



CEHMM

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*Candidate Conservation Agreements
for the Lesser Prairie-Chicken
and the Dunes Sagebrush Lizard in New Mexico
2019 Annual Report*



Table of Contents

Candidate Conservation Agreements (CCA) & Candidate Conservation Agreements with Assurances (CCAA)

Introduction	1
Candidate Conservation Agreements & Candidate Conservation Agreements with Assurances	2
Participating Cooperator’s Need for the CCA/CCAA.....	3
Ranching Conservation Measures	3
Industry Conservation Measures.....	7
CCA/CCAA Ranchers.....	9
CCA/CCAA Industry	9

Funding

Candidate Conservation Funds (HCF)	10
--	----

Projects

Proposals And Projects	10
Technical Working Group Meeting.....	11
Mesquite Treatment.....	11
Funded and/or Completed Mesquite Projects in 2019	12
Funded Mesquite Projects (prior to 2019) Awaiting Completion	14
Removal of Dead Standing Mesquite (DSM)	16
Funded and/or Completed DSM Removal Projects in 2019	17
Escape Ramps	20
Solar Conversion and Trough Replacement	20
Funded and/or Completed Water Projects in 2019	24
Funded Water Projects (prior to 2019) Awaiting Completion.....	27
Fence Removal and Replacement.....	28
Funded and/or Completed Fence Projects in 2019	31
Funded Fence Projects (prior to 2019) Awaiting Completion	33
Caliche Removal and Reseeding	34
Funded and/or Completed Reclamation Projects in 2019	34
Research, Education, and Other Projects	37
Net Conservation Gain.....	37

Monitoring

Monitoring of Completed Projects	49
--	----

Species Monitoring 51

Grazing Monitoring 54

Mitigation of Impact to Habitat 57

Conservation Measure Violations 57

Conclusion

Summary 60

Literature Cited 61

Appendices

Appendix A 62

Appendix B 70

Appendix C 73

Appendix D 75

Appendix E 77

Appendix F 79

Appendix G 110

Appendix H 111

Appendix I 113

Appendix J 115

Appendix K 137

List of Tables

Table 1. Funded Projects in 2019 38

Table 2. Completed Projects in 2019 45

Table 3. Mesquite Canopy Values (%) Collected in 2019 on Completed Projects 49

Table 4. Change in Grass and Forb Canopy Percentages on Previously Completed Mesquite Treatments 49

Table 5. Onsites Completed in 2019 57

Table 6. Company Involvement in 2019 58

List of Figures

Figure 1. Lesser Prairie-Chicken (*Tympanuchus pallidicinctus*) 1

Figure 2. Dunes Sagebrush Lizard (*Sceloporus arenicolus*) 1

Figure 3. CCA/CCAA Ranch Enrollments 4

Figure 4. CCA/CCAA Industry Enrollments 5

Figure 5. Hand Treatment of Mesquite..... 11

Figure 6. Aerial Treatment of Mesquite..... 12

Figure 7. All Mesquite Projects Completed by the CCA/CCAA Program 15

Figure 8. Track Steer with Rotary Cutter Attachment..... 16

Figure 9. Before DSM Removal 16

Figure 10. After DSM Removal..... 16

Figure 11. Before DSM Removal on the BLM ACEC 17

Figure 12. After DSM Removal on the BLM ACEC..... 17

Figure 13. DSM Removal Completed in 2019 18

Figure 14. All DSM Removal Completed by the CCA/CCAA Program 19

Figure 15. Escape Ramp Installed in a Water Tank..... 20

Figure 16. Escape Ramp Installation Locations in 2019 21

Figure 17. All Escape Ramp Installations Completed by the CCA/CCAA Program 22

Figure 18. Before: Old, Worn-Out Water Troughs..... 23

Figure 19. After: Fiberglass Water Trough with Solar Pump 23

Figure 20. One of the Old, Dilapidated Water Troughs on the TNC Water Project..... 24

Figure 21 One of the New Water Troughs on the TNC Water Project 24

Figure 22. New Water Trough on the Mohon Water Project 24

Figure 23. Solar Well on the M. Coombes Water #1 Project 25

Figure 24. New Storage Tank on the M. Coombes Water #1 Project 25

Figure 25. New Water Trough on the M. Coombes Water #2 Project 25

Figure 26. New Solar Well and Storage Tank on the M. Coombes Water #2 Project..... 25

Figure 27. New Wildlife-Friendly Boundary Fence 29

Figure 28. Water Projects Completed in 2019..... 29

Figure 29. All Water Projects Completed by the CCA/CCAA Program..... 30

Figure 30. After Wildfire but Before Fence Repairs on the Peterson-Buffington Project 31

Figure 31. After Fence Repairs Were Made on the Peterson-Buffington Project 31

Figure 32. M. Coombes Boundary Fence Before 32

Figure 33. M. Coombes Boundary Fence After 32

Figure 34. Reclaimed Road After Caliche Removal and Reseeding 34

Figure 35. Fence Projects Completed in 2019 35

Figure 36. All Fence Projects Completed by the CCA/CCAA Program 36

Figure 37. Illustration of Habitat Lost when a New Oil or Gas Well is Drilled 37

Figure 38. 2019 Funded Projects in 2019 43

Figure 39. Funded Projects Awaiting Completion 44

Figure 40. Completed Projects 2019..... 47

Figure 41. All Projects Completed by the CCA/CCAA Program 48

Figure 42. Oil and Gas Pad in March 2013, One Year After Caliche Removal..... 50

Figure 43. Oil and Gas Pad in January 2019, Six Years After Caliche Removal 50

Figure 44. Dunes Sagebrush Lizard 51

Figure 44. Lesser Prairie-Chickens on a Lek 51

Figure 46. DSL Surveys 2011-2019 52

Figure 47. LPC Surveys 2013-2019 53

Figure 48. Vegetation Monitoring Transect..... 54

Figure 49. Exclosure Locations..... 55

Figure 50. Grazing Monitoring and Transect Locations 56

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INTRODUCTION

The Center of Excellence (CEHMM) is a 501 (c)(3) non-profit corporation involved in research and development in southeastern New Mexico. Through the use of funding from the Candidate Conservation Agreements (CCA) and Candidate Conservation Agreements with Assurances (CCAA), CEHMM can provide conservation measures to maintain and improve habitat for two species of concern in New Mexico.

The lesser prairie-chicken (LPC) (*Tympanuchus pallidicinctus*) (Figure 1) is a prairie grouse species native to the southern Great Plains. Its historic and current home ranges include parts of New Mexico, Colorado, Kansas, Oklahoma, and Texas. The LPC currently has populations in Quay, Curry, De Baca, Roosevelt, Lea, Chaves, and Eddy Counties in New Mexico. Approximately 73% of the LPC current occupied range within New Mexico is in Chaves, Roosevelt, and Northern Lea Counties. In New Mexico, the LPC relies on vegetation that consists of a mix of shinnery oak (*Quercus harvardii*) and mixed grasses.



Figure 1. Lesser Prairie-Chicken (*Tympanuchus pallidicinctus*).

The dunes sagebrush lizard (*Sceloporus arenicolus*) (DSL) (Figure 2), also known as the sand dune lizard (SDL), is a species native to a small area of southeastern New Mexico and west Texas. In New Mexico, the DSL only exists in complexes of large blowouts and their peripheries in the Mescalero Sands in Chaves, Roosevelt, Eddy, and Lea counties. Shinnery oak is also important to the DSL as was indicated by significantly more individuals being captured where shinnery oak was present compared to areas where treatment to kill the plant had occurred (Gorum, et al., 1995). Regardless of shinnery oak presence, the blowouts where this study took place were of similar size and shape.



Figure 2. Dunes Sagebrush Lizard (*Sceloporus arenicolus*).

The Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. § 1531, et seq.), provides for the conservation of species that are endangered or threatened throughout all or a significant portion of their ranges. The ESA also provides for the conservation of the ecosystems that are important to a species. Section 9 of the ESA prohibits “take” (i.e., harass, harm, pursue, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct)

of a listed species on public and private lands. In addition to the Section 9 prohibitions, Section 7 requires federal agencies to ensure their actions will not jeopardize the continued existence of the listed species. In 1995, a petition was filed to list the LPC as “threatened” under the ESA. Species status reviews conducted by the United States Fish and Wildlife Service (FWS) in 1998 and 2011 determined a threatened status was warranted, but precluded under the ESA. A 2012 status review of the LPC proposed a listing of threatened under the ESA. A final decision to list the LPC as threatened was made by the FWS in March 2014. It was removed from the list following a ruling by the U.S. District Court for the Western District of Texas, Midland Division to vacate the ruling in September 2015. Nearly a year later, a petition to list the LPC as endangered was filed by the Center for

Biological Diversity, Defenders of Wildlife, and WildEarth Guardians. That petition is currently under review, and a 12-month finding will be made in 2021.

Three petitions have been filed with the FWS to list the DSL as endangered. In 2002 and 2008 it was warranted, but precluded by other species. However, in 2012 the FWS withdrew the rule that proposed a listing of the DSL, citing conservation efforts along with current and future threats being less serious than previously found (Endangered and Threatened Wildlife and Plants; Withdrawal of the Proposed Rule to List Dunes Sagebrush Lizard, 2013). The most recent petition to list the DSL as threatened or endangered, and to designate critical habitat was filed by the Center for Biological Diversity and Defenders of Wildlife in June 2018. The FWS is currently in the decision making process of whether or not to list the DSL.

The New Mexico LPC/DSL Working Group was formed in 2003 to address concerns and develop strategies for the future conservation of the LPC and DSL. Members of the group included representatives from the FWS, the Bureau of Land Management (BLM), the Center of Excellence (CEHMM), oil and gas producers, and livestock operators. Their findings were published in 2005 in a document titled, "Collaborative Conservation Strategies for the Lesser Prairie-Chicken and Sand Dune Lizard in New Mexico." The group's work provided a pathway that led to the signing of the CCA and CCAA by federal and state authorities on December 8, 2008. The CCA and CCAA, collectively referred to as the CCA/CCAA, provide a mechanism to conserve LPC and DSL habitats while allowing the FWS, the BLM, and CEHMM to work in cooperation with private landowners and industry to support conservation while continuing to work on the land.

CANDIDATE CONSERVATION AGREEMENTS AND CANDIDATE CONSERVATION AGREEMENTS WITH ASSURANCES

By implementing the CCA/CCAA, the following will be accomplished (U.S. Fish and Wildlife Service, 2008):

- Develop, coordinate, and implement conservation actions which reduce and/or eliminate known threats to the LPC and the DSL in New Mexico on federal, state, and private surface mineral holdings and livestock operations;
- Support ongoing efforts to re-establish and maintain viable populations of both species in currently occupied and suitable habitats; and,
- Encourage preservation, restoration, and development of suitable LPC and DSL habitat by incentivizing Participating Cooperators to implement specific conservation measures.

Entrance into the CCA by federal lessees, operators, and grazing permittees (collectively referred to as Participating Cooperators) is gained by voluntarily signing a Certificate of Participation (CP) which outlines conservation commitments for both species. Legal descriptions and maps of the properties/leases where the Participating Cooperator desires to implement said conservation measures is also included in the CP. By entering into the CCA, Participating Cooperators receive a high degree of certainty that additional restrictions would not be placed on their otherwise legal activities in the event that either or both species were to be given threatened or endangered status.

By signing a Certificate of Inclusion (CI), Participating Cooperators can enter into the CCAA, which grants them the opportunity to receive incentives for implementing specific conservation measures for the LPC and DSL on their non-federal land interests. By taking part in the CCAA, Participating Cooperators are provided assurances that additional restrictions would not be placed on their otherwise legal activities if a decision to list either species was to occur. Regulatory assurances are a necessary component of the CCAA, because conservation measures may not be implemented by private landowners if not provided. Like the CCA, entrance into the CCAA is voluntary. The voluntary nature of the agreements is important because it allows Participating Cooperators to relinquish their participation if they deem it necessary.

Upon the execution of a CP and/or CI, oil and gas operators have agreed to contribute funds that will be used for conservation projects, research, and activities to restore, protect, and create suitable habitat for the LPC and/or DSL. Proposals for these projects are submitted annually to CEHMM and the CCA/CCAA ranking team who rank them in order of conservation priority for either or both species. Dependent on the funding available to complete projects that year, the highest priority projects are approved and then completed. The ranking team includes wildlife

biologists from the BLM, FWS, CEHMM, New Mexico State Land Office (NMSLO), and the New Mexico Department of Game and Fish (NMDGF). In addition to biologists, one Participating Cooperator from the oil and gas industry and one Participating Cooperator from the ranching community are included in the ranking process.

Based in Carlsbad, NM, CEHMM is a 501(c)(3) nonprofit corporation that is the federal permit holder for the CCA/CCAA. CEHMM is obligated to administer, monitor, and report on projects completed with CCA/CCAA funds. CEHMM's participation allows for a federally approved, independently audited financial management system to provide for fund management and administration.

Input from the public was requested in the development of the CCA/CCAA through public forums. Forum locations were strategically placed to accommodate the attendees whom were directly affected by, or had a particular interest in, the species of concern. Through public input, government and private entities involved in the drafting of the CCA/CCAA were able to address the needs and concerns of those that would be affected by a decision to list either/or both species. Frequently asked questions (FAQs) from these forums provide an accurate indicator of public opinion and interest (Appendix A).

Figures 3 and 4 show the enrollments covered under the CCA and CCAA. Land within this region can be divided into three general surface ownership categories: federal, state, or private. Specifically, the BLM has surface ownership of approximately 3 million acres (19%); the state of New Mexico has 2.8 million acres (19%); and private landowners have 9 million acres (59%). The BLM also has management responsibilities for an additional 10 million acres of mineral estate where the surface is either privately or state-owned. The U.S. Forest Service, National Park Service, and FWS combined have less than 3% of the lands within the covered area.

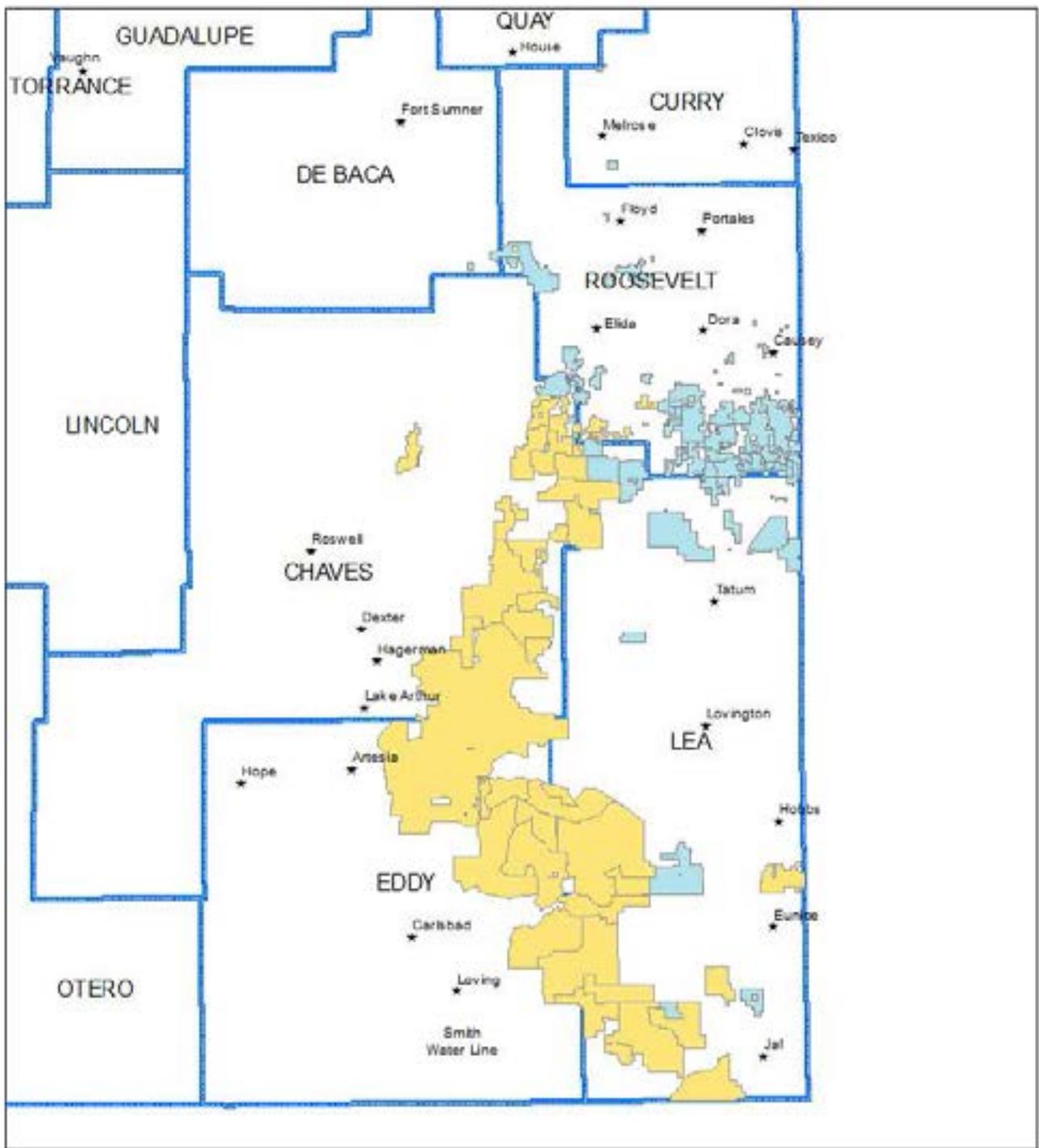
PARTICIPATING COOPERATOR'S NEED FOR THE CCA/CCAA

Throughout LPC and DSL habitat, two major uses of the landscape are ranching and oil and gas development. Under the ESA, a listing of either species would authorize the FWS to prohibit activities that may harm the LPC or the DSL. If not enrolled in the CCA/CCAA, ranching and industry entities may face restrictions on their operations. Ranching operations may be required to reduce stocking rates, implement different management strategies, or be subject to other regulatory measures. Regulatory mechanisms, including an increased period of time for permitting of infrastructure associated with oil and gas development, may be implemented in the event of a listing. As stated before, through participation in the CCA/CCAA, operators are provided a high degree of certainty (CCA) and assurances (CCAA) that their operations would not be subject to additional restrictions as long as conservation measures listed in each respective CP and CI are achieved.

RANCHING CONSERVATION MEASURES

Livestock operators that enroll in the CCA/CCAA agree to a list of conservation measures detailed in their respective CP (for federal operations) and CI (for state and private operations). These measures include:

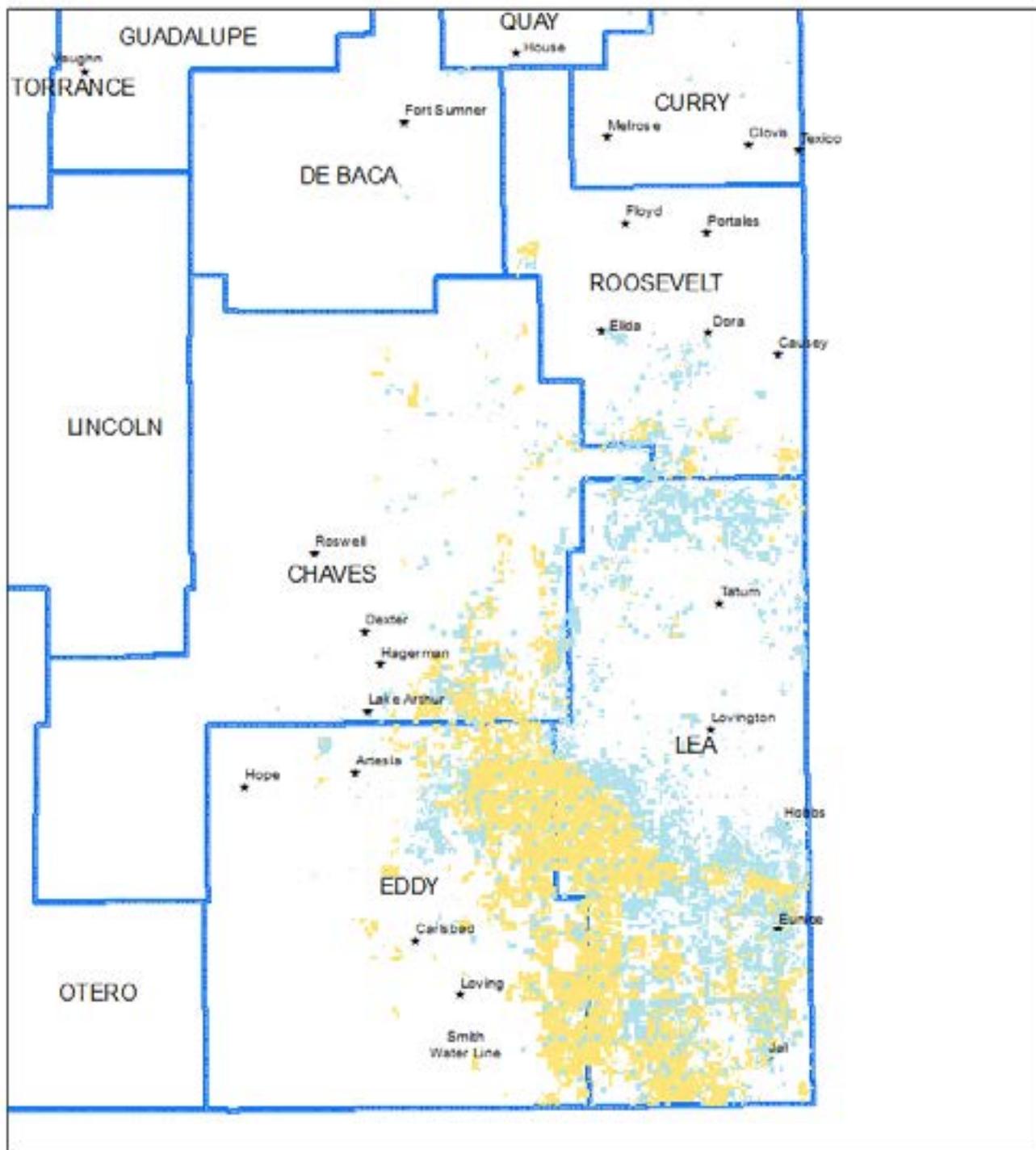
1. To the extent determined by the BLM representative at the plan of development stage, all infrastructure supporting the development of a well (including roads, power lines, and pipelines) will be constructed within the same corridor.
2. On enrolled parcels that contain inactive wells, roads and/or facilities that are not reclaimed to current standards, the Participating Cooperator shall remediate and reclaim their facilities within three years of executing the CP, unless the Cooperator can demonstrate they will put the facilities back to beneficial use for the enrolled parcel(s). If an extension is requested by the Cooperator, they shall submit a detailed plan (including dates) and receive BLM approval prior to the three-year deadline. All remediation and reclamation shall be performed in accordance with BLM requirements and be approved in advance by the Authorized Officer.
3. Allow no new surface occupancy within 30 meters of areas designated as occupied or suitable, unoccupied DSL dune complexes, or within delineated shinnery oak corridors. The avoidance distance is subject to change based on new information received from peer-reviewed science.



- CCA Ranch
- CCAA Ranch
- NM Counties



Figure 3. CCA/CCA Ranch Enrollments.



- CCA Industry
- CCAA Industry
- NM Counties

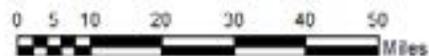
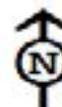


Figure 4. CCA/CCAA Industry Enrollments.

4. Utilize alternative techniques to minimize new surface disturbance when required and as determined by the BLM representative at the plan of development stage.
5. Provide escape ramps in all open water sources under the Participating Cooperator's control.
6. Allow CEHMM personnel or their designee access to the enrolled lands for purposes of compliance monitoring of conservation commitment.
7. Use herbicides for shinnery oak management only when habitat goals cannot be achieved by other means, including grazing system management.
 - a. No herbicide treatments will be applied in dune complexes (Natural Resource Conservation Service (NRCS) Sandhills ecological sites) and corridors between dune complexes. Maintain an application buffer around dune complexes of 100 m to ensure dunal stability.
 - b. Prohibit tebuthiuron spraying within 500 m of DSL habitat. In addition, for DSL, prohibit spraying in dune complexes or within corridors which connect dune complexes that are within 2,000 m of each other. All application of tebuthiuron will be by a licensed applicator and in accordance with the New Mexico supplemental label for wildlife habitat.
 - c. In conducting such treatments, the goal will be to temporarily reduce shinnery oak competition with grasses, allowing grass cover to increase naturally. Herbicides should be used at dosages that would set back (defoliate) shinnery oak, not kill it.
 - d. Large block and linear application of herbicides will be avoided. Application should follow the natural patterns on the landscape such that only patches needing treatment are treated.
 - e. For LPC, herbicide treatment should not be applied around large oak motts, or within 1.5 miles of active lek sites.
 - f. Post-treatment grazing management is essential to success. Grazing will be deferred through at least two consecutive growing seasons after treatment. If vegetation response to treatment has been hindered due to drought or other factors, additional deferments may be required to ensure success of the treatment.
 - g. Experimental treatments outside of these guidelines may occur with the approval of the FWS. Experimental treatments must be part of a quantitative research design to study vegetation response, viability of shinnery oak, drift, sub-surface spread, the interaction of herbicide treatment and/or grazing management, and the response of LPC and DSL to various treatments.
8. For livestock ranches, implement grazing management plans intended to move towards meeting specific habitat goals for the LPC and/or DSL as defined in the Collaborative Conservation Strategies for the Lesser Prairie-Chicken and Sand Dune Lizard in New Mexico (New Mexico LPC and DSL Working Group, 2005) on individual ranches. This may include adjustment of stocking rates, rest-rotation patterns, grazing intensity and duration, avoidance of nesting areas during nesting season, and contingency plans for varying prolonged weather patterns including drought.
9. No leasing of lands within the Participating Landowner's designated conservation lands to wind power development (including any appurtenant turbine towers, roads, fences, or power lines).
10. No leasing of any lands within the conservation lands to oil and gas development (including roads, fences, or power lines), where the private land holder has discretion.
11. No conversion of conservation lands to crop production (sod busting) or development as part of maintaining existing LPC and/or DSL habitat.
12. Avoid construction of new roads. If unavoidable, route and construct new roads, pipelines and power lines outside of occupied, and suitable, unoccupied shinnery dune complexes as delineated by the FWS, BLM, NMDGF, and/or designees.

13. Avoid well pad construction within 1.5 miles of an active lek, (as defined in Bureau of Land Management, 2008 and/or New Mexico LPC and DSL Working Group, 2005) unless reviewed and approved by CEHMM and FWS.
14. Initiate control of shinnery oak only after coordinating with and gaining approval from CEHMM and FWS concerning control procedures so they will not be detrimental to LPC and/or DSL.
15. Any trenches dug on enrolled property will have escape ramps placed at the ends and approximately every 500 feet to allow for LPC/DSL escape. Trenches may alternatively be covered to avoid entrapment and should be inspected three times a day.
16. Provide information on an annual basis to CEHMM on implementation of conservation commitment, observations of LPC/DSL on enrolled property, and any mortality of either species observed.

In addition to the conservation actions described above, the enrollee must also agree to the following conservation measures:

Lesser Prairie-Chicken

- Install escape ramps in all open water sources.
- Remove invasive brush (non-shinnery oak).
- Maintain current grazing practices to continue to benefit LPC and livestock operation.
- Remove legacy well markers.
- Reseed or inter-seed disturbed areas.
- Allow LPC surveys.

Dunes Sagebrush Lizard

- Allow DSL surveys.
- Prohibit herbicide treatments in dune complexes (NRCS Sandhills ecological sites) and corridors between dune complexes. Maintain an application buffer around dune complexes of 100 m to ensure dunal stability.
- Prohibit tebuthiuron spraying within 500 m of DSL habitat. Prohibit spraying in dune complexes or within corridors, which connect dune complexes that are within 2,000 m of each other. All application of tebuthiuron will be by a licensed applicator and in accordance with the New Mexico supplemental label for wildlife habitat.
- Remove unnecessary development (non-functioning power lines, fences etc.) from dunes, as funding is available.

INDUSTRY CONSERVATION MEASURES

Any operations requiring federal authorization are subject to requirements described in the BLM's Special Status Species Resource Management Plan Amendment (RMPA) that was rolled out in April 2008. Oil and gas operators that choose to participate in the CCA/CCAA agree to implement conservation measures described in their CP and CI in addition to those that are described in the respective parent document (CCA or CCAA). Conservation measures listed in each CP are above and beyond those described in the RMPA and include:

1. To the extent determined by the BLM representative at the Plan of Development stage, all infrastructures supporting the development of a well (including roads, power lines, and pipelines) will be constructed within the same corridor.

2. On enrolled parcels that contain inactive wells, roads and/or facilities that are not reclaimed to current standards, the Participating Cooperator shall remediate and reclaim their facilities within three years of executing this CP, unless the Cooperator can demonstrate they will put the facilities back to beneficial use for the enrolled parcel(s). If an extension is requested by the Cooperator, they shall submit a detailed plan (including dates) and receive BLM approval prior to the three-year deadline. All remediation and reclamation shall be performed in accordance with BLM requirements and be approved in advance by the Authorized Officer.
3. Allow no new surface occupancy within 30 meters of areas designated as occupied or suitable, unoccupied DSL dune complexes or within delineated shinnery oak corridors. The avoidance distance is subject to change based on new information received from peer-reviewed science.
4. Utilize alternative techniques to minimize new surface disturbance when required and as determined by the BLM representative at the Plan of Development stage.
5. Provide escape ramps in all open water sources under the Participating Cooperator's control.
6. Bury new power lines that are within two miles of LPC lek sites active at least once within the past five years (measured from the lek). The avoidance distance is subject to change based on new information received from peer-reviewed science.
7. Bury new power lines that are within one mile of historic LPC lek sites where at least one LPC has been observed within the past three years (measured from the historic lek). The avoidance distance is subject to change based on new information received from peer-reviewed science.
8. Limit seismic exploration to areas outside of occupied and suitable shinnery dune complexes to protect DSL habitat.
9. Submit a routine monitoring and schedule of inspection for oil, gas and produced water pipelines and facilities to ensure accidental pollution events are avoided in sensitive habitats for DSL.
10. Inside the BLM RMPA DSL polygon, the following will apply:
 - Any trench left open for eight (8) hours or less is not required to have escape ramps; however, before the trench is backfilled, an agency-approved monitor shall walk the entire length of open trench and remove all trapped wildlife and release them at least 100 yards from the trench.
 - For trenches left open for eight (8) hours or more, earthen escape ramps (built at no more than a 30-degree slope and spaced no more than 500 feet apart) shall be placed in the trench. The open trench shall be monitored each day by an agency approved monitor during the following three time periods: (1) 5:00 am to 10:00 am, (2) 11:00 am to 2:00 pm, and (3) 3:00 pm to sunset. All trapped wildlife shall be released at least 100 yards from the trench.
 - One agency-approved monitor shall be required for every mile of open trench. A daily report (consolidate if there is more than one monitor) on the wildlife found and removed from the trench shall be provided to the BLM (email is acceptable) the following morning.
 - This stipulation shall apply to the entire length of the project in the sand dune lizard habitat regardless of land ownership.

11. Management recommendations may be developed based on new information received from peer-reviewed science to mitigate impacts from H₂S and/or the accumulation of sulfates in the soil related to production of gas containing H₂S on the DSL and LPC. Such management recommendations will be applied by the Participating Cooperator as Conservation Measures under this CI/CP in suitable and occupied LPC/DSL habitat where peer-reviewed science has shown that H₂S levels threaten the LPC/DSL.

The following conservation measures are foundational RMPA requirements that are also included in each operator's CI:

- Allow no 24-hour drilling operations or 3-D geophysical exploration during the period from March 1st through June 15th, annually, on lands enrolled by the Participating Cooperator that are located within Zone 1 (see Exhibit D of the CCA/CCAA). Other activities that produce noise or involve human activity, such as geophysical exploration (other than 3-D operations) and pipeline, road, and well pad construction will be allowed during these dates except between 3:00 am and 9:00 am. The 3:00 am to 9:00 am restriction will not apply to normal, around-the-clock operations, such as venting, flaring, or pumping, which do not require a human presence during this period. Normal vehicle use on existing roads will not be restricted. Exceptions to these requirements would be considered in emergency situations, such as mechanical failures, but would not be considered for routine planned events.
- Noise abatement during the period from March 1st through June 15th, annually. Noise from facilities (e.g., pumpjack, compressor) under the control of the Participating Cooperator that services enrolled lands located within Zone 1 (see Exhibit D of the CCA/CCAA) will be muffled or otherwise controlled so as not to exceed 75 dB measured at 30 ft. from the source of the noise.
- Upon the plugging and subsequent abandonment of a well within Zone 1 (see Exhibit D of the CCA/CCAA), the well marker will be installed at ground level on a plate containing the pertinent information for the plugged well unless otherwise precluded by law or private surface owner.

When a Participating Cooperator is planning for the development of a well, pipelines, power lines, roads, and any other infrastructure associated with that well is assessed by desktop and/or field visits to determine if there will be an impact to the species or its habitat in the plan for development. If an impact is identified, the BLM, CEHMM, and/or the FWS work with the Participating Cooperator to relocate wells or reroute Rights of Way (ROW) for pipelines and power lines to eliminate the impact. Field verification and monitoring of projects ensures that the conservation measures listed above are being achieved.

CCA/CCAA RANCHERS

To date, 69 ranches have enrolled their surface or grazing operations in the CCA/CCAA for a total of 1,872,039.35 acres. The enrolled ranches span the area of concern for both LPC and DSL habitat with acreage in Lea, Eddy, Chaves, Curry, De Baca, and Roosevelt Counties.

CCA/CCAA INDUSTRY

Forty-two oil and gas operators are enrolled in the CCA/CCAA, with enrolled leases spanning the area of concern for both LPC and DSL habitat in Eddy, Lea, Chaves, Curry, De Baca, Quay and Roosevelt Counties. There are 997,970 acres of mineral enrollments in the CCA and 929,881 acres of mineral enrollments in the CCAA. Total mineral enrollments by oil and gas companies and the New Mexico State Land Office are 2,121,111 acres.

FUNDING

HABITAT CONSERVATION FUNDS

CEHMM establishes a Habitat Conservation Fund (HCF) for each oil and gas operator that executes a CP or CI. The contribution amount is determined by the number of acres included in the CP or CI. Upon permitting of activities that will disturb lands identified in the operator's certificate, conservation fees are debited from their HCF. Activities that occur off of enrolled acreage are also subject to a habitat conservation fee if disturbance caused from these activities is associated with an enrolled lease. The debited amount is determined by the habitat zone (as described in the RMPA) in which surface-disturbing activities occur.

CEHMM manages each Participating Cooperator's HCF by tracking of balances and debiting when appropriate.

Ten percent of the funds received through industry participation are allocated to overhead such as building rentals, utilities, and insurance. The remaining balance is used solely and exclusively in support of the CCA/CCAA programs which include, but are not limited to: planning and implementation; onsites; grazing programs; projects authorized by the ranking team; research; enrollments and amendments; project monitoring; education and outreach; and support services such as vehicles and equipment.

PROJECTS

PROPOSALS AND PROJECTS

Enrollees, universities, government agencies, and others may submit project proposals to the ranking team for funding consideration. CEHMM personnel work closely with enrollees to develop project proposals. The ranking team, which prioritizes each proposal using a ranking system developed by the team (Appendices B, C, D, E), includes biologists from CEHMM, the FWS, the BLM, the NMSLO, the NRCS, and the NMDGF. The ranking team meets quarterly, via phone or in person, and votes on proposed projects at least once annually. The annual meeting when projects are ranked and voted on, occurs in person; however, the ranking team may also vote on projects via electronic transmission at any time.

Projects are separated into two groups, reclamation/restoration and research/education. Reclamation/restoration projects improve habitats for the species, including but not limited to the following: mesquite treatment, improved infrastructure relating to improved grazing management, caliche removal, and reseeding. Research projects are any projects that help improve the knowledge of the species or their habitats, resulting in conservation of the species and their habitats. Education projects must promote the ecology of the southern shortgrass prairie and the flora and fauna of the associated ecosystem with an emphasis on LPC and DSL. Both types of proposals have a unique ranking system. After the proposals are evaluated and scored, the team convenes in a meeting to assess the benefits of each proposal regarding the two species of concern and determines which projects should be funded via a majority vote (consensus). This methodology provides an objective, non-biased system of evaluation by biologists from the different agencies.

The following sections describe the types of projects or activities funded by the CCA/CCAA Program. Table 1 illustrates the projects that were funded in 2019; Table 2 illustrates the projects that were completed in 2019; and Appendix F illustrates all projects completed through the CCA/CCAA Program.

TECHNICAL WORKING GROUP MEETING

On May 16, 2019, a Technical Working Group Meeting was held to discuss future conservation priorities for the LPC and DSL. Experts in the fields of research and conservation of both species travelled to Roswell, NM to discuss conservation priorities and new, innovative projects for future implementation to address these priorities. Priorities for both species included: continued mesquite treatment and removal; land preservation; habitat restoration and reclamation; invasive plant species (non-mesquite) control; rangeland infrastructure improvements; and development of a five-year strategic plan to outline a path forward for all parties involved in the betterment of both species. As always, CEHMM will accept project proposals that address these priorities and meet the conservation goals outlined in the CCA/CCAA.

MESQUITE TREATMENT

Mesquite (*Prosopis* spp.), although a native species, is universally accepted as an invasive and highly competitive shrub that may readily encroach onto landscapes that did not historically support the species and have experienced disturbance or changes in natural ecological processes over a significant period of time. Habitat fragmentation, a decline in forage availability, and a perceived higher predation risk associated with woody encroachment can affect nesting site locations, with the female LPC avoiding areas with even low to medium tree density (Lautenbach et al. 2017). Lautenbach, et al. (2017) also explain that eradicating and removing mesquite opens up habitat for lekking, nesting, and brood-rearing. CCA/CCAA-funded research determined that, where present, mesquite canopy in occupied LPC habitat does not exceed 15% (Boggie, et al. 2017). Through interspecific competition with beneficial grasses, forbs, and shrubs, mesquite has increased in frequency caused these grassland landscapes to transition into shrub lands or shrub/grasslands which are less suitable for the LPC. Chemical treatment of mesquite through hand and aerial applications is the primary method that CEHMM has used to suppress mesquite in LPC habitat. By removing mesquite, native grasses have the opportunity to become re-established due to increased water availability (Jones, 2008), providing suitable habitat for nesting, brooding, foraging, and cover for the LPC. By clearing mesquite, grasses and forbs that LPC rely on for all life cycles should become more productive, and habitat should convert from a shrub-dominated landscape back to a native prairie.

