

The Central Grasslands of North America – Landscape Synopsis and Joint Venture Capacity

Introduction and Concept

This synopsis is a short document that highlights the current eight Joint Venture approaches to deliver grassland conservation across the North American Central Grasslands biome. The purpose of the Synopsis is to inform and engage potential partners to accelerate the grassland conservation work of Joint Ventures, highlight the approach and capacity of Joint Ventures, and the rationale in creating the JV8 Central Grasslands Conservation Initiative as a coordinating unit.

The JV8 Central Grasslands Conservation Initiative

The eight Migratory Bird Joint Ventures within the North American Central Grassland and Chihuahuan Desert biome sought to improve collaboration between Joint Ventures and their partners and develop a framework for this collaboration to conserve the Central Grasslands constituting the full annual-cycle geography of many of the grassland-dependent birds (Figure 1 and Appendix 1).

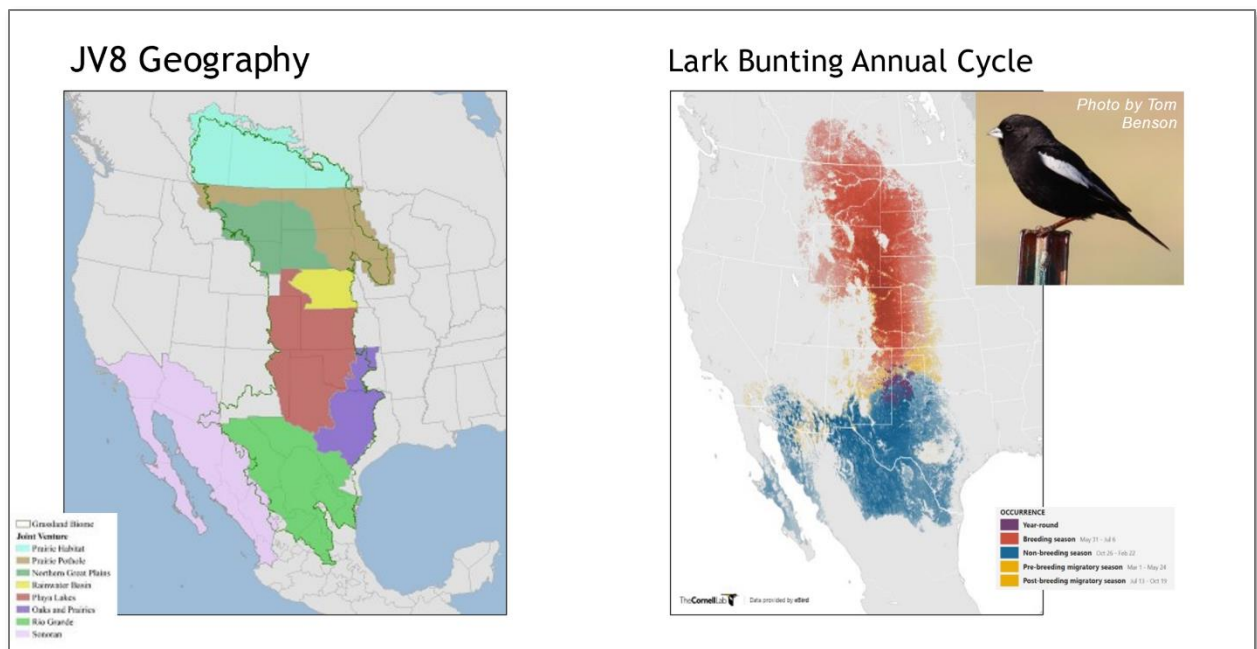


Figure 1: The eight Joint Ventures making up JV8 showing the grassland biome boundary and b) the full annual cycle of the lark bunting (*Calamospiza melanocorys*)

In 2019, the eight grassland Joint Ventures developed the concept of the JV8 Central Grasslands Conservation Initiative (JV8) and obtained funding to hire a Conservation Director in late 2020. A key early step for JV8 was the production of a Conservation Implementation Strategy that was finalized in 2021. The 3-year strategy is a planning tool to allow the eight Migratory Bird Joint Ventures in the Central Grasslands, and their partners, to collaborate on grassland and grassland bird conservation across the North American Central Grasslands region and to bridge the gap between what we and our

partners can currently do and what is needed to reverse the declines in grassland habitat and grassland birds. The prime elements of this strategy are 1) Build a conservation synopsis of the Central Grasslands; 2) Accelerate successful conservation actions; 3) Promote and fundraise for grassland and grassland bird conservation; 4) Identify legislative policy and donor priorities that support changes which advance grassland and grassland bird conservation; 5) Promote applied research to answer key questions to optimize conservation actions; and 6) Support innovations and new initiatives.

