESR Name Medicine Line Mixed-grass

PCA Area (sq. km) 6,614 **PCA_Quantitative Rating** 11.10

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	Present / No Significance	**Sharp-tailed Grouse**	Moderate	**Baird's Sparrow**	Very High
Piping plover	Present / No Significance	**Sage Grouse**	High	**Cassin's Sparrow**	Very High
Long-billed Curlew	Very High	**Burrowing Owl**	High	**Chestnut-collared Longspur**	Very High
Ferruginous Hawk	High	**Loggerhead Shrike**	High	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	High	**Black tailed Prairie dog**	High
Lesser Prairie-Chicken	N/A	**Lark Bunting**	High	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	High	**Bison**	High

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Disturbance/Destruction	Moderate	High; Likely within 5 years	Increasing in Magnitude	Oil and Gas primarily, small amount of agricultural cultivation
Altered Composition/Structure	Moderate	High; Likely within 5 years	Increasing in Magnitude	crested wheat grass invasion; potential for noxious spp e.g. leafy spurge

GPCAs of the Northern Region

PCA Name **Bow Island**

PCA Number **19**

ESR Name Medicine Line Mixed-grass

PCA Area (sq. km) 5,686 **PCA_Quantitative Rating** 9.04

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	Present / No Significance	**Sharp-tailed Grouse**	N/A	**Baird's Sparrow**	N/A
Piping plover	Present / No Significance	**Sage Grouse**	Present / No Significance	**Cassin's Sparrow**	N/A
Long-billed Curlew	N/A	**Burrowing Owl**	N/A	**Chestnut-collared Longspur**	N/A
Ferruginous Hawk	N/A	**Loggerhead Shrike**	N/A	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	N/A	**Black tailed Prairie dog**	N/A
Lesser Prairie-Chicken	N/A	**Lark Bunting**	N/A	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	N/A	**Bison**	Present / No Significance

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Disturbance/Destruction	High	Very High; Current happening	Increasing in Magnitude	Irrigation for special crops

GPCAs of the Northern Region

PCA Name **Poverty Plains**

PCA Number **13**

ESR Name Manitoba Mixed-grass\Towner Sandhills

PCA Area (sq. km) 1,725 **PCA_Quantitative Rating** 3.78

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	N/A	**Sharp-tailed Grouse**	Moderate	**Baird's Sparrow**	N/A
Piping plover	N/A	**Sage Grouse**	N/A	**Cassin's Sparrow**	N/A
Long-billed Curlew	N/A	**Burrowing Owl**	N/A	**Chestnut-collared Longspur**	N/A
Ferruginous Hawk	Moderate	**Loggerhead Shrike**	N/A	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	Moderate	**Black tailed Prairie dog**	N/A
Lesser Prairie-Chicken	N/A	**Lark Bunting**	N/A	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	N/A	**Bison**	N/A

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Disturbance/Destruction	Very High	Very High; Current happening	Increasing in Magnitude	conversion to cultivation
Habitat Fragmentation	Very High	Very High; Current happening	Increasing in Magnitude	conversion to cultivation
Altered Composition/Structure	High	Very High; Current happening	Increasing in Magnitude	Leafy spurge
Alteration of Fire Regime	Moderate	Very High; Current happening	Stable in Magnitude	woody plant invasion

GPCAs of the Northern Region

PCA Name Tall-grass

PCA Number 12

ESR Name Agassiz Tallgrass

PCA Area (sq. km) 834 **PCA_Quantitative Rating** 2.00

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	N/A	**Sharp-tailed Grouse**	Moderate	**Baird's Sparrow**	Presnt / No
Piping plover	N/A	**Sage Grouse**	N/A	**Cassin's Sparrow**	N/A
Long-billed Curlew	N/A	**Burrowing Owl**	Present / No	**Chestnut-collared Longspur**	N/A
Ferruginous Hawk	N/A	**Loggerhead Shrike**	Low	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	N/A	**Black tailed Prairie dog**	N/A
Lesser Prairie-Chicken	N/A	**Lark Bunting**	N/A	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	Very High	**McCown's Longspur**	N/A	**Bison**	N/A

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Disturbance/Destruction	Low	Low; Possible in next 10 - 20 years	Stable in Magnitude	conversion to cultivation
Habitat Fragmentation	Low	Low; Possible in next 10 - 20 years	Stable in Magnitude	conversion to cultivation
Alteration of Fire Regime	Very High	Very High; Current happening	Increasing in Magnitude	aspen invasion

GPCAs of the Northern Region

PCA Name **Montana Glaciated Plains**

PCA Number 8

ESR Name Medicine Line Mixed-grass

PCA Area (sq. km) 11,261 **PCA_Quantitative Rating** 10.59

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	Very High	**Sharp-tailed Grouse**	High	**Baird's Sparrow**	Low
Piping plover	Present / No Significance	**Sage Grouse**	Very High	**Cassin's Sparrow**	N/A
Long-billed Curlew	Moderate	**Burrowing Owl**	Very High	**Chestnut-collared Longspur**	High
Ferruginous Hawk	High	**Loggerhead Shrike**	Moderate	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	Moderate	**Black tailed Prairie dog**	Very High
Lesser Prairie-Chicken	N/A	**Lark Bunting**	Moderate	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	High	**Bison**	Very High

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Fragmentation	Very High	Very High; Current happening	Stable in Magnitude	
Habitat Disturbance/Destruction	High	High; Likely within 5 years	Increasing in Magnitude	
Excessive Herbivory	Moderate	Moderate; Likely 5 - 10 years	Stable in Magnitude	
Extraordinary predation/parasitism/disease	Very High	Very High; Current happening	Stable in Magnitude	

GPCAs of the Northern Region

PCA Name **Prairie Montana**

PCA Number **10**

ESR Name Medicine Line Mixed-grass

PCA Area (sq. km) 3,652 **PCA_Quantitative Rating** 7.49

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	Present / No Significance	**Sharp-tailed Grouse**	Moderate	**Baird's Sparrow**	Very High
Piping plover	Present / No Significance	**Sage Grouse**	Moderate	**Cassin's Sparrow**	N/A
Long-billed Curlew	High	**Burrowing Owl**	Present / No Significance	**Chestnut-collared Longspur**	Very High
Ferruginous Hawk	Moderate	**Loggerhead Shrike**	Moderate	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	Very High	**Black tailed Prairie dog**	Present / No Significance
Lesser Prairie-Chicken	N/A	**Lark Bunting**	Moderate	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	High	**Bison**	Low

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Excessive Herbivory	Moderate	Moderate; Likely 5 - 10 years	Stable in Magnitude	No prairie dogs
Altered Composition/Structure	High	High; Likely within 5 years	Increasing in Magnitude	
Habitat Fragmentation	High	Very High; Current happening	Increasing in Magnitude	