Benefits of hand application (Figure 5) include:

- The hand application can be performed year-round. This allows land managers to respond to requests any time of year, and it is not constrained by seasonal leaf emergence as is the case with aerial applications.



Figure 5. Hand Treatment of Mesquite.

- This application causes no negative impacts on non-target plants within a defined area and alleviates any inadvertent harmful effects on non-target species due to direct application or spray drift. Figure 5 is an individual mesquite tree that was sprayed by hand. The blue coloring is a dye used to ensure that the chemical was applied properly and only to the desired plant.
- The application can be used effectively in close proximity to other sensitive areas such as agricultural crops or near resident livestock.
- This method allows the precision to avoid mesquite occupied by resident wildlife including occupied (protected) bird nests. This also applies to any sensitive insects, reptiles, mammals, or protected plants in the near proximity.

- Hand application is highly effective; in fact, initial observations indicate hand sprays are over 95 percent effective. This is evidenced by chlorosis (yellowing) in the leaves and other visible signs of stress within only days of prescribed treatments, and when applied during the winter, an even higher percentage of stressed and/or dying mesquite is observed.
- Chemicals and carriers are continually being improved; therefore, it is essential to work with the applicator and chemical companies to determine proper mix and timing.

Benefits of aerial applications (Figure 6) include:

- Aerial applications are less expensive than hand treatments. Costs typically range from \$20-\$40 per acre for electrostatic and conventional applications. The costs for requisite support personnel and administrative services in support of aerial application are not included in the per acre cost.
- Although constrained by seasonal status of the target plant species, this method encompasses much larger expanses of landscape in less time, with highly effective results.
- Electrostatic technology charges the spray particles as they leave the spray boom on the airplane. This charge causes the spray particles to be attracted to the plants and allows for more of the chemical to contact the target species, which improves the effectiveness of the treatment.
- Chemicals and carriers are continually being upgraded; therefore, it is essential to work with the applicator and the chemical companies to determine proper mix and timing.



Figure 6. Aerial Treatment of Mesquite.

To date, 79,297 acres of mesquite have been treated (Appendix G) . Future treatments are currently funded for 17,739 acres, and spraying will occur when environmental conditions are conducive for an effective treatment. Mesquite control of this nature improves habitat for the LPC and mitigates mesquite encroachment into dunal areas that are suitable for the DSL (Appendix H).

*Funded and/or Completed Mesquite Projects in 2019 (*indicates completed in 2019):*

No mesquite projects completed in 2019 due to unfavorable conditions of the mesquite.

Weaver Mesquite – This aerial treatment of approximately 837 acres was approved and funded in 2019 for \$36,432.55 (Table 1, Figures 36 & 37). Mesquite is problematic for the LPC in a variety of ways. In addition to outcompeting native plant species, the mesquite changes habitat structure in the area (in regard to lekking, foraging, nesting, and brood-rearing). LPCs also tend to avoid areas with mesquite coverage (Appendix H). Reducing or eliminating mesquite can open up new areas for the LPC to use for cover, lekking, nesting, and brood-rearing. A separate proposal to remove the dead, standing mesquite (DSM) will be submitted in the future. The Technical Working Group Meeting, held on May 16, 2019, expressed that creating new LPC/DSL habitat is of the highest priority, with mesquite treatment and removal said to be the best way to accomplish this. The majority of the ranch is in Crucial Habitat Assessment Tool (CHAT) 1 with a small portion falling in CHAT 2.

Pembers Mesquite — This aerial treatment of approximately 1,600 acres was approved and funded in August 2019 for \$67,172.14 (Table 1, Figures 36 & 37). Six areas on the property will be sprayed. Two of the spray areas include areas of mesquite previously treated through NRCS contracts, but the chemical failed to adequately kill the mesquite. Some small areas of mesquite were killed, and CEHMM removed the DSM from those areas in 2017. This ranch is occupied by DSLs. Treatment of the encroaching mesquite will prevent it from moving into areas of DSL occupancy and from outcompeting the shinnery oak that the DSL relies on for habitat. Mesquite is problematic for the LPC in a variety of ways. In addition to outcompeting native plant species, the mesquite changes habitat structure in the area (in regard to lekking, foraging, nesting, and brood-rearing). LPCs also tend to avoid areas with mesquite coverage. Reducing or eliminating the mesquite can help to improve the LPC habitat present on the property, as well as possibly opening up new areas for the LPC to use for cover, lekking, nesting, and brood-rearing (Appendix H). A separate proposal to remove DSM will be submitted in the future. The Technical Working Group Meeting, held on May 16, 2019, expressed that creating new LPC/DSL habitat is of the highest priority, with mesquite treatment and removal said to be the best way to accomplish this. CEHMM completed vegetation and forage monitoring on the ranch in 2017, and the property met or exceeded the standards set by the CCA/CCAA for both. The southern portion of the property is in CHAT 1, and the northern portion is in CHAT 3.

G. Coombes Halo Mesquite — This aerial treatment of approximately 200 acres of mesquite was approved and funded in August 2019 for \$12,888.66 (Table 1, Figures 36 & 37). This mesquite treatment will help to reduce habitat fragmentation for the LPC in one area of the ranch. To avoid nesting birds, a migratory bird survey will be conducted prior to the treatment. A separate proposal to remove the DSM will be submitted in the future. Mesquite is problematic for the LPC in a variety of ways. In addition to outcompeting native plant species, the mesquite changes habitat structure in the area (in regard to lekking, foraging, nesting, and brood-rearing). LPCs also tend to avoid areas with mesquite coverage. Reducing or eliminating mesquite can open up new areas for the LPC to use for cover, lekking, nesting, and brood-rearing (Appendix H). The Technical Working Group Meeting, held on May 16, 2019, expressed that creating new LPC/DSL habitat is of the highest priority, with mesquite treatment and removal said to be the best way to accomplish this. CEHMM completed forage utilization monitoring on the ranch in 2017, and the ranch met the grazing standards set by the CCA/CCAA. Vegetation monitoring and forage utilization surveys will be conducted again in 2020. The majority of the ranch falls within CHAT 2, with a small portion in CHAT 3.

G. Coombes Lovejoy Mesquite — This aerial treatment of 2,000 acres was approved and funded in August 2019 for \$82,591.08 (Table 1, Figures 36 & 37). This mesquite treatment will help to reduce habitat fragmentation for the LPC in one area of the ranch. To avoid nesting birds, a migratory bird survey will be conducted prior to the treatment. A separate proposal to remove the DSM will be submitted in the future. Mesquite is problematic for the LPC in a variety of ways. In addition to outcompeting native plant species, the mesquite changes habitat structure in the area (in regard to lekking, foraging, nesting, and brood-rearing). LPCs also tend to avoid areas with mesquite coverage. Reducing or eliminating the mesquite can open up new areas for the LPC to use for cover, lekking, nesting, and brood-rearing (Appendix H). The Technical Working Group Meeting, held on May 16, 2019, expressed that creating new LPC/DSL habitat is of the highest priority, with mesquite treatment and removal said to be the best way to accomplish this. CEHMM completed forage utilization monitoring on the ranch in 2017, and the ranch met the grazing standards set by the CCA/CCAA. Vegetation monitoring and forage utilization surveys will be conducted again in 2020. The Lovejoy pasture falls within CHAT 1.

Running N Mesquite — This aerial treatment of 5,800 acres was approved and funded in August 2019 for \$237,172.04 (Table 1, Figures 36 & 37). This spray is in conjunction with two other previously approved treatments, one through the NRCS and the other through CEHMM. Together, these treatments will provide great improvements for a very large area of the ranch's LPC habitat. Mesquite is problematic for the LPC in a variety of ways. In addition to outcompeting native plant species, mesquite changes habitat structure in the area (in regard to lekking, foraging, nesting, and brood-rearing). The LPCs also tend to avoid areas with mesquite coverage. Reducing or eliminating the mesquite can open up new areas for the LPC to use for cover, lekking, nesting, and brood-rearing (Appendix H). The Technical Working Group Meeting, held on May 16, 2019, expressed that creating new LPC/DSL habitat is of the highest priority, with mesquite treatment and removal said to be the best way to accomplish this. A separate proposal to remove the DSM will be submitted in the future. This property is in CHAT 1.

TNC Mesquite – This aerial treatment of approximately 1,300 acres was approved and funded in August 2019 for \$58,329.10 (Table 1, Figures 36 & 37). Honey mesquite (*Prosopis glandulosa*) is encroaching on The Nature Conservancy (TNC) property, and previous treatments have been completed to mitigate this problem. In 2010, a hand treatment was completed on this property. In 2018, TNC had two out of seven active leks treated as part of a CCA/CCAA project that treated active leks in vital LPC habitat areas. This proposal is aimed at aerial treatments for the areas connected to those previously treated. This will increase acreage of mesquite-free LPC habitat. Mesquite is problematic for the LPC in a variety of ways. In addition to outcompeting native plant species, the mesquite changes habitat structure in the area (in regard to lekking, foraging, nesting, and brood-rearing). LPCs also tend to avoid areas with mesquite coverage (Appendix H). Reducing or eliminating the mesquite can open up new areas for the LPC to use for cover, lekking, nesting, and brood-rearing. A separate proposal to remove the DSM will be submitted in the future. The Technical Working Group Meeting, held on May 16, 2019, expressed that creating new LPC/DSL habitat is of the highest priority, with mesquite treatment and removal said to be the best way to accomplish this. The ranch is also prime LPC habitat, along with dunes occupied by the DSL. This property is in CHAT 1.

Bud Bilberry Mesquite — This aerial treatment of 1,600 acres was approved and funded in August 2019 for \$68,128.22 (Table 1, Figures 36 & 37). This ranch is being heavily encroached upon by honey mesquite (*Prosopis glandulosa*), a native, woody species that is problematic, especially for our two species of interest. To avoid nesting birds, a migratory bird survey will be conducted prior to the treatment. A separate proposal to remove the DSM will be submitted in the future. This ranch is occupied by the DSL. Treatment of the encroaching mesquite will prevent it from moving into areas of DSL occupancy and from outcompeting the shinnery oak that the DSL relies on for habitat. Mesquite is problematic for the LPC in a variety of ways. In addition to outcompeting native plant species, the mesquite changes habitat structure in the area (in regard to lekking, foraging, nesting, and brood-rearing). LPCs also tend to avoid areas with mesquite coverage. Reducing or eliminating the mesquite can open up new areas for the LPC to use for cover, lekking, nesting, and brood-rearing (Appendix H). The Technical Working Group Meeting, held on May 16, 2019, expressed that creating new LPC/DSL habitat is of the highest priority, with mesquite treatment and removal said to be the best way to accomplish this. CEHMM completed vegetation and forage monitoring on the ranch in 2016, and the ranch met or exceeded the standards set by the CCA/CCAA for both. This ranch is located almost entirely in CHAT 2, but it is situated between two areas of CHAT 1.

Funded Mesquite Projects (prior to 2019) Awaiting Completion:

Running N Mesquite #2 — This aerial treatment of 4,402 acres was approved and funded in July 2018 for \$173,089.20 (Figures 37). A proposal to remove the DSM will be presented in the future. To avoid nesting birds, a migratory bird survey will be conducted prior to the treatment. In 2018, two LPC leks were observed on this ranch, with multiple leks present on surrounding enrolled acreage; therefore, this project can help improve habitat connectivity for the LPC (Appendix H). LPC surveys were completed in 2019. Vegetation and forage utilization monitoring were completed in 2019. The majority of this enrolled acreage is in CHAT 1. The southern portion of this enrolled acreage also falls within the DSL polygon. DSLs were detected on this enrolled acreage in 2011, and other DSLs were detected on neighboring properties to the south in 2011 and 2013. Conditions were not right for treatment in 2018 or 2019, but they will be reevaluated in 2020 to determine if the mesquite is suitable for treatment.

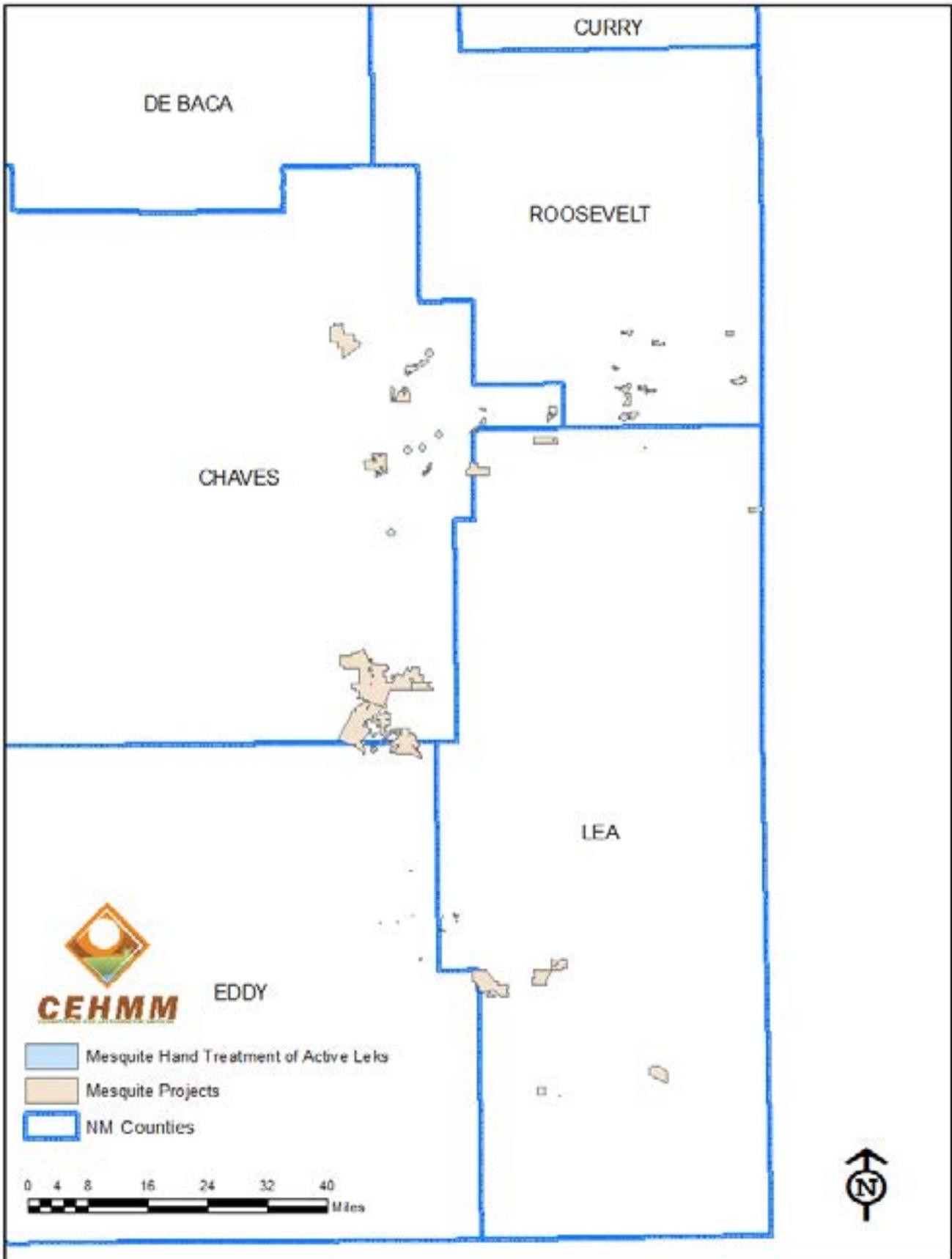


Figure 7. All Mesquite Projects Completed by the CCA/CCA Program.

REMOVAL OF DEAD, STANDING MESQUITE

Historical and current research (Boggie, et. al. 2017) indicates the LPCs avoid vertical structures, and additionally, the LPCs avoid mesquite whether or not the shrub is foliated. It is recommended that all mesquite be removed two km from historic and active leks.

CEHMM, the FWS, the BLM, and the NRCS, have voiced concerns about erect skeletons, as sprayed mesquite cannot be considered “removal of woody species or removal of vertical structures” until the skeleton is removed. Therefore, in 2015, with the approval of the ranking team, CEHMM purchased two track steers and rotary cutter attachments (Figure 8) to remove DSM on acreage that the ranking team deems ready for removal (Figures 9 & 10). The decision is based upon proximity to an active lek and an average of 80 percent



Figure 8. Skid Steer with Rotary Cutter Attachment.

kill of the mesquite that had been chemically treated at least two full years prior to the mechanical action. CEHMM staff have been trained to safely operate these machines, not only for their personal safety, but to ensure that the soil is not disturbed through the actions of the machinery. Currently, CEHMM has two machines in operation and has successfully removed 6,404.7 acres of DSM (Appendix G). Refer to (Appendix H) for more information.



Figure 9: Before DSM Removal.



Figure 10: After DSM Removal.

*Funded and/or Completed DSM Removal Projects in 2019 (*indicates completed in 2019):*

***Bresenham DSM Removal** — This project was approved and funded in February 2019 for \$3,331.15 (Tables 1 & 2, Figures 13, 14, 40, & 41). Approximately 350 acres of DSM were removed using two track steers with masticator implements. The mesquite was treated through NRCS funding in 2014. Once the mesquite plant is dead, the skeleton of the plant is still a vertical structure that must be removed in order to achieve the greatest conservation benefit for the LPC throughout lekking, nesting, and brood-rearing seasons (Appendix H). This ranch is entirely in CHAT 1 and within two miles of active and historic leks. Work was completed on February 27, 2019.

***ACEC DSM Removal** — This project was approved and funded in September 2019 for \$21,741.51 (Tables 1 & 2, Figures 13, 14, 38, 40, & 41). Approximately 950 acres of DSM were removed from the BLM Area of Critical Environmental Concern (ACEC) (Figures 11 & 12). This project started on September 24, 2019 and was completed on October 14, 2019 (Figure 10). Eradicating and removing mesquite opens up habitat for LPC lekking, nesting, and brood-rearing. Once the mesquite plant is dead, the skeleton of the plant is still a vertical structure that must be removed in order to achieve the greatest conservation benefit for the LPC (Appendix H).

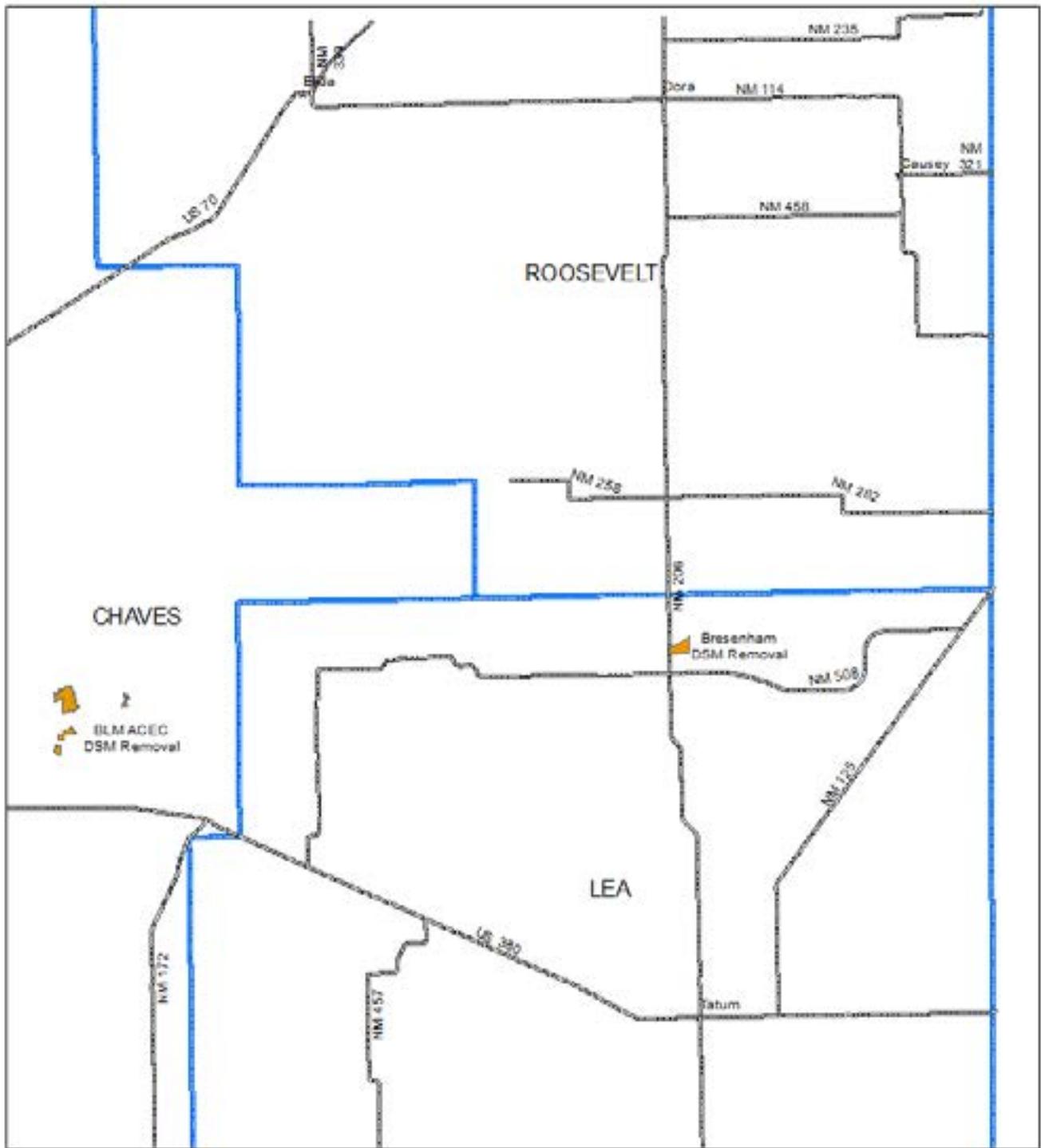


Figure 11: Before DSM Removal on the BLM ACEC.



Figure 12: After DSM Removal on the BLM ACEC.

BLM Running N DSM Removal — This project was approved and funded in September 2019 for \$26,337.96 to remove approximately 1,160 acres of DSM using two skid steers with masticator implements (Table 1, Figures 38 & 39). Once the mesquite plant is dead, the skeleton of the plant is still a vertical structure that must be removed in order to achieve the greatest conservation benefit for the LPC throughout nesting, lekking, and brood-rearing seasons (Appendix H). The Technical Working Group Meeting, held on May 16, 2019, expressed that creating new LPC/DSL habitat is of the highest priority, with mesquite treatment and removal said to be the best way to accomplish this. This property is in CHAT 1.



 DSM Treatments
 NM Counties

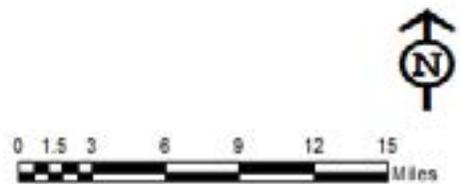
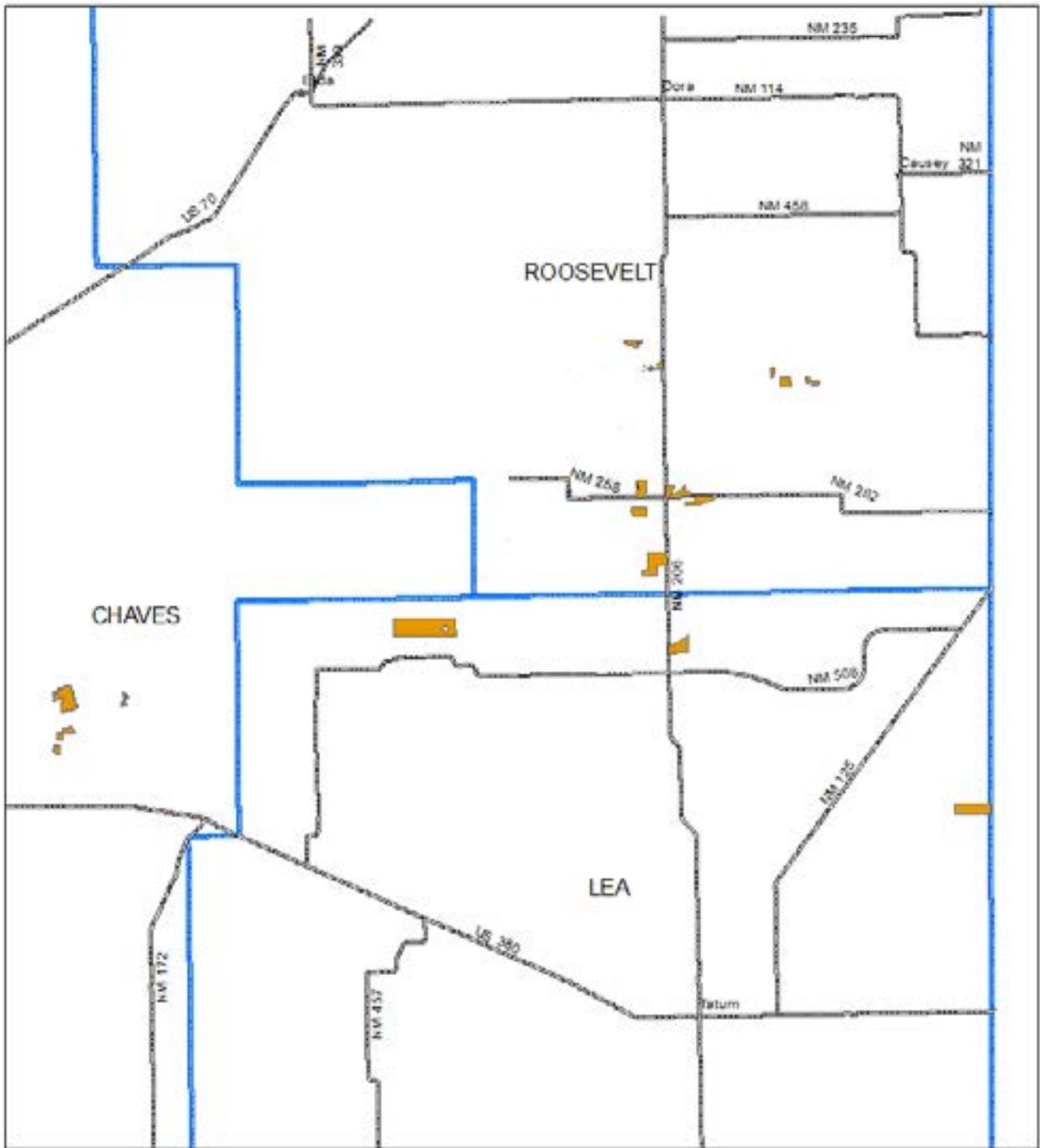


Figure 13. DSM Removal Completed in 2019.



DSM Treatments
 NM Counties



Figure 14. All DSM Removal Completed by the CCA/CAA Program.

ESCAPE RAMPS

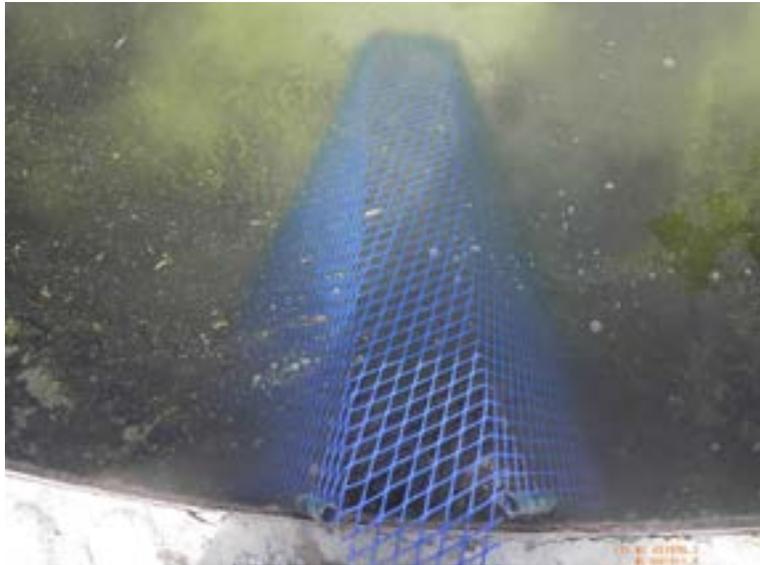


Figure 15. Escape Ramp Installed in Water Tank.

In 2007, the National Wildlife Federation (Di Sylvestro, 2007) published concerns regarding the serious threat of livestock watering tanks on indigenous wildlife throughout the arid southwest. This threat is not exclusive to birds, and it also includes insects and small mammals, such as bats. Once an animal falls into a livestock tank while attempting to access water, it inherently struggles to the sides of the tank in an attempt to escape. Once a ramp is installed, it provides an available mechanism to facilitate the entrapped animal's escape (Figure 15). CEHMM escape ramps are modeled after proven BLM standard ramp design. In order to increase traction for an entrapped animal and extend ramp longevity, the ramps are coated prior to installation with a stable, non-toxic textured polymer material (similar to spray-on truck bed liners). In 2014, CEHMM changed the escape ramp design, adding a rubber hose around the perimeter of the ramp to prevent the metal from rubbing on the side and bottom of the tanks, which created holes in some water troughs. All previously installed ramps with the old design have been retrofitted or replaced to prevent the rubbing. In 2019, CEHMM installed 18 escape ramps on four ranches (Figure 16). To date, 689 escape ramps have been installed in water troughs on ranches with signed CIs (CCAA) and CPs (CCA) (Figure 17). CEHMM will continue to install escape ramps on enrolled ranches within LPC and DSL habitats.

SOLAR CONVERSION AND TROUGH REPLACEMENT

In 2013, CEHMM held a strategic meeting when researchers identified grazing management as the primary concern for the LPC. In order for producers to effectively graze to benefit the LPC, infrastructure (e.g. fences and waters) must be in place to ensure adequate rotation of cattle, promoting the health of the rangeland and improving habitats. Because of these expert discussions and conclusions, the ranking team prioritized funding for water projects. In 2018, a similar meeting was held, and participants again determined grazing/rangeland health to be a primary concern.

The availability of water is one of the key issues facing native grasslands in eastern New Mexico. Concerns pertaining to livestock grazing are discussed in the CCA/CCAA. Due to water sources being a limiting factor in livestock management, it is essential to provide producers the ability to develop reliable and well-distributed watering points. This aids in the management of livestock in a fashion that creates suitable LPC habitat. The installation of new stock tanks, wildlife waters, pipelines, and water storage tanks on enrolled ranches provides critical water sources allowing ranch and livestock managers to utilize the landscape more efficiently (Appendix I). These water sources are not only critical to providing suitable habitat but may also serve the LPC in times where diet and surface water dependent on precipitation is not adequate for hydration. All troughs were outfitted with escape mechanisms, per CCA/CCAA requirements, to eliminate risks of the LPC and other wildlife from drowning when utilizing these troughs.

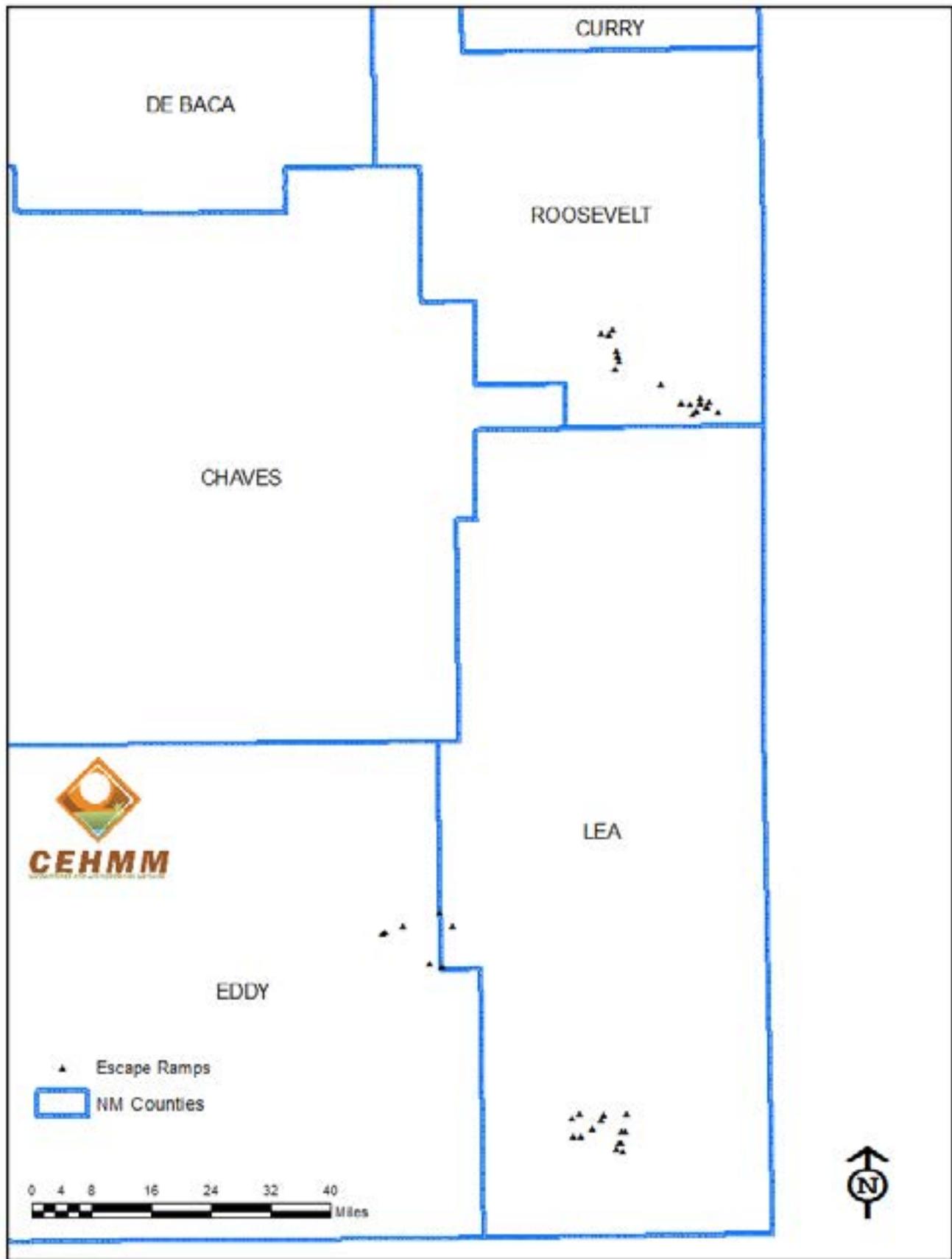


Figure 16. Escape Ramp Installation Locations in 2019.

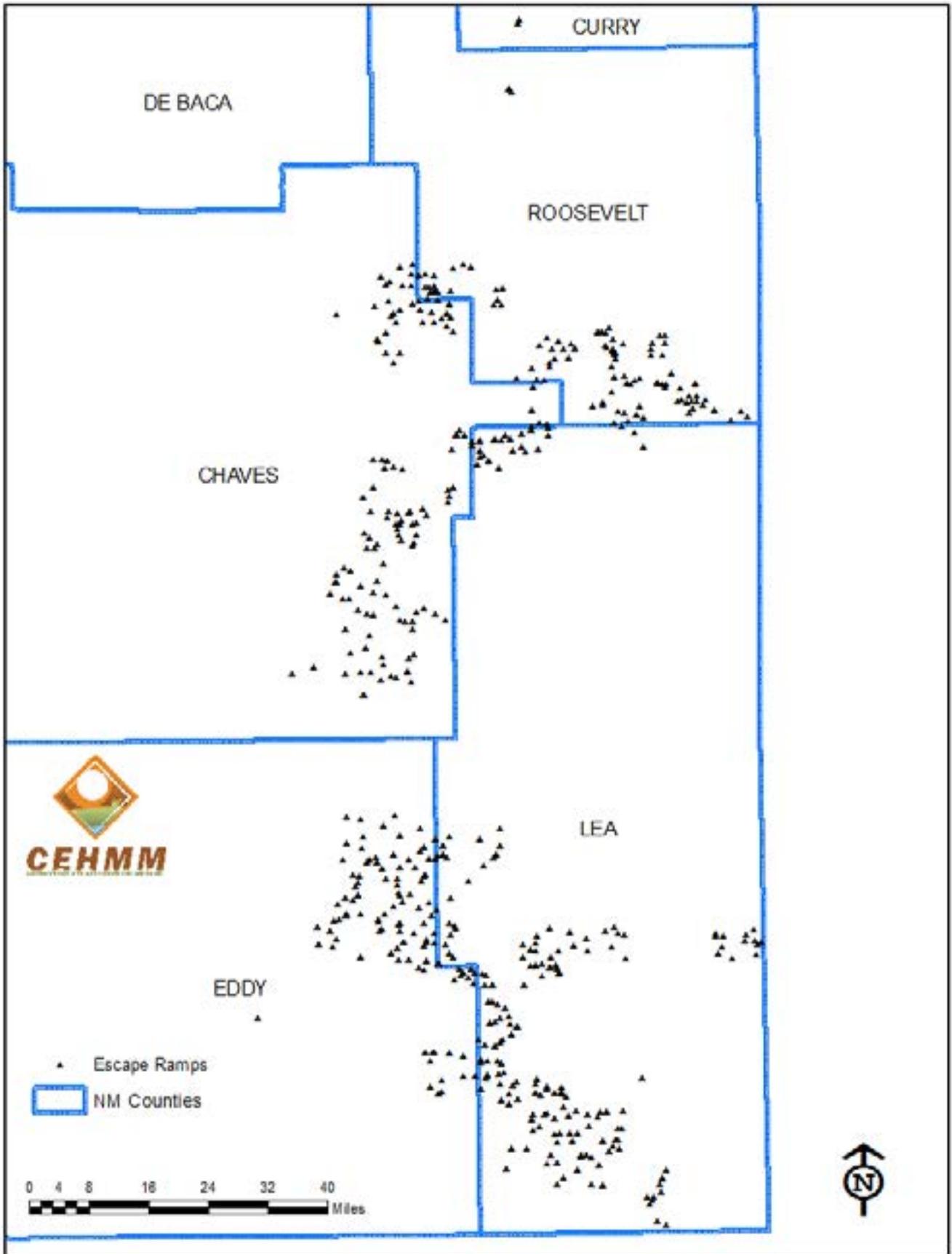


Figure 17. All Escape Ramp Installation Locations Completed by the CCA/CAA Program.