Joint Ventures were originally established with a prime focus on implementation of the North American Waterfowl Management Plan. This primarily involved the conservation of priority waterfowl habitats in key breeding, migrating, and wintering geographies. Many upland nesting waterfowl, however, relied on grassland habitat and, through the protection, restoration, and enhancement of wetland and surrounding grasslands, Joint Ventures had established important grassland conservation methodologies. As Joint Ventures moved beyond a prime focus on waterfowl and wetland-dependent birds, a greater emphasis on grassland-dependent bird conservation characterized an expanded focus of those Joint Ventures in the Central Grasslands region.

The mission of the JV8 Central Grasslands Conservation Initiative is to engage and expand Migratory Bird Joint Venture partnerships across North America for the stewardship of native grassland ecosystems. Migratory Bird Joint Ventures are cooperative, regional partnerships that work to conserve habitat for the benefit of birds, other wildlife, and the people of North America. They are primarily habitat-based, partnership organizations with a long history of conservation success. They bring together federal and nonfederal allies to promote collaboration and to motivate partners to contribute their primary skills to this collective conservation endeavor. Joint Ventures have distinguished themselves as having boots on the ground – working directly with land stewards to deliver important and priority habitat conservation. The eight distinct Joint Ventures that collaborated to create the JV8 Central Grasslands Conservation Initiative recognized the importance of strengthening impact by connecting their widespread efforts. These Joint Ventures together have an almost complete footprint in the North American Central Grasslands landscape, stretching from Canada to Mexico reflecting shared challenges and shared habitat, including the breeding, migration, and wintering range of the imperiled guild of grassland-dependent bird species. JV8 will work to highlight the threats and challenges to conserving the Central Grasslands, to build synergies between the distinct Joint Ventures and other regional initiatives, to innovate through developing new and extended partnerships, and to coordinate efforts to elevate Joint Venture work to meet the enormous challenges of conserving the North American Central Grasslands.

The Decline of the North American Central Grasslands

Temperate grasslands are considered by the International Union for the Conservation of Nature (IUCN) as the most endangered terrestrial ecosystem on earth. Comprising a 770-million-acre landscape the Central Grasslands of North America is perhaps the largest remaining block of grasslands globally. The ecosystem stretches from southern Canada, through the central part of the USA and into northern Mexico and incorporating a number of sovereign tribal lands. The Central Grasslands of North America

are complex ecosystems which evolved over millennia shaped by fire, drought, and the grazing of massive herds of bison. The dominant vegetation consists of grasses and forbs with relatively minor component of native trees.

There are climatological differences across the broad geography of the Central Grasslands with the wetter parts on the eastern side and with seasonal temperature variation greater in the northern part of the grasslands. Edaphic characteristics also play a key role in describing grassland productivity and defining the key grassland types that existed across central North America ¹ (Figure 2). Each of these areas are defined by the structure and species of dominant vegetation generally divided into tall grass, mixed grass, and short grass ecoregions– the gradation from tall grass in the wetter east through mixed grass to short grass in the drier west.

