United States Department of the Interior
U.S. FISH AND WILDLIFE SERVICE
Ecological Services
P.O. Box 1306, Room 6034
Albuquerque, New Mexico 87103

March 29, 2024

Zach Ducheneaux, Administrator
United States Department of Agriculture
Farm Service Agency
1400 Independence Ave SW, Room 5105-A
Washington, D.C. 20250

2024-0068258

Dear Administrator Ducheneaux:

This document transmits the Fish and Wildlife Service's (Service) biological opinion (opinion) for the Farm Service Agency's (FSA) Conservation Reserve Program (CRP) within the defined action area. This is a programmatic opinion covers the implementation of the CRP and the associated effects on the lesser prairie-chicken (*Tympanuchus pallidicinctus*, LEPC) by cooperators who implement the described conservation practices and associated conservation measures. This opinion is based upon extensive coordination between FSA and Service Staff and the biological assessment submitted by FSA in March 2022. Our response is conducted in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 United States Code [U.S.C.] 1531 *et seq*., ESA). This opinion covers only the effects of the actions on the LEPC. On March 27, 2023, the listing of two distinct population segments (DPS) of the LEPC became effective. The Northern DPS of the LEPC is as threatened with a 4(d) rule and the Southern DPS of the LEPC is listed as endangered.

The LEPC is a species of prairie grouse that occupies a five-state range encompassing portions of Texas, New Mexico, Oklahoma, Kansas, and Colorado. Lesser prairie-chicken populations need large tracts of relatively intact native grasslands to thrive. Significant threats to the LPC include habitat loss, modification, degradation, and fragmentation of native grasslands and rangelands within its range. The vast majority (approximately 95%) of LEPC habitat occurs on privately owned and operated lands across the range. Therefore, the voluntary actions of private landowners are the key to maintaining, enhancing, restoring, and reconnecting habitat for the species. The FSA's CRP is one of several important opportunities available to landowners to support private landowners interested in grassland convservation.

This biological opinion contains the Service's analysis of the expected effects likely to result from implementation of the CRP using the identified conservation practices and their associated conservation measures included in this opinion on the LEPC and its habitat. Overall, effective implementation of the CRP and the associated conservation measures described in this opinion are anticipated to result in a positive population response by the species by applying restoration efforts to increase the quantity of LEPC habitat and maintaining and enhancing the quality of existing habitat for the LEPC. However, in some cases, implementing the conservation practices may also result in adverse effects to individual birds but will result in long-term benefits to the species as a whole through improved habitat quality and an increase in the number of usable acres of grasslands as a result of restoration. The goal of this biological opinion's conservation measures is to minimize these effects and ensure that the identified conservation measures do not result in a reduction in the overall conservation value of the program as a whole. In addition, the Service recommends an annual meeting between the Service and NRCS to discuss successes and challenges as well as potential changes or additions to the program.

The Service appreciates the dedication of FSA to implementing CRP in a way that is beneficial to the conservation of LEPC and the landowners willing to participate in the program. We appreciate the opportunity to cooperate with you and all of our State, Federal and private partners on efforts to protect the species and its habitat.

Sincerely,

Jonna Polk Digitally signed by Jonna Polk
Date: 2024.03.29 13:23:15 -05'00'

Jonna Polk
Assistant Regional Director, Ecological Services
U.S. Fish and Wildlife Service, Southwest Region

BIOLOGICAL OPINION

1 INTRODUCTION

1.1 Overview

The statutory title of "section 7" of the Endangered Species Act of 1973, as amended (ESA), "Interagency Cooperation", § 7(a)(1) directs all Federal agencies to carry out programs for the conservation of threatened and endangered species in consultation with the U.S. Fish and Wildlife Service (Service). Further, §7(a)(2) directs each Federal agency to ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of critical habitat.

The Service encourages, engages in, and supports all Federal action agencies in fulfilling the §7(a)(1) directive and prioritizes those agencies that participate in the cooperative §7(a)(1) consultation process to maximize conservation efficiency and effectiveness. This document has been prepared under the ESA's §7 (a)(4) regarding the U.S. Department of Agriculture (USDA) Farm Service Agency (FSA) Federal actions under the Conservation Reserve Program (CRP) that 'May Affect' the Lesser Prairie-Chicken (*Tympanuchus pallidicinctus*; LEPC), which occurs within the defined action area. More information on the regulatory and conservation status of the LEPC is found in Section 3 of this document.

Background on the Conservation Reserve Program

The CRP is a voluntary conservation program that provides participants with annual rental payments and cost-share assistance to remove environmentally sensitive land from agricultural production and establish long-term, resource-conserving vegetative cover for the purpose of conserving and improving the soil, water, and wildlife resources of the land. The CRP is administered by the USDA through the FSA and was authorized by Congress with the passage of the Food Security Act of 1985. Its original intent was to incentivize the establishment of permanent grass or tree cover on privately owned, highly erodible croplands to reduce soil loss. Subsequent reauthorizations of the Farm Bill legislation led to policy changes that established conservation of wildlife habitat as a co-equal program purpose along with conserving soil and protecting water quality.

1.2 Purpose

The purpose of this document is to serve as the formalization and conclusion of the consultation process using the Service's authorities under the section 7 of the ESA. Specifically, this document conveys the Service's programmatic analysis of the expected adverse and beneficial effects likely to result from the implementation of all aspects of the CRP utilizing the conservation practices and their associated conservation measures included in this opinion on the

LEPC and its habitat. Additionally, it provides guidance on implementing the CRP to facilitate conservation of LEPC and supports implementation of the CRP. We expect implementation of the CRP and the associated conservation measures described will result in positive population response by LEPC through reduction of threats resulting from habitat loss, modification, degradation, and fragmentation. We do anticipate implementing the CRP may result in some short-term adverse effects to individual LEPC, but the conservation measures include actions that will reduce negative impacts of the conservation practices to the LEPC. Additionally, after contract expiration, the adverse effects resulting from landowners who opt to convert the previously enrolled lands back into crop production are included within this Biological Opinion.

1.3 Consultation History

On December 11, 2012, the Service published in the Federal Register (77 FR 73827) a proposed rule to list the LEPC as a threatened species under the ESA. Shortly after this notice was published, the FSA initiated contact with the Service and entered voluntary conferencing with the Service to address the effects of CRP on the LEPC and other federally listed species within the occupied range of the LEPC so that ESA compliance could be offered to landowners and agricultural operators participating in the CRP, should the species be listed. FSA and Service collaboratively developed a BA approved by the FSA Administrator on February 3, 2014. The formal consultation resulted in a BO that was issued by the Service on April 11, 2014. The LEPC became listed under the Endangered Species Act, on April 14, 2014. In September 2015, the LEPC listing was vacated by a U.S. District Court, thereby removing the species from the endangered species list.

On June 1, 2021, the Service published in the Federal Register (86 FR 29432) a proposed rule to list two distinct population segments (DPS) of the LEPC. The Service proposed listing the Southern DPS as endangered and the Northern DPS as threatened with a 4(d) rule. To address the potential listing, the FSA initiated contact with Service to begin the development of a new BA. In May 2022, FSA submitted its request, alongside a Biological Assessment, to the Service to finalize a Conference Opinion (CO) on the CRP. Subsequently, the Service finalized the listing determination for the LEPC which became effective in March 2023 and thus the Service, after discussions with FSA, converted the draft CO to a Biological Opinion (BO). This is the subject of the proposed action analyzed herein.

2 DESCRIPTION OF THE PROPOSED ACTION

The CRP is a voluntary conservation program administered by the FSA that supports the establishment and maintenance of conservation practices (also referred to as conservation covers) by producers on environmentally sensitive cropland, marginal pastureland, and grasslands. The CRP was authorized by the Food Security Act of 1985 (1985 Farm Bill) and is amended through the reauthorization of the Farm Bill every 4 to 6 years. Conservation practices are vegetative and tree covers designed to improve the quality of ground and surface waters,

control soil erosion, and enhance wildlife habitat on cropland, marginal pastureland, and grasslands. Conservation practices may also include wetland restoration and measure to protect existing wetland and aquatic systems. In return for establishing and maintaining conservation practices, participants receive rental payments and cost-share assistance under contracts that extend from 10 to 15 years. As of 2022, there were nearly 7.35 million acres within the range of LEPC.

Some CRP policies and procedures are defined statutorily in Farm Bills and are documented in handbooks for implementation of the program. FSA Handbook Agricultural Resource Conservation Program for State and County Offices (2-CRP Rev. 6, FSA 2023) is the most recent version and provides CRP policies and instructions from 2019 to 2023 to FSA state and county offices and to Natural Resources Conservation Service (NRCS) regional, state, area, and field offices for implementing all aspects of CRP.

The CRP eligibility and enrollment requirements and processes are described in Section 2.1. Establishment, Maintenance, and Required Management of CRP follows defined procedures (including both statutory and policy requirements) with respect to allowable activities, conservation goals, and regulatory compliance. Details of CRP conservation planning and regulatory compliance; establishment of conservation covers; maintenance and management of conservation covers; other activities that can occur on CRP land; and re-enrollment of land in CRP follow in Sections 2.2 – 2.4. The Action Area for this Biological Opinion is described in Section 2.5.

The following program activities, when conducted in accordance with an NRCS Conservation Plan incorporating the applicable conservation measures as described in this Biological Opinion, are included in the proposed action:

- CRP practice establishment, maintenance and required management activities, including required maintenance of the approved cover including weed, insect, and pest control; required management activities; and permissive uses (recreational uses such as hunting, emergency haying and grazing, and non-emergency haying and grazing).
- Conversion of CRP conservation covers back to crop production including early land preparation during the last year of the CRP contract, the Transition Incentive Program (TIP), and development of associated conservation plans in accordance with this Biological Opinion.
- Conversion of CRP conservation covers back to crop production following contract expiration. It is critical for the continued success of the program to ensure that eventual conversion of expired acres is included in this Biological Opinion. Without the inclusion of this action, regulatory requirements associated with expiring CRP contracts may be a barrier that disincentivizes the program at large resulting in less conservation benefits.

- Amending, as appropriate, CRP policy, national handbook provisions, program practices, and technical guides and specifications, to ensure that direction to state and county FSA offices is consistent with conservation of the LEPC and other federally listed species.

It is important to note that the proposed action, and thus this BO, does not include the following elements or potential sources of adverse effects to LEPC:

- Commercial scale energy development or associated infrastructure.
- Construction of new public roads or highways.
- Wind energy development on CRP enrolled acres. While this is a permissive use in CRP, FSA will perform a site-specific section 7 consultation when developing wind turbines on CRP enrolled acres.
- Tree planting, including windbreaks and shelterbelt plantings, within the LEPC core and fringe counties. While this is a practice eligible for enrollment under CRP, this practice is rarely utilized within the LEPC range. As such, FSA will perform a site-specific section 7 consultation if tree plantings are proposed under a CRP offer in a core or fringe county if it is determined that the action may affect the LEPC.
- Conversion of native prairie, rangeland or other LEPC habitat that has not been enrolled in CRP to crop production or conversion of LEPC habitat to development.
- Actions taken, conservation plans developed, and programs administered by the USDA NRCS other than CRP.
- Other programs administered by FSA.

2.1 Eligibility and Enrollment

Only active cropland is eligible for General and Continuous signup types. Land converted from a natural state to agriculture for subsequent inclusion in CRP does not meet land eligibility criteria. To be eligible for enrollment in general and continuous CRP signup, land must: have been planted or considered planted in an agricultural commodity (or alfalfa or multi-year grass and legumes) during 4 of the previous 6 crop years set by statute; be physically or legally (no planting restrictions due to an easement or other legally binding instrument) capable of being planted in a normal manner to an agricultural commodity. Additionally, the following land eligibility requirements apply to General signup:

- Have a weighted average erosion index of eight or higher;
- Be enrolled in an expiring CRP contract; or
- Be located in a national or state CRP conservation priority area.

A CRP General Signup Conservation Priority Area is a designated area with adverse water quality, wildlife habitat, air quality, or other natural resource impacts related to agricultural

production activities or an area where assistance to an agricultural producer is required to comply with federal or state environmental laws to meet conservation needs. Currently, there are five Conservation Priority Areas in the United States: Chesapeake Bay National CRP Conservation Priority Area, Great Lakes National CRP Conservation Priority Area, Long Island Sound National CRP Conservation Priority Area, Longleaf Pine National CRP Conservation Priority Area, and the Prairie Pothole National CRP Conservation Priority Area. Maps of these areas can be found in FSA Handbook 2-CRP Rev. 6 (FSA 2023). There are also National and State Priority areas set for Grassland CRP. State priority areas are set by the states and then approved by the State Technical Committee and State FSA Committee. In addition to lands newly entering CRP, land that is currently enrolled in CRP, and has been maintained according to the conservation plan, is eligible to offer for reenrollment in the final contract year.

In addition to General Sign-up (usually referred to as General CRP), CRP offers Continuous Sign-up (usually referred to as Continuous CRP). The differences in eligibility between General CRP and Continuous CRP are described in Section 2.1.1 below and in FSA Handbook 2-CRP Rev.6 (Part 6, Sections 1 and 6; Part 7, Section 1).

The CRP offers three signup types; General, Continuous, and Grassland. Beyond the three signup types the CRP also includes Conservation Reserve Enhancement Program (CREP), State Acres for Wildlife Enhancement (SAFE), Highly Erodible Lands Initiative (HELI), Farmable Wetlands Program (FWP) and Clean Lakes, Estuaries, and Rivers (CLEAR). CREP, SAFE, HELI, FWP and CLEAR are currently offered through Continuous CRP signup and are designed to target specific resource concerns. The three signup types (General, Continuous, and Grassland) have slightly different eligibility requirements as well as different maintenance and management policies and as such are briefly described in Sections 2.1.3, 2.1.4, and 2.1.5 below. Regardless of enrollment type or program, if a land is accepted into CRP, then the offer moves into Conservation Planning and Implementation, described in Section 2.2, below.

2.1.1 General Enrollment

General CRP enrollment occurs annually for producers during announced enrollment periods. Offers for CRP contracts are evaluated and ranked using the Environmental Benefits Index (EBI) that uses multiple factors to establish environmental benefits. These factors include benefits to wildlife habitat, water, soil, and air quality, as well as benefits that will occur beyond the contract period and cost.

2.1.2 Continuous Enrollment

Continuous CRP enrollment does not occur during a defined time. Producers may submit offers to enroll eligible acreage at any time. Unlike General CRP, Continuous CRP does not have a competitive evaluation process. The purpose of Continuous CRP is to enroll targeted, environmentally sensitive acreage. The cropping requirements described above apply to

Continuous CRP, but lands are not required to meet one of the three additional criteria discussed. Acceptance of an offer is based on a site visit and suitability and feasibility determination of eligibility by a conservationist from NRCS or other certified Technical Service Provider (TSP).

2.1.3 Farmable Wetlands Program

The Food Security Act of 1985 authorized the Farmable Wetlands Pilot Program. The program is no longer a pilot after the Agricultural Improvement Act of 2018 (2018 Farm Bill) and currently is in effect. The program targets enrollment of lands into CRP that met certain criteria: certain cropped wetlands and their associated buffers, land devoted to constructed wetlands and associated buffers, land devoted to certain commercial pond-raised agriculture, and land subject to natural overflow of a prairie wetland (flooded prairie wetland) and associated buffers (Farmable Wetlands are described in 2-CRP Rev. 6, Paragraph 237). Farmable Wetlands CRP cannot exceed 750,000 acres nationwide and may not exceed 100,000 acres in any one state. Land that is permanently underwater is not eligible for Farmable Wetlands CRP.

2.1.4 State Acres for Wildlife Enhancement (SAFE)

SAFE was established as a CRP initiative in 2007 and on April 22, 2021, Notice CRP-929, was included in continuous enrollment. SAFE allows for restoration of habitat to meet priority state wildlife management goals. The various practices in SAFE are designed to enhance habitat for important wildlife populations. The Agricultural Resource Conservation Manual (2-CRP) provides additional information related to enrollment of land in SAFE (FSA, 2023). Practices include buffers, wetlands, trees, longleaf pine, and grass restoration under SAFE.

Eligible land for SAFE is cropland, as defined in 2-CRP, paragraph 151, and is located within the defined SAFE project boundaries. Marginal pastureland is not eligible for SAFE enrollment unless it meets the criteria for a threatened or endangered species with specific habitat needs of marginal pastureland (2-CRP, paragraph 181). Marginal pastureland eligibility is defined in 2-CRP paragraph 181 (FSA, 2023). Under no circumstances can cropland be also considered marginal pastureland.

2.1.5 Grasslands CRP

Grassland CRP was created by the Agricultural Act of 2014 (2014 Farm Bill) and is fully described in 2-CRP Rev. 6, Part 9. The program was created to recognize the importance of privately owned grasslands and to address the threat of loss of these lands to cropland conversion, development, or the invasion of woody plants. Participants in Grassland CRP voluntarily limit future development and cropping uses of enrolled land while retaining the right to conduct common grazing practices and operations related to the production of forage and seed crops.

Eligible land includes privately owned grasslands, including Tribal lands, that contain forbs or shrubs (including rangeland, pastureland, and hayland) for which grazing is the predominant use, and which are in an area that has been historically dominated by grasslands; and could provide habitat for animal or plant populations of significant ecological value if the land is retained in the current use or restored to its natural condition.

Like General CRP, Grassland CRP offers are accepted using a competitive system where offers are ranked and evaluated by the FSA national office. Grassland CRP emphasizes support of grazing operations, maintaining, and improving plant and animal biodiversity, and protecting grasslands and shrublands from the threat of conversion to other uses. Grassland CRP participants are authorized to manage enrolled acres with grazing, haying, or wildlife management and must conduct such activities according to a conservation plan including the applicable conservation practices of Prescribed Grazing (528), Forage Harvest Management (511), and Upland Wildlife Habitat Management (645). Haying is restricted during the state defined primary nesting dates. Grassland CRP currently has a 2-million-acre minimum nationwide.

2.2 Conservation Planning and Regulatory Compliance

2.2.1 Conservation Planning

When offers are accepted into CRP, the NRCS or a qualified technical service provider (TSP) assists each participant in the development of a site-specific Conservation Plan for each field enrolled in CRP. Participants must establish, maintain, and manage conservation practices on land enrolled in CRP according to an approved conservation plan. Conservation Plans consider existing conditions of the land to be enrolled in CRP and define the activities that must occur to establish and maintain the conservation practice(s) for the life of the CRP contract. Conservation Plans consist of applicable NRCS practice standards, which describe the activities that will be undertaken to establish and maintain conservation covers. Conservation Plans must be developed according to NRCS conservation planning policy as described in NRCS General Manual Title 180 – Conservation Planning, Part 409 Conservation Planning Policy (NRCS 2021) and CRP conservation planning policy per 2-CRP Rev. 6, Paragraph 52 and Part 11 (FSA 2023). CRP policy, along with an accompanying FSA and NRCS Memorandum of Agreement (MOA) define conservation planning requirements specific to CRP which include environmental evaluation, site visits, technical certification of practice installation, status reviews, and conservation plan modifications when necessary.

While conservation planning will not result in effects to LEPCs, it is a very important first step in ensuring environmental benefit of CRP and prescribes the actions which will result in effects to LEPCs. Conservation planning ensures that the establishment, maintenance, and management of CRP practices are effective. Additionally, the conservation planning process helps FSA, as the decisionmaker, to comply with other federal laws, including the National Environmental Policy

Act (NEPA), ESA, and Clean Water Act, among others (See Section 2.2.2 Regulatory Compliance below).

Implementation of a Conservation Plan that is designed specifically for an individual site and accounts for local conditions helps to ensure a conservation benefit from each CRP contract. Conservation Plans contain prescribed activities that are necessary to establish and maintain Conservation Practices in each CRP field for the life of the CRP contract.

A Conservation Plan is developed for each field that is accepted into CRP, prior to initiation of the CRP contract. The Conservation Plan must meet the following criteria.

- Contain all activities necessary to successfully establish and maintain the Conservation Practices on all CRP acres throughout the contract, including locally specific seed mix defining the plant species and seeding rate, seedbed preparation, seeding technique, seeding dates, establishment activities such as mowing, and vegetation maintenance activities such as weed control.

- Inform the client and FSA of any Federal, state, and local permit requirements.

- Incorporate and adhere to guidance from the NRCS Conservation Practice Standards, identified in the State's Field Office Technical Guide (FOTG). The FOTG provides NRCS technical information about resources and reflects local conditions. For more information: https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/fotg/

- Include any best management practices (BMPs) or measures (Appendix A) to be employed to benefit and/or avoid, minimize, or mitigate adverse impacts to resources specific to those lands being offered for CRP. Where adverse impacts to the LEPC are expected, minimization measures to reduce or eliminate significant impacts to an acceptable level for protected species identified by Service are to be included in the Conservation Plan as referenced in FSA Handbook 1-EQ (Rev. 3) Par. 5B.

- When applicable, the Conservation Plan may include a grazing, haying, or biomass harvest plan for all CRP lands where these activities are authorized and the participant desires to implement these activities. Haying and grazing activities must not defeat the purpose of CRP, must be consistent with the conservation of soil, water quality, and wildlife habitat, and must not result in long-term damage to the conservation cover. CRP participants must maintain CRP cover in accordance with their approved Conservation Plan to control erosion, noxious weeds, and pests.

For Grassland CRP, a Prescribed Grazing (528) Plan is required and developed in accordance with the NRCS National Planning Procedures Handbook (NRCS 2021). The Grazing

Management Plan includes a Conservation Plan, Restoration Plan, and any applicable grazing management systems. These plans must comply with all Federal, state, local, and tribal regulations and permit requirements, and include a schedule of operations for implementation and maintenance of practices with a description of the grazing management system and permissible and prohibited activities. Grassland CRP also allows haying outside of PNS by following NRCS practice standard 511 (NRCS, 2020) and managing for wildlife habitat following NRCS practice standard 645.

During conservation planning, in addition to the measures required per statute and agency policies, NRCS will incorporate the conservation measures for each activity, as applicable, consistent with the conservation measures included in Appendix A. These conservation measures mirror those included within the recently completed NRCS BO for the LEPC (USFWS 2023a) and thus will create consistency between the two programs.

2.2.2 Regulatory Compliance

While there are no anticipated impacts to LEPCs that would result from regulatory compliance related to CRP, it is important to note that there are a number of existing processes and requirements in place to ensure the regulatory compliance of establishing and maintaining CRP.

After the CRP offer has been accepted, as part of the conservation planning process, a site-specific environmental evaluation (EE) is completed by a conservation planner from NRCS or TSP. The EE involves collecting data and documenting findings needed for FSA to ensure compliance with the NEPA, ESA, and other related laws, regulations, and Executive Orders (EOs). Environmental Evaulations are kept on file at local county FSA offices. The site-specific EE process is completed consistent with FSA's Environmental Quality and Related Environmental Concerns – Compliance with NEPA (7 CFR §799) and FSA's Handbook on Environmental Quality Programs for State and County Offices (1-EQ (Rev-3); FSA 2018). FSA reviews and completes sections of the site-specific EE to document that all required consultations with regulatory agencies have been completed. The site-specific EE, along with programmatic NEPA documentation prepared for each Farm Bill, provide full NEPA coverage for each CRP contract.

For ESA section 7 compliance, and as part of the site-specific EE, NRCS or TSPs evaluate whether threatened or endangered species, habitat suitable for those species, or any designated critical habitats occur on the land being proposed for CRP or advise if those species may be affected by CRP activities. Procedures for evaluating presence/absence of threatened or endangered species within the area in question are defined in FSA Handbook 1-EQ (Rev-3) as well as in NRCS General Manual Title 190 – Ecological Sciences, Part 410.22 – Endangered and Threatened Species and Species of Concern (NRCS 2010).

FSA NEPA policy is that it will not approve actions or activities that have the potential to adversely affect threatened and endangered species or result in adverse modification of their designated critical habitats without the development and publication of an Environmental Assessment (EA). If it is likely that threatened and endangered species or their designated critical habitat are present on land offered into CRP, or if suitable habitat for threatened and endangered species may be affected by CRP enrollment, then section 7 consultation must be initiated. A categorical exclusion can only be applied if the Service determines conservation measures will reduce the impact of activities to an acceptable level where adverse effects have been avoided and minimized to the extent practicable. Otherwise, the offer to enroll the land in CRP may be rejected, modified to exclude areas where threatened or endangered species could be present, or an environmental assessment be developed for the proposed offer.

For the LEPC, this Biological Opinion will serve as the required section 7 consultation for new CRP enrollments, future re-enrollments, and existing CRP contracts. This will allow projects to meet NEPA requirements without the need for site-specific environmental assessments. Other threatened and endangered species that may be affected by CRP enrollment may continue to require site-specific section 7 consultation and could result in the need for an environmental assessment to be developed.

2.3 CRP Conservation Practices

Financial assistance is made available to facilitate implementation of conservation practices designed to reduce soil erosion, protect water quantity and quality, and enhance wildlife habitat, throughout the history of the program. The conservation practices for each field enrolled in the program will be identified within the site-specific Conservation Plan that was developed for that parcel. To be eligible for CRP cost-share assistance, each of these conservation practices must improve environmental benefits to less than soil loss tolerance, prevent degradation of environmental benefits from occurring, be maintained for the life of the CRP contract, and be included in the approved Conservation Plan. The following conservation practices (CP) are currently installed, as of March 2022, throughout the LEPC range:

Table 2.1. CRP conservation practices occurring within LEPC Ecoregions.

Conservation Practice Code	Description
CP1	Establishment of Permanent Introduced Grasses and Legumes
CP2	Establishment of Permanent Native Grasses
CP4B	Wildlife Corridors
CP4D	Permanent Wildlife Habitat
CP5A	Field Windbreak Establishment
CP8A	Grass Waterways
CP9	Shallow Water Areas for Wildlife
CP10	Vegetative Cover - Grass - Already Established*
CP12	Wildlife Food Plots
CP15A	Establishment of Permanent Vegetative Cover (Contour Grass Strips)
CP16A	Shelterbelt Establishment
CP17A	Living Snow Fences
CP18	Salinity Reducing Vegetation
CP21	Filter Strips
CP22	Riparian Buffers
CP23	Wetland Restoration
CP23A	Wetland Restoration, Non-Floodplain
CP24	Establishment of Permanent Vegetative Cover as Cross Wind Trap Strips
CP25	Rare and Declining Habitat
CP27	Farmable Wetlands Pilot Wetland
CP28	Farmable Wetlands Pilot Buffer
CP33	Habitat Buffers for Upland Birds
CP38B	SAFE – Wetlands
CP38E	SAFE – Grass
CP42	Pollinator Habitat
CP43	Prairie Strips
CP87	Grassland CRP: Permanent Introduced Grasses and Legumes**
CP88	Grassland CRP: Permanent Grasses and Legumes

* Beginning March 14, 2011, CP is no longer available for new offers.
** Only available under SU200 and SU201.

The CRP participants are generally required to seed or install the conservation practice within the first year of the CRP contract, though implementation of the conservation practice may be delayed for as long as 3 years due to factors out of the producers' control like climate, availability of seed, and access to vendors to do the work. After the seeding is complete CRP participants are instructed through their conservation plan on what is required to establish the seeding. Establishment activities such as mowing and chemical weed control are common

establishment activities and may take an additional 1-2 years post seeding to foster establishment (FSA 2023). The establishment of CRP conservation covers and practices is expanded upon in Section 2.4.1.

CRP participants, according to compliance requirements contained within their CRP contracts, must perform periodic maintenance and required management activities. These actions are required to protect or enhance the soil, water, and wildlife benefits provided by the vegetative cover established. An example of a maintenance activity might be mowing or chemical spraying to control invasive weeds. A required management activity might be grazing, prescribed burning or disking to improve plant composition, diversity, and structure, to enhance wildlife habitat. The required management and maintenance of CRP conservation covers and practices is expanded upon in Section 2.4.2.

NRCS Conservation Practice Standards

Each CRP Practice must be planned using NRCS conservation practice standards (CPS). Approved CPS are defined in 2-CRP Exhibit 11 for each CRP Practice. Conservation plans may only include CPS that are needed to achieve the purpose of the CRP Practice according to each Practice description in 2-CRP Exhibit 11. NRCS policy allows states to modify national CPS by including additional requirements but may not be less restrictive than national CPS thus allowing for slight variation on how CPS are applied across states. Financial assistance is made available for some CPS and the CRP participant must install the CPS according to the Conservation Plan requirements and CPS associated with the CRP program practices as described in Table 2.1 that are authorized to be used within the LEPC occupied range. Technical practices will be planned and implemented using conservation measures as identified in Appendix A. These conservation measures mirror the conservation measures established within the 2023 NRCS Lesser Prairie-Chicken Biological Opinion.

2.4 Practice Establishment, Maintenance, and Required Management Activities

2.4.1 Establishing CRP Practices

At the onset of the CRP contract participants must begin establishing conservation practices according to their conservation plan. .During establishment, all activities are performed by the CRP participant or contractor acting on behalf of the participant. Such activities may include removal of existing vegetation, seedbed preparation such as disking, application of nutrients and other soil amendments, planting of approved cover, construction of structural conservation practices, and and post planting establishment activities such as mowing for weed control. Establishment of Approved Cover is described in FSA Handbook 2-CRP Paragraph 426 (FSA 2023). As noted above, all establishment activities are designed specifically for each field where a conservation practice will be established and must be included in the Conservation Plan. The CRP participants must seed the approved cover and construct structural practices in the first 12

months of the contract period. Participants may request extensions if circumstances arise that preventseeding or construction in the first 12 months of the contact. CRP policy prohibits extensions for seeding or construction past the first 36 months of the contract. After seeding and construction is complete NRCS reviews and certifies that the practices were installed according to the approved conservation plan. After certification it is the participants responsibility to establish approved cover activities in the conservation plan. Commonly mowing is required for one to two growing seasons following seeding. Mowing and weed control during PNS is authorized until NRCS or TSP completes a site visit to determine if the cover is fully established. Once the cover is determined to be fully established then all maintenance activities must occur outside PNS. Activities that may occur during CRP establishment are described in Sections 2.4.1.1 -2.4.1.3.

2.4.1.1 Vegetation Removal

Removal of existing vegetation may be required prior to seeding of conservation covers. This may be true for new enrollments or re-enrollments that are transitioning to a new CRP practice with a different plant community. For active cropland entering CRP, the existing vegetation may be crop residue following harvestor termination of perennial crops such as alfalfa. The extent and impact of vegetation removal would be limited, as 32% of the total currently enrolled CRP acres throughout LEPC counties were re-enrollments from 2017-2022, for which establishment activities such as vegetation removal, may not be necessary. Extrapolating the re-enrollment data for the past 5 years shows that it is likely that over half of CRP acres re-enroll in LEPC counties over a 10-year contract period.

Vegetation removal could be accomplished using prescribed burning, disking, mowing, grazing, and/or the application of herbicides. Removal activities include use of equipment such as hand tools, tractors, backpack sprayers, tractor-pulled spray tanks, and other machinery.

2.4.1.2 Nutrients and Soil Amendments

Soil amendments may be used as a source of plant nutrients and may include organic wastes, commercial fertilizer, crop residue, manure, municipal and industrial bio-solids, sludge, and other organic byproducts. Nutrients and soil amendments are only authorized if included in the conservation plan. Additional guidance on the Application of Waste Products located in Paragraph 367 and 635 of the 2-CRP Rev. 6, FSA 2023 handbook should be consulted when applying nutrients or soils amendments to CRP. Fertilizers and soil amendments are applied using various application methods and machinery such as broadcast, soil incorporation, or foliar applications by tractor-mounted spreaders or sprayers, and other methods.

2.4.1.3 Seeding or Planting of Conservation Covers

Once existing vegetation is removed and any soil amendments have been applied, as required by an approved Conservation Plan, conservation covers will be planted. For some conservation practices, planting methods include drill or broadcast seeding. Broadcast seeding uses a spreader attached to a tractor or similar vehicle to distribute seed on the soil surface. Drill seeding is accomplished using a mechanical drill that creates furrows for seeds and covers them to improve seed to soil contact for germination success. The establishment and management of conservation covers is described further in Paragraph 426 through 428 of the 2-CRP Rev. 6. (FSA 2023).

For other conservation practices, such as hardwood tree planting or other tree practices, standard planting methods for tree species are typically employed. Due to the potential adverse impacts resulting from introducing trees within LEPC habitat, CRP offers that include tree plantings within either a core or fringe county (as defined in Table 2.5) will require a site-specific section 7 consultation and will not be considered under this proposed action. This would also apply to reenrollment of tree practices.

2.4.2 CRP Maintenance and Required Management

The CRP has specific definitions and requirements for maintenance and required management activities that occur on CRP-enrolled lands. Maintenance and required management are considered different activities in CRP policy guidelines, though the resulting impacts to the CRP cover are generally similar (i.e., periodic disturbance to maintain conservation cover as determined by the approved Conservation Plan). Maintenance activities are required throughout the duration of the contract to maintain the contractual requirements of the conservation cover. Once NRCS or the TSP has completed a status review of the newly enrolled CRP and determines that the conservation cover is fully established, maintenance activities are solely the responsibility of the CRP participant. Required management activities are similar in nature to maintenance activities but are designed to ensure plant diversity and wildlife benefits, while continuing to ensure protection of water and soil resources.

Examples of typical maintenance and required management activities for CRP are described below. While these are common activities that could take place, they do not represent a comprehensive list of all things that could occur on CRP lands to ensure the success and to maintain the conservation cover as described in the approved Conservation Plan. While a nationwide comprehensive list of all activities that could occur as maintenance and required management does not exist, the State Technical Committee for each individual state develops and approves activities with final approval from FSA Deputy Administrator for Farm Programs (DAFP). As such, the maintenance and required management activities required for CRP practices varies by state.

2.4.2.1 CRP Maintenance

Periodic maintenance of CRP is necessary to ensure the cover meets the criteria and goals of the conservation practice and the site-specific Conservation Plan. Maintenance of CRP is described in FSA Handbook 2-CRP (Rev. 6) Paragraph 427. CRP maintenance occurs after NRCS or the TSP completes a status review to determine that the conservation cover is fully established. Cover maintenance is the responsibility of CRP participants and must be performed according to the approved Conservation Plan. Maintenance activities are specific to each individual conservation practice, as well as being tailored to each locality where CRP occurs. All CRP maintenance practices must be outlined within the approved Conservation Plan prior to completing the maintenance activity, and must be completed, within statutory and policy limits. Maintenance may include common activities such as: spot mowing, spot spraying, interseeding, and prescribed burning. Other maintenance activities may be allowed, provided they are in the approved site-specific Conservation Plan.

Once approved permanent cover has been established and confirmed by NRCS or the TSP, maintenance activities (such as mowing, burning, and/or spraying pesticides) are not allowed during the primary nesting season (PNS) to reduce the chance for inadvertent impacts to birds that are ecologically significant, in significant decline, or conserved in accordance with Federal or State law. The PNS was developed by FSA for all birds and is not specific to the LEPC or this BO. PNS dates were established specifically for each state but generally extend from March through July (see Table 2.2 for states where LEPC is present). While PNS dates apply to all activities occurring on general and continuous CRP acres, for Grassland CRP PNS restrictions apply only to activities involving haying, mowing, or harvesting for seed production. During PNS, Grassland CRP acres can continue to utilize common grazing practices, including maintenance and necessary cultural practices, in a manner that is consistent with maintaining the viability of grassland, forb, and shrub species appropriate to that locality.