Water wells outfitted with windmills have been found to be undependable water sources due to windmill age and repair expenses. Wind is not a constant force and usually subdues during the hottest time of the year, resulting in reduced water delivery into troughs. While the initial investment in a solar pump is expensive, the maintenance, repair, and longevity of the product far outweigh the initial investment. Converting a water well from a windmill to a solar pump also includes removal of the tower and associated windmill, as they are no longer necessary and are identified as potential threats (vertical structures) to the LPC (U.S Fish and Wildlife Service, 2008). After the tower is removed, the solar panel and associated submersible pump are installed. The pumps are very efficient since they only require a small amount of direct sunlight to power them. In a three-year study, Grisham, et al. (2014) documented 1,245 visits of LPCs at open water sources. This study illustrates the necessity to provide water sources for the LPC, especially in times of drought.

Over time, water troughs become degraded, fall into disrepair, and become unable to hold water (Figure 16), thus eliminating a water source from the landscape the LPC and other wildlife have become dependent upon. Troughs of this nature are replaced with new, fiberglass troughs (Figure 18 & 19) outfitted with escape ramps.



Figure 18. Before; Old, Worn-Out Water Troughs.



Figure 19. After; Fiberglass Water Trough with Solar Well.

With adequate and reliable watering facilities, Participating Cooperators are able to manage their grazing operations in a fashion that leaves residual grasses and cover for the LPC to use for nesting and brood-rearing (Appendix I). Installing adequate water sources allows ranchers to combine herds, which in turn gives ranchers the ability to rest pastures.

In 2019, five windmills were converted to solar wells; 18 water troughs were replaced; and two new storage tanks were installed (Figure 26). To date, CEHMM has converted 13 windmills to solar and has replaced 25 water troughs (Figure 29).

*Funded and/or Completed Water Projects in 2019 (*indicates completed in 2019):*

***TNC Water** — This project was approved and funded in 2018 for \$52,830.44. Seven small, worn out stock tanks were replaced with 20' fiberglass stock tanks that include built-in wildlife-friendly escape ramps (Table 2, Figures 20, 21, 28, 29, 40, & 41). This project was completed on May 2, 2019. Since this property is managed specifically to benefit the LPC, it provides a large area of suitable and occupied LPC habitat by exceeding vegetation and forage utilization goals. With proper management, these water projects increasingly benefit the growing number of LPCs on the property (Appendix I). This enrolled acreage is in CHAT 1. In 2018, 29 LPC leks were observed. LPC surveys were conducted in 2019. A portion of this enrolled acreage also falls within the DSL polygon. DSLs were detected in four locations on this enrolled acreage in 2012, and other DSLs were detected on neighboring properties to the east.



Figure 20. One of the Old, Dilapidated Water Troughs on TNC Water Project.



Figure 21. One of the New Water Troughs on the TNC Water Project.

***Mohon Water Tanks** — This project was approved and funded in 2018 for \$19,369.24. An old stock tank that no longer held water was removed and replaced with a new 20' fiberglass stock tank with a wildlife-friendly escape ramp (Table 2, Figures 22, 28, 29, 40, & 41). Another 20' fiberglass tank with a wildlife-friendly escape ramp was installed in another area of the ranch coming out of the Conservation Reserve Program (CRP). The Participating Cooperator installed the pipeline. The project was completed on May 2, 2019. In the past, this property has exceeded vegetation and forage utilization goals. However, much of this ranch was enrolled in CRP, which caused certain areas to be overutilized at times. Implementation of this project will allow better distribution in one such area, while providing a water source in an area that has come out of CRP. This will allow a better rest and rotation grazing management plan to improve previously overutilized areas through longer periods of rest (Appendix I). Although no LPCs were detected during lekking season, this property borders other enrolled properties and a Prairie-Chicken Area (PCA) with documented leks. With the close proximity of detected leks on neighboring properties, a high probability exists that LPCs occupy this enrolled acreage throughout different times of the year; therefore, this project can improve habitat connectivity for the LPC. Along with proper management, the completion of this project will also help to improve LPC habitat for lekking, nesting, and brood-rearing on the property. This enrolled acreage is in CHAT 1. LPC surveys were completed in 2019; vegetation monitoring, and forage utilization monitoring were completed in 2019.



Figure 22. New Water Trough on the Mohon Water Project.

With the close proximity of detected leks on neighboring properties, a high probability exists that LPCs occupy this enrolled acreage throughout different times of the year; therefore, this project can improve habitat connectivity for the LPC. Along with proper management, the completion of this project will also help to improve LPC habitat for lekking, nesting, and brood-rearing on the property. This enrolled acreage is in CHAT 1. LPC surveys were completed in 2019; vegetation monitoring, and forage utilization monitoring were completed in 2019.

***M. Coombes Water #1 North** — This project was approved and funded in 2018 for \$141,205.21 (Table 2). During this project, three unreliable windmills were removed and replaced with solar pumps; eight small, inefficient stock tanks were replaced with 20' fiberglass tanks with wildlife-friendly escape ramps; a new water point was installed with a 20' fiberglass stock tank and one 12' x 20' storage tank; and 3,900 feet of pipeline was connected to an existing pipeline (Figures 23, 24, 28, 29, 40, & 41). This property was damaged by wildfires in early 2018. Prior to the fires, the Coombes property was exceeding vegetation and forage utilization goals. With proper management, the implementation of this project will allow continued benefits to the LPC habitat (Appendix I). Although no LPCs were detected during lekking season, the close proximity of detected leks on neighboring properties immediately to the east and west indicates a high probability the LPC occupies this enrolled acreage throughout different times of the year; therefore, this project can improve habitat connectivity for the LPC. This enrolled acreage is in CHAT 1. LPC surveys were conducted in 2019.



Figure 23. Solar Well on the M. Coombes Water #1 Project.



Figure 24. New Storage Tank on the M. Coombes Water #1 Project.

***M. Coombes Water #2 North** — This project was approved and funded in 2018 for \$59,911.47 (Table 2). Throughout the scope of this project, two unreliable windmills were replaced with solar pumps; one 20' fiberglass stock tank with a wildlife-friendly escape ramp was installed (Figure 6); and one 12' x 20' storage tank was added (Figures 25, 26, 28, 29, 40, & 41). Prior to wildfire damage in early 2018, the Coombes property was exceeding vegetation and forage utilization goals. With proper management, the implementation of this project will allow continued benefits to the LPC habitat (Appendix I). Although no LPCs were detected during lekking season, the close proximity of detected leks on neighboring properties immediately to the east and west indicates a high probability the LPC occupies this enrolled acreage throughout different times of the year; therefore, this project can improve habitat connectivity for the LPC. This enrolled acreage is in CHAT 1. LPC surveys were conducted in 2019.



Figure 25. New Water Trough on the M. Coombes Water #2 Project.



Figure 26. New Solar Well and Storage Tank on the M. Coombes Water #2 Project.

Bilbrey Water — This project was approved and funded in August 2019 for \$61,458.39 to remove two unreliable windmills and one dilapidated stock tank; install three new 20' fiberglass stock tanks with wildlife-friendly escape ramps; install one electric well pump; and install 9,000' of pipeline (Table 1, Figures 38 & 39). Strategic meetings held in Milnesand, NM in 2014 and 2018 identified grazing management as a top priority for improving and maintaining LPC habitat in eastern NM. Having adequate water points distributed on the ranch will allow for the utilization of a rest/rotation pattern, which will provide an adequate growing season and period of rest for the vegetation that the LPC relies on throughout the year (Appendix I). This rest is critical for the native grasses and forbs to recover from grazing and to reproduce. This practice also ensures enough residual vegetation will be left on the ranch for LPCs to use for nesting, cover, and brood-rearing. Each time it was surveyed, the ranch met the utilization and vegetation standards set by the CCA/CCAA. CEHMM's annual spring surveys have detected multiple leks on the ranch. The ranch is also bordered on all four sides by the Sandhills Prairie Conservation Area (PCA), which also supports many LPCs throughout the year. Lek surveys for the LPC will continue to be conducted on the property every spring. The entire ranch is in CHAT 1.

Luman Tank — This project was approved and funded in August 2019 for \$10,300.43 to remove one old, leaky stock tank and replace it with a 20' fiberglass stock tank with a wildlife-friendly escape ramp. An overflow pond will also be installed (Table 1, Figures 38 & 39). Adequate water sources and distribution are key to the implementation of an efficient rest/rotation grazing management plan. The water source in this pasture is very unreliable and is preventing proper utilization of the area. This is causing another area of the pasture to be overutilized, while the area of the pasture with the tank is being left without grazing disturbance. Both overutilization and underutilization can lead to decline in LPC habitat quality, as they both can lead to the decline in grassland heterogeneity as promoted by a proper grazing system (Appendix I). This tank, along with its associated overflow pond, will provide a reliable source of water to all wildlife in the area, especially in times of drought. The property falls entirely in CHAT 1.

G. Coombes Halo Water — This project was approved and funded in August 2019 for \$125,097.57 to run 12.5 miles of pipeline to 24 new stock tanks. Mr. Coombes will provide the stock tanks in-kind. Through an NRCS contract on this property, Mr. Coombes will remove three windmills and replace them with solar pumps (Table 1, Figures 38 & 39). By improving infrastructure, the producer will be able to implement a more efficient grazing rotation (Appendix I). The new water points on the ranch will also provide many year-round sources of water to the wildlife in the area, including the LPCs. CEHMM completed forage utilization monitoring on the ranch in 2017, and the ranch met the grazing standards set by the CCA/CCAA. Vegetation monitoring and forage utilization surveys will be conducted again in 2020. The majority of the ranch falls within CHAT 2, with a small portion in CHAT 3.

Mohon Water — This project was approved and funded in August 2019 for \$35,887.25 to remove one windmill and to install four 20' fiberglass stock tanks with wildlife-friendly escape ramps (Table 1, Figures 38 & 39). With adequate infrastructure in place, the operator can give a sufficient growing season and period of rest to pastures that support LPC habitat (Appendix I). Improved water points on the property will also provide critical water sources for the LPC and other wildlife during times of drought. The windmill removal will also eliminate a significant vertical structure, which LPCs tend to avoid. CEHMM completed vegetation and forage monitoring on the ranch in 2016, and the ranch met the standards set by the CCA/CCAA for both. All of the Mohon properties fall within CHAT 1.

Running N Water — This project was approved and funded in August 2019 for \$65,540.96 to remove two windmills and replace them with two solar pumps; install two new 20' fiberglass stock tanks with wildlife-friendly escape ramps; and install one 12x12 storage tank at one of these sites (Table 1, Figures 38 & 39). Strategic meetings held in Milnesand, NM in 2014 and 2018 identified grazing management as a top priority for improving and maintaining LPC habitat in eastern NM. With adequate infrastructure in place, the operator will be able to distribute cattle across pastures to utilize them more efficiently, allowing adequate growing season rest for all pastures (Appendix I). Improved water points on the property will also provide critical water sources for the LPC and other wildlife during times of drought. The removal of two windmills on the property will also eliminate significant vertical structures, which LPC tend to avoid. This property is in CHAT 1.

Weaver/Grasslans Water – This project was approved and funded in August 2019 for \$79,856.06 to remove three windmills; install three 20' fiberglass stock tanks with wildlife-friendly escape ramps; install 15,840' of pipeline; and install one solar pump (Table 1, Figures 38 & 39). By improving infrastructure, the producer is able to implement a more efficient grazing rotation (Appendix I). The new, reliable water points will provide water not only for cattle, but for all wildlife. The majority of the ranch is in CHAT 1 with a small portion falling in CHAT 2.

Funded Water Projects (prior to 2019) Awaiting Completion:

Weinheimer Fence & Water — This project was approved and funded in July 2018 for \$89,395.41 to install 3.25 miles of new, wildlife-friendly interior fence; install two 20' fiberglass stock tanks with wildlife-friendly escape ramps; remove an old, inadequate windmill and replace it with a solar pump; and install a storage tank (Figure 39). The fence was completed on September 11, 2018. The windmill was removed, and the pipeline was installed. The tanks are scheduled for delivery. The Weinheimer ranch met the vegetation and forage utilization goals of the CCA/CCAA, but it was approaching the utilization limit. This was largely due to inadequate infrastructure throughout the ranch as well as heavy mesquite encroachment, leading to overutilization of much of the ranch. Implementing this project will help to improve grazing distribution across the property, providing much-needed rest in critical areas. Although no LPCs were detected during lekking season, this property borders other enrolled properties with documented leks. With the close proximity of detected leks on neighboring properties to the northeast, east, and southeast, a high probability exists that LPCs occupy this enrolled acreage throughout different times of the year; therefore, this project can help to improve habitat connectivity for the LPC. Given proper management, the completion of this project will also improve LPC habitat for lekking, nesting, and brood-rearing (Appendix I). LPC surveys were conducted in 2019. About half of this enrolled acreage is in CHAT 1 and the other half is in CHAT 3, with the northeast corner providing connectivity. Part of this ranch also falls within the DSL polygon.

Pearce Water – This project was funded in August 2014 for \$200,000 to allow the Participating Cooperator to improve their grazing management strategy (Figure 39). The current strategy includes short durations of grazing followed by long periods of rest (Appendix I). A different pasture is getting at least 12 consecutive months of rest each year, and all others are rested for extended periods during the growing season. By implementing this type of management strategy, the LPC nesting and brood-rearing substrates are less susceptible to drought and are more productive due to long periods of rest. In order to continue these practices, a more productive water system was necessary. The Pearce water well was drilled to a depth of 380 feet into a water-bearing zone in a sandstone formation. A pump test indicated the well maintains a flow rate of one gallon per minute. Drilling mud was cleaned out of the well with no increase in the flow rate. CEHMM will set the pump in the well to pump into a storage tank provided by the Participating Cooperator. One bid was received to install a solar-powered pump and panels at a location where a windmill was removed. The solar panels and pump were installed. CEHMM staff met with the Participating Cooperator to discuss grazing management, rangeland improvements put on the landscape since the initial proposal was submitted, and the final stages of the project to be completed. Three additional windmills will be removed and replaced with solar-powered pumps.

Smith Ranch Water – This project was funded in July 2016 for \$19,657.63. By introducing a new water source in this pasture, other pastures with suitable, and potentially suitable, LPC habitat will be relieved from grazing pressure by moving cattle into the pasture with the new water source. This will increase the productivity of vegetation the LPC relies on for nesting and brood-rearing (Appendix I). CEHMM will develop a bid proposal for contractors. The National Environmental Policy Act (NEPA) process was completed in August 2017. The project was put on hold pending further discussions with the Participating Cooperator. After conversations with the ranch manager, this project was cancelled, and a different proposal will be drafted to provide a greater conservation benefit to the LPC.

K. James Wildlife Water Amendment—This project was funded in June 2018 for \$39,451.89. CEHMM will contract the installation of approximately 1.25 miles of water line and install a solar-powered submersible pump, a solar-powered booster pump, and a 200-300 gallon tire trough with a satellite water location (Figure 39). The Participating Cooperator will provide in-kind services to include plumbing the trough, removing a windmill, and providing a storage tank. These efforts will provide water for the LPC in times of drought and will allow grazing in an area that is underutilized due to remoteness from existing livestock water sources. By allowing this area to be utilized, livestock use in other areas will decrease, leaving more residual vegetation for LPC nesting and brood-rearing (Appendix I). CEHMM received the signed project agreement from the Participating Cooperator. The BLM has been contacted to proceed with the NEPA process. An onsite visit with BLM wildlife staff, archaeologists, range staff, and CEHMM was completed in November 2018 to determine a suitable route and to stake the line for archaeological clearance. BLM range staff are preparing NEPA documents. An archaeological (ARCH) survey was completed, and information has been submitted to the BLM in order to complete the NEPA process.

FENCE REMOVAL AND REPLACEMENT

In 2013, CEHMM held a strategic meeting when researchers identified grazing management as the primary concern for the LPC. In order for producers to effectively graze to benefit LPC, infrastructure (e.g. fences and waters) must be in place to ensure adequate rotation of cattle, promoting the health of the rangeland and improving habitats. Because of these expert discussions and conclusions, the ranking team prioritized funding for fence projects. In 2018, a similar meeting was held, and researchers again determined grazing management/rangeland health to be a primary concern.

Fencing, along with implementation of a grazing management plan, benefits all grassland species, including the LPC. The installation of wildlife-friendly fences allows enrollees to graze cattle more efficiently, allowing other pastures to rest. Adequate rest provides recovery time for native grasses and forbs, while also providing suitable habitat for nesting, brood-rearing, foraging, and cover for the LPC (Appendix I). Removing old, dilapidated fencing (5-strand barbed and sheep fence) and replacing with new wildlife-friendly fencing (Figure 27) also decreases the risk of trespass cattle on the enrolled property, giving enrollees better control of their management practices. In addition to the LPC benefits described above, wildlife-friendly fences allow for adequate clearance (18 inches) for pronghorn to cross underneath the smooth bottom wire, and for deer to cross the top wire. In 2019, 14 miles of wildlife-friendly fence were completed, and five miles of fire-damaged fence were repaired on two enrolled ranches (Figures 35).



Figure 27. New Wildlife-Friendly Boundary Fence.

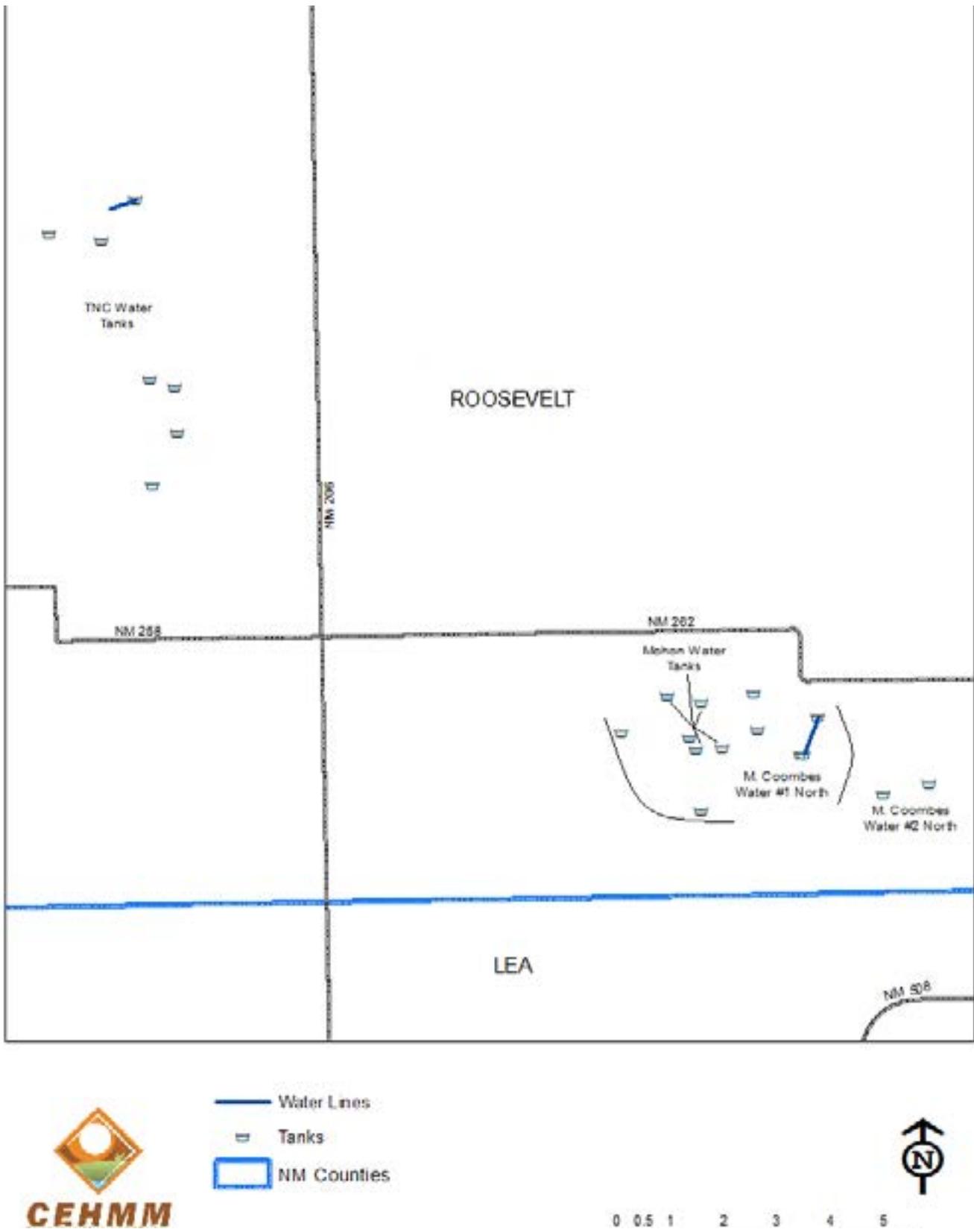


Figure 28. Water Projects Completed in 2019.

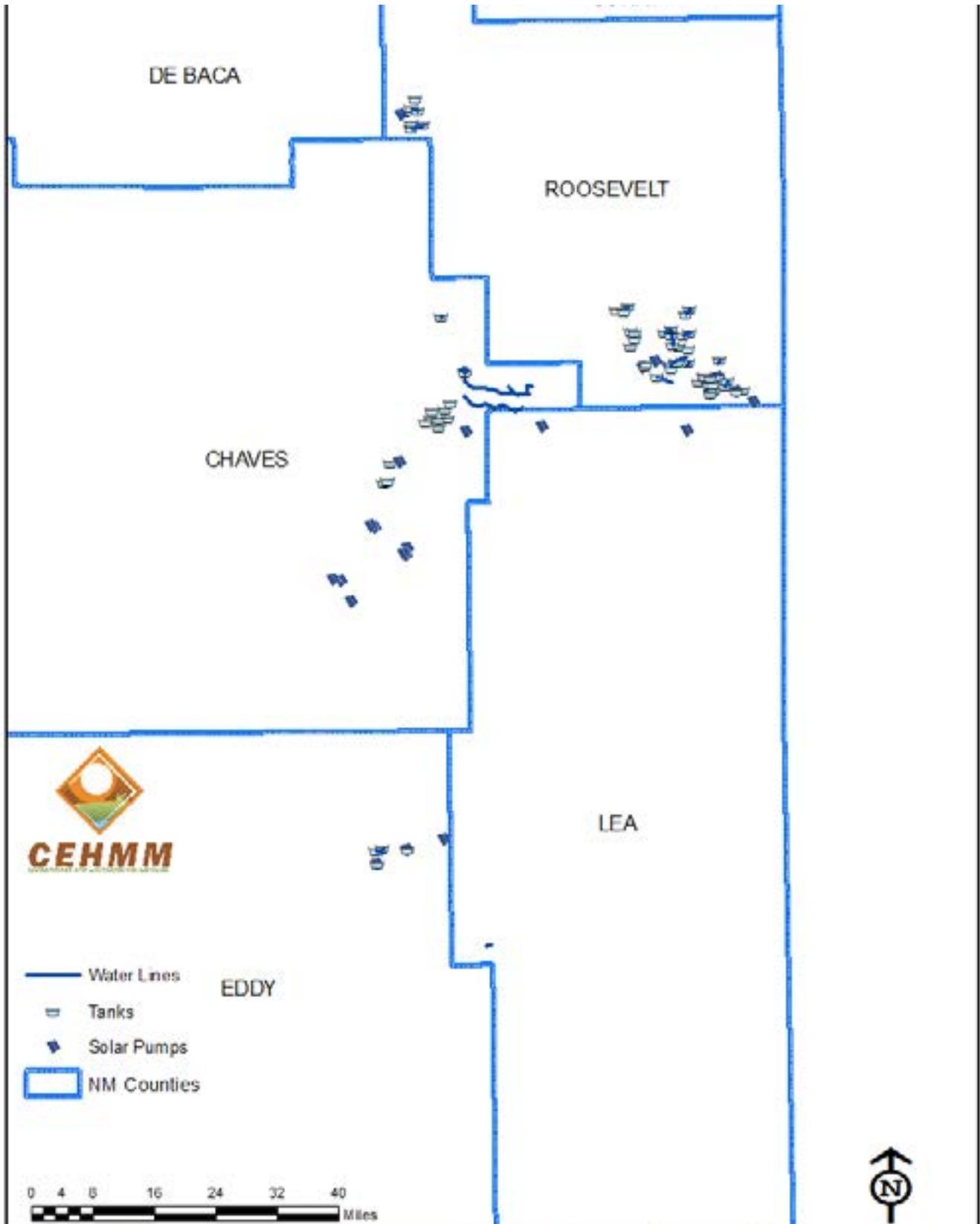


Figure 29. All Water Projects Completed by the CCA/CCA Program.

*Funded and/or Completed Fence Projects in 2019 (*indicates completed in 2019):*

***Peterson-Buffington Fence Repair** — This project was approved and funded in 2018 for \$26,945.01. In early 2018, this fence was damaged by a wildfire that went through a large portion of the District 2 area. CEHMM removed and replaced 1.25 miles of boundary fence. Three miles were repaired with new posts, H-braces, and corners (Table 2, Figures 30, 31, 35, 36, 40, & 41). Although this enrolled ranch exceeded vegetation and forage utilization goals in the past, the wildfire caused severe damage to the property. With proper management, this project will help the Participating Cooperator continue to meet or exceed goals. While only one LPC lek was observed in 2016 on the Buffington property, multiple active leks are present on an enrolled property to the southeast. The property also borders two large NMDGF Prairie Chicken Areas (PCAs) with documented leks. With the close proximity of detected leks on neighboring properties, it is highly probable the LPCs occupy this enrolled acreage throughout different times of the year; therefore, this project will improve habitat connectivity for the LPC. Proper grazing management without the fear of trespass cattle, along with the cooperation of the primary landowner and their neighbors, will directly benefit the LPC by providing vital nesting and brood-rearing habitat (Appendix I). It will indirectly benefit all grassland flora and fauna by conserving native vegetation species to be used by all wildlife. Lek surveys were conducted in 2019. This enrolled acreage is in CHAT 1.



Figure 30. After Wildfire, but Before Fence Repairs on the Peterson-Buffington Project.



Figure 31. After Fence Repairs on the Peterson-Buffington Project.

G. Coombes Halo Boundary Fence — This project was approved and funded in August 2019 for \$218,779.65 to remove 12.5 miles of old, dilapidated boundary fence and replace it with new five-strand wildlife-friendly fence (Table 1, Figures 38 & 39). Mr. Coombes will provide in-kind materials including all of the H-braces, corner posts, and gates. The boundary fence also borders another enrollee. Strategic meetings held in Milnesand, NM in 2014 and 2018 identified grazing management as a top priority for improving and maintaining LPC habitat in eastern NM. This fencing upgrade will greatly improve the Coombes grazing management plan and will prevent trespass cattle that would jeopardize the grazing plan in pastures that have been left to rest (Appendix I). CEHMM completed forage utilization monitoring on the ranch in 2017, and the ranch met the grazing standards set by the CCA/CCAA. Vegetation monitoring and forage utilization surveys will be conducted again in 2020. The majority of the ranch falls within CHAT 2, with a small portion in CHAT 3.

G. Coombes Halo Interior Fence — This project was approved and funded in August 2019 for \$308,645.84 to remove 21 miles of unrepairable, old interior fence and replace it with new four-strand wildlife-friendly fence (Table 1, Figures 38 & 39). Mr. Coombes will provide in-kind materials including H-braces, corner posts and gates. Strategic meetings held in Milnesand, NM in 2014 and 2018 identified grazing management as a top priority for improving and maintaining LPC habitat in eastern NM. By improving infrastructure, the producer will be able to implement a more efficient grazing rotation (Appendix I). CEHMM completed forage utilization monitoring on the ranch in 2017, and the ranch met the grazing standards set by the CCA/CCAA. Vegetation monitoring and forage utilization surveys will be conducted again in 2020. The majority of the ranch falls within CHAT 2, with a small portion in CHAT 3.

***M. Coombes Boundary Fence-Removal North** — This project was approved and funded in 2018 for \$281,631.81. CEHMM removed 15.75 miles of fence, installed 12.75 miles, and repaired 12.75 miles (Table 2, Figures 32, 33, 35, 36, 40, & 41). This property was also damaged by area wildfires in early 2018. Prior to the fires, the Coombes property was exceeding vegetation and forage utilization goals. This fence borders five other CCA/CCAA enrolled properties and three NMDGF properties with active leks present. This project will continue to benefit LPC habitat, while also removing derelict fencing that is dangerous to all wildlife, and to keep trespass cattle from overutilizing habitat. Although no LPCs were detected during lekking season, the close proximity of detected leks on neighboring properties immediately to the east and west indicates a high probability that the LPCs occupy this enrolled acreage throughout different times of the year; therefore, this project will improve habitat connectivity for the LPC. With proper management, the completion of this project will also help improve LPC habitat for lekking, nesting and brood-rearing on the property (Appendix I). Lek surveys were conducted in 2019. This enrolled acreage is in CHAT 1.



Figure 32. M. Coombes Boundary Fence Before.



Figure 33. M. Coombes Boundary Fence After.

G. Coombes Atlee-Lovejoy Boundary Fence — This project was approved and funded in August 2019 for \$67,002.37 to remove four miles of old, dilapidated boundary fence and replace it with new five-strand wildlife-friendly fence (Table 1, Figures 38 & 39). This fence will coincide with the construction of 7.5 miles of interior fence that Mr. Coombes is implementing through an NRCS contract. These fencing improvements will greatly improve the Coombes grazing management plan and prevent trespass cattle that would jeopardize the grazing plan in pastures that have been left to rest (Appendix I). Mr. Coombes will provide in-kind materials including all of the H-braces, corner posts, and gates. Strategic meetings held in Milnesand, NM in 2014 and 2018 identified grazing management as a top priority for improving and maintaining LPC habitat in eastern NM. CEHMM completed forage utilization monitoring on the ranch in 2017, and the ranch met the grazing standards set by the CCA/CCAA. Vegetation monitoring and forage utilization surveys will be conducted again in 2020. The majority of the ranch falls within CHAT 1 and 2, with a small portion in CHAT 3.

Mohon Boundary Fence — This project was approved and funded in August 2019 for \$78,313.76 to remove 4.25 miles of old, dilapidated boundary fence and replace it with new five-strand wildlife-friendly fence (Table 1, Figures 38 & 39). Strategic meetings held in Milnesand, NM in 2014 and 2018 identified grazing management as a top priority for improving and maintaining LPC habitat in eastern NM. This fencing upgrade will greatly improve the Mohon grazing management plan and prevent trespass cattle that would jeopardize the grazing plan in pastures that have been left to rest (Appendix I). CEHMM completed vegetation and forage monitoring on the ranch in 2016, and the ranch met the standards set by the CCA/CCAA for both. All of the Mohon properties fall within CHAT 1.

Mohon Interior Fence – This project was approved and funded in August 2019 for \$43,959.87 to remove 2.25 miles of unrepairable interior fence and replace it with new four-strand wildlife-friendly fence (Table 1, Figure 36). Strategic meetings held in Milnesand, NM in 2014 and 2018 identified grazing management as a top priority for improving and maintaining LPC habitat in eastern NM. With adequate infrastructure in place, the operator can give a sufficient growing season and a period of rest to pastures that support LPC habitat (Appendix I). CEHMM completed vegetation and forage monitoring on the ranch in 2016, and the ranch met the standards set by the CCA/CCAA for both. All of the Mohon properties fall within CHAT 1.

Funded Fence Projects (prior to 2019) Awaiting Completion:

Weinheimer Interior Fence—This project was approved and funded in July 2018 for \$110,486.94 to install approximately 7.5 miles of new, wildlife-friendly fence and to remove approximately 1.25 miles of old, dilapidated fence (Figure 39). Work commenced on this project on July 17, 2018. Two miles of fence remain to be completed. The ARCH survey was completed in July 2019. The Weinheimer ranch met the vegetation and forage utilization goals of the CCA/CCAA, but it approached the utilization limit. This was largely due to inadequate infrastructure throughout the ranch along with heavy mesquite encroachment, leading to overutilization of much of the ranch. Implementing this project will help to improve grazing distribution across the property, providing much-needed rest in critical areas (Appendix I). Although no LPCs were detected during lekking season, this property borders other enrolled properties with documented leks. With the close proximity of detected leks on neighboring properties to the northeast, east, and southeast, a high probability exists that LPCs occupy this enrolled acreage throughout different times of the year; therefore, this project will improve habitat connectivity for the LPC. With proper management, the completion of this project will improve LPC habitat on the property. LPC surveys were conducted in 2019. About half of this enrolled acreage is in CHAT 1 and the other half is in CHAT 3, with the northeast corner providing connectivity. Part of this ranch also falls within the DSL polygon.

Weinheimer Fence & Water — This project was approved and funded in July 2018 for \$89,395.41 to install 3.25 miles of new, wildlife-friendly interior fence; install 2,720' of pipeline; install two 20' fiberglass stock tanks with wildlife-friendly escape ramps; remove an old, inadequate windmill and replace it with a solar pump; and install a storage tank (Figure 39). The fence was completed on September 11, 2018. The windmill was removed, and the pipeline was installed. The tanks are scheduled for delivery. The Weinheimer ranch met the vegetation and forage utilization goals of the CCA/CCAA, but it was approaching the utilization limit. This was largely due to inadequate infrastructure throughout the ranch as well as heavy mesquite encroachment, leading to overutilization of much of the ranch. Implementing this project improve grazing distribution across the property, providing much-needed rest in critical areas. Although no LPCs were detected during lekking season, this property borders other enrolled properties with documented leks. With the close proximity of detected leks on neighboring properties to the northeast, east, and southeast, a high probability exists that LPCs occupy this enrolled acreage throughout different times of the year; therefore, this project can help to improve habitat connectivity for the LPC. Given proper management, the completion of this project will also improve LPC habitat for lekking, nesting, and brood-rearing (Appendix I). LPC surveys were conducted in 2019. About half of this enrolled acreage is in CHAT 1 and the other half is in CHAT 3, with the northeast corner providing connectivity. Part of this ranch also falls within the DSL polygon.

Running N Boundary Fence – This project was approved and funded in August 2019 for \$86,158.77 to remove 4.25 miles of old, dilapidated boundary fence and replace it with new five-strand wildlife-friendly fence (Table 1, Figures 38 & 39). The old fence can be a hazard to the LPC and other grassland wildlife. Removal and replacement of the old fence will benefit all species in the area by providing ample clearance for wildlife to pass above the top wire and below the bottom wire. Strategic meetings held in Milnesand, NM in 2014 and 2018 identified grazing management as a top priority for improving and maintaining LPC habitat in eastern NM. This fencing upgrade will greatly improve the Running N’s grazing management plan and will prevent trespass cattle that would jeopardize the grazing plan in pastures that have been left to rest (Appendix I). This property is in CHAT 1.

Weaver/Grasslands Boundary Fence – This project was approved and funded in August 2019 for \$90,890.13 to remove 2.5 miles of dilapidated boundary fence and replace it with new, five-strand wildlife-friendly fence. An additional 7.5 miles of boundary fence will be repaired (Table 1, Figures 38 & 39). This fence was damaged in a wildfire in 2018. This project, along with the grazing management plan set in place by the landowner, will improve LPC habitat on both properties. Removing old, derelict fencing will eliminate a potential hazard for wildlife in the area. The new fence will also keep trespass cattle from damaging LPC habitat (Appendix I). The majority of the ranch is in CHAT 1 with a small portion falling in CHAT 2.

CALICHE REMOVAL AND RESEEDING

In areas of loose, sandy soil, oil and gas well pads and roads are constructed from caliche, which is a layer of calcium carbonate that is precipitated below the soil surface through evaporation in arid environments. Caliche makes an ideal substrate for roads; it becomes almost impenetrable when compacted with heavy equipment. When companies construct these roads and well pads in LPC and DSL habitats, this impenetrable layer fragments the habitats. Reclamation of these wells and pads removes the caliche from the surface using heavy equipment. By removing caliche pads and roads, fragmentation in LPC and DSL habitats is reduced or eliminated. Once the caliche is removed, reseeding with native vegetation occurs and speeds the rehabilitation of the disturbed areas. (Figure 34). To date, CEHMM has reclaimed 154 roads and pads and reclaimed and reseeded 159.2 acres through the CCA/CCAA.