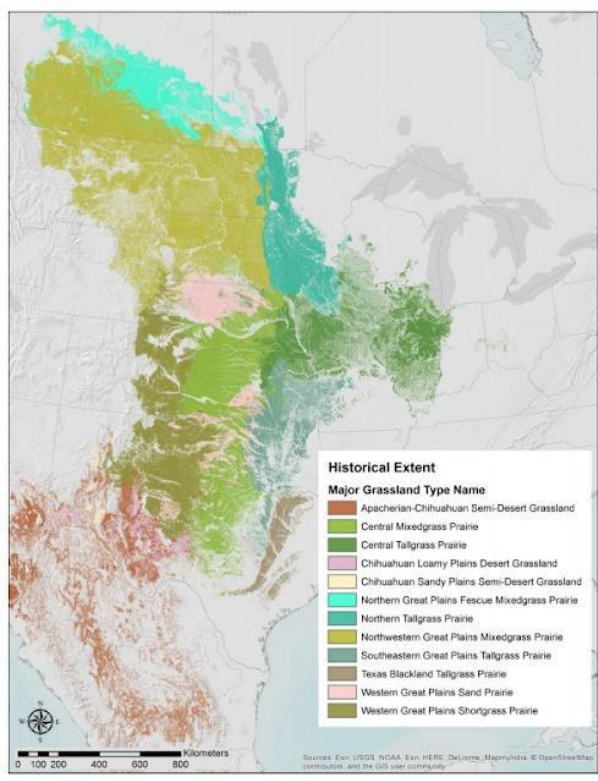


Figure 2: Historic extent of grasslands in North America prior to colonial expansion

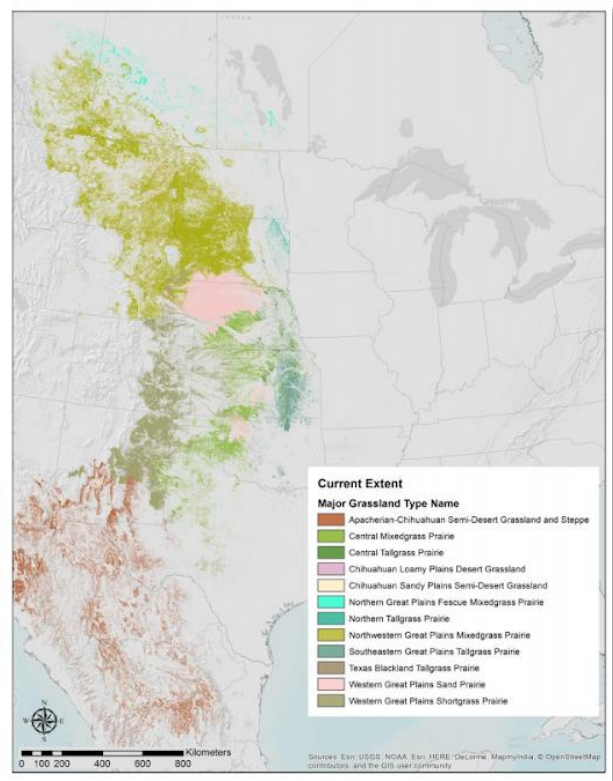


Figure 3: Current extent of grasslands in North America

The North American Central Grasslands habitats have been in decline for the last two hundred years (Figure 3)². Fire suppression resulting in the invasion of woody plants³ and the conversion of native grasslands to agricultural lands are the two key causes of grassland loss – the loss of grasslands to the plow was particularly prevalent in the wetter climate of the tall grass prairies such that only remnants of

¹ Comer P *et al.* 2018 *Natural Areas Journal* 38:196–211

² Comer P. *et al.* 2017. Published in *Data Basin*

³ Twidwell, D *et al.*, 2021 *Frontiers in Ecology and the Environment* 11:64-71

this habitat remain that once stretched as far east as the Great Lakes. There are a number of other threats to grasslands including energy development, increasing use of herbicides/pesticides and their bioaccumulation, and invasive species. Some of these threats are better understood than others particularly as they directly impact grassland bird populations.