GPCAs of the Northern Region

PCA Name **State Line Wetlands**

PCA Number **11**

ESR Name Missouri Couteau

PCA Area (sq. km) 1,919 **PCA_Quantitative Rating** 4.67

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	N/A	**Sharp-tailed Grouse**	Present / No Significance	**Baird's Sparrow**	High
Piping plover	High	**Sage Grouse**	N/A	**Cassin's Sparrow**	N/A
Long-billed Curlew	N/A	**Burrowing Owl**	Present / No Significance	**Chestnut-collared Longspur**	High
Ferruginous Hawk	Present / No Significance	**Loggerhead Shrike**	Low	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	High	**Black tailed Prairie dog**	N/A
Lesser Prairie-Chicken	N/A	**Lark Bunting**	Low	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	N/A	**Bison**	N/A

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Extraordinary predation/parasitism/disease	High	Very High; Current happening	Stable in Magnitude	
Habitat Disturbance/Destruction	Moderate	Moderate; Likely 5 - 10 years	Stable in Magnitude	conventional energy
Habitat Fragmentation	Moderate	Moderate; Likely 5 - 10 years	Stable in Magnitude	

GPCAs of the Northern Region

PCA Name **Lostwood**

PCA Number 7

ESR Name Missouri Couteau

PCA Area (sq. km) 1,443 **PCA_Quantitative Rating** 6.32

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	N/A	**Sharp-tailed Grouse**	High	**Baird's Sparrow**	Very High
Piping plover	Moderate	**Sage Grouse**	N/A	**Cassin's Sparrow**	N/A
Long-billed Curlew	N/A	**Burrowing Owl**	N/A	**Chestnut-collared Longspur**	Moderate
Ferruginous Hawk	Low	**Loggerhead Shrike**	Moderate	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	Very High	**Black tailed Prairie dog**	N/A
Lesser Prairie-Chicken	N/A	**Lark Bunting**	Low	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	N/A	**Bison**	Present / No Significance

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Altered Composition/Structure	Moderate	Moderate; Likely 5 - 10 years	Stable in Magnitude	
Habitat Fragmentation	Moderate	Moderate; Likely 5 - 10 years	Stable in Magnitude	
Habitat Disturbance/Destruction	Moderate	Very High; Current happening	Increasing in Magnitude	

GPCAs of the Northern Region

PCA Name **Chase Lake**

PCA Number **6**

ESR Name Missouri Couteau

PCA Area (sq. km) 3,534 **PCA_Quantitative Rating** 6.33

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	N/A	**Sharp-tailed Grouse**	Moderate	**Baird's Sparrow**	High
Piping plover	Very High	**Sage Grouse**	N/A	**Cassin's Sparrow**	N/A
Long-billed Curlew	N/A	**Burrowing Owl**	Present / No Significance	**Chestnut-collared Longspur**	Moderate
Ferruginous Hawk	Low	**Loggerhead Shrike**	Moderate	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	High	**Black tailed Prairie dog**	N/A
Lesser Prairie-Chicken	N/A	**Lark Bunting**	Moderate	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	N/A	**Bison**	N/A

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Altered Composition/Structure	High	Very High; Current happening	Increasing in Magnitude	
Habitat Fragmentation	Moderate	Very High; Current happening	Increasing in Magnitude	
Habitat Disturbance/Destruction	High	Very High; Current happening	Increasing in Magnitude	
Extraordinary predation/parasitism/disease	High	Very High; Current happening	Stable in Magnitude	

GPCAs of the Northern Region

PCA Name **Southern Coteau**

PCA Number **4**

ESR Name Missouri Couteau

PCA Area (sq. km) 6,977 **PCA_Quantitative Rating** 2.00

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	N/A	**Sharp-tailed Grouse**	High	**Baird's Sparrow**	Present / No Significance
Piping plover	Present / No Significance	**Sage Grouse**	N/A	**Cassin's Sparrow**	N/A
Long-billed Curlew	N/A	**Burrowing Owl**	Present / No Significance	**Chestnut-collared Longspur**	Present / No Significance
Ferruginous Hawk	Present / No Significance	**Loggerhead Shrike**	Low	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	Present / No Significance	**Black tailed Prairie dog**	N/A
Lesser Prairie-Chicken	N/A	**Lark Bunting**	Moderate	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	N/A	**Bison**	N/A

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Disturbance/Destruction	Very High	Very High; Current happening	Increasing in Magnitude	No piping plover
Habitat Fragmentation	Very High	Very High; Current happening	Increasing in Magnitude	
Altered Composition/Structure	Moderate	Moderate; Likely 5 - 10 years	Stable in Magnitude	

GPCAs of the Northern Region

PCA Name **Aspen Parkland**

PCA Number **9**

ESR Name Agassiz Tallgrass

PCA Area (sq. km) 1,781 **PCA_Quantitative Rating** 2.00

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	N/A	**Sharp-tailed Grouse**	Low	**Baird's Sparrow**	Present / No Significance
Piping plover	N/A	**Sage Grouse**	N/A	**Cassin's Sparrow**	N/A
Long-billed Curlew	N/A	**Burrowing Owl**	N/A	**Chestnut-collared Longspur**	N/A
Ferruginous Hawk	N/A	**Loggerhead Shrike**	Low	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	N/A	**Black tailed Prairie dog**	N/A
Lesser Prairie-Chicken	N/A	**Lark Bunting**	N/A	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	Moderate	**McCown's Longspur**	N/A	**Bison**	N/A

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Disturbance/Destruction	Moderate	Moderate; Likely 5 - 10 years	Stable in Magnitude	
Habitat Fragmentation	Moderate	Moderate; Likely 5 - 10 years	Stable in Magnitude	
Altered Composition/Structure	Moderate	Moderate; Likely 5 - 10 years	Stable in Magnitude	
Alteration of Fire Regime	High	Very High; Current happening	Stable in Magnitude	

GPCAs of the Northern Region

PCA Name **Cheyenne River**

PCA Number **5**

ESR Name Cheyenne Prairie

PCA Area (sq. km) 2,550 **PCA_Quantitative Rating** 6.64

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	N/A	**Sharp-tailed Grouse**	Moderate	**Baird's Sparrow**	N/A
Piping plover	N/A	**Sage Grouse**	N/A	**Cassin's Sparrow**	N/A
Long-billed Curlew	High	**Burrowing Owl**	Moderate	**Chestnut-collared Longspur**	Low
Ferruginous Hawk	Moderate	**Loggerhead Shrike**	Moderate	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	Present / No Significance	**Black tailed Prairie dog**	High
Lesser Prairie-Chicken	N/A	**Lark Bunting**	Moderate	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	N/A	**Bison**	Very High

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Disturbance/Destruction	Low	Low; Possible in next 10 - 20 years	Stable in Magnitude	
Habitat Fragmentation	Low	Low; Possible in next 10 - 20 years	Stable in Magnitude	
Altered Composition/Structure	Low	Moderate; Likely 5 - 10 years	Stable in Magnitude	