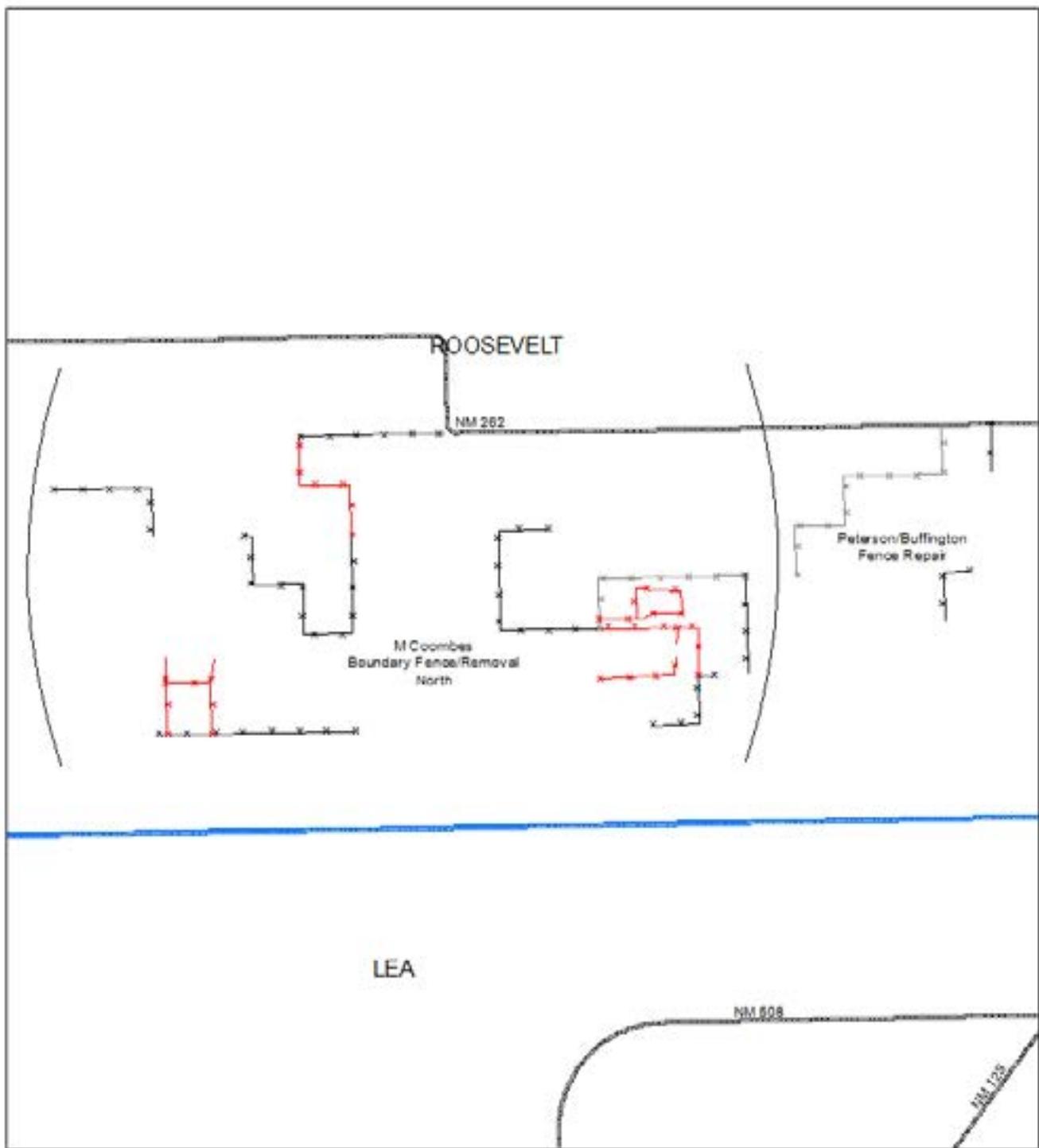
*Funded and/or Completed Reclamation Projects in 2019 (*indicates completed in 2019):*

2019 DSL Habitat Reclamation— This project was approved and funded in August 2019 for \$42,784.30 (Table 1, Figures 38 & 39). Caliche will be removed from approximately 3.3 miles of an oilfield road no longer in use. In addition to the road, approximately 0.6 acres of caliche will be removed from one unused well pad. These are legacy wells with no responsible party. Since roads made from caliche cause habitat fragmentation, these removal efforts will improve habitat for the DSL.

Card Federal Reclamation— This project was approved and funded in August 2019 for \$29,250.00 to address four orphaned wells and one orphaned facility site (Table 1, Figures 38 & 39). These are legacy wells with no responsible party. Downhole plugging operations were completed, but no surface reclamation work has taken place. The facility site has a large amount of contamination that will be addressed.



Figure 34: Reclaimed Road After Caliche Removal and Reseeding.



- x—x—x— New Fence
- x—x—x— Fence Removed
- x—x—x— Fence Repaired
- NM Counties



Figure 35. Fence Projects Completed in 2019.

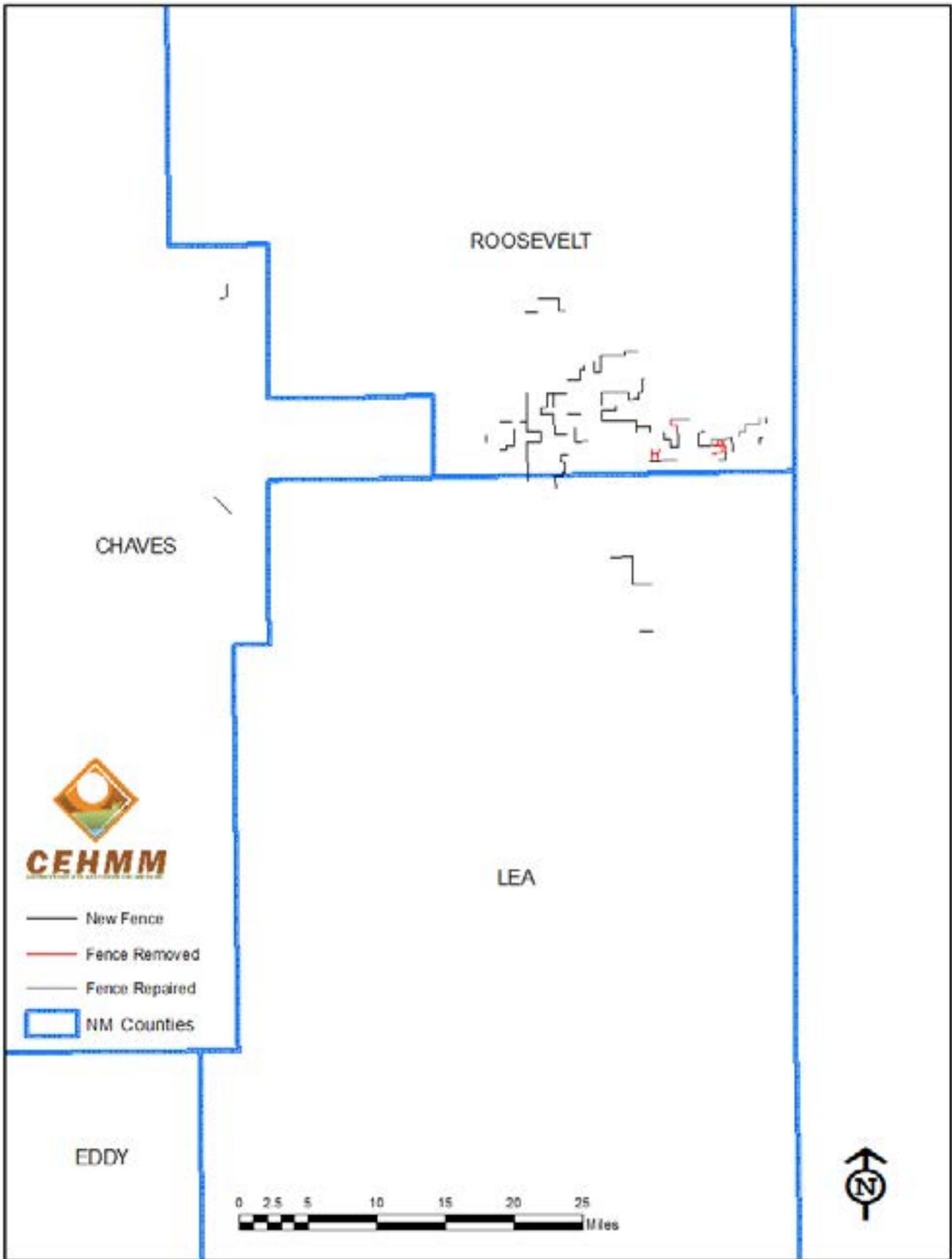


Figure 36. All Fence Projects Completed by the CCA/CCA Program.

RESEARCH, EDUCATION, AND OTHER PROJECTS (*indicates completed in 2019):

Natural Heritage LPC Data Management Amendment— This project was funded in 2014 for \$43,572.00. Natural Heritage New Mexico consolidated all historic New Mexico LPC data, including raw data yet to be validated or published into an easily accessible database. This project was re-funded in 2018 for \$19,051.00 for two additional years (2019 and 2020) of data collection and maintenance of an LPC database.

Davis Mercantile Historical Plaque/Marker — This project was approved and funded in August 2019 for \$6,354.88 (Table 1). In 2018, CEHMM personnel began working with the New Mexico State Historical Preservation Division to list the Davis Mercantile as a historical building. It was approved and listed in early 2019 as a Historic District with both the state and national historical societies. A historical roadside marker and a historical plaque will be mounted at the store to show the significance and history of the Davis Mercantile, when it depicted life in the era when the area was being developed.

DSL Population Viability Analysis Development — This project was approved and funded in 2019 for \$29,250.00 to provide a predictive model of longevity for the DSL (Table 1). The following four steps demonstrate how to complete this task: initial data gathering, population viability analysis development, population viability model sensitivity analysis, and report writing.

NET CONSERVATION GAIN

In conjunction with the FWS, CEHMM began calculating Net Conservation Gain (NCG) achieved through the CCAs/CCAAs. NCG compares the amount of habitat reclaimed or restored to the amount of habitat lost due to development. Operations not enrolled in the CCA/CAA are not being considered in this process. Practices that achieve a conservation gain include, but are not limited to, removal of windmills, reclamation of legacy pads and roads, treatment of mesquite, removal of DSM, and removal of power lines and power poles. Habitat loss occurs during construction of new infrastructure on enrolled operations. Such infrastructure includes new oil wells, frac ponds, and central tank batteries (CTB). All habitat loss has been calculated, but infrastructure that was in place prior to the implementation of the CCA/CAA that has not been reclaimed must also be considered. Accounting for disturbance that existed prior to the implementation of the program is important because new development may not have resulted in habitat loss because existing development had already caused loss of habitat. Figure 37 illustrates the impact that an oil or gas well has on the LPC in regards to avoidance buffers. The LPC tends to stay at least 300 m away from these wells.

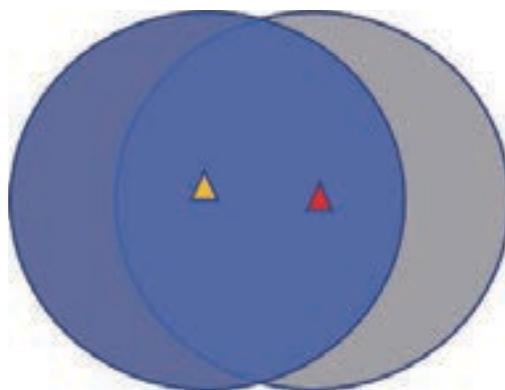


Figure 37. Illustration of Habitat Lost (Light Blue Portion of Circle) when a New Oil or Gas Well (Red Triangle) is Drilled Next to an Existing Well (Yellow Triangle) Where Habitat was Previously Lost (Dark Portion of Diagram).

Table 1. Funded Projects in 2019.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Units</i>	<i>Description</i>
Technical Working Group Meeting	April 2019	\$15,400.00	N/A	Conservation priorities for the LPC and DSL were discussed. Experts in the fields of study of the DSL and the LPC to gather to discuss new and innovative project ideas. Ideas developed were used later in the year to continue recovery and conservation efforts of both the DSL and the LPC
DSL Population Viability Analysis Development	August 2019	\$29,250.00	N/A	This will provide a predictive model of longevity for the DSL. There are four steps to develop the model: 1) initial data collection 2) population viability analysis development 3) population viability model sensitivity analysis, and 4) report writing.
Bilbrey Water	August 2019	\$61,458.39	9,000 ' pipeline	By improving infrastructure, the producer will be able to implement a more efficient grazing rotation. The new water points on the ranch will also provide many year-round sources of water to the wildlife in the area, including the LPCs.
Bud Bilberry Mesquite	August 2019	\$68,128.22	1,600 acres	Treatment of the encroaching mesquite will prevent it from moving into areas of DSL occupancy and from outcompeting the shinnery oak that the DSL relies on for habitat. Reducing or eliminating the mesquite can open up new areas for the LPC to use for cover, lekking, nesting, and brood-rearing.
Running N Water	August 2019	\$65,540.96	N/A	By improving infrastructure, the producer will be able to implement a more efficient grazing rotation. The new water points on the ranch will also provide many year-round sources of water to the wildlife in the area, including the LPCs.
Running N Mesquite	August 2019	\$237,172.04	5,800 acres	Treatment of the encroaching mesquite will prevent it from moving into areas of DSL occupancy and from outcompeting the shinnery oak that the DSL relies on for habitat. Reducing or eliminating the mesquite can open up new areas for the LPC to use for cover, lekking, nesting, and brood-rearing.

Project	Date Funded	Amount Funded	Units	Description
Running N Boundary Fence	August 2019	\$86,158.77	Remove/replace 4.25 miles	The old fence can be a hazard to the LPC and other grassland wildlife. These fencing improvements will greatly improve the enrollee's grazing management plan and prevent trespass cattle that would jeopardize the grazing plan in pastures that have been left to rest.
Davis Mercantile Historical Plaque/Marker	August 2019	\$6,354.88	N/A	CEHMM personnel worked with the New Mexico State Historical Preservation Division to list the Davis Mercantile as an historical building. It was approved and listed in early 2019 as a Historical District with both the state and national historical society. Will place a historical roadside marker, and mount a historical plaque on the store to show the significance and history of the Davis Mercantile.
G. Coombes Halo Boundary Fence	August 2019	\$218,779.65	Remove/replace 12.5 miles	The old fence can be a hazard to the LPC and other grassland wildlife. These fencing improvements will greatly improve the enrollee's grazing management plan and prevent trespass cattle that would jeopardize the grazing plan in pastures that have been left to rest.
G. Coombes Halo Interior Fence	August 2019	\$308,645.84	Remove/replace 21 miles	The old fence can be a hazard to the LPC and other grassland wildlife. By improving infrastructure, the producer will be able to implement a more efficient grazing rotation.
G. Coombes Halo Water	August 2019	\$125,097.57	12.5 miles pipeline	By improving infrastructure, such as water and fencing, the producer is better able to implement a more efficient grazing rotation. The new water points on the ranch will also provide many sources of year-round water to wildlife in the area, including LPCs.
G. Coombes Halo Mesquite	August 2019	\$12,888.66	200 acres	Treatment of the encroaching mesquite will prevent it from moving into areas of DSL occupancy and from outcompeting the shinery oak that the DSL relies on for habitat. Reducing or eliminating the mesquite can open up new areas for the LPC to use for cover, lekking, nesting, and brood-rearing.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Units</i>	<i>Description</i>
Mohon Boundary Fence	August 2019	\$78,313.76	Remove/replace 4.25 miles	This project, along with the grazing management plan set in place by the landowner, will improve LPC habitat. Removing old, derelict fencing will eliminate a potential hazard for wildlife in the area. The new fence will also keep trespass cattle from damaging LPC habitat.
Mohon Interior Fence	August 2019	\$43,959.87	Remove/replace 2.25 miles	This project, along with the grazing management plan set in place by the landowner, will allow for better rest/rotation of pastures, which allows for better vegetation for LPC habitat.
Mohon Water	August 2019	\$35,887.25	N/A	By improving infrastructure, such as water and fencing, the producer is better able to implement a more efficient grazing rotation. The new water points on the ranch will also provide many sources of year-round water to wildlife in the area, including LPCs.
Weaver/Grasslans Boundary Fence	August 2019	\$90,890.13	Remove/replace 2.5 miles and repair 7.5 miles	This project, along with the grazing management plan set in place by the landowner, will improve LPC habitat. Removing old, derelict fencing will eliminate a potential hazard for wildlife in the area. The new fence will also keep trespass cattle from damaging LPC habitat.
Weaver/Grasslans Water	August 2019	\$79,856.06	N/A	By improving infrastructure, such as water and fencing, the producer is better able to implement a more efficient grazing rotation. The new water points on the ranch will also provide many sources of year-round water to wildlife in the area, including LPCs.
Weaver Mesquite	August 2019	\$36,432.55	837 acres	Treatment of the encroaching mesquite will prevent it from moving into areas of DSL occupancy and from outcompeting the shiner oak that the DSL relies on for habitat. Reducing or eliminating the mesquite can open up new areas for the LPC to use for cover, lekking, nesting, and brood-rearing.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Units</i>	<i>Description</i>
Luman Tank	August 2019	\$10,300.43	N/A	By improving infrastructure, such as water and fencing, the producer is better able to implement a more efficient grazing rotation. The new water points on the ranch will also provide many sources of year-round water to wildlife in the area, including LPCs.
Pembers Mesquite	August 2019	\$67,172.14	1,600 acres	Treatment of the encroaching mesquite will prevent it from moving into areas of DSL occupancy and from outcompeting the shiner oak that the DSL relies on for habitat. Reducing or eliminating the mesquite can open up new areas for the LPC to use for cover, lekking, nesting, and brood-rearing.
TNC Mesquite	August 2019	\$58,329.10	1,300 acres	Treatment of the encroaching mesquite will prevent it from moving into areas of DSL occupancy and from outcompeting the shiner oak that the DSL relies on for habitat. Reducing or eliminating the mesquite can open up new areas for the LPC to use for cover, lekking, nesting, and brood-rearing. This ranch is prime LPC habitat, along with dunes occupied by DSL.
2019 DSL Habitat Reclamation	August 2019	\$42,784.30	Remove 3.3 miles caliche and remove 0.6 acres caliche	This project will consist of the removal of caliche on approximately 3.3 miles of oilfield road no longer in use. In addition to the road, one pad no longer in use (0.6 acres) will have caliche removed. The DSL will benefit from this project because unnatural alterations in the form of infrastructure associated with oilfield activity will be removed from the landscape.
Card Federal Reclamation	August 2019	\$267,660.00	N/A	This project will address four orphaned wells and one orphaned facility site where downhole plugging operations are complete but no surface reclamation work has taken place. The facility site has a large amount of contamination that will be addressed.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Units</i>	<i>Description</i>
G. Coombes Atlee-Lovejoy Boundary Fence	August 2019	\$67,002.37	Remove/replace 4 miles	This project, along with the grazing management plan set in place by the landowner, will improve LPC habitat. Removing old, derelict fencing will eliminate a potential hazard for wildlife in the area. The new fence will also keep trespass cattle from damaging LPC habitat.
G. Coombes Lovejoy Mesquite	August 2019	\$82,591.08	2,000 acres	Treatment of the encroaching mesquite will prevent it from moving into areas of DSL occupancy and from outcompeting the shiner oak that the DSL relies on for habitat. Reducing or eliminating the mesquite can open up new areas for the LPC to use for cover, lekking, nesting, and brood-rearing.
BLM ACEC DSM Removal	September 2019	\$21,741.51	950 acres	Eradicating and removing mesquite opens up habitat for lekking, nesting, and brood rearing. Once the mesquite plant is dead, the skeleton of the plant is still a vertical structure and must be removed to actually deliver a conservation benefit for the LPC.
BLM Running N DSM Removal	September 2019	\$26,337.96	1160 acres	Eradicating and removing mesquite opens up habitat for lekking, nesting, and brood rearing. Once the mesquite plant is dead, the skeleton of the plant is still a vertical structure and must be removed to actually deliver a conservation benefit for the LPC.
2019 Funded Projects Total		\$2,244,133.49		

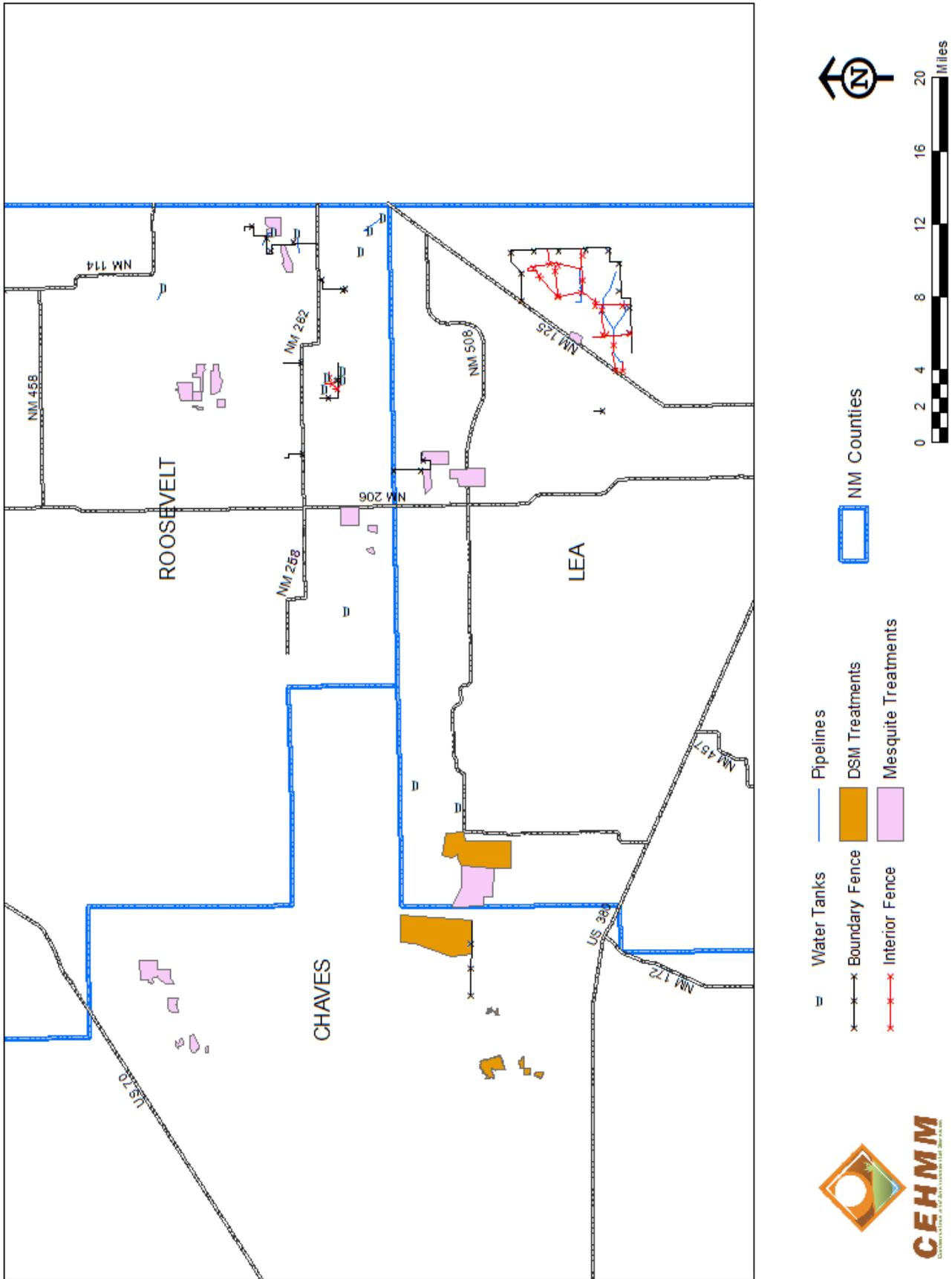
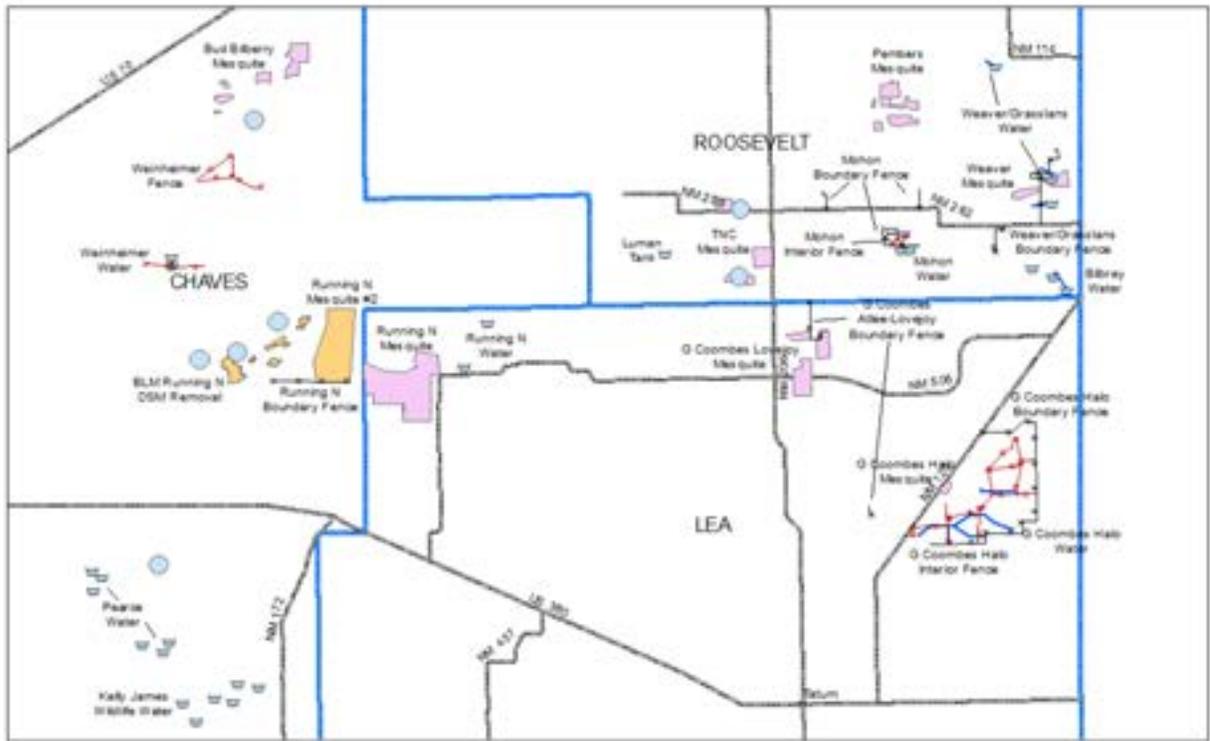


Figure 38. 2019 Funded Projects.



- Boundary Fence
- Interior Fence
- Water Tanks
- Pipelines
- Mesquite Treatments
- Mesquite Hand Treatment of Active Leaks
- DSM Treatments
- NM Counties



- ★ Abandoned Well
- Roads Proposed For Reclamation

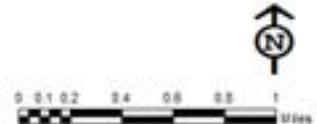


Figure 39. Funded Projects Awaiting Completion.

Table 2. Completed Projects in 2019.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Project Cost</i>	<i>Units</i>	<i>Date Completed</i>	<i>Description</i>
Peterson/Buffington Fence Repair	June 2018	\$26,945.01	\$25,460.73	1.25 miles fence removed and replaced, three miles repaired.	January 2019	Repairs due to wildfire damage. This project, along with the grazing management plan set in place by the landowner, will improve LPC habitat. Removing old, derelict fencing eliminates a potential hazard for wildlife in the area. The new fence will also keep trespass cattle from damaging LPC habitat
M. Coombes Boundary Fence-Removal North	June 2018	\$281,631.81	\$232,058.47	12.75 miles new fence, 15.75 miles removed, two miles repaired.	January 2019	Repairs due to wildfire damage. This project, along with the grazing management plan set in place by the landowner, will improve LPC habitat. Removing old, derelict fencing eliminates a potential hazard for wildlife in the area. The new fence will also keep trespass cattle from damaging LPC habitat. This fence also shares a boundary with other enrollees.
Bresenham DSM Removal	February 2019	\$3,331.15	\$1,464.49	350 acres	February 2019	For the treatment of mesquite to be beneficial, the skeletons of the mesquite, still a vertical structure, need to be removed to benefit LPC through lekking, nesting, and brood-rearing.
Mohon Water Tanks	June 2018	\$19,369.24	\$12,345.37	N/A	April 2019	By improving infrastructure, the producer will be able to implement a more efficient grazing rotation. The new water points on the ranch will also provide many year-round sources of water to the wildlife in the area, including the LPCs.
TNC Water Tanks	June 2018	\$52,830.44	\$45,880.15	N/A	April 2019	By improving infrastructure, the producer will be able to implement a more efficient grazing rotation. The new water points on the ranch will also provide many year-round sources of water to the wildlife in the area, including the LPCs.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Project Cost</i>	<i>Units</i>	<i>Date Completed</i>	<i>Description</i>
Technical Working Group Meeting	April 2019	\$15,400.00	\$3,830.17	N/A	May 2019	This project was approved and funded to allow experts in the fields of study of the DSL and the LPC to gather to discuss new and innovative project ideas. Projects that will be necessary for the continued recovery and conservation of both species will be developed from ideas generated in the meeting.
M. Coombes Water #1 North	June 2018	\$141,205.21	\$96,776.37	N/A	July 2019	Having adequate water points distributed on the ranch will allow for the utilization of a rest/rotation pattern, which will provide an adequate growing season and period of rest for the vegetation that the LPC relies on throughout the year.
M. Coombes Water #2 North	June 2018	\$59,911.47	\$40,886.02	N/A	July 2019	Having adequate water points distributed on the ranch will allow for the utilization of a rest/rotation pattern, which will provide an adequate growing season and period of rest for the vegetation that the LPC relies on throughout the year.
BLM ACEC DSM Removal	September 2019	\$21,741.51	\$2,362.26	950 acres	October 2019	Eradicating and removing mesquite opens up habitat for lekking, nesting, and brood rearing. Once the mesquite plant is dead, the skeleton of the plant is still a vertical structure and must be removed to actually deliver a conservation benefit for the LPC.
BLM Running N DSM Removal	September 2019	\$26,337.96	Pending	1,160 acres	Pending	Eradicating and removing mesquite opens up habitat for lekking, nesting, and brood rearing. Once the mesquite plant is dead, the skeleton of the plant is still a vertical structure and must be removed to actually deliver a conservation benefit for the LPC.
2019 Completed Projects Total		\$701,534.24	\$504,581.92 + pending			

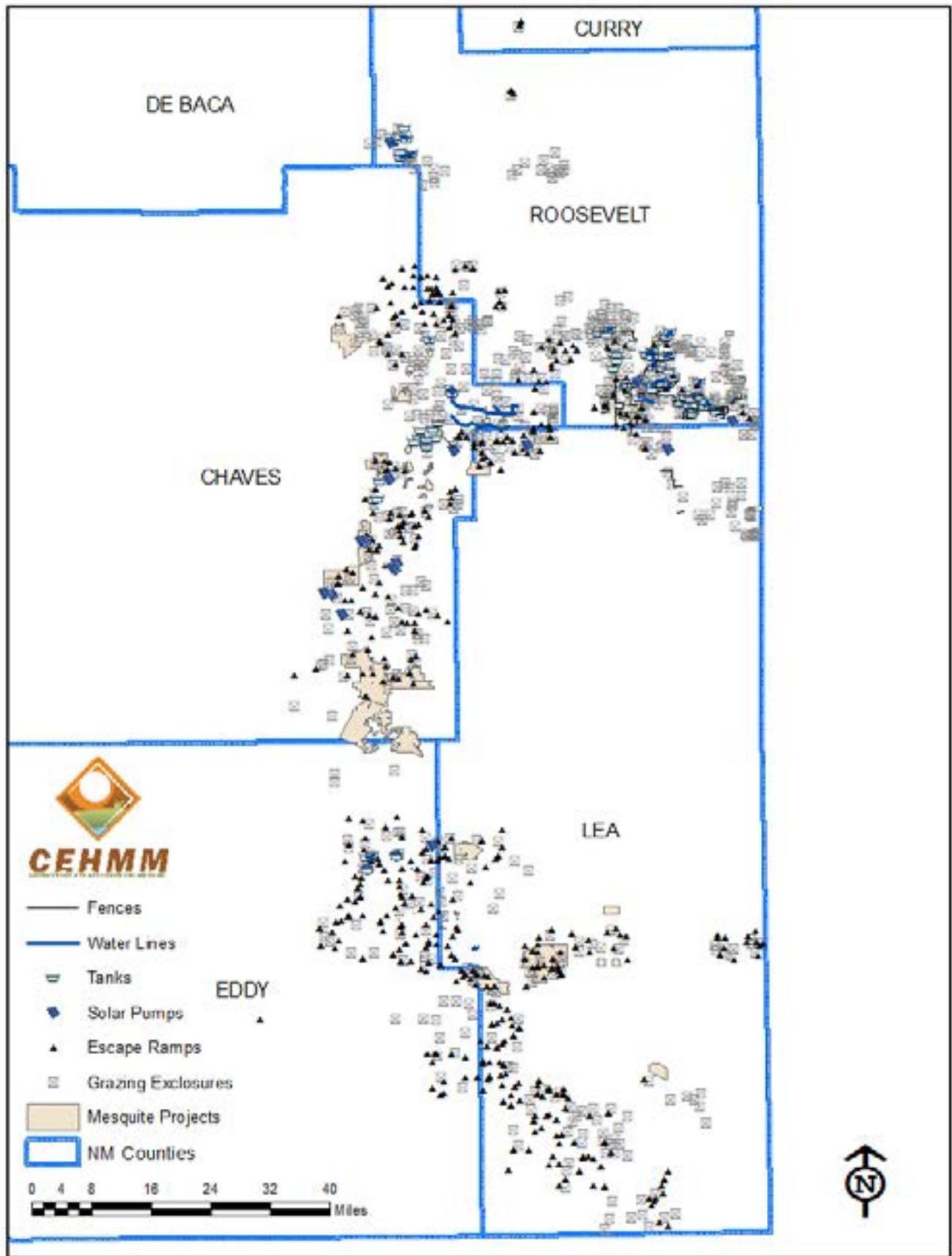


Figure 41. All Projects Completed by the CCA/CAA Program.

MONITORING

MONITORING OF COMPLETED PROJECTS

Part of CEHMM’s role in the CCA/CCAA is to monitor completed projects and vegetative attributes to determine if the proposed goals were achieved. Monitored projects included mesquite treatments, rangeland improvements (e.g. fence and livestock water), and reclamation projects.

Canopy cover for mesquite, grasses, and forbs was monitored on six mesquite treatment sites in 2019. Appendix J describes CEHMM’s monitoring efforts, including data collected from the 2018 mesquite projects. The same data was also collected on mesquite treatments that were completed in 2018. Treatments completed in 2018 will be revisited in 2020 to determine changes in canopy cover. Table 3 shows the canopy values of mesquite for treatments completed prior to 2018. Table 4 illustrates the change in grass and forb canopy cover between the first year of data collection and 2019.

Table 3. Mesquite Canopy Values (%) Collected in 2019 on Completed Projects.

Project Name	Spray Method	Date Completed	Post-Treatment Canopy	Post-Treatment Canopy
Sims Mesquite	Aerial	6/30/2011	7.58% (2018)	7.47% (2019)
Berry Mesquite	Aerial	6/30/2011	3.16% (2018)	6.08% (2019)
Bogle Mesquite	Aerial	6/30/2011	1.32% (2018)	4.45% (2019)
BLM Caviness Mesquite	Aerial	6/30/2014	1.76% (2018)	2.55% (2019)
Meyers Mesquite	Aerial	6/30/2011	1.76% (2018)	0.38% (2019)
Field Mesquite	Hand followed by mechanical removal	1/15/2018 (DSM removal)	10.08% (2016)	0.75% (2018)

Table 4. Change in Grass and Forb Canopy Percentages on Previously Completed Mesquite Treatments. The change is from the first year data was collected to 2019.

Percent Change in Canopy		
Project Name and Years Data was Collected	Grasses	Forbs
Sims Mesquite (2016, 2019)	3.39%	-2.54%
Berry Mesquite (2016, 2019)	10.25%	-1.68%
Bogle Mesquite (2016, 2019)	-8.65%	0.55%
BLM Caviness Mesquite (2016,2019)	-8.42%	-4.09%
Meyers Mesquite (2016, 2019)	-7.65%	-4.71%
Field Mesquite (2016, 2018)	-23.0%	31.0%

Some mesquite treatment areas have shown slight increases in mesquite canopy cover, although this can be attributed to various environmental factors. Some treatment areas have shown decreases in bunchgrasses and forbs, while others have shown increases. Drought conditions were reported throughout Chaves, Eddy, and Lea Counties between May and September 2019. Photos also indicate drier conditions than those that existed in 2016. All monitored areas met the forage utilization goal of 45% or less.



Figure 42: Oil and Gas Pad in March 2013, One Year After Caliche Removal.

Range improvement projects (e.g., fence and livestock water) are monitored quarterly to ensure functionality. All range improvements were found to be functional in 2019. These types of projects are related to the implementation of adaptive grazing management. These practices are geared toward helping Participating Cooperators achieve the conservation measures described in their respective CP and/or CI.

Vegetation and forage utilization records show all properties with fence and water improvements are fulfilling their conservation commitments as outlined in the CCA/CCAA. Multiple, previously undocumented leks have been observed on these properties since the projects have been implemented.

In addition to mesquite and rangeland improvement projects, three reclamation projects were also monitored for vegetative response. Previously completed reclamation projects have historically included the removal of caliche and reintroduction of native vegetation through seeding. Photographs were taken at each site to document reclamations success. Figures 42 and 43 show an old oil and gas pad one and six years following reclamation efforts.



Figure 43: Oil and Gas Pad in January 2019, Six Years After Caliche Removal.

SPECIES MONITORING

In 2019, as part of a project funded in 2018, herpetologist Mike Hill established seven pitfall trap grids to determine occupancy of suitable habitat and demographics of the DSL (Figure 44). A pitfall trap is a five-gallon bucket that is placed in the ground with the top of the bucket even with ground level. Buckets are filled with approximately two inches of sand to allow trapped wildlife and arthropods to seek cover. Each trap also has holes drilled in the bottom to allow water from precipitation events to percolate through and prevent drowning mortality of trapped wildlife. While traps are open, a cover rests on pegs approximately one-half inch above the top of the bucket which attracts lizards to seek cover, and they subsequently fall into the bucket. Each grid consisted of 36 buckets arranged in a six by six manner with 15 m between each bucket. Grids were strategically placed throughout the range of the DSL in order to capture genetic differences that were documented in a project funded by the CCA/CCAA for Duke University in 2012. Each grid was opened for two, separate five-day periods, resulting in a total of 70 grid days, or 2,520 trap days. These surveys resulted in 61 DSL captures with 45 unique (individual) captures. Figure 46 depicts grid locations.



Figure 44. Dunes Sagebrush Lizard.

CEHMM conducted 36 days of LPC road surveys on 37 CCA/CCAA ranches in March, April, and May 2019. Road surveys are also known as listening surveys. During the surveys, the surveyors shut off their vehicles and stood outside, listening for ten minutes at each stop. The surveyors collected the following data at each stop: survey area (ranch name), presence of LPCs, direction of LPC locations, time, temperature, wind speed, cloud cover, noise sources, noise levels, and other wildlife observed or heard. At the end of ten minutes, the surveyors returned to their vehicles and drove one mile down the road and repeated the above protocol. Surveys were initiated thirty minutes prior to sunrise and concluded at 9 a.m. If wind speeds exceeded fifteen miles per hour the survey was stopped and continued the following day. Winds at those speeds inhibit the surveyor from hearing the LPCs and thus may produce false negatives for the area. In 2019, there were 495 stops made on 37 ranches. LPCs were heard on 168 stops on 25 of the 37 ranches, and 795 LPCs were observed on 89 leks (Figure 45). Figure 47 depicts survey locations for 2019.



Figure 45. Lesser Prairie-Chickens on a Lek.