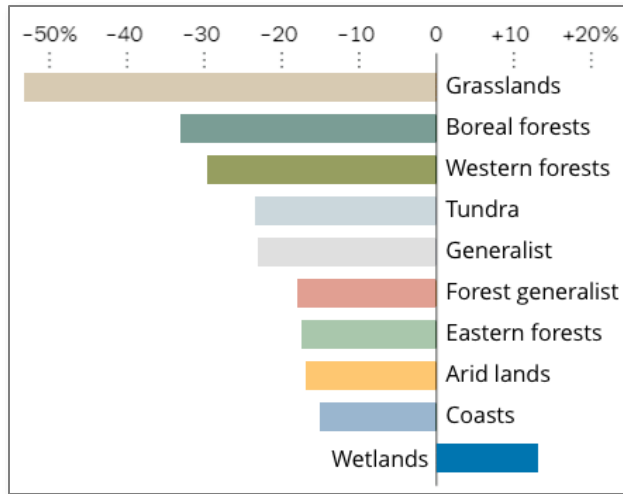


Figure 4: North American Bird Population Change by Breeding Habitat since 1970

The loss of grasslands has resulted in a massive decline in birds that breed in grassland habitats. Although populations of birds that depend on wetland habitats have rebounded likely due, in large part, to conservation efforts, other bird guilds are declining at rapid rates with the grassland breeding guild of birds having declined the most of any of the major groups⁴ (Figure 4). This highlights the grassland conservation imperative.

In 2019 Prairie Pothole Joint Venture produced an assessment of the status of grasslands across the eight Joint Ventures that make up JV8⁵. It showed that a large proportion (93%) of

undisturbed grassland exists on private and tribal lands with the balance on public lands. The Joint Ventures have a long history of active engagement and strong relationships with private landowners with a focus on accelerating voluntary conservation actions on private land across the Central Grasslands. Finding win-win solutions with private landowners and other land stewards will be an effective strategy for both conserving grasslands and associated birds, but also safeguarding human livelihoods.

Partners

Joint Ventures are partnership organizations, and their capacity relates to the core capacity of each joint venture as well as the capacity of those partners with whom Joint Ventures work with on shared goals. Key partners are represented on the management boards of each Joint Venture and represent over seventy separate organizations with Federal and State agencies, NGOs and academia well represented. Currently there is one corporate member and efforts are underway to bring a wider range of board level partners and sectors. Joint Ventures, however, operate in the field with a much wider set of partners than are represented on their Management Boards.

⁴ Rosenberg, K *et al.* 2019. Science 366: 120-124

⁵ Fields, S and Barnes, K. 2019. Grassland Assessment of North American Great Plains Migratory Joint Ventures. Unpublished report - https://ppjv.org/assets/docs/Great_Plains_Grassland_Assessment_Final_Report.pdf

Conservation Delivery

A key aspect of Joint Venture partnerships is the application of information and technology toward establishing science-based biological objectives at regional landscape scales. Through this process, partners focus on on-the-ground conservation delivery using biologically driven and transparent prioritization. Many of the voluntary, incentive-based habitat conservation programs that Joint Ventures use to deliver conservation to landowners and agricultural producers are administered by individual partners. These programs are often tailored to Joint Venture-specific conservation issues and are conveyed to landowners through local delivery networks of professional conservation staff. As the diversity and complexity of conservation programs increase, the value of effectively conveying the partnership's collective goals, objectives, decision support products, and other information has grown accordingly.

Within the JV8, each Joint Venture has developed its own conservation delivery approach rooted in adaptive management (e.g., USFWS Strategic Habitat Conservation) and defined by the specific conservation actions. These actions adhere to four primary categories: habitat protection, restoration, enhancement and persistence/retention (Appendix 2). JV8 maintains updates on Joint Venture specific actions tailored to local needs, conservation priorities and available budgets⁶. Specific conservation programs within these larger categories include agricultural transition, agriculture sustainability, grassland restoration/enhancement, wetland conservation (embedded in grasslands), invasive shrub removal, and land protection (see Appendix 2 for definitions). Practices and strategies used to achieve these programs include reverting cropland back to working grasslands, incorporating cover crops, prescribed fire, grazing management, chemical and mechanical defoliation, habitat lease, and easement acquisition. Finally, monitoring programs are employed to ensure these programs and practices provide the habitat outcomes and desired migratory bird population responses. It is important to understand that not all approaches to habitat conservation include direct habitat actions. For example, ensuring that intact priority habitat remains on the landscape does not necessarily include easement or lease acquisition (i.e., land protection). Agricultural producers can use technical assistance and estate planning as the primary mechanisms to ensure working lands are not converted to other uses and are passed to future generations of farmers and ranchers.