Table 2.2. Primary nesting season dates by state for CRP.

State	Primary Nesting Season
Colorado	March 15 – July 15
Kansas	April 15 – July 15
New Mexico	March 1 – July 1

Oklahoma	May 1 – July 1
Texas	March 1 – June 1 (Grazing) March 1 – July 1 (Haying)

The timing and duration of all maintenance activities are specified in the Conservation Plan and are based on the local conditions of each site to ensure appropriate maintenance of the conservation cover. Some common maintenance activities on CRP are described below. CRP Required Management is discussed in Section 2.4.2.2.

Spot Treatments: CRP policy allows for spot treatments to maintain approved cover (FSA Handbook 2-CRP (Rev. 6) Paragraph 427A). Spot treatments are defined as mowing and pesticide applications. Spot e treatments may occur during PNS only if all the following conditions are met within the CRP field:

- If left untreated, weeds or insects would adversely affect approved cover as determined by NRCS or a TSP,
- The FSA County Committee (COC) or FSA County Executive Director (CED) in consultation with NRCS or a TSP determine such activity is needed to maintain approved cover, and
- Spot treatment is limited to affected areas of the field.

If spot treatment is deemed necessary, the COC or CED must approve a method that results in the least damage to nesting wildlife and habitat. Spot treatment includes spot spraying or spot mowing and is limited to the immediate area of infestation.

Spot Mowing. CRP maintenance does not allow periodic mowing for cosmetic purposes. Mowing for cosmetic purposes is prohibited on CRP. Annual mowing of CRP for general weed control is also prohibited. CRP participants may carry out spot mowing in limited areas to manage undesirable plant species. Mowing can be accomplished using units pulled behind tractors or by using riding or walk-behind units, depending on the area to be mowed. Spot mowing occurs as needed to maintain the cover. There are no aggregated data on the frequency that it is employed for maintenance.

Spot Application of Pesticides and/ or Herbicides. This includes application of herbicides, insecticides, and/or fungicides to individual plants or specific areas as needed to maintain the cover and control invasive agricultural pests to prevent spread and infestation. Application can

be accomplished using backpack applicators, cut and dab, hoses from vehicle mounted spray tanks, or other spot treatment methods as needed. There are no aggregated data on the frequency for invasive species control that it is employed for maintenance.

Prescribed Burning. The use of fire in a predetermined area of land can be used to maintain CRP covers and to control invasive species. This maintenance activity is prohibited during the PNS. There are no aggregated data on the frequency that it is employed for maintenance.

2.4.2.2 CRP Required Management

The CRP required management activities are similar in nature to CRP maintenance and are required as appropriate. Due to changes in CRP policy, participants with CRP contracts effective June 3, 2019, are required to perform at least one required management activity, if determined necessary in the approved Conservation Plan. The required management activity must be designed to ensure plant diversity and wildlife benefits, while also ensuring the protection of soil and water resources. Management activities are only required if the FSA State Executive Director, NRCS State Conservationist, and State Technical Committee recommend they be required for a specific practice. Management activities are defined for each conservation practice, if necessary, and are outlined in the site-specific Conservation Plan.

The timing and duration of all required management activities are specified in the Conservation Plan and are based on the local conditions of each site to ensure vegetation and wildlife benefits, while providing protection of soil and water resources and not resulting in long-term damage to the cover. Required management activities must occur at least once per contract but may occur more frequently if desired by the producer and included in the conservation plan. For 10-year contracts, required management activities must be completed before the end of year 6. For 15-year contracts, required management must be completed before the end of year 9. Brief descriptions of some common required management activities are below.

Light Disking. Light disking is used to encourage further root development of the approved CRP cover while reducing undesirable vegetation through soil disturbance. Light disking also encourages plant diversity and helps to set back succession. This required management activity is prohibited during the PNS. There are no aggregated data on the frequency that it is employed.

Strip Spraying. Strip spraying is used to encourage plant diversity and reduce undesirable vegetation. Strip herbicide application can enhance habitat quality by releasing important food and cover plants, resulting in an increased abundance and diversity of food and cover available to a wide range of wildlife species. This required management activity is prohibited during the PNS. There are no aggregated data on the frequency that it is employed.

Interseeding. Interseeding is the practice of seeding into an existing stand of vegetation for the purpose of increasing stand density or diversity. Seed is generally applied via seed drilling or a

broadcast method. This required management activity is prohibited during the PNS. Interseeding occurs as needed to manage and improve cover and there are no aggregated data on the frequency as used for management.

Prescribed Burning. Prescribed burning may also be employed to manage CRP conservation covers, where it is required to meet the practice standards and as specified in the Conservation Plan. Burning can be used as a management activity per policy in 2-CRP (Rev. 6) Paragraph 428. This required management activity is prohibited during the PNS.

Non-Emergency Haying. Haying can be utilized for required management of CRP covers although must adhere to non-emergency haying policy, which restricts timing, frequency, duration, and other limits. Haying involves the use of mechanical equipment to harvest vegetation that will be used as livestock forage. It can be effective to maintain early successional vegetation stages.

Non-Emergency Grazing. Grazing can be utilized for management of CRP covers, subject to timing, frequency, duration, and other limits. If grazing is to be utilized on CRP, it must be included in the approved Conservation Plan.

2.4.3 Other Activities that Can Occur on CRP

In addition to establishment, maintenance and management activities, other activities that may affect conservation covers can occur on CRP land. These include non-emergency haying and grazing, haying and grazing during specific emergency conditions (known as emergency haying and emergency grazing), land preparation during the last year of a CRP contract, installation of wind turbines, and Grassland CRP Activities.

2.4.3.1 Non-Emergency Haying and Non-Emergency Grazing

Non-emergency haying. Non-emergency eligibility for haying is described in the FSA Handbook 2-CRP (Rev. 6) Paragraph 663) (FSA 2023). Non-emergency haying is prohibited during the PNS. Table 2.3 shows a summary of allowable non-emergency haying types on CRP. In 2021, non-emergency haying occurred on an average of 0.16 percent of CRP acres in LEPC counties (see Appendix B for more information on haying and grazing). Haying may not be employed more once every three years with 25% of the acreage remaining unharvested.

Table 2.3. Allowable non-emergency haying types on CRP.

Activity	**Frequency**
Non-emergency haying or harvesting for biomass outside primary nesting season	Not more than once every three years with 25% of the acreage unharvested.

Non-emergency grazing. Non-emergency eligibility for grazing is described in the FSA Handbook 2-CRP (Rev. 6) Paragraph 663 (FSA 2023). Table 2.4 shows a summary of allowable non-emergency grazing types on CRP. Non-emergency grazing can occur during the PNS on acres enrolled under a general or continuous CRP contract but cannot occur more frequently than every other year. Grazing involves the removal of vegetation by livestock. Stocking rates are highly variable due to type of animal, forage, and may change depending on local conditions. In 2021, non-emergency grazing occurred on an average of 0.41 percent of CRP acres in LEPC counties (see Appendix B for more information on haying and grazing).

Table 2.4. Non-Emergency Grazing Potentially Allowable on CRP.

Activity	**Frequency**
Non-emergency grazing outside of PNS	Not more than every other year
Non-emergency grazing during PNS	Not more than every other year, with a 50 percent reduction in stocking rate
Non-emergency grazing to control invasive species outside of PNS	Outside the PNS as determined by Conservation Plan to control Kudzu and other invasive species
Non-emergency grazing outside of PNS for beginning farmer	May be conducted annually by a beginning farmer or rancher with a contract share greater than zero
Non-emergency incidental grazing outside of PNS	Intermittent and seasonal grazing of buffers surrounded by fields used for agriculture may be conducted annually for up to 60 days following crop harvest or during small grain dormancy prior to harvest
Non-emergency gleaning grazing	May be conducted once in the fall of the first year of CRP-1, before cover is established for up to 60 days

2.4.3.2 Emergency Haying and Emergency Grazing

Emergency eligibility for grazing is described in the FSA Handbook 2-CRP (Rev. 6) Paragraph 681 (FSA 2023). Emergency Haying and Emergency Grazing can only occur during severe drought conditions. For these activities to occur on CRP, the county must be designated as stage D2 Severe Drought or greater by the U.S. Drought Monitor (https://www.drought.gov/current-conditions), there is a 40 percent or greater loss of forage within the county (as determined by FSA County Committees), or the Secretary of USDA and NRCS State Conservationist determine

that haying or grazing CRP can assist in response to a disaster without permanent damage to the conservation cover. Current haying and grazing provisions under emergency conditions are statutory requirements of the 2018 Farm Bill.

Emergency Haying. Haying that occurs on CRP land during emergency conditions is referred to as "emergency haying". Like non-emergency haying, emergency haying involves the use of mechanical equipment to harvest vegetation that will be used as livestock forage. On CRP land, emergency haying can occur after conservation cover is fully established. Producers have up to 60 days to complete one cutting of hay. Prior to any activity, the producer must file a request with the county FSA office. Before any CRP acres can be hayed a modified Conservation Plan must be developed by NRCS or TSP. The modified Conservation Plan must be site-specific, include the authorized duration, and reflect local wildlife needs and concerns. The primary purpose of the modified Conservation Plan must be to maintain vegetative cover, minimize soil erosion, protect the quality of water and wildlife habitat. Any acres where emergency haying would cause long-term damage to conservation cover would be ineligible for emergency haying. Emergency haying is prohibited during the PNS. Emergency haying and emergency grazing cannot occur on the same CRP acreage in a single year. In 2021, emergency haying occurred on an average of 0.13 percent of CRP in LEPC counties (see Appendix B for more information on haying and grazing).

Emergency Grazing. Grazing that occurs on CRP land during emergency conditions is referred to as "emergency grazing". Like non-emergency grazing, emergency grazing involves allowing livestock to forage on CRP land. On CRP land, emergency grazing can occur after the conservation cover is fully established for up to 90 days outside of PNS. As with emergency haying, emergency grazing requires a modified Conservation Plan developed by NRCS or TSP. Emergency grazing can occur during the PNS with a 50 percent reduction in carrying capacity if the county is eligible under the definition of "severe drought conditions" provided above. Carrying capacity is the number of animals a pasture can support or "carry" without damaging the forage resource. Emergency haying and emergency grazing cannot occur on the same CRP acreage. Any acres where emergency grazing would cause long-term damage to conservation cover would be ineligible for emergency grazing. In 2021, emergency grazing occurred on an average of 2.5 percent of CRP in LEPC counties (see Appendix B for more information on haying and grazing).

2.4.3.3 Early Land Preparation in the Final Year of CRP Contract

In some cases when CRP participants do not plan to re-enroll land in CRP, activities can be undertaken during the final year of the CRP contract to prepare land for a return to agricultural production. Early land preparation in the final year of a contract can include land preparation for grazing or planting of agricultural crops. Early land preparation can occur on all CPs except for CP5A, CP8A, CP9, CP16A, CP21, CP21B, CP21S, CP22, CP22B, CP22S, CP23, CP27, CP28,

CP29, and CP30. Additionally, any activities associated with early land preparation cannot occur during PNS. Early land preparation can involve mechanical removal of the cover but cannot involve haying and grazing for commercial use. The County Committee must approve the activity prior to beginning early land preparation.

In addition to early land preparation that can occur in the final year of the contract, CRP participants may also perform early land preparation associated with the Transition Incentives Program (TIP). TIP allows transition for expiring CRP land from an owner or operator to a beginning, veteran, or socially disadvantaged farmer or rancher to return land to production for sustainable grazing or crop production. The beginning, veteran, or socially disadvantaged farmer or rancher can make conservation and land improvements according to an approved conservation plan during the last two years of the CRP contract. Any producers enrolled in TIP may also choose to re-enroll the otherwise eligible land under CRP's continuous signup provisions including the Conservation Reserve Enhancement Program.

2.4.3.4 Installation of Wind Turbines

While wind energy development is not a part of the proposed action, as described in Section 2.0 the installation of windmills, wind turbines, wind-monitoring towers, or other wind-powered generation equipment and associated access to such equipment may occur on CRP acreage provided that all the following conditions are met:

- Total acreage devoted to such equipment, including transformers and other ancillary equipment, and associated access and firebreak acreage does not exceed 5.00 acres per CRP contract;
- Installation does not occur during PNS; and
- Wind turbines are sited using the Service's land-based wind energy guidelines (USFWS 2012).

Wind turbine installation results in a 25 percent reduction in CRP acreage payment. While the installation of wind turbines is a permissible activity under CRP, due to the potential adverse impacts resulting from wind turbines within LEPC habitat, FSA chose not to include the installation of wind turbines in this consultation. When a producer would like to install wind turbines on land enrolled in CRP that may effect the LEPC, a site-specific Section 7 consultation will be required.

2.4.3.5 Activities Allowed on Grassland CRP

Grassland CRP provides for the protection of grasslands while allowing for common grazing practices, as identified in a site specific Conservation Plan, including the following.

- Maintenance and necessary cultural practices on the land in a manner consistent with maintaining the viability of grassland, forb, and shrub species appropriate to that locality.
- Haying, mowing, or harvesting for seed production, subject to appropriate state-determined restrictions during the nesting season for birds in the local area that are economically significant, in significant decline, or conserved in accordance with Federal or state laws.
- Fire suppression, fire-related rehabilitation, and construction of fire breaks.
- Grazing-related activities, such as fencing and livestock watering.

2.4.4 Other Activities Caused by the Action

At the end of CRP contracts, participants may choose to re-enroll in CRP, participate in other land conservation programs, or return land to agricultural production. Land may also lie fallow with occasional management by landowners. Recent enrollment data indicate that of the currently enrolled acres, 32% of those acres were re-enrolled in the past 5 years. FSA does not track the fate of land after CRP contracts expire. The remaining land may enter other conservation programs or return to production, or simply remain fallow. FSA is not aware of any additional activities caused by the Action that are not included in the previous description of the Action.

2.4.5 CRP Re-Enrollment

CRP land can be re-enrolled in the program, recent estimates indicate that at least 32% of lands that are currently enrolled were re-enrollments that occurred in the past 5 years. Such land would not require establishment activities described above, as these lands already support established conservation cover. CRP land may also be re-enrolled with a change in CRP practices. These practices may require the expiring land to be interseeded or transitioned to a more diverse cover than the original enrollment. Re-enrolled CRP lands must be in good standing with the CRP program, and conservation cover must be reflective of the goals of the Conservation Plan. Those activities described above for maintenance, management, and other activities that can occur on CRP lands (Sections 2.3.2 and 2.3.3) would continue to occur on re-enrolled lands.

2.4.6 CRP Contract Expiration and Terminated and Landowner Predictability

This Biological Opinion authorizes incidental take of the LEPC caused by the implementation, maintenance, and management of the conservation practices identified in a CRP participant's conservation plan as long as such conservation practices are consistent with this Biological Opinion. In order to receive the predictability provided by the incidental take exemption, a landowner is required to implement and maintain the conservation practices and associated conservation measures identified in their conservation plan exactly as detailed. CRP participants are encouraged to contact FSA and NRCS County offices to ensure that NRCS personnel or

technical service providers update CRP conservation plans to incorporate LPC conservation measures. The offered predictability is attached to the land and is transferrable to any future owner(s) as long as they continue to maintain the species habitat using the conservation practices and associated conservation measures described in the CRP conservation plan. Should landowners or agricultural producers wish to return a field to agricultural production following CRP contract termination, such activities must occur outside the primary nesting and brood rearing season in order to be covered.

If a landowner decides to change their land management, they are in no way bound to continue implementation of the conservation practices and measures. The predictability applies only and specifically to the conservation practices and associated conservation measures implemented in accordance with their CRP conservation plan. If a landowner wishes to make land management changes and keep the provided predictability, they should contact FSA and NRCS County offices to discuss the proposed changes and update their conservation plan.

Recognizing that continued implementation of CRP conservation plans by participating producers beyond the term of the CRP contract would advance the longer-term goals of both agencies missions, the Service is evaluating the effects of implementing CRP activities as described in this opinion over a 30-year period. Following CRP contract termination, the Service will extend regulatory predictability coverage if a landowner voluntarily chooses to continue implementing the practices as described in their conservation plans after their CRP contract ends. The Service coverage lasts for as long as the land continues to be managed as to provide habitat for LEPC following the conservation practices and associated conservation measures described in their conservation plan. Each landowner involved in CRP will have the sole discretion whether or not to continue implementing the conservation practices at the end of their contract with FSA. If a landowner chooses to continue implementing the conservation practices identified in their conservation plan, they will have predictability and confidence in knowing that any ESA issues associated with their implementation will have been addressed for up to a 30-year period from the issuance of this Biological Opinion, as long they continue to implement the conservation practices and their associated conservation measuers. By taking this step, the Service, in partnership with FSA, hopes to encourage the long-term implementation of the conservation practices and associated conservation measures. This coverage will end at the completion of activities associated with the land being returned to agricultural production, when the landowner chooses not to continue implementing their conservation plan, or when the land ceases to provide wildlife habitat values of benefit to LPC. CRP lands under contract that are terminated by FSA due to violations of the agreement would no longer provide landowner exemption from incidental take.

The success of application of the CRP conservation practices over time will be assessed and information will be gained that will allow their refinement to improve results for the LPC, landowners, FSA, and the Service. Any refinements to the conservation practices would be

developed in full collaboration between FSA and the Service using information gained from on the ground implementation of the conservation practices.

2.5 Action Area

The action area for this programmatic consultation is defined by the counties that intersect estimated occupied range for the LEPC (see Figure 3.2). These counties within the action area have been further designated either "core" or "fringe" counties. A county is considered a "core" county if (1) at least 25% of its land intersects with the LEPC range or (2) if less than 25% of the county's land intersects with the LEPC range but the county has numerous leks. All other counties that intersect with the LEPC range are "fringe" counties. These counties either have (1) less than 25% of their land intersecting with the LEPC range or (2) more than 25% land intersecting the LEPC range, but have few documented LEPC detections and limited habitat. Counties that are designated as "core" counties will have conservation measures applied during the conservation planning process in accordance with the conservation measures included in this BO, which mirror the conservation measures included in the recent NRCS BO for the LEPC completed in 2023 (USFWS 2023a), while the application of conservation measures in "fringe" counties is optional. A list of all counties and their designations can be found below in Table 2.5.

Table 2.5. Counties that intersect the lesser prairie-chicken estimated occupied range and their designation for this Biological Opinion.

State	County	Designation	% Intersect with LEPC Range
Colorado	Baca	Core	41%
	Cheyenne	Core	86%
	Kiowa	Core	43%
	Kit Carson	Fringe	12%
	Lincoln	Fringe	4%
	Prowers	Core	41%
Kansas	Barber	Core	33%
	Clark	Core	95%
	Comanche	Core	100%
	Edwards	Core	36%
	Ellis*	Fringe	56%
	Finney	Core	31%
	Ford	Fringe	24%
	Gove	Core	100%

State	County	Designation	% Intersect with LEPC Range
	Graham	Core	48%
	Grant	Fringe	21%
	Gray	Fringe	4%
	Greeley	Fringe	2%
	Hamilton	Core	74%
	Haskell	Fringe	10%
	Hodgeman	Core	86%
	Kearney	Core	31%
	Kiowa	Core	98%
	Lane	Core	49%
	Logan	Core	96%
	Meade	Core	60%
	Morton	Core	34%
	Ness	Core	100%
	Pawnee	Fringe	15%

State	County	Designation	% Intersect with LEPC Range
	Pratt	Fringe	13%
	Rush*	Fringe	37%
	Scott	Fringe	15%
	Seward	Core	49%
	Sheridan	Core	42%
	Sherman	Fringe	6%
	Stafford	Fringe	6%
	Stanton*	Fringe	31%
	Stevens	Fringe	15%
	Thomas	Fringe	16%
	Trego	Core	100%
	Wallace	Core	66%
	Wichita	Fringe	4%
New Mexico	Chaves **	Core	13%
	Curry	Fringe	5%

State	County	Designation	% Intersect with LEPC Range
	DeBaca	Fringe	7%
	Lea**	Core	11%
	Roosevelt	Core	54%
Oklahoma	Beaver	Core	92%
	Beckham	Fringe	2%
	Cimarron	Fringe	6%
	Custer	Fringe	>1%
	Dewey	Fringe	2%
	Ellis	Core	100%
	Harper	Core	100%
	Major	Fringe	>1%
	Roger Mills*	Fringe	55%
	Texas	Fringe	6%
	Woods*	Fringe	49%
	Woodward*	Fringe	64%

State	County	Designation	% Intersect with LEPC Range
Texas	Bailey	Core	67%
	Cochran	Core	63%
	Deaf Smith	Core	26%
	Donley	Fringe	5%
	Gray	Core	43%
	Hemphill	Core	91%
	Hockley	Fringe	5%
	Lamb	Fringe	12%
	Lipscombe	Core	100%
	Ochiltree	Fringe	22%
	Roberts	Fringe	4%
	Terry	Fringe	6%
	Wheeler	Core	42%
	Yoakum	Core	39%

* These counties have limited LEPC detections and habitat – therefore have been identified as fringe.

** These counties have numerous leks – therefore have been identified as core due to relative importance.

3 STATUS OF THE SPECIES

Status of the Species is an analysis of appropriate and best available scientific information on the species' life history, habitat and distribution, and other data on factors related to its survival and recovery. This analysis considers the effects of past human and natural activities or events that have led to the current condition of the species.

The LEPC is the only covered species addressed in this biological opinion. This section provides a concise review of pertinent information on the species, including a species description, status and occurrence, life history, habitat requirements, population trends, and threats. For more comprehensive information regarding these subjects, refer to the Services' Species Status Assessment (SSA) (USFWS 2022) for the LEPC.

3.1 Species description

Hagen and Giesen (2020) describe the LEPC as a medium-sized grouse with a total body length of 15−16 inches (38−41 centimeters). Plumage is generally similar for both sexes throughout the year, with alternating dark (brown) and light (buffy white) bands. The chin and throat are largely unmarked, and the tail is short, rounded, and brownish black. During courtship, males exhibit bright yellow eye-combs above the eye and dull red esophageal "air sacs" on the sides of the neck. Males also have a tuft of elongated feathers (pinnae) on each side of the neck that they hold erect during courtship displays. The pinnae in females are shorter. Immature birds are similar in appearance to adults. The weight of male LEPC averages 1.65 pounds (0.75 kilograms), while that of females averages 1.57 pounds (0.71 kilograms; Robb and Schroeder 2005). The LEPC is similar in appearance to the greater prairie-chicken (*Tympanuchus cupido*), which occurs primarily to the east of the LEPC range. Hybridization has been recorded where their ranges overlap.

3.2 Species Status and Occurrence

The LEPC has been considered for Federal listing under the ESA since July 8, 1997 (62 FR 36482) and was briefly listed as threatened on April 10, 2014 (79 FR 19973, USFWS 2014a) until the ruling was overturned in court (U.S. District Court for the Western District of Texas 2015), and Federal protection for the species was removed on July 20, 2016 (81 FR 47047). In response to a new petition, on June 1, 2021, the Service proposed to list two DPSs of the LEPC. In November 2022, the Service published a final rule listing the two DPSs of the LEPC. The Northern DPS is listed as threatened with a 4(d) rule and the Southern DPS is listed as endangered (Figure 3.1). While we have listed two DPSs of the LEPC, we did not break out the discussion of the basic biological needs, threats, and the effects of covered activities by DPS within this opinion because they are the same across ecoregions. During the later sections of this opinion when discussing the cumulative effects, conclusions, and incidental take statement, we include an analysis for each DPS.

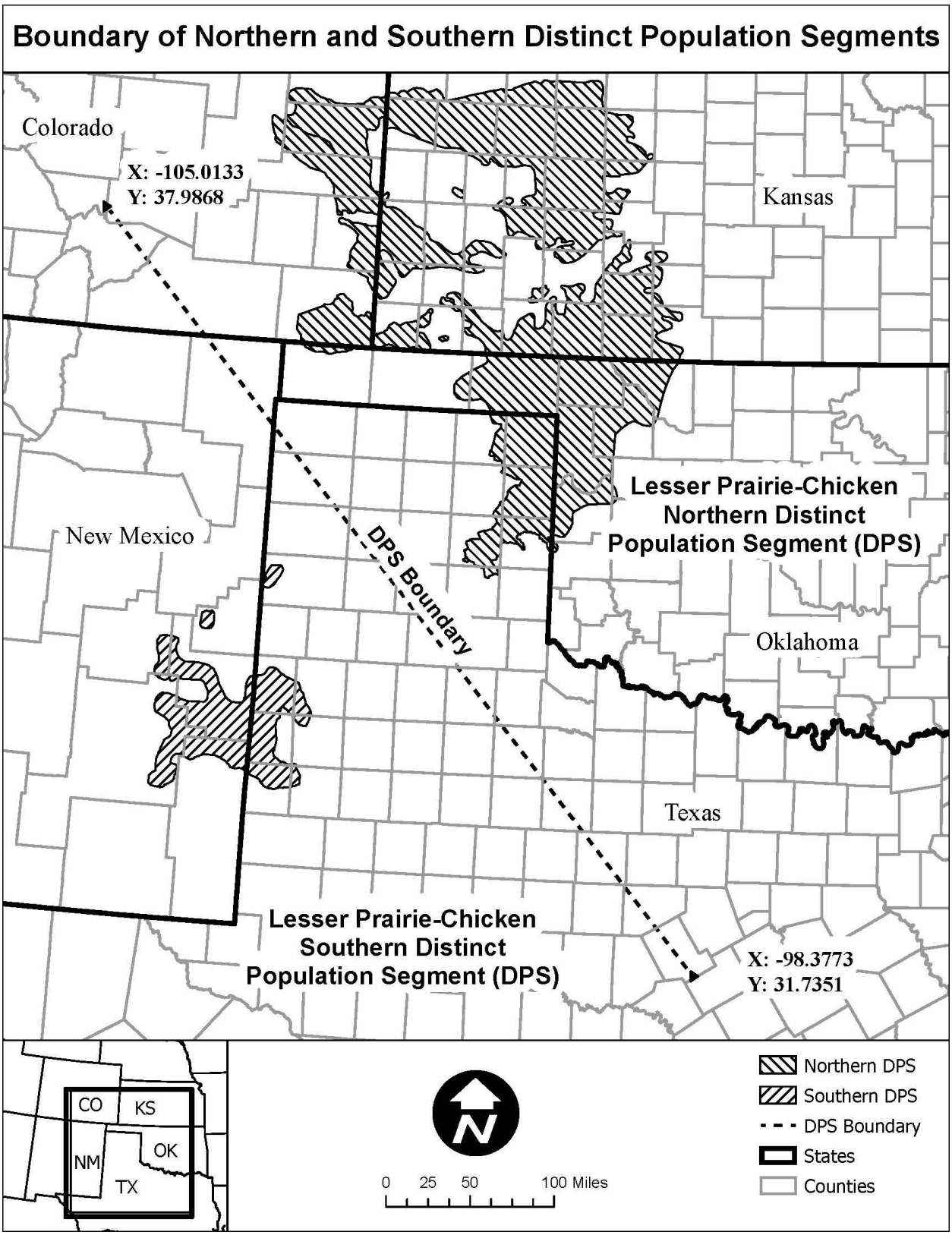

Figure 3.1. LEPC proposed Distinct Population Segments.

The LEPC currently inhabits sand sagebrush (Artemisia filifolia), sand shinnery oak, and mixed grass vegetation communities within the southern Great Plains in portions of Colorado, Kansas, New Mexico, Oklahoma, and Texas (USFWS 2022). The species' historical range was approximately 115,000,000 acres (ac), not all of which was occupied or had the ability to support LEPCs (Figure 3.2). Within the LEPCs current estimated occupied range, there are a total of 21,000,000 ac, of which we estimate a maximum of 4,000,000 ac or 18% are potentially habitat (USFWS 2022). The causes for this reduction in range between the LEPC's historical and current status are primarily attributed to habitat loss, fragmentation, and degradation (USFWS 2022). USFWS (2022) summarized the primary habitat loss, fragmentation, and degradation factors as conversion of native prairie to cropland; long-term fire suppression that has led to tree invasion; grazing management and herbicide spraying practices that have reduced habitat quality; and the development of oil and gas, wind, transmission, distribution lines, and roads. Habitat loss and fragmentation, as well as other threats to the LEPC, are described in Section 3.5 Current Habitat and Recent Population Trends by Ecoregion.

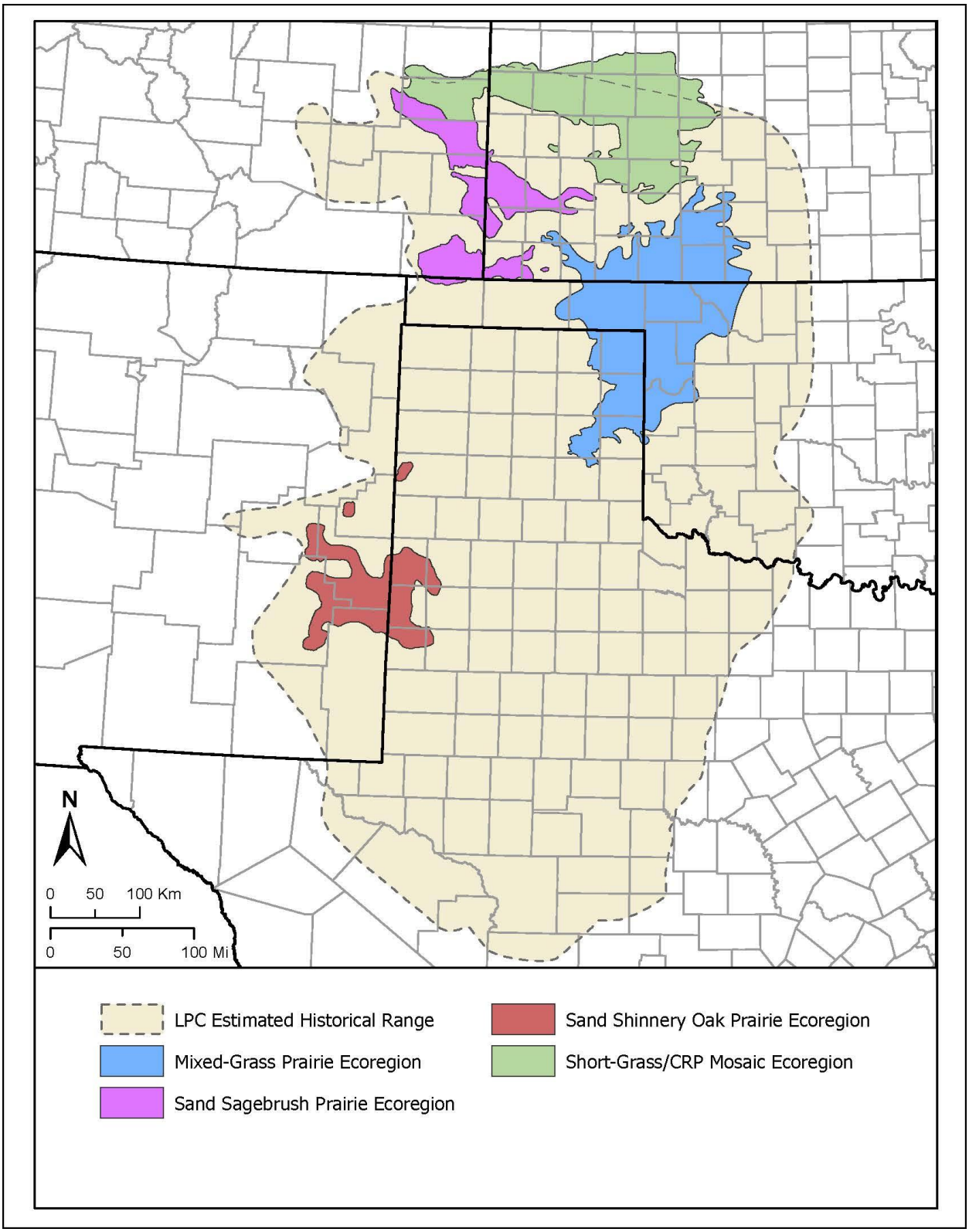

Figure 3.2. Estimated historical range and the LEPC's current estimated range with ecoregions delineated (USFWS 2022).

3.3 Life History and Demographics

While the males' lekking behavior may begin in February, the breeding season typically peaks in late March through late April. Male LEPC congregate on lek sites (communal display grounds) and perform courtship displays to attract females for mating. Yearling males attend leks, but older males secure the majority of mating opportunities (Hagen and Giesen 2020). Males primarily display during the first few hours of daylight, and to a lesser degree in the late afternoon. Displays involve some combination of erected feathers, exposed bare skin of bright colors, a dance, and bubbling or clucking vocalizations. Females attend leks from late March through May, with copulations peaking during the second and third weeks of April. Variations in weather conditions such as drought or late season snowstorms may delay peak female attendance (Hagen and Giesen 2020).

Lesser prairie-chickens have relatively high fidelity to lek sites, with males primarily using established leks year after year, and females tending to select these traditional leks rather than newer or temporary leks (Haukos and Smith 1989). The number of males on leks and/or the density of leks are often used to evaluate population status (Hagen and Giesen 2020). Some females may attend >1 lek during breeding season (Haukos 1988).

Females begin to breed the year after hatching and raise only one successful brood per season (Hagen and Giesen 2020). Nest initiation occurs from mid-April through late May, typically within two weeks of lek attendance and copulation (Bent 1932, Copelin 1963, Snyder 1967, Merchant 1982, Haukos 1988, Behney et al. 2010). Clutch size is commonly 10–12 eggs, but is reduced for re-nesting females (Hagen and Giesen 2020). Hatching peaks in late May through mid-June throughout the range (Copelin 1963, Merchant 1982). If the first clutch is lost as a result of predation or abandonment, females may attempt to nest again, with chicks hatching mid-June through early July (Merchant 1982, see Pitman et al. 2006b, Haukos and Boal 2016). Hatching success for the first clutch averages greater than 90% (Copelin 1963, Merchant 1982, Pitman 2003), but droughts and hot, dry weather can negatively affect hatching success (Merchant 1982). After hatching, chicks are brooded by the female until about mid-July (Van Pelt et al. 2013). Average brood size reported in various studies range from 3.5 to 7.8 (Hagen and Giesen 2020). The critical reproduction period for LEPC range-wide is from March 1 – July 15, with some latitudinal variation (Van Pelt et al. 2013).

Nest success and survival of chicks to the first breeding season has been identified as a key parameter affecting LEPC population growth rates (Hagen et al. 2009). Cooler spring temperatures and increased precipitation could enhance nest survival by increasing food and cover for LEPC (Grisham et al. 2013). Annual survival also affects LEPC population growth rates. Annual survival rates vary based on sex, age, season, and habitat type, and ranges from 0.30 in New Mexico (Campbell 1972) and Kansas (Hagen et al. 2007) to 0.60 in Kansas (Hagen et al. 2005; see Table 6.1 in Haukos and Zavaleta 2016).