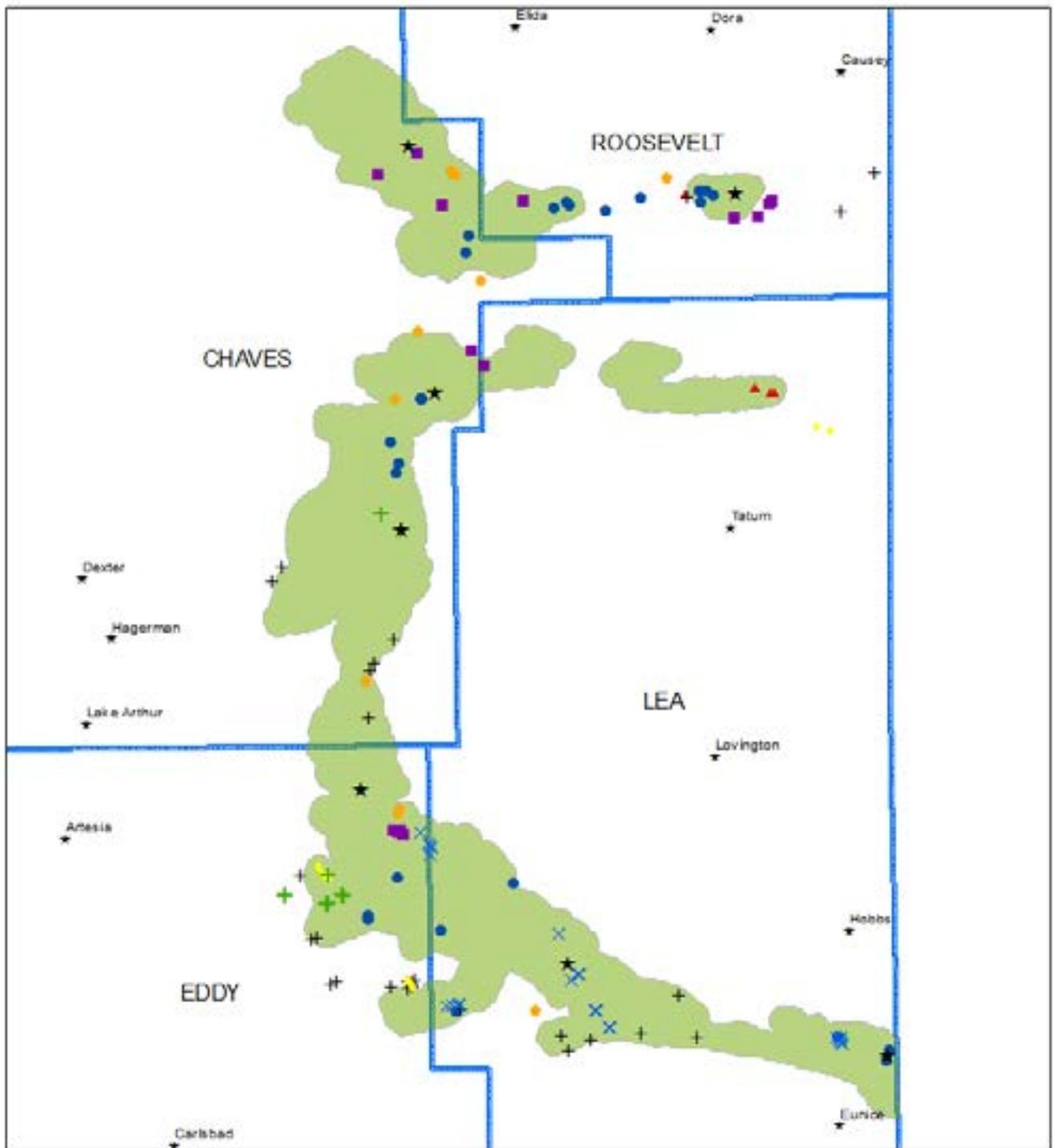


Figure 46. DSL Surveys 2011-2019.

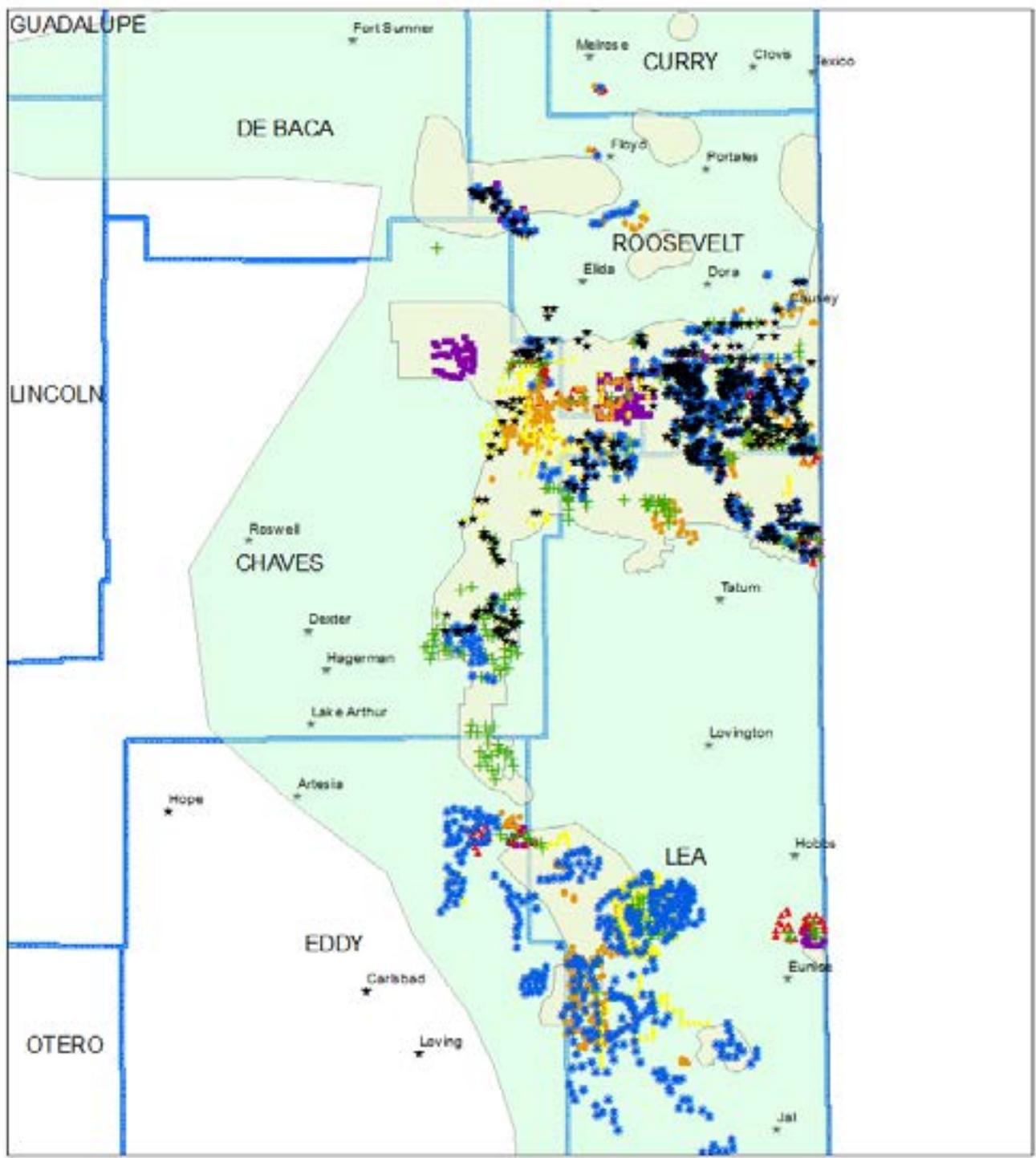


Figure 47. LPC Surveys 2013-2019.

GRAZING MONITORING

Baseline data for livestock grazing operations, with acreage identified in a CI or CP, were monitored (Figure 48) for the vegetative habitat attributes described in “Collaborative Conservation Strategies for Lesser Prairie Chicken and Sand Dune Lizard in New Mexico” (New Mexico LPC and DSL Working Group, 2005) and the BLM RMPA (2008). A protocol to monitor habitat components for both species describes the methodology and data to be collected. The vegetative attributes collected directly apply to available nesting and brood-rearing habitat for the LPC. DSL habitat related to grazing and rangeland management is also considered by ensuring conservation measures are achieved in relation to treatment of shinnery oak in dune complexes and their corridors. In addition to monitoring vegetative attributes on the landscape, results were discussed with Participating Cooperators; sites were prepared to collect forage utilization data in winter 2019-2020; and educational events were attended.



Figure 48. Vegetation Monitoring Transect.

Previously established LPC and DSL habitat sites were monitored to assess canopy cover, ground cover, and visual obstruction values (also known as Robel monitoring). Data was collected between June and September 2019 so habitats could be analyzed during late nesting and brood-rearing seasons. Data was collected on acreage enrolled by 21 Participating Cooperators at 79 sites (Figures 49 & 50) in the estimated occupied by ranges of either or both the LPC and the DSL. Data for these same attributes will be collected within the next three years in the same two-week window to determine if conservation measures mentioned above are being achieved or are showing a trend toward achieving the goals listed in

CEHMM’s grazing monitoring protocol. When monitoring habitat, landscape events, including, but not limited to rangeland management, natural disasters, energy development, and other uses of the landscape, are taken into account to determine if a Participating Cooperator is achieving the conservation measures identified in their respective CIs and CPs.

In addition to the data collection mentioned above, CEHMM also prepared 194 sites to monitor forage utilization on the grazing operations identified in 21 CIs and/or CPs. As a conservation measure, Participating Cooperators and landowners agree to a livestock forage utilization rate of 45%. This ensures the LPCs have adequate cover remaining for the upcoming nesting season. If overutilization deems the habitat unsuitable, CEHMM range conservation staff will work with the operator to apply management practices and continue to monitor progress to determine if other avenues are necessary. To develop the adaptive management practices, CEHMM will use the grazing plans listed in the questionnaire and compare those plans to the actions on the ground (Appendix I).

All monitored ranches were found to provide suitable habitat for the LPC and DSL within their respective ranges. The grass species preferred by the LPC for nesting were highly productive where present. CEHMM will continue to monitor grazing operations in the future to analyze vegetative habitat component trends and identify grazing management plans and practices that benefit the LPC and DSL.

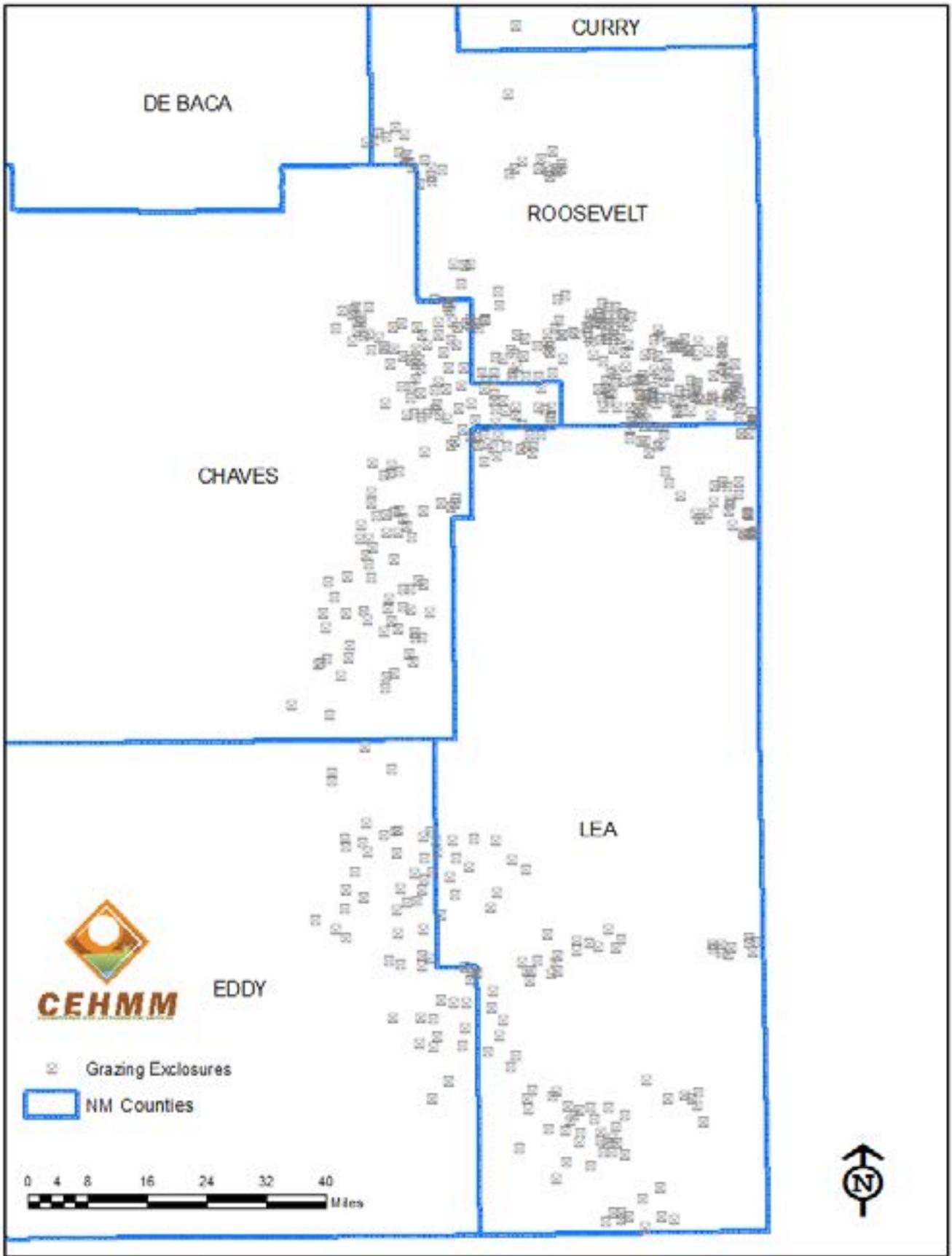
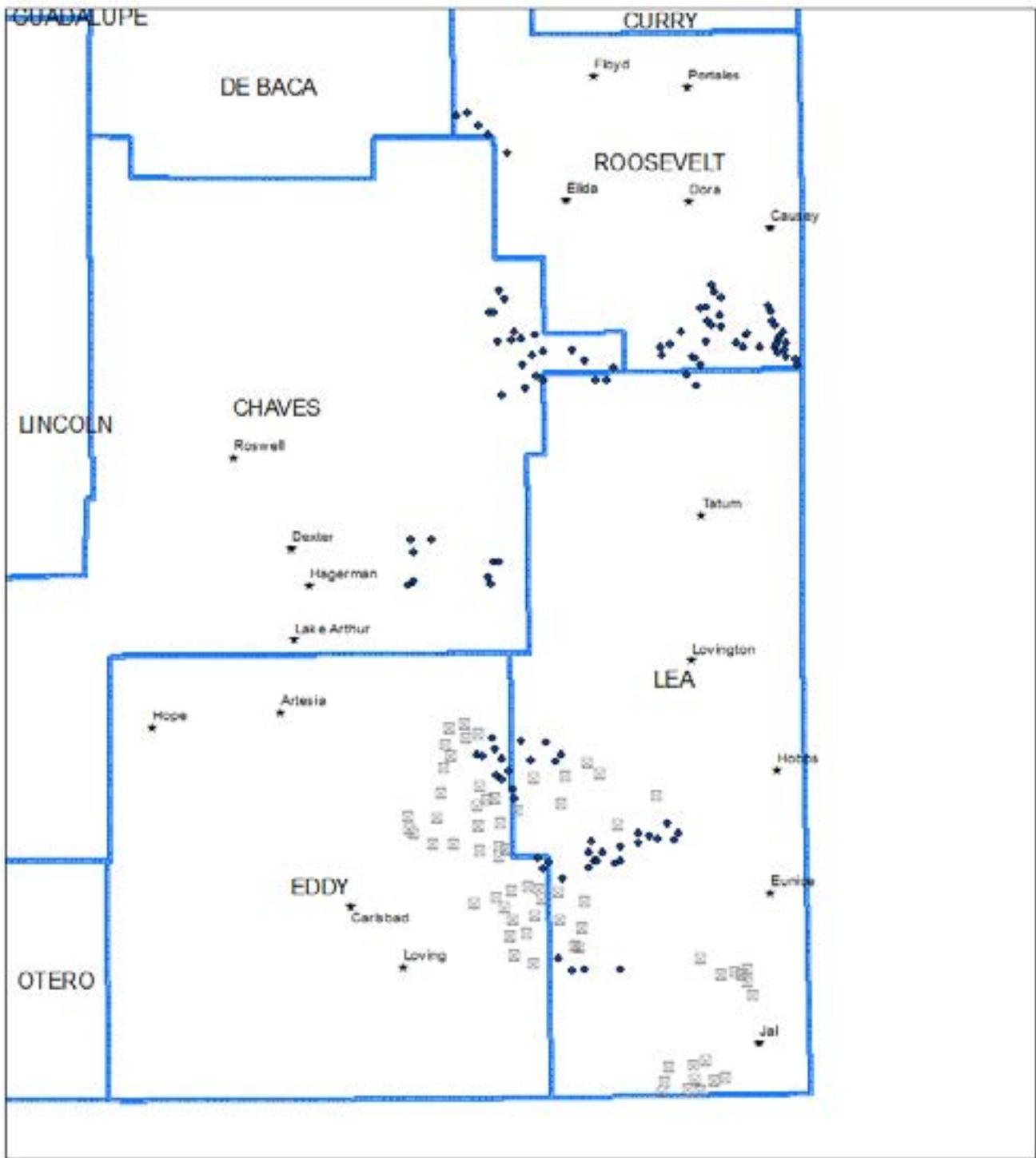


Figure 49. Enclosure Locations.



- Exclosures 2019
- Grazing Transect 2019
- ▭ NM Counties



Figure 50. Grazing Monitoring and Transect Locations.

MITIGATION OF IMPACTS TO HABITAT

CEHMM collaborated with four enrolled operators and the BLM to perform onsite for 22 planned well locations on federal lands. Onsites were conducted to assist Participating Cooperators in the achievement of conservation measures outlined in the CCA, following the guidelines set forth in the RMPA (Bureau of Land Management, 2008), to avoid suitable LPC and/or DSL habitat. Three onsite were conducted on non-federal lands with three operators to assist Participating Cooperators in achieving the conservation measures defined in the CCAA related to the establishment of facilities associated with well development. Two wells were relocated on federal lands to avoid suitable DSL habitat. No wells were relocated on non-federal lands. Table 5 describes the onsite completed in 2019. Since the inception of the CCA/CCAA, and through the cooperation of the parties involved, 624 wells have been relocated to avoid LPC and/or DSL habitat.

In 2019, 877 wells were permitted and/or drilled on lands enrolled in the CCA or CCAA, and 110 ROW were permitted and/or constructed on acreage enrolled in the CCA/CCAA. Reclamation efforts by enrolled operators totaled 186.86 acres. Eight Participating Cooperators reported reclamation activities. Table 6 illustrates all activities that were reported by Participating Cooperators in 2019.

Table 5. Onsites Completed in 2019.

<i>Federal onsites completed</i>	<i>Federal well locations moved for CCA</i>	<i>Non-Federal onsites complet- ed</i>	<i>Non-Federal well locations moved for CCAA</i>
22	2	3	0

CONSERVATION MEASURE VIOLATIONS

As the administrator of the CCA/CCAA, it is CEHMM’s responsibility to provide the Participating Cooperators with formal notifications if any of the conservation measures are not being implemented as listed in their Cis and CPs. A Conservation Measure Violation (CMV) formally notifies the Participating Cooperators of the failure to implement conservation measure(s). It is similar to the BLM’s Incident of Non-Compliance (INC) issued to operators that do not meet the conditions of use on their respective operations. When a CMV is issued, CEHMM will work with the Participating Cooperators to plan corrective actions specific to the conservation measures in question. No fine or penalty is assessed with a CMV; however, if three CMVs are issued in a 12-month period, Participating Cooperators will be at risk of termination of their CP or CI. They would also lose any benefits from the CCA/CCAA enrollment in the event that the LPC or DSL is added to the threatened or endangered species list. Due to diligent planning, consultation with CEHMM, and an understanding of the purpose of the CCA/CCA, no CMVs were issued in 2019. A blank CMV can be reviewed in Appendix K.

Table 6. Company Involvement 2019.

<i>Company</i>	<i>Number of Federal Wells Drilled/ Permitted</i>	<i>Number of State/ Fee Wells Drilled/ Permitted</i>	<i>Number of Federal Wells Re-located</i>	<i>Number of State/Fee Wells Re-located</i>	<i>Number of ROWs (pipelines, roads, etc.)</i>	<i>Number of ROWs Re-located</i>	<i>Acres Re-claimed</i>
Apache	17	1	0	0	17	0	0
Armstrong	0	0	0	0	*	*	*
BTA	0	0	0	0	*	*	*
Burnett	2	0	0	0	0	0	1.6
Caza	0	0	0	0	0	0	0
Chevron	0	0	0	0	0	0	21.52
Chisholm	7	1	0	0	0	0	*
Cimarex	31	0	*	*	*	*	*
COG	42	7	*	*	*	*	0.3
Colgate	0	0	0	0	*	*	*
Conoco Phillips	0	0	0	0	0	0	7.32
Cross Timbers	0	0	0	0	*	*	*
Devon	168	26	*	*	*	*	44.74
Enervest	0	0	0	0	*	*	*
EOG	95	120	0	0	*	*	54.46
Fair Oil	0	0	0	0	0	0	0
Fasken	0	0	0	0	0	0	0.76
Hanley Petroleum	0	0	0	0	*	*	*
Hudson	0	0	0	0	0	0	0.03
Kaiser-Francis	20	0	0	0	*	*	*

* Denotes company that did not submit information in time to be included in this report.

<i>Company</i>	<i>Number of Federal Wells Drilled/ Permitted</i>	<i>Number of State/Fee Wells Drilled/ Permitted</i>	<i>Number of Federal Wells Relocated</i>	<i>Number of State/ Fee Wells Relocated</i>	<i>Number of ROWs (pipelines, roads, etc.)</i>	<i>Number of ROWs Relocated</i>	<i>Acres Re-claimed</i>
Legacy	9	0	0	0	*	*	*
Mack	9	3	*	*	*	*	*
Marathon	30	0	*	*	*	*	*
Marshall & Winston	1	2	*	*	*	*	*
Matador	0	12	*	*	*	*	*
McElvain	0	0	0	0	*	*	*
Mewbourne	12	12	0	0	0	0	0
Nemo Fund	*	*	*	*	*	*	*
OGX Production	0	0	0	0	*	*	*
OXY	102	23	3	0	11	0	56.43
Primero	0	0	0	0	*	*	*
Read & Stevens	0	0	0	0	*	*	*
Regeneration	0	0	0	0	*	*	*
RKI/WPX Energy Permian, LLC	1	0	0	0	*	*	*
Shackelford	0	0	0	0	*	*	*
Strata	0	0	0	0	0	0	0
Tierra	0	0	0	0	*	*	*
V-F Petroleum	0	0	0	0	0	0	0
XTO	116	8	0	0	*	*	*
TOTAL	662	215	3	0	28	0	187.16

* Denotes company that did not submit information in time to be included in this report.

SUMMARY

To date, a total of 1,872,039.35 acres of rangeland have been enrolled in the CCA/CCAA. Since the original agreements were executed, a total of 1,884,393 acres within the historical ranges of the LPC and the DSL have been enrolled by oil and gas operators participating in the CCA/CCAA program.

Eleven projects were completed in 2019 and included:

- Construction of 14 miles of wildlife-friendly barbed wire fence and repair of five miles of fire damaged fence.
- Conversion of five windmills to solar pumps, and installation of 18 water troughs with escape ramps and two storage tanks.
- 1,300 acres of mechanical mesquite removal.
- One project to manage data for LPC and DSL was extended until 2020.

The continued CCA/CCAA program participation from the ranching community, oil and gas industry, and state and federal agencies has allowed CEHMM to successfully initiate and complete these projects as well as those in previous years. Through the cooperative conservation of the Participating Cooperators, operations remain in effect while still managing the landscapes with the vision to maintain and create suitable habitats for both species.

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**Frequently Asked Questions from the Oil and Gas Industry
 Lesser Prairie-Chicken & Dunes Sagebrush Lizard
 Candidate Conservation Agreement (CCA) &
 Candidate Conservation Agreement with Assurances (CCAA)**

Why are we doing this?

One of the primary reasons the U.S. Fish and Wildlife Service (FWS) and the Bureau of Land Management (BLM) developed the Candidate Conservation Agreement (CCA) and Candidate Conservation Agreement with Assurances (CCAA) is to address landowner and federal lease holder concerns about the potential regulatory implications of having a species listed under the Endangered Species Act (ESA) on their land or mineral lease.

If enough existing conservation measures are being implemented prior to a listing decision, increased regulation for protecting the species might be unnecessary. These agreements allow for voluntary participation by those whose operations would likely be impacted if the lesser prairie-chicken (LPC) or dunes sagebrush lizard (DSL, sand dune lizard) were to be listed under the ESA. Although the FWS cannot guarantee that listing will not occur, the CCA/CCAA seeks to implement conservation measures which could preclude the need to list the LPC and DSL. The decision to list is a regulatory process and conservation agreements cannot predetermine the outcome. The actions and successes of this tool will be evaluated in accordance with USFWS Policy for Evaluation of Conservation Efforts (2003) during the listing process. This will then be considered into the five-factor analysis of the listing decision.

What is the CCA, and why do I need it?

The CCA is an agreement between the FWS, the BLM, and the Center of Excellence (CEHMM) for actions (such as oil and gas development and livestock grazing) occurring on lands or minerals administered by the BLM. The Participating Cooperator (rancher or oil and gas producer) can volunteer to join the Agreement through a Certificate of Participation (CP). Participation in the CCA provides a high level of certainty that if the Cooperator implements the conservation activities in their CP, they will not likely be subject to additional restrictions if LPC and/or DSL become listed under the ESA.

What is the CCAA, and why do I need it?

The Candidate Conservation Agreement with Assurances (CCAA) is an agreement similar to the CCA but it applies to non-federal lands and minerals. The land user (land owner or lessee) can volunteer to join the Agreement through a Certificate of Inclusion (CI). Participants agree to help reduce threats to candidate species by following the conservation measures in their CI. In return, they receive assurances they will not be subject to additional restrictions if the LPC and/or the DSL become listed under the ESA.

What is the difference between a CCA and CCAA?

In practice, there are few differences between the two Agreements; however, legally, the main difference is participants in the CCAA receive “assurances” that their operations will not be affected by a listing decision and participants in the CCA receive a “high degree of certainty” that operations will not be affected. The goal of the program is to implement consistent conservation measures across the landscape to improve the statuses for both LPC and DSL. CCA Certificates of Participation (CP) are signed and agreed on by both permittee (oil and gas or rancher) and BLM. CCAA Certificates of Inclusion (CI) are signed and agreed on by landowner/lessee.

How will I know if I have lesser prairie-chicken or dunes sagebrush lizard habitat on my property/lease?

Lesser prairie-chickens can be found in shinnery oak, sand sage, and bluestem prairies. Dunes sagebrush lizards can be found in shinnery oak sand dunes. When agency staff are working with an interested party, they will utilize available location data to determine if the lease in question contains suitable habitat for either species.

Do I need to participate if I do not have lesser prairie-chicken or dunes sagebrush lizard habitat?

No.

If the species gets listed, will it only affect activities on federal lands or minerals?

No! If a species is listed, it is listed and protected on all land ownerships (federal, state, and private).

Can I sign up state or private land that I am leasing?

Yes. A “Participating Landowner” is defined in 50 CFR § 17.3 as a person with a fee simple, leasehold, or property interest, or any other entity that may have a property interest sufficient to carry out the proposed management activities.

What if I want to discontinue participation?

The CCA and CCAA are voluntary agreements, so participants can choose to cancel enrollment at any time. If a participant chooses to cancel their agreement, the enrolled lands would no longer be covered if either species is listed under the Endangered Species Act.

What are the practices I would have to implement?

A standard set of conservation measures were established in the BLM’s 2008 Special Status Species Resource Management Plan. Operators of federal leases are already familiar with these stipulations/conditions of approval.

Where will my contributed funds go?

Funds are sent to CEHMM, whose role is defined at the end of these FAQs. Projects and priorities are determined by a team of biologists from CEHMM, the FWS, the NM Game & Fish Department (NMGFD), the NM State Land Office, and the BLM. CEHMM is responsible for implementing (contracting), monitoring, and reporting on projects.

What are the advantages of a participant?

If the LPC or the DSL were to be listed under the ESA, Participating Cooperators would only have their operations delayed by about one to two months while the FWS consults on the Agreement (CCA/CCAA) and adopts it as their final “opinion.” After that period, the companies could continue their operations. For those who have not participated in an Agreement, permits may be delayed up to three years since they will require analysis for impacts to the species. In some situations a permit may not even be approved. An additional advantage to participating is once the FWS issues a final “opinion” of the Agreement, a provision for incidental take will be included. Without a Certificate, an operator, whether on federal or non-federal lands, would not have protection from take.

What is “take?”

The ESA prohibits the take of endangered and threatened species without special exemption. “Take” is defined 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 by the FWS as an act which kills or injures wildlife and may 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 by the FWS as intentional or negligent actions or omissions which create 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.

I have an approved Application for Permit to Drill (APD) for federal minerals, but have not drilled it yet. If the species gets listed before I drill the well, do I have to wait until an Endangered Species Act Consultation is completed?

You will not have to delay new development if the APD is located on a lease enrolled in a Certificate. If the federal lease has not been enrolled, the action would have to go through formal consultation under the Endangered Species Act prior to the start of new activities.

How long do I contribute funds?

The Participating Cooperator will provide funds over a three-year period beginning with the execution of their Certificate.

The Participating Cooperator will make the first payment into the Habitat Conservation Fund Account at the date of execution of their Certificate. The second and third payments will be made on the first and second anniversary of the execution date of the Certificate. For each of the three years, the annual prepayment will be calculated at \$2 per gross acre for all parcels enrolled in the Certificate, with a minimum of \$20,000 deposited each year.

The Participating Cooperator may, at their sole option, pay more than the required amount into their Habitat Conservation Fund Account during any prepayment period but never less than the required amount of \$20,000 per year for the three-year period.

Prepayment of any new federal parcels added by addendum to a Certificate will be calculated at \$2 per gross acre and be due at the time the parcels are added to the Certificate. The total acreage enrolled in a Certificate, and the resulting annual prepayment, will be recalculated on the remaining anniversary dates of the three-year cycle.

Where do I send the contributed funds?

The Participating Cooperator will remit the Habitat Conservation Fee to CEHMM. CEHMM will maintain the funds in a Habitat Conservation Fund Account specific to each Certificate. The purpose of the Habitat Conservation Fund Account is to meet the Participating Cooperator's obligations under the CCA.

Will activities not covered by a certificate be allowed to continue during the Section 7 consultation?

No. Section 7 consultation only occurs after a species is listed and applies to new activities that require a federal permit and would result in take. Those activities cannot begin until the consultation process is complete. However, a benefit of having a Certificate is analyses will have already been performed, meaning an opinion has already been issued and Section 7 consultation would be unnecessary. Only projects addressed in the Certificate would be able to begin without consultation.

Properties without a Certificate in effect will require some level of consultation with the USFWS before the project begins. For any new actions on federal lands, Section 7 interagency consultation is the process. For any new actions on non-federal lands, the owner/lessee would need to contact the FWS to address potential take issues from the operation. The Section 10 process is necessary before a project begins.

Cite the exact wording in the regulations for “Assurance” under a CCAA.

Federal Register / Vol. 64, No. 116 / Thursday, June 17, 1999 / Notices/ Announcement of Final Policy for CCAA: On June 12, 1997, the Services issued a draft policy (62 FR 32183), and the FWS issued proposed regulations to implement the policy (62 FR 32189). Under the policy, non-federal property owners, who enter into a CCAA that commit them to implement voluntary conservation measures for proposed or candidate species, or species likely to become candidates or proposed in the near future, will receive assurances from the Services that additional conservation measures will not be required and additional land, water, or resource use restrictions will not be imposed should the species become listed in the future. These assurances will be provided in the property owner’s Agreement and in an associated enhancement of survival permit issued under section 10(a)(1)(A) of the Act. This policy was effective July 19, 1999.

If we get “Assurances” under a CCAA, what do we receive under a CCA?

Participants in the CCA receive a “high degree of certainty” that additional measures would not be required of Participating Cooperators. Should listing occur, the Conference Opinion for the agreement and associated incidental take statement would be adopted as a Biological Opinion if no significant new information is developed that would alter the content or determinations of the Conference Opinion. Having a robust CCA is the key to having a high degree of certainty that changes in activities or circumstances on federal lands would only be necessary if unanticipated and unusual circumstances develop that are not adequately addressed by the CCA.

What other requirements are included in my certificate?

Besides contributed funding, terms of individual Certificates will be tailored to the Participants and the specific parcels being enrolled. For projects involving federal minerals, many of the conservation measures are already applied as lease stipulations or conditions-of-approval for the permitted activity. Examples include planning locations to avoid sensitive habitats (e.g., staying out of dune complexes of dunes sagebrush lizards), routing infrastructure in corridors, and avoiding construction/drilling activities during the breeding season of the lesser prairie-chicken. Other conservation measures are designed to further enhance or protect habitat as necessary on a case-by-case basis.

If I contribute funds, are the funds used for habitat improvement on my lease?

Not necessarily. The funds will be used to complete the highest priority projects that benefit the species. Projects are identified and prioritized by the interagency team. CEHMM is responsible for keeping the list of prioritized projects for implementation.

What types of projects will be completed with the contributed funds?

Specifically for the LPC, projects would include invasive brush control, removal of abandoned structures, installation of wildlife escape ramps in water troughs, and caliche removal from abandoned roads and well pads (where there is no responsible party).

Could an enrolled lease increase its value if I choose to sell the lease?

While this is not the intent of the CCA/CCAA, it is possible because the new lessee/operator will retain the benefits of the agreement if the species is listed under the Endangered Species Act. Without a Certificate, new actions that could impact the species would require consultation with FWS.

If we wait until right before the species is listed, can I come in at the last minute and sign up?

Probably. However, the goal is to accomplish enough conservation to prevent the listing of the species. Waiting will only reduce the amount of time to implement conservation measures and will offer little to preclude the need to list. Furthermore, if you wait to come in at the last minute, you may not be able to get your leases enrolled in a timely manner since Certificates will be processed on a first-come, first-served basis and priority will be placed on proposed enrollments that best benefit the two species.

If I have leases I want to consider enrolling, but I'm not sure it is in candidate species habitat, how do I know?

Agency specialists will meet with you and look at your specific lease(s) to determine if they are in candidate species habitat. If you are not, they will tell you that a certificate is not necessary.

Is the cost the same for a Certificate of Inclusion (CI) on state or private lands as it is on federal lands?

Yes. The goal is to approach LPC and DSL conservation across all ownerships in the same manner since the primary goal of the agreements is to guide conservation measures and efforts to make listing unnecessary.

Can I cancel my Certificate at any time I want?

Yes. However, by cancelling the Certificate, the enrolled lands would no longer receive the benefits described in the agreement.

What is the risk of not participating?

Permits for actions proposed on federal lands or minerals (actions that require a federal permit) that were approved prior to a listing decision become void where the proposed action would have an effect on the newly listed species. If there will be no impacts to the species or its habitat, the permit would not be affected. However, if impacts are anticipated, Section 7 interagency consultation between the BLM and FWS is required. Due to limited staff and an anticipated abundance of applications that require consultations, this process may cause a significant delay in processing new permits. The benefit of participating is that a pre-listing consultation occurs as part of the enrollment process, resulting in the issuance of a Biological Opinion as a part of the Certificate. If a listing decision occurs, the Conference Opinion is then converted into a Biological Opinion, which is expected to take only 30-60 days. The risks of not participating include not knowing how long the consultation process will delay future development of the lease, and the risk of increased regulation, which may not allow the proposed action at all. Enrollment in the appropriate Agreement can highly reduce or eliminate these risks.

If I participate, can I place wells anywhere I want to on my lease?

Not necessarily. If a proposed surface disturbing activity conflicts with the conservation goals for the lease, the proposed activity will have to be modified to avoid impacts to the species.

Who is CEHMM?

The Center of Excellence (CEHMM) was established in May of 2004 as a 501(c)(3) organization dedicated to the research, development, and implementation of environmentally sound programs. Since its inception, CEHMM has identified and pursued applied research projects that have nation-wide impact and are innovative, meaningful, and practical. CEHMM has created a wide range of cutting edge applied research programs including developing technology for using algae for biofuels, biomonitoring for the H5N1 (avian influenza) and West Nile viruses, and cooperative conservation of species listed as "warranted but precluded" on the federal endangered species list. CEHMM has had swift advances in these projects due to the varied talents of the CEHMM staff and directors and the organization's success in developing strong partnerships with universities, national laboratories, and private industry.

What is CEHMM's role?

CEHMM's role is to:

- implement and administer the Agreements;
- enroll participants in to the conservation program;
- provide technical assistance to participants;
- conduct compliance reviews of projects being implemented by participants;
- utilize contributed funds to contract and inspect projects;
- monitor projects using existing agency protocols in order to determine success and adaptations needed;
- conduct outreach and public education efforts to promote the conservation of both species;
- secure permission to complete projects on private and state lands;
- lead annual meetings with the FWS, BLM, NMDGF, and interested participants to review progress from the previous year;
- seek potential solutions for factors that hamper conservation of LPC/DSL, and future projects;
- track expenditure of funds and prepare an annual report on implementation of projects;
- use no more than 10 percent of contributed funds for administrative responsibilities under the agreements;
- maintain a digital photo database to document project performance; and
- conduct audits annually, at CEHMM's expense.