GPCAs of the Northern Region

PCA Name **Conata Basin**

PCA Number **3**

ESR Name Thunder Basin\Conata

PCA Area (sq. km) 6,948 **PCA_Quantitative Rating** 5.77

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	Present / No Significance	**Sharp-tailed Grouse**	Low	**Baird's Sparrow**	N/A
Piping plover	N/A	**Sage Grouse**	Present / No Significance	**Cassin's Sparrow**	N/A
Long-billed Curlew	Present / No Significance	**Burrowing Owl**	High	**Chestnut-collared Longspur**	High
Ferruginous Hawk	Low	**Loggerhead Shrike**	Low	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	N/A	**Black tailed Prairie dog**	Very High
Lesser Prairie-Chicken	N/A	**Lark Bunting**	Moderate	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	Moderate	**Bison**	High

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Disturbance/Destruction	High	Very High; Current happening	Increasing in Magnitude	Prairie dog poisoning
Habitat Fragmentation	High	Very High; Current happening	Increasing in Magnitude	Prairie dog poisoning

GPCAs of the Northern Region

PCA Name **Thunder Basin**

PCA Number **2**

ESR Name Thunder Basin\Conata

PCA Area (sq. km) 1,648 **PCA_Quantitative Rating** 7.51

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	High	**Sharp-tailed Grouse**	Present / No Significance	**Baird's Sparrow**	N/A
Piping plover	N/A	**Sage Grouse**	Present / No Significance	**Cassin's Sparrow**	N/A
Long-billed Curlew	High	**Burrowing Owl**	Moderate	**Chestnut-collared Longspur**	High
Ferruginous Hawk	High	**Loggerhead Shrike**	Moderate	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	N/A	**Black tailed Prairie dog**	Very High
Lesser Prairie-Chicken	N/A	**Lark Bunting**	Moderate	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	Moderate	**Bison**	Moderate

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Disturbance/Destruction	High	Very High; Current happening	Increasing in Magnitude	
Habitat Fragmentation	High	Very High; Current happening	Increasing in Magnitude	
Extraordinary predation/parasitism/disease	High	Very High; Current happening	Stable in Magnitude	

GPCAs of the Northern Region

PCA Name **Hole in the Wall**

PCA Number **1**

ESR Name Thunder Basin\Conata

PCA Area (sq. km) 2,179 **PCA_Quantitative Rating** 5.48

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	High	**Sharp-tailed Grouse**	Present / No Significance	**Baird's Sparrow**	N/A
Piping plover	N/A	**Sage Grouse**	Moderate	**Cassin's Sparrow**	N/A
Long-billed Curlew	High	**Burrowing Owl**	Moderate	**Chestnut-collared Longspur**	Low
Ferruginous Hawk	Moderate	**Loggerhead Shrike**	Low	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	N/A	**Black tailed Prairie dog**	High
Lesser Prairie-Chicken	N/A	**Lark Bunting**	Low	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	Low	**Bison**	Present / No Significance

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Disturbance/Destruction	Moderate	Moderate; Likely 5 - 10 years	Unknown	
Habitat Fragmentation	Low	Moderate; Likely 5 - 10 years	Unknown	

GPCAs of the Northern Region

PCA Name **Rocky Mountain Front**

PCA Number **14**

ESR Name Rocky Mountain Front

PCA Area (sq. km) 9,189 **PCA_Quantitative Rating** 1.89

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	N/A	**Sharp-tailed Grouse**	High	**Baird's Sparrow**	Present / No
Piping plover	Present / No	**Sage Grouse**	N/A	**Cassin's Sparrow**	N/A
Long-billed Curlew	Moderate	**Burrowing Owl**	Present / No	**Chestnut-collared Longspur**	Low
Ferruginous Hawk	Moderate	**Loggerhead Shrike**	Low	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	Low	**Black tailed Prairie dog**	N/A
Lesser Prairie-Chicken	N/A	**Lark Bunting**	Present / No	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	Low	**Bison**	N/A

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale

GPCAs of the Central Region

PCA Name **Pawnee**

PCA Number **35**

ESR Name Pawnee Grasslands

PCA Area (sq. km) 9,097 **PCA_Quantitative Rating** 6.41

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	High	**Sharp-tailed Grouse**	N/A	**Baird's Sparrow**	N/A
Piping plover	N/A	**Sage Grouse**	N/A	**Cassin's Sparrow**	Moderate
Long-billed Curlew	Low	**Burrowing Owl**	Moderate	**Chestnut-collared Longspur**	Moderate
Ferruginous Hawk	Moderate	**Loggerhead Shrike**	Moderate	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	N/A	**Black tailed Prairie dog**	High
Lesser Prairie-Chicken	N/A	**Lark Bunting**	High	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	Low	**McCown's Longspur**	Very High	**Bison**	Moderate
				Bobwhite Quail	N/A

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Fragmentation	High	High; Likely within 5 years	Increasing in Magnitude	housing development in front range; wind power;
Habitat Disturbance/Destruction	Very High	Very High; Current happening	Increasing in Magnitude	even-aged grazing (inappropriate grazing); Off-highway vehivle use
Alteration of Fire Regime	High	Very High; Current happening	Increasing in Magnitude	lack of fire
Extraordinary predation/parasitism/disease	Moderate	Very High; Current happening	Stable in Magnitude	black-tailed prairie dog plague

GPCAs of the Central Region

PCA Name **Sioux Box Butte**

PCA Number **36**

ESR Name Thunder Basin\Conata

PCA Area (sq. km) 5,229 **PCA_Quantitative Rating** 4.22

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	N/A	**Sharp-tailed Grouse**	N/A	**Baird's Sparrow**	N/A
Piping plover	N/A	**Sage Grouse**	High	**Cassin's Sparrow**	N/A
Long-billed Curlew	Low	**Burrowing Owl**	Low	**Chestnut-collared Longspur**	Low
Ferruginous Hawk	Moderate	**Loggerhead Shrike**	High	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	N/A	**Black tailed Prairie dog**	Low
Lesser Prairie-Chicken	N/A	**Lark Bunting**	High	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	Moderate	**Bison**	High
				Bobwhite Quail	Present/No

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Fragmentation	High	Very High; Current happening	Stable in Magnitude	conversion from native to cropland; small patch size
Alteration of Fire Regime	High	Very High; Current happening	Stable in Magnitude	no fire
Habitat Disturbance/Destruction	High	Very High; Current happening	Stable in Magnitude	conversion from native to cropland; small patch size;
Extraordinary predation/parasitism/disease	Low	Very High; Current happening	Stable in Magnitude	plague in black-tailed prairie dogs

GPCAs of the Central Region

PCA Name **Chalk Bluff**

PCA Number **32**

ESR Name Smoky Hills

PCA Area (sq. km) 3,811 **PCA_Quantitative Rating** 5.68

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	N/A	**Sharp-tailed Grouse**	N/A	**Baird's Sparrow**	N/A
Piping plover	N/A	**Sage Grouse**	N/A	**Cassin's Sparrow**	N/A
Long-billed Curlew	N/A	**Burrowing Owl**	High	**Chestnut-collared Longspur**	N/A
Ferruginous Hawk	N/A	**Loggerhead Shrike**	N/A	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	N/A	**Black tailed Prairie dog**	High
Lesser Prairie-Chicken	Moderate	**Lark Bunting**	High	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	Moderate	**McCown's Longspur**	N/A	**Bison**	N/A
				Bobshite Quail	N/A