Lesser Prairie-Chicken are not known to migrate (Hagen and Giesen 2020); rather, in autumn and winter, the birds assemble in mixed-gender flocks. Therefore, LEPC annual habitat needs include breeding habitat, nesting habitat, brood-rearing habitat, and autumn/winter habitat, all located relatively close to one another. Each of these habitat types have different vegetation compositions, which are described in below.

3.4 Habitat Characteristics

Lesser prairie-chicken are a landscape level species that use various habitat types to satisfy particular life requirements. LEPC use of habitats follows Johnson (1980) order of habitat selection where the first order of selection is the extent of potentially available habitat within their range. The range of the LEPC is divided into four ecoregions based on the dominant type of vegetation used by the birds in each region. These include: Shinnery Oak Prairie, Sand Sagebrush Prairie, Mixed-Grass Prairie, and Short-Grass/CRP Mosaic (Figure 3.2). Within each of these ecoregions, LEPC select areas to place their home ranges (e.g., second order of selection (Johnson 1980). The extent of these home ranges incorporates the use of different habitats during various seasons; however, in general, the species requires relatively large parcels of intact native grassland and shrubland, and it has been speculated at least 25,000 ac of contiguous high-quality habitat may be required to maintain self-sustaining populations (Bidwell et al. 2002). Van Pelt et al. (2013) summarized research with a range of purposes and states that the minimum habitat patch size to support LEPC is not clear but mention several studies that have speculated habitat mosaics ranging from 1,200–25,000 ac (486–10,118 hectares) of continuous native rangelands could be capable of sustaining a viable population. More specifically in Kansas, 19,407 ac of habitat that contained 77% grassland were more likely to be used by LEPC than areas with less grassland (Sullins et al. 2019).

The habitats that LEPC select within individual home ranges (e.g., third order [Johnson 1980]) varies based on seasons and ecoregions. Preferred habitat for the LEPC includes native short- and mixed-grass prairies with a shrub component dominated by sand sagebrush or shinnery oak (Taylor and Guthery 1980a, USFWS 2010) to provide summer shade, winter protection, and supplemental food (USFWS 2010). The absence of trees and other relatively tall woody vegetation is characteristic of these grassland ecosystems, with the exception of areas along watercourses (USFWS 2010, Lautenbach et al. 2017). Habitats are characterized by grasses of short to medium stature, particularly sand bluestem (*Andropogon hallii*), little bluestem (*Schizachyrium scoparium*), buffalo grass (*Buchloe dactyloides*), various dropseeds (*Sporobolus* spp.), and various gramas (*Bouteloua* spp.).

At the site-specific scale or fourth order of selection (Johnson 1980), LEPC use of habitats is specific to the species' life history needs. Van Pelt et al. (2013) divided LEPC habitat into four components necessary to fulfill the species' life history needs. These components include leks (breeding habitat), nesting habitat, brood habitat, and autumn/winter habitat that occur in close

proximity to one another. Van Pelt et al. (2013) provides summaries of habitat components required by LEPC, as described below in more detail.

3.4.1 Leks

Lek sites are characterized by relatively sparse vegetation generally less than 4 inches (10 centimeters) in height, and are often located on a knoll, ridge, or grama flat. Disturbed areas can also be used, including roads, abandoned oil and gas well pads, areas around livestock watering facilities, and areas subjected to herbicide treatments. Generally, a landscape that supports LEPC contains sufficient lek habitat. Thus, lek habitat is not considered a limiting factor, and habitat management to provide for lek sites is not considered necessary.

Lesser prairie-chicken exhibit site fidelity to lek sites, with the majority of use occurring within 3.1 miles (mi) (5 kilometers [km]) of leks (Winder et al. 2015b). All existing population indices are derived from estimates of lek density and the number of males and females attending leks; therefore, monitoring leks is important for managing local populations. Traditional lek surveys can only provide a rough population index due to uncertainties in detections >one mile from leks under certain conditions (Butler et al. 2010, Holt and Butler 2019), and uncertainty in lek attendance rates by grouse (Wann et al. 2019, Fremgen et al. 2019). However, the presence of birds at a lek does not consistently correlate with the quality of surrounding habitat for nesting, brood-rearing, and wintering, unless the population trend is known, preferably over a 5 to 10-year period that captures annual fluctuations in response to drought and rainfall patterns. Evidence of a stable or increasing population at a lek or group of leks only reveals minimum habitat quality exists in the area (Van Pelt et al. 2013). However, recent evidence from a 4-year study conducted in Kansas and Colorado that quantified the amount and composition of habitat within 3.1 mi (5 km) of 62 lek sites found a positive correlation between lek attendance and the proportion of grassland in the surrounding landscape (Gehrt et al. 2020).

3.4.2 Nesting Habitat

Lesser prairie-chicken nest and brood survival are generally considered the most critical population parameters for LEPC sustainability at a local level (Haukos and Zavaleta 2016). Thus, habitat conditions that promote nesting and brood-rearing success are key, specifically the vegetative composition and structure that provides visual obstruction to nesting and brooding birds (Gehrt et al. 2020). Increased vegetation height and cover density have been found to increase nest success in sand sagebrush, sand shinnery oak, and CRP grasslands. The management of vegetation height and density to provide visual obstruction could help increase the amount of suitable LEPC nesting habitat (Gehrt et al. 2020). While improving vegetation characteristics to support increased survival in local populations will help support persistence of existing LEPC, failure to couple these actions with efforts to address the scale of availability of total usable space will not address the primary threat of habitat loss and fragmentation (Fuhlendorf et al. 2017a).

A number of researchers have found most female LEPC nest within 2.0 mi (3.2 km) of leks (Haukos and Zavaleta 2016), although not necessarily the lek where mating occurred (Pitman et al. 2006a). Most year-round female space use occurs within 3.1 mi (5 km) of leks (Winder et al. 2015a). Hagen et al. (2013) suggest vegetation management for nesting should be focused around 1 mile (1.6 kilometers) from occupied leks. Thus, locations of leks can serve as an indicator of where existing nesting habitat is located and where improvements to nesting habitat could increase nesting success (Van Pelt et al. 2013).

3.4.3 Brood Habitat

Young broods have relatively limited mobility; therefore, quality brood habitat must occur in close proximity to nesting habitat. The interspersion of nesting and brood habitat is important for providing optimal habitat conditions (Van Pelt et al. 2013). Giesen (1998) suggested approximately 1,000 feet (305 meters) represented the maximum distance for movement between nesting and brood habitat.

The preferred vegetation characteristics at brood sites varies among ecoregions but in general have a more dominate herbaceous component than nesting sites (Hagen et al. 2013). Van Pelt et al. (2013) cited various studies to assert that brood habitat typically has a higher amount of forb cover and less grass cover than nesting sites. This habitat is usually associated with higher levels of insect abundance and provided vegetation cover that allowed chicks to move comparatively easily on the ground. Active sand dunes, dunes that physically change size, shape, or location due to the effects of wind, with shrubs, especially within sand shinnery oak or sand sagebrush vegetation types, are relatively common in brood-rearing habitat. Some studies suggest habitat disturbance by burning, grazing, and herbicide treatment could improve brood habitat. In addition, adults and broods have been found to use shrubs and shinnery oak for shade during the summer (Bell et al. 2010). Woodward et al. (2001) suggested that shrubland communities could provide year-round food and cover and are less influenced by climate and grazing than herbaceous-dominated communities.

3.4.4 Autumn/Winter Habitat

Van Pelt et al. (2013), citing Giesen (1998), states that while individuals range across larger areas during the autumn and winter months, individual LEPC occupy the same general vegetation types used during nesting and brood rearing, and remain in close proximity to leks. Agricultural fields with waste grains were used if located close enough to mixed-grass, sand sagebrush, or sand shinnery oak utilized for resting and roosting locations (Taylor and Guthery 1980a). Van Pelt et al. (2013) suggested specific management for autumn and winter habitat was not necessary so long as nesting and brood habitat of comparatively high quality was present due to the overlap in habitat requirements.

3.5 Current Habitat and Recent Population Trends by Ecoregion

3.5.1 Short-Grass/CRP Ecoregion

Prairies of the Short-Grass/CRP Mosaic Ecoregion have been significantly altered since European settlement of the Great Plains. Much of these prairies have been converted to other land uses such as cultivated agriculture, roads, power lines, petroleum production, wind energy, and transmission lines. Some areas have also been altered due to woody vegetation encroachment. Within this ecoregion, it has been estimated that about 73% of the landscape has been converted to cropland with 7% of the area in CRP (Dahlgren et al. 2016). Using the geospatial analysis described in Section 3.2 of the SSA, we were able to explicitly account for habitat loss and fragmentation and quantify the current condition of this ecoregion for the LEPC. Of the sources of habitat loss and fragmentation that have occurred, conversion to cropland has had the single largest impact on land cover in this ecoregion (Table 3.1). We estimated approximately 1,023,894 ac (414,355 hectares), or 16% of the ecoregion occur in potential usable unimpacted areas with 60% or greater potential usable unimpacted land cover within one mi (1.6 km) (Table 3.2).

Table 3.1. Estimated areas of current direct and indirect impacts, by impact source, and the proportion (%) of the total area of the Short-Grass/CRP Mosaic Ecoregion estimated to be impacted (Table 3.2). Impacts are not necessarily cumulative because of overlap of some impacted areas by more than one impact source (USFWS 2022).

Impact Sources	Acres	% of Ecoregion
Cropland Conversion	2,333,660	37%
Petroleum Production	248,146	4%
Wind Energy Development	145,963	2%
Transmission Lines	436,650	7%
Woody Vegetation Encroachment	284,175	5%
Roads	1,075,931	17%
Total Ecoregion Area	**6,298,014**	

Table 3.2. Results of LEPC geospatial analysis by ecoregion and range-wide estimated total area in acres, potential usable area, potential usable unimpacted area, spaces with 60% or greater potential usable unimpacted area within one mile (1.6 kilometers), and proportion of the total ecoregion of each total for spaces with 60% or greater potential usable unimpacted areas within one mile (1.6 kilometers) (USFWS 2022).

Ecoregion	Ecoregion total area (acres)	Potential usable area (acres)	Potential usable unimpacted area (acres)	Potential usable unimpacted area (60% within one mile) (acres)	Percent of total area
Short-Grass/CRP Mosaic	6,298,014	2,961,318	1,985,766	1,023,894	16.3%
Mixed-Grass Prairie	8,527,718	6,335,451	2,264,217	994,483	11.7%
Sand Sagebrush Prairie	3,153,420	1,815,435	1,358,405	1,028,523	32.6%
Sand Shinnery Oak Prairie	3,850,209	2,626,305	1,423,417	1,023,572	26.6%
Range-wide Totals	21,829,361	13,738,509	7,031,805	4,070,472	18.6%

Prior to the late 1990s, LEPC in this ecoregion were thought to be largely absent (or occurred sporadically in low densities) (Hagen and Giesen 2020, Rodgers 1999). We do not know what proportion of the eastern Short-Grass/CRP Mosaic Ecoregion in Kansas was historically occupied by LEPC (Hagen 2003), and surveys in this ecoregion only began in earnest in 1999 (Dahlgren et al. 2016). Rodgers and Hoffman (2005) reported that most CRP lands in Kansas were seeded using warm season native mix, often dominated by little bluestem (*Schizachyrium scoparium*) with significant amounts of sideoats grama (*Bouteloua curtipendula*) and/or switchgrass (*Panimum virgatum*) and lesser amounts of other species. Starting in 1997, the CRP often included seed mixtures that contained introduced and native forbs, and they reported that stands reached 14–32 inches (35–80 centimeters) in height (Rodgers and Hoffman 2005). This is largely due to the fact that the CRP is an idle lands program and has contractual limits to the type, frequency, and timing of management activities, such as burning, haying, or grazing. As a result of these factors, CRP often provides the vegetative structure preferentially used by lesser prairie-chickens for nesting. Fields (2004) and Fields et al. (2006) surmised that the availability of CRP lands, especially CRP lands with interseeded or original seed mixture of forbs, in the State of Kansas resulted in the increased population abundance and occupancy of the LEPC in this ecoregion.

The northern section of this ecoregion is the only portion of the LEPC's range where co-occurrence with greater prairie-chicken occurs. Hybridization rates of up to 5% have been reported (Pitman 2013), and that rate seemed to be stable across multiple years of Kansas Department of Wildlife, Parks and Tourism (KDWPT) surveys at the time, though sampling is limited where the species co-occur (Pitman 2013). Limited additional work has been completed to further assess the rate of hybridization. Dahlgren et al. (2016) expresses concerns about the

implications of genetic introgression (i.e., dilution) of LEPC genes, and the fact that potential effects are poorly understood. Subsequent publication by Oyler-McCance et al. (2016) summarize the evidence of hybridization of greater prairie-chicken and LEPC, including discussion that introgression seems to be occurring through females because of failure of hybrid males to breed due to conflated sexually selected traits between the species (Galla and Johnson 2015). The apparent female-biased introgression is probably magnified because the majority of breeding at leks is completed by a limited number of males in this lek system (Bain and Farley 2002). Unresolved issues include whether hybridization reduces fitness, alters behavior or morphological traits in either a positive or negative way and the historical occurrence and rate of hybridization.

Hagen et al. (2017) estimated historical trends in LEPC abundance from 2001 to 2016 in the Short-Grass/CRP Mosaic Ecoregion using population reconstruction methods and aerial survey results from 2016 as the initial population size. The mean population estimate increased from a minimum of about 14,000 males in 2001 and peaked at about 21,000 males in 2011.

Aerial surveys have been conducted to estimate LEPC population abundance since 2012 and results indicate that the Short-Grass/CRP Mosaic Ecoregion has the largest population size (Nasman et al. 2021) of the four ecoregions. Average estimates from 2016 to 2021 are 19,870 birds (90% confidence intervals (CI): 6,521, 36,329), making up about 67% of the range-wide LEPC total. Recent years have suggested modest increases.

3.5.2 Mixed-Grass Prairie Ecoregion

Much of the Mixed-Grass Prairie Ecoregion was severely fragmented originally by homesteading, which subdivided tracts of land into small parcels of 160–320 ac (65–130 hectares) in size (Rodgers 2016). As a result of these small parcels, road and fence densities are higher compared to other ecoregions and, therefore, increase habitat fragmentation and pose higher risk for collision mortalities than in other ecoregions (Wolfe et al. 2016). Fragmentation has also occurred due to oil and gas development, wind energy development, transmission lines, highways, and expansion of invasive plants such as eastern red cedar. Conservation Reserve Program fields occupy between 10% and 20% of the Mixed-Grass Ecoregion, and these lands in Oklahoma and the northeastern panhandle of Texas are dominated by exotic grasses (Wolfe et al. 2016). A major concern for LEPC populations in this ecoregion is the loss of grassland due to the rapid westward expansion of the eastern red cedar (NRCS 2016). Oklahoma Forestry Services estimated the average rate of expansion of eastern red cedar in 2002 to be 762 ac (308 hectares) per day (Wolfe et al. 2016).

Using the geospatial analysis described in Section 3.2 of the SSA (USFWS 2022), we were able to explicitly account for habitat loss and fragmentation and quantify the current condition of this ecoregion for the LEPC. Of the sources of habitat loss and fragmentation that have occurred, encroachment of woody vegetation had the largest impact, with conversion to cropland, roads,

and petroleum production also having significant impacts on land cover in this ecoregion (Table 3.3). We estimate approximately 994,483 ac (402,453 hectares), or 12% of the ecoregion, occur in potential usable unimpacted areas with 60% or greater potential usable unimpacted land cover within one mile (1.6 kilometers) (Table 3.2).

Table 3.3. Estimated areas of current direct and indirect impacts, by impact source, and the proportion (%) of the total area of the Mixed-Grass Ecoregion estimated to be impacted (Table 3.2). Impacts are not necessarily cumulative because of overlap of some impacted areas by more than one impact source (USFWS 2022).

Impact sources	Acres	% of ecoregion
Cropland Conversion	1,094,688	13%
Petroleum Production	859,929	10%
Wind Energy Development	191,571	2%
Transmission Lines	576,713	7%
Woody Vegetation Encroachment	2,047,510	24%
Roads	1,732,050	20%
Total Ecoregion Area	**8,527,718**	

The Mixed-Grass Prairie Ecoregion historically contained the highest LEPC densities (Wolfe et al. 2016). Hagen et al. (2017) estimated historical trends in LEPC abundance from 1965–2016 in the Mixed-Grass Prairie Ecoregion using population reconstruction methods. The mean population estimate was around 30,000 males in the 1970s and 1980s. Population estimates declined in the 1990s and peaked again in the early 2000s at around 25,000 males, before declining and remaining to its lowest levels, <10,000 males in 2012, since the late 2000s.

Aerial surveys have been conducted to estimate LEPC population abundance since 2012, and results in the Mixed-Grass Prairie Ecoregion from 2012 through 2021 indicate this ecoregion has the second highest population size (Nasman et al. 2021) of the four ecoregions. Average estimates from 2016 to 2021 are 5,202 birds (90% CI: 1,662, 10,441), representing about 18% of the range-wide total. Results show minimal variation since surveys began with lower than average estimates in the past two years.

3.5.3 Sand Sagebrush Prairie Ecoregion

Prairies of the Sand Sagebrush Prairie Ecoregion have been influenced by a variety of activities since European settlement of the Great Plains. Much of these grasslands have been converted to other land uses such as cultivated agriculture, roads, power lines, petroleum production, wind energy, and transmission lines. Some areas have also been altered due to woody vegetation encroachment. Haukos et al. (2016) concluded only 26% of historical sand sagebrush prairie is available as potential nesting habitat for LEPC. Using the geospatial analysis described in Section 3.2 of the SSA (USFWS 2022), we were able to explicitly account for habitat loss and

fragmentation and quantify the current condition of this ecoregion for the LEPC. Of the sources of habitat loss and fragmentation that have occurred, conversion to cropland has had the single largest impact on land cover in this ecoregion (Table 3.4). We estimate approximately 1,028,523 ac (416,228 hectares), or 33% of the ecoregion, occurs in potential usable unimpacted areas with 60% or greater potential usable unimpacted land cover within one mile (1.6 kilometers) (Table 3.2). In addition, habitat loss due to the degradation of the rangeland within this ecoregion continues to be a limiting factor for LEPC, and most of the existing birds within this ecoregion persist primarily on CRP lands.

Table 3.4. Estimated areas of current direct and indirect impacts, by impact source, and the proportion (%) of the total area of the Sand Sagebrush Prairie Ecoregion estimated to be impacted (Table 3.2). Impacts are not necessarily cumulative because of overlap of some impacted areas by more than one impact source (USFWS 2022).

Impact sources	Acres	% of ecoregion
Cropland Conversion	994,733	32%
Petroleum Production	163,704	5%
Wind Energy Development	0	0%
Transmission Lines	167,240	5%
Woody Vegetation Encroachment	68,147	2%
Roads	446,316	14%
Total Ecoregion Area	**3,153,420**	

This region supported large numbers of LEPC in the past, with a single flock detected in Seward County, Kansas, estimated to potentially contain more than 15,000 birds (Bent 1932). The estimated population size is believed to have peaked at over 85,000 males in the 1970s (Garton et al. 2016). This population has been in decline since the late 1970s. Most of the decline has been attributed to habitat deterioration and conversion of sand sagebrush to intensive row crop agriculture due to an increase in center pivot irrigation innovations (Jensen et al. 2000).

Environmental conditions in this ecoregion can be extreme, with stochastic events impacting LEPC populations. As an example, during an extreme blizzard event in Prowers County, Colorado, during 2006–2007, it was estimated that about 80% of the LEPC died overwinter and there was about a 75% reduction of the LEPC population in the Colorado portion of the ecoregion (Haukos et al. 2016). Drought conditions from 2011–2014 have expedited population decline (Haukos et al. 2016).

Hagen et al. (2017) estimated historical trends in LEPC abundance from 1965 to 2016 in the Sand Sagebrush Prairie Ecoregion using population reconstruction methods. The mean population estimate peaked at >90,000 males from 1970 to 1975 and declined to its lowest level of fewer than 1,000 males in recent years.

Aerial surveys have been conducted to estimate LEPC population abundance since 2012 and results in the Sand Sagebrush Prairie Ecoregion from 2012 through 2021 indicate that this ecoregion has the lowest population size (Nasman et al. 2021) of the four ecoregions. Average estimates from 2016 to 2021 are 1,182 birds (90% CI: 55, 4,547) representing about 4% of the range-wide LEPC total. Recent results have been highly variable, with 2020 being the lowest estimate reported. Although the aerial survey results show 171 birds in this ecoregion in 2020 (without confidence intervals because the number of detections were too low for statistical analysis), ground surveys in this ecoregion in Colorado and Kansas detected 406 birds, so we know the current population is actually larger than indicated by the aerial survey results (Rossi and Fricke, pers. comm. 2020, entire). The 2021 results estimated 440 birds (CI: 55, 963).

3.5.4 Shinnery Oak Prairie Ecoregion

The Shinnery Oak Ecoregion is geographically disconnected from populations elsewhere in the species distribution. With the exception of LEPC areas owned by the New Mexico Department of Game and Fish (NMDGF) and Federally owned Bureau of Land Management (BLM) lands in New Mexico, the majority of shinnery oak prairie on the southern High Plains is privately owned (Grisham et al. 2016). Nearly all of the area in the Texas portion of the ecoregion is privately owned and managed for agricultural use and petroleum production (Haukos 2011). The remaining patches of shinnery oak prairie have become isolated, relict communities because the surrounding grasslands have been converted to row crop agriculture or fragmented by oil and gas exploration and urban development (Peterson and Boyd 1998). Additionally, mesquite encroachment within this ecoregion has played a significant role in available space for the LEPC. Prior to the late 1990s, approximately 100,000 ac (40,000 hectares) of sand shinnery oak in New Mexico and approximately 1,000,000 ac (405,000 hectares) of sand shinnery oak in Texas were lost due to the application of tebuthiuron and other herbicides for agriculture and range improvement (Peterson and Boyd 1998). Technological advances in irrigated row crop agriculture have led to recent conversion of shinnery oak prairie habitat to row crops in eastern New Mexico and west Texas (Grisham et al. 2016).

Using the geospatial analysis described in Section 3.2 of the SSA (USFWS 2022), we were able to explicitly account for habitat loss and fragmentation and quantify the current condition of this ecoregion for the LEPC. Of the sources of habitat loss and fragmentation that have occurred, cropland conversion, roads, and encroachment of woody vegetation had the largest impacts on land cover in this ecoregion (Table 3.5). We estimate approximately 1,023,572 ac (414,225 hectares), or 27% of the ecoregion, occurs in potential usable unimpacted areas with 60% or greater potential usable unimpacted land cover within one mile (1.6 kilometers) (Table 3.2).

Table 3.5. Estimated areas of current direct and indirect impacts, by impact source, and the proportion (%) of the total area of the Shinnery Oak Ecoregion estimated to be impacted (Table 3.2). Impacts are not necessarily cumulative because of overlap of some impacted areas by more than one impact source (USFWS 2022).

Impact sources	Acres	% of ecoregion
Cropland Conversion	540,120	14%
Petroleum Production	161,652	4%
Wind Energy Development	90,869	2%
Transmission Lines	372,577	10%
Woody Vegetation Encroachment	617,885	16%
Roads	742,060	19%
Total Ecoregion Area	**3,850,209**	

Hagen et al. (2017) estimated historical trends in LEPC abundance from 1969–2016 in the Shinnery Oak Ecoregion using population reconstruction methods. The mean population estimate ranged between about 5,000 to 12,000 males through 1980, increased to 20,000 males in the mid-1980s and declined to approximately 1,000 males in 1997. The mean population estimate peaked again to approximately 15,000 males in 2006 and then declined again to fewer than 3,000 males in the mid-2010s.

Aerial surveys have been conducted to estimate LEPC population abundance since 2012, and results in the Shinnery Oak Ecoregion from 2012 through 2021 indicate that this ecoregion has the third highest population size (Nasman et al. 2021) of the four ecoregions. Average estimates from 2015 to 2021 are 3,249 birds (90% CI: 630, 9,300), representing about 11% of the range-wide total. Recent estimates have varied between fewer than 1,000 birds in 2015 to more than 5,000 birds in 2020.

3.6 Threats

The range of the LEPC has been substantially reduced as a result of habitat loss, fragmentation, and degradation resulting from a variety of ongoing factors. Because the species requires relatively large parcels of intact native grassland and shrubland, often in excess of 20,000 ac to maintain self-sustaining populations, habitat loss and alteration has increased the species risk of extinction. In addition, the life history of the species, primarily the lek breeding system and behavioral avoidance of vertical structures that increase predation risk, make LEPC especially vulnerable to ongoing impacts occurring on the landscape, particularly at the species' currently reduced range-wide population. Within the LEPC SSA, the Service concluded LEPC lacked sufficient redundancy and resilience to ensure the species' viability from present and future threats, although some populations appeared to be sufficiently stable to ensure the species' persistence in the near term (USFWS 2022). This section provides a general overview of influences negatively impacting the LEPC. For a more comprehensive analysis and estimation

of usable land cover for the LEPC that has been impacted by these influences, refer to the LEPC SSA (USFWS 2022).

3.6.1 Habitat Loss, Fragmentation, and Degradation

The grasslands of the Great Plains are among the most threatened ecosystems in North America (Samson et al. 2004) and have been impacted more than any other major ecosystem on the continent (Samson and Knopf 1994), and temperate grasslands are also one of the least conserved ecosystems (Hoekstra et al. 2005). The vast majority of the LEPC range (>95%) occurs on private lands that have been in some form of agricultural production since at least the early 1900s. Past land cover evaluations have estimated grassland loss in the Great Plains at approximately 70% (Samson et al. 2004), with nearly 93,000 square kilometers (23 million ac; 9.3 million hectares) of grasslands in the United States lost between 1982 and 1997 alone (Samson et al. 2004). As a result, available habitat for grassland species, such as the LEPC, has been much reduced and fragmented compared to historical conditions across its range.

The following sections provide a discussion and quantification of the influence of habitat loss and fragmentation from difference sources of disturbance on the grasslands of the Great Plains and more specifically allow us to characterize the current condition of LEPC habitat.

3.6.1.1 Conversion of Grassland to Cropland

At the time the LEPC was determined to be taxonomically distinct from the greater prairie-chicken in 1885 and shortly after, much of the historical and current range was beginning to be altered as human settlement of the Great Plains progressed and grasslands were being used for agriculture (Bartuszevige and Daniels 2016). Between 1915 and 1925, considerable areas of prairie had been plowed in the Great Plains and planted to wheat (Laycock 1987). As a result, by the 1930s the LEPC had begun to disappear from areas where it had been considered abundant, with populations nearing extirpation in Colorado, Kansas, and New Mexico, and populations were reduced in Oklahoma and Texas (Bent 1932, Davison 1940, Lee 1950, Baker 1953, Oberholser 1974, Crawford 1980). Additional areas of previously unbroken grassland were brought into cultivation in the 1940s, and enhancement in farming techniques (for example, center pivot irrigation) caused additional increases in conversion in the 1970s and 1980s (Laycock 1987, Laycock 1991). Conversion of grassland to cultivated agricultural lands has been regularly cited as an important cause in the range-wide decline in abundance and distribution of LEPC populations (Copelin 1963, Jackson and DeArment 1963, Crawford and Bolen 1976a, Crawford 1980, Taylor and Guthery 1980b, Braun et al. 1994, Mote et al. 1999).

Because cultivated grain crops may have provided increased or more dependable winter food supplies for LEPC (Braun et al. 1994), the initial conversion of smaller patches of grassland to cultivation may have been temporarily beneficial to the short-term needs of the species as primitive and inefficient agricultural practices made grain available as a food source (Rodgers

2016). Sharpe (1968) believed that the presence of cultivated grains may have facilitated the temporary occurrence of LEPC in Nebraska. However, as conversion increased, more recent information suggests that landscapes having greater than 20 to 37% cultivated grains may not support stable LEPC populations (Crawford and Bolen 1976a). More recently, Ross et al. (2016b) found a response to the gradient of cropland to grassland land cover. Specifically, they found abundances of LEPC increased with increasing cropland until a threshold of 10% cropland was reached and then abundance declined with increasing cropland cover. This indicates that a relatively small amount of cropland could have a positive influence on LEPC abundance, but levels of conversion to cropland that exceed 10% are detrimental to the LEPC. While LEPC may forage in agricultural croplands, croplands do not provide for the habitat requirements of the species' life cycle (cover for nesting and thermoregulation), and thus they avoid landscapes dominated by cultivated agriculture, particularly where small grains are not the dominant crop (Crawford and Bolen 1976a).

3.6.1.2 Petroleum and Natural Gas Production

Petroleum and natural gas production has occurred over much of the estimated historical and current analysis areas of the LEPC. Oil exploration began as early as the late 1800s in the Great Plains and commercial production began as early as the 1880s. By 1920, oil and gas production had dramatically increased on the Great Plains. As demand for energy has continued to increase nationwide so has oil and gas development in the Great Plains. In Texas, for example, Timmer et al. (2014) stated that active oil and gas wells in the LEPC occupied range had increased by more than 80% over the previous decade. Oil and gas development involves activities such as surface exploration, exploratory drilling, field development, and facility construction, as well as access roads, well pads, and operation and maintenance. Associated facilities can include compressor stations, pumping stations, and electrical generators. Activities such as well pad construction, seismic surveys, access road development, power line construction, and pipeline corridors can all result in direct habitat loss by removal of vegetation used by LEPC. As documented in other grouse species, consequential habitat loss also occurs from avoidance of vertical structures, noise, and human presence (Weller et al. 2002), which all can influence LEPC behavior in the general vicinity of oil and gas development areas. These activities affect LEPC by disrupting reproductive behavior (Hunt and Best 2004) and through habitat loss and fragmentation (Hunt and Best 2004). Numerous studies demonstrate the impacts that anthropogenic features, such as oil and gas wells, have on the LEPC by affecting the behavior of individuals and altering the way in which they use the landscape (Hagen et al. 2011, Pitman et al. 2005, Hagen 2010, Hunt and Best 2004, Plumb et al. 2019, Sullins et al. 2019, Peterson et al. 2020).

3.6.1.3 Wind Energy Development and Power Lines

Wind power is a form of renewable energy increasingly being used to meet current and projected future electricity demands in the United States. Much of the new wind energy development to meet these anticipated demands is likely to come from the Great Plains states because they have high wind resource potential, which exerts a strong, positive influence on the amount of wind energy developed within a particular State (Staid and Guikema 2013). In both 2018 and 2019, the wind industry added over 7,500 and 9,100 megawatts (MW) nationwide of new capacity, respectively (American Wind Energy Association [AWEA] 2019a, AWEA 2020a). Wind energy has now surpassed hydroelectric power production to become the largest source of renewable energy capacity in the country. In 2019, three of the five LEPC States, Colorado, New Mexico, and Kansas, were within the top 10 States nationally for fastest growing states for wind generation in the past year (AWEA 2020a). The Great Plains is one of the leading regions for wind energy development, with three of the States from the range of the LEPC occurring in the top four of installed capacity in 2019. There is substantial information (Southwest Power Pool 2020) indicating interest by the wind industry in developing wind energy within the range of the LEPC, especially if additional transmission line capacity is constructed. The entire estimated historical range of the LEPC occurs in areas determined to have average wind speeds exceeding what is recognized as necessary for large-scale wind energy development (21.3 feet/second (6.5 meters/second), at 262 feet (80 meters) high) (Department of Energy [USDOE] National Renewable Energy Laboratory 2010b).

The average size of installed wind turbines continues to increase (USDOE 2015a, p. 63; AWEA 2020a, p. 87–88). Wind energy developments range from 20 to 400 towers, each supporting a single turbine. Review of previous annually reported metrics of wind energy developments indicates a continued increase in all size aspects of wind energy developments (AWEA 2014, AWEA 2015, AWEA 2016, AWEA 2017, AWEA 2018, AWEA 2019a, AWEA 2020a). Roads are necessary to access the turbine sites for installation and maintenance. One or more electrical substations, where the generated electricity is collected and transmitted on to the power grid, also may be built depending on the size of the wind energy development. Considering the initial capital investment, and that the service life of a single turbine is at least 20 years (USDOE 2008), we expect most wind energy developments to be in place for at least 30 years.

Hagen et al. (2004) recommended that wind turbines and other large vertical structures be placed greater than 1.6 mi (2 km) from known or potentially occupied LEPC habitat. Hagen et al. (2010) reported the effects of anthropogenic features on displacement and demographics of several species of prairie grouse by compiling and analyzing existing data from 22 studies (which included data on various kinds of development) that reported quantitative data on prairie grouse response to energy development. This report suggested that prairie grouse appear to be tolerant of disturbances beyond minimum distances of less than 1.1 mi (1.8 km) in many cases. Additionally, Hagen et al. (2011) used minimum behavioral avoidance distances based on Monte

Carlo simulations of data obtained from 226 radio-marked female LEPC in Kansas to recommend a distance of greater than or equal to 0.9 mi (1.4 km) to account for the impact of wind energy development until empirical data are available.

Manier et al. (2014) reported recommended buffer distances for greater sage-grouse based on the energy development category (which included wind energy). The minimum and maximum values at which effects from energy development were observed in the scientific literature were 2.0 mi (3.2 km) and 12 mi (20 km), respectively. Manier et al. (2014) also reported proposed values for potential conservation buffer distances based on multiple sources ranging from 3 to 5 mi (5 to 8 km). Lastly, the Range-wide Conservation Plan (RWP) identified a 2,188-feet (667-meters) impact radius for use within their mitigation strategy to account for the indirect effects of wind turbines.

The effects of wind energy development on the LEPC must also take into consideration the influence of the transmission lines critical to distribution of the energy generated by wind turbines. Transmission lines can traverse long distances across the landscape and can be both above ground and underground, although the vast majority of transmission lines are erected above ground. Most of the impacts to LEPC associated with transmission lines are with the above ground systems. Support structures vary in height depending on the size of the line. Most high-voltage power line towers are 98 to 125 feet (30 to 38 meters) high but can be higher if the need arises. Local distribution lines are usually much shorter in height but still contribute to fragmentation of the landscape. Local distribution lines, while more often are erected above ground, can be placed below ground.

The physical footprint of transmission line installation is typically much smaller than the effect of the transmission line infrastructure itself. Transmission lines can indirectly lead to alterations in LEPC behavior and space use (avoidance), decreased lek attendance, and increased predation on LEPC. Transmission lines, particularly due to their length, can be a significant barrier to dispersal of prairie grouse, disrupting movements to feeding, breeding, and roosting areas. Pruett et al. (2009) summarizes evidence for avoidance behavior associated with transmission lines in prairie grouse. Both lesser and greater prairie-chickens avoided otherwise usable habitat near transmission lines and crossed these power lines much less often than nearby roads, suggesting that power lines are a particularly strong barrier to movement (Pruett et al. 2009). Because LEPC avoid tall vertical structures like transmission lines and because transmission lines can increase predation rates, leks located in the vicinity of these structures may see reduced attendance by new males to the lek, as was reported by Braun et al. (2002) for sage-grouse. Decreased probabilities of use by LEPC was shown with the occurrence of more than 0.09 mi (0.15 km) of major roads, or transmission lines within a 1.2 mile (2 kilometer) radius (Sullins et al. 2019).