The following Conservation Measures are to be accomplished in addition to those described in the CCA:

1. To the extent determined by the BLM representative at the Plan of Development stage, all infrastructures supporting the development of a well (including roads, power lines, and pipelines) will be constructed within the same corridor.
2. On enrolled parcels that contain inactive wells, roads and/or facilities that are not reclaimed to current standards, the Participating Cooperator shall remediate and reclaim their facilities within three years of executing this CP, unless the Cooperator can demonstrate they will put the facilities back to beneficial use for the enrolled parcel(s). If an extension is requested by the Cooperator, they shall submit a detailed plan (including dates) and receive BLM approval prior to the three-year deadline. All remediation and reclamation shall be performed in accordance with BLM requirements and be approved in advance by the Authorized Officer.
3. Allow no new surface occupancy within 30 meters of areas designated as occupied or suitable, unoccupied DSL dune complexes, or within delineated shinnery oak corridors. The avoidance distance is subject to change based on new information received from peer reviewed science.
4. Utilize alternative techniques to minimize new surface disturbance when required and as determined by the BLM representative at the Plan of Development stage.
5. Provide escape ramps in all open water sources under the Participating Cooperator's control.
6. Bury new power lines that are within two miles of LPC lek sites active at least once within the past five years (measured from the lek). The avoidance distance is subject to change based on new information received from peer reviewed science.
7. Bury new power lines that are within one mile of historic LPC lek sites where at least one LPC has been observed within the past three years (measured from the historic lek). The avoidance distance is subject to change based on new information received from peer reviewed science.
8. Limit seismic exploration to areas outside of occupied and suitable shinnery dune complexes to protect dunes sagebrush lizard habitat.
9. Submit a routine monitoring and schedule of inspection for oil, gas and produced water pipelines and facilities to ensure accidental pollution events are avoided in sensitive habitats for dunes sagebrush lizard.

Contributed Funds

The Habitat Conservation Fee for new surface disturbance associated with oil and gas development activities will be calculated using the following scales.

The scales also apply to third parties doing work for the Participating Cooperator either on or off the Participating Cooperator’s enrolled parcels, regardless of who constructs or operates the associated facilities. The Participating Cooperator must notify the BLM prior to conducting any surface-disturbing activities associated with this CP on or off the enrolled leases either by the Cooperator or third-party subcontractors. The Habitat Class of the new surface disturbance is determined by the location of the activity being developed, not the actual habitat found on site.

1). New Well Location Fees¹

<u>Habitat Class</u>	<u>Conservation Fee</u>
Primary Population Area	\$20,000/location
Core Management Area	\$20,000/location
Habitat Evaluation Area	\$15,000/location
Scarce & Scattered Population Area	\$12,500/location
Isolated Population Area	\$10,000/location
Other areas ²	\$ 3,000/location

¹. Includes well pad and associated access road

². Includes areas outside the RMPA planning area boundary but within historic range of LPC in New Mexico.

2). New Surface Development Fees

For other new surface disturbances associated with enrolled parcels, but not directly attributable to a new well pad³ and associated road, the Habitat Conservation Fee will be based on the following scale:

<u>Habitat Class</u>	<u>Conservation Fee</u>
Primary Population Area	\$5,000/acre
Core Management Area	\$5,000/acre
Habitat Evaluation Area	\$3,750/acre
Scarce & Scattered Population Area	\$3,125/acre
Isolated Population Area	\$2,500/acre
Other areas ⁴	\$1,000/acre

³. Co-located wells that require an increase in the size of the existing pad will be assessed by new acres disturbed.

⁴. Includes areas outside the RMPA planning area boundary but within historic range of LPC in New Mexico.

Note: All acreage calculation will be rounded up to the next whole acre.

New operations on previously disturbed land (e.g., co-located new well on an existing pad or new pipeline in an existing corridor, etc.) will incur no additional conservation fee, unless the area to be re-disturbed has been reseeded and/or reclaimed as part of reclamation. Fees will also be assessed for any new disturbed acreage.

The disturbed area will be calculated based on information received and/or on-the-ground observation. Habitat Conservation Fees are based on the total acres disturbed in each appropriate habitat class. Should the Participating Cooperator disagree with the estimate of the area disturbed, they have the right to challenge the estimate and provide supporting data. The BLM will have the responsibility for the final determination of the area disturbed.

All above ground power lines will have a fee calculated using the above scale for New Surface Development. The acreage will be based on information provided in the permit application.

Habitat Conservation Fees will not be charged for buried power lines or surface pipelines in accordance with the BLM 2008 Special Status Species Resource Management Plan Amendment (RMPA).

3). Fees associated with new seismic data acquisition

<u>Habitat Class</u>	<u>3D Survey Conservation Fee</u>	<u>2D Survey Conservation Fee</u>
Primary Population Area	\$ <u>10.00</u> /acre	\$ <u>200.00</u> /linear mile*
Core Management Area	\$ <u>10.00</u> /acre	\$ <u>200.00</u> /linear mile*
Habitat Evaluation Area	\$ <u>7.50</u> /acre	\$ <u>150.00</u> /linear mile*
Scarce & Scattered Population Area	\$ <u>6.25</u> /acre	\$ <u>125.00</u> /linear mile*
Isolated Population Area	\$ <u>5.00</u> /acre	\$ <u>100.00</u> /linear mile*
Other areas ⁵	\$ <u>1.50</u> /acre	\$ <u>25.00</u> /linear mile*

* or any fraction thereof

⁵ Includes areas outside the RMPA planning area boundary but within historic range of LPC in New Mexico.

The acquisition of seismic data on enrolled parcels may also disturb the surface of other land not enrolled in this CP. The Habitat Conservation Fee calculated for seismic activity includes disturbances occurring on both enrolled and non-enrolled land.

Routine Production Operations

Routine production operations are not considered new surface development and will not create the obligations to pay a Habitat Conservation Fee. Routine production operations are those which do not require an agency permit or approval, and those operations that require an agency approval but do not disturb the surface.

APPENDIX B
CCA Habitat Restoration Program Project Proposal Form
Candidate Conservation Agreement Habitat Restoration Program
Project Proposal Form

Participant's Name: _____

Project Name: _____

Address: _____

Phone: _____

Number of acres included in project area: _____

Is participant enrolled in the CCA/CCAA (20 point bonus)? Project must be completely on enrolled lands to receive the entire bonus:

Estimated cost of project (Provide detailed budget utilizing CEHMM's budget template):

Project Overview/Narrative:

Project Duration:

Species that will benefit from project:

Dunes Sagebrush Lizard: YES ___ NO ___ How?

Lesser Prairie-Chicken: YES ___ NO ___ How?

How will the project restore missing habitat components for feeding, breeding, shelter, or water for the species?

Explain how/if the project is a component of an overall restoration plan or objective?

Does the proposal include surveying the project area for lizards or chickens, or are surveys already being conducted for each species in the project area? Explain.

Is the project in the Core Management Area (CMA) or Primary Population Area (PPA)? Provide map of project in relation to Resource Management Plan (RMP) Zones.

Is the project in a Habitat Evaluation Area (HEA)? Provide a map of the project in relation to RMP Zones.

Is the project within the Crucial Habitat Assessment Tool (CHAT) Focal Habitat zone habitat area? Provide a map of the project in relation to CHAT Zones.

Is the project within three miles of an unoccupied historic lek? Provide a map of the project in relation to unoccupied historic leks.

Is the project within three miles of an active lek? Provide a map of the project in relation to active leks.

Is the project within the Bureau of Land Management (BLM) Dunes Sagebrush Lizard (DSL) polygon? Provide a map of the project in relation to DSL habitat.

Will the project remove infrastructure from suitable or occupied dune complexes? Explain.

Will the project restore or create shinnery oak dunes? Explain.

Explain how the project will remove invasive weeds or brush to increase beneficial plant species.

Will grazing be deferred for at least two consecutive growing seasons as part of a grazing management system for the property? Explain.

Will there be a Private, Federal or State cost share match (i.e., a Natural Resource Conservation Site (NRCS) grant)? Explain.

How many years will the project be maintained? How will maintenance occur?

Is the project within five miles of another restoration project for either species? Provide a map of the project in relation to other restoration projects.

If applicable, explain how the project will provide connectivity between two habitat patches for either species.

Will the project remove power lines, poles, or other vertical structures (> 15ft. tall) within three miles of an active lek?

Will the project remove fences, roads, and pads and reduce habitat fragmentation?

Please provide a map of the proximity of the project to known locations of either species.

Does the project include reintroducing the species to the project area? If so, please include the following:

- Game and Fish permit for trapping and releasing
- Approved plan for relocating the species onto the property

Both the preparer of the above proposal and the Participator agree to the terms of the project proposed within the attached proposal. Participator is aware that the proposal will be submitted to the CCA/CCAA ranking team for review. Participator will be notified in writing by CEHMM upon acceptance or rejection of the proposed project. Upon acceptance, Participant will be required to sign a Project Agreement with CEHMM, detailing all aspects of the accepted project. Additional projects requested by Participator will be addressed by submission of a new project proposal to the CCA/CCAA ranking team.

Proposal Preparer: _____
(signature)

(date)

Landowner/Operator: _____
(signature)

(date)

APPENDIX C
CCA Habitat Restoration Program Ranking Criteria
Candidate Conservation Agreement Habitat Restoration Program
Ranking Criteria

Participant Name:	Enrolled in CCA/CCAA? (YES) (NO)	
Project Name:	Number of acres to be treated?	
Address:	Evaluator Name:	
Criteria	Max. Points	Score
1. Does the project benefit the Dunes Sagebrush	10	
2. Does the project benefit the Lesser Prairie-	10	
3. Will the project restore missing habitat components for feeding, breeding, shelter, or water for the species?*	10	
4. Is the project a component of an overall restoration plan or objective?*	10	
5. Are lizard surveys included in the project plans?	5	
6. Are prairie-chicken surveys included in the project plan/ area?	5	
7. Is the project in the Core Management Area	10	
8. Is the project in an Habitat Evaluation Area	5	
9. Is the project within the Crucial Habitat Assess-	10	
10. Is the project within the CHAT connectivity zone	5	
11. Is the project within three miles of an unoccupied historic lek?	5	
12. Is the project within three miles of an active lek?	10	
13. Is the project within the BLM DSL Polygon?	10	
14. Will the project remove infrastructure from suitable or occupied dune complexes?	10	
15. Will project restore or create shinnery oak dunes	10	
16. Will project remove invasive weeds or brush to increase beneficial plant species?	5	
17. Will grazing be deferred for at least one year (12 consecutive months) as part of a grazing management system for the property? <ul style="list-style-type: none"> • > 640 acres deferred in one year • 160 – 640 acres deferred in one year 	(10 point max) 10 5	

18. 20 Point CCA/CCAA Enrollment Bonus if project is entirely on enrolled	20	
19. Will there be a private, federal or state cost share match (e.g. Natural	5	
20. How many years will the project be maintained (1 point/year)	10 points max	
21. Is the project within five miles of another restoration project for either species?	5	
22. Will the project provide connectivity between two habitat patches?	10	
23. Will the project remove power lines, poles, or other vertical structures (> 15ft. tall) within three miles of an active lek?	5	
24. Will the project remove fences, roads, and pads and reduce habitat fragmentation?*	5	
25. Does the project include reintroducing the species to the project area?*	5	
26. Does the project provide a map showing known locations of either species?	5	
Total	210	

Does this project warrant funding? Yes or No. Explain. _____

*Additional clarification for the following criteria:

1. In order to have a benefit for the Dunes Sagebrush Lizard, there must be suitable or occupied lizard habitat in the project area. The project must provide a direct benefit to the species, such as the removal of a fence, power line, or road in a dune; removing fragmentation around dunes; rebuilding a shinnery oak dune; or directly removing one or more threats to the species.
2. In order to have a benefit for the Lesser Prairie-Chicken, suitable or occupied (or historically suitable or occupied) habitat must be present in the project area. Project must provide a direct benefit to the species by increasing or creating suitable habitat, removing fragmentation, or directly removing one or more threats to the species.
3. There must be an explanation of the habitat components that will be restored. For example:
 - Native seed (e.g. sand bluestem, giant drop-seed, little blue stem, etc.) will be inter-seeded or re-seeded to provide cover and feeding areas for LPC chicks.
 - The project will turn unsuitable (bald) dunes into suitable shinnery oak dunes for lizards.
4. The project proposal should describe the overall restoration objective/goal for the project, and how this project will help to accomplish this goal.
24. The project must create a corridor between two habitat patches that have been disconnected by infrastructure or unsuitable habitat.
25. The proposed project must be part of a New Mexico Department of Game and Fish (NMDGF) permitted/approved reintroduction project for either species.

APPENDIX D

Candidate Conservation Agreement Program
Research/Monitoring - Project Proposal Form

Fully describe the project, benefits, and location (Include a project map with lizard and chicken habitats, known leks, and lizard localities). Be specific.

Participant's Name: _____

Project Name: _____

Address: _____

Phone: _____

Estimated cost of project: _____

Estimated cost of monitoring and surveys: _____

Complete Project Description (include a clear description of the proposed outcome or product):

Project Schedule:

Explain how research will provide information that will have a conservation benefit for either/both species:

Dunes Sagebrush Lizard (DSL): YES _____ NO _____ How?

Lesser Prairie Chicken (LPC): YES _____ NO _____ How?

Explain how/if the project is a component of an overall research plan or objective.

Does the proposal include surveying for lizards or chickens, or are surveys already being conducted for each species in the project area? Explain.

Is the project within the Crucial Habitat Assessment Tool (CHAT) Focal Habitat zone habitat area? Provide a map of the project in relation to CHAT Zones.

Is the project within the CHAT connectivity zone habitat area? Provide a map of the project in relation to CHAT Zones.

Is the project within the Bureau of Land Management (BLM) DSL polygon? Provide a map of the project in relation to DSL habitat.

Will there be a Private, Federal, or State cost share match? Explain.

Explain how this project will coordinate with State/Federal agencies and other partners to accomplish common research goals.

Does the project include captive rearing or reintroduction of the species? If so, please include the following:

- Game and Fish permit
- Approved plan for rearing or relocating the species

Attach a detailed budget utilizing CEHMM's budget template.

Both the Preparer of the above proposal and the Participator agree to the terms of the project proposed within the attached proposal. Participator is aware that the proposal will be submitted to the CCA/CCAA Ranking Team for review. Participator will be notified in writing by CEHMM upon acceptance or rejection of the proposed project. Upon acceptance, Participant will be required to sign a Project Agreement with CEHMM, detailing all aspects of the accepted project. Additional projects requested by Participator will be addressed by submission of a new project proposal to the CCA/CCAA Ranking Team.

Proposal Preparer:

(Signature)

(Date)

Participator:

(Signature)

(Date)

APPENDIX E
Candidate Conservation Agreement Program
Ranking Criteria for Research/Monitoring Projects

Participant Name:	Address:	
Project Name:		
Evaluator Name:	Total Score:	
Criteria	Max. Points	Score
1. Does the project benefit the Dunes Sagebrush Lizard	10	
2. Does the project benefit the Lesser Prairie Chicken	10	
3. Is the project within the Crucial Habitat Assessment	10	
4. Is the project within the CHAT connectivity zone habitat area?	5	
5. Is the project within the Bureau of Land Management	10	
6. Will the project provide necessary information for the conservation of either species?	10	
7. Is the project a component of an overall research plan or objective?	10	
8. Are lizard surveys/monitoring included in the project plan?	10	
9. Are prairie chicken surveys/monitoring included in the project plan?	10	
10. Does the proposal define a clear outcome or product?	10	
11. Does the proposal include a timeline in which work will be completed?	10	
12. Will it provide information that is necessary to make conservation decisions?	10	
13. Is the proposal included in the CCAA Research Priority List?	10	
14. Will there be a private, federal, or state cost share	10	
15. Does the proposal include partnership and coordination with agencies and non-governmental organizations (NGO's)?	15	
16. Is there a detailed budget included?	10	
Total	160	

Does this project warrant funding? Yes or No. Explain.

*Additional clarification for the following criteria:

1. In order to have a benefit for the Dunes Sagebrush Lizard, there must be suitable or occupied lizard habitat in the project area. The project must provide a direct benefit to the species, such as removing a fence, power line, or road in a dune; removing fragmentation around dunes; rebuilding a shinnery oak dune; or directly removing one or more threats to the species.
2. In order to have a benefit for the Lesser Prairie-Chicken, suitable or occupied (or historically suitable or occupied) habitat must be present in the project area. The project must provide a direct benefit to the species by increasing or creating suitable habitat, removing fragmentation, or directly removing one or more threats to the species.
6. The project proposal should describe the overall objective/goal for the project and how this project will help to accomplish this goal.

**APPENDIX F:
Projects throughout the life of the CCA/CCA program.**

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Project Cost</i>	<i>Units</i>	<i>Date Completed</i>	<i>Description</i>
TTU Cox Shin-Oak	August 2010	\$4,537.00	\$7,024.71	N/A	February 2012	The goal was to provide a foundation for restoration of DSL habitat, and included travel to field sites to meet with the CCAA group, and to study the effectiveness of caliche removal on reestablishment of shin-oak community species. Actual cost includes indirect costs, budget did not.
TNC MPP-S Hand Mesquite	May 2010	\$17,440.00	\$17,440.00	630 acres	June 2010	Hand treatment of mesquite to allow native flora the opportunity to become reestablished. Treatment will improve and enlarge an area that LPC are already utilizing for cover, nesting, and forage. This project was funded with \$30,000 from a private stewardship grant through Grasslans Charitable. The remaining cost was funded using CCA/CCA funds. Project cost totaled \$47,440.00.
Weaver Hand Mesquite	August 2010	\$25,000.00	\$50,734.01	320 acres	October 2010	Eradication of mesquite on a half section (320 acres) using Remedy Ultra applied with the use of back pack sprayers by qualified CEHMM employees. Eradication and removing mesquite opens up habitat for lekking, nesting, and brood rearing.
Bresenham Hand Mesquite and Windmill Removal	August 2010	\$22,584.95	\$24,254.03	40 acres	October 2010	The removal of mesquite will allow for native grasses and forbs to become reestablished thus creating habitat conducive for LPC occupancy. A windmill tower that was no longer in use was also removed.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Project Cost</i>	<i>Units</i>	<i>Date Completed</i>	<i>Description</i>
TNC MPP-S Aerial Mesquite	August 2010	\$13,968.00	\$13,968.00	600 acres	June 2011	This project is in desirable LPC habitat that was being encroached upon by mesquite. By Eradicating and removing the mesquite it will eliminate the competition to the native grasses and allow the habitat to remain suitable for occupancy by LPC.
APHIS Feral Hog Removal	January 2011	\$50,000.00	\$54,856.68	128, 816 acres (8 mile radius around active leks)	May 2012	This was a three year proposal, with the second and third year of funding contingent upon the success of year one. Feral hogs were hunted and trapped within an eight-mile radius of active leks. The goal was to validate LPC nest predation by feral hogs. Actual cost includes indirect costs, budget did not.
Berry Aerial Mesquite	January 2011	\$100,000.00	\$106,702.64	12,000 acres	June 2011	This was a cost shared project between the BLM, NRCS, CEHMM, and the landowner. The goals for this project were to prevent mesquite encroachment on dunes suitable for DSL, to restore native grass communities beneficial to LPC, and to create a corridor of suitable LPC habitat between historically occupied areas for LPC. Actual cost includes indirect costs, budget did not.
Brininstool Lehmann's	January 2011	\$19,905.63	\$12,847.61	12 acres	May 2011	The intention of this project was to compare different chemical applications, grazing methods, and effects of burning to control and eradicate Lehmann's Lovegrass (<i>Eragrostis lehmanniana</i>), which does not provide suitable habitat for LPC. Actual cost includes indirect costs, budget did not.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Project Cost</i>	<i>Units</i>	<i>Date Completed</i>	<i>Description</i>
SDL and LPC Monitoring	January 2011	\$40,000.00	\$38,272.03	N/A	September 2014	This project was geared toward developing DSL survey and monitoring protocols, identifying and surveying areas on lands that were and were not enrolled in the CCA/CCAA, identifying areas for habitat restoration, and to coordinate with recipients of funds to develop projects that would benefit LPC and DSL.
BLM Pipeline Mesquite (aka Bogle Mesquite)	January 2011	\$100,000.00	\$106,702.64	12,450 acres	June 2011	This project was proposed to benefit both LPC and DSL. Removal of mesquite would increase grass and forb cover, increasing cover for LPC. Reducing mesquite encroachment into occupied DSL habitat was also a benefit to the species. Actual cost includes indirect costs, budget did not.
Sims Aerial Mesquite	January 2011	\$35,000.00	\$20,800.46	2,560 acres	June 2011	This project was funded and completed with the purpose of treating areas outside of DSL habitat, to allow grasses usable by livestock to re-establish themselves. Occupied DSL habitat was able to be relieved through the implementation of this project. DOI F&W Co-op Agreement also contributed \$34,497.94 on this project.
TNC MPP-S Aerial Yucca	January 2011	\$7,500.00	\$1,935.17	120 acres	October 2011	Three test plots of 40 acres each will be aerially treated to determine effectiveness of chemical treatment to control Plains Yucca. This treatment was also mixed with an ultraviolet dye to determine the effectiveness of traditional spray versus electrostatic application.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Project Cost</i>	<i>Units</i>	<i>Date Completed</i>	<i>Description</i>
BLM (Carlsbad Field Office) Caliche Removal Project (on the Turkey Track Allotment) (aka CFO Bogle Caliche)	January 2011	\$60,000.00	\$68,675.72	20 acres	October 2011	The removal of caliche was intended to reduce habitat fragmentation for both species by removing caliche roads, which are a barrier for DSL, and to reduce vehicular access to areas of suitable LPC habitat that had a historic lek site. Removing caliche would also allow native vegetation to return to the area, in turn increasing areas that could support cover and nesting habitat. Actual cost includes indirect costs, budget did not.
Slash ML Caliche	January 2011	\$60,000.00	\$76,988.46	33 acres	October 2011	This project was geared toward developing DSL survey and monitoring protocols, identifying and surveying areas on lands that were and were not enrolled in the CCA/CCAA, identifying areas for habitat restoration, and to coordinate with recipients of funds to develop projects that would benefit LPC and DSL.
DSL Research Duke University (aka Chan DSL Research)	August 2011	\$157,627.00	\$350,225.07	N/A	March 2014	There were two primary objectives of this project: 1) To delineate genetically and geographically isolated populations of the Dunes Sagebrush Lizard throughout their range and identify the habitat features correlated with this divergence, and 2) To examine the effects of anthropogenic habitat alteration and fragmentation by oil and gas extraction practices on population genetic diversity and gene flow at local scales.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Project Cost</i>	<i>Units</i>	<i>Date Completed</i>	<i>Description</i>
DSL Research Texas A&M University (aka Fitzgerald DSL Workshop)	August 2011	\$12,000.00	\$18,105.27	N/A	April 2012	This was a project proposed to conduct a workshop to help agency biologists and university researchers to collaborate and discuss research efforts at the time. A document was to be produced showing research accomplishments, how research projects compliment one another, to identify gaps in knowledge, and make recommendations for important future research to inform policy relevant to conservation of the DSL. Actual cost includes indirect costs, budget did not. Cost also includes CEHMM employee travel to workshop.
Pearce Hand Mesquite	August 2011	\$8,000.00	\$8,000.00	18,108 acres	August 2012	Hand treatment of mesquite was completed in this project to maintain and improve the integrity of DSL and LPC habitat in the BLM ACEC. Encroachment of mesquite into dune complexes, reduced competition between native grasses and forbs, and removal of vertical structures were the goals of this project.
BLM ACEC Mesquite	August 2011	\$64,833.00	\$101,770.52	1,390 acres proposed, 1,235 actually treated	June 2012	Hand treatment of mesquite was completed in this project to maintain and improve the integrity of DSL and LPC habitat in the BLM ACEC. Encroachment of mesquite into dune complexes, reduced competition between native grasses and forbs, and removal of vertical structures were the goals of this project. Actual cost includes indirect costs, budget did not.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Project Cost</i>	<i>Units</i>	<i>Date Completed</i>	<i>Description</i>
BLM (Carlsbad Field Office) Caliche Removal (on the Clayton Basin Allotment) (AKA CFO Creamer Caliche)	August 2011	\$60,000.00	\$67,119.23	20 acres	February 2012	The removal of caliche was intended to reduce habitat fragmentation for both species by removing caliche roads, which are a barrier for DSL, and do not allow for the growth of native vegetation that LPC rely on for cover and nesting. Removing caliche would also allow native vegetation to return to the area, in turn increasing areas that could support cover and nesting habitat. Actual cost includes indirect costs, budget did not.
Slash ML Caliche (Group B) #2	August 2011	\$49,000.00	\$56,985.36	14 acres	February 2012	The removal of caliche was intended to reduce habitat fragmentation for both species by removing caliche roads. Restoration of sand dunes near occupied DSL habitat was also a possibility with this project. Removing caliche would also allow native vegetation to return to the area, in turn increasing areas that could support cover and nesting habitat. Actual cost includes indirect costs, budget did not.
Duke University DSL Research Addendum (aka Chan DSL Research Addendum)	April 2012	\$14,336.00	Included with DSL Research Duke University (aka Chan DSL Research) funded August 2011 on page 60.	N/A	March 2014	This was a continuation of the original Duke University proposal that would help further analyze DSL genetics in comparison to other species within their groups.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Project Cost</i>	<i>Units</i>	<i>Date Completed</i>	<i>Description</i>
TTU Cox Shin-Oak Yr. One, Yr. Two not funded	April 2012	\$62,559.00	\$31,637.89	N/A	August 2013	Continuation of the original TTU Cox Shin-Oak project. Dr. Cox of Texas Tech University was developing possible techniques to restore shinnery oak in dunes that had been disturbed by oil and gas operations as well as pastures that were sprayed with Tebuthiuron. Several sites in southeastern NM were visited to better understand the habitat physiology and what could be done to re-establish, sustain, and possibly improve the shinnery oak dune ecology. Actual cost includes indirect costs, budget did not.
Hathcock/Hill Shrike Research	April 2012	\$36,283.83	\$46,128.33	N/A	November 2012	Research was conducted to study predation rates on DSL by loggerhead shrikes in fragmented and unfragmented habitat. Remote cameras were set up at loggerhead shrike nests to determine prey items that were brought to nests. Fecal samples were collected and analyzed to determine if DSL were prey for shrikes. Actual cost includes indirect costs, budget did not.
Natural Heritage DSL Research	April 2012	\$356,080.00	\$356,024.25	N/A	June 2016	Natural Heritage New Mexico was to create a new DSL habitat map using the most recent, highest resolution imagery available at the time. A web mapping application provided access to DSL habitat and occurrence data.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Project Cost</i>	<i>Units</i>	<i>Date Completed</i>	<i>Description</i>
NMSU Carleton LPC Research	April 2012	\$247,260.00	\$246,921.09	N/A	December 2015	NMSU conducted research to determine if reproduction survival, habitat use, and landscape vegetation characteristics were linked to declining patterns of lek attendance by LPC across portions of the Sand Ranch and Mescalero Sands ACEC.
BLM Windmill Conversion	April 2012	\$25,600.00	\$12,841.20	N/A	November 2012	CEHMM converted one windmill to a solar water pump in LPC habitat to eliminate vertical structure from LPC habitat, which the LPCs tend to avoid.
BLM Caliche (aka Caviness and Smith Caliche)	April 2012	\$50,000.00	\$49,208.13	21.2 acres	November 2012	This project was funded to reduce habitat fragmentation for both DSL and LPC by removing caliche from legacy oil and gas roads and pads where there was no responsible party. The proposal stated that caliche is a barrier for DSL and they will be more likely to disperse into areas that they previously may not have. Re-vegetation on caliche roads and pads would also be beneficial to LPC for cover and nesting habitat.
ABQ BioPark	April 2012	\$81,499.00	\$80,636.30	N/A	July 2013	The Albuquerque Biological Park created a DSL exhibit depicting DSL in their habitat. They observed habitats of DSL and reported them to biologists and advised other local zoos on the creation of similar exhibits.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Project Cost</i>	<i>Units</i>	<i>Date Completed</i>	<i>Description</i>
Weaver Mesquite/ Mechanical	April 2012	\$50,000.00	\$52,098.88	158 acres	January 2016	Mechanically remove mesquite to create a corridor for LPC to travel to and from nesting and feeding sites that are currently occupied by LPC.
TNC Solar/Windmill Conversion—2 windmills	May 2012	\$17,528.00	\$17,281.87	N/A	September 2012	Conversion of two windmills to solar water pumps in LPC habitat, both windmill towers removed.
Natural Heritage LPC Data Management	January 2013	\$25,470.00	\$56,426.79	N/A	October 2013	Natural Heritage New Mexico consolidated all historic New Mexico LPC data, including raw data yet to be validated or published into an easily accessible database. Costs for amendments are included in this line.
Bresenham Caliche Removal	January 2013	\$100,000.00	\$182,525.58	30 acres	February 2014	Reclaimed and reseeded 30 acres of caliche pads and roads in LPC and DSL habitat.
BLM ACEC Replace- ment Well	January 2013	\$14,395.00	\$153,137.79	N/A	March 2014	The project consisted of drilling a replacement well in in the Lesser Prairie Chicken ACEC (LPC ACEC), SWSE, Section 28, T. 9 S., R. 30 E. The existing well was reworked to function as a solar unit with the removal of two windmills. After installation, the well had marginal to poor production as a solar well. This well was probably too old to warrant reconditioning and use of the well. Drilling a new well allowed the BLM to appropriate three acre feet per annum which allowed more water to be used for beneficial use on public land.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Project Cost</i>	<i>Units</i>	<i>Date Completed</i>	<i>Description</i>
BLM ACEC Fence Removal	January 2013	\$29,800.00	\$24,428.25	12.5 miles	August 2013	Remove 12.5 miles of pasture fence within the lesser prairie-chicken habitat preservation Area of Critical Environmental Concern (ACEC). The Bureau of Land Management (BLM) Roswell Field Office range staff has agreed there is no longer a need for these fences.
BLM ACEC Storage Tanks/Twin Windmills	January 2013	\$22,584.00	\$32,298.00	N/A	November 2014	Drill a new well at the twin windmill site and the GPM will support it. Construction of 2.5 miles of pipeline with storage tanks and drinkers. There will be two separate legs with a storage tank and drinker at the end of them. There are 21 LPC leks within 2.5 miles of the two proposed drinkers, 5 of them are active.
Meyers Mesquite	April 2013	\$195,480.06	\$37,380.31	7,080 acres	June 2014	NFWF Match. Aerial mesquite spray to remove mesquite in LPC habitat.
NFWF Drinkers—Williamson/Mohon	April 2013	\$73,215.00	\$82,325.83	9 drinkers	June 2015	Preliminary studies have shown that, for egg laying prairie chicken hens, water availability increases nest success, and larger clutch sizes would be expected in areas where water is readily available. Lesser prairie chickens have been photographed utilizing drinkers and troughs, and it has been suggested that hens visit sites with water more frequently during the mating and nesting season. Nine drinkers were installed to increase the supply of water in areas where prairie chickens are active.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Project Cost</i>	<i>Units</i>	<i>Date Completed</i>	<i>Description</i>
Lauren Chan DSL Research Addendum Claremont McKenna/Pacific University	April 2013	\$185,050.00	Included with DSL Research Duke University (aka Chan DSL Research) funded August 2011 on page 60.	N/A	December 2016	This was a continuation of the previously funded Duke University research projects conducted by Lauren Chan. Fine-scale landscape models predicting population genetic diversity and connectivity across the entire range of the DSL based on detailed fine-scale data from focal study sites near Maljamar, NM. Dr. Chan relocated to various institutions prior to contracts expiring. Thus, contracts were needed for individual universities where work was occurring.
BLM Caviness Mesquite	April 2013	\$140,000.00	\$141,172.05	5,600 acres	June 2014	This project was an aerial mesquite treatment geared towards preventing encroachment of mesquite into suitable DSL habitat as well as improving LPC habitat by increasing grass and forb cover critical for nesting and brood rearing cover and thermal protection.
BLM Caviness Reclamation	April 2013	\$63,000.00	\$51,698.68	18 acres	March 2014	This project included the removal of caliche and reseed-ing on 18 acres of roads and pads in DSL habitat no longer used by the oil and gas industry. DSL and LPC habitat improvement was the goal of this project by re-establishing native grasses and forbs beneficial to LPC and reducing habitat fragmentation for DSL.
McCloy/Jesko Fences/McCloy Fence	April 2013	\$72,000.00	\$67,112.52	Remove 7.5 miles & install 2.25 miles of fence	September 2015	Removal of 7.5 miles of fence and installation of 2.25 miles of wildlife-friendly fence to implement proper grazing rotation.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Project Cost</i>	<i>Units</i>	<i>Date Completed</i>	<i>Description</i>
McCloy/Jesko Water	April 2013	\$57,000.00	\$109,289.55	21.19 miles	August 2015	Installation of 21.19 miles of water line and tied into eleven water troughs and four storage tanks. The troughs and storage tanks were purchased and installed by Mr. McCloy.
McCloy/Jesko Mesquite (remainder of 5000 cancelled)	April 2013	\$153,000.00	\$50,743.04	1,782 acres	June 2014	Aerial treatment of mesquite. This project is in desirable LPC habitat that is being encroached upon by mesquite, by removing the mesquite it will eliminated the competition to the native grasses and allow the habitat to remain suitable for occupancy by LPC.
TNC Mesquite - Hand Treatment #2	April 2013	\$123,300.00	\$122,803.18	1,640 acres	December 2013	This project is in desirable LPC habitat that is being encroached upon by mesquite, by removing the mesquite it will eliminated the competition to the native grasses and allow the habitat to remain suitable for occupancy by LPC.
TNC Drought/ Grazing Workshop	April 2013	\$30,000.00	\$21,416.85	N/A	September 2013	CEHMM held four drought/ grazing workshops to educate ranchers on how to cope with and effectively manage their land during the drought.
TNC Tractor	April 2013	\$40,000.00	\$31,336.00	N/A	September 2013	Purchase of a tractor for LPC habitat conservation activities.
G&F Aerial Surveys	April 2013	\$38,340.00	\$38,340.00	N/A	May 2013	Funded to get a population estimation of LPC in New Mexico.
G&F Power Line	April 2013	\$35,390.00	\$12,932.52	6.7 miles	December 2013	Removal of 6.7 miles of power lines and poles on the NMDGF Milnesand-South Bluit PCAs.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Project Cost</i>	<i>Units</i>	<i>Date Completed</i>	<i>Description</i>
BLM North ACEC Well	April 2013	\$93,322.00	See BLM ACEC Replacement Well	N/A	March 2014	The Bureau of Land Management (BLM) Area of Critical Environmental Concern (ACEC) is limited both in the availability and distribution of water that is accessible to wildlife throughout the interior of the property. The well will accommodate the water needs of any and all wildlife including but not limited to LPC.
Natural Heritage LPC Data Management Amendment	February 2014	\$62,623.00	\$47,052.28 + pending	N/A	In progress	Natural Heritage New Mexico consolidated all historic New Mexico LPC data, including raw data yet to be validated or published into an easily accessible database.
CCA/CCAA Documentary—FWS	February 2014	\$7,610.50	\$11,546.64	N/A	July 2016	The USFWS made a documentary on the CCA/CCAA as an educational tool. It highlighted the key habitats needed for the LPC and DSL, showed restoration sites completed and outlined the benefits to both species.
TTU—Grisham LPC	February 2014	\$148,838.70	\$181,789.60	N/A	December 2017	An ongoing study conducted by Blake Grisham from Texas Tech University looked to identify the conservation actions that were needed to preserve LPC populations in regard to land management practices and environmental variation.
Jolley Solar Pump	February 2014	\$30,255.00	\$42,465.03	N/A	April 2015	This project removed an old windmill and drilled a new well with a solar-powered pump.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Project Cost</i>	<i>Units</i>	<i>Date Completed</i>	<i>Description</i>
Auburn—T Best	February 2014	\$49,707.00	\$49,707.00	N/A	June 2014	This project determined the status of the populations and distributions of the LPC in the BLM Carlsbad Field Office's Chaves, Lea, and Roosevelt county areas.
Bilberry Water (Revised July 2016)	February 2014	\$10,807.00	\$10,892.41	0.2 miles	March 2017	Installation of 0.2 miles of water pipeline and a 12-foot fiberglass tank to implement proper grazing rotation.
Field Hand Mesquite	February 2014	\$50,700.00	\$63,671.93	507 acres	January 2015	Hand treatment of mesquite in LPC habitat.
Riley Mesquite (Postponed until mesquite was in condition to treat, updated budget in 2016)	February 2014	\$149,350.08	\$132,727.22	Budgeted 4,028 acres/ actual treatment 3,793 acres	July 2018	Aerial treatment of mesquite. This project is in desirable LPC habitat that is being encroached upon by mesquite. By removing the mesquite it will eliminate the competition to the native grasses and allow the habitat to remain suitable for occupancy by LPC. After the nesting bird surveys were conducted, the treatment area was 3,793 acres.
Riley Tank and Booster	February 2014	\$17,921.00	\$5,625.00	N/A	November 2014	BLM provided Mr. Riley with two storage tanks, CEHMM had the booster pumps and associated parts installed to move water to two stock tanks.
TNC Hand Mesquite #3	February 2014	\$56,000.00	\$68,580.66	560 acres	February 2015	Hand treatment of 560 acres of mesquite to improve LPC habitat.
Woody Fence	February 2014	\$7,725.00	\$12,422.12	1 mile	September 2015	One mile of fence was replaced with a wildlife-friendly fence to improve herd management by allowing the enrollee to keep these two pastures separate.
Woody Water	February 2014	\$77,852.00	\$90,721.68	N/A	August 2016	Installation of one solar pump, three 20 - foot fiberglass stock tanks, two miles of pipeline, one storage tank, and one lid for existing storage tank to improve better grazing management.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Project Cost</i>	<i>Units</i>	<i>Date Completed</i>	<i>Description</i>
Landess Property	February 2014	\$220,000.00	\$221,888.60	960 acres	April 2015	Purchase of 960 acres of occupied LPC habitat in Roosevelt County.
BLM Robel Monitoring	August 2014	\$15,000.00	\$27,796.25	65 Sites	March 2015	This project was used to assist the Roswell BLM field office collect ROBEL data at 65 pre-established sites to determine LPC habitat conditions.
Richardson Water	August 2014	\$56,000.00	\$40,277.76	N/A	August 2016	This was a cost share between CEHMM and Richardson Cattle Company to drill three water wells, install eight troughs and three miles of water line to assist in grazing management. One well was drilled in 2016, but upon testing of the water, it was deemed unfit for wildlife and livestock consumption.
Meyers Reclamation	August 2014	\$14,500.00	\$14,855.43	3 acres	December 2014	A road and an old pad were reclaimed to prevent traffic from entering onto an HEA. DSL and LPC benefitted from this by reducing habitat fragmentation and vehicular traffic.
Jolley Fence Installation	August 2014	\$17,556.00	\$48,725.05	1.75 miles	November 2015	A new fence was constructed to assist in improved grazing management geared toward managing for LPC.
Jolley Fence Removal	August 2014	\$25,080.00	Included in Jolley Fence Installation	8.83 miles	November 2015	Fence was removed to assist in improved grazing management in LPC habitat. Potential for LPC mortality by fence collision was also achieved.
Bilbrey Solar	August 2014	\$31,000.00	\$20,002.42	N/A	July 2015	A windmill tower was removed, a solar pump, and a 20-foot stock tank was installed for a reliable water source in LPC habitat.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Project Cost</i>	<i>Units</i>	<i>Date Completed</i>	<i>Description</i>
Pearce Water	August 2014	\$200,000.00	\$56,693.82 + pending	N/A	In Progress	Two water wells, six storage tanks, seven solar pumps, a half-mile of water line and four windmill removals were to be completed. One well was drilled, but was found to not recharge at a sufficient rate. One windmill has been removed by the landowner and the solar pump to replace it is in the bidding process. The pump test for that well was conducted in May 2018.
Running N Solar (Clemmons)	August 2014	\$83,500.00	\$49,439.56	N/A	September 2015	Three windmill towers were removed, three solar pump were installed, and a storage tank was installed to increase the amount of available water in LPC habitat.
Hay Reclamation (cancelled)	August 2014	\$5,500.00	\$96.73	0.5 miles	N/A	N/A
Luman Drinker Repair	August 2014	\$13,500.00	\$24,559.88	N/A	May 2015	Two 20 - foot stock tanks were installed for a more reliable source of water.
Mathis Water	August 2014	\$5,200.00	\$17,029.55	N/A	January 2016	Installation of 1.1 miles pipeline and a 20-foot stock tank were placed on an abandoned well pad which allowed for better distribution of livestock grazing and more accessible water to wildlife.
M Williamson Water	August 2014	\$100,000.00	\$90,464.92	N/A	February 2016	Removal of two windmill towers, and multiple dysfunctional steel stock, and storage tanks. Installation of pithouse, 2.2 miles of pipeline, two 20-foot fiberglass stock tanks, and a new pond was dug.
Bresenham Mesquite (cancelled)	August 2014	\$11,750.00	N/A	450 acres	N/A	N/A
Clark Fence	August 2014	\$19,100.00	\$30,289.77	2 miles	December 2015	Installation of two miles of wildlife-friendly fence in order to separate the Clark ranch from the neighbor.