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Fragmentation	Moderate	Very High; Current happening	Stable in Magnitude	currently fragmented, but no urgent threat
Groundwater Depletion	Moderate	Very High; Current happening	Stable in Magnitude	Severe depletion affects aquatic species, not upland species
Excessive Herbivory	Moderate	Very High; Current happening	Stable in Magnitude	grazing not always appropriate (timing, intensity, and variation)
Alteration of Fire Regime	Moderate	Very High; Current happening	Stable in Magnitude	no use of fire

GPCAs of the Central Region

PCA Name **Thunder Basin, Bill**

PCA Number **34**

ESR Name Southern Prairies

PCA Area (sq. km) 14,821 **PCA_Quantitative Rating** 9.75

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	N/A	**Sharp-tailed Grouse**	N/A	**Baird's Sparrow**	N/A
Piping plover	N/A	**Sage Grouse**	N/A	**Cassin's Sparrow**	N/A
Long-billed Curlew	N/A	**Burrowing Owl**	Moderate	**Chestnut-collared Longspur**	High
Ferruginous Hawk	High	**Loggerhead Shrike**	N/A	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	N/A	**Black tailed Prairie dog**	Moderate
Lesser Prairie-Chicken	N/A	**Lark Bunting**	N/A	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	Moderate	**Bison**	N/A
				Bobshite Quail	N/A

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Disturbance/Destruction	Very High	Very High; Current happening	Increasing in Magnitude	front range urban sprawl; roads
Habitat Fragmentation	Very High	Very High; Current happening	Increasing in Magnitude	front range urban sprawl; roads
Alteration of Fire Regime	Moderate	Very High; Current happening	Stable in Magnitude	no fire use
Extraordinary predation/parasitism/disease	Moderate	Very High; Current happening	Stable in Magnitude	plague in black-tailed prairie dogs

GPCAs of the Central Region

PCA Name Cimarron

PCA Number 28

ESR Name Southern Prairies

PCA Area (sq. km) 7,622 **PCA_Quantitative Rating** 11.25

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	High	**Sharp-tailed Grouse**	N/A	**Baird's Sparrow**	N/A
Piping plover	N/A	**Sage Grouse**	N/A	**Cassin's Sparrow**	High
Long-billed Curlew	High	**Burrowing Owl**	High	**Chestnut-collared Longspur**	Moderate
Ferruginous Hawk	Moderate	**Loggerhead Shrike**	Moderate	**Worthen´s Sparrow**	N/A
Scaled Quail	Moderate	**Sprague's Pipit**	N/A	**Black tailed Prairie dog**	High
Lesser Prairie-Chicken	High	**Lark Bunting**	Moderate	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	Moderate	**Bison**	N/A
				Bobwhite Quail	Moderate

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Fragmentation	High	Very High; Current happening	Increasing in Magnitude	cropland; oil and gas development
Habitat Disturbance/Destruction	High	Very High; Current happening	Increasing in Magnitude	cropland; oil and gas development; herbicide use
Excessive Herbivory	Moderate	Very High; Current happening	Stable in Magnitude	inappropriate herbivory
Alteration of Fire Regime	Moderate	Very High; Current happening	Stable in Magnitude	no fire use

GPCAs of the Central Region

PCA Name **Western Red Hills**

PCA Number **26**

ESR Name Southern Prairies

PCA Area (sq. km) 3,856 **PCA_Quantitative Rating** 11.25

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	N/A	**Sharp-tailed Grouse**	N/A	**Baird's Sparrow**	N/A
Piping plover	Present Not Sig.	**Sage Grouse**	N/A	**Cassin's Sparrow**	Moderate
Long-billed Curlew	Present Not Sig.	**Burrowing Owl**	Moderate	**Chestnut-collared Longspur**	Low
Ferruginous Hawk	Low	**Loggerhead Shrike**	Low	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	Present Not Sig.	**Black tailed Prairie dog**	Moderate
Lesser Prairie-Chicken	Very High	**Lark Bunting**	Low	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	Low	**Bison**	N/A
				Bobwhite Quail	Moderate

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Disturbance/Destruction	High	Very High; Current happening	Increasing in Magnitude	cropland; oil and gas development
Habitat Fragmentation	High	Very High; Current happening	Increasing in Magnitude	cropland; oil and gas development; herbicide use
Excessive Herbivory	Moderate	Very High; Current happening	Stable in Magnitude	inappropriate herbivory
Alteration of Fire Regime	Moderate	Very High; Current happening	Stable in Magnitude	no fire use

GPCAs of the Central Region

PCA Name **Central Red Hills**

PCA Number **25**

ESR Name Southern Prairies

PCA Area (sq. km) 2,956 **PCA_Quantitative Rating** 11.25

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	N/A	**Sharp-tailed Grouse**	N/A	**Baird's Sparrow**	N/A
Piping plover	N/A Present/ Not sig	**Sage Grouse**	N/A	**Cassin's Sparrow**	N/A Present/ Not sig
Long-billed Curlew	N/A	**Burrowing Owl**	N/A Moderate	**Chestnut-collared Longspur**	N/A Low
Ferruginous Hawk	N/A Low	**Loggerhead Shrike**	N/A Moderate	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	N/A	**Black tailed Prairie dog**	N/A Moderate
Lesser Prairie-Chicken	N/A High	**Lark Bunting**	N/A Present/ Not sig	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	N/A Present/ Not sig	**Bison**	N/A Moderate
				Bobshite Quail	N/A High

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Disturbance/Destruction	High	Very High; Current happening	Increasing in Magnitude	cropland; oil and gas development
Habitat Fragmentation	High	Very High; Current happening	Increasing in Magnitude	cropland; oil and gas development; herbicide use
Excessive Herbivory	Moderate	Very High; Current happening	Stable in Magnitude	inappropriate herbivory
Alteration of Fire Regime	Moderate	Very High; Current happening	Decreasing in Magnitude	fire increasing in use

GPCAs of the Central Region

PCA Name **Ellis**

PCA Number **27**

ESR Name Southern Prairies

PCA Area (sq. km) 4,210 **PCA_Quantitative Rating** 11.25

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	N/A	**Sharp-tailed Grouse**	N/A	**Baird's Sparrow**	N/A
Piping plover	N/A	**Sage Grouse**	N/A	**Cassin's Sparrow**	Moderate
Long-billed Curlew	N/A	**Burrowing Owl**	Low	**Chestnut-collared Longspur**	N/A
Ferruginous Hawk	Low	**Loggerhead Shrike**	Moderate	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	N/A	**Black tailed Prairie dog**	Low
Lesser Prairie-Chicken	Low	**Lark Bunting**	N/A	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	N/A	**Bison**	High
				Bobwhite Quail	Moderate