3.6.1.4 Woody Vegetation Encroachment

Selected LEPC habitat is characterized by expansive regions of treeless grasslands interspersed with patches of small shrubs (Giesen 1998). Prior to extensive Euro-American settlement, frequent fires and grazing by large, native ungulates helped confine trees like eastern red cedar to river and stream drainages and rocky outcroppings. However, settlement of the southern Great Plains altered the historical ecological context and disturbance regimes. The frequency and intensity of these disturbances directly influenced the ecological processes, biological diversity, and patchiness typical of Great Plains grassland ecosystems, which evolved with frequent fire and ungulate herbivory and that maintained prairie habitat for LEPC (Collins 1992, Fuhlendorf and Smeins 1999).

Once these historical fire and grazing regimes were altered, the processes that helped maintain extensive areas of grasslands ceased to operate effectively. Following Euro-American settlement, fire suppression allowed trees, such as eastern red cedar, to begin invading or encroaching upon neighboring grasslands. Increasing fire suppression that accompanied human settlement, combined with government programs promoting eastern red cedar for windbreaks, erosion control, and wildlife cover, facilitated the expansion of eastern red cedar distribution in grassland areas (Owensby et al. 1973, DeSantis et al. 2011). Within the southern- and western-most portions of the estimated historical and occupied ranges of LEPC in eastern New Mexico, western Oklahoma, and the south plains and panhandle of Texas, honey mesquite is another common woody invader within these grasslands (Riley 1978, Boggie et al. 2017). Mesquite is a particularly effective woody invader in grassland habitat due to its ability to produce abundant, long-lived seeds that can germinate and establish in a variety of soil types and moisture and light regimes (Lautenbach et al. 2017). Though not as widespread as mesquite or eastern red cedar, other tall, woody plants, such as redberry or Pinchot juniper (*Juniperus pinchotii*), black locust (*Robinia pseudoacacia*), Russian olive (*Elaeagnus angustifolia*), and Siberian elm (*Ulmus pumila*) can also be found in grassland habitat historically and currently used by LEPC and may become invasive in these areas.

Invasion of grasslands by certain opportunistic woody species, like eastern red cedar and mesquite, cause otherwise usable grassland habitat to no longer be used by LEPC and contributes to the loss and fragmentation of grassland habitat (Lautenbach 2017, Boggie et al. 2017). More specifically, in Kansas LEPC were found to be 40 times more likely to use areas that had no trees than areas with 1.6 trees per acre (5 trees per hectare), and no nests were placed in areas with a tree density greater than 0.8 trees per acre (2 trees per hectare), at a scale of 89 ac (36 hectares) (Lautenbach 2017). Similarly, within the Shinnery Oak Ecoregion, Boggie et al. (2017) documents that LEPC space use in all seasons is altered in the presence of mesquite, even at densities of less than 5% canopy cover. Woody vegetation encroachment has a direct effect on LEPC by making the area not usable. In addition, Boggie et al. (2017, mesquite) and Lautenbach (2017, eastern red cedar) documented that woody vegetation encroachment also contributes to

indirect habitat loss and increases habitat fragmentation because LEPC are less likely to use areas adjacent to trees.

3.6.1.5 Roads and Electrical Distribution Lines

Roads and distribution power lines are linear features on the landscape that contribute to loss and fragmentation of LEPC habitat and fragment populations as a result of behavioral avoidance. Specifically, Plumb et al. (2019) found that as distance increased from 0 to 1.9 mi (0 to 3 km) away from roads, the relative probability of LEPC home range placement and space used increased by 1.66 times; this ultimately led the authors to suggest a buffer of >1,148 feet (>350 meters) for secondary roads. Sullins et al. (2019) found evidence to suggest a decreased probability of use for areas with greater than 5 mi (8 km) of county roads within a 1.2-mile (2-kilometer) radius and greater than 0.1 mi (0.15 km) of major roads. Additionally, roads are known to contribute to lek abandonment when they disrupt the important habitat features (such as affecting auditory or visual communication) associated with lek sites (Crawford and Bolen 1976b). Some mammalian species known to prey on LEPC, such as red fox (*Vulpes vulpes*), raccoons (*Procyon lotor*), and striped skunks (*Mephitis mephitis*), have greatly increased their distribution by dispersing along roads (Forman and Alexander 1998, Forman 2000, Frey and Conover 2006).

Traffic noise from roads may indirectly impact LEPC. Because LEPC depend on acoustic signals to attract females to leks, noise from roads, oil and gas development, wind turbines, and similar human activity may interfere with mating displays, influencing female attendance at lek sites, and causing young males not to be drawn to the leks. Within a relatively short period, leks can become inactive due to a lack of recruitment of new males to the display grounds.

Depending on the traffic volume and associated disturbances, roads also may limit LEPC dispersal abilities. Lesser prairie-chickens have been shown to avoid areas of usable habitat near roads (Pruett et al. 2009, Plumb et al. 2019) and in areas where road densities are high (Sullins et al. 2019). Lesser prairie-chickens are thought to avoid major roads due to disturbance caused by traffic volume and, perhaps behaviorally, to avoid exposure to predators that may use roads as travel corridors. However, the extent to which roads constitute a significant obstacle to LEPC movement and space use is largely dependent upon the local landscape composition and characteristics of the road itself.

Local electrical distribution lines are usually much shorter in height than transmission lines but can still contribute to habitat fragmentation through similar mechanisms as other vertical features described in this document. Local distribution lines, while more often are erected above ground, can be placed below ground to minimize effects to LEPC. Distribution lines are similar to transmission lines with the exception to height of poles and electrical power carried through the line. Plumb et al. (2019) found that for LEPC within their study, as distance increased from 0 to 1.9 mi (0 to 3 km) away from roads, the relative probability of home range placement and space

used increased by 1.54 times; this ultimately led the authors to suggest a buffer of >1,800 feet (>550 meter) for power lines. In addition to habitat loss and fragmentation, electrical power lines can directly affect prairie grouse by posing a collision hazard (Leopold 1933, Connelly et al. 2000). There were no datasets available to quantify the total impact of distribution lines on the landscape for the LEPC.

3.6.2 Other Factors

3.6.2.1 Livestock Grazing

Grazing has long been an ecological driving force throughout the ecosystems of the Great Plains (Stebbins 1981), and much of the untilled grasslands within the range of the LEPC is currently grazed by livestock and other animals. Historically, the interaction of fire, drought, prairie dogs (*Cynomys ludovicianus*), and large ungulate grazers created and maintained distinctively different plant communities in the western Great Plains that resulted in a mosaic of vegetation structure and composition that maintained the prairie ecosystem that sustained LEPC and other grassland bird populations (Derner et al. 2009). As such, grazing by domestic livestock is not inherently detrimental to LEPC management and, in many cases, is needed to maintain appropriate vegetative structure through disturbance. However, grazing practices that tend to result in overutilization of forage, as well as decreasing vegetation heterogeneity (incompatible grazing), can produce habitat conditions that differ in significant ways from the historical grassland mosaic by altering the vegetation structure and composition and degrading the quality of habitat for the LEPC. The more heavily altered conditions are the least valuable for the LEPC (Jackson and DeArment 1963, Davis et al. 1979, Taylor and Guthery 1980a, Bidwell and Peoples 1991) and, in some cases, can result in areas that do not contain the biological components necessary to support the LEPC. It is important that grazing be managed at a given site to account for a variety of factors including past management, soils, precipitation, and other factors to ensure that the resulting vegetative composition and structure will support the LEPC as needed management will vary across the range.

Livestock are also known to inadvertently flush LEPC and trample LEPC nests (Toole 2005, Pitman et al. 2006a). Brief flushing of adults from nests can expose eggs and chicks to predation and extreme temperatures. Trampling nests can cause direct mortality to LEPC eggs or chicks or may cause adults to permanently abandon their nests, ultimately resulting in loss of young. Although these effects have been documented, the significance of direct livestock effects on the LEPC is largely unknown and is presumed not to be significant at a population scale.

In summary, domestic livestock grazing (including management practices commonly used to benefit livestock production) has altered the composition and structure of grassland habitat, both currently and historically, used by the LEPC. Much of the remaining remnants of mixed-grass grasslands, while still important to the LEPC, exhibit conditions quite different from those that prevailed prior to Euro-American settlement. These changes have likely considerably reduced

the suitability of remnant grassland areas as habitat for LEPC. Grazing management that has altered the vegetation community to a point where the composition and structure are no longer suitable for LEPC and can contribute to fragmentation within the landscape, even though these areas may remain as prairie or grassland. Livestock grazing, in many cases, is needed to maintain appropriate vegetative structure provided that grazing management results in a plant community diversity and structure that is suitable for LEPC.

3.6.2.2 Shrub Control and Eradication

Shrub control and eradication are additional forms of habitat alteration that can influence the availability and suitability of habitat for LEPC (Jackson and DeArment 1963). Most shrub control and eradication efforts in LEPC habitat are primarily focused on sand shinnery oak for the purpose of increasing forage for livestock grazing. Sand shinnery oak is toxic if eaten by cattle when it first produces leaves in the spring, and it also competes with more palatable grasses and forbs for water and nutrients (Peterson and Boyd 1998), which is why it is a common target for control and eradication efforts by rangeland managers. Prior to the late 1990s, approximately 100,000 ac (40,000 hectares) of sand shinnery oak in New Mexico and approximately 1,000,000 ac (405,000 hectares) of sand shinnery oak in Texas were lost due to the application of tebuthiuron and other herbicides for agriculture and range improvement (Peterson and Boyd 1998).

Shrub cover is an important component of LEPC habitat in certain portions of the range, and sand shinnery oak is a key shrub in the Sand Shinnery Oak Prairie and portions of the Mixed-Grass Prairie Ecoregions. The importance of sand shinnery oak as a component of LEPC habitat in the Shinnery Oak Ecoregion has been demonstrated by several studies (Fuhlendorf et al. 2002, Bell 2005). In west Texas and New Mexico, LEPC have been documented to avoid nesting where sand shinnery oak has been controlled with tebuthiuron, indicating their preference for habitat with a sand shinnery oak component (Grisham et al. 2014, Haukos and Smith 1989, Johnson et al. 2004, Patten and Kelly 2010). Where sand shinnery oak occurs, LEPC use it both for food and cover. Sand shinnery oak may be particularly important in drier portions of the range due to the more severe and frequent droughts and extreme heat events, as sand shinnery oak is more resistant to drought and heat conditions than are most grass species. And since sand shinnery oak is toxic to cattle and thus not targeted by grazing, shinnery oak shrubs can provide available cover for LEPC nesting and brood rearing during these extreme weather events. Loss of this component of the vegetative community likely contributed to observed population declines in LEPC in these areas. While relatively wide-scale shrub eradication has occurred in the past, geospatial data do not exist to evaluate the extent to which shrub eradication has contributed to the habitat loss and fragmentation for the LEPC.

3.6.2.3 Influence of Anthropogenic Noise

Anthropogenic noise can be associated with almost any form of human activity, and LEPC may exhibit behavioral and physiological responses to the presence of noise. In prairie-chickens, the ‘‘boom’’ call vocalization transmits information about sex, territorial status, mating condition, location, and individual identity of the signaler and, thus, is important to courtship activity and long-range advertisement of the display ground (Sparling 1981). The timing of displays and frequency of vocalizations are critical reproductive behaviors in prairie grouse and appear to have developed in response to unobstructed conditions prevalent in prairie habitat and indicate that effective communication, particularly during the lekking season, operates within a fairly narrow set of acoustic conditions. Prairie grouse usually initiate displays on the lekking grounds around sunrise, and occasionally near sunset, corresponding with times of decreased wind turbulence and thermal variation (Sparling 1983). Considering the narrow set of acoustic conditions in which communication appears most effective for breeding LEPC and the importance of communication to successful reproduction, human activities that result in noises that disrupt or alter these conditions could result in lek abandonment (Crawford and Bolen 1976b). Anthropogenic features and related activities that occur on the landscape can create noise that exceeds the natural background or ambient level. When the behavioral response to noise is avoidance, as it often is for LEPC, noise can be a source of habitat loss or degradation leading to increased habitat fragmentation.

3.6.2.4 Hunting, and Other Recreational, Educational, or Scientific Use

In the late 19th century, LEPC were subject to commercial hunting (Jackson and DeArment 1963, Fleharty 1995, Jensen et al. 2000). Harvest throughout the species’ historical range has been regulated since approximately the turn of the 20th century (Crawford 1980). Currently, the LEPC is classified as a game species in Kansas, New Mexico, Oklahoma, and Texas, although authorized harvest is no longer allowed in any of the States. Most recently in Kansas, LEPC could legally be hunted up until 2014.

A growing recreational activity that has the potential to negatively affect individual breeding aggregations of LEPC is the occurrence of public and guided bird watching tours of leks during the breeding season. The site-specific impact of recreational observations of LEPC at leks is currently unknown, but daily human disturbance could reduce mating activities, possibly leading to a reduction in total production. However, disturbance effects are likely to be minimal at the population level if disturbance is avoided by observers remaining in vehicles or blinds until LEPC naturally disperse from the lek and if observations are confined to a limited number of days and leks. Solitary leks comprising fewer than 10 males are most likely to be affected by repeated recreational disturbance.

Research and monitoring activities such as roadside surveys, aerial surveys, and lek and flush counts that tend to rely on passive sampling rather than active handling of the birds are not likely

to substantially impact the LEPC at the population level, although brief flushing of adults from nests can expose eggs and chicks to predation and extreme temperatures. Aerial surveys, as currently executed, have been shown to result in birds briefly abandoning leks, but are not expected to be a substantial effect (McRoberts et al. 2011a). When birds are flushed, some increased energy expenditure or exposure to predation may occur, but the impacts are anticipated to be minor and of short duration that do not rise to measurable effects at the population level. Studies that involve handling of adults, chicks, and eggs, particularly those involving the use of radio transmitters, also may cause increased energy expenditure, predation exposure, or otherwise impact individual birds. However, such studies typically occur at a relatively small, localized scale, are of short duration, during the lekking rather than nesting season, last no more than a few years, and are not likely to cause an impact to LEPC populations.

3.6.2.5 Collision Mortality from Fences

Fencing is a fundamental tool of livestock management and is often essential for proper herd and grazing management. Fencing is used to confine livestock and prevent them from grazing areas such as public roads, agricultural fields, lands intended for hay production, outside of property boundaries, and those lands enrolled in some types of conservation programs. However, fencing, particularly at higher densities, can contribute to fragmentation of the landscape and hinder efforts to conserve grasslands on a landscape scale (Samson et al. 2004). Fencing can be particularly detrimental to the LEPC in areas, such as western Oklahoma, where initial settlement patterns favored larger numbers of smaller parcels for individual settlers (Patten et al. 2005). Fencing large numbers of small parcels increases the density of fences on the landscape, increasing the potential for LEPC to encounter fences during flight. In addition to direct mortality of LEPC through collisions during flight, fencing can also indirectly lead to mortality by creating hunting perches used by raptors and by facilitating corridors that may enhance movements of mammalian predators (Wolfe et al. 2007). Wolfe et al. (2007,) and Patten et al. (2005) found high proportions of mortality to fence collisions in Oklahoma; however, the majority of studies range-wide have found little evidence that fence collisions are a large contribution to direct mortality of LEPC (Hagen et al. 2007, Grisham and Boal 2015, Kukal 2010, Pirius 2011, Robinson et al. 2016). Therefore, in most areas where the landscapes have not been fenced as intensively as in Oklahoma, fence collision risk is not as high and not likely to result in population level effects.

3.6.2.6 Predation

Predation is a naturally occurring process and generally does not independently pose a substantial risk to wildlife populations, including the LEPC. Natural predation can be a confounding cause for species declines when populations are extremely small, when habitat conditions have been altered to create increased predatory opportunities or increased effectiveness for predators, or when the species has an abnormal level of vulnerability to

predation. The LEPC's cryptic plumage and behavioral adaptations allow the species to persist under normal predation pressures. Lesser prairie-chicken predation varies seasonally during different life stages, with higher predation during the breeding season compared to the nonbreeding season (Boal 2016). Although all age classes of LEPC may experience relatively constant, year-round risk from mammals, higher predation risk is seen during LEPC breeding season in the spring and summer from ravens (*Corvus corax*) and from various species of snakes preying on eggs and young, and during raptor migration seasons in the fall and spring from raptors preying on juveniles and adults (Boal 2016). Adults may be most susceptible to predation while on the lek when birds are more conspicuous. Both Patten et al. (2005) and Wolfe et al. (2007) reported that raptor predation increased with lek attendance. Patten et al. (2005) stated that male LEPC are more vulnerable to predation when exposed during lek displays than they are at other times of the year and that male LEPC mortality was chiefly associated with predation. However, during 650 hours of lek observations in Texas, raptor predation at leks was considered to be uncommon and an unlikely reason for declines in LEPC populations (Behney et al. 2011). Behney et al. (2012) further observed that the timing of lekking activities in their study area corresponded with the lowest observed densities of raptors and that LEPC contend with a more abundant and diverse assemblage of raptors in other seasons.

Rates of predation on LEPC likely are influenced by certain aspects of habitat quality such as fragmentation or other forms of habitat degradation (Robb and Schroeder 2005). As habitat fragmentation increases, usable habitat becomes more spatially restricted and the effects of terrestrial nest predators on grouse populations may increase (Braun et al.1978). Nest predators typically have a positive response (e.g., increased abundance, increased activity, and increased species richness) to habitat fragmentation, although the effects are expressed primarily at the landscape scale (Stephens et al. 2003). Similarly, as habitat quality decreases through reduction in vegetative cover, predation of LEPC nests, juveniles, and adults are all expected to increase. For this reason, ensuring adequate vegetative cover and removing raptor perches such as trees, power poles, and fence posts may lower predation more than any conventional predator removal methods (Wolfe et al. 2007). As discussed prior, existing trees, power poles, transmission lines, fences, and other vertical structures have either contributed to additional predation on LEPC through increase of perches for avian predators, provided movement areas and hunting corridors for other predators, or caused areas of usable habitat to be abandoned by LEPC due to avoidance behavior (Hovick et al. 2014). The data necessary to calculate the total effect of predation on the LEPC does not exist.

3.6.2.7 Parasites and Disease

Although parasites and diseases have the potential to influence LEPC population dynamics, little is known regarding the consequences of parasites or diseases at the LEPC population level (Peterson 2016). Past adverse impacts to LEPC populations have not been observed, although diseases and parasites have been found in LEPC (Peterson 2016). Some degree of impact from

parasites and disease is a naturally occurring phenomenon for most wildlife species and is one element of compensatory mortality (the phenomenon that various causes of mortality in wildlife tend to balance each other, allowing the total mortality rate to remain constant) that operates among many species. However, there is no information that indicates parasites or disease have caused, or contributed to, the decline of any LEPC populations, and, at this time, we have no basis for concluding that disease or parasite loads are a concern to any LEPC populations.

3.6.2.8 Fire

Fire, or its absence, is understood to be one of three major ecological drivers of grasslands in the southern Great Plains, with the remaining two being climate and grazing (Anderson 2006, Koerner and Collins 2014, Wright and Bailey 1982). Fire is an ecological process important to maintaining grasslands by itself and in coupled interaction with grazing and climate. The interaction of these ecological processes results in increasing heterogeneity on grasslands through the creation of temporal and spatial diversity in plant community composition and structure and concomitant response of wildlife (Fuhlendorf and Engle 2001, Fuhlendorf and Engle 2004, Fuhlendorf et al. 2017a). Some landowners working in these landscapes use fire as one of many tools to manage livestock behavior, forage quantity and quality and to increase performance of livestock (Fuhlendorf et al. 2017a). Acknowledging the role and importance of fire, grassland conservation recommendations often promote prescribed fire use and provide incentives to landowners' use of fire through conservation program efforts such as training and education, cost share, and planning assistance.

In general, following settlement of the Great Plains, fire management emphasized fire prevention and suppression, and often knowingly coupled with purposeful grazing pressures that significantly reduce and remove fine fuels (Sayre 2017). This approach, occurring in concert with settlement and ownership patterns that occurred in most of the southern Great Plains, meant that the scale of management was relegated to smaller parcels than historically were affected. Smaller parcels intensively grazed and typically precluded from fire to the maximum extent resulted in landscapes generally transforming from dynamic heterogeneous configurations to largely static and homogenous plant communities. This simplification of vegetative pattern due to decoupling fire and grazing (Starns et al. 2019) is now seen as part of the contribution to changes in the number and size of wildfires and, ultimately, declines in biodiversity in the affected systems (Fuhlendorf and Engle 2001). Fire behavior has also been affected such that these increasingly large wildfires are burning under weather conditions (Lindley et al. 2019) that result in greater burned extent and intensity. These shifts in fire parameters and their outcomes have potential consequences for LEPC, including: (1) larger areas of complete loss of nesting habitat as compared to formerly patchy mosaicked burns; and (2) large scale reduction in the spatial and temporal variation in vegetation structure and composition affecting nesting and brood rearing habitat, thermoregulatory cover, and predator escape cover.

While LEPC evolved in a fire adapted landscape, little research (Thacker and Twidwell 2014) has been conducted on response of LEPC to altered fire regimes. Research completed to date has focused on site-specific responses and consequences. Human suppression of wildfire and the limited extent of fire use (i.e., prescribed fire) for management over the past century has altered the frequency, scale, and intensity of fire occurrence in LEPC habitat. These changes in fire parameters have happened simultaneously with habitat loss and fragmentation, resulting in patchy distribution of LEPC throughout their range. An increase of larger and more intense or severe wildfires as compared to historical occurrences results in increased vulnerability of isolated, smaller LEPC populations. Both woody plant encroachment and drought are additive factors that increase risk of negative consequences of wildfire ignition, as well as extended post-fire LEPC habitat effects. The extent of these negative impacts can be significantly altered by precipitation patterns following the occurrence of the fire (dry periods will inhibit or extend plant community response).

Historically, fire served an important role in maintenance and quality of habitat for the LEPC. Currently, due to a significant shift in fire regimes in the LEPC range, fire use for management of grasslands plays a locally important but overall limited role in most LEPC habitat. Concurrently, wildfire has increased as a threat due to compounding influences of increased size and severity of wildfires and the potential consequences to remaining isolated and fragmented LEPC populations.

3.6.2.9 Insecticides

Concerns over pesticides affecting vertebrate wildlife populations have recently focused on systemic products which exert broad-spectrum toxicity (Gibbons et al. 2014). Recent studies have shown that neonicotinoid insecticides (a class of insecticides that share a common mode of action that targets the central nervous system of insects), which are used within the range of the LEPC, have adverse effects on non-target invertebrate species (Hallmann et al. 2014). Invertebrate constitute a substantial part of the diet of many bird species, including LEPC, during the breeding season and are vital for raising offspring (Hallmann et al. 2014). Although this has not been investigated specifically in relation to LEPC, Hallmann et al. (2014) illustrated that local bird populations in the Netherlands declined by 3.5% annually in areas where there was a higher concentration of the neonicotinoid imidacloprid, and this spatial pattern of decline appeared only after the introduction of imidacloprid in the mid-1990s (even after accounting for spatial differences in land use changes). Use of imidacloprid and clothianidin (two neonicotinoid insecticides) as seed treatments on some crops also poses risks to small birds, and ingestion of even a few treated seeds could cause mortality or reproductive impairment to sensitive bird species (Gibbons et al. 2014). Despite these concerns, we currently have no information that indicates insecticides are influencing LEPC populations.

3.6.2.10 Extreme Weather Events

Weather-related events such as drought, snow, and hailstorms can influence habitat quality or result in direct mortality of LEPC. Although hailstorms typically only have a localized effect, the effects of snowstorms and drought can often be more wide-spread and can affect considerable portions of the LEPC range. Drought is considered a universal ecological driver across the Great Plains (Knopf 1996). Annual precipitation within the Great Plains is highly variable (Wiens 1974), with prolonged drought c apable of causing local extinctions of annual forbs and grasses within stands of perennial species, and recolonization is often slow (Tilman and El Haddi 1992). Grassland bird species in particular are impacted by climate extremes such as extended drought, which acts as a bottleneck that allows only a limited number of individuals to survive through the relatively harsh conditions (Wiens 1974, Zimmerman 1992). Drought also interacts with many of the other factors addressed in this report, such as amplifying the effects of incompatible grazing and predation.

Although the LEPC has adapted to drought as a component of its environment, drought and the accompanying harsh, fluctuating conditions (high temperatures and low food and cover availability) have influenced LEPC populations. Widespread periods of drought commonly result in "bust years" of recruitment. Following extreme droughts of the 1930s, 1950s, 1970s, and 1990s, LEPC population levels declined and a decrease in their overall range was observed (Lee 1950, Ligon 1953, Schwilling 1955, Hamerstrom and Hamerstrom 1961, Copelin 1963, Crawford 1980, Massey 2001, Hagen and Giesen 2020). Additionally, LEPC populations reached near record lows during and after the more recent drought of 2011 to 2013 (McDonald et al. 2017, Fritts et al. 2018).

Although LEPC have persisted through droughts in the past, the effects of such droughts are exacerbated by human land use practices such as incompatible grazing and land cultivation (Merchant 1982 Hamerstrom and Hamerstrom 1961, Davis et al. 1979, Taylor and Guthery 1980a, Ross et al. 2016a) as well as the other factors that have affected the current condition and have altered and fragmented the landscape and decreased population abundances (Fuhlendorf et al. 2002, Rodgers 2016). In past decades, fragmentation of LEPC habitat was less extensive than it is today, and connectivity between occupied areas was more prevalent and populations were larger, allowing populations to recover more quickly; in other words, LEPC populations were more resilient to the effects of stochastic events such as drought. As LEPC population abundances decline and usable habitat declines and becomes more fragmented, their ability to rebound from prolonged drought is diminished. We are not able to quantify the impact that severe weather has had on the LEPC populations, but, as discussed above, these events have shaped recent history and influenced the current condition for the LEPC.

3.7 Range-wide Survival and Recovery Needs

Lesser prairie-chicken populations need large tracts of relatively intact native grasslands to ensure persistence. Significant threats to the LEPC include habitat loss, modification, degradation, and fragmentation within its range. In order to address the long-term conservation of the LEPC, the Service suggests implementation of overarching management goals to address the primary challenges facing the species. The Service believes that in order to increase LEPC viability that large-scale, strategic, restoration of native grasslands in the southern Great Plains, that increases in the amount of large intact grassland will be required and should be prioritized. Additional information regarding recovery needs by DPS can be found in the Recovery Outline for the LEPC (USFWS 2023b).

4 ENVIRONMENTAL BASELINE

Regulations implementing the Act (50 CFR 402.02) define the environmental baseline as the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline.

In addition to the efforts occurring through CRP (including existing contracts signed prior to completion of the opion), there are several Federal programs that currently provide conservation benefits to the species within the action area and directly address threats to the LEPC. Certain programs provide technical and financial assistance to landowners for habitat management for LEPC. Some of these efforts include the NRCS's Working Lands for Wildlife, the Service's Partners for Fish and Wildlife Program in all five LEPC States, the U.S. Forest Service (USFS) Cimarron and Comanche National Grasslands management, and the BLM Lesser Prairie-Chicken Habitat Preservation Area of Critical Environmental Concern. These existing Federal conservation programs provide an overall conservation benefit to the LEPC across its range. In addition to the current benefits being provided by these programs, the Services' LEPC SSA (USFWS 2022) projected the benefits of these efforts to the LEPC over the next 25 years at different levels of intensity across each of the four ecoregions occupied by the LEPC. Additionally, there are multiple LEPC State-led and private conservation efforts ongoing across the range of the LEPC, including, but not limited to, the Range-Wide Lesser Prairie-Chicken Conservation Plan and associated oil and gas Candidate Conservation Agreement with Assurances (CCAA), the Texas agricultural CCAA, the Oklahoma agricultural CCAA, the

Candidate Conservation Agreement (CCA) and CCAA covering agricultural and oil and gas activities in New Mexico, conservation actions by the State fish and wildlife agencies, and by the Nature Conservancy (TNC). For a complete description of the current and projected future benefits of these programs, please refer to the Services' LEPC SSA (USFWS 2022).

Because the action area includes the entire range of the LEPC, refer to Section 3 Status of the Species of this opinion for a description of the Status of the Species in the action area.

4.1 CRP Accomplishments To Date

Conservation practices available through CRP provide for the establishment, maintenance, management, and improvement of LEPC habitat. The CRP has provided many positive benefits (discussed in Section 5.2) to LEPC habitat through the implementation of various conservation covers available through the program. Acres of conservation practices currently being applied across the landscape are provided in Table 4.1. These impacts are part of the environmental baseline.

Table 4.1. Acres of conservation practices being applies across the landscape.

Conservation Practice Code	Acres in mixed-grass	Acres in sand sagebrush	Acres in shortgrass	Total acres in northern DPS	Acres in shinnery oak	Total acres in southern DPS	Total acres
CP1	75,203	67,438	343	142,984	145,894	145,894	**288,878**
CP2	240,415	854,110	57,129	1,151,654	559,983	559,983	**1,711,637**
CP4B	0	15	0	15	0	0	**15**
CP4D	63,397	221,279	68,739	353,415	0	0	**353,415**
CP5A	243	5	138	386	0	0	**386**
CP8A	322	120	1,508	1,950	40	40	**1,990**
CP9	0	0	4	4	0	0	**4**
CP10	379	0	10	389	2,953	2,953	**3,342**
CP12	494	225	283	1,002	183	183	**1,185**
CP15A	0	12	999	1,011	50	50	**1,061**
CP16A	34	4	142	180	0	0	**180**
CP17A	2	0	7	9	0	0	**9**
CP18	139	0	0	139	0	0	**139**
CP21	88	0	1,065	1,153	0	0	**1,153**
CP22	78	0	0	78	0	0	**78**
CP23	1,214	118	109	1,441	1,584	1,584	**3,025**
CP23A	1,704	1,736	1,662	5,102	13	13	**5,115**
CP24	0	0	35	35	0	0	**35**
CP25	42,487	96,700	208,474	347,661	0	0	**347,661**
CP27	172	13	66	251	0	0	**251**
CP28	284	36	89	409	0	0	**409**
CP33	3,169	1,473	3,134	7,776	8,748	8,748	**16,524**
CP38B & CP38E	46,808	127,396	108,434	282,638	142,094	142,094	**424,732**
CP42	154	2,469	643	3,266	1,320	1,320	**4,586**

CP43	0	0	65	65	0	0	**65**
CP87	15	919	0	934	1,178	1,178	**2,112**
CP88	82,488	491,619	42,626	616,733	106,148	106,148	**722,881**

4.1.1 CRP Science Support Component

The USDA Farm Service Agency and the Farm Production and Conservation Business Center have initiated a research project to examine the effects of haying and grazing (both emergency and non-emergency) on CRP vegetation structure and composition within LEPC habitat. Impacts from this action are part of the environmental baseline. This project will:

- Determine if existing conservation planning with prescribed grazing are producing the desired vegetation composition and structure favorable to the LEPC; and
- Determine if existing emergency haying and grazing provisions affect vegetation composition and structure in a manner that is favorable to the LEPC.

Upon completion of the study, FSA will utilize the results to inform policy decisions regarding haying and grazing allowances and revisit the conservation measures developed through this section 7 process to ensure any implemented conservation measures are appropriate for the impacts measured during field verification.

4.1.2 Expected Conservation Outcomes

The long-term goal of CRP is to re-establish valuable land cover to help improve water quality, prevent soil erosion, and reduce loss of wildlife habitat. Implementation of the proposed action is expected to reduce the threats to the LEPC and improve its conservation status. The targeted benefit of this action is to restore and maintain habitat and, therefore, improve the status of the species on private lands that were farming and ranching operations, while the landowner receives CRP cost share and technical assistance. The proposed action is expected to benefit the LEPC by maintaining, enhancing, and restoring populations and their habitats as well as by reducing the threats of direct mortality. Landowners who are interested in participating in the CRP within the occupied range of the LEPC will restore, manage, and enhance conservation covers which benefit LEPC. Recent research in Kansas has shown that participation in CRP can mitigate losses of grasslands (Spencer et al. 2017). As identified by many authors (Ross et al. 2016b, Hagen and Elmore 2016, Spencer et al. 2017, Sullins et al. 2019) maintaining grassland in large blocks (<10% cropland) is vital to conservation of LEPC.

The overall CRP benefit to LEPC is affected by the number of enrolled acres in the region. The spatial extent of CRP varies from year-to-year and depends on the program's statutory authority and prevailing economic conditions. The CRP cover quality also affects benefits. Except for Kansas and Colorado, most of the early CRP conservation covers used nonnative grasses as the predominant cover type established on enrolled lands. As the program evolved since its inception in 1985, use of native grasses as the predominant cover type has been encouraged,

resulting in even greater benefit for LEPC (FSA 2016). Use of native grasses in the CRP potentially creates suitable nesting and brood rearing habitat for the LEPC depending on subsequent management activity and larger landscape characteristics. In addition to the type of cover is established on CRP enrollments, maintenance of that cover (e.g., preventing encroachment of eastern red cedar and mesquite) is critical and has been of some concern.

The vast majority of CRP maintenance and management activities are conducted outside of primary nesting and brood rearing season further reducing the likelihood of LEPC mortality or injury. As recently shown in the northern extent of the LEPC range, areas enrolled in CRP were 7 times more likely to be used by LEPC (Sullins 2017). The positive population response to the restored and enhanced habitat conditions created by the proposed action is expected to more than compensate for the limited mortality that may occur. The CRP, along with the myriad of other public and private initiatives and related assistance, will likely encourage more willing farmers and ranchers to restore and manage habitat in the quantity and quality needed by the LEPC.

4.2 Federally Listed, Proposed, and Candidate Species within the Action Area

Many of the practices implemented will have little or no effect on the other listed, proposed, and candidate species within the action area, and some practices will benefit these other species. The LEPC is the only listed species covered by this Opinion. Being that this Biological Opinion only covers the LEPC, practices implemented through CRP that may affect other listed species will still need a separate individual or programmatic section 7 consultation to cover any potential impacts.

5 EFFECTS OF THE ACTION

In accordance with 50 CFR 402.02, effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of all other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (see §402.17).

Some of the actions associated with implementing the CRP will adversely effect individual LEPC, but the overall benefits of the program will likely outweigh the identified adverse effects, including incidental take. Appendix C provides a comprehensive narrative of each of the CRP activities and associated technical practice standards in this biological opinion, its purpose, the identification of any potential adverse effects and description of expected beneficial effects, and the identification of the appropriate conservation measure(s).

5.1 Potential Adverse Effects of the Action

5.1.1 Adverse Effect: (I) Physical disturbance (including noise)

All covered CRP activities and associated technical practice standards, either directly or indirectly, have the potential to produce some level of physical disturbance because they involve the physical presence of humans, livestock, and/or associated equipment, vehicles, or machinery within suitable LEPC habitat. Further, future periodic disturbances have the potential to occur in suitable habitat, as maintenance and management of established CRP cover is needed over the length of the CRP contract.