Project	Date Funded	Amount Funded	Project Cost	Units	Date Completed	Description
Medlin Mesquite	August 2014	\$50,500.00	\$58,223.04	2,000 acres	August 2015	Aerially treatment of mesquite. This project is in desirable LPC habitat that is being encroached upon by mesquite, by removing the mesquite it will eliminated the competition to the native grasses and allow the habitat to remain suitable for occupancy by LPC.
TNC Fence—Budget Amended 8/12/16	August 2014	\$341,077.62	\$352,194.15	23.5 miles	March 2017	Installation of 23.5 miles of wildlife-friendly fence. TNC's existing fence was in nearly non-functional condition with a portion consisting of sheep fence which can be harmful to wildlife. Conservation measure to be meet is to improve habitat and increase population by coordinating vegetation treatment with ongoing activities.
M Williamson Fence—Budget Amended 8/2/16	August 2014	\$242,740.71	\$237,942.71	16 miles	January 2017	Installation of 16 miles of wildlife-friendly fence. The majority of the fence was down, which resulted in poor grazing management. Williamson worked through CEHMM personnel and NRCS to create a grazing management plan which will result in better wildlife habitat.
Running N Fence (Clemmons)	August 2014	\$49,500.00	\$48,624.97	3.4 miles	September 2015	Installation of 3.4 miles of wildlife-friendly fence to allow for better herd management and better grazing practices to improve LPC habitat.
TNC DSM Removal	August 2014	\$258,000.00	\$11,222.55	1,059 acres	July 2017	1,059 acres of DSM were removed on the TNC ranch. Once the mesquite plant is dead, the skeleton of the plant is still a vertical structure and must be removed to actually deliver a conservation benefit for the LPC.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Project Cost</i>	<i>Units</i>	<i>Date Completed</i>	<i>Description</i>
Pheasants Forever, Inc—Amended 6/13/16*	August 2014	\$25,000.00	N/A	N/A	July 2017	Pheasants Forever has contracted with CEHMM for the assistance of one private lands biologist on a part time basis. CEHMM will coordinate their efforts with this biologist in order to meet conservation measures. Pheasants Forever refunded all funds on 7/10/17 and contract was terminated since no Biologist was hired into that position.
Weaver Burn Plan	August 2015	\$3,500.00	\$4,273.06	Entire Ranch	June 2017	A comprehensive prescribed fire burn plan for the entire 25,000 acres which make up the Weaver Ranch. Fire is an integral part of functioning grassland habitat. Fire has been shown to reinvigorate grassland health and subsequently create habitat patches needed throughout the lifecycle of the LPC
Mesquite Eradication	Not Specified	Not Specified	\$151,377.66	N/A	July 2017	(2) Compact Loaders (Track Steers), (2) 30' Gooseneck Trailers, (2) Brush Cutters, Root Grapple for post-project mesquite eradication in an effort to continue invasive species abatement on treated mesquite projects for habitat improvement.
Pheasants Forever, Inc (cancelled)	June 2016	\$25,000.00	N/A	N/A	N/A	N/A
Audubon NM—Engaging Community in Conservation	June 2016	\$440,000.00	\$243,864.25 + pending	N/A	In Progress	Audubon NM is focusing on education in the shortgrass prairie of eastern NM, targeting DSL and LPC. They will work with the school systems of Dora, Floyd, Elida, and Portales to establish a credited natural resource curriculum. Their plans are for two positions: coordinator and educator. Audubon and employees will also work with resource agencies and producers. This is a three phase program. Phase I and Phase II have been paid.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Project Cost</i>	<i>Units</i>	<i>Date Completed</i>	<i>Description</i>
Smith Ranch Water (Cancelled)	June 2016	\$19,657.63	Pending	1.1 miles of pipe-line	N/A	N/A
K. James Wildlife Water Amendment	June 2016/ Amended 2018	\$39,451.89	\$4,104.77 + pending	1.25 miles of pipeline, new trough, new LPC water	Pending	This water project will provide a safe water source for LPC and a water trough for cattle to utilize, which will assist the Participating Cooperator in grazing management. There will also be a windmill removed and replaced by a solar-powered pump. Approximately 1.25 miles of buried pipeline will be installed to plumb the new water sources. Some initial planning costs have been recorded, although the project will not break ground until a later date.
NMACD—Support for Partners Biologist	June 2016	\$47,819.00	N/A	N/A	September 2017	New Mexico Association of Conservation Districts has contracted with CEHMM for the assistance of two private land biologists on a part time basis. CEHMM will coordinate their efforts with these biologists in order to meet all conservation measures. This program will end in September of 2017. Their biologists did no work under this contract, as they relocated. No funds expended.
Bilberry Boundary Fence	July 2016	\$32,438.00	\$25,073.82	1.5 miles	March 2017	Installation of 1.5 miles of wildlife-friendly fence for better grazing management. Mr. Bilberry has been working with CEHMM and BLM in developing a rotational grazing program.
Coombes Boundary Fence 2 Atlee	July 2016	\$115,203.00	\$98,231.35	6 Miles	December 2017	Installation of 6.5 miles of wildlife-friendly fence to implement proper grazing rotation.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Project Cost</i>	<i>Units</i>	<i>Date Completed</i>	<i>Description</i>
Running N Interior Fence	July 2017	\$26,716.00	\$25,808.64	1.72 miles	January 2018	Installation of 1.72 miles of wildlife-friendly fence. Middle Sand Pasture is composed of 9 sections (approximately 5,800 acres). This project divided this pasture in half to better implement a rest/rotational management plan, which allows for better vegetation for LPC habitat.
Luman Boundary Fence	July 2016	\$131,381.00	\$106,306.98	6.5 miles	October 2017	Installation of 6.5 miles of wildlife-friendly fence to implement proper grazing rotation in LPC habitat.
Thomas Boundary Fence	July 2017	\$126,947.00	\$104,291.68	6.5 miles	September 2017	Installation of 6.5 miles of wildlife-friendly fence to implement proper grazing rotation.
Thomas Water 3	July 2016	\$27,659.00	\$21,285.37	1.75 miles	June 2017	A pithouse, submersible pump, and pressure tank were installed. Additionally a 75' electric line for the pump was installed and buried. 1.75 miles of pipeline to an existing tank will allow Mr. Thomas the ability to improve upon his grazing system as his watering facilities had historically been limiting.
Williamson Mohon Wildlife Water Repair	October 2016	\$32,220.00	\$63,791.95	N/A	February 2017	Repairs were made on wildlife waters on John Mohon and Betty Williamson to include new plumbing, concrete pads for stabilization, and enclosures to prevent cattle from damaging waters but allowing access for pronghorn, deer, and other wildlife.
ACEC DSM Removal (cancelled)	November 2016	\$144,425.00	\$302.60	1,140 acres	N/A	N/A

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Project Cost</i>	<i>Units</i>	<i>Date Completed</i>	<i>Description</i>
Mesquite Hand Treatment Active Leks #1	March 2017	\$897,876.85	\$882,330.29	3,514 acres	December 2018	Hand treat a half mile radius around seven active leks as mesquite appears to limit habitat for LPC. Eradication and removal of mesquite opens up habitat for lekking, nesting, and brood rearing.
Milnesand Office	July 2017	\$319,075.00	\$320,033.84	290 acres + buildings	May 2018	The purchase of 290 acres of LPC habitat which includes the District 2 office. Purchasing this acreage, and office allows on-the-ground support to enrollees in the area and the core of LPC habitat.
Mesquite Hand Treatment Active Leks #2 (cancelled)	August 2017	\$745,470.00	N/A	5,020 acres	N/A	Hand treat a half mile radius around an additional group of active leks as mesquite appears to limit habitat for LPC. CEHMM personnel is in the process of determining lek numbers and locations.
George Hay DSM Removal	August 2017	\$30,342.00	\$2,108.57	268.2 acres	October 2017	268.2 acres of DSM were removed on the Hay ranch. Once the mesquite plant is dead, the skeleton of the plant is still a vertical structure and must be removed to actually deliver a conservation benefit for the LPC.
Dan Fields DSM Removal	August 2017	\$90,540.00	\$2,322.17	595.5 acres	October 2017	595.5 acres of DSM were removed on the Fields ranch. Once the mesquite plant is dead, the skeleton of the plant is still a vertical structure and must be removed to actually deliver a conservation benefit for the LPC.
Peterson-Luman DSM Removal	August 2017	\$26,562.00	\$1,206.22	250 acres	October 2018	250 acres of DSM were removed on the Luman ranch. Once the mesquite plant is dead, the skeleton of the plant is still a vertical structure and must be removed to actually deliver a conservation benefit for the LPC.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Project Cost</i>	<i>Units</i>	<i>Date Completed</i>	<i>Description</i>
M Williamson DSM Removal	Funded August 2017/ Amended May 2018	\$41,996.13	\$7,154.61	450 (+482) acres	August 2018	932 acres of DSM were removed on the Williamson ranch. Once the mesquite plant is dead, the skeleton of the plant is still a vertical structure and must be removed to actually deliver a conservation benefit for the LPC.
Running N State- BLM Mesquite #2 (postponed, mesquite not in condition to treat)	June 2018	\$173,089.20	Pending	4,402 acres	Pending	Treatment of the encroaching mesquite will prevent it from moving into areas of DSL occupancy and from outcompeting the shinnery oak that the DSL relies on for habitat. Reducing or eliminating the mesquite can open up new areas for the LPC to use for cover, lekking, nesting, and brood-rearing.
Medlin Mesquite	June 2018	\$46,235.46	\$38,303.25	Budgeted 1,108 acres/ actual treatment 993 acres	July 2018	Aerial treatment of mesquite. Eradication and removal of mesquite opens up habitat for lekking, nesting, and brood rearing. After the nesting bird surveys were conducted, the treatment area was 993 acres.
Weinheimer Mesquite	June 2018	\$153,792.89	\$142,657.57	Budgeted 3,900 acres/ actual treatment 3,727 acres	July 2018	Aerial treatment of mesquite. Eradication and removal of mesquite opens up habitat for lekking, nesting, and brood rearing. After the nesting bird surveys were conducted, the treatment area was 3,727 acres.
Medlin DSM Removal	May 2018	\$90,276.34	\$13,693.77	2,000 acres	September 2018	2,000 acres of DSM were removed on the Medlin ranch. Once the mesquite plant is dead, the skeleton of the plant is still a vertical structure and must be removed to actually deliver a conservation benefit for the LPC. Eradication and removal of mesquite opens up habitat for lekking, nesting, and brood rearing.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Project Cost</i>	<i>Units</i>	<i>Date Completed</i>	<i>Description</i>
TNC Water	June 2018	\$52,830.44	\$45,880.15	N/A	4/30/19	Improved water points in a grazing regime, if managed correctly, can provide for improved habitat for all wildlife by conserving native vegetation species, as the operator will be able to rotate their herd and rest pastures in a more effective manner. This will also allow for the conservation of critical nesting/ brood-rearing habitat for the LPC. Provides a source of year round water to all wildlife including LPC.
Mohon Water Tanks	June 2018	\$19,369.24	\$12,345.37	N/A	4/30/19	Improved water points in a grazing regime, if managed correctly, can provide for improved habitat for all wildlife by conserving native vegetation species, as the operator will be able to rotate their herd and rest pastures in a more effective manner. This will also allow for the conservation of critical nesting/ brood-rearing habitat for the LPC. Provides a source of year round water to all wildlife including LPC.
M Coombes Water #1 North	June 2018	\$141,205.21	\$96,776.37	3,900' pipeline	7/28/19	Improved water points in a grazing regime, if managed correctly, can provide for improved habitat for all wildlife by conserving native vegetation species, as the operator will be able to rotate their herd and rest pastures in a more effective manner. This will also allow for the conservation of critical nesting/ brood-rearing habitat for the LPC. Provides a source of year round water to all wildlife including LPC.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Project Cost</i>	<i>Units</i>	<i>Date Completed</i>	<i>Description</i>
M Coombes Water #2 North	June 2018	\$59,911.47	\$40,886.02	N/A	7/28/19	Improved water points in a grazing regime, if managed correctly, can provide for improved habitat for all wildlife by conserving native vegetation species, as the operator will be able to rotate their herd and rest pastures in a more effective manner. This will also allow for the conservation of critical nesting/ brood-rearing habitat for the LPC. Provides a source of year round water to all wildlife including LPC.
Weinheimer Fence and Water	June 2018	\$89,395.41	\$45,589.42 + pending charges on water portion of project	3.25 miles fence/27 20' pipeline	Fence complete, water in progress	Improved water points in a grazing regime, if managed correctly, can provide for improved habitat for all wildlife by conserving native vegetation species, as the operator will be able to rotate their herd and rest pastures in a more effective manner. This will also allow for the conservation of critical nesting/ brood-rearing habitat for the LPC.
Weinheimer Interior Fence	June 2018	\$110,486.94	\$79,926.86 + pending	1.25 mile remove and replace/7.5 miles new	In Progress	Fencing improves grazing rotation which allows for the maintenance or improvement of LPC habitat.
Peterson-Buffington Fence Repair	June 2018	\$26,945.01	\$25,460.73	1.25 miles remove and replace/3 miles repair	December 2018	Repairs due to wildfire damage. Proper grazing management, without the fear of trespass grazing and the cooperation of the primary landowner and their neighbors, will benefit not only the LPC but all grassland flora and fauna by conserving native vegetation species to be used by all wildlife, while providing vital nesting/brood-rearing habitat for the LPC.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Project Cost</i>	<i>Units</i>	<i>Date Completed</i>	<i>Description</i>
M Coombes Boundary Fence-Removal North	June 2018	\$281,631.81	\$232,058.47	14 miles remove and re-place/6.5 miles remove, not re-placed	1/21/19	The old fence can be a hazard to the LPC and other grassland wildlife. These fencing improvements will greatly improve the enrollee's grazing management plan and prevent trespass cattle that would jeopardize the grazing plan in pastures that have been left to rest.
Grazing Workshop	June 2018	\$12,712.81	\$11,346.74	N/A	October 2018	Two workshops promoting adaptive grazing management, focused on managing through drought and utilizing adaptive grazing management strategies.
Leavitt and Hill Monitoring Plan	June 2018	\$60,343.01	\$44,850.29 + pending	N/A	In progress	This monitoring plan will account for estimating two important aspects of the biology of DSL: occupancy and demography. These two aspects account for the geographic spread (occupancy) and the population dynamics (demography) of populations throughout the range of the lizard. During the development of the monitoring plan for the DSL previous data collected will be evaluated and how detection probabilities, activity budgets, and field biologists influence output parameters. To determine the level of effort that will be required for high confidence regarding monitoring parameters, a power analysis will be conducted with the existing population and distribution data. These statistical tests will be conducted in GenPRES (Hines 2006) and the R programming environment.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Project Cost</i>	<i>Units</i>	<i>Date Completed</i>	<i>Description</i>
Grisham—Fire and Grazing	June 2018	\$289,773.00	\$1163,704.33 + pending	N/A	In progress	The study will assess the impact of prescribed fire and grazing on LPC habitat on three separate plots of land on the BLM ACEC.
Bresenham DSM Removal	February 2019	\$3,331.15	\$1,464.49	350 acres	February 2019	Eradicating and removing mesquite opens up habitat for LPC lekking, nesting, and brood-rearing. Once the mesquite plant is dead, the skeleton of the plant is still a vertical structure that must be removed in order to achieve the greatest conservation benefit for the LPC.
Technical Working Group Meeting	April 2019	\$15,400.00	\$3,830.17	N/A	May 2019	This project was approved and funded to allow experts in the fields of study of the DSL and the LPC to gather to discuss new and innovative project ideas. Projects that will be necessary for the continued recovery and conservation of both species will be developed from ideas generated in the meeting.
Bilbrey Water	August 2019	\$61,458.39	Pending	N/A	Pending	By improving infrastructure, the producer will be able to implement a more efficient grazing rotation. The new water points on the ranch will also provide many year-round sources of water to the wildlife in the area, including the LPCs.
Bud Bilberry Mesquite	August 2019	\$68,128.22	Pending	1,600 acres	Pending	Treatment of the encroaching mesquite will prevent it from moving into areas of DSL occupancy and from outcompeting the shinnery oak that the DSL relies on for habitat. Reducing or eliminating the mesquite can open up new areas for the LPC to use for cover, lekking, nesting, and brood-rearing.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Project Cost</i>	<i>Units</i>	<i>Date Completed</i>	<i>Description</i>
Running N Water	August 2019	\$65,540.96	Pending	N/A	Pending	By improving infrastructure, the producer will be able to implement a more efficient grazing rotation. The new water points on the ranch will also provide many year-round sources of water to the wildlife in the area, including the LPCs.
Running N Mesquite	August 2019	\$237,172.04	Pending	5,800 acres	Pending	Treatment of the encroaching mesquite will prevent it from moving into areas of DSL occupancy and from outcompeting the shinnery oak that the DSL relies on for habitat. Reducing or eliminating the mesquite can open up new areas for the LPC to use for cover, lekking, nesting, and brood-rearing.
Running N Boundary Fence	August 2019	\$86,158.77	Pending	Remove/ replace 4.25 miles	Pending	This project, along with the grazing management plan set in place by the landowner, will improve LPC habitat. Removing old, derelict fencing will eliminate a potential hazard for wildlife in the area. The new fence will also keep trespass cattle from damaging LPC habitat.
Mohon Interior Fence	August 2019	\$43,959.87	Pending	Remove/ replace 2.25 miles	Pending	The old fence can be a hazard to the LPC and other grassland wildlife. By improving infrastructure, the producer will be able to implement a more efficient grazing rotation.
Mohon Water	August 2019	\$35,887.25	Pending	N/A	Pending	By improving infrastructure, the producer will be able to implement a more efficient grazing rotation. The new water points on the ranch will also provide many year-round sources of water to the wildlife in the area, including the LPCs.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Project Cost</i>	<i>Units</i>	<i>Date Completed</i>	<i>Description</i>
G. Coombes Halo Boundary Fence	August 2019	\$218,779.65	Pending	Remove/ replace 12.5 miles	Pending	This project, along with the grazing management plan set in place by the landowner, will improve LPC habitat. Removing old, derelict fencing will eliminate a potential hazard for wildlife in the area. The new fence will also keep trespass cattle from damaging LPC habitat.
G. Coombes Halo Mesquite	August 2019	\$12,888.66	Pending	200 acres	Pending	Treatment of the encroaching mesquite will prevent it from moving into areas of DSL occupancy and from outcompeting the shinnery oak that the DSL relies on for habitat. Reducing or eliminating the mesquite can open up new areas for the LPC to use for cover, lekking, nesting, and brood-rearing.
G. Coombes Halo Water	August 2019	\$125,097.57	Pending	12.5 miles pipeline	Pending	By improving infrastructure, such as water and fencing, the producer is better able to implement a more efficient grazing rotation. The new water points on the ranch will also provide many sources of year-round water to wildlife in the area, including LPCs.
Mohon Boundary Fence	August 2019	\$78,313.76	Pending	Remove/ replace 4.25 miles	Pending	This project, along with the grazing management plan set in place by the landowner, will improve LPC habitat. Removing old, derelict fencing will eliminate a potential hazard for wildlife in the area. The new fence will also keep trespass cattle from damaging LPC habitat.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Project Cost</i>	<i>Units</i>	<i>Date Completed</i>	<i>Description</i>
G. Coombes Halo Interior Fence	August 2019	\$308,645.84	Pending	Remove/ replace 21 miles	Pending	This project, along with the grazing management plan set in place by the landowner, will allow for better rest/rotation of pastures, which allows for better vegetation for LPC habitat.
Davis Mercantile Historical Plaque/ Marker	August 2019	\$6,354.88	Pending	N/A	Pending	CEHMM personnel worked with the New Mexico State Historical Preservation Division to list the Davis Mercantile as an historical building. It was approved and listed in early 2019 as a Historical District with both the state and national historical society. Will place a historical roadside marker, and mount a historical plaque on the store to show the significance and history of the Davis Mercantile.
Weaver/Grasslans Water	August 2019	\$79,856.06	Pending	N/A	Pending	By improving infrastructure, such as water and fencing, the producer is better able to implement a more efficient grazing rotation. The new water points on the ranch will also provide many sources of year-round water to wildlife in the area, including LPCs.
Weaver/Grasslans Boundary Fence	August 2019	\$90,890.13	Pending	Remove/ replace 2.5 miles and re- pair 7.5 miles	Pending	This project, along with the grazing management plan set in place by the landowner, will improve LPC habitat. Removing old, derelict fencing will eliminate a potential hazard for wildlife in the area. The new fence will also keep trespass cattle from damaging LPC habitat.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Project Cost</i>	<i>Units</i>	<i>Date Completed</i>	<i>Description</i>
Weaver Mesquite	August 2019	\$36,432.55	Pending	837 acres	Pending	Treatment of the encroaching mesquite will prevent it from moving into areas of DSL occupancy and from outcompeting the shinnery oak that the DSL relies on for habitat. Reducing or eliminating the mesquite can open up new areas for the LPC to use for cover, lekking, nesting, and brood-rearing.
Lumen Tank	August 2019	\$10,300.43	Pending	N/A	Pending	By improving infrastructure, such as water and fencing, the producer is better able to implement a more efficient grazing rotation. The new water points on the ranch will also provide many sources of year-round water to wildlife in the area, including LPCs.
Pembers Mesquite	August 2019	\$67,172.14	Pending	1,600 acres	Pending	Treatment of the encroaching mesquite will prevent it from moving into areas of DSL occupancy and from outcompeting the shinnery oak that the DSL relies on for habitat. Reducing or eliminating the mesquite can open up new areas for the LPC to use for cover, lekking, nesting, and brood-rearing.
TNC Mesquite	August 2019	\$58,329.10	Pending	1,300 acres	Pending	Treatment of the encroaching mesquite will prevent it from moving into areas of DSL occupancy and from outcompeting the shinnery oak that the DSL relies on for habitat. Reducing or eliminating the mesquite can open up new areas for the LPC to use for cover, lekking, nesting, and brood-rearing. This ranch is prime LPC habitat, along with dunes occupied by DSL.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Project Cost</i>	<i>Units</i>	<i>Date Completed</i>	<i>Description</i>
DSL Population Viability Analysis Development	August 2019	\$29,250.00	Pending	N/A	Pending	This project will provide a predictive model of longevity for the Dunes Sagebrush Lizard. There are 4 steps that demonstrate how to attempt to complete this task; Initial Data Gathering, Population Viability Analysis Development, Population Viability Model Sensitivity Analysis, and Report Writing.
BLM ACEC DSM Removal	September 2019	\$21,741.51	\$2,362.26	950 acres	October 2019	Eradicating and removing mesquite opens up habitat for lekking, nesting, and brood rearing. Once the mesquite plant is dead, the skeleton of the plant is still a vertical structure and must be removed to actually deliver a conservation benefit for the LPC.
BLM Running N DSM Removal	September 2019	\$26,337.96	Pending	1,160 acres	Pending	Eradicating and removing mesquite opens up habitat for lekking, nesting, and brood rearing. Once the mesquite plant is dead, the skeleton of the plant is still a vertical structure and must be removed to actually deliver a conservation benefit for the LPC.
Project Totals		\$12,553,485.71	\$8,444,085.31			

**APPENDIX G:
Total Treatments for Life of the CCA/CCAA Program**

Total Treated for Entire Project	
Roads and Pads, Caliche Removal, and Reseeding (Acres)	159.20
Mesquite (Acres)	79,297.00
Dead, Standing Mesquite Eradication (Acres)	6,404.70
Yucca (Acres)	120.00

Conservation Benefits: Mesquite Removal

Conservation Benefits Mesquite Removal



Fragmentation and loss of habitat for the lesser prairie-chicken is considered a major cause for the decline in population of this grassland bird across their range.

Honey Mesquite (*Prosopis* spp.) is universally accepted as an invasive and highly competitive shrub that may readily encroach onto landscapes that did not historically support the species. This landscape has experienced intense disturbance or changes in natural ecological processes over a significant period of time. Through interspecific competition with other beneficial plant species, mesquite has increased in frequency, and subsequently led to a transition from grassland landscapes into shrub/grasslands which is less desirable for grassland birds, specifically lesser prairie-chickens (LPC). Research shows that LPC avoid areas with more than 1% mesquite canopy cover due to changes in vertical obstruction and conversion to shrub-dominated landscapes, which greatly limits desirable habitat for this species.

Mesquite outcompetes desirable grasses and forbs, thus reducing quality and quantity of nesting habitat for LPC. Removal or reduction of mesquite in lesser prairie-chicken habitat, followed with proper grazing management, can increase production and composition which will benefit grassland species.



Mesquite skeleton following a successful herbicide treatment.

CCA/A

Conservation Benefits: Mesquite Removal

LPC Biologist Highlight:

Blake Grisham, PhD, Texas Tech University

"Mesquite removal is most beneficial for lesser prairie-chickens in areas within 1–2 miles of existing, active leks. Contemporary evidence suggests mesquite encroachment in areas surrounding leks causes lesser prairie-chickens to constrain their space use to areas without mesquite. Also, and more importantly, mesquite dominated landscapes (>25% mesquite cover at any scale) are structurally different than grasslands, and research shows that lesser prairie-chickens select shrubs and grasses 15-25 inches tall for nesting and brood rearing activities. The benefits of mesquite removal for lesser prairie-chickens are maximized when the skeleton of treated plants are completely removed. Post-treatment care via managed grazing and prescribed fire is highly recommended to give beneficial grasses and forbs the competitive advantage over mesquite in treated areas over time. Beyond 1–2 miles of existing, active leks, targeting areas between active leks in sandy soils that contain mesquite is an excellent strategy to promote connectivity between active lek clusters across the sand shinnery oak ecoregion in New Mexico and Texas."



Conservation Benefits:

- ✓ Improved grasslands habitat for lesser prairie-chickens.
- ✓ Increase grasslands resiliency for drought conditions.
- ✓ Removes vertical obstruction.

CCA/A



CEHMM's Approach to Mesquite Control

- Aerial herbicide
- Hand application of herbicide

Aerial application is the least expensive method to control mesquite because large areas with high densities can be treated. The ability to perform aerial applications is limited by plant health, precipitation, temperature and wind speed. Certain thresholds within these limitations must be met to ensure that the treatment will be successful.

Hand application may be performed at any time of the year. This method produces a higher percent kill of individual plants due to the ability of directly applying the chemical to each plant. Cost per acre is appreciably higher than aerial applications and smaller areas with lower densities must be targeted.

CEHMM's Approach to Removal of Dead Standing Mesquite

- Shredding-Mowing

Once the mesquite plant is dead, the skeleton of the plant is still a vertical obstruction and must be removed to actually deliver a conservation benefit for the LPC. CEHMM returns to past herbicide treatments and removes the dead standing mesquite.



To learn more about CCA/A assistance, contact your local CEHMM office:

District 1 – 575-885-3700

District 2 – 575-875-2324

Visit us at www.cehmm.org

Conservation Benefits: Mesquite Removal

Conservation Benefits: Grazing Management

Conservation Benefits Grazing Management



CEHMM recognizes the mutual benefit between sustainable grazing and lesser prairie-chickens. Collaboration between enrollees and the efforts of the CCA/A via technical and financial assistance leads to improved grassland health.

The lesser prairie-chicken (LPC) occupies four ecoregions in the Great Plains. In eastern New Mexico and west Texas, this region is known as "Sand Shinnery Oak Prairie" (SSOP) and is dominated by shinnery oak, sand/big-bluestem, little bluestem, sand drop seed and sand sagebrush. Ranching is the most common use of this large expanse of land. Grazing as a conservation tool for the LPC is an essential management component as this endemic species has evolved with large bovines for centuries. SSOP is the southernmost extension of the LPC range; the warmest and driest ecoregion of the four ecoregions. Sustainable grazing practices have been identified by Center of Excellence (CEHMM) and US Fish and Wildlife Service (FWS) as a top priority to insure adequate habitat for all life stages of the LPC.



CCA/A



Benefits of Sustainable Grazing

- Improved rangeland for wildlife and ranching operations.
- Improved quality and quantity of forage.
- Heterogenic landscapes for all grassland species.
- Drought resiliency.

Conservation Benefits: Grazing Management

Range Conservationist Spotlight:

CEHMM District 2
Josh Ricklefs

Sustainable Grazing and the Lesser Prairie Chicken

"Grazing practices utilizing a rest/rotation pattern, paired with stocking rates that the land is capable of supporting, promote habitat for the lesser prairie-chicken, while also allowing ranchers to sustain and improve rangeland health. Sustainable grazing practices leave residual vegetation of sufficient height and density that the lesser prairie-chicken can utilize for nesting, brood-rearing, and concealment from potential threats. This also helps the rancher by acting as a drought contingency plan, as the rangeland will be in better condition when a drought event occurs. The vegetation will also be more resilient and will be able to respond better once drought conditions end. Through vegetation monitoring, CEHMM can analyze trends along with current rainfall data to assist ranchers in planning for these events. Improved and new infrastructure via projects through CCA funding also allows the rancher to implement sustainable grazing practices to the benefit of both the rancher and the lesser prairie-chicken."



The dunes sagebrush lizard, a species of concern, is a secondary beneficiary of sustainable grazing. Attention to the treatment of their very specialized habitat and ability to survey on private lands has increased survey numbers and knowledge in this species.

Photo courtesy of Mike Hill

CCA/A

Sustainable grazing practices are addressed in the Candidate Conservation Agreements and Agreements with Assurances (CCA/CCAA). The voluntary Certificate of Participation (CP) and Certificate of Inclusion (CI), which applies to enrolled ranches on federal, state and/or deeded lands, partially includes:

- ✓ Improving or maintaining conservation lands.
- ✓ Designing grazing plans to meet habitat specific goals for individual ranches that may include stocking rates, rotation patterns, grazing intensity and duration, and contingency plans for varying prolonged weather patterns including drought.
- ✓ Utilizing no more than 45% of current year's forage growth.
- ✓ Consultation with CEHMM prior to using herbicide treatments on shinnery oak due to impacts upon LPC and the dunes sagebrush lizard (DSL). Post-treatment grazing management is essential for success. Grazing by any livestock will be deferred during the growing season for at least the two consecutive years following treatment.



CEHMM works with enrollees on grazing plans, improving infrastructure and monitoring vegetation. CEHMM, with approval from the Candidate Conservation Ranking Team, offers assistance on such practices as brush management, water development, prescribed fire, fencing, and defragmentation through road and well pad reclamation.

CEHMM monitors vegetative components of LPC habitat on the enrolled livestock operations to determine habitat improvement, static levels, or decline in habitat by using standard protocol methods:

- ✓ Forage utilization cages.
- ✓ Determination of composition and cover of forbs, grasses and woody plants through established grazing monitoring methods.
- ✓ Establishing photo points to view trends.

To learn more about CCA/A assistance, contact your local CEHMM office:

District 1 – 575-885-3700

District 2 – 575-875-2324

Visit us at www.cehmm.org

Conservation Benefits: Grazing Management

APPENDIX J
Monitoring Report



CEHMM

505 North Main Street, Carlsbad, NM 88220 • 575-885-3700 • www.cehmm.org

**Lesser Prairie-Chicken and Dunes Sagebrush Lizard
Candidate Conservation Agreement Program**

Monitoring Report



August 2018

Table of Contents

Introduction	1
Projects Completed	2
Mesquite Treatment	2
Windmill to Solar Conversions and Establishment of New Water Sources	6
Construction and Removal of Fence	8
Monitoring Methods	9
Species Monitoring	9
LPC surveys	9
DSL Surveys	10
Habitat and Grazing Monitoring	12
Conclusion	14
Comparison of Pre and post results	14
Benefits to species and fulfillment of CCA/A for each project type	15
Path forward	16

Executive Summary

The Candidate Conservation Agreement (CCA) and Candidate Conservation Agreement with Assurances (CCAA) for the Lesser Prairie-Chicken (LPC) (*Tympanuchus pallidicinctus*) and Dunes Sagebrush Lizard (DSL) (*Sceloporus arenicolus*) (USFWS et al. 2008) in New Mexico allow the US Fish and Wildlife Service (FWS), the Bureau of Land Management (BLM), and the Center of Excellence (CEHMM) to work in cooperation and consultation with private land owners and industry in support of conservation measures for the LPC and the DSL. Projects completed through the CCA/A Program include mesquite treatments, windmill to solar conversions and establishment of new water sources, and construction and removal of fences.

Post-monitoring results show that chemical mesquite treatments alone may not be beneficial to the LPC or the DSL, as no increase in either species was observed. Although chemical applications have improved since the inception of the CCA/As and implementation of the projects completed, CEHMM anticipates coupling future chemical treatments with removal of “skeleton” mesquite, which appears to have a more immediate benefit to the LPC.

In 2013 and 2018, CEHMM held Strategic Priority Meetings. Attendees included LPC researchers and local producers. The consensus was that grazing, drought, and habitat fragmentation were primary concerns for LPCs, with grazing management identified as a prevalent matter of concern. It was determined that these concerns can be addressed through proper grazing management. By implementing fence and water projects, producers are better equipped to avoid over-utilizing the land by preventing trespass cattle and implementing a rest/rotation plan to graze areas previously unusable due to a lack of infrastructure. Post-monitoring results show increases in LPC in areas surrounding fence and water improvements, although neither showed an increase in DSL.

In 2018, the New Mexico Department of Game and Fish reported a 17% increase in LPC numbers. This increase in numbers may be attributed to the improvements in habitat conditions through conservation efforts such as the CCA/As, above average precipitation, and increased survey efforts. Based on initial monitoring efforts combined with increased LPC numbers, we anticipate conducting similar conservation efforts throughout the lifespan of the CCA/A agreements.

Introduction

The Candidate Conservation Agreement (CCA) and Candidate Conservation Agreement with Assurances (CCAA) for the Lesser Prairie-Chicken (LPC) (*Tympanuchus pallidicinctus*) and Dunes Sagebrush Lizard (DSL) (*Sceloporus arenicolus*) (USFWS et al. 2008) in New Mexico allow the US Fish and Wildlife Service (FWS), the Bureau of Land Management (BLM), and the Center of Excellence (CEHMM) to work in cooperation and consultation with private land owners and industry in support of conservation measures for the LPC and the DSL, which were warranted for listing under the Endangered Species Act of 1973, as amended (16 U.S.C. § 1531, et seq.). CCAs:

- Develop, coordinate, and implement conservation actions, which reduce and/or eliminate known threats to the LPC and DSL in New Mexico on federal, state, and private surface and minerals;
- Support ongoing efforts to re-establish and maintain viable populations of both species in currently occupied and suitable habitats; and,
- Encourage development and protection of suitable LPC and DSL habitat by giving Participating Cooperators incentives to implement specific conservation measures.

Under the CCA, federal lessees, operators, or permittees that join by voluntarily signing a Certificate of Participation (CP) receive a high degree of certainty that additional restrictions would not be placed on their otherwise legal activities if either species is listed. The companion Candidate Conservation Agreement with Assurances (CCAA) provides incentives for voluntary conservation of species-at-risk on non-federal lands. Under the CCAA, the lessee, owner or permittee voluntarily commits to implement specific conservation measures on non-federal lands for the species by signing a Certificate of Inclusion (CI). Under the CCAA, if either species is listed, private landowners receive assurances that additional restrictions would not be placed on their otherwise legal activities. Without regulatory assurances, landowners may be unwilling to initiate conservation measures for these species. In both cases, signing up for the CCA or CCAA is voluntary.

CEHMM is the Federal permit holder for these agreements and is responsible for implementing, monitoring, and reporting on projects completed with CCA/A funds. CEHMM is a 501(c)(3) non-profit corporation based in Carlsbad, New Mexico. CEHMM's participation allows for a federally approved, independently audited financial management system to provide for fund management and administration.

Since the inception of the CCA and CCAA in New Mexico, projects have been completed with the goal of improving and restoring habitat and reducing threats for both species. The scope of projects completed with funding gained by industry participants includes mesquite (*Prosopis glandulosa*) treatment, windmill to solar conversions and establishment of new water sources, construction and removal of fences, and reclamation of sites once occupied by oil and gas infrastructure (roads and pads). Baseline data for forage utilization and vegetative attributes related to LPC habitat has been collected throughout the life of the CCA/As. The projects completed, conservation measures in the CCA and CCAA, and data collected are related to the Bureau of Land Management's (BLM) "2008 Special Status Species Resource Management Plan Amendment" (RMPA), which set minimum requirements to Federal activities after approval. The CCA and CCAA include additional conservation measures beyond those included in the RMPA that will benefit both species. In this report, we examine a subset of completed projects to determine benefits to the two species and achievement of conservation measures implemented through the agreements. We have chosen to discuss projects that have no less than two years of post-completion monitoring data; one year of post completion monitoring data is insufficient to derive trend data to determine if the project is truly benefitting the species. More than two years of monitoring may be necessary to understand the long-term benefit of the project due to environmental factors such as drought, wildfire, or historical overgrazing or other anthropogenic disturbances.