Joint Ventures use an array of robust planning tools to strategically target the habitat delivery programs described above. These tools range from periodically updated spatially explicit datasets (e.g., landcover and habitat maps), to landscape-level decisions support tools (DSTs) derived from species-habitat relationship models to project-level DSTs developed to maximize return on conservation investments. The tools enable partners to focus on-the-ground conservation delivery using transparent prioritization that ensures accountability. The Joint Venture-specific delivery approaches fall within categories that reflect the philosophy and capacity of individual Joint Ventures to deliver habitat actions. These approaches can be Joint Venture staff-led, partner staff-led, or a combination of both depending on capacity and opportunities. These frameworks have a variety of labels including partner-based

⁶ Link to current Joint Venture-specific actions – <https://jv8.org/conservation-actions/>

networks, conservation delivery networks, local initiative teams, private lands networks, public lands networks

To ensure these programs, tools, and conservation delivery approaches reflect the goals and objectives of national and international bird conservation plan partnerships, each Joint Venture has developed a priority bird species list. These priority lists can guide the development of programs, practices, and conservation planning and delivery tools. Although the approaches to species prioritization varies by Joint Venture, the basic concept of a priority species is the foundation of adaptive management practices. Species-specific population objectives are translated to habitat objectives and long-term monitoring provides the feedback loop to inform successful conservation delivery.

The varied aspects of Joint Venture conservation planning and delivery hinge on the development of population and habitat goals and objectives for priority species. These regional population objectives are stepped down from the international bird population objectives that have been established for the major bird guilds. As a result, the Joint Venture network will collectively provide sufficient habitat to support priority migratory bird species at desired levels if habitat goals are achieved. The metrics/habitat goals provide a roadmap that guide conservation delivery and hold Joint Ventures accountable through the development of implementation plans, strategic plans, and business plans. As Joint Ventures have evolved over the initial 35-years of existence, Joint Ventures have integrated ecosystem services into the delivery outcomes to ensure habitat objectives resonate with community-based objectives that are more relevant to the people in their respective regions. For example, the Playa Lakes Joint Venture has spearheaded an initiative that focuses playa conservation and on Ogallala Aquifer recharge. Delivering sufficient habitat for wetland dependent birds can be strategically delivered to ensure sustainable source of potable water for rural communities that are facing water shortages that threaten their future existence. The benefits for wetland dependent birds are quantified as a measure of success, but the primary messaging for playa conservation is on the societal benefits.

A recent review of both short-term habitat objective provides a synopsis for the current conservation efforts by the collective Joint Ventures of the JV8. Although each Joint Venture are in different phases of strategic planning (two Joint Ventures are currently developing short-term objectives), the existing metrics provide a starting point to understand the current state of conservation delivery in the Central Grasslands. In addition to grassland acres, wetland acres are provided in the objectives. Wetlands, such as prairie potholes and playa lakes, are important components of grassland complexes and are compatible habitat for many grassland bird species.

Within the next five years, the Joint Ventures of the JV8 collectively are targeting 11,316,100 acres for grassland protection, restoration, or enhancement and 926,510 acres for wetland protection, restoration, or enhancement (see Appendix 2 for definitions). The total short-term habitat conservation objective of 12,242,610 acres represents the current capacity (funding and staffing) of the Joint Ventures. Ongoing analyses investigating what additional acres and resources (aspirational objectives) are needed to increase conservation delivery to stem the decline of grassland bird populations and their habitat will be key to the JV8 moving forward.