Although effects are not quantitatively known, the literature suggests that some form of physical effects from presence and associated noise will create a disturbance response by individual birds. Most of this disturbance, however, will be localized to the immediate area where the work is occurring and is expected to be of limited duration and temporary in nature.

A particular concern is physical disturbance during the LEPC breeding, nesting, and brood-rearing season. The bird's response ("flushing"/escape behavior) may place individual birds at greater risk to predation when they leave cover. If the equipment and actions occur close to occupied nests, the female may abandon the nest for some indeterminate period or permanently. The net effect of the physical disturbance and associated noise may be a localized reduction of survival or productivity, avoidance of otherwise suitable habitat, and/or reduction of breeding frequency. The presence of livestock may also create physical disturbance to LEPC. Adverse consequences of grazing include livestock flushing individuals from nests, removing nest cover, and trampling of LEPC nests. Although the effect of trampling at a population level is unknown, outright nest destruction has been documented. For example, Pitman et al. (2006a) quantified nest loss over 6 breeding seasons and identified 1.9 percent of nests lost (n = 161) to trampling by livestock. The presence of livestock potentially could cause LEPC to abandon their nests but has not been documented.

Disturbance of some individual LEPC may occasionally occur from feeding, calving, and herding of livestock. These effects are expected to rarely occur and are not expected to produce significant changes in species distribution and abundance. However, some small level of impact is expected. While general and continuous CRP have PNS dates that restrict grazing activities, Grassland CRP allows grazing, haying (in some cases), and associated management and maintenance activities to occur throughout the PNS. Therefore, acres enrolled in Grassland CRP are expected to result in more frequent physical disturbances than acres enrolled in general or continuous CRP but those effects are not expected to rise to the level of take.

With respect to physical disturbance and associated noise, normal and routine use of equipment necessary to maintain ranching and farming operations is not considered to be a significant source of adverse effects to the species. Conservation measures were specifically developed to

minimize physical disturbances to LEPC during the critical breeding, nesting, and brood-rearing season.

The adverse effects of these activities are expected to be localized and temporary, and the use of conservation measures will further reduce the risks of adverse effects at the scale upon which populations or the species will be negatively impacted. On balance, the anticipated benefits of establishing, maintaining, and managing conservation cover through installation and application of a particular technical practice standard under CRP are expected to exceed the temporary adverse effects created from their installation.

5.1.2 Adverse Effect: (II) Temporary soil disturbance and vegetation removal and (III) Increased potential of introduction of invasive plants

Temporary soil disturbance and vegetation removal are expected to result from the implementation of most of the conservation covers and technical practices. This disturbance may result in loss or fragmentation of suitable LEPC habitat and increase the potential for invasive plants to become established or spread within the action area, thus degrading the quality of the habitat. For purposes of this analysis, these two conservation issues have been combined into a single discussion of their potential adverse effects. Sources of the disturbance would include use of equipment (post-hole diggers, tractors, and other machinery) as well as practices that involve the planting or manipulation of vegetation (examples such as establishment or enhancement of conservation cover, vegetation management, nutrients and soil amendments, and prescribed burning). Common potential adverse effects include degradation of habitat conditions and the potential for increased habitat fragmentation if the scale of the disturbance is large enough and the potential to create opportunities for colonization of these disturbed sites by invasive plants.

The Southern Great Plains has a long fire history. When conducted properly, prescribed burns can increase bare ground and forbs density and maintain low-ground woody cover as well as native grass stands. Prescribed burning can alter habitat structure, removing standing vegetation, producing sparse, low growing grasses, and increasing visibility preferred by displaying males. Prescribed burning can also be used to increase forb production and density providing brood rearing habitat for up to two years following a burn. While prescribed burning can adversely affect nesting habitat if improperly done, by following the conservation measures included in Appendix A, minimal impacts to nesting habitat are expected. The short-term effects expected from prescribed burning are the temporary loss of quality habitat until cover is re-established. These short-term negative impacts are greatly outweighed by the improved habitat quality once re-established. Additionally, prescribed burning will typically only take place once throughout the contract period. Burning plans should be cognizant of vegetative types, fuel loads, topography, and climatic conditions and may call for portions of fields to be left unburned.

Herbicides are an effective, economical, and efficient method for controlling brush and weeds that encroach into LEPC habitat. LEPC habitat quality declines as trees and brush begin to dominate sites. Controlling eastern red cedar and honey mesquite helps to restore native plant communities by removing non-native, tall, vertical trees and shrubs. Removing the vertical structure increase grassland health and reduce predation. But removing trees and brush is sometimes difficult with the use of fire only, and chemical or mechanical treatment is sometimes necessary, and can be costly. Herbicide application to remove eastern red cedar and honey mesquite will not likely result in any adverse effects though because LEPC are known to avoid areas which have been invaded by these species.

The CRP activities analyzed that could produce these potential sources of adverse effect (temporary soil disturbance and vegetation removal and increased potential of introduction of invasive plants) will be implemented to establish, maintain, and manage acres enrolled in CRP to meet the conservation needs of the LEPC. The net effect will be that the installation, maintenance, and management of these practices may result in short-term disturbance but produce long-term habitat restoration, maintenance, and enhancement gains for the LEPC.

That said, the use of the conservation measures is expected to minimize the short-term adverse effects of establishing, maintaining, and managing CRP conservation cover and the action of returning CRP acres to cropland. Conservation measures have been developed to manage the risk of soil erosion as well as the risk of invasive plants. A restoration strategy using native plants appropriate to the ecological site will be used to provide a temporary buffer in the establishment of native vegetation which will further ameliorate these potential adverse effects.

Further, the long-term and landscape benefits of providing quality CRP conservation cover in priority areas for LEPC as conditioned by the conservation measures are expected to exceed any temporary adverse effects created from cover establishment and management.

5.1.3 Adverse Effect: (IV) Return to cultivated cropland

While there will certainly be adverse effects resulting from decisions by CRP participants to return enrolled acres back to cropland after contract expiration, conservation measures will be implemented to minimize those adverse effects. Specifically, most conversion activities, such as land and seedbed preparation, will be required to occur outside of the breeding and nesting period for the LEPC.

Upon contract expiration landowners have a variety of options regarding future activities on the expired acres, including actions that would maintain those lands in cover as well as converting those lands back to cropland. The decision regarding future activities on these lands will be driven by a variety of factors which vary both temporally and spatially, including, but not limited to, commodity prices. In the past, most of the lands removed from CRP returned to grassland. An evaluation of imagery from the National Agricultural Statistic Service's (NASS) Cropland

Data Layer across the five LEPC inhabited states showed that land that was in CRP in 2008, but not in 2018, was still in grass on 58 percent of the acreage. Colorado accounted for the largest percentage return (63 percent) to cropland production during this period, while Oklahoma accounted for the largest percentage of retention at 77 percent (Sullins 2021).

Across the entire LEPC range, a 2012 survey estimated that, of CRP acreage that expired during the period of 2008 through 2011, 73 percent of the acres in Colorado, 90 percent of the acres in Kansas, 97 percent of the acres in New Mexico, 90 percent of the acres in Oklahoma, and 80 percent of the acres in Texas, were still in grass. Former CRP fields in Kansas that had expired from the program prior to 2008 were compared to 2010 National Agriculture Imagery Program aerial imagery, and 86 percent of the former CRP acreage was still in grass. Not only were these acres still in conservation cover, but the native grass covers were also located in areas identified of significant conservation need for LEPC.

In an effort to minimize the detrimental effects for acreage which landowners want to convert back to cropland, landowners will defer early land preparation or destruction of CRP conservation covers during the final year of the CRP contract until after the primary nesting and brood rearing season for the LEPC (2-CRP Rev. 6, Para. 636A)(FSA 2023).

The temporary adverse effect of returning conservation covers to cropland on LEPC habitat can include increased levels of stress hormones, increased recesses during incubation (i.e., may increase detection by predators and predation risk), or disturbance/flushing of young broods. The latter may increase predator detection and predation risk as chicks increase the frequency of calling in attempt to rejoin with their brood and hen. If these risks are realized, individual fitness is reduced and may have population level effects if disturbance is over a broad enough spatial or temporal scale.

Long-term adverse effects from converting CRP lands back to crop production is related directly to habitat loss and fragmentation which is identified as the primary threat to the species and will depend on the location and type of CRP cover that is converted back to cropland. Some of these detrimental effects may be offset by the targeted enrollment and re-enrollment of high-quality CRP acreage across the landscape as part of the proposed action. The total acres enrolled in CRP throughout the LEPC range has remained in excess of 3.5 million acres since 1998.

While this conversion back to agricultural production has the potential to result in adverse effects, the overall benefits of the program will drastically outweigh these impacts as any perceived increase in regulatory risk for producers may result in lower new enrollments and further decrease habitat available for LEPC.

5.1.4 Adverse Effect: (V) Permanent removal/loss of suitable habitat

This adverse effect is a result of permanent removal of LEPC habitat conditions and specific vegetative loss caused by the installation of the technical practice standard or the expectation that, once implemented, permanent degradation of habitat conditions for the LEPC will have resulted. Certain practices (e.g., firebreak, watering facility, spring development, and fence) included as part of this proposed action have the potential to result in the permanent removal/loss of habitat for the LEPC.

The primary adverse effect is the permanent loss of foraging, brooding, and nesting habitat which can lead to a reduction of available habitat. Maintaining large areas of suitable habitat with appropriate connectivity is essential to LEPC persistence (Giesen 1998, Bidwell et al. 2002, Hagen et al. 2004) and small-scale removal of habitat, while resulting some potential effects, will be insignificant if conservation measures are followed due to the scale and availability of suitable habitat adjacent to these actions. Actions involving the small-scale removal of habitat are essential to the implementation of the overall program, which provides significant, overall benefits to the species.

Habitat conversion to non-agricultural usage, such as wind energy development, is permissible on CRP lands but is not covered under this Biological Opinion and would require project specific consultation if the action would result in effects to the LEPC. Consequently, any permanent loss of habitat and increases in rate/extent of habitat fragmentation under the CRP activities and associated conservation practices implemented as described in the proposed action is expected to be localized and minor.

Most of the structural practices will produce localized losses, which can be minimized using the identified recommended conservation measure(s). The conservation measure(s) focus on design and planning aspects of the practice to avoid large expanses of habitat loss especially from linear practices. These practices are essential to the implementation of the overall conservation program, which provides significant benefits to the species. Implementation of the conservation measures are expected to result in minimization of adverse effects to the LEPC and, as a result, in most cases take will not be likely.

The long-term and cumulative benefits of installation and application of the conservation activities and technical practice standards as conditioned by the conservation measures are expected to exceed the temporary expected adverse effects created from their installation. Further, the use of the conservation measures will ensure that the species habitat is maintained or improved following application. Cumulatively, the expected species response is anticipated to be positive as the extent of adverse effects are not expected to occur at the scale necessary to adversely impact population trends or to result in significant additional habitat fragmentation effects.

5.1.5 Adverse Effect: (VI) Increased potential of accidental mortality to individuals

Several technical practice standards (e.g., Watering Facility, Forage Harvest Management, Cover Crop, and Fencing) may result in mortality or injury to individual birds. These include accidental mortality from drowning in livestock water tanks, striking a fence, or vehicle collision. Any mechanized equipment operating at intensive levels in LEPC habitat has the potential to create harm to individual birds as a result of accidental collisions with birds.

Currently cost share will not be provided to install fence unless required to exclude livestock from CRP riparian plantings under general and continuous CRP. Grassland CRP does provide cost share for interior fencing. As very few riparian plantings were implemented across the occupied range of LEPC with CRP assistance, direct mortality from fencing associated with CRP is not expected to have a population level effect on the LEPC.

The use of specific conservation measures focusing on design, timing, and method of operation of machinery and the placement and management of water features (such as the use of escape ramps and individual site selection for proper placement) to reduce mortality risk is expected to significantly reduce the potential adverse effects of these technical practice standards.

Cumulatively, the use of the recommended conservation measures is anticipated to provide a net positive conservation outcome to the species, created through removal of existing fences in essential habitat features such as leks, the installation of escape ramps, and modifications of the installations of the other affected technical practice standards.

5.1.6 Adverse Effect: (VII) Increased potential for predation

Implementation of conservation measures will address the potential for predation to the species as direct or indirect consequence of implementation of the proposed action. Certain technical practice standards may increase the potential for predation on individual birds through the installation of structures or modifying existing habitat conditions. For example, some installed practices may create habitat for raptor perching. In addition, some practices will temporarily reduce available cover and food sources, making LEPCs more vulnerable to predation. Finally, the presence of humans during practice installation can temporarily create an artificial food source for predators (i.e., trash attracts predators such as foxes, coyotes, badgers). The affected conservation practice standards include those that involve the creation or maintenance of infrastructure or habitat manipulations associated with establishment, maintenance, and management of CRP lands.

The identified conservation measures suggest modifications to the design of fences, management of brush piles, and avoiding the use of tall structures in the species' habitat to the extent possible and practicable. Removing raptor perches such as trees, power poles, and fence posts is likely to lower predation risk more than any conventional predator removal methods (Wolfe et al. 2007).

Conservation measures are anticipated to effectively reduce the risk of predation at the local and landscape scale to the extent that adverse effects, if any occur, would be insignificant or discountable.

5.1.7 Adverse Effect: (VIII) Disturbance and modification of habitat resulting from grazing

The application of the technical management practice Prescribed Grazing (528) for non-emergency, emergency, and other grazing uses of CRP has the potential to create conditions for temporary soil disturbance and vegetation removal and increased potential of introduction of invasive plants. Temporary adverse effects on individuals can include increased levels of stress hormones, increased recesses during incubation (i.e., may increase detection by predators and predation risk), or disturbance/flushing of young broods. The latter may increase predator detection and predation risk as chicks increase the frequency of calling in attempt to rejoin with their brood and hen. If these risks are realized, individual fitness is reduced and may have population level effects if disturbance is over a broad enough spatial or temporal scale.

Improperly conducted emergency grazing of lands enrolled in CRP can impair winter thermal, predator avoidance, and nesting habitat covers for LEPC and other wildlife temporarily following the activity. Severity of the drought can reduce the ability of the plant species on-site to recover from the emergency grazing activity in a timely manner and can result in less than favorable habitat conditions and increased LEPC winter kill, loss to predators, and fewer nests and chicks the following years.

Collectively, these adverse effects can produce impacts to individual birds as well as at the population level. The primary adverse effect is the potential for habitat degradation from unsustainable or unmanaged livestock grazing – specific to temporary loss of nesting and brood-rearing habitat. A secondary adverse effect is the opportunity created for invasion of undesirable plants during practice implementation.

To address potential adverse effects, a prescribed grazing plan will be designed and implemented in accordance with the identified conservation measures and recommendations. The measures relating to timing, frequency, intensity and duration, and the targeting of stocking rates which produce a desired vegetative response that, upon implementation, will ensure that a diversity of plants and cover types, including shrubs, remain on the landscape.

CRP prescribed grazing plans will allow for all life requirements of the LEPC to be present at the landscape level. It is recognized that, dependent upon the grazing design, patch grazing will occur. Patch grazing will result in areas within individual units where the goal is to obtain nesting habitat and some areas for brood rearing which may lead to areas that provide for only one life history stage but combined across the landscape provide for the entire life history needs.

The prescribed grazing plan allows for these diverse areas which will create a mosaic across smaller management units of necessary LEPC habitat.

The outcome of a prescribed grazing plan will ensure livestock utilization levels leave sufficient cover in the spring to ensure that LEPC nests are adequately concealed from predators, while also providing appropriate brood rearing habitat. Although some level of adverse effect is anticipated from livestock operations in the short-term, the long-term benefits will maintain or, after application, improve habitat and the expected species response will be positive.

5.1.8 Adverse Effect: (IX) Disturbance and modification of habitat resulting from haying or harvesting

The application of the technical management practice Forage Harvest Management (511) for non-emergency, emergency, and other haying uses of CRP has the potential to create conditions for temporary soil disturbance and vegetation removal and increased potential of introduction of invasive plants. Additionally, vegetation removal may result in loss of habitat on a temporary basis. Other temporary adverse effects on individuals can include increased levels of stress hormones, increased recesses during incubation (i.e., may increase detection by predators and predation risk), or disturbance/flushing of young broods. The latter may increase predator detection and predation risk as chicks increase the frequency of calling in attempt to rejoin with their brood and hen. If these risks are realized, individual fitness is reduced and may have population level effects if disturbance is over a broad enough spatial or temporal scale. Improperly conducted haying of lands enrolled in CRP can impair winter thermal, predator avoidance, and nesting habitat covers for LEPC and other wildlife temporarily following the activity. Severity of the drought can reduce the ability of the plant species on-site to recover from the emergency haying activity in a timely manner and can result in less than favorable habitat conditions and increased LEPC winter kill, loss to predators, and fewer nests and chicks the following spring.

Collectively, these adverse effects can produce impacts to individual birds as well as at the population level. The primary adverse effect is the potential for habitat loss from unsustainable or unmanaged haying operations – specific to temporary loss of nesting and brood-rearing habitat. A secondary adverse effect is the opportunity created for invasion of undesirable plants during practice implementation.

To minimize potential adverse effects, a Conservation Plan that includes specific measures for haying and harvesting will be designed and implemented in accordance with the identified conservation measures and recommendations. Technical practice Forage Harvest Management (511), and its associated conservation measures, must be included within the plan. The measures relating to timing, frequency, intensity, and duration will ensure that a diversity of plants and cover types, including shrubs, remain on the landscape. Additionally, harvesting or haying must

not occur within the primary breeding and nesting period, for core counties, as outlined in the conservation measures included in Appendix A.

5.2 Beneficial Effects

The long-term goal of CRP is to re-establish valuable land cover to help improve water quality, prevent soil erosion, and reduce loss of wildlife habitat. Implementation of the proposed action is intended to eliminate or reduce the threats to the LEPC habitat and to improve its conservation status. The targeted benefit of this action is to enhance habitat and therefore, improve the status of the species on private lands engaged in traditional farming and ranching operations and receiving CRP cost share and technical assistance. The proposed action is expected to benefit the LEPC by maintaining, enhancing, and restoring populations and their habitats as well as by reducing the threats of direct mortality. Landowners who are interested in participating in the CRP within the occupied range of the LEPC will be agreeing to restore, manage, and enhance conservation covers to benefit LEPC. Recent research in Kansas has shown that participation in CRP can mitigate losses of grasslands (Spencer et al. 2017). As identified by many authors (Ross et al. 2016b, Hagen and Elmore 2016, Spencer et al. 2017, Sullins et al. 2019) maintaining grassland in large blocks (<10% cropland) is vital to conservation of LEPC.

The overall CRP benefit to LEPC is affected by the number of enrolled acres in the region. The spatial extent of CRP varies from year-to-year and depends on the program's statutory authority and prevailing economic conditions. CRP cover quality also affects benefits. Except for Kansas and Colorado, most of the early CRP conservation covers used nonnative grasses as the predominant cover type established on enrolled lands. As the program evolved since its inception in 1985, use of native grasses as the predominant cover type has been encouraged, resulting in even greater benefit for LEPC (FSA 2016). Use of native grasses in the CRP potentially creates suitable nesting and brood rearing habitat for the LEPC depending on subsequent management activity and larger landscape characteristics. In addition to what type of cover is established on CRP enrollments, maintenance of that cover (e.g., preventing encroachment of eastern red cedar and mesquite) is critical and has been of some concern.

The vast majority of CRP maintenance and management activities are conducted outside of primary nesting and brood rearing season further reducing the likelihood of LEPC mortality or injury. As recently shown in the northern extent of the LEPC range, areas enrolled in CRP were 7 times more likely to be used by LEPC in landscapes receiving 22 in (55 cm) of average annual precipitation as compared to 28 in (70 cm) (Sullins 2017). The positive population response to the enhanced habitat conditions created by the proposed action is expected to more than compensate for the limited mortality that may occur. The CRP, along with the myriad of other public and private initiatives and related assistance, will encourage more willing farmers and ranchers to create, restore and manage habitat in the quantity and quality needed by the LEPC.

5.3 CUMULATIVE EFFECTS

Cumulative effects include the impacts of future State, local, or private actions that are reasonably certain to occur in the action area (50 CFR 402.02). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Because most of the land (approximately 95 percent) in the occupied range of the LEPC is in private ownership, future land use decisions by farmers and ranchers will have the greatest impact on LEPC habitat. These private actions will be influenced by economic and climactic factors, including drought, fluctuating crop commodity prices, and oil, gas, and wind energy development.

As described in this Biological Opinion, farming and ranching practices can be compatible with LEPC conservation efforts and produce beneficial effects to the species. However, the conversion of native prairie, rangeland or other non-CRP grassland habitat to cropland or development will have adverse cumulative effects on LEPC.

Some areas of the southern Great Plains have significant oil and natural gas deposits, which when developed have been reported to cause impacts to LEPC. Concern continues that increased densities of wells in the area will result in further reduced LEPC populations. Hunt (2004) found a higher number of abandoned leks near active well sites and Plumb et al. (2019) found higher use within home ranges farther from wells, roads, and powerlines. Roads, power lines, pipelines, compressor stations, and other structures all add to the adverse cumulative effects of oil and gas development on LEPC populations. However, there are several conservation planning efforts mentioned in the environmental baseline section of this opinion that include measures aimed at reducing impacts of oil and gas development described above.

Known for its steady, and sometimes intense, winds, the southern Great Plains are currently experiencing significant wind energy and associated infrastructure development. Wind developments include turbines to harness the energy, access roads, and transmission lines. Physical disturbance during construction and operation of wind turbines have the potential to disturb nesting LEPC. Behavioral avoidance of such areas by LEPC has the potential to further exacerbate habitat fragmentation concerns. However, there are several conservation planning efforts mentioned in the environmental baseline that include measures aimed at reducing impacts of wind energy development described above.

5.4 SUMMARY OF EFFECTS

Implementation of the proposed action is intended to create, conserve, and improve grasslands across the range of LEPC. The proposed action, in conjunction with the integrated use of the conservation measures, is expected to benefit the LPC by restoring, maintaining, and enhancing

LEPC habitat. The application of the conservation measures included within this Biological Opinion is expected to reduce the adverse effects associated with the implementation of the identified conservation practices. Landowners who are interested in participating in CRP agree to contribute to the establishment and/or maintenance of LEPC habitat on enrolled lands through implementation of the conservation practices and associated conservation measures identified in their conservation plan. This will result in restoration and maintenance of LEPC habitat through either: the conversion of cropland to grassland; maintaining grassland through reenrollment of expiring contracts; and the implementation of grazing practices and land management measures, incentivizing long-term retention and management of grasslands. If the CRP were not an available option for landowners, economics of landownership would decrease the likelihood cropland being converted to grasslands and would remove incitives for landowners to maintain existing grasslands which would result in the increased the likelihood of the conversion of existing grassland to cropland. Benefits to multiple grassland species are realized through incentivizing grassland management opportunities, including implementing conservation practices and land management measures.

Conservation measures are designed to maintain and enhance habitat and decrease loss and fragmentation of LEPC, which is the greatest threat to LPC. Conservation measures also include commitments to reduce direct mortality and conserve the natural landscape attributes required by the species. Implementation of the proposed action will encourage large expanses of connected private landscapes that will be involved in habitat restoration and/or management, subsequently providing a substantial conservation benefit for the species. Because the species' persistence is dependent almost exclusively upon private lands, private lands programs that are consistent with private landowners, as well as the LEPC, are essential to conservation of the species.

Through the individual and cumulative application of the proposed action as designed (including the incorporation of the conservation measures), the Service believes that the extent and occurrences of adverse effects will be minimized and off-set by the creation of and maintaince of LEPC habitat through conservation practices designed to be compatible with and support the life history and requirements of the LPC while maintaining a healthy grasslands ecosystem.

We expect that the incidental take will be in the form loss of nests and death or injury resulting from fence collisions during conservation practice installation, operation, and maintenance. For some conservation practices, such as Haying and Prescribed Burning, incidental take is expected to primarily occur only during the initial phase of practice implementation. The scale of the effect will be landscape specific but will most likely involve the injury of inviduals and destruction of nests and loss of eggs. For some conservation practices, such as Fence Establishment and Prescribed Grazing, some level of incidental take is expected over the life of the practice and will involve trampling of nests and eggs by cattle as well as fence collisions. Lastly, incidental take will result from conversion of grassland back to cropland when contracts

expire. The effects of grassland conversion to cropland will be in the form of habitat loss and fragmentation, which is the primary threat to the LEPC.

The conservation benefits of implementation of the proposed action will result in restoration, enhancement, and maintenance of LEPC habitat that will outweigh short-term negative impacts to individual and local populations of LEPC. The implementation of the proposed action will: manage the threats that adversely affect populations; create more LEPC habitat; reduce LEPC habitat fragmentation; and result in more habitat under the appropriate management prescriptions. Lesser prairie-chicken rely upon a diversity of habitat types within large, interconnected landscapes rather than a single specific habitat to persist. The proposed action contributes to conservation of the species by addressing habitat loss and fragmentation as well as assisting landowners with grazing management.

Land management in the range of the LEPC has been heavily influenced by natural and economic forces. The arid ecosystem where the LEPC lives is characterized by climatic extremes - from droughts to flash floods and extreme heat to bitter cold. Economic factors including fluctuating crop commodity prices, the price of oil, wind energy leases, and the development of high-capacity transmission lines continue to impact landowners. While future conditions cannot be predicted, it is safe to assume that climatic and economic extremes may impact the ability to conserve and manage LEPC populations.

Cumulatively, the Service finds that effective implementation of conservation practices and associated conservation measures are anticipated to result in a positive population response by the species. This positive response is expected as threats are reduced; notably in addressing habitat loss and fragmentation and improvement of habitat conditions across the landscape.

Further, the proposed action is expected to limit unfavorable impacts to the species, and to restore, maintain, and enhance habitat at both the population and landscape level. In conclusion, the anticipated levels of adverse effects are more than offset by the implementation of conservation practices for the benefit of LEPC as modified by the agreed-upon conservation measures.

6 EFFECTS DETERMINATION

6.1 Analytical Framework for the Jeopardy and Adverse Modification Determinations

6.1.1 Jeopardy Determination

In accordance with policy and regulation, the jeopardy analysis relies on four components:

(1) the Status of the Species, which evaluates species' range-wide condition, the factors responsible for that condition, and its survival and recovery needs;

(2) the Environmental Baseline, which evaluates the condition of listed species in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of listed species;

(3) the Effects of the Action, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on listed species; and

(4) Cumulative Effects, which evaluates the effects of future, non-Federal activities in the action area.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of LEPC in the wild.

The jeopardy analysis places an emphasis on consideration of the survival and recovery needs of LEPC and the role of the action area in the survival and recovery of LEPC as the context for evaluating the significance of the effects of the proposed Federal action, taken together with cumulative effects and status of the species, for purposes of making the jeopardy determination. This Biological Opinion includes a jeopardy analysis for both the Northern DPS and the Southern DPS of the LEPC.

6.1.2 Adverse Modification Determination

Neither the Northern DPS nor the Southern DPS of the LEPC has proposed or designated critical habitat. Therefore, the Service will not be evaluating the effects of the proposed action on this feature of LEPC conservation needs or providing regulatory effects determination under section 7 of the ESA.

6.2 Jeopardy/No-Jeopardy Determination

After reviewing the current status of the LEPC in the Northern DPS, the environmental baseline, the effects of the proposed action and cumulative effects for this area, it is our biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the Northern DPS of the LEPC. We anticipate that the implementation of the proposed action will not appreciably diminish the likelihood of both the survival and recovery of the Northern DPS of the LEPC.

After reviewing the current status of the LEPC in the Southern DPS, the environmental baseline, the effects of the proposed action and cumulative effects for this area, it is our biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the Southern DPS of the LEPC. We anticipate that the implementation of the proposed action will not

appreciably diminish the likelihood of both the survival and recovery of the Southern DPS of the LEPC.

We conducted separate jeopardy analyses for each DPS, and we base our conclusions on the following:

1. The implementation of the CRP, and associated conservation measures identified in this biological opinioin, is expected to produce a net conservation benefit to the LEPC by increasing habitat quantity and quality.
2. While there will be a number of acres (estimated below) of lands that were enrolled in CRP converted back to cropland, it is important to note the benefits originating from the original conversion of those acres from cropland to grassland resulting in habitat availability throughout the life of the contract. It is also noteworthy that, as discussed above in this opinion, a number of those acres will remain in conservation cover and continue to provide habitat for the LEPC after contract expiration. While some acres which exit the program will be converted back to cropland, new acres will be enrolled into the program creating additional conservation benefits.
3. Demand from landowners for participation in the CRP, and resulting acres conserved, is expected to be maintained overtime.
4. Effective implementation of the CRP, and associated conservation measures, are anticipated to result in a positive population response by the species. This positive response is expected to reduce habitat fragmentation and improve habitat conditions across the landscape.
5. The anticipated long-term conservation benefits to LEPC populations resulting from the targeted approach will likely contribute to the reduction of threats to the LEPC at a landscape scale and will overcome any short-term adverse effects to individual LEPC that may result from the implementation of practices and their associated conservation measures.
6. The implementation of the CRP, with the associated conservation measures identified in this biological opinion, is not expected to appreciably reduce the potential for LEPC conservation in the wild nor prohibit the ability to recover the species.

The conclusions of this biological opinion are based on full implementation of the program as described in the Description of the Proposed Action section (Section 2.0) of this document, including the conservation measures that were incorporated.

7 INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species without special exemption. Take is defined by section 3 of

the ESA as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined in 50 CFR §17.3 to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined in 50 CFR §17.3 as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this incidental take statement.

7.1 Approach to Assessing Incidental Take

In a large-scale program with birds that can move easily around their varied habitat, it is very difficult to precisely estimate the number of birds that are likely to be exposed to impacts from the proposed action. In addition, once a bird is exposed, it is difficult to determine the individual bird's response to the impact. Below we describe the method that Service has used to approach those issues. We recognize that the resulting simple estimate is based on many assumptions, including an assumption that the birds are evenly distributed across the habitat in an ecoregion and that all birds have an equal probability of being exposed to the various practices. When evaluating a range of values we chose to use the numerical values that represent greater amount of effect. We recognize that these assumptions will likely lead to an overestimate of potential effects to the species rather than an underestimate of effects. However, we know of no more reasonable method for arriving at an estimate. Also, regarding the probability of overestimating the impact, this method provides a cautious and reasonable "worst case" analysis for meta-population effects. If the likely overestimate is still compatible with survival and recovery of the LEPC, then we can be satisfied that the actual impacts are compatible. Throughout the approach for estimating take, we provide estimates by ecoregion, as discussed below, and then combine to provide an estimate of take for each DPS.

7.2 Amount or Extent of Take

After an analysis of adverse effects and the inclusion of the identified conservation measures, we have determined that implementation of four of the activities included in the proposed actions have effects that rise to the level of "likely to adversely affect" the species. Those activities are controlled burning, haying (both non-emergency and emergency), grazing (both non-emergency and emergency) including fences, and converstion of enrolled acres back to cropland.

Prescribed burning is used for CRP maintance and management and is commonly used in conjunction with brush management. The potential disturbance associated with this practice is

the destruction of nests if the fire is conducted during the nesting season. Although there is a lack in published research/management studies designed to precisely quantify the effects of prescribed burning on the LEPC, Augustine and Sandercock (2011) documented two of 34 greater prairie-chicken nests were lost to prescribed fires in the Flint Hills of Kansas. The Service believes this evaluation represents the best available information on these sources of risk to the species and has prepared an incidental take estimate in accordance with the approach and results from Augustine and Sandercock (2011).

Prescribed grazing is a widely used management practice to improve the quality of forage for livestock, and if managed properly, to improve rangeland vegetation to meet the habitat needs of LEPC. Pitman et al. (2006a) quantified nest loss over six breeding seasons and identified 1.9% of nest loss (n = 161) to trampling by livestock. Some, but not all, of the items in a grazing management plan are rest and deferment periods, stocking rates, location of mineral/salt supplements, and consideration of riparian and other sensitive or high impact areas. As a result of the expected implementation of prescribed grazing, as conditioned by the other conservation measures, the Service does not anticipate incidental take coverage is needed for any potential sources of adverse effect noted in the above analysis, except for those related to livestock trampling.

Fences have been documented as a collision risk to LEPC (Wolfe et al. 2007) and greater sage-grouse (Stevens et al. 2011) although impacts to populations are not well documented. Fences can be a valuable tool to facilitate improved grazing management providing for improved LEPC habitat. More recently, in Kansas and Colorado, scientists found only three carcasses and 12 possible collisions after observing 12,706 fence crossings by GPS-marked LEPC and surveying an additional 1,750 miles of fence lines (Robinson et al. 2016). The Service believes this evaluation represents the best available information on the risk of Fencing to the species and has prepared an incidental take estimate in accordance with the results from Robinson et al. (2016).

Haying involves the use of mechanical equipment to harvest vegetation that will be used as livestock forage. It can be effective to maintain early successional vegetation stages. The Service anticipates that incidental take estimates for haying (both emergency and non-emergenc) actions are based on the practices with the largest potential disturbance (destroying nests and/or incubating hens), such as the use of heavy machinery, thus, it is likely an overestimation of incidental take. Although there is a lack in published research/management studies designed to precisely quantify the effects of haying on the LEPC, Pitman (2003) documented one female LEPC, of 209 nests, having been killed by farm machinery cutting the alfalfa field where she had nested. We believe similar rates of incidental take for haying can be expected. The Service believes this evaluation represents the best available information on these sources of risk to the species and has prepared an incidental take estimate in accordance with the approach and results from Pitman (2003).

Conversion of grassland to cultivated agricultural lands has been regularly cited as an important cause in the range-wide decline in abundance and distribution of LEPC populations (Copelin 1963, Jackson and DeArment 1963, Crawford and Bolen 1976a, Crawford 1980, Taylor and Guthery 1980b, Braun et al. 1994, Mote et al. 1999). Landscapes having greater than 20 to 37% cultivated grains may not support stable LEPC populations (Crawford and Bolen 1976a). More recently, Ross et al. (2016b) found a response to the gradient of cropland to grassland land cover. Specifically, they found abundances of LEPC increased with increasing cropland until a threshold of 10% cropland was reached and then abundance declined with increasing cropland cover. This indicates that a relatively small amount of cropland could have a positive influence on LEPC abundance, but levels of conversion to cropland that exceed 10% are detrimental to the LEPC. While LEPC may forage in agricultural croplands, croplands do not provide for the habitat requirements of the species' life cycle (cover for nesting and thermoregulation), and thus they avoid landscapes dominated by cultivated agriculture, particularly where small grains are not the dominant crop (Crawford and Bolen 1976a). To estimate take associated with conversion of enrolled acres back to cropland, we considered acres of habitat as a surrogate. We use a surrogate for this activity because there is limited information available to form a justifiable estimate of take of individuals resulting from this action because it is not feasible to estimate what proportion of birds will find suitable habitat adjacent to the area being converted and if the landscape will support them. Thus, because it is impracticable to express take in terms of individuals from the conversion expired acres to cropland, the impact of this activity is measured in acres of habitat.