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Disturbance/Destruction	High	Very High; Current happening	Increasing in Magnitude	cropland; oil and gas development; herbicide use; endemic Chinnery oak
Habitat Fragmentation	High	Very High; Current happening	Increasing in Magnitude	cropland; oil and gas development
Excessive Herbivory	Moderate	Very High; Current happening	Stable in Magnitude	inappropriate herbivory
Alteration of Fire Regime	Moderate	Very High; Current happening	Stable in Magnitude	no fire use

GPCAs of the Central Region

PCA Name **Mescalero Sands**

PCA Number **29**

ESR Name Southern Prairies

PCA Area (sq. km) 11,595 **PCA_Quantitative Rating** 11.25

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	N/A	**Sharp-tailed Grouse**	N/A	**Baird's Sparrow**	N/A
Piping plover	N/A	**Sage Grouse**	N/A	**Cassin's Sparrow**	Very High
Long-billed Curlew	Low	**Burrowing Owl**	Low	**Chestnut-collared Longspur**	High
Ferruginous Hawk	Moderate	**Loggerhead Shrike**	Moderate	**Worthen´s Sparrow**	N/A
Scaled Quail	High	**Sprague's Pipit**	Present/no significant	**Black tailed Prairie dog**	Low
Lesser Prairie-Chicken	Very High	**Lark Bunting**	Moderate	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	Moderate	**Bison**	N/A
				Bobshite Quail	Moderate

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Disturbance/Destruction	Very High	Very High; Current happening	Increasing in Magnitude	cropland; oil and gas development; herbicide use; endemic shinnery oak; wind power
Habitat Fragmentation	Very High	Very High; Current happening	Increasing in Magnitude	cropland; oil and gas development
Excessive Herbivory	Very High	Very High; Current happening	Stable in Magnitude	

GPCAs of the Central Region

PCA Name **Rita Blanca**

PCA Number **30**

ESR Name Southern Prairies

PCA Area (sq. km) 9,262 **PCA_Quantitative Rating** 11.25

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	N/A	**Sharp-tailed Grouse**	N/A	**Baird's Sparrow**	N/A
Piping plover	N/A	**Sage Grouse**	N/A	**Cassin's Sparrow**	Low
Long-billed Curlew	Low	**Burrowing Owl**	Moderate	**Chestnut-collared Longspur**	High
Ferruginous Hawk	Moderate	**Loggerhead Shrike**	Low	**Worthen´s Sparrow**	N/A
Scaled Quail	Present/no sign	**Sprague's Pipit**	Present/no sign	**Black tailed Prairie dog**	Moderate
Lesser Prairie-Chicken	N/A	**Lark Bunting**	Low	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	Low	**Bison**	N/A
				Bobshite Quail	Present/no sign

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Fragmentation	High	Very High; Current happening	Increasing in Magnitude	conversion from native to cropland; wind power
Habitat Disturbance/Destruction	High	Very High; Current happening	Increasing in Magnitude	conversion from native to cropland
Extraordinary predation/parasitism/disease	High	Very High; Current happening	Stable in Magnitude	plague in black-tailed prairie dogs is high

GPCAs of the Central Region

PCA Name **Panhandle**

PCA Number **38**

ESR Name Southern Prairies

PCA Area (sq. km) 1,655 **PCA_Quantitative Rating** 10.50

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	N/A	**Sharp-tailed Grouse**	N/A	**Baird's Sparrow**	N/A
Piping plover	N/A	**Sage Grouse**	N/A	**Cassin's Sparrow**	High
Long-billed Curlew	High	**Burrowing Owl**	N/A	**Chestnut-collared Longspur**	High
Ferruginous Hawk	N/A	**Loggerhead Shrike**	N/A	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	N/A	**Black tailed Prairie dog**	N/A
Lesser Prairie-Chicken	High	**Lark Bunting**	N/A	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	N/A	**Bison**	N/A
				Bobshite Quail	Low

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Fragmentation	High	Very High; Current happening	Increasing in Magnitude	conversion from native to cropland; wind power
Habitat Disturbance/Destruction	High	Very High; Current happening	Increasing in Magnitude	conversion from native to cropland
Extraordinary predation/parasitism/disease	High	Very High; Current happening	Stable in Magnitude	plague in black-tailed prairie dogs is high

GPCAs of the Central Region

PCA Name **Kiowa**

PCA Number **39**

ESR Name Southern Prairies

PCA Area (sq. km) 855 **PCA_Quantitative Rating** 6.06

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	Moderate	**Sharp-tailed Grouse**	N/A	**Baird's Sparrow**	N/A
Piping plover	N/A	**Sage Grouse**	N/A	**Cassin's Sparrow**	High
Long-billed Curlew	N/A	**Burrowing Owl**	N/A	**Chestnut-collared Longspur**	Low
Ferruginous Hawk	N/A	**Loggerhead Shrike**	N/A	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	Present / No Significance	**Black tailed Prairie dog**	Present / No Significance
Lesser Prairie-Chicken	Present / No Significance	**Lark Bunting**	Low	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	Present / No Significance	**McCown's Longspur**	Low	**Bison**	N/A
				Bobshite Quail	Low

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Alteration of Fire Regime	Moderate	Very High; Current happening	Increasing in Magnitude	Fire exclution leading to conifer encroachment
Habitat Disturbance/Destruction	Moderate	Very High; Current happening	Stable in Magnitude	Recreational use of the grassland

GPCAs of the Central Region

PCA Name Carrzozo

PCA Number 33

ESR Name Southern Prairies

PCA Area (sq. km) 3,445 **PCA_Quantitative Rating** 6.25

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	Moderate	**Sharp-tailed Grouse**	N/A	**Baird's Sparrow**	Present / No Significance
Piping plover	N/A	**Sage Grouse**	N/A	**Cassin's Sparrow**	Low
Long-billed Curlew	Low	**Burrowing Owl**	Low	**Chestnut-collared Longspur**	Moderate
Ferruginous Hawk	N/A	**Loggerhead Shrike**	Low	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	N/A	**Black tailed Prairie dog**	N/A
Lesser Prairie-Chicken	Present / No Significance	**Lark Bunting**	N/A	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	Low	**Bison**	N/A
				Bobshite Quail	N/A

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Disturbance/Destruction	Very High	Very High; Current happening	Increasing in Magnitude	urbanization
Habitat Fragmentation	Very High	Very High; Current happening	Increasing in Magnitude	urbanization

GPCAs of the Central Region

PCA Name **Roosevelt**

PCA Number **37**

ESR Name Southern Prairies

PCA Area (sq. km) 3,365 **PCA_Quantitative Rating** 9.50

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	Moderate	**Sharp-tailed Grouse**	N/A	**Baird's Sparrow**	N/A
Piping plover	N/A	**Sage Grouse**	N/A	**Cassin's Sparrow**	Very High
Long-billed Curlew	N/A	**Burrowing Owl**	Moderate	**Chestnut-collared Longspur**	N/A
Ferruginous Hawk	High	**Loggerhead Shrike**	Moderate	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	N/A	**Black tailed Prairie dog**	Moderate
Lesser Prairie-Chicken	High	**Lark Bunting**	N/A	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	N/A	**Bison**	N/A
				Bobshite Quail	N/A