Cost

It is difficult to estimate the cost of achieving aspirational goals for conservation of the Central Grasslands. An advanced analysis conducted by Rainwater Basin Joint Venture (RBJV) put an overall cost of \$19 million per annum to achieve their landbird (principally grassland species) targets with prime focus on habitat protection, enhancement and management. Rainwater Basin Joint Venture has thirty million acres of undisturbed grasslands derived from the Grassland Assessment, and this represents around 7 percent of the total 471 million acres of potentially undisturbed grasslands across the Central Grasslands biome from the same study. So, using RBJV cost estimates can provide a crude estimate of the total cost of implementing grassland work across the Central Grasslands biome even if the assumptions in this estimate are many. But \$250 million per annum does seem like a reasonable cost estimate to achieve JV8 goals. This number, of course, represents the combined efforts of many (more than 30) partners active in grassland conservation and is not a JV8 target. The cost may seem dauntingly high, but the area is vast, and cost works out to a little more than \$2 dollars per acre, though effort and resources will need to focus on the most threatened grasslands. To help with perspective on this \$250 million annual goal for grassland conservation, CEC⁷ estimated that in Canada and the US in 2013 that beef production from the Central Grasslands was greater than \$50 billion (no data was available for Mexico). Grassland conservation efforts are focused on building resiliency in native grasslands. A win for conservation but also a win for sustainable and resilient beef production.

Research and Innovation

Acknowledging that Joint Ventures have a prime focus on grassland bird conservation, JV8 seeks to promote understanding of the connections between bird populations, habitat quantity and quality as well as human economic use. We are investigating opportunities to reduce threats to grasslands and understand the most cost-effective grassland conservation measures. We are also working to increase awareness about the benefits of healthy, functional ecosystems resulting from grassland stewardship, conservation, and restoration to build support for Joint Venture efforts.

The global benefits or ecosystem services that accrue from grassland conservation include carbon capture, pollinators, water quality and quantity, and soil conservation values. Increased appreciation and understanding of the benefits of healthy, functional ecosystems and responsible stewardship can potentially result in support for conservation activities on public, private, and tribal or communally-owned (e.g., by ejidos in Mexico) grasslands. We are looking for ways to support new opportunities and improve adoption of existing options that could yield measurable conservation benefits, for example reintroduction of keystone native species, adoption of sustainable or regenerative agriculture, tourism, conservation incentives, and new and/or innovative approaches to rangeland management. Many of the questions require us to combine biological and social sciences with traditional knowledge and to retain focus on how a changing climate (and changes in other economic drivers) that require us to adapt our

⁷ CEC. 2015. North American Ranching Industries, Beef Cattle Trade, and Grasslands: Status and Trends. Montreal, Canada: Commission for Environmental Cooperation. 38 pp.

approaches over time. Communication to the key stakeholders will also be key to attract support and collaboration with our efforts.

JV8 has played a key role in developing an ongoing multi-partner study - the Central Grasslands Avian Modeling Project (CGAMP) - incorporating habitat quality and breeding bird population data to direct us towards the most important breeding habitat. We are discussing how to refine and expand that work, particularly to address the related issue of wintering bird habitat.

Concluding remarks

The Central Grasslands of North America is an iconic landscape embedded in the North American psyche. These prairie habitats are rich with biological and cultural diversity, and they provide key ecosystem services beyond their boundaries. JV8 will focus the strength of the eight Joint Ventures on-the-ground conservation actions on private, communal, and sovereign lands where voluntary, incentive-based conservation programs are complementary with well-managed working lands. A win for resilient grasslands is a win for a grazing-focused economy and a win for wildlife and grassland birds. Reversing current loss of native grassland habitat is urgent if we are not to witness further declines in grassland species; we must play our key role in closing the gap to stem, and ultimately reverse, this loss.

Appendix 1 – list of grassland breeding birds utilized in the analysis of Rosenberg et al.⁸ that are also included on the eight Joint Venture priority species lists