7.3 Estimating Exposure

To approximate the number of birds that may be exposed to the impacts, we started with the bird density (per ecoregion) as estimated using the average bird density from 2012 - 2022 of each ecoregion estimated by the most recent aerial surveys for the LEPC (Nasman et al. 2022). That produced a density (per acre) of LEPC by ecoregion (Tables 7.1-7.4, column 2). Next, we worked with FSA to project the estimated acres of each the four activities, that we expect to result in take, expected in each ecoregion by participants of CRP (Table 7.1-7.4, column 3). The future landowner interest and program funding is difficult to predict, but we increased the projected acres for each action by 50% to account for potential increased interest and/or program expansion over the 30-year life of the project (Table 7.1-7.4, column 4). By multiplying the bird density times the acres where a given action, we arrive at an approximate number of birds that may be exposed to the practice in each ecoregion (Tables 7.1-7.4, column 5).

7.3.1 Estimating Birds Subject to Incidental Take

Not all birds exposed to the practices will experience adverse effects that reach the level of take. Many effects will be in the form of short-term behavioral responses ranging from flushing,

temporary changes behavior, interruptions in feeding, stress, etc., resulting in insignificant and discountable effects that do not rise to the level of take. Though scientific studies are scant on the effects of the activities included in the proposed action, we have used the available information on rates of injury or mortality to inform our approximation of the number of birds taken incidentally by the proposed action. See below for take estimates for each of the activities that will result in take.

Controlled burning, even with the associated conservation measures, will result in incidental take during the implementation of this activity. We estimated the number of birds exposed to this activity by multiplying the bird density per ecoregion (Table 7.1, column 2) and the projected number of acres increased for potential program expanded (Table 7.1, column 4). We then were able to multiply the estimated number of birds exposed to the activity (Table 7.1, column 5) by the rate of mortality or injury for that activity (Table 7.1, column 6), which resulted in an estimated number of individuals taken (rounded to whole numbers) annually from implementation of controlled burning in each ecoregion (Table 7.1, column 7) and each DPS (Table 7.1, column 8).

Implementation of prescribed grazing, even with the associated conservation measures, will result in incidental take primarily as a result of nest trampling. We estimated the number of nests exposed to this activity by multiplying the nest density per ecoregion (Table 7.2, column 2) and the projected number of acres increased for potential program expansion (Table 7.2, column 4). We then were able to multiply the estimated number of nests exposed (Table 7.2, column 5) by the rate of nest trampling (Table 7.2, column 6), which resulted in an estimated number of nests impacted rounded to whole numbers (Table 7.2, column 7). Lastly, we multiplied the number of nests trampled (Table 7.2, column 7) by the average number of eggs per nest (Table 7.2, column 8) to arrive at a number of individuals taken (rounded to whole numbers) annually from implementation of prescribed grazing in each ecoregion (Table 7.2, column 9) and each DPS (Table 7.2, column 10).

The implementation of haying, even with the associated conservation measures, will result in incidental take during the implementation of this activity. We estimated the number of nests exposed to this activity by multiplying the nest density per ecoregion (Table 7.3, column 2) and the projected number of acres increased for potential program expansion (Table 7.3, column 4). We then were able to multiply the estimated number of nests exposed to the activity (Table 7.3, column 5) by the rate of nest destruction for that activity (Table 7.3, column 6), which resulted in an estimated number of nests impacted rounded to whole numbers (Table 7.3, column 7). Lastly, we multiplied the number of nests lost (Table 7.3, column 7) by the average number of eggs per nest (Table 7.3, column 8) to arrive at a number of individuals taken (rounded to whole numbers) annually from implementation of haying in each ecoregion (Table 7.3, column 9) and each DPS (Table 7.3, column 10).

Fencing, even with the associated conservation measures, will result in incidental take during the implementation of this activity. We estimated the number of individuals (rounded to whole numbers) taken annually in each ecoregion (Table 7.4, column 7) and each DPS (Table 7.4, column 8) due to construction of new or replacing existing fences by multiplying the rate of mortality (Table 7.4, column 6) times the number of practice miles (Table 7.4, column 4).

Lastly, conversion of enrolled acres back to cropland will result in incidental take. As discussed above, we estimated take associated with this activity by using habitat as a proxy. We estimated annual take by DPS (Table 7.5). Annual take was estimated utilizing the average acres of expiration over the next ten years (based upon annual contract expiration data provided by FSA for the action are of this BO) and then assuming a reenrollment rate of 32% (based upon past reenrollment rates for the action area of this BO). While this methodology will admitlingly result in an overestimate of annual take associated with the conversion of expired acres back to cropland, it provides a conservative method to ensure the effects of the action are fully considered.

The estimated annual incidental take of LEPC in the Northern DPS from controlled burning, fencing, haying, and grazing in the future using the assumptions identified above is 165 birds, which is less than 1 percent of the average Northern DPS population estimate of 29,404 from 2017-2022. In addition to the annual number of birds taken, the annual estimated take, using habitat as a suragate, for conversion of enrolled acres back to cropland is estimated is to be 123,500 acres annually, which is less 5% of the total estimated habitat for the Northern DPS. The estimated annual incidental take of LEPC in the Southern DPS from controlled burning, fences, haying, and grazing in the future using the assumptions identified above is 30 birds, which is approximately 1 percent of the average Southern DPS population estimate of 2,806 from 2017-2022. In addition to the annual number of birds taken, the annual estimated take, using habitat as a suragate, for conversion of enrolled acres back to cropland is estimated is to be 51,200 acres annually, which is approximately 5% of the total estimated habitat for the Southern DPS. Take will be monitored annually by practice, ecoregion, and DPS. Reinitiation of consultation will be required if the projected acreage adjusted for program expansion (Tables 7.1-7.4, column 4) is exceeded, the total annual take for a DPS exceeds the annual allocated take for that given DPS, or if modification of the proposed action or the conservation measures results in a substantial change. The amount of estimated annual take during the 30-year life of the project may be adjusted based on monitoring of contracts and research that provides additional information on rates of injury or mortality.

Table 7.1. Lesser prairie-chicken density (birds/acre), projected acreages of activity implemented through the CRP used to estimate numbers of individuals "at risk" of adverse effect, and estimated annual incidental take associated with ***prescribed burning.*** When the estimated number of birds taken annually is a fraction (less than 1) of a bird it is assumed that at least 1 incident of take occurs.

Ecoregion or DPS	Density (birds per acre)	Projected acres	Acres increased for potential program expansion	Number of birds exposed to activity	Rate of mortality or injury for activity	Estimated number of birds taken annually	DPS total
Short-Grass/CRP	0.002	70,000	105,000	210	0.0588	13	n/a
Sand Sagebrush	0.0003	70,000	105,000	210	0.0588	13	n/a
Mixed-Grass	0.0006	184,000	276,000	166	0.0588	10	n/a
Northern DPS	n/a	n/a	n/a	n/a	n/a	n/a	**36**
Shinnery Oak	0.0003	250	375	2	0.0588	1	n/a
Southern DPS	n/a	n/a	n/a	n/a	n/a	n/a	**1**

Table 7.2. Lesser prairie-chicken nest density (nests/acre), projected acreages of activity implemented through the CRP used to estimate numbers of nests "at risk" of adverse effect, and estimated annual incidental take associated with ***prescribed grazing***. When the estimated number of birds taken annually is a fraction (less than 1) of a bird it is assumed that at least 1 incident of take occurs.

Ecoregion or DPS	Density (nests per acre)	Projected acres	Acres increased for potential program expansion	Number of nests exposed to activity	Rate of nest trampling	Number of nests impacted	Clutch size	Estimated number of birds taken annually	DPS total
Short-Grass/CRP	.001	38,000	57,000	57	0.0191	2	14	28	n/a
Sand Sagebrush	.00015	390,000	585,000	88	0.0191	2	14	28	n/a
Mixed-Grass	.0003	130,000	195,000	59	0.0191	2	14	28	n/a
Northern DPS	n/a	n/a	n/a	n/a	n/a			n/a	**84**
Shinnery Oak	.0002	155,000	232,500	47	0.0191	1	14	14	-
Southern DPS	n/a	n/a	n/a	n/a	n/a			n/a	**14**

Table 7.3. Lesser prairie-chicken nest density (nests/acre), projected acreages of activity implemented through CRP used to estimate numbers of nests "at risk" of adverse effect, and estimated annual incidental take associated with ***haying***. When the estimated number of birds taken annually is a fraction (less than 1) of a bird it is assumed that at least 1 incident of take occurs.

Ecoregion or DPS	Density (nests per acre)	Projected acres	Acres increased for potential program expansion	Number of nests exposed to activity	Rate of nest destruction for activity	Numer of nests impacted	Clutch size	Estimated number of birds taken annually	DPS total
Short-Grass/CRP	0.001	80,300	120,450	121	0.0048	1	14	14	n/a
Sand Sagebrush	0.00015	16,000	24,000	4	0.0048	1	14	14	n/a
Mixed-Grass	0.0003	45,500	68,250	21	0.0048	1	14	14	n/a
Northern DPS	n/a	n/a	n/a	n/a	n/a			n/a	**42**
Shinnery Oak	0.0002	12,200	18,300	4	0.0048	1	14	14	n/a
Southern DPS	n/a	n/a	n/a	n/a	n/a			n/a	**14**

Table 7.4. Lesser prairie-chicken density (birds/acre), projected miles of activity implemented through CRP used to estimate numbers of individuals "at risk" of adverse effect, and estimated annual incidental take associated with ***fences***. When the estimated number of birds taken annually is a fraction (less than 1) of a bird it is assumed that at least 1 incident of take occurs.

Ecoregion or DPS	Density (birds per acre)	Projected practice miles	Miles increased for potential program expansion	Number of birds exposed to activity	Rate of mortality or injury for activity (strikes per mile)	Estimated number of birds taken annually	DPS total
Short-Grass/CRP	0.002	7	10.5	NA	0.0086	1	n/a
Sand Sagebrush	0.0003	14	21	NA	0.0086	1	n/a
Mixed-Grass	0.0006	13	19.5	NA	0.0086	1	n/a
Northern DPS	n/a	n/a	n/a	n/a	n/a	n/a	**3**
Shinnery Oak	0.0003	13	19.5	NA	0.0086	1	n/a
Southern DPS	n/a	n/a	n/a	n/a	n/a	n/a	**1**

Table 7.5. Annual projected take associated with conversion of enrolled lands back to cropland using habitat as a proxy.

DPS	Projected acreage
Northern DPS	123,500
Southern DPS	51,200

7.4 Monitoring Take

Take will be estimated per the methodology above as acreages (or miles) of practices that are implemented annually and will be reported back to the Service. As FSA or NRCS field staff conduct any field visits, they will ask the landowner if they have observed any mortality or nest loss while implementing the practices as described in this opinion.

7.5 Effect of the Take

In the accompanying opinion, we have determined that the level of anticipated take is not likely to result in jeopardy to the either the Northern DPS of the LEPC or the Southern DPS of the LEPC. As detailed above, implementation of the proposed action, which may have short-term adverse effects, will result in conservation benefits that far outweigh those adverse effects. Based upon our take estimates, we expect annual take within both the Northern and the Southern DPS to be approximately 1 percent of their respective populations and less than 5 percent of their respective available habitat.

Although we anticipate some nests, eggs and chicks may be destroyed, second nesting attempts may occur when the first attempt is lost. These renesting attempts may minimize these aforementioned adverse consequences on abundance of LEPC throughout the action area. We also anticipate take resulting from conversion of some expired acres back to cropland but as discussed above, many of those acres are expected remain in grassland after contract expiration. Additionally, while some expired acres will be converted back to crop production, concurrently FSA will be enrolling new acres of cropland that will converted to conservation cover supporting the LEPC and thus the maintaining the overall conservation benefit provided by the program. Most importantly, the Service concludes that implementation of the CRP will ultimately result in an either maintaining or an overall increase of habitat quantity and quality in the long-term. The expected benefits will assist in either maintaining existing levels or increasing LEPC abundance (through greater adult and juvenile survivorship, improved nest success, and recruitment rates) and distribution of LEPC in the action area. The anticipated benefits of the CRP are significantly greater than the effect of the anticipated take. Incidental take, therefore, is not expected to nullify the conservation benefits anticipated to accrue under the proposed action. Conversely, we expect the long-term benefits of the CRP will greatly outweigh the anticipated short-term adverse effects of anticipated take.

8 REASONABLE AND PRUDENT MEASURES

The Service believes that the following reasonable and prudent measures and their implementing terms and conditions are necessary and appropriate for FSA to minimize impacts of incidental take of LEPC. In order to be exempt from the prohibitions of section 9 of the ESA, the FSA must ensure that implementation of the CRP complies with the following terms and conditions that implement the Reasonable and Prudent Measures.

The Service believes that the following Reasonable and Prudent Measures are necessary and appropriate to minimize impacts of incidental take of LEPC:

Reasonable and Prudent Measure 1 - The Farm Service Agency shall report the estimated incidental take of LEPC based on the acres/miles of conservation practices and acres of emergency haying and grazing implemented annually within the action area summarized by practice, ecoregion, and DPS.

Reasonable and Prudent Measure 2 – The Farm Service Agency shall implement conservation measures as described in appendix A of this report during the implementation and management of the proposed action.

8.1 Term and Condition 1 for Reasonable and Prudent Measure 1

The Farm Service Agency shall conduct monitoring and reporting of incidental take as follows. By March 30th of each year, for the term of the proposed action, the FSA shall submit a report to the Service describing estimated incidental take of LEPC in the action area during the previous fiscal year summarized by CRP conservation practice, ecoregion, and DPS of activities occurring within the action area. The report will be submitted to the Assistant Regional Director for Ecological Services in Albuquerque, New Mexico. The report will include acres of activities implemented and not any estimate of future implementation. Any revisions to bird density, the rate of injury or mortality practices will be made in coordination with the Service. The annual should also contain a summary of total currently enrolled acres by county, ecoregion, and DPS by practice.

8.2 Term and Condition 1 for Reasonable and Prudent Measure 2

Any observations or evidence of LEPC mortality or nest loss resulting from implementation of the proposed action shall be reported the Service within 30 days.

9 CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and

threatened species. Conservation recommendations are discretionary agency actions. The Service offers the following conservation recommendations:

a. Work collaboratively with the Service and other conservation partners to discuss targeted implementation of the Conservation Reserve Program to maximimze program benefits throughout the life of this Biological Opinion.

b. Meet annually with the Service to discuss implementation of this Biological Opinion, conservation successes, and any needed program adjustments to maximimize conservation benefits of the program.

c. Prioritize implementation of the proposed action within 3 miles of existing leks or in other areas identified as conservation priorities for the LEPC.

10 REINITIATION NOTICE

Reinitiation of consultation is required and shall be requested by FSA or by the Service, where discretionary Federal involvement or control over the action has been retained or is authorized by law and: (a) If new information reveals effects of the action that may affect the LEPC beyond those effects considered within this Biological Opinion; or (b) the identified action is subsequently modified in a manner that causes an effect to the LEPC that was not consideration herein.

We appreciate your collaboration in this effort. If further assistance or information is required, please contact Clay Nichols at clay_nichols@fws.gov.

_____ 3/29/2024

Jonna Polk Date

Assistant Regional Director, Ecological Services

U.S. Fish and Wildlife Service, Southwest Region

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Appendices

A. Conservation practices and associated conservation measures
B. Haying and grazing information
C. Comprehensive practice list

APPENDIX A.

Conservation practice standard	Code[1]	Potential adverse effects[2]	Conservation measures	Threats/limiting factors addressed	Beneficial effects
All Practices, as applicable	NA	NA	(1) The FSA shall coordinate with the affected State fish and wildlife Agency to identify appropriate restrictions on the placement, extent, configuration, and timing of conservation practice standards and the area where these practice restrictions would apply to avoid or minimize adverse effects to the LEPC and supporting habitat conditions. (2) The best scientific data available will guide the development of each practice to ensure effectiveness and adaptability. (3) Utilize acceptable habitat evaluation tools and monitoring protocol such as the WHEG (see Appendix II) to evaluate habitat conditions to ensure the conservation plan is adapted to meet the habitat and wildlife needs. (4) The FSA shall ensure that Conservation Plans and specifications for this practice are prepared by persons with adequate training in the fields of wildlife management, biology, or range ecology. (5) Identify, document, and discuss with landowner, invasive species seen during habitat assessments, site visits, monitoring and conservation practice implementation so they may be addressed in conservation planning. Monitor, evaluate and control State-listed invasive and noxious plants during practice planning, and design and implementation. (6) Machinery associated with practices should be clean and free of vegetative debris prior to use to prevent the spread of invasive plant species. (7) Use site specific reclamation strategies developed using ecological site descriptions. Native species will be used to meet practice objectives with preference to forbs, grasses and grass-like plants preferred by the LEPC as well as those plants that reflect the potential of the specific ecological site to optimize LEPC habitat needs. Seed mixes should be State-certified, meeting the appropriate State certification criteria as being free of State declared noxious and invasive vegetative material. (8) Timing of planting and post-establishment vegetation management will be	Management without consideration of LEPC needs.	Ensures all conservation practices included here provide focused consideration of LEPC needs that engages State expertise, uses the best available scientific data, standardizes habitat evaluations, and ensures appropriately trained staff are the planners.

[1] More information on the covered conservation practice standards can be found in Appendix IV and by accessing the NRCS Field Office Technical Guide.

[2] Adverse effect 1 includes physical disturbance (including noise); Adverse effect 2 includes temporary soil disturbance and vegetation removal; Adverse effect 3 includes an increased potential of introduction of invasive plants; Adverse effect 4 includes permanent removal and/or loss of suitable habitat; Adverse effect 5 includes increased potential of accidental mortality to individuals; Adverse effect 6 includes increased potential for predators. Refer to Section 5.1 Potential Adverse Effects of the Action for specific information on these potential sources of risk to the LPC.

Conservation practice standard	Code[1]	Potential adverse effects[2]	Conservation measures	Threats/limiting factors addressed	Beneficial effects
			designed as per local site conditions to meet practice specifications.		
Upland Wildlife Habitat Management	645	1, 2	(1) Ensure all facilitating practices include critical non-disturbance dates to minimize their effects on leks, nesting and brooding periods, as appropriate to the practice.	(1) Reduced habitat quality, (2) habitat loss and fragmentation, (3) factors otherwise limiting population growth.	(1) Focused consideration of LEPC needs in conservation plans. (2) Used to restore, enhance, create and/or manage suitable habitat for LEPC. (3) Creating, maintaining, and restoring landscape connectivity.
Prescribed Grazing	528	1, 2, 3, 5	(1) Implementation of grazing management plans, to the extent practicable, will meet habitat conditions for each habitat type. (2) Frequency- Grazing recurrence will occur at a rate necessary to create or maintain desired habitat structure. Grazing systems that prescribe high intensity or rapid forage removal will allow for adequate recovery time (non-grazed periods) to meet LEPC habitat needs. (3) Duration- Grazing periods (days, weeks, or months) for scheduled grazing events will be designed to address limiting habitat factors as identified by the habitat assessments for the LEPC. Scheduled grazing periods will also be used to manipulate or create desired or targeted habitat conditions. (4) Timing- Grazing events will be scheduled when possible to avoid potential disturbance to known breeding or lek sites. (5) Intensity- The amount of forage removed (or left) during any particular grazing cycle will be in keeping with the specific life cycle requirements (i.e. nesting, lekking, brood rearing, etc.). (6) Develop contingency plans to deal with expected episodic disturbance events (e.g., drought, wildfire, insect infestation, etc.)	(1) Reduced habitat quality, including lack of diverse species composition, vigor of plant communities, low quantity and quality of forage, water quality and quantity, soil erosion, quantity and quality of food and/or cover available for wildlife.	(1) This practice ensures that rangelands are managed sustainably to provide continued ecological processes, forage and habitat for livestock and wildlife. (2) Increases residual cover of perennial grasses and forbs to improve the LEPC nesting cover and success. (3) Improves plant litter cover over the soil surface to facilitate better moisture infiltration and produce more vegetative cover for nesting birds as well as increased forbs for brood habitat. (4) Grazing system can decrease the time anyone pasture is exposed to grazing animals reducing the overall disturbance to individual birds and concurrently providing rest to the site plant community.
Prescribed Burning	338	1, 2, 5	(1) Defer implementation of this conservation practice within 1/2 mile to known leks until all breeding and nesting activities are completed, typically March 1 through July 15.	(1) Reduced habitat quality due to reduced plant productivity, health, and vigor, and (2) habitat loss and fragmentation from woody	(1) With the use of prescribed burning, plant communities can be altered to create brood-rearing habitat, increasing forbs, legumes, and insect populations needed by LEPC. (2) Prescribed burning is important in

Conservation practice standard	Code[1]	Potential adverse effects[2]	Conservation measures	Threats/limiting factors addressed	Beneficial effects
				encroachment and non-native species.	maintaining or restoring plant communities as described in ecological site descriptions.
Brush Management	314	3	(1) Minimize vegetative disturbances during installation of conservation practice. Avoid disturbing the soil on sensitive areas with a high potential for soil erosion. (2) Evaluate the site's potential for soil erosion and invasion by undesirable plants during practice planning and design. Regularly monitor the site after implementation to ensure weed issues are addressed quickly. (3) The practice will be designed to avoid or minimize unintentional damage to non-target plants. (4) Woody species that are >3' and not part of ecological sites reference community will be felled unless other consideration necessitate leaving them standing. (5) Woody slash shall be treated if significant buildup of fuels occurs. Slash piles shall be burned when wildfire risk is low (usually when soils are frozen or saturated). Follow state forestry laws, when applicable, for treating slash to minimize wildfire risk. (6) Treated sites may be deferred from livestock grazing for a period of time determined to be adequate based on pre and post site conditions (i.e., brush densities, potential for plant community to improve in health, vigor, and cover). The NRCS will identify appropriate deferment periods.	(1) Habitat loss and fragmentation from encroachment of woody plants and non-native species.	(1) By removing brush, a limiting habitat factor is removed, and desired or targeted habitat conditions are created.
Restoration of Rare and Declining Natural Communities	643	1, 2, 3	(1) When implementing this practice for the purpose of establishing perennial vegetation, a number of activities, primarily planting, will need to take place during the primary breeding and nesting season. In these situations, an effort shall be taken to complete activities with as little disturbance as possible to adjacent and surrounding existing LEPC habitat.	(1) Reduced habitat quality, and (2) habitat loss and fragmentation by non-native habitat and areas of low biodiversity.	(1) This practice will help to ensure a diversity of native habitat, such as native grasses, forbs, and shrubs, for the LEPC and other wildlife.
Access Control	472	1, 3	(1) This practice standard will be designed to support other practices, which will create the desired habitat conditions for the LEPC. (2) Routine follow-up will occur to monitor the effectiveness of the practice and determine presence of invasive or non-native plant species, at least annually. (3) If fence construction is needed to facilitate this practice, use conservation practice standard Fence (382) for specific conservation measures.	(1) Reduced habitat quality from over-use.	(1) Practice can be an effective tool for reducing disturbance to LEPCs and their habitats, such as lek areas. (2) Access control, in combination with prescribed grazing, can be used to help improve vegetative structure and composition for nesting and brood rearing.
Forage Harvest Management	511	1, 2, 5	(1) Defer implementation of this conservation practice within ½ mile to known leks until all nesting activities are completed, typically April 15 through July 15. (2) Leave corners, field borders, and odd	(1) Reduced habitat quality from low yield and quality of forage, low plant	(1) This practice can be used to designate areas to annually remain un-harvested and retain site specific

Conservation practice standard	Code[1]	Potential adverse effects[2]	Conservation measures	Threats/limiting factors addressed	Beneficial effects
			areas un-harvested for supplemental cover and brood rearing habitat.	vigor, insects, diseases, and weeds.	minimum heights of vegetation for future use. (2) This practice can be used to maintain desirable plant composition and structure for food production, nesting cover, and brood rearing habitat.
Firebreak	394	1, 2, 3	(1) Disked firebreaks will be allowed to re-establish or be seeded to beneficial native grasses, forbs, and legumes to provide bugging or brood rearing habitat. (2) State-listed noxious and invasive plants will be identified and controlled following firebreak installation.	(1) Habitat loss and fragmentation, (2) reduced habitat quality due to the spread of fire beyond targeted prescribed burn areas and the spread of wildfires, resulting in large-scale, temporary alteration of the landscape, and (3) limited or no implementation of prescribed fire resulting in declining habitat quality.	(1) This practice will help to ensure a diversity of native habitat, such as native grasses, forbs, and shrubs, for the LEPC and other wildlife. (2) This practice can help reduce the spread of wildfires thus reducing the risk of large-scale, habitat loss. (3) Firebreaks can provide a food source for LEPC by stimulating annual forb growth. (4) Firebreaks are an important practice incentivizing the use of prescribed fire. (5) Reduce or remove invasive woody plants.
Cover Crop	340	1, 3	(1) When implementing this practice for the purpose of establishing perennial vegetation, a number of activities, primarily planting, will need to take place during the primary breeding and nesting season. In these situations, an effort shall be taken to complete activities with as little disturbance as possible to adjacent and surrounding existing LEPC habitat. (2) Minimize vegetative disturbances during installation of conservation practices. (3) Where practicable, use of more than one cover crop species will provide greater benefit to LEPC.	(1) Habitat loss and fragmentation, and (2) reduced habitat quality due to wind and water erosion between harvesting of a crop and planting of native grass.	(1) Multi-species cover crops planted on cropland adjacent to LEPC nesting habitat for a full growing season or planted after small grain harvest can create and improve brood-rearing habitat if adjacent to grasslands. (2) Cover crops planted until permanent vegetation is established can provide stability in the ecosystem by improving soil quality, preventing erosion, and providing limited cover for birds.
Critical Area Planting	342	1, 3	(1) Minimize vegetative disturbances during installation of conservation practices. (2) Regularly monitor the site after implementation to ensure weed issues are addressed quickly.	(1) Habitat loss and fragmentation, and (2) reduced	(1) Establishment of permanent vegetation can provide stability in the ecosystem by

Conservation practice standard	Code[1]	Potential adverse effects[2]	Conservation measures	Threats/limiting factors addressed	Beneficial effects
				habitat quality due to un-vegetated, disturbed soil, which creates sites for invasive plant species to colonize, promotes increased soil erosion, and reduces wildlife habitat quality.	improving soil quality, preventing erosion, and providing limited cover for birds.
Pasture and Hay Planting	512	1, 3	(1) When implementing this practice for the purpose of establishing perennial vegetation, a number of activities, primarily planting, will need to take place during the primary breeding and nesting season. In these situations, an effort shall be taken to complete activities with as little disturbance as possible to adjacent and surrounding LEPC leks. (2) Control livestock access as needed to allow for initial establishment of new vegetative plantings and control weeds through flash grazing.	(1) Habitat loss and fragmentation, and (2) reduced habitat quality by non-native, annual crops.	(1) Many of these plantings can provide good quality nesting and brood-rearing habitat. (2) The corresponding increase in available forage for livestock can also remove grazing pressure on existing native rangelands and lead to improved range condition.
Range Planting	550	1, 3	(1) When implementing this practice for the purpose of establishing perennial vegetation, a number of activities, primarily planting, will need to take place during the primary breeding and nesting season. In these situations, an effort shall be taken to complete activities with as little disturbance as possible to adjacent and surrounding existing LEPC habitat. (2) Control livestock access as needed to allow for initial establishment of new vegetative plantings and control weeds through flash grazing.	(1) Habitat loss and fragmentation, and (2) reduced habitat quality by non-native, annual crops.	(1) Practice increases habitat quality for LEPC. (2) Addresses habitat loss and fragmentation by restoring diverse, permanent, native plant communities.
Watering Facility	614	1, 2, 3, 4,5	(1) Minimize vegetative disturbances during installation of conservation practices. (2) Design conservation practice to avoid or minimize loss of shrubs during practice installation. (3) If access for operation and maintenance is required, limit access to one side of disturbance and limit access to one vehicle width. (4) Regularly monitor the site after implementation to ensure erosion and weed issues are addressed quickly. (5) Install wildlife escape ramps.	(1) Reduced habitat quality from over- and under-use due to livestock concentrating and overgrazing near water sources and avoiding areas without a water source.	(1) Use of this practice can facilitate prescribed grazing by livestock. (2) Can provide water for some wildlife species, including LEPC. This benefit may be especially pronounced during drought conditions.
Spring Development	574	1, 2, 3, 4	(1) Minimize vegetative disturbances during installation of conservation practices.	(1) Reduced habitat quality from over- and under-use due to livestock concentrating and overgrazing near water sources and avoiding areas	(1) Practice may facilitate improved livestock grazing management, which allows for creation, enhancement or maintenance of nesting and brood-rearing habitat for LEPC. (2)

Conservation practice standard	Code[1]	Potential adverse effects[2]	Conservation measures	Threats/limiting factors addressed	Beneficial effects
				without a water source.	Can provide improved water quality and water availability for other wildlife.
Pumping Plant	533	1, 2, 3, 4, 6	(1) Install low profile pumping devices and housings and use solar pumps whenever practicable, as the power source for wells rather than electric lines. (2) Place wells and infrastructure as close as possible to existing structures rather than creating new vertical structure in areas presently devoid of such features. (3) Design solar panel mounting pole as short as possible to avoid use as raptor perch. (4) Limit construction and access footprint and future vehicle traffic access to one vehicle width. (5) New windmills for pumping or power generation will not be used within the action area (unless individually approved by the Service). (6) Design solar panel mounting pole as short as possible to avoid use as raptor perch. (7) Minimize noise levels of fuel-powered plants to less than 40dbA.	(1) Reduced habitat quality from over- and under-use due to livestock concentrating and overgrazing near water sources and avoiding areas without a water source.	(1) Practice may facilitate improved livestock grazing management, which allows for creation, restoration or enhancement of nesting and brood-rearing habitat for LEPC. (2) Can provide water availability for other wildlife.
Water well	642	1, 2, 3, 4	(1) Place wells and associated infrastructure as close as possible to existing structures rather than creating new vertical structure in areas presently devoid of such features. (2) Design the water well to avoid or minimize the loss of desirable shrubs during practice installation.	(1) Reduced habitat quality from over- and under-use due to livestock concentrating and overgrazing near water sources and avoiding areas without a water source	(1) This practice can be implemented in a manner that will facilitate improved distribution of livestock grazing and result in improved vegetative diversity and structure of LEPC habitat. (2) The practice can also provide a supplemental water source for LEPC and other wildlife.
Livestock Pipeline	516	1, 2, 3,	(1) Design the pipeline route to avoid or minimize the loss of desirable shrubs during practice installation. (2) Where practical, defer implementation of this conservation practice within 1/2 mile to known leks during breeding and nesting seasons, typically March 1 through July 15.	(1) Reduced habitat quality from over- and under-use due to livestock concentrating and overgrazing near water sources and avoiding areas without a water source.	(1) Practice may facilitate improved livestock grazing management, which allows for creation, maintenance or enhancement of nesting and brood-rearing habitat for LEPC. (2) Can provide water availability for other wildlife. (3) The disturbed area created by construction activities along the pipeline route may support early succession forbs and legumes that can provide food and

Conservation practice standard	Code[1]	Potential adverse effects[2]	Conservation measures	Threats/limiting factors addressed	Beneficial effects
					brood-rearing habitat for LEPCs.
Grade Stabilization Structure	410	1, 2, 3, 4, 6	(1) Minimize vegetative disturbances during installation of conservation practices. (2) Defer implementation of this conservation practice within 1/2 mile to known leks during breeding and nesting seasons, typically March 1 through July 15, daily until after 10 am.	(1) Reduced habitat quality due to erosion control.	(1) This practice can control erosion that if left unchecked can result in habitat loss or degradation.
Fence	382	1, 2, 3, 5, 6	(1) Alternatives to fencing will be evaluated prior to fence installation (e.g., water placement, placement of minerals, prescribed burning to achieve the desired outcome. (2) Defer implementation of this conservation practice within 1/2 mile to known leks during breeding and nesting seasons, typically March 1 through July 15, daily until after 10 am. Affected State fish and wildlife agencies and the State Technical Team can determine the need to mark fences within 1/4 mile of a known lek when construction can't be avoided or relocated. (3) Temporary electric fencing may be used in some cases to minimize potential collision fatalities.	(1) Reduced habitat quality from over- and under-use due to livestock concentrating and overgrazing in certain areas and avoiding other areas.	(1) This practice can be an effective tool for managing wild and domestic animal disturbance to LEPC habitat, including reseeded or reclaimed sites. Fence is typically used to facilitate prescribed grazing to areas targeted for creation or protection of specific habitat needs.
Obstruction Removal	500	1, 2, 3	(1) Minimize vegetative disturbances during installation of conservation practices. (2) Defer implementation of this conservation practice within 1/2 mile to known leks during breeding and nesting seasons, typically March 1 through July 15, daily until after 10 am.	(1) Habitat fragmentation from structures, including buildings, power poles, and fences.	(1) Practice will benefit LEPC by removing unnecessary fences that contribute to fragmentation and direct mortality due to collisions. (2) Removing unneeded power poles or infrastructure that provides predator perches. (3) Removing structures that serve as mammalian predator habitat and/or visual/psychological obstructions that cause LEPC to partially or completely abandon otherwise suitable habitat.
Herbaceous Weed Treatment	315	1, 2, 5	(1) Spot treatment should be utilized where practicable.	(1) Habitat quality, and (2) habitat loss and fragmentation by invasive and noxious weeds.	(1) Practice implementation removes or reduces invasive or other weed species that directly or indirectly limit LEPC habitat quality and productivity. (2) Practice can beneficially influence the vigor and establishment of native

Conservation practice standard	Code[1]	Potential adverse effects[2]	Conservation measures	Threats/limiting factors addressed	Beneficial effects
					or desirable vegetation required to provide LEPC habitat.
Pond	378	1, 2, 3, 4, 6	(1) Defer implementation of this conservation practice within 1/2 mile to known leks until all breeding and nesting activities are completed, typically March 1 through July 15. (2) This practice will only be applied where needed to meet the daily water requirements of livestock and to facilitate prescribed livestock grazing distribution.	(1) Reduced habitat quality from over- and under-use due to livestock concentrating and overgrazing near water sources and avoiding areas without a water source	(1) This practice facilitates improved distribution of livestock grazing and result in improved vegetative diversity and structure of LEPC habitat. (2) This practice can also provide a supplemental water source for some wildlife species
Tree/Shrub Establishment	612	1, 2, 3, 5, 6	(1) Minimize vegetative disturbances during application of conservation practices. (2) The implementation plan shall clearly identify any special resources that need to be avoided, such as leks. (3) When livestock are present, plots must be deferred from livestock grazing for a period of time determined to be adequate based on recommendations in the Standard and Specification. (4) Species planted must be ecologically appropriate and beneficial to LEPC. (5) Within the LEPC action area, all Tree/Shrub Establishments (612) shall be completed in coordination with the local biologist (U.S. Fish and Wildlife Service Ecological Services Field Office Biologist) who will sign off on the planting as either providing LEPC habitat or not negatively impacting LEPCs. Planting of trees are is not covered under this opinion and thus would require consultation under section 7 of th ESA if it would result in effects to the LEPC.	(1) Reduced habitat quality due to lacking vegetative structure and thermal cover.	(1) This practice will ameliorate a limiting habitat factor and create desired or targeted habitat conditions. Benefits include (2) increased availability of food during heavy snowfall events, (3) diversity of cover beneficial for thermal regulation in winter and summer, and (4) enhanced pollinator habitat, which will increase available food potential for broods.
Heavy Use Area Protection	561	1, 2, 3, 4	(1) Defer implementation of this conservation practice within 1/2 mile to known leks during breeding and nesting seasons, typically March 1 through July 15, daily until after 10 am. (2) Minimize vegetative disturbances during installation of conservation practices.	(1) Reduced habitat quality from over- and under-use due to livestock concentrating and overgrazing near water sources and avoiding areas without a water source.	(1) Use of this practice in conjunction with and as a supporting practice for watering facilities can facilitate prescribed grazing by livestock to conserve or enhance important LEPC habitat
Woody Residue Treatment	384	1, 2, 3, 5	(1) Minimize vegetative disturbances during installation of conservation practices. (2) Design conservation practice to avoid or minimize or avoid loss of shrubs during practice installation.	(1) Habitat loss and fragmentation, and (2) reduced habitat quality due to standing dead carcasses of woody species.	(1) Use of this practice in conjunction with and as a supporting practice for Brush Management (314) will allow for the opportunity for LEPC to recolonize acres where tall woody vegetation has

Conservation practice standard	Code[1]	Potential adverse effects[2]	Conservation measures	Threats/limiting factors addressed	Beneficial effects
					presented a habitat concern for LEPC.
Well Decommissioning	351	1, 2, 3	(1) Minimize vegetation disturbance during installation of conservation practice	(1) Reduced habitat quality due to resource concerns from failing to properly decommission a water well.	(1) This practice when accompanied by a well or other water facility will facilitate improved distribution of livestock grazing and result in improved vegetative diversity and structure of LEPC habitat.
Conservation Cover	327	1, 3	(1) When implementing this practice for the purpose of establishing perennial vegetation, a number of activities, primarily planting, will need to take place during the primary breeding and nesting season. In these situations, an effort shall be taken to complete activities with as little disturbance as possible to adjacent and surrounding existing LEPC habitat.	(1) Reduced habitat quality due to erosion, low water quality and quantity, and (2) habitat fragmentation due to croplands	(1) Practice increases habitat quality for LEPC and restores diverse, permanent, native plant communities.
Structures for Wildlife	649	1, 5	(1) Affected State fish and wildlife agencies and the State Technical Team can determine the need to mark fences within 1/4 mile of a known lek when construction can't be avoided or relocated. (2) Defer implementation of this conservation practice within 1/2 mile to known leks during breeding and nesting seasons, typically March 1 through July 15, daily until after 10 am.	(1) Direct injury or mortality.	(1) Practice removes or reduces potential for fence collision or drowning in open water sources.
Wildlife Habitat Planting	420	1, 2, 3	(1) When implementing this practice for the purpose of establishing perennial vegetation, a number of activities, primarily planting, will need to take place during the primary breeding and nesting season. In these situations, an effort shall be taken to complete activities with as little disturbance as possible to adjacent and surrounding existing LEPC habitat.	(1) Habitat loss and fragmentation, and (2) reduced habitat quality by non-native, annual crops.	(1) Practice increases habitat quality for LEPC. (2) Restores diverse, permanent, native plant communities.