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Fragmentation	High	Very High; Current happening	Increasing in Magnitude	conversion from native to cropland; wind power
Habitat Disturbance/Destruction	High	Very High; Current happening	Increasing in Magnitude	conversion from native to cropland
Extraordinary predation/parasitism/disease	High	Very High; Current happening	Stable in Magnitude	plague in black-tailed prairie dogs is high

GPCAs of the Central Region

PCA Name **Curry**

PCA Number **40**

ESR Name Southern Prairies

PCA Area (sq. km) 1,368 **PCA_Quantitative Rating** 9.75

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	Moderate	**Sharp-tailed Grouse**	N/A	**Baird's Sparrow**	N/A
Piping plover	N/A	**Sage Grouse**	N/A	**Cassin's Sparrow**	N/A
Long-billed Curlew	N/A	**Burrowing Owl**	Moderate	**Chestnut-collared Longspur**	N/A
Ferruginous Hawk	High	**Loggerhead Shrike**	Moderate	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	N/A	**Black tailed Prairie dog**	N/A
Lesser Prairie-Chicken	High	**Lark Bunting**	N/A	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	N/A	**Bison**	N/A
				Bobshite Quail	N/A

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Fragmentation	High	Very High; Current happening	Increasing in Magnitude	conversion from native to cropland; wind power
Habitat Disturbance/Destruction	High	Very High; Current happening	Increasing in Magnitude	conversion from native to cropland
Extraordinary predation/parasitism/disease	High	Very High; Current happening	Stable in Magnitude	plague in black-tailed prairie dogs is high

GPCAs of the Central Region

PCA Name **Flint Hills**

PCA Number **31**

ESR Name Flint Hills

PCA Area (sq. km) 14,005 **PCA_Quantitative Rating** 4.24

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	N/A	**Sharp-tailed Grouse**	N/A	**Baird's Sparrow**	N/A
Piping plover	Low	**Sage Grouse**	N/A	**Cassin's Sparrow**	N/A
Long-billed Curlew	N/A	**Burrowing Owl**	Present / No Significance	**Chestnut-collared Longspur**	Present
Ferruginous Hawk	Present/ Not signif	**Loggerhead Shrike**	High	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	N/A	**Black tailed Prairie dog**	Present / No Significance
Lesser Prairie-Chicken	N/A	**Lark Bunting**	N/A	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	Very High	**McCown's Longspur**	N/A	**Bison**	low
				Bobshite Quail	High

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Disturbance/Destruction	High	Very High; Currently happening	Increasing in Magnitude	urbanization increasing but localized
Habitat Fragmentation	High	High; Likely within 5 years	Unknown	wind power impending
Altered Composition/Structure	High	Very High; Currently happening	Stable in Magnitude	altered structure due to fire and grazing practices and herbicides
Alteration of Fire Regime	High	Very High; Currently happening	Stable in Magnitude	issue is annual burning; need less frequent fire
Excessive Herbivory	High	Very High; Current happening	Stable in Magnitude	early season double-stocking impacts breeding birds by creating grazing lawns; need different grazing system

GPCAs of the Southern Region

PCA Name Cuatro Cienegas

PCA Number 41

ESR Name Chihuahua - Tokio/Mapimi

PCA Area (sq. km) 1,531 **PCA_Quantitative Rating** 9.22

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	Present / No Significance	**Sharp-tailed Grouse**	N/A	**Baird's Sparrow**	N/A
Piping plover	Present / No Significance	**Sage Grouse**	N/A	**Cassin's Sparrow**	Moderate
Long-billed Curlew	Low	**Burrowing Owl**	Moderate	**Chestnut-collared Longspur**	N/A
Ferruginous Hawk	N/A	**Loggerhead Shrike**	Moderate	**Worthen´s Sparrow**	N/A
Scaled Quail	Moderate	**Sprague's Pipit**	N/A	**Black tailed Prairie dog**	N/A
Lesser Prairie-Chicken	N/A	**Lark Bunting**	Low	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	N/A	**Mexican prairie dog**	N/A
				Gypsophillic vegetation	Very High

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Modification of water levels; changes in natural flow patterns	Very High	Very High; Current happening	Increasing in Magnitude	Increasing agriculture areas
Groundwater Depletion	Very High	Very High; Current happening	Increasing in Magnitude	Increasing agriculture areas
Habitat Disturbance/Destruction	High	Low; Possible in next 10 - 20 years	Stable in Magnitude	Traffic of cacteen and mesquite wood
Excessive Herbivory	Moderate	Low; Possible in next 10 - 20 years	Stable in Magnitude	Horses
Sedimentation Toxics/contaminants	Moderate	Low; Possible in next 10 - 20 years	Increasing in Magnitude	Increasing tourism

GPCAs of the Southern Region

PCA Name Tokio

PCA Number 42

ESR Name Chihuahua - Tokio/Mapimi

PCA Area (sq. km) 9,364 **PCA_Quantitative Rating** 12.25

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	Very High	**Sharp-tailed Grouse**	N/A	**Baird's Sparrow**	N/A
Piping plover	N/A	**Sage Grouse**	N/A	**Cassin's Sparrow**	High
Long-billed Curlew	Very High	**Burrowing Owl**	Very High	**Chestnut-collared Longspur**	N/A
Ferruginous Hawk	Very High	**Loggerhead Shrike**	High	**Worthen´s Sparrow**	Very High
Scaled Quail	Moderate	**Sprague's Pipit**	Low	**Black tailed Prairie dog**	N/A
Lesser Prairie-Chicken	N/A	**Lark Bunting**	Low	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	Low	**Mexican prairie dog**	Very High
				Gypsophillic vegetation	Very High

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Disturbance/Destruction	Very High	Very High; Current happening	Increasing in Magnitude	Increasing agriculture areas
Habitat Fragmentation	Very High	Very High; Current happening	Increasing in Magnitude	Increasing agriculture areas
Excessive Herbivory	High	Low; Possible in next 10 - 20 years	Stable in Magnitude	Horses, cow and goats
Groundwater Depletion	High	Low; Possible in next 10 - 20 years	Increasing in Magnitude	Increasing agriculture areas
Sedimentation Toxics/contaminants	Moderate	Low; Possible in next 10 - 20 years	Stable in Magnitude	Increasing agriculture areas and urban areas

GPCAs of the Southern Region

PCA Name **Mapimi**

PCA Number **43**

ESR Name Chihuahua - Tokio/Mapimi

PCA Area (sq. km) 6,824 **PCA_Quantitative Rating** 11.75

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	Moderate	**Sharp-tailed Grouse**	N/A	**Baird's Sparrow**	Moderate
Piping plover	N/A	**Sage Grouse**	N/A	**Cassin's Sparrow**	Very High
Long-billed Curlew	High	**Burrowing Owl**	High	**Chestnut-collared Longspur**	High
Ferruginous Hawk	Moderate	**Loggerhead Shrike**	High	**Worthen´s Sparrow**	N/A
Scaled Quail	Very High	**Sprague's Pipit**	Low	**Black tailed Prairie dog**	N/A
Lesser Prairie-Chicken	N/A	**Lark Bunting**	Very High	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	Present / No Significance	**Mexican prairie dog**	N/A
				Gypsophillic vegetation	N/A