Common name	Scientific name
Baird's Sparrow	<i>Centronyx bairdii</i>
bobolink	<i>Dolichonyx oryzivorus</i>
burrowing owl	<i>Athene cunicularia</i>
Cassin's sparrow	<i>Peucaea cassinii</i>
chestnut-collared longspur	<i>Calcarius ornatus</i>
clay-colored sparrow	<i>Spizella pallida</i>
dickcissel	<i>Spiza americana</i>
eastern kingbird	<i>Tyrannus tyrannus</i>
eastern meadowlark	<i>Sturnella magna</i>
ferruginous hawk	<i>Buteo regalis</i>
grasshopper sparrow	<i>Ammodramus savannarum</i>
greater prairie-chicken	<i>Tympanuchus cupido</i>
Henslow's sparrow	<i>Centronyx henslowii</i>
horned Lark	<i>Eremophila alpestris</i>
lark bunting	<i>Calamospiza melanocorys</i>
lark sparrow	<i>Chondestes grammacus</i>
LeConte's sparrow	<i>Ammospiza leconteii</i>
lesser prairie-chicken ⁹	<i>Tympanuchus pallidicinctus</i>
loggerhead shrike	<i>Lanius ludovicianus</i>
long-billed curlew	<i>Numenius americanus</i>
mountain plover	<i>Charadrius montanus</i>
savannah sparrow	<i>Passerculus sandwichensis</i>
scissor-tailed flycatcher	<i>Tyrannus forficatus</i>
sharp-tailed grouse	<i>Tympanuchus phasianellus</i>
Sprague's pipit	<i>Anthus spragueii</i>
Swainson's hawk	<i>Buteo swainsoni</i>
thick-billed longspur	<i>Rhynchophanes mccownii</i>
upland sandpiper	<i>Bartramia longicauda</i>
western meadowlark	<i>Sturnella neglecta</i>

⁸ Rosenberg, K et al. 2019. Science 366: 120-124

⁹ Lesser prairie-chicken was added to this list as a grassland species. The exclusion of lesser prairie chicken from the Rosenberg et al. continental-scale analysis was due to its low population size.

Appendix 2 – Definitions

The following wetland and grassland habitat conservation definitions apply to actions across the Great Plains and Chihuahuan Desert. Each of the categories include voluntary incentive-based examples and are focused primarily on private and communal lands (e.g., ejidos) for the benefit of wildlife and land stewards. The duration of benefits derived from conservation actions range from term-limited to perpetual timeframes

Habitat Protection is the process to reserve real property through fee-title acquisition or the voluntary incentive-based encumbrance of specific private land property rights (e.g., residential development, wetland drainage, grassland tillage, etc.) for the preservation of natural resources and/or specific ecological values. Protected lands occur across the ownership spectrum (e.g., federal, state provincial, private, corporate, etc.).

Example Practices: perpetual private land conservation easements, fee title acquisition, and fixed-term leases.

Partner Programs: USFWS wetland and grassland easement program, NRCS Agricultural Conservation Easement Program, DU Rotating Lands Program, Land Trust voluntary incentive-based acquisition programs

Habitat Restoration is the process of reestablishing land cover and vegetation, on lands that have been intentionally converted to uses other than its natural state, to a desired condition or seral stage. This also includes conservation actions on lands that have been altered by natural disasters (e.g., wildfire, flood, hurricane, etc.)

Example Practices: Agricultural transition of unproductive cropland back to working grasslands, returning natural hydrology to drained or altered wetlands.

Partner Programs: USDA programs (e.g., Conservation Reserve Program, Wetland Reserve Easements with restoration), USFWS Partners for Fish and Wildlife Program, Grassland Restoration Incentive Programs, state fish and wildlife agency and NGO private lands programs.

Habitat Enhancement is the process of managing lands that have been degraded or damaged with the objective of returning land cover and vegetation to a desired condition or seral stage. This also includes maintaining/managing working lands habitat to keep it in its current state through grass-based agricultural practices.

Example Practices: grazing management (e.g., rotational grazing infrastructure development); prescribed fire, and/or biological, chemical, mechanical treatments to control invasive species and shrub encroachment, or regenerative agriculture practices.

Partner Programs: NRCS Technical Assistance, various private lands conservation programs noted above.

Habitat Persistence/Retention is the process of keeping working intact grasslands agriculturally functional through means other than direct habitat management or protection through lease or easement acquisition. This includes working directly with operators through technical assistance programs or ranch estate planning to ensure agricultural operations remain economically successful.

Example Practices: alternative revenue stream planning (e.g., agritourism, hunting leases); niche marketing (e.g., bird-friendly beef, Community Supported Agriculture programs, Farm to Institution initiatives); grassbank programs; grazing coalition mentor programs.

Partner Programs: NRCS Technical Assistance, Cooperative Agricultural Extension services, NGO estate planning services, TNC Matador grassbank, North Dakota Grazing Lands Coalition mentor program