APPENDIX B.

Haying and Grazing Overview		
	Frequency and Timing	**Other limitations**
Non-Emergency Grazing	• Every other year • 12 months after conservation cover is established • A single period of up to 120 days or 2 60-day periods before September 30	• Land within 20 feet of a stream or other water body is ineligible • Emergency haying or grazing restarts the frequency clock • Haying and grazing cannot occur on same acreage • During PNS, at 50% approved stocking rate • Must be defined and evaluated in Conservation Plan (grazing plan) • Must not hay on 25 percent of contract acres
Emergency Grazing	• No frequency limitation • Can occur after cover is established • Up to 90 days before September 1	• Land within 120 feet of a stream or other water body is ineligible • County designated D2 or greater according to the National Drought Monitor or there is a 40% or greater loss of forage production in the county or the Secretary and State Technical Committee determine the program can assist in response to a disaster without permanent damage to the cover • Requires a modified Conservation Plan (grazing plan) • Haying and grazing cannot occur on same acreage
Non-Emergency Haying	• No more frequent than 1 in 3 years • Can occur 12 months after conservation cover is established • Prohibited during the PNS • Up to 120 calendar days after the end of PNS • Limited to one cutting per year	• Land within 20 feet of a stream or other water body is ineligible • Emergency haying or grazing restarts the frequency clock • Haying and grazing cannot occur on same acreage • Requires modification of Conservation Plan to identify acres
Emergency Haying	• No frequency limitation • Can occur after cover is established • Prohibited during the PNS • Up to 60 days before August 31	• Land within 20 feet of a stream or other water body is ineligible • County designated D2 or greater according to the National Drought Monitor or there is a 40% or greater loss of forage production in the county or the Secretary and STC determine the program can assist in response to a disaster without permanent damage to the cover • Haying and grazing cannot occur on same acreage

APPENDIX C

The term *known leks*, when used in the following conservation measures, means leks that are occupied or have been recorded as active at least once within the previous five years.

If any modification of the conservation practice and the associated conservation measures occur that could result in adverse effects or incidental take above what is anticipated in the associated conference opinion, contact the local Service Field Office to coordinate implementation and any additional compliance under the Act that may be needed, or discuss potential for reinitiation.

The following conservation measures, when applicable, will be followed by all conservation plans regardless of the conservation practice Standards used:

(1) Coordinate with the affected State Fish and Wildlife Agency to identify appropriate restrictions on the placement, extent, configuration, and timing of conservation practice standards and the area where these practice restrictions would apply to avoid or minimize adverse effects to the LEPC and supporting habitat conditions.

(2) The best scientific data available will guide the development of each practice to ensure effectiveness and adaptability.

(3) Utilize acceptable habitat evaluation tools and monitoring protocol such as the WHEG (see Appendix II) to evaluate habitat conditions to ensure the conservation plan is adapted to meet the habitat and wildlife needs.

(4) Ensure that conservation plans and specifications for this practice are prepared by persons with adequate training in the fields of wildlife management, biology or range ecology.

(5) Identify, document, and discuss with landowners, any invasive species seen during habitat assessments, site visits, monitoring and conservation practice implementation so they may be addressed in conservation planning. Monitor, evaluate and control State-listed invasive and noxious plants during practice planning, and design and implementation.

(6) Machinery associated with practices should be clean and free of vegetative debris prior to use to prevent the spread of invasive plant species.

(7) Use site specific reclamation strategies developed using ecological site descriptions. Native species will be used to meet practice objectives with preference to forbs, grasses and grass-like plants preferred by the LEPC as well as those plants that reflect the potential of the specific ecological site to optimize LEPC habitat needs. Seed mixes should be State-certified, meeting the appropriate State certification criteria as being free of state declared noxious and invasive vegetative material.

(8) Timing of planting and post-establishment vegetation management will be designed per local site conditions to meet NRCS practice specifications.

Conservation Practice Standard: Brush Management (314)

Definition: The management or removal of woody (non-herbaceous or succulent) plants including those that are invasive and noxious.

Purpose: To restore or enhance the desired native plant community which is consistent with the ecological site description, and which provides the most suitable habitat for the LEPC and other wildlife species. Specifically, it may be used for the purpose of:

- Removing undesirable post-settlement conifers such as juniper, Eastern red cedar or deciduous species such as mesquite and black locust which have encroached into habitats being restored for LEPC habitat.
- Improving the diversity of habitat to create a mosaic of irregular shaped grassland openings based on LEPC home range, or to provide a release to allow for the native grass and forb community to be expressed.

Resource concern(s): Habitat loss and fragmentation from encroachment of invasive woody plants and non-native species into suitable habitat for the LEPC.

Potential beneficial effect(s) to LEPC: Removal of limiting habitat factor and creation of desired or targeted habitat conditions.

Potential adverse effect(s) to LEPC: Potential effects include increased potential for invasive plants on areas disturbed during implementation. There is potential for damage to non-target shrub species during implementation.

Documentation by State for Technical Practice 314:

- Colorado
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements
- Kansas
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements
- New Mexico
  - Technical Practice Standard
  - Practice Specifications

- Oklahoma
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements - LEPC
- Texas
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements

Conservation Measures:

- Minimize soil and vegetative disturbances during installation of conservation practices. Avoid disturbing the soil on sensitive areas with a high potential for soil erosion.
- On disturbed areas, use site specific reclamation strategies developed using ecological site descriptions with consideration to LEPC habitat needs.
- Use the conservation measures provided for facilitative practices in areas where reseeding disturbed areas is needed.
- Evaluate the site's potential for soil erosion and invasion by undesirable plants during practice planning and design. Regularly monitor the site after implementation to ensure erosion and weed issues are addressed quickly.
- The practice will be designed to minimize or avoid unintentional damage to non-target plants.
- The implementation plan shall clearly identify any special resources that need to be avoided; such as riparian areas, wetlands/playas, or habitat of other at-risk species.
- Large brush (>3 ft.) will be felled unless other considerations necessitate leaving them standing.
- Woody slash shall be treated if significant buildup of fuels occurs. Slash piles shall be burned when wildfire risk is low (usually when soils are frozen or saturated). Follow state forestry laws, when applicable, for treating slash to minimize wildfire risk.
- Treated sites may be deferred from livestock grazing for a period of time determined to be adequate based on pre and post site conditions (i.e. brush densities, potential for erosion, potential for plant community to improve in health, vigor and cover). NRCS with input from the State Technical Committee and the affected state fish and wildlife agency will identify appropriate deferment periods.

Conservation Practice Standard: Herbaceous Weed Control (315)

Definition: The removal or control of herbaceous weeds including invasive, noxious and undesirable prohibited plants.

Purpose: This practice may be applied to control or remove invasive and noxious weeds through chemical, biological, or mechanical means to restore native or desired plant communities and habitat for LEPC consistent with the ecological site description. It secondarily protects soils, controls erosion, reduces fine-fuels fire hazards, and improves air quality.

Resource concern(s): Invasive and noxious weeds degrade ecological sites by increasing competition with native and desirable plant species. This results in decreased sustainability and resiliency of the ecological sites and leads to reduced habitat quality and quantity for wildlife, including LEPC.

Potential beneficial effect(s) to LEPC: Practice implementation removes or reduces invasive or other weed species that directly or indirectly limit LEPC habitat quality and productivity. Practice can beneficially influence the vigor and establishment of native or desirable vegetation required to provide LEPC habitat.

Potential adverse effect(s) to LEPC: Temporary physical disturbance (including noise), vegetation disturbance. Degradation and temporary impacts to structure of nesting habitat and loss of nests and/or young when mechanical treatment coincides with nesting season. Temporary reduction of forage and prey availability.

Documentation by State for Technical Practice 315:

- Colorado
  - Technical Practice Standard
  - Implementation Requirements
- Kansas
  - Technical Practice Standard
  - Implementation Requirements
- New Mexico
  - Technical Practice Standard
  - Implementation Requirements
- Oklahoma
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements - LEPC

- Texas
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements

Conservation Measures:

- Use site specific reclamation strategies developed using ecological site descriptions. Native species will be used whenever possible to meet practice objectives with preference to forbs, grasses and grass-like plants preferred by the LEPC as well as those plants that reflect the potential of the specific ecological site to optimize LEPC habitat needs. Seed mixes should be State certified, meeting the appropriate State certification criteria as being free of state declared noxious and invasive vegetative material.
- Spot treatment should be utilized where practicable.
- Monitor, evaluate and control State listed invasive and noxious plants during practice planning and design.
- Machinery associated with the practice should be clean and free of vegetative debris prior to use to prevent the spread of invasive plant species.
- Use the conservation measures provided for the facilitative practice of Critical Area Planting (342) in areas where reseeding disturbed areas is needed.
- Operate machinery in a manner that allows wildlife to flush and escape by methods such as starting operations in the middle of field and working outward, and/or by modify equipment with flush bar attachments.

Conservation Practice Standard: Conservation Cover (327)

Definition: Establishing and maintaining permanent vegetative cover.

Purpose: This practice shall be applied to reduce soil erosion and sedimentation, improve water quality, improve air quality, enhance wildlife habitat and pollinator habitat, improve soil quality, and manage plant pests. Special considerations will be given to planting species mixes that will provide LEPC habitat requirements.

Resource concern(s): This practice is most commonly used to convert cropland fields to permanent vegetative cover to prevent soil loss, improve soil conditions, and improve water quality and quantity and create habitat for LEPC. Cropland sites typically provide inadequate food and cover for LEPC and other grassland species.

Potential beneficial effect(s) to LEPC: Practice increases habitat quality for LEPC and restores diverse, permanent, native plant communities.

Potential adverse effect(s) to LEPC: Short-term and occasional physical disturbance (including noise); increased potential for invasive plants.

Documentation by State for Technical Practice 327:

- Colorado
  - Technical Practice Standard
  - Implementation Requirements
- Kansas
  - Technical Practice Standard
  - Practice Specifications
- New Mexico
  - Technical Practice Standard
  - Implementation Requirements
- Oklahoma
  - Technical Practice Standard
  - Implementation Requirements - LEPC
- Texas
  - Technical Practice Standard
  - Implementation Requirements

Conservation Measures:

- Evaluate the site's potential for soil erosion and invasion by undesirable plants during practice planning and design. Minimize soil and vegetative disturbances during installation of conservation practices. Utilize soil erosion protection measures, if potential for soil erosion exists (silt fences etc.).
- Use site specific reclamation strategies developed using ecological site descriptions. Native species will be used whenever possible to meet practice objectives with preference to forbs, grasses and grass-like plants preferred by the LEPC as well as those plants that reflect the potential of the specific ecological site to optimize LEPC habitat needs. Seed mixes should be State certified, meeting the appropriate State certification criteria as being free of state declared noxious and invasive vegetative material.
- Timing of planting and post-establishment vegetation management will be designed as per local site conditions to meet NRCS practice specifications and NRCS biologist or State Fish and Wildlife Agency recommendations.
- Monitor, evaluate and control State listed invasive and noxious plants during practice planning and design.
- Machinery associated with the practice should be clean and free of vegetative debris prior to use to prevent the spread of invasive plant species.

Conservation Practice Standard: Prescribed Burning (338)

Definition: Controlled fire applied to a predetermined area.

Purpose: Create the desired plant community phase consistent with the ecological site description that is preferable LEPC habitat. Control undesirable vegetation or to manipulate desired vegetation. Prepare sites for planting or seeding. Reduce wildfire hazards. Improve wildlife habitat specifically enhance and produce desirable or needed plant communities for all phases of LEPC life cycle. Improve forage production quantity and/or quality. Facilitate distribution of grazing to target the maintenance or creation of desired LEPC habitat. Restore and/or maintain ecological sites. This practice may be used to accomplish one or more of the following purposes:

- Manage undesirable vegetation to improve plant community structure and composition
- Manage pests, pathogens, and diseases to reduce plant pressure
- Reduce wildfire hazards from biomass accumulation
- Improve terrestrial habitat for wildlife and invertebrates
- Improve plant and seed production, quantity, and/or quality
- Facilitate distribution of grazing and browsing animals to improve forage-animal balance
- Improve and maintain habitat for soil organisms and enhance soil health

Resource concern(s): Lack of prescribed burning activities results in ecological sites which are vastly different from historic plant communities for LEPC and grazing by large ungulates such as livestock. Plant productivity, health, and vigor have been reduced due to a lack of fire. Increased fire return intervals have created a plant community less responsive to prescribed fire and have allowed for invasion of undesirable species such as eastern red cedar and non-native grass species.

Potential beneficial effect(s) to LEPC: With the use of prescribed burning plant communities can be altered to create brood-rearing habitat, increasing forbs and legumes while improving insect populations and succulent forbs needed by LEPC in early life stages. Prescribed burning is also important in maintaining or restoring plant communities as described in ecological site descriptions. Prescribed burning can be used to manipulate grazing activities for the purpose of restoring, creating, or manipulating plant communities to meet the LEPC habitat needs. Target areas and defined objective(s) will be clearly stated with intended goals to be addressed for each client defined management unit.

Potential adverse effect(s) to LEPC: Accidental injury or mortality of nesting hens, eggs, or brood may occur if the burn is conducted during the nesting or brood-rearing seasons. In addition, a temporary reduction of cover for LEPC may occur for one to three years.

Documentation by State for Technical Practice 338:

- Colorado
  - Technical Practice Standard
  - Implementation Requirements
- Kansas
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements
- New Mexico
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements
- Oklahoma
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements - LEPC
- Texas
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements

Conservation Measures:

- Defer implementation of this conservation practice within 1/2 mile to known leks until all breeding and nesting activities are completed, typically March 1 through July 15.

Conservation Practice Standard: Cover Crop (340)

Definition: Crops including grasses, legumes, and forbs for seasonal cover and other conservation purposes.

Purpose: This practice will reduce soil erosion from wind and water, increase soil organic matter content, capture and recycle or redistribute nutrients in the soil profile, promote biological nitrogen fixation, increase biodiversity, weed suppression, provide supplemental forage, soil moisture management, reduce particulate emissions into the

atmosphere, minimize and reduce soil compaction. Cover crops are typically used to provide ground cover until the permanent vegetation can be established when converting cropland to grass.

Resource concern(s): Limited LEPC brood rearing habitat between site preparation and full establishment can reduce brood survival.

Potential beneficial effect(s) to LEPC: Multi-species cover crops planted on cropland adjacent to LEPC nesting habitat for a full growing season or planted after small grain harvest can create and improve brood-rearing habitat if adjacent to grasslands. Cover crops planted until permanent vegetation is established can provide temporary stability in the ecosystem by improving soil quality, preventing erosion and providing limited cover for birds.

Potential adverse effect(s) to LEPC: Short-term and occasional physical disturbance (including noise); temporary vegetation disturbances; increased potential for invasive plants.

Documentation by State for Technical Practice 340:

- Colorado
  - Technical Practice Standard
  - Implementation Requirements
- Kansas
  - Technical Practice Standard
  - Practice Specifications
- New Mexico
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements
- Oklahoma
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements - LEPC
- Texas
  - Technical Practice Standard
  - Implementation Requirements

Conservation Measures:

- When implementing this practice on cropland for the purpose of establishing perennial vegetation several activities, primarily planting, will need to take place

during the primary breeding and nesting season. In these situations, an effort shall be taken to complete activities with as little disturbance as possible to adjacent and surrounding existing LEPC habitat.

- Evaluate the site's potential for soil erosion. Minimize soil and vegetative disturbances during installation of conservation practices. During installation, utilize soil erosion protection measures if potential for off-site soil erosion exists.
- Monitor, evaluate and control State listed invasive and noxious plants during practice planning and design.
- Machinery associated with the practice should be clean and free of vegetative debris prior to use to prevent the spread of invasive plant species.
- Where practicable use of more than one cover crop species will provide greater benefit to LEPC.

Conservation Practice Standard: Critical Area Planting (342)

Definition: Establishing permanent vegetation on sites that have, or are expected to have, high erosion rates, and on sites that have physical, chemical or biological conditions that prevent the establishment of vegetation with normal practices.

Purpose: This practice is applied as needed in order to stabilize erosion by the establishment of native and/or non-invasive vegetation in areas with disturbed soil from installation of other practices, such as grade stabilization structures or from long-term damage caused by oil and gas activities.

Resource concern(s): Loss and fragmentation of habitat. Un-vegetated, disturbed soil creates sites for invasive plant species to colonize, promotes increased soil erosion, and reduces wildlife habitat quality.

Potential beneficial effect(s) to LEPC: Establishment of permanent vegetation can provide stability in the ecosystem by improving soil quality, preventing erosion and providing limited cover for birds.

Potential adverse effect(s) to LEPC: Short-term and occasional physical disturbance (including noise); increased potential for invasive plants.

Documentation by State for Technical Practice 342:

- Colorado
  - Technical Practice Standard
  - Implementation Requirements
- Kansas
  - Technical Practice Standard

    - Practice Specifications
    - Implementation Requirements
- New Mexico
    - Technical Practice Standard
    - Practice Specifications
    - Implementation Requirements
- Oklahoma
    - Technical Practice Standard
    - Practice Specifications
    - Implementation Requirements - LEPC
- Texas
    - Technical Practice Standard
    - Implementation Requirements

Conservation Measures:

- Evaluate the site's potential for soil erosion. Minimize soil and vegetative disturbances during installation of conservation practices. During installation, utilize soil erosion protection measures if potential for off-site soil erosion exists.
- Use site specific reclamation strategies developed using ecological site descriptions. Native species will be used whenever possible to meet practice objectives with preference to forbs, grasses and grass-like plants preferred by the LEPC as well as those plants that reflect the potential of the specific ecological site to optimize LEPC habitat needs. Seed mixes should be State certified, meeting the appropriate State certification criteria as being free of state declared noxious and invasive vegetative material.
- Monitor, evaluate and control state listed invasive and noxious plants during practice planning and design.
- Machinery associated with the practice should be clean and free of vegetative debris prior to use to prevent the spread of invasive plant species.
- Timing of planting and post-establishment vegetation management will be designed as per local site conditions to meet NRCS practice specifications.
- Regularly monitor the site after implementation to ensure erosion and weed issues are addressed quickly

Conservation Practice Standard: Pond (378)

Definition: A water impoundment made by constructing an embankment or by excavating a pit or dugout. In this standard, ponds constructed by the first method are referred to as embankment ponds, and those constructed by the second method are referred to as excavated ponds. Ponds constructed by both the excavation and the

embankment methods are classified as embankment ponds if the depth of water impounded against the embankment at the auxiliary spillway elevation is 3 feet or more above the lowest original ground along the centerline of the embankment.

Purpose: The purpose of this practice is to provide water for livestock, fish and wildlife, recreation, fire control, and other related uses and to maintain or improve water quality.

Resource concern(s): The inability to provide adequate water supplies and to properly locate water supplies throughout grazing units can reduce the opportunity to manage livestock grazing distribution. As a result, forage may be over or under-utilized with resulting impacts on range health, livestock production and associated wildlife habitat. Livestock may be disproportionately concentrated near a water source and overgraze the surrounding area to the point where food producing forbs and legumes are eliminated, residual grasses are inadequate for nesting cover, and protective cover provided by shrubs is reduced due to heavy browsing. Conversely, areas more distant from a water supply may be underutilized and in the absence of disturbance, the health and vigor of grasses for livestock grazing and the value of the habitat for LEPC may be diminished through plant succession.

Potential beneficial effect(s) to LEPC: This practice facilitates improved distribution of livestock grazing and result in improved vegetative diversity and structure of LEPC habitat. This practice can also provide a supplemental water source for some wildlife species.

Potential adverse effect(s) to LEPC: Potentially there will be a small amount (10-20 acres per year cumulatively) of prairie-chicken nesting, brood-rearing, and foraging habitat permanently lost. Adverse impacts may result from constructing the pond during reproductive and nesting periods. Potential LEPC habitat consisting of grasses and shrubs would be permanently replaced with water. Pond construction could result in the concentration of livestock activity near the pond which could make the habitat less attractive to LEPCs. Undesirable plants, including woody vegetation may become established on disturbed soils which could reduce the quality and quantity of LEPC habitat.

Documentation by State for Technical Practice 378:

- Colorado
  - Technical Practice Standard
  - Practice Specifications
- Kansas
  - Technical Practice Standard
  - Implementation Requirements

- New Mexico
  - Technical Practice Standard
  - Practice Specifications
- Oklahoma
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements - LEPC
- Texas
  - Technical Practice Standard
  - Practice Specifications - Enbankment
  - Practice Specifications - Excavated

Conservation Measures:

- Defer implementation of this conservation practice within 1/2 mile to known leks until all breeding and nesting activities are completed, typically March 1 through July 15.
- Use site specific reclamation strategies developed using ecological site descriptions. Native species will be used whenever possible to meet practice objectives with preference to forbs, grasses and grass-like plants preferred by the LEPC as well as those plants that reflect the potential of the specific ecological site to optimize LEPC habitat needs. Seed mixes should be State certified, meeting the appropriate State certification criteria as being free of state declared noxious and invasive vegetative material.
- Monitor, evaluate and control State listed invasive and noxious plants during practice planning and design.
- Machinery associated with the practice should be clean and free of vegetative debris prior to use to prevent the spread of invasive plant species.
- Use the conservation measures provided for the facilitative practice of Critical Area Planting (342) in areas where reseeding disturbed areas is needed.
- This practice will only be applied where needed to meet the daily water requirements of livestock and to facilitate prescribed livestock grazing distribution.

Conservation Practice Standard: Fence (382)

Definition: A constructed barrier to animals or people.

Purpose: This practice facilitates the accomplishment of conservation objectives by providing a constructed means to control movement of animals and people, including

vehicles. The need and extent of this practice is determined based on the management practice it facilitates, such as prescribed grazing or access control.

Resource concern(s): The concerns typically addressed by a constructed fence are plant health and vigor, soil erosion and condition, livestock health and vigor and wildlife habitat needs.

Potential beneficial effect(s) to LEPC: This practice can be an effective tool for managing wild and domestic animal disturbance to LEPC habitat, including reseeded or reclaimed sites. Fence is typically used to facilitate prescribed grazing to areas targeted for creation or protection of specific habitat needs.

Potential adverse effect(s) to LEPC: Noise and physical disturbance during implementation; invasive plants following implementation; incidental damage or removal of desirable shrub during or prior to implementation; accidental mortality by way of collisions by flying LEPC after implementation, and potentially altering predator routes during and after implementation.

Documentation by State for Technical Practice 382:

- Colorado
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements – Barbed Barbless and Woven Wire
  - Implementation Requirements – Permanent Temporary Electric
  - Implementation Requirements – Suspension Fence
- Kansas
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements
- New Mexico
  - Technical Practice Standard
  - Practice Specifications – Barbed and Barbless
  - Practice Specification – Electric Fence
  - Implementation Requirements – Permanent Fence
  - Implementation Requirements - Electric Fence
- Oklahoma
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements - LEPC

- Texas
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements

Conservation Measures:

- Alternatives to fencing will be evaluated prior to fence installation (e.g., water placement, placement of minerals, prescribed burning) to achieve the desired outcome.
- Machinery associated with the practice should be clean and free of vegetative debris prior to use to prevent the spread of invasive plant species.
- Defer implementation of this conservation practice within ½ mile to known leks during breeding and nesting season, typically March 1 through July 15, daily until after 10:00 AM.
- Temporary electric fencing may be used in some cases to minimize potential collision fatalities.
- Permanent interior fence requires a maximum of 4 strands of wire < 44 inches high.
- Permanent exterior fencing must meet local fence laws and insurance liability clauses.
- Use the conservation measures provided for the facilitative practice of Critical Area Planting (342) in areas where reseeding disturbed areas is needed.

Conservation Practice Standard: Firebreak (394)

Definition: A permanent or temporary strip of bare or vegetated land planned to retard fire.

Purpose: Reduce the spread of wildfire and contain prescribed burns to their targeted area.

Resource concern(s): The primary concerns that a firebreak addresses are the spread of fire beyond the targeted prescribed burn area and the spread of wildfires, resulting in large-scale, temporary alteration of the landscape. Since fire is a naturally occurring ecological process that supports and maintains grasslands, providing a firebreak supports land managers in applying fire to manage their resources in benefit of livestock production and wildlife habitat. Without firebreaks, the use of prescribed fire is less likely, and results in a declining quality of grassland habitat for wildlife.

Potential beneficial effect(s) to LEPC: This practice can help reduce the spread of wildfires thus reducing the risk of large-scale, habitat loss. Firebreaks incentivize use of

fire as a management tool because it supports safer application. Firebreaks can provide a food source for LEPC by stimulating annual forb growth.

Potential adverse effect(s) to LEPC: Short-term physical disturbances, such as disking or mowing, may cause LEPC to leave the area temporarily. Disked or mowed firebreaks disturb vegetation and result in a temporary reduction of cover over a small area. Soil disturbance may also allow invasive plants to grow and alter the community structure.

Documentation by State for Technical Practice 394:

- Colorado
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements
- Kansas
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements
- New Mexico
  - Technical Practice Standard
  - Implementation Requirements
- Oklahoma
  - Technical Practice Standard
  - Implementation Requirements - LEPC
- Texas
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements

Conservation Measures:

- Disked firebreaks will be allowed to re-establish or be seeded to beneficial grasses, forbs, and legumes to provide bugging or brood rearing habitat.
- State-listed noxious and invasive plants will be identified and controlled following firebreak installation.

Conservation Practice Standard: Grade stabilization structure (410)

Definition: A structure used to control the grade and head cutting in natural or artificial channels.

Purpose: This practice may be applied to stabilize the grade and control erosion in natural or artificial channels to prevent the formation or advance of gullies, restore associated hydrology to surrounding lands, and to enhance environmental quality by reducing siltation or pollution hazards.

Resource concern(s): Erosion control.

Potential beneficial effect(s) to LEPC: This practice can control erosion that if left unchecked can result in habitat loss or degradation.

Potential adverse effect(s) to LEPC: Temporary physical disturbance (including noise), vegetation disturbance and increased potential for invasive plants. Individual mortality risk from vehicle strikes.

Documentation by State for Technical Practice 410:

- Colorado
  - Technical Practice Standard
  - Practice Specifications
- Kansas
  - Technical Practice Standard
  - Practice Specifications
- New Mexico
  - Technical Practice Standard
  - Practice Specifications – Log Drop
  - Practice Specifications – Rock and Brush
- Oklahoma
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements - LEPC
- Texas
  - Technical Practice Standard
  - Practice Specifications

Conservation Measures:

- Evaluate the site's potential for soil erosion. Minimize soil and vegetative disturbances during installation of conservation practices. During installation, utilize soil erosion protection measures if potential for off-site soil erosion exists.
- Use site specific reclamation strategies developed using ecological site descriptions. Native species will be used whenever possible to meet practice objectives with preference to forbs, grasses and grass-like plants preferred by the

LEPC as well as those plants that reflect the potential of the specific ecological site to optimize LEPC habitat needs. Seed mixes should be State certified, meeting the appropriate State certification criteria as being free of state declared noxious and invasive vegetative material.

- Monitor, evaluate and control State listed invasive and noxious plants during practice planning and design.
- Machinery associated with the practice should be clean and free of vegetative debris prior to use to prevent the spread of invasive plant species.
- Timing of planting and post-establishment vegetation management will be designed as per local site conditions to meet NRCS practice specifications.
- Regularly monitor the site after implementation to ensure erosion and weed issues are addressed quickly.
- Ingress/egress routes will avoid nesting/brood-rearing/lek areas as mortality may occur on routes.
- Use the conservation measures provided for the facilitative practice of Critical Area Planting (342) in areas where reseeding disturbed areas is needed.
- Defer implementation of this conservation practice within 1/2 mile to known leks during breeding and nesting seasons, typically March 1 through July 15, until after 10 am.

Conservation Practice Standard: Wildlife Habitat Planting (420)

Definition: Establishing wildlife habitat by planting herbaceous vegetation or shrubs.

Purpose: This practice is used to improve degraded wildlife habitat for the target wildlife species or guild and/or establish wildlife habitat that resembles the historic, desired, and reference native plant community.

Resource concern(s): This practice is most commonly used to convert areas that are currently being used for other purposes (cropland or pasture) to herbaceous or shrubby wildlife habitat to prevent soil loss, improve soil conditions, and improve water quality and quantity and create habitat for LEPC. Cropland sites typically provide inadequate cover for LEPC.

Potential beneficial effect(s) to LEPC: Practice increases habitat quality for LEPC and restores diverse, permanent, native plant communities.

Potential adverse effect(s) to LEPC: Short-term and occasional physical disturbance (including noise); temporary vegetation disturbances; increased potential for invasive plants.

Documentation by State for Technical Practice 420:

- Colorado
  - Technical Practice Standard
  - Implementation Requirements
- Kansas
  - Technical Practice Standard
- New Mexico
  - Technical Practice Standard
  - Implementation Requirements
- Oklahoma
  - Technical Practice Standard
  - Implementation Requirements
- Texas
  - Technical Practice Standard
  - Implementation Requirements

Conservation Measures:

- When implementing this practice on cropland for the purpose of establishing perennial vegetation several activities, primarily planting, will need to take place during the primary breeding and nesting season. In these situations, an effort shall be taken to complete activities with as little disturbance as possible to adjacent and surrounding existing LEPC habitat.
- Use site specific reclamation strategies developed using ecological site descriptions. Native species will be used whenever possible to meet practice objectives with preference to forbs, grasses and grass-like plants preferred by the LEPC as well as those plants that reflect the potential of the specific ecological site to optimize LEPC habitat needs. Seed mixes should be State certified, meeting the appropriate State certification criteria as being free of state declared noxious and invasive vegetative material.
- Timing of planting and post-establishment vegetation management will be designed as per local site conditions to meet NRCS practice specifications and NRCS biologist or State Fish and Wildlife Agency recommendations.
- Monitor, evaluate and control State listed invasive and noxious plants during practice planning and design.
- Machinery associated with the practice should be clean and free of vegetative debris prior to use to prevent the spread of invasive plant species.
- Control livestock access as needed to allow for initial establishment of new vegetative plantings and control weeds through flash grazing.

Conservation Practice Standard: Access Control (472)

Definition: The temporary or permanent exclusion of animals, people, vehicles, and/or equipment from an area.

Purpose: Prevent, restrict, or control access to an area in order to maintain or improve the quantity and quality of natural resources.

Resource concern(s): Habitat improvement and/or protection from excessive vehicles, domestic animals, or human activities.

Potential beneficial effect(s) to LEPC: Practice can be an effective tool for reducing disturbance to LEPCs and their habitats, such as lek areas. Access control in combination with prescribed grazing can be used to help improve vegetative structure and composition for nesting and brood rearing.

Potential adverse effect(s) to LEPC: Potential short-term temporary disturbance, including noise, while installing necessary elements. Access control could allow species such as eastern red cedar, invasive shrubs and forbs, and non-native grasses to establish or expand due to a change in the use of a previously disturbed site.

Documentation by State for Technical Practice 472:

- Colorado
  - Technical Practice Standard
  - Implementation Requirements
- Kansas
  - Technical Practice Standard
- New Mexico
  - Technical Practice Standard
  - Implementation Requirements
  - Implementation Requirements – Existing Fence
- Oklahoma
  - Technical Practice Standard
  - Implementation Requirements
- Texas
  - Technical Practice Standard
  - Implementation Requirements

Conservation Measures:

- This practice standard will be designed to support other practices which will create the desired habitat conditions for the LEPC.
- Routine follow-up will occur to monitor the effectiveness of the practice, at least annually.
- If fence construction is needed to facilitate this practice, use the Fence (382) conservation practice standard for specific conservation measures.