Projects Completed

Mesquite Treatment

Projects

Habitat fragmentation, a decline in forage availability, and a perceived higher predation risk associated with woody encroachment can affect nesting site locations, with female LPC avoiding areas with even low to medium tree density (Lautenbach et al. 2017). CCA/A funded research determined that, where present, mesquite canopy in occupied LPC habitat does not exceed 15% (Boggie et al. 2017). Reducing the amount of mesquite on the landscape reduces interspecific competition between herbaceous plants, native shrubs (e.g., sand sage and shinnery oak), and mesquite. Brush, including mesquite, uses water not accessible to grasses and forbs, so its removal will generally encourage production of grasses and forbs (Jones and Gregory 2008). Chemical treatments, along with mastication, have been used to reduce vertical structure and restore grasslands to a state in which LPC evolved. By clearing mesquite, grasses and forbs that LPC rely on for all life cycles should become more productive and habitat should convert from a shrub-dominated landscape back to a native prairie. Below we examine results of four aerial chemical treatments (Sims, Berry, Bogle, and Caviness) and one hand treatment (Field) conducted through the CCA/A Program.

With the exception of the Sims and Fields projects, all of the mesquite treatments were at least partially located in NM DSL range (Laurencio and Fitzgerald 2010). Mesquite and grass provide higher vegetative cover than is typical of blowouts suitable for DSL (Neville et al. 2007). Loggerhead Shrikes (*Lanius ludovicianus*) have been observed using mesquite to impale DSL on the thorny branches (Neville et al. 2007). Although the true impact of mesquite treatment to DSL is not fully understood, treatments benefit DSL based on these observations. The four aerial treatments were completed using Dow Agrosience's Remedy/Reclaim mixture with electrostatic technology. Electrostatic technology involves using a 200-micron charged droplet that binds to moisture or living tissue (G. Alpers, 2018, pers. comm.).

In June 2011, CEHMM aerielly treated 2,560 acres of mesquite on the Sims Ranch. The goal of the Sims project was to remove mesquite and increase grass production so that cattle could be concentrated outside shinnery oak dunes, which provide habitat for the LPC and the DSL. Johnson et al.'s map (2016) shows this area is suitable DSL habitat, with contiguous tracts of blowouts with moderate to high connectivity in between. In 2007, prior to treatment, LPC were documented on the Sims Ranch. DSLs were first documented on the ranch in 1995 and were most recently observed in 2011.

Approximately 12,000 acres of mesquite were aerielly treated on the Berry Ranch in June 2011. At the time of treatment, there were three active and two historic leks within three miles of treatment areas on the Berry Mesquite project. An active lek is defined as one that has been documented within the previous five years and has two or more males strutting during mating season (DOI 2008). Historic leks are defined as observed leks inactive for the past five or more years. DSL were not present in the treatment area at the time this project was funded (2011), although DSL were confirmed less than a half mile from the perimeter of the treatment in 2006. As defined by Johnson et al. (2016), there are blowouts and suitable DSL habitat in the area that was treated, although connectivity to suitable habitat is minimal (less than 50 acres). By removing the mesquite, native grasses should thrive and naturally restore the native prairie habitat that LPC prefer. Increasing the suitability of unoccupied habitat by keeping mesquite from encroaching onto suitable habitat was the goal of the project in relation to DSL.

The vast majority of the Bogle Mesquite project, completed in 2011, was within the Sparse and Scattered Population Area referenced in the RMPA, adjacent to one Habitat Evaluation Area (HEA), and within three miles of one historic lek. A significant portion of the treatment was also within the DSL range in NM (Laurencio and Fitzgerald 2010). The treatment area bordered suitable DSL habitat and connectivity zones varying from broad to highly restricted (Johnson et al. 2016). Johnson et al. (2016) also identified patches of suitable DSL habitat in the northern portion of the treatment with areas in between classified as shin oak-mesquite duneland. DSL were identified 52 times either in or within a half-mile of the treated area prior to completion of the spray in June 2011. The entire treated area encompassed 44,807 acres, although only 12,500 of the total acres were funded through the CCA/A in a cost share with the BLM, Natural Resources Conservation Service (NRCS), and Participating Cooperator.

In June 2014, 4,373 acres of mesquite were treated for the Caviness Aerial Mesquite project. There were nine historic leks within three miles of the treated area, which was also less than three miles from four HEA's. Suitable and occupied DSL habitat on the Little Lake and Maljamar South Allotments of the Caviness Ranch is located between areas of similar habitat but with heavy mesquite presence. Removing the mesquite would reduce the potential impacts from shrub encroachment into the occupied habitat. As mesquite trees increase in an area, sand is deposited in a manner not conducive for sand dune blowouts and leads to changes in the local vegetative and soil characteristics. Removing the existing mesquite would increase the suitability of the surrounding areas over time. Conserving existing occupied habitat and increasing the suitability of unoccupied habitat were the goals of the project in relation to DSL. Prior to the treatment (2005-2011) there were eight confirmed DSL within a half mile of the treated area.

The 507 acres of mesquite on the Field Ranch was chemically treated by hand in 2015. LPC were observed on the Fields property in 2014, and the ranch borders one other enrolled ranch with documented LPC. It is not located within the DSL polygon. 595 acres of mesquite were treated, and removal of the dead-standing structure occurred in late 2017 via mastication.

Mesquite Treatment Results

LPC and DSL surveys for the Sims mesquite project were conducted after the project was completed. LPC were documented in 2007 on the ranch. No LPC have been detected during four seasons (2015-2018) of surveys since the completion of the project. Prior to treatment, DSL were present in other areas of the ranch. DSL surveys that took place on the ranch in 2011 (after the treatment) resulted in two confirmations of the species in suitable dunes that were grazed less intensely because of the mesquite treatment.

Prior to the Berry Mesquite Treatment in 2011, there were three active and two historic leks within three miles of the treatment area. DSL were also confirmed within a half-mile of the treatment perimeter in 2011. LPC and DSL surveys were conducted following the treatment. During four seasons of surveys (2015-2018), no leks were heard on the ranch or within the treatment area. In February 2015, an LPC sighting was reported to CEHMM within the treatment area, but no leks were observed on the ranch or adjacent enrolled properties during surveys that year. DSL surveys conducted of the treated area in 2011 (post-treatment) were also negative, but DSL were documented just over half a mile from the perimeter of the treated area that year.

Previous DSL surveys within a half mile of the Bogle Mesquite project resulted in 65 positive identifications of DSL. In 2014, species surveys performed by CEHMM after the treatment resulted in two DSL being confirmed within a half-mile of the boundary of the treatment area. Thirteen additional positive DSL identifications (taken from <https://nhnm.unm.edu/data/citation>) within a half mile of the treated area were made by other parties that conducted surveys for the species following the treatment (2011-2012). LPC surveys on the ranch in 2012

(post-treatment) indicated one previously undocumented lek located within three miles of the treated area. Other LPC surveys completed by CEHMM in 2016 and 2017 within the treated area were negative.

There have not been any DSL surveys conducted by CEHMM on the Caviness ranch since the treatment, but other parties confirmed three DSL within a half mile of the treatment area (taken from <https://nhnm.unm.edu/data/citation>) following the treatment in 2014. These identifications were made in what Johnson et al. (2016) refer to as a disturbed blowout. Six of the eight positive DSL identifications made between 2005 and 2011 were in a disturbed blowout, and the other two were made in blowouts within shin oak duneland as described by Johnson et al. (2016). Although the treatment was within the NM DSL range (Laurencio and Fitzgerald 2010), habitat suitable for DSL occupancy was not abundant in the treatment area (approximately 15% of the treated area). The two patches of suitable habitat were separated by what Johnson et al. (2016) refer to as grassland, mesquite shrubland, mesquite, and shin oak-mesquite shrubland. As referenced previously, this treatment was conducted with the goal of preventing encroachment of mesquite onto soils suitable for DSL. LPC surveys for three seasons (2014, 2017 and 2016) within the treated area resulted in no detections of leks or observations of LPC.

DSL have not been detected on the Fields ranch since treatment. However, in 2017, two years after treatment occurred, two new leks were discovered within one mile of the treatment area. In 2014, prior to treatment, LPC were recorded on the ranch through call surveys, and eight LPC were visually recorded during those surveys.

Table 1 shows forage monitoring results of the mesquite treatments described above with at least two years of post-completion data. Canopy gap refers to the amount of mesquite canopy that is present on the landscape. For example, if a 100-foot line transect is intersected by mesquite for 10 feet, the canopy gap is 10 percent. If more than one mesquite tree intersects the transect, the total footage of all mesquite that intersects the tape is summed and divided by the total length of the transect in feet to determine the percent of canopy. Forage utilization data was collected and conservation measures described in the CCA, CCAA, and RMPA were achieved on all four ranches.

Mesquite canopy is increasing in the areas treated. Environmental factors such as wind speed, health of the target species, changes in topography on the landscape, and other unknown parameters at the time of the treatment may affect treatment results. As technology has advanced, so has the effectiveness of aerial treatments. In 2010, Sendero[®] was introduced and increased the average kill of mesquite by 10%, and in 2014 adding eight ounces of Remedy[®] to Sendero[®] increased the average kill another 15% (G. Alpers, pers. comm., 2018). Greg Alpers (pers. comm., 2018) stated that methods previously used originally provided an average 50-55% kill on mesquite, and the latest methods kill, on average, 80% of mesquite. At the time of the four aerial treatments discussed, Sendero[®] was not authorized for use on BLM lands; however, it has since been approved for use. It should also be noted that mesquite control using the methods in the Sims, Berry, Bogle, and Caviness aerial mesquite treatments are most effective in eastern New Mexico when precipitation between January 1 and June 1 is at least three inches (Duncan and McDaniel 2015). Data obtained from the National Oceanic and Atmospheric Administration (retrieved July 28, 2018) indicates that precipitation did not amount to three inches in 2011 and 2013 during these months in Chaves, Eddy, and Lea Counties. Figure 1 is an illustration of aerial mesquite treatment results.

Table 1: Forage utilization and mesquite canopy gap data on mesquite projects with two years of post-completion monitoring data that have been completed through CEHMM and the CCA/A.

Project Name	Spray Method	Date Completed	Post-Treatment Canopy Gap (1st year data)	Post-Treatment Canopy Gap (2nd year data)	Forage Utilization
Sims Mesquite	Aerial	6/30/2011	4.09 (2016)	7.7 (2017)	Achieved
Berry Mesquite	Aerial	6/30/2011	5.79 (2016)	6.28 (2017)	Achieved
Bogle Mesquite	Aerial	6/30/2011	5.39 (2016)	8.36 (2017)	Achieved
BLM Caviness Mesquite	Aerial	6/30/2014	3.68 (2016)	7.63 (2017)	Achieved
Field Mesquite	Hand followed by mechanical removal.	1/15/2015	10.08 (2016)	0.75 (2018)	Achieved

In addition to monitoring mesquite canopy, CEHMM also monitored canopy of grasses and forbs. All treatments showed increases in either bunchgrass or forb canopy. The increase in bunchgrasses gives LPC the opportunity to select better nesting sites, while forbs provide a valuable food source in Spring and Summer (Davis et al. 1979). Table 2 shows the percentage of canopy change from 2016 to 2017 for bunchgrass and forbs in relation to each project. Data was not collected for the Sims mesquite project in this category in 2017; however, monitoring for this attribute will take place in 2018.

Table 2: Change in grass and forb canopy percentages on mesquite projects with two years of post-completion monitoring data that have been completed through CEHMM and the CCA/A. Change is from the first year data was collected, to the second.

Project Name and Years Data was Collected	Percent Change in Canopy	
	Grasses	Forbs
Berry Mesquite (2016, 2017)	31%	1%
Bogle Mesquite (2016, 2017)	25%	1%
Caviness Mesquite (2016, 2017)	7%	-17 %
Field Mesquite (2016, 2018)	-23%	31%



Figure 1: Aerial mesquite treatment taken in September 2011 approximately two months post treatment (left photo), and in October 2016 five and a half years post treatment (right photo). Arrows indicate reference points.

Windmill to Solar Conversions and Establishment of New Water Sources

One of the key issues facing native grasslands in Eastern New Mexico is water availability. Concerns pertaining to livestock grazing are discussed in the CCA and the CCAA. Because water sources are a limiting factor in livestock management, it is essential to provide producers the ability to develop reliable and well distributed watering points to aid in the management of livestock in a fashion that creates suitable LPC habitat. Installing new stock tanks, wildlife waters, pipelines and water storage tanks on enrolled ranches provides critical water sources that allow ranch and livestock managers to utilize the landscape in a more efficient manner. These water sources are not only critical to providing suitable habitat but may also serve LPC in times where diet and surface water dependent on precipitation is not adequate for hydration. All troughs were outfitted with escape mechanisms, per CCA/A requirements, to eliminate risks of LPC and other wildlife from drowning when utilizing these troughs.

In 2013, CEHMM held a strategic meeting where researchers identified grazing as the primary concern for LPCs. In order for producers to effectively graze to benefit LPCs, infrastructure must be in place to ensure adequate rotation of cattle. This infrastructure includes fences and waters, which allow for better rotation of cattle, which in turn promotes the health of the rangeland and improves habitat for the LPC. Because of these discussions and conclusions by experts, the ranking team funded water projects as a priority for the species. In 2018, a similar meeting was held, and researchers again determined that grazing/rangeland health was a primary concern.

Water projects were implemented on six enrolled ranches that had inadequate water due to disrepair of stock tanks or old and inefficient windmill pumps on wells, which in most cases meant that certain areas of the ranches didn't have water. Due to these limitations in water, overgrazing of areas with sufficient water was an issue. Water projects help to improve grazing distribution, relieving grazing pressure on previously overgrazed areas. Installation of these water sources allows enrollees to graze pastures more efficiently, which allows ample residual vegetation that LPC prefer for nesting and brood rearing to be left on the landscape. These more efficient watering systems gave these enrollees the ability to give growing season rest to pastures that may not have received it in the past. Grazing management plans that have been provided to CEHMM indicate that

ranches where these projects were completed will have rest periods during the growing season or will destock pastures if the potential for overutilization of forage exists. The M. Williamson, Running N, Bilbrey Solar, Mathis Water, McCloy Water, and Luman Drinker Repair projects replaced old and/or provided watering facilities for cattle and wildlife to safely access. Each of the ranches were suffering from areas of overutilization. This meant that suitable and potentially suitable LPC habitat was being degraded and, if not corrected, could be lost to the LPC on the ranches. After speaking with the producers, it was determined that one of the main causes of this overutilization was inadequate water distribution.

The conversion from windmill pumps to solar pumps, which are more reliable and efficient, also allows for the reduction of manmade vertical obstruction and perches for raptors that may prey on LPC. Removing these structures will reduce avoidance in areas that LCP use and increase the amount of habitat that can be used, as the LPC tends to avoid areas with tall, vertical structures that may provide hunting perches for predators (USFWS et al. 2008)

The M. Williamson Water, Bilbrey Solar, and Running N Solar projects all involved removal of windmills, and installation of solar pumps. In the case of the M. Williamson and Bilbrey properties, the solar conversion and associated tank projects provided a more reliable source of water for rest/rotation patterns. The Running N solar conversion brought more reliable, year-round water to critical areas of the ranch, which allowed for more efficient grazing, while also benefitting wildlife.

The M. Williamson, Bilbrey, and McCloy properties all had documented recent and historic leks present within one mile prior to implementation of these projects, and leks were documented in the same area as recently as 2017. The Mathis property had documented recent and historic leks present within one mile prior to the implementation on the project, with the most recent survey in 2016 (the year of project completion) showing the leks were still present. The Luman property had multiple recent and historic leks within one mile prior to project the implementation of the project, with the most recent survey in 2017 showing leks were still present in the area. These ranches are all located in CHAT 1. A portion of the Running N property falls within the DSL range identified by Laurencio and Fitzgerald (2010). Johnson et al. (2016) identified suitable DSL habitat and blowouts outside of the connectivity model on this property, and DSL were detected on the Running N (in the areas identified as suitable habitat) and Mathis properties in 2011 and 2008, respectively. The Mathis property contains suitable habitat with connectivity models ranging from highly restricted to broad (Johnson, et al. 2016).

Windmill to Solar Conversions and Establishment of New Water Sources Results

By implementing these water projects, the enrollees were able to avoid over utilizing critical habitat areas by improving their rest/rotation plans, while meeting the grazing standards set by the CCA/CCAA. Forage utilization data prior to project completion is not available; however, forage utilization and vegetative habitat component data was and will continue to be collected to determine if conservation measures were achieved. All six ranches achieved their conservation measures for utilization and habitat components. Ranches are on a three-year rotation for this type of monitoring, so a second round of data will be collected when they come up in the rotation. Vegetation monitoring will also be conducted during these same years.

Species surveys were also conducted before and after project implementation. All projects listed have historic or active leks present on the property, as shown in Table 3. Before projects were completed there were 43 active and 10 historic leks within three miles of the project areas. Since the completion of these projects, 57 new or previously undocumented leks have been discovered. DSL were detected on the Running N and Mathis properties in 2011 and 2008, respectively prior to project completion.

Table 3: Water projects that have been completed through CEHMM and the CCA/A.

Water Projects			
Project Name	Date Completed	Leks ¹	DSL
M. Williamson Water	2/16/2016	19 A, 17 N	N/A
Bilbrey Solar	7/31/2015	9 A, 10 N	N/A
Mathis Water	1/29/2016	3 H, 8 A, 5 N	Detected, 2008
McCloy Water	8/7/2015	1 H, 3 A, 8 N	N/A
Luman Drinker Repair	5/14/2015	3 H, 3 A, 11 N	N/A
Running N Solar	9/25/2015	3 H, 1 A, 6 N	Detected, 2011

1: Number of leks within 3 miles of project area; A = Active prior to completion of project, N = New or previously undocumented leks since project completion, H = Historic leks.

Construction and Removal of Fence

In 2013 and 2018, CEHMM held Strategic Priority Meetings where researchers and producers identified drought and habitat fragmentation as primary concerns for LPCs. Both of these concerns can be addressed through proper grazing management. In order for producers to effectively graze to benefit LPCs, infrastructure must be in place to ensure adequate rotation of cattle. This infrastructure includes fences and waters, which allow for better rotation of cattle, in turn promoting the health of the rangeland and improving habitat for the LPC. Because of these discussions and conclusions by experts, the ranking team funded fence projects as a priority for the species.

Many enrolled properties contain inadequate and derelict fencing, which allow for trespass cattle to potentially graze these pastures and contribute to habitat decline. Trespass livestock negatively affects LPC by overgrazing pastures, leading to degradation of vegetation that LPC rely on for nesting and brood rearing. In addition to preventing trespass livestock with boundary fences, interior fence projects benefit LPC by giving livestock managers the opportunity to implement grazing management plans that allow for rest periods on pastures that they were not able to provide with previous setups. LPC habitat quality increases during these rest periods because vegetation is given more time to recover from grazing pressure.

Studies in previous years have shown that fence collisions were a major cause of mortality for LPC (Wolfe et al. 2007). However, more recent studies have shown that mortalities due to fence collisions are much lower than previously thought and are not significant, especially in areas with larger pastures and lower fence density, such as in Western Kansas and Eastern New Mexico (Robinson et al. 2017).

The M. Williamson, McCloy, and Running N properties were suffering from areas of overutilization. This meant that suitable and potentially suitable LPC habitat was being degraded and, if not corrected, could be lost to the LPC on the ranches. Additionally, the M. Williamson property was suffering from trespass cattle utilizing areas that were designated to be rested. A major cause of this over-utilization was due to inadequate fencing. Grazing management plans for these enrolled ranches indicate planned periods of rest during the 2018 growing season.

All three ranches had documented recent or historic leks on the property, with the Williamson and Running N properties still showing active leks as recently as 2018. The McCloy property was last surveyed in 2017 and active leks were present. They are all located in CHAT 1. DSL were detected on the Running N in 2011.

Construction and Removal of Fence Results

Just as on the water projects, forage utilization data before projects were completed is not available; however, forage utilization and vegetative habitat component data was and will continue to be collected to determine if conservation measures were achieved. All three ranches achieved their conservation measures for utilization and habitat components post-completion. Ranches are on a three-year rotation for this type of monitoring, so a second round of data will be collected when they come up in the rotation.; however, vegetation monitoring will be conducted annually post-completion. By implementing fence projects, the producers are better equipped to avoid over-utilizing these areas by preventing trespass cattle and implementing a better rest/rotation plan to graze areas previously unusable due to a lack of infrastructure, which in turn gives rest to these previously over-utilized areas.

LPC surveys were conducted by CEHMM or other agency personnel on all properties prior to project implementation. LPC surveys were conducted each year following project completion on all ranches. All projects listed have historic or active leks present on the property, as shown in Table 4. Before projects were completed there were 23 active and 4 historic leks within three miles of the project areas. Since the completion of these projects, 31 new or previously undocumented leks have been discovered. DSL were detected on the Running N property in 2011, prior to project completion.

Table 4: Fence projects that have been completed through CEHMM and the CCA/A.

Fence Projects			
Project Name	Date Completed	Leks ¹	DSL
M. Williamson Fence	1/17/2017	19 A, 17 N	N/A
McCloy Fence	9/25/2015	1 H, 3 A, 8 N	N/A
Running N Fence	9/25/2015	3 H, 1 A, 6 N	Detected, 2011

¹: Number of leks within 3 miles of project area; A = Active, N = New or previously undetected since project completion, H = Historic.

Monitoring Methods

Species Monitoring

All species monitoring for the above projects was completed utilizing the methods described below for the LPC and DSL.

LPC surveys

LPC surveys were conducted through roadside, lek, and call surveys. Roadside and call surveys were conducted on enrolled ranches.

Roadside surveys were conducted in an attempt to locate lek sites. Surveyors drove a predetermined road and stop every mile to conduct the survey. Upon arrival at a survey point, surveyors turned vehicles off and exited to listen for LPC for ten minutes. If no LPC were heard at the initial stop, the surveyors returned to the vehicle, proceeded one mile along the planned route, stopped and listened again. If at any of the survey points, LPC

were heard and not in the direction of the next survey point, then the surveyor attempted to get in near proximity of the lek to get a location of the lek and a count of the birds in attendance. If LPCs were heard and in the same direction of the next survey point the surveyors will drive to the next point and conducted the survey at that location. If the LPCs were near this location the surveyor approached the lek as described above. Roadside surveys started thirty minutes prior to sunrise and continued until 9 a.m., unless winds greater than 15 mph, at which time the surveys will concluded. The FWS survey protocol cuts surveys off 90 minutes after sunrise and at maximum wind speed of 12 MPH (taken from https://www.fws.gov/southwest/es/Documents/R2ES/LPC_Survey_Protocol.pdf). If the survey route wasn't being completed, then the remainder of the route was completed on a different date until the full route was completed. A minimum of ten listening points were conducted each survey season. Wind speed, temperature, noise, topography, and any other wildlife observed or heard were documented on the survey form. Figure 1 in Appendix 1 is an example of the data sheet used in the field. Once surveys are complete, data was recorded on a spreadsheet, and then converted to a geographical information system (GIS) file using Arcmap.

Call surveys were conducted in a similar fashion to road surveys, but LPC decoys were set on an area that would represent a typical lek site in that area. A "call box," with the LPC call/booming sounds was placed in near proximity to the decoys and played for no less than 15 minutes at the site. Observers made their best efforts to park the vehicle away from decoys and observed from a distance that did not discourage LPC from landing at the site. Wind restrictions were still in place during call surveys. Figure 2 in appendix 1 is an example of the data sheet used for call surveys. Data was also recorded on a spreadsheet and converted to a GIS file.

Lek surveys were completed by driving as near as possible to known, active lek sites and then approaching it on foot to get a count of birds in attendance. Once LPC were counted and observed, the next lek on the route was attended. GIS files were then updated to account for the most recent observations.

DSL Surveys

Two methods of surveys were used to conduct DSL surveys, walking and pitfall traps. Walking surveys consisted of traversing suitable DSL habitat by foot to detect and catch DSL with a noose pole. A noose pole is an extendable pole with a small noose made from fly backing that is tied to the end of the pole. When the lizard was captured with the noose pole, it was verified to be DSL, and voucher photos are taken. Voucher photos were taken as evidence to show that the lizard captured was indeed a DSL. Ventral, dorsal, lateral pictures were taken for confirmation, as well as a photo with the specimen and visible geographic coordinates on a handheld GPS unit. Once the voucher photos were taken the specimen was released into the shade. Figures 2, 3, and 4 are examples of voucher photos of DSL.



Figure 2: Ventral Voucher Photo



Figure 3: Lateral Voucher Photo



Figure 4: Picture of DSL with GPS unit

Another method used for surveying DSL was pitfall trapping. Pitfall traps are five-gallon buckets that are buried in suitable DSL habitat (mostly within large blowouts). Bucket bottoms were filled with two to three inches of sand and have holes drilled into them to prevent water from filling them in a precipitation event. A cover was placed on top of pegs that stick one to two inches out of the ground. Figures 5 and 6 show a pitfall trap grid and checking pitfall traps, respectively. The gap between the lid and the bucket allowed the specimen to fall into the bucket and be captured when it approaches. Traps were checked daily to prevent capture times of more than 24 hours. If traps were not checked for greater than 24 hours, the pegs were removed, and bucket completely covered with the lid and covered with sand to keep wildlife and livestock from falling into the pitfall. All specimens trapped were speciated, sexed, and photographed utilizing the methodology described above.

DSLs were confirmed 87 times during 266 total days of walking surveys and pitfall trapping between 2010 and 2017.



Figure 5: Pitfall trip grid with lids on pegs.



Figure 6: Checking pitfall traps.

Habitat and Grazing Monitoring

Regular habitat and grazing monitoring is conducted on enrolled properties, on a three-year interval. Over time, these data will determine if the enrolled property is meeting, or trending toward forage utilization, vegetation and habitat goals described in the RMPA, which is referenced in the CCA/A. Attributes monitored included ground cover, canopy cover, and visual obstruction (Robel, measures height of vegetation at the site). These vegetative and rangeland components were collected in all pastures on enrolled ranches with the exception of visual obstruction, which was not collected on sites where soils do not support vegetation that will grow tall enough to meet the goals. Baseline data was collected on enrolled ranches, but further data will need to be collected to determine if the ranches are trending toward habitat goals.

When ground cover was observed, a 20cm x 50cm quadrat was placed on the ground at defined increments along a transect tape. Estimates of bare ground, litter, and basal plant cover percentages were taken in each quadrat. Percentages were averaged to determine ground cover at each site. Table 5 lists the conservation measure goals for ground cover percentages in different habitat types.

Table 5: Ground cover conservation measure goals from RMPA.

	<u>Ground Cover (%)</u>	
	Grassland Community	Shinnery Oak-Dune
Grasses and Forbs	15-52	16-40
Shrubs and Trees	3-12	3-17
Bare Ground	14-60	5-20
Litter	8-44	25-70

Canopy cover data was collected along the same transect tape as ground cover. A pin flag was dropped along the tape at defined increments, and vegetation remaining intact (including basal parts of plants) that touched the pin was recorded. Up to six recordings were taken for each point. Litter was also considered canopy. Mesquite is not included in the shrubs category, as it is not desired for LPC habitat and is measured on its own. If no vegetation was touched, bare ground, or litter, was recorded. The percent of canopy cover was calculated by adding the number of times each different classification of canopy was recorded and dividing that number by the total number of canopy interceptions plus the number of bare ground recordings. Table 6 lists the canopy cover goals, which were identified by The New Mexico LPC/SDL Working Group (2005) and is referenced in the CCA/A.

Table 6: Canopy cover conservation measure goals.

<u>Canopy Cover (%)</u>			
Grasses	Shrubs (Excluding Mesquite)	Forbs	Bare Ground and Litter
30-50	25-40	3-10	Less than 42% combined



Figure 7: Example of a cage to monitor forage utilization.

Visual obstruction (Robel) data was collected by observing the height of plants that obstruct at least half of a one-inch PVC pipe from the bottom up from a distance of 10 feet and a height of four feet. Bands measuring one decimeter each are on the pole to observe plant height. When data was recorded it was converted to inches and compared to conservation measure goals.

These vegetation monitoring practices, along with utilization surveys, will not only show how much of the pasture is being utilized, but will also determine if the grazing practices are having a positive or negative effect on vegetation height, the species that the LPC prefers for nesting/habitat, and bare ground coverage. This helps us gain an overall understanding of the condition of the property.

Conclusion

Comparison of Pre and post results

Because of the lack of data being collected prior to many of the aerial mesquite projects, there are not any comparisons that can be made to determine the amount of mesquite canopy that was reduced or how much grass and forb canopy changed. Post treatment data indicates no significant increase in LPC or DSL in treated areas. Since these original mesquite treatments, CEHMM has consulted, on an individual project basis, with DOW Chemical representatives who advise when to most effectively treat mesquite.

Grazing management, water, and fence projects are all intertwined with the infrastructure needed to support sustainable grazing and rangeland health, which in turn benefits LPC. Water and fence projects can improve a landowner's ability to manage livestock in a fashion that creates suitable habitat for LPC. While functionality of fences and waterers must be ensured through periodic monitoring, documenting the response of vegetation on landscapes where these projects have taken place is also necessary to ensure that conservation measures in the CCA/A are achieved. Data analyzed in this report indicate improvement in LPC habitat as shown by the increased number of new leks observed after completion of projects. Continued monitoring of forage utilization and vegetative components in these landscapes is necessary to further determine if the projects are having the intended effect, and to assist landowners in applying adaptive practices if habitat is not remaining suitable. Comparisons of habitat conditions before and after future projects will be determined through long term monitoring. Forage utilization data for properties that have been surveyed post-project completion can be seen in Table 7.

Table 7: Post-project completion forage utilization data for fence and water projects.

Fence Projects		
Project Name	Date Completed	Forage Utilization (Post Project Completion)
McCloy Fence	9/25/2015	27%
Running N Fence	9/25/2015	0.11%
Water Projects		
Project Name	Date Completed	Forage Utilization (Post Project Completion)
Bilbrey Solar	7/31/2015	1%
Mathis Water	1/29/2016	11%
McCloy Water	8/7/2015	27%
Luman Drinker Repair	5/14/2015	-7%
Running N Solar	9/25/2015	0.11%

Benefits to species and fulfillment of CCA/A for each project type

Post treatment data from some aerial mesquite projects indicates that there are increases in canopy percent of mesquite between years, which does not fulfill the needs of LPC or DSL referenced in the original proposals. These are older projects that occurred when application technology, chemical science, and the understanding of the right conditions to treat mesquite were not as well developed. The Fields hand treatment is more recent and has shown a much greater decrease in canopy cover.

Water, fence, and grazing management projects will help landowners achieve conservation measures in the CCA/A through adaptive grazing management. Areas that may benefit from grazing can be deferred more easily to increase habitat quality through adaptive grazing management, as well as reducing the trespass of cattle that could result in overgrazing of critical LPC habitat. More functional fence and reliable water sources will also allow landowners to develop more in-depth grazing management plans and provide safe water sources for LPC to access. It is important to note that at the time of this report, all enrolled ranches have fulfilled their commitment to the CCA/As by limiting utilization to 45%, as per their agreements. Multiple previously undocumented leks were observed on ranches where these projects have been implemented, and NMDGF reported a 17% increase in LPC numbers in New Mexico in 2018 (G. Beauprez, 2018, pers.comm.), with 4,953 birds and 233 leks observed during ground surveys. This increase in numbers may be attributed to the improvements in habitat conditions through conservation efforts such as the CCA/As, above average precipitation, and increased survey efforts.

Path forward

LPC

On April 11, 2018, CEHMM personnel, CCA/CCAA enrollees, and representatives from multiple state and Federal agencies came together at a Strategic Priority Meeting to discuss conservation measures in relation to the LPC and DSL. Mesquite encroachment, habitat fragmentation, and drought were primary concerns for the LPC. Mesquite encroachment is best mitigated by aerial and hand application of herbicide, followed by mastication of the dead standing mesquite structure. Studies have shown that LPC avoid areas of mesquite encroachment regardless of canopy cover; therefore, removing the “skeleton” may be necessary to increase connectivity and improve habitat (Boggie et al. 2017). This opens up land for the native grasses and forbs on which the LPC relies, while also decreasing the habitat fragmentation caused by mesquite encroachment. Images from hand treatments followed by mechanical removal shows mesquite completely eradicated from the landscape (Figure 8).

Chemical treatments followed by mastication seems to have the most immediate benefit to LPC, as this kills the plant while also removing the vertical structure that deters the LPC, thus restoring habitat that is conducive to LPC. Evidence of this was observed in Roosevelt County, NM. An integrated chemical and mechanical mesquite treatment was completed on the Sandhills Prairie Chicken Area, and the following spring a new lek consisting of three LPC cocks was documented 115 meters from the area where mesquite was removed (G. Beauprez, 2018, pers. comm.). In the eight years prior to the treatment, no leks were documented in the area. Based on these data, CEHMM anticipates coupling mesquite treatments (both future and past treatments) with removal of dead standing mesquite for a more immediate benefit to the LPC. In order to assure desired results of mesquite treatments, especially aerial treatments, weather patterns and condition of mesquite prior to treatments will be observed and CEHMM will consult with DOW Chemical representatives prior to treatment. Wind speed and temperatures at the time of the treatment will also be monitored to ensure the most effective kill. With these combined processes, the goal is to reduce mesquite canopy to less than 15%. Boggie et al. (2017) determined that this was the LPC rarely occupy areas with greater than 15% canopy.



Figure 8: Side by side comparison of mesquite that has been masticated following a hand treatment (right) and mesquite that has not been treated.

Preparing for a drought is critical to preserving habitat for the LPC. CEHMM fence and water projects help enrollees to better manage their grazing rest/rotation patterns and meet or exceed the forage utilization requirements of the CCA/A. These projects ensure that critical habitat be preserved during periods of drought and reliable water sources for the LPC (and all wildlife) will be available in these times. When forage utilization goals are met, native grass and forbs that the LPC rely on are able to better recover after a long period of drought. Based on responses of the 2018 Strategic Meeting as well as initial monitoring results discussed in this report, CEHMM anticipates continuing to fund fence and water projects through the CCA/A Program.

CEHMM is also currently in the first year of applying an adaptive grazing management strategy on two enrolled ranches. Data including, but not limited to precipitation, plant species composition, ground cover, visual obstruction by vegetation (Robel), and brush canopy cover; specifically, catclaw that has encroached on this area will be collected to determine if the methods work. If positive results that show in improvement in habitat quality for LPC are seen, CEHMM will use the strategies applied to help landowners develop similar grazing management practices to further improve habitat for the LPC.

DSL

Experts in attendance at the 2018 Strategic Priority Meeting determined that areas of concern for the DSL were impacts from oil and gas developments, new sand mines, and tebuthiuron treatments on Shinnery Oak in sand dunes. The CCA/CCAA agreements do not allow tebuthiuron treatments on enrolled properties in or within 100 meters of sand dune complexes. Tebuthiuron is also not allowed within 500 meters of occupied DSL habitat.

CEHMM personnel work regularly with industry representatives to ensure that new surface developments do not interfere with occupied DSL habitat. To date, CEHMM and industry have voluntarily moved nearly 600 wells out of DSL habitat. CEHMM is in the process of examining these relocations by completing surveys in locations where wells had voluntarily been moved out of DSL habitat, in hopes of quantifying results to show the benefits of relocations to the DSL.

The CCA/A ranking team also recently approved a research project to examine occupancy and demographics of the DSL in order to establish a standard monitoring protocol for the DSL. Utilizing methods found to be most productive, a monitoring plan for subsequent years will be proposed, with additional funding.

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LPCCALL-SURVEY FORM

DATE ___/___/___ GPS#: _____ OBSERVER: _____

WAYPOINT: _____ SEC ___ T- ___ R- _____ RIMPA ZONE: _____

LPC OBSERVED? YES or NO

START TIME: _____ TOTAL TIME: _____ DECOYS SET?: Y/N

WEATHER: Clear PC Cloudy Fog Rain Snow

WIND (MPH): MAX: _____ AVG: _____ STEADY or GUSTS

NOISE LEVEL: N / S / L / M / H / EX

NOISE SOURCES: umPJ ePJ comp road pwl other (explain):

Description of Area: Flat/ Small Dunes/ Large Dunes/ Hummocks/ Drainage

Any Evidence of LPC?

Other Wildlife Observed?

Notes:

Example of LPC Call survey field data sheet.

**APPENDIX K
Conservation Measure Violation**

**Center of Excellence for Hazardous Materials Management (CEHMM)
Notice of Conservation Measure Violation**

<i>Authorized Organization</i> CEHMM	<i>Operator/Landowner</i>	<i>CI/CP Number</i>
<i>Address</i> 505 N. Main Street Carlsbad, NM 88220	<i>Address</i>	
<i>Telephone</i> 575-885-3700	<i>Attention</i>	

<i>Well/Site Name</i>	<i>API Number</i>	<i>Unit/Lot</i>	<i>Section</i>	<i>Township</i>	<i>Range</i>	<i>County</i>	<i>State</i>

The following condition(s) were found by CEHMM on the date and at the site(s) listed above

<i>Date</i>	<i>Time (24-hour clock)</i>	<i>Inspector</i>	<i>Corrective Action to be Completed by</i>	<i>Date Corrected</i>

Description of Conservation Measure Violation with Corrective Action:

When the Written Order is complied with, sign this notice and return to the above address.

Company Representative: _____

Title: _____

Address: _____ *Phone:* _____

Signature: _____ *Date:* _____

Company Comments: _____

Warning

The Center of Excellence is providing notice of deficiency to the Participating Operator/Landowner and is giving them the opportunity to cure this deficiency. If the deficiency is not corrected, or due diligence is not being shown to correct the deficiency within sixty (60) days of the receipt of the letter, the parcel(s) involved will be terminated from this CI/CP. If Participating Operator/Landowner has three (3) deficiencies within 365 consecutive days (excluding deficiencies cured as stated above), the entire CI/CP will be terminated.

Signature of CEHMM Authorized Officer _____

Date _____