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Excessive Herbivory	Very High	Very High; Current happening	Increasing in Magnitude	Cattle raising very important economic activity
Habitat Disturbance/Destruction	High	High; Likely within 5 years	Stable in Magnitude	ocassional conversion to agriculture
Habitat Fragmentation	Moderate	Low; Possible in next 10 - 20 years	Unknown	ocassional conversion to agriculture

GPCAs of the Southern Region

PCA Name Valle Colombia

PCA Number 45

ESR Name Chihuahua - Marfa/Big Bend/Maderas del Carmen

PCA Area (sq. km) 4,477 **PCA_Quantitative Rating** 7.24

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	N/A	**Sharp-tailed Grouse**	N/A	**Baird's Sparrow**	N/A
Piping plover	N/A	**Sage Grouse**	N/A	**Cassin's Sparrow**	N/A
Long-billed Curlew	N/A	**Burrowing Owl**	N/A	**Chestnut-collared Longspur**	N/A
Ferruginous Hawk	N/A	**Loggerhead Shrike**	N/A	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	N/A	**Black tailed Prairie dog**	N/A
Lesser Prairie-Chicken	N/A	**Lark Bunting**	N/A	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	N/A	**Mexican prairie dog**	N/A
				Gypsophillic vegetation	N/A

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale

GPCAs of the Southern Region

PCA Name **Valles Centrales**

PCA Number **46**

ESR Name Chihuahua - Marfa/Big Bend/Maderas del Carmen

PCA Area (sq. km) 10,316 **PCA_Quantitative Rating** 12.48

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	N/A	**Sharp-tailed Grouse**	N/A	**Baird's Sparrow**	N/A
Piping plover	N/A	**Sage Grouse**	N/A	**Cassin's Sparrow**	N/A
Long-billed Curlew	N/A	**Burrowing Owl**	N/A	**Chestnut-collared Longspur**	N/A
Ferruginous Hawk	N/A	**Loggerhead Shrike**	N/A	**Worthen´s Sparrow**	N/A
Scaled Quail	N/A	**Sprague's Pipit**	N/A	**Black tailed Prairie dog**	N/A
Lesser Prairie-Chicken	N/A	**Lark Bunting**	N/A	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	N/A	**Mexican prairie dog**	N/A
				Gypsophillic vegetation	N/A

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Excessive Herbivory	Very High	Very High; Current happening	Stable in Magnitude	Cattle raising very important economic activity
Modification of water levels; changes in natural flow patterns	High	Moderate; Likely 5 - 10 years	Stable in Magnitude	Presence of agriculture areas
Groundwater Depletion	High	Low; Possible in next 10 - 20 years	Stable in Magnitude	Presence of agriculture areas and recreational areas
Alteration of Fire Regime	Low	Low; Possible in next 10 - 20 years	Decreasing in Magnitude	Less fuel fire
Altered Composition/Structure	Very High	Moderate; Likely 5 - 10 years	Increasing in Magnitude	Exotic species invasion

GPCAs of the Southern Region

PCA Name **Marfa**

PCA Number **47**

ESR Name Chihuahua - Marfa/Big Bend/Maderas del Carmen

PCA Area (sq. km) 3,123 **PCA_Quantitative Rating** 5.55

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	Present / No Significance	**Sharp-tailed Grouse**	N/A	**Baird's Sparrow**	Moderate
Piping plover	N/A	**Sage Grouse**	N/A	**Cassin's Sparrow**	Moderate
Long-billed Curlew	Moderate	**Burrowing Owl**	Low	**Chestnut-collared Longspur**	N/A
Ferruginous Hawk	Low	**Loggerhead Shrike**	Moderate	**Worthen´s Sparrow**	N/A
Scaled Quail	Moderate	**Sprague's Pipit**	Moderate	**Black tailed Prairie dog**	Low
Lesser Prairie-Chicken	N/A	**Lark Bunting**	Moderate	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	Low	**Mexican prairie dog**	N/A
				Gypsophillic vegetation	N/A

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Excessive Herbivory	Low	Low; Possible in next 10 - 20 years	Stable in Magnitude	Reduction in habitat quality for birds, including aplomado falcon.

GPCAs of the Southern Region

PCA Name **Cuchillas de la Zarca**

PCA Number **44**

ESR Name Sierra Madre Occidental Foothills

PCA Area (sq. km) 5,914 **PCA_Quantitative Rating** 9.71

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	N/A	**Sharp-tailed Grouse**	N/A	**Baird's Sparrow**	High
Piping plover	N/A	**Sage Grouse**	N/A	**Cassin's Sparrow**	Low
Long-billed Curlew	N/A	**Burrowing Owl**	N/A	**Chestnut-collared Longspur**	N/A
Ferruginous Hawk	Moderate	**Loggerhead Shrike**	Moderate	**Worthen´s Sparrow**	N/A
Scaled Quail	Moderate	**Sprague's Pipit**	High	**Black tailed Prairie dog**	N/A
Lesser Prairie-Chicken	N/A	**Lark Bunting**	Low	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	N/A	**Mexican prairie dog**	N/A
				Gypsophillic vegetation	N/A

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Excessive Herbivory	High	Very High; Current happening	Increasing in Magnitude	Cattle raising very important economic activity
Habitat Fragmentation	Very High	Very High; Current happening	Stable in Magnitude	Changes in land tenure
Habitat Disturbance/Destruction	Moderate	Moderate; Likely 5 - 10 years	Unknown	ocassional conversion to agriculture

GPCAs of the Southern Region

PCA Name Armendaris

PCA Number 53

ESR Name Sierra Madre Occidental Foothills

PCA Area (sq. km) 1,500 **PCA_Quantitative Rating** 6.95

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	N/A	**Sharp-tailed Grouse**	N/A	**Baird's Sparrow**	Low
Piping plover	N/A	**Sage Grouse**	N/A	**Cassin's Sparrow**	Moderate
Long-billed Curlew	Present / No Significance	**Burrowing Owl**	Moderate	**Chestnut-collared Longspur**	High
Ferruginous Hawk	Low	**Loggerhead Shrike**	High	**Worthen´s Sparrow**	N/A
Scaled Quail	High	**Sprague's Pipit**	Low	**Black tailed Prairie dog**	Low
Lesser Prairie-Chicken	N/A	**Lark Bunting**	Low	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	Present / No Significance	**Mexican prairie dog**	N/A
				Gypsophillic vegetation	N/A

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Altered Disturbance Regimes	Low	Low; Possible in next 10 - 20 years	Stable in Magnitude	No threats forseen in five years.