Conservation Practice Standard: Forage Harvest Management (511)

Definition: The timely cutting and removal of forages from the field as hay, green-chop or ensilage.

Purpose: This practice may be applied annually during the forage growing season (summer), to optimize yield and quality of forage at the desired levels; to promote vigorous plant re-growth; to manage for the desired species composition; to remove soil nutrients through uptake and harvest of forage plant biomass; to control insects, diseases and weeds; and to maintain or improve LEPC habitat by providing a vigorous plant community with the composition and structure needed for nesting and brood-rearing activities. This practice is most used to manage the timing, frequency, and extent of forage harvest to maintain plant production, health and vigor. Within the range of LEPC, this practice would primarily be associated with native grass hay production, but could also apply to hay crops such as alfalfa and annually planted forage species.

Resource concern(s): Yield and quality of forage, plant vigor, and timing of harvest, insects, diseases and weeds are typical concerns addressed by this practice.

Potential beneficial effect(s) to LEPC: This practice will be used to insure that hay fields and forages used by LEPC are not cut, harvested, or otherwise disturbed during reproductive and nesting periods. The practice can also be used to designate areas that will annually remain un-harvested and to retain site specific minimum heights of residual vegetation for future use. Finally, the practice can be used to maintain desirable plant composition and structure for food production, nesting cover, and brood rearing habitat.

Potential adverse effect(s) to LEPC: Without the conservation plan and the associated conservation measures of this conservation practice, adverse impacts may result from unrestricted cutting and harvesting forage during reproductive and nesting periods resulting in disturbance of breeding activities on lek sites and nesting hens, and the injury and mortality of hens, young brood, and eggs.

Documentation by State for Technical Practice 511:

- Colorado
  - Technical Practice Standard
  - Implementation Requirements
- Kansas
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements
- New Mexico
  - Technical Practice Standard
  - Implementation Requirements for CRP
- Oklahoma
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements - LEPC
- Texas
  - Technical Practice Standard

Conservation Measures:

- Defer implementation of this conservation practice within ½ mile to known leks until all nesting activities are completed, typically April 15 through July 15.
- Leave corners, field borders, and odd areas un-harvested for supplemental cover and brood rearing habitat.

Conservation Practice Standard: Forage and Biomass Planting (512)

Definition: Establishing adapted and/or compatible species, varieties, or cultivars of herbaceous species suitable for pasture, hay production.

Purpose: This practice may be applied as needed to improve or maintain livestock nutrition and health, to provide or increase forage supply during periods of low forage production, to reduce soil erosion, improve soil and water quality, and to produce feedstock for bio-fuel or energy production. Within the action area, this practice is typically used to convert croplands to perennial grass and legume mixtures to increase forage hay production and grazing for livestock.

Resource concern(s): This practice is most commonly used to convert cropland fields to permanent vegetative cover to prevent soil loss, improve soil conditions, improve wildlife cover, and improve water quality and quantity. When native species are used, this

practice offsets habitat loss, fragmentation, and quality by addressing the needs for adequate food for livestock and will provide adequate food and cover for the LEPC.

Potential beneficial effect(s) to LEPC: Many of these plantings can provide good quality nesting and brood-rearing habitat if haying and grazing are properly managed. The corresponding increase in available forage for livestock can also remove grazing pressure on existing native rangelands and lead to improved range condition.

Potential adverse effect(s) to LEPC: Short-term adverse impacts may result from installing the practice during reproductive period. However, this practice is typically implemented on cropland fields with limited prior value to LEPC, so disturbance impacts would be minimal.

Documentation by State for Technical Practice 512:

- Colorado
  - Technical Practice Standard
- Kansas
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements
- New Mexico
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements
- Oklahoma
  - Technical Practice Standard
  - Implementation Requirements - LEPC
- Texas
  - Technical Practice Standard
  - Implementations Requirements

Conservation Measures:

- When implementing this practice for the purpose of establishing perennial vegetation several activities, primarily planting, will need to take place during the primary breeding and nesting season. In these situations, an effort shall be taken to complete activities with as little disturbance as possible to adjacent and surrounding existing LEPC habitat.
- Use site specific reclamation strategies developed using ecological site descriptions. Native species will be used whenever possible to meet practice objectives with preference to forbs, grasses and grass-like plants preferred by the

LEPC as well as those plants that reflect the potential of the specific ecological site to optimize LEPC habitat needs. Seed mixes should be State certified, meeting the appropriate State certification criteria as being free of state declared noxious and invasive vegetative material.

- Timing of planting and post-establishment vegetation management will be designed as per local site conditions to meet NRCS practice specifications and NRCS biologist or State Fish and Wildlife Agency recommendations.
- Monitor, evaluate and control State listed invasive and noxious plants during practice planning and design.
- Machinery associated with the practice should be clean and free of vegetative debris prior to use to prevent the spread of invasive plant species.
- Operate machinery in a manner that allows wildlife to flush and escape by methods such as starting operations in the middle of field and working outward, and/or by modify equipment with flush bar attachments.
- Control livestock access as needed to allow for initial establishment of new vegetative plantings and control weeds through flash grazing.

Conservation Practice Standard: Pipeline (516)

Definition: A pipeline and appurtenances installed to convey water for livestock or wildlife. Pipeline having an inside diameter of 8 inches or less.

Purpose: The purpose of this practice is to convey water from a source of supply to points of use for livestock, wildlife, or recreational purposes. Typically, the water conveyed by a pipeline originates from a well, spring, or in some cases, ponds and streams. The practice is most commonly used to facilitate proper use of vegetation through grazing distribution, to meet the daily water requirements of livestock, or to provide alternative sources of livestock water away from streams and aquatic habitats.

Resource concern(s): The inability to provide adequate water supplies and to properly locate water supplies throughout grazing units can reduce the opportunity to manage livestock grazing distribution. As a result, forage may be over or under-utilized with resulting impacts on range health, livestock production and associated wildlife habitat. Livestock may be disproportionately concentrated near a water source and overgraze the surrounding area to the point where food producing forbs and legumes are eliminated, residual grasses are inadequate for nesting cover, and protective cover provided by shrubs is reduced due to heavy browsing. Conversely, areas more distant from a water supply may be underutilized and in the absence of disturbance, the health and vigor of grasses for livestock grazing and the value of the habitat for LEPC may be diminished through plant succession.

Potential beneficial effect(s) to LEPC: Practice may facilitate improved livestock grazing management, which allows for creation, maintenance or enhancement of nesting and brood-rearing habitat for LEPC, and can provide water availability for other wildlife. The disturbed area created by construction activities along the pipeline route may support early succession forbs and legumes that can provide food and brood-rearing habitat for LEPCs.

Potential adverse effect(s) to LEPC: Temporary noise and minimal physical disturbance may occur during construction along with short-term reduction of cover that can result in invasive species and erosion problems. Adverse impacts may result from constructing and installing the pipeline during reproductive and nesting periods. Undesirable plants may become established on disturbed soils which could reduce the quality and quantity of LEPC habitat. Beneficial shrubs such as sand sagebrush and shinnery oak could be removed during construction.

Documentation by State for Technical Practice 516:

- Colorado
  - Technical Practice Standard
  - Practice Specifications
- Kansas
  - Technical Practice Standard
  - Practice Specifications
- New Mexico
  - Technical Practice Standard
  - Practice Specifications
- Oklahoma
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements - LEPC
- Texas
  - Technical Practice Standard
  - Practice Specifications

Conservation Measures:

- Use site specific reclamation strategies developed using ecological site descriptions. Native species will be used whenever possible to meet practice objectives with preference to forbs, grasses and grass-like plants preferred by the LEPC as well as those plants that reflect the potential of the specific ecological site to optimize LEPC habitat needs. Seed mixes should be State certified,

meeting the appropriate State certification criteria as being free of state declared noxious and invasive vegetative material.

- Design the pipeline route to minimize or avoid the loss of desirable shrubs during practice installation.
- Monitor, evaluate and control State listed invasive and noxious plants during practice planning and design.
- Machinery associated with the practice should be clean and free of vegetative debris prior to use to prevent the spread of invasive plant species.
- Timing of planting and post-establishment vegetation management will be designed as per local site conditions to meet NRCS practice specifications.
- Regularly monitor the site after implementation to ensure erosion and weed issues are addressed quickly.
- Use the conservation measures provided for the facilitative practice of Critical Area Planting (342) in areas where reseeding disturbed areas is needed.
- Defer implementation of this conservation practice within 1/2 mile to known leks during breeding and nesting seasons, typically March 1 through July 15.

Conservation Practice Standard: Prescribed Grazing (528)

Definition: Managing the harvest of vegetation with grazing and/or browsing animals.

Purpose: When livestock grazing is present or planned, this practice is applied or maintained annually as a part of a conservation management system to achieve one or more of the following: (A) Improve or maintain desired species composition and vigor of plant communities. (B) Improve or maintain quantity and quality of forage for grazing and browsing animals' health and productivity. (C) Improve or maintain surface and/or subsurface water quality and quantity. (D) Improve or maintain riparian and watershed function. (E) Reduce soil erosion, and maintain or improve soil condition. (F) Improve or maintain the quantity and quality of food and/or cover available for wildlife. (G) Manage fine fuel loads to achieve desired conditions. (H) Promote economic stability through grazing land sustainability and continued livestock production.

At the individual and landscape scale, the use of this practice standard is expected to produce a mosaic of vegetation structure and composition to benefit the LEPC (e.g. create areas of greater forb and resulting insect production, create areas of higher residual cover for nesting birds and maintain open lek habitat).

Resource concern(s): Resource concerns addressed by this practice are lack of diverse species composition and vigor of plant communities, low quantity and quality of forage for grazing and browsing animals, water quality and quantity, soil erosion, quantity and quality of food and/or cover available for wildlife, and economic stability for continued

livestock production. Additional resource concern is the identification of limiting biological conditions for the LEPC and the creation of a grazing management system to help address the limiting biological conditions for the LEPC.

Potential beneficial effect(s) to LEPC: Practice assures that stocking rate is in balance with forage supply, season of use is rotated to ensure plants have adequate reproduction opportunity, and rangeland is monitored to inform adaptive management. These measures ensure that rangelands are managed sustainably to provide continued ecological processes, forage for livestock and wildlife, and habitat for wildlife, including LEPC. Planned grazing systems are expected to increase residual cover of perennial grasses and forbs to improve the LEPC nesting cover and success. Increased residual cover will also improve plant litter cover over the soil surface. Plant litter facilitates better moisture infiltration and produces more vegetative cover for nesting birds as well as increased forbs for brood habitat. Grazing system can also decrease the time any one pasture is exposed to grazing animals and people reducing the overall disturbance to individual birds.

Potential adverse effect(s) to LEPC: Physical disturbance may be realized from livestock grazing (short-term negative grazing impacts may temporarily cause birds to leave the immediate area or reduce availability of nesting cover). Depending on the source of livestock used in prescribed grazing, there is possibility of the introduction of invasive plants. Additionally, mortality to individuals (adults, chicks, and/or eggs) is possible as a result of trampling and indirectly due to a flushing response of individual birds that may result in the subsequent mortality event due to the presence of a chance/opportunistic predator.

Documentation by State for Technical Practice 528:

- Colorado
  - Technical Practice Standard
- Kansas
  - Technical Practice Standard
  - Practice Specifications
- New Mexico
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements - CRP
- Oklahoma
  - Technical Practice Standard
  - Practice Specifications

- Texas
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements

Conservation Measures:

- Follow all CRP Grazing policies.

- Implementation of grazing management plans, to the extent practicable, will meet habitat conditions for each habitat type.
- Frequency- Grazing recurrence will occur at a rate necessary to create or maintain desired habitat structure. Grazing systems which prescribe high intensity or rapid forage removal will allow for adequate recovery time (non-grazed periods) to meet LEPC habitat needs.
- Duration- Grazing periods (days, weeks, or months) for scheduled grazing events will be designed to address limiting habitat factors as identified by the habitat assessments for the LEPC. Scheduled grazing periods will also be used to manipulate or create desired or targeted habitat conditions.
- Timing- Grazing events will be scheduled, when possible, to avoid potential disturbance to known breeding or lek sites.
- Intensity- The amount of forage removed (or left) during any particular grazing cycle will be in keeping with the specific life cycle requirements (i.e. nesting, leking, brood rearing, etc.)
- Develop contingency plans to deal with expected episodic disturbance events (eg. Drought, wildfire, insect infestation, etc.).

Conservation Practice Standard: Range Planting (550)

Definition: Establishment of adapted perennial or self-sustaining vegetation such as grasses, forbs, legumes, shrubs, and trees.

Purpose: Applied to restore the native plant community to a condition similar to the ecological site description reference state for the site, provide or improve forages for livestock and browse or cover for wildlife, reduce erosion by wind and/or water, improve water quality and quantity, and increase carbon sequestration. This practice is used to restore important native habitats by converting cropland to grasslands, to meet habitat requirements for LEPC.

Resource concern(s): This practice is most commonly used to convert cropland fields to permanent vegetative cover to prevent soil loss, improve soil conditions, and improve

water quality and quantity and create habitat for LEPC. Cropland sites typically provide inadequate food and cover for LEPC and other grassland species.

Potential beneficial effect(s) to LEPC: Practice increases habitat quality for LEPC and addresses habitat loss and fragmentation by restoring diverse, permanent, native plant communities.

Potential adverse effect(s) to LEPC: Short-term and occasional physical disturbance (including noise); increased potential for invasive plants.

Documentation by State for Technical Practice 550:

- Colorado
  - Technical Practice Standard
- Kansas
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements
- New Mexico
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements
- Oklahoma
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements - LEPC
- Texas
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements

Conservation Measures:

- When implementing this practice for the purpose of establishing perennial vegetation several activities, primarily planting, will need to take place during the primary breeding and nesting season. In these situations, an effort shall be taken to complete activities with as little disturbance as possible to adjacent and surrounding existing LEPC habitat.
- Use site specific reclamation strategies developed using ecological site descriptions. Native species will be used whenever possible to meet practice objectives with preference to forbs, grasses and grass-like plants preferred by the LEPC as well as those plants that reflect the potential of the specific ecological

site to optimize LEPC habitat needs. Seed mixes should be State certified, meeting the appropriate State certification criteria as being free of state declared noxious and invasive vegetative material.

- Timing of planting and post-establishment vegetation management will be designed as per local site conditions to meet NRCS practice specifications and NRCS biologist or state fish and wildlife agency recommendations.
- Monitor, evaluate and control State listed invasive and noxious plants during practice planning and design.
- Machinery associated with the practice should be clean and free of vegetative debris prior to use to prevent the spread of invasive plant species.
- Operate machinery in a manner that allows wildlife to flush and escape by methods such as starting operations in the middle of field and working outward, and/or by modify equipment with flush bar attachments.
- Control livestock access as needed to allow for initial establishment of new vegetative plantings and control weeds through flash grazing.

Conservation Practice Standard: Heavy Use Area Protection (561)

Definition: The stabilization of areas frequently and intensively used by people, animals, or vehicles by establishing vegetative cover, surfacing with suitable materials, and/or installing needed structures.

Purpose: To provide a stable, non-eroding surface for areas frequently used by animals, people, or vehicles and to protect and improve water quality.

Resource concern(s): The inability to provide adequate water supplies and to properly locate water supplies throughout grazing units can reduce the opportunity to mange livestock grazing distribution. As a result, forage may be over or under-utilized with resulting impacts on range health, livestock production and associated wildlife habitat. Livestock may be disproportionately concentrated near a water source and overgraze the surrounding area to the point where food producing forbs and legumes are eliminated, residual grasses are inadequate for nesting cove r, and protective cover provided by shrubs is reduced due to heavy browsing. Conversely, areas more distant from a water supply may be underutilized and in the absence of disturbance, the health and vigor of grasses for livestock grazing and the value of the habitat for LEPC may be diminished through plant succession. Without proper protection in the area immediately surrounding the tank this area will become prone to erosion and water quality concerns.

Potential beneficial effect(s) to LEPC: Use of this practice in conjunction with and as a supporting practice for watering facilities can facilitate prescribed grazing by livestock to conserve or enhance important LEPC habitat.

Potential adverse effect(s) to LEPC: Short-term and occasional physical disturbance (including noise) and temporary vegetation disturbance during installation. There could also be an increased potential for invasive plants in the disturbed soil post installation.

Documentation by State for Technical Practice 561:

- Colorado
  - Technical Practice Standard
  - Practice Specifications
- Kansas
  - Technical Practice Standard
  - Practice Specifications
- New Mexico
  - Technical Practice Standard
- Oklahoma
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements - LEPC
- Texas
  - Technical Practice Standard
  - Practice Specifications

Conservation Measures:

- Defer implementation of this conservation practice within 1/2 mile to known leks until all breeding and nesting activities are completed, typically March 1 through July 15.
- Evaluate the site's potential for soil erosion and invasion by undesirable plants during practice planning and design. Minimize soil and vegetative disturbances during installation of conservation practices. Utilize soil erosion protection measures if potential for soil erosion exists (silt fences etc.).
- Design conservation practice to minimize or avoid loss of shrubs during practice installation.
- If access for operation and maintenance is required, limit access to one side of disturbance and limit access to one vehicle width.
- Use site specific reclamation strategies developed using ecological site descriptions. Native species will be used whenever possible to meet practice objectives with preference to forbs, grasses and grass-like plants preferred by the LEPC as well as those plants that reflect the potential of the specific ecological site to optimize LEPC habitat needs. Seed mixes should be State certified,

meeting the appropriate State certification criteria as being free of state declared noxious and invasive vegetative material.

- Monitor, evaluate and control State listed invasive and noxious plants during practice planning and design.
- Machinery associated with the practice should be clean and free of vegetative debris prior to use to prevent the spread of invasive plant species.
- Timing of planting and post-establishment vegetation management will be designed as per local site conditions to meet NRCS practice specifications.
- Regularly monitor the site after implementation to ensure erosion and weed issues are addressed quickly.
- Limit duration of construction period to the minimum practicable.

Conservation Practice Standard: Spring Development (574)

Definition: Collection of water from springs or seeps to provide water for a conservation need.

Purpose: Spring developments will be applied to improve the quantity and quality of water for livestock and wildlife or other agricultural uses. This practice will be used to facilitate prescribed grazing to improve water quality, reduce erosion, protect sensitive areas, and/or improve mesic habitat quality for LEPC and broods.

Resource concern(s): The inability to provide adequate water supplies and to properly locate water supplies throughout grazing units can reduce the opportunity to manage livestock grazing distribution. As a result, forage may be over or under-utilized with resulting impacts on range health, livestock production and associated wildlife habitat. Livestock may be disproportionately concentrated near a water source and overgraze the surrounding area to the point where food producing forbs and legumes are eliminated, residual grasses are inadequate for nesting cover, and protective cover provided by shrubs is reduced due to heavy browsing. Conversely, areas more distant from a water supply may be underutilized and in the absence of disturbance, the health and vigor of grasses for livestock grazing and the value of the habitat for LEPC may be diminished through plant succession.

Potential beneficial effect(s) to LEPC: Practice may facilitate improved livestock grazing management, which allows for creation, enhancement or maintenance of nesting and brood-rearing habitat for LEPC, and can provide improved water quality and water availability for other wildlife.

Potential adverse effect(s) to LEPC: Temporary noise and minimal physical disturbance may occur during construction along with short-term reduction of cover that

can result in invasive species. Small amount of permanent habitat loss as affected area is usually less than 1/8 acre per spring.

Documentation by State for Technical Practice 574:

- Colorado
  - Technical Practice Standard
- Kansas
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements
- New Mexico
  - Technical Practice Standard
  - Practice Specifications
- Oklahoma
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements
- Texas
  - Technical Practice Standard
  - Practice Specifications

Conservation Measures:

- Evaluate the site's potential for soil erosion and invasion by undesirable plants during practice planning and design. Minimize soil and vegetative disturbances during installation of conservation practices. Utilize soil erosion protection measures if potential for soil erosion exists (silt fences etc).
- Use site specific reclamation strategies developed using ecological site descriptions. Native species will be used whenever possible to meet practice objectives with preference to forbs, grasses and grass-like plants preferred by the LEPC as well as those plants that reflect the potential of the specific ecological site to optimize LEPC habitat needs. Seed mixes should be State certified, meeting the appropriate State certification criteria as being free of state declared noxious and invasive vegetative material.
- Monitor, evaluate and control State listed invasive and noxious plants during practice planning and design.
- Machinery associated with the practice should be clean and free of vegetative debris prior to use to prevent the spread of invasive plant species.
- Timing of planting and post-establishment vegetation management will be designed as per local site conditions to meet NRCS practice specifications.

- Regularly monitor the site after implementation to ensure erosion and weed issues are addressed quickly.
- Ingress/egress routes will avoid nesting/brood-rearing/lek areas as mortality may occur on routes resulting from bird-vehicle collisions.

Conservation Practice Standard: Tree/Shrub Establishment (612)

Definition: Establishing woody plants by planting seedlings or cuttings, direct seeding, or natural regeneration.

Purpose: To restore or enhance the desired native shrub community that is consistent with the ecological site description and as recommended by the affected state fish and wildlife agency that identifies the most suitable habitat for the LEPC and other wildlife species. Specifically, Tree/Shrub Establishment (612) may be used for the purpose of:

1. Providing vertical and thermal cover.
2. Improving the diversity of habitat to create a wider suite of food options that are available throughout the LEPC's life cycle.
3. Increasing food availability during heavy snow events.

Resource concern(s): Wildlife habitat, specifically increased over-winter food, vegetative structure, and thermal cover for LEPC.

Potential beneficial effect(s) to LEPC: While implementation of this practice may cause limited short term adverse impacts, the long term benefits achieved will far exceed any short term detriments associated with this practice. The practice will ameliorate a limiting habitat factor and create desired or targeted habitat conditions. Benefits include increased availability of food during heavy snowfall events, diversity of cover beneficial for thermal regulation in winter and summer, and enhanced pollinator habitat, which will increase available food potential for broods.

Potential adverse effect(s) to LEPC: Short-term effects may result from visual and physical disturbance (including noise) during implementation. Temporary vegetation disturbances resulting from implementation and increased potential for invasive plants on disturbed areas. There might be an increased potential for accidental mortality during implementation, especially from overland vehicle travel.

Documentation by State for Technical Practice 612:

- Colorado
  - Technical Practice Standard
  - Implementation Requirements
- Kansas

    - Technical Practice Standard
    - Practice Specifications
    - Implementation Requirements
- New Mexico
    - Technical Practice Standard
    - Practice Specifications
    - Implementation Requirements
- Oklahoma
    - Technical Practice Standard
    - Practice Specifications
    - Implementation Requirements - LEPC
- Texas
    - Technical Practice Standard
    - Practice Specifications
    - Implementation Requirements

Conservation Measures:

- Evaluate and minimize the site's potential for soil erosion and invasion by undesirable plants during practice planning and design.
- Regularly monitor the site after implementation to ensure erosion and undesirable plant issues are addressed quickly.
- Machinery associated with the practice should be clean and free of vegetative debris prior to use to prevent the spread of invasive plant species.
- Minimize vegetative disturbances during application of conservation practices.
- The implementation plan shall clearly identify any special resources that need to be avoided such as riparian areas, wetlands/playas, leks, or habitat of other at-risk species.
- When livestock are present, plots must be deferred from livestock grazing for a period of time determined to be adequate based on recommendations in the Tree/Shrub Establishment (612) conservation practice standard and specifications. (See also the plot definition in Practice Application guidelines.)
- Species planted must be ecologically appropriate, arranged to minimize predator impacts, and beneficial to LEPC.
- Within the LEPC Action Area, all Tree/Shrub Establisment (612) shrub plantings shall be completed in coordination with the local biologist (Service) who will sign off on the planting as either providing LEPC habitat or not negatively impacting LEPCs. Tree and srub planting that would negatively impact the LEPC is not covered in this consultation and would require additional consultation with the FWS under Section 7 of the ESA.

Conservation Practice Standard: Watering Facility (614)

Definition: A permanent or portable device to provide an adequate amount and quality of drinking water for livestock and or wildlife.

Purpose: To provide access to drinking water for livestock and/or wildlife to meet daily water requirements and improve animal distribution. This practice will be applied in the action area to facilitate Prescribed Grazing (528) to provide access to drinking water for livestock to meet daily water requirements and improve animal distribution to conserve or enhance important LEPC habitat.

Resource concern(s): The inability to provide adequate water supplies and to properly locate water supplies throughout grazing units can reduce the opportunity to manage livestock grazing distribution. As a result, forage may be over or under-utilized with resulting impacts on range health, livestock production and associated wildlife habitat. Livestock may be disproportionately concentrated near a water source and overgraze the surrounding area to the point where food producing forbs and legumes are eliminated, residual grasses are inadequate for nesting cover, and protective cover provided by shrubs is reduced due to heavy browsing. Conversely, areas more distant from a water supply may be underutilized and in the absence of disturbance, the health and vigor of grasses for livestock grazing and the value of the habitat for LEPC may be diminished through plant succession.

Potential beneficial effect(s) to LEPC: Use of this practice can facilitate prescribed grazing by livestock and can provide water for some wildlife species, including LEPC. This benefit may be especially pronounced during drought conditions.

Potential adverse effect(s) to LEPC: Short-term and occasional physical disturbance (including noise) and temporary vegetation disturbance during installation. There could also be an increased potential for invasive plants in the disturbed soil post installation. Small amount of permanent removal or loss of suitable habitat for the footprint of the structure. Direct mortality can occur due to drowning.

Documentation by State for Technical Practice 614:

- Colorado
  - Technical Practice Standard
  - Practice Specifications
- Kansas
  - Technical Practice Standard
  - Practice Specifications
- New Mexico

    - Technical Practice Standard
    - Practice Specifications
- Oklahoma
    - Technical Practice Standard
    - Practice Specifications – Trough Tanks
    - Practice Specifications – Watering Ramps
    - Implementation Requirements - LEPC
- Texas
    - Technical Practice Standard
    - Practice Specifications

Conservation Measures:

- Evaluate the site's potential for soil erosion and invasion by undesirable plants during practice planning and design. Minimize soil and vegetative disturbances during installation of conservation practices. Utilize soil erosion protection measures if potential for soil erosion exists (silt fences etc.).
- Design conservation practice to minimize or avoid loss of shrubs during practice installation.
- If access for operation and maintenance is required, limit access to one side of disturbance and a limit access to one vehicle width.
- Use site specific reclamation strategies developed using ecological site descriptions. Native species will be used whenever possible to meet practice objectives with preference to forbs, grasses and grass-like plants preferred by the LEPC as well as those plants that reflect the potential of the specific ecological site to optimize LEPC habitat needs. Seed mixes should be State certified, meeting the appropriate State certification criteria as being free of state declared noxious and invasive vegetative material.
- Monitor, evaluate and control State listed invasive and noxious plants during practice planning and design.
- Machinery associated with the practice should be clean and free of vegetative debris prior to use to prevent the spread of invasive plant species.
- Timing of planting and post-establishment vegetation management will be designed as per local site conditions to meet NRCS practice specifications.
- Regularly monitor the site after implementation to ensure erosion and weed issues are addressed quickly.
- Install wildlife escape ramps.
- Limit duration of construction period to the minimum practicable.

Conservation Practice Standard: Water Well (642)

Definition: A hole drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for agricultural water supply.

Purpose: This practice will be applied to provide water for livestock to facilitate proper use of vegetation through grazing distribution and to provide alternative sources of livestock water to meet the daily animal requirements. The water provided by the well is also used as a part of a watering system that includes watering facilities, pipeline and pumping plant.

Resource concern(s): The inability to provide adequate water supplies and to properly locate water supplies throughout grazing units can reduce the opportunity to manage livestock grazing distribution. As a result, forage may be over or under-utilized with resulting impacts on range health, livestock production and associated wildlife habitat. Livestock may be disproportionately concentrated near a water source and overgraze the surrounding area to the point where food producing forbs and legumes are eliminated, residual grasses are inadequate for nesting cover, and protective cover provided by shrubs is reduced due to heavy browsing. Conversely, areas more distant from a water supply may be underutilized and in the absence of disturbance, the health and vigor of grasses for livestock grazing and the value of the habitat for LEPC and other wildlife may be diminished through plant succession. These potential impacts on livestock grazing and wildlife habitat need to be considered when planning wells and other water supply sources.

Potential beneficial effect(s) to LEPC: If properly designed and installed, this practice can be implemented in a manner that will facilitate improved distribution of livestock grazing and result in improved vegetative diversity and structure of LEPC habitat. The practice can also provide a supplemental water source for LEPC and other wildlife. The disturbed area around the water well installation may re-vegetate with early succession forbs and legumes that can provide food and brood-rearing habitat for LEPCs.

Potential adverse effect(s) to LEPC: Adverse impacts may result from digging or drilling the water well during reproductive and nesting periods. These impacts could include disturbance of breeding activities on lek sites, disturbance of nesting hens, or physical destruction of nests and eggs. High profile pumping devices, housing structures, and electric poles/lines could provide vertical structure for raptor perch sites. These potential perch sites could contribute to habitat fragmentation by causing LEPC to avoid areas around the structures that would otherwise provide suitable habitat. Undesirable plants may become established on disturbed soils which could reduce the quality and quantity of LEPC habitat. If improperly located and implemented without a grazing management plan, the increased water availability and distribution could alter livestock

grazing patterns and change plant composition and structure with negative impacts on LEPC habitat.

Documentation by State for Technical Practice 642:

- Colorado
  - Technical Practice Standard
  - Practice Specifications
- Kansas
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements
- New Mexico
  - Technical Practice Standard
  - Practice Specifications
- Oklahoma
  - Technical Practice Standard
  - Implementation Requirements - LEPC
- Texas
  - Technical Practice Standard
  - Practice Specifications

Conservation Measures:

- Install low profile pumping devices and housings and use solar pumps whenever practicable, as the power source for wells rather than electric lines.
- Place wells and associated infrastructure as close as possible to existing structures rather than creating new vertical structure in areas presently devoid of such features. These measures will reduce the presence of raptor perch sites and prevent habitat fragmentation by allowing continued use of suitable habitat.
- Design the water well to minimize or avoid the loss of desirable shrubs during practice installation.
- Use the conservation measures provided for the facilitative practice of Critical Area Planting (342) in areas where reseeding disturbed areas is needed.
- Design solar panel mounting pole as short as possible to avoid use as raptor perch.

Conservation Practice Standard: Restoration and Management of Rare and Declining Habitats (643)

Definition: Restoring, conserving, and managing unique or diminishing native terrestrial and aquatic ecosystems.

Purpose: This facilitating management practice will be applied annually to those areas of unique or diminishing native terrestrial ecosystems; to restore their original or highest functioning condition. This practice will be used to improve the overall biodiversity of the LEPC action area.

Resource concern(s): Reduced habitat quality, habitat loss and fragmentation by non-native habitat and areas of low biodiversity.

Potential beneficial effect(s) to LEPC: This practice will help to ensure a diversity of native habitat types/components, such as native grasses, forbs, and shrubs, for the LEPC and other wildlife.

Potential adverse effect(s) to LEPC: Short-term and occasional physical disturbance (including noise); temporary vegetation disturbances; increased potential for invasive plants.

Documentation by State for Technical Practice 643:

- Colorado
  - Technical Practice Standard
- Kansas
  - Technical Practice Standard
- New Mexico
  - Technical Practice Standard
  - Practice Specifications
- Oklahoma
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements – Herbaceous Seeding
  - Implementation Requirements – Tree/Shrub
- Texas
  - Technical Practice Standard
  - Implementation Requirements

Conservation Measures:

- When implementing this practice on cropland for the purpose of establishing perennial vegetation several activities, primarily planting, will need to take place during the primary breeding and nesting season. In these situations, an effort shall be taken to complete activities with as little disturbance as possible to adjacent and surrounding existing LEPC habitat.

Conservation Practice Standard: Upland Wildlife Habitat Management (645)

Definition: Provide and manage upland habitats and connectivity within the landscape for wildlife.

Purpose: This core management practice will be applied or maintained annually to treat and manage wildlife, particularly LEPC resource concerns identified during the conservation planning process. Application of this practice shall remove or reduce habitat limiting factors, in their order of significance, as indicated by results of the LEPC wildlife habitat evaluation or other acceptable assessments. This practice alone, or in combination with facilitating practices, shall result in a conservation system that will enable the planning area to meet or exceed the minimum quality criteria for upland wildlife habitat.

Resource concern(s): Factors that reduce habitat quality, or result in habitat loss and fragmentation, or otherwise limit population growth of the targeted species.

Potential beneficial effect(s) to LEPC: This core management practice was developed for the primary purpose of focusing consideration of LEPC needs in conservation plans to improve habitat. This core management practice will be used to restore, enhance or create, and manage for suitable habitat for the LEPC; to improve habitat conditions for all life cycles, including breeding, nesting, brood-rearing, and over-wintering and to provide adequate food, cover and shelter, and address the effects of habitat fragmentation by creating, maintaining, or restoring landscape connectivity for movement.

Potential adverse effect(s) to LEPC: Potential exists for short-term, temporary effects that include physical disturbance (including noise), temporary soil disturbance and vegetation removal.

Documentation by State for Technical Practice 645:

- Colorado
  - Technical Practice Standard
  - Implementation Requirements
- Kansas
  - Technical Practice Standard
  - Practice Specifications
- New Mexico
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements – CP12
  - Implementation Requirements – CP42
  - Implementation Requirements – Mid Contract Mgmt

    - Implementation Requirements – Grassland CRP
- Oklahoma
    - Technical Practice Standard
- Texas
    - Technical Practice Standard
    - Practice Specifications
    - Implementation Requirements

Conservation Measures:

- Ensure all facilitating practices include critical non-disturbance dates to minimize their effects on leks, nesting and brood rearing periods, as appropriate to the practice.

Conservation Practice Standard: Structures for Wildlife (649)

Definition: A structure installed to replace or modify a missing or deficient wildlife habitat component.

Purpose: To provide structures, in proper amounts, locations, and seasons to enhance or sustain non-domesticated wildlife or modify existing structures that pose a hazard to wildlife.

Resource concern(s): This practice will be used to retrofit fences with fence markers or modify water facilities to include escape ramps.

Potential beneficial effect(s) to LEPC: This practice will be used to miminize potential effects to LEPC from existing features and their potential effects, including fence collisions or drowning in water tanks.

Potential adverse effect(s) to LEPC: Adverse impacts may result from disturbance around the retrofitted structures. These impacts could include disturbance of breeding activities on lek sites, disturbance of nesting hens, or physical destruction of nests and eggs.

Documentation by State for Technical Practice 649:

- Colorado
    - Technical Practice Standard
    - Implementation Requirements
- Kansas
    - Technical Practice Standard
    - Practice Specifications

- New Mexico
  - Technical Practice Standard
  - Practice Specifications
  - Implementation Requirements
- Oklahoma
  - Technical Practice Standard
- Texas
  - Technical Practice Standard
  - Implementation Requirements

Conservation Measures:

- Defer implementatioin of this conservation practice within ½ mile of known leks during breeding and nesting seasons, typically March 1 through July 15, daily until after 10:00 AM.