GPCAs of the Southern Region

PCA Name **Otero Mesa**

PCA Number **48**

ESR Name Sierra Madre Occidental Foothills

PCA Area (sq. km) 2,494 **PCA_Quantitative Rating** 7.75

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	N/A	**Sharp-tailed Grouse**	N/A	**Baird's Sparrow**	Low
Piping plover	N/A	**Sage Grouse**	N/A	**Cassin's Sparrow**	Moderate
Long-billed Curlew	Low	**Burrowing Owl**	Moderate	**Chestnut-collared Longspur**	Moderate
Ferruginous Hawk	Moderate	**Loggerhead Shrike**	High	**Worthen´s Sparrow**	N/A
Scaled Quail	High	**Sprague's Pipit**	Low	**Black tailed Prairie dog**	Low
Lesser Prairie-Chicken	N/A	**Lark Bunting**	Moderate	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	Low	**Mexican prairie dog**	N/A
				Gypsophillic vegetation	N/A

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Disturbance/Destruction	High	High; Likely within 5 years	Increasing in Magnitude	Petroleum development
Habitat Fragmentation	High	High; Likely within 5 years	Increasing in Magnitude	Petroleum development
Altered Disturbance Regimes	High	High; Likely within 5 years	Increasing in Magnitude	Petroleum development
Sedimentation Toxics/contaminants	Moderate	High; Likely within 5 years	Increasing in Magnitude	Petroleum development

GPCAs of the Southern Region

PCA Name **New Mexico Bootheel**

PCA Number **52**

ESR Name Sierra Madre Occidental Foothills

PCA Area (sq. km) 7,547 **PCA_Quantitative Rating** 7.75

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	Low	**Sharp-tailed Grouse**	N/A	**Baird's Sparrow**	Low
Piping plover	N/A	**Sage Grouse**	N/A	**Cassin's Sparrow**	High
Long-billed Curlew	Moderate	**Burrowing Owl**	Low	**Chestnut-collared Longspur**	High
Ferruginous Hawk	Moderate	**Loggerhead Shrike**	Very High	**Worthen´s Sparrow**	N/A
Scaled Quail	High	**Sprague's Pipit**	Low	**Black tailed Prairie dog**	Low
Lesser Prairie-Chicken	N/A	**Lark Bunting**	High	**Mexican Pronghorn**	High
Greater Prairie-Chicken	N/A	**McCown's Longspur**	Low	**Mexican prairie dog**	N/A
				Gypsophillic vegetation	N/A

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale

GPCAs of the Southern Region

PCA Name **Sonoita**

PCA Number **49**

ESR Name Sierra Madre Occidental Foothills

PCA Area (sq. km) 2,998 **PCA_Quantitative Rating** 6.95

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	N/A	**Sharp-tailed Grouse**	N/A	**Baird's Sparrow**	Moderate
Piping plover	N/A	**Sage Grouse**	N/A	**Cassin's Sparrow**	High
Long-billed Curlew	Present / No Significance	**Burrowing Owl**	Low	**Chestnut-collared Longspur**	Moderate
Ferruginous Hawk	Low	**Loggerhead Shrike**	High	**Worthen´s Sparrow**	N/A
Scaled Quail	High	**Sprague's Pipit**	Moderate	**Black tailed Prairie dog**	Present / No Significance
Lesser Prairie-Chicken	N/A	**Lark Bunting**	High	**Mexican Pronghorn**	Low
Greater Prairie-Chicken	N/A	**McCown's Longspur**	Low	**Mexican prairie dog**	N/A
				Gypsophillic vegetation	N/A

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Disturbance/Destruction	Very High	Very High; Current happening	Increasing in Magnitude	Housing development
Excessive Herbivory	Moderate	High; Likely within 5 years	Stable in Magnitude	Livestock grazing
Habitat Fragmentation	Very High	Very High; Current happening	Increasing in Magnitude	Housing development

GPCAs of the Southern Region

PCA Name **Sulphur Springs**

PCA Number **50**

ESR Name Sierra Madre Occidental Foothills

PCA Area (sq. km) 3,311 **PCA_Quantitative Rating** 7.21

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	Low	**Sharp-tailed Grouse**	N/A	**Baird's Sparrow**	Moderate
Piping plover	N/A	**Sage Grouse**	N/A	**Cassin's Sparrow**	Moderate
Long-billed Curlew	Low	**Burrowing Owl**	Low	**Chestnut-collared Longspur**	Moderate
Ferruginous Hawk	Moderate	**Loggerhead Shrike**	High	**Worthen´s Sparrow**	N/A
Scaled Quail	High	**Sprague's Pipit**	Low	**Black tailed Prairie dog**	N/A
Lesser Prairie-Chicken	N/A	**Lark Bunting**	High	**Mexican Pronghorn**	N/A
Greater Prairie-Chicken	N/A	**McCown's Longspur**	Low	**Mexican prairie dog**	N/A
				Gypsophillic vegetation	N/A

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Disturbance/Destruction	Very High	Very High; Current happening	Increasing in Magnitude	Housing development and agriculture
Habitat Fragmentation	Very High	Very High; Current happening	Increasing in Magnitude	Housing development and agriculture
Groundwater Depletion	Very High	Very High; Current happening	Increasing in Magnitude	Housing development and agriculture

GPCAs of the Southern Region

PCA Name Janos

PCA Number 51

ESR Name Sierra Madre Occidental Foothills

PCA Area (sq. km) 4,866 **PCA_Quantitative Rating** 10.69

PCA Significance to Grassland Focal Species/Elements

Mountain Plover	Very High	**Sharp-tailed Grouse**	N/A	**Baird's Sparrow**	Low
Piping plover	N/A	**Sage Grouse**	N/A	**Cassin's Sparrow**	Low
Long-billed Curlew	High	**Burrowing Owl**	Very High	**Chestnut-collared Longspur**	High
Ferruginous Hawk	Very High	**Loggerhead Shrike**	High	**Worthen´s Sparrow**	N/A
Scaled Quail	Moderate	**Sprague's Pipit**	High	**Black tailed Prairie dog**	Very High
Lesser Prairie-Chicken	N/A	**Lark Bunting**	Very High	**Mexican Pronghorn**	High
Greater Prairie-Chicken	N/A	**McCown's Longspur**	Low	**Mexican prairie dog**	N/A
				Gypsophillic vegetation	N/A

PCA Threats

Threat	Threat Rating	Threat Urgency	Threat Trend	Threat Rationale
Habitat Disturbance/Destruction	High	Very High; Current happening	Increasing in Magnitude	Expansion of agriculture
Habitat Fragmentation	High	Very High; Current happening	Increasing in Magnitude	Expansion of agriculture
Altered Composition/Structure	Moderate	Very High; Current happening	Increasing in Magnitude	Overgrazing and prairie dog poisoning
Excessive Herbivory	Very High	Very High; Current happening	Stable in Magnitude	Carrying capacity exceeded
Electrocution	Very High	Very High; Current happening	Stable in Magnitude	Unsuitable design of distribution power lines and affecting raptors and ravens.