



# CEHMM

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## *Candidate Conservation Agreements for the Lesser Prairie-Chicken and the Dunes Sagebrush Lizard in New Mexico 2018 Annual Report*



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## INTRODUCTION

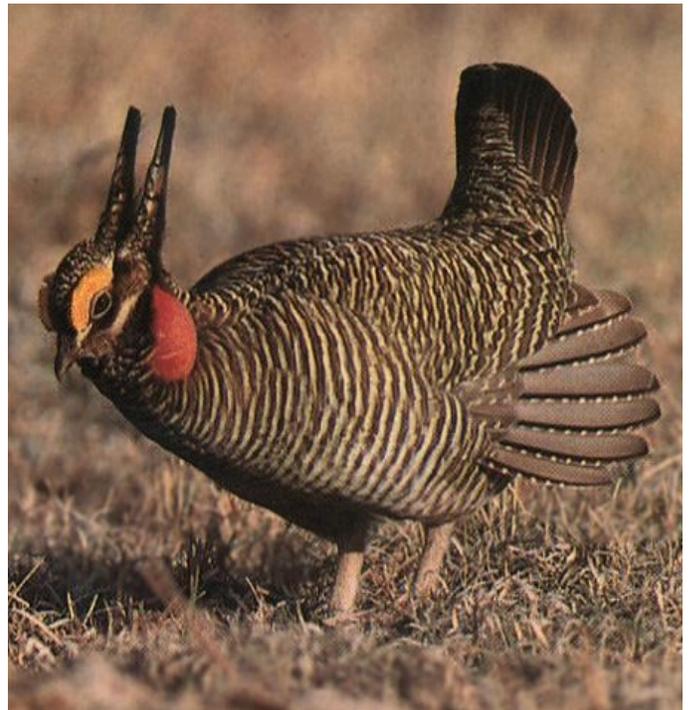
The lesser prairie-chicken (*Tympanuchus pallidicinctus*) (LPC) (Figure 1) is a prairie grouse species native to the southern Great Plains. It's historic and current home ranges include parts of New Mexico, Colorado, Kansas, Oklahoma, and Texas. The LPC currently has populations in Quay, Curry, De Baca, 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. The LPC relies on vegetation that consists of a mix of shinnery oak (*Quercus harvardii*) and mixed grasses in New Mexico.

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, 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). Blowouts where this study took place were similar in size and shape.

The Endangered Species Act of 1973 (ESA), 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 range. The conservation of the ecosystems on which they depend is also a provision of the ESA.



**Figure 2: Dunes Sagebrush Lizard (*Sceloporus arenicolus*) - Courtesy of Mike Hill**



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

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 listed species on public and private lands. In addition to the Section 9 prohibitions, Section 7 requires federal agencies to ensure that 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 that 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.

Three petitions have been filed with the FWS to list the DSL as endangered. In 2002 and 2008 it was warranted, but precluded. However, in 2012 the FWS withdrew the rule that proposed a listing of the DSL, citing conservation efforts along with current and future threats not being as serious as 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 have critical habitat designated was filed by the Center for Biological Diversity and Defenders of Wildlife in June 2018. There has yet to be a finding on the most recent petition.

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 consisted of representatives from the FWS, Bureau of Land Management (BLM), 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 work of the group provided a pathway that led to the signing of the Candidate Conservation Agreement (CCA) and Candidate Conservation Agreement with Assurances (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 FWS, 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**

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 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 were 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 to CEHMM and the CCA/CCAA ranking team annually and ranked in order of conservation priority for either or both species. Dependent on funding available to complete projects that year, the highest priority projects are approved for funding by the ranking team and then completed. Those who rank projects include wildlife biologists from the BLM, FWS, CEHMM, New Mexico State Land Office (NMSLO), Natural Resources Conservation Service (NRCS), 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 from the ranching community are included in the ranking process.

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

Input from the public was sought out in the development of the CCA/CCAA through public forums. Locations of these forums were strategically thought out 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, and can be found in Appendix A.

The maps in Figures 3 and 4 show the enrollments covered under the CCA and CCAA. Lands 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 private 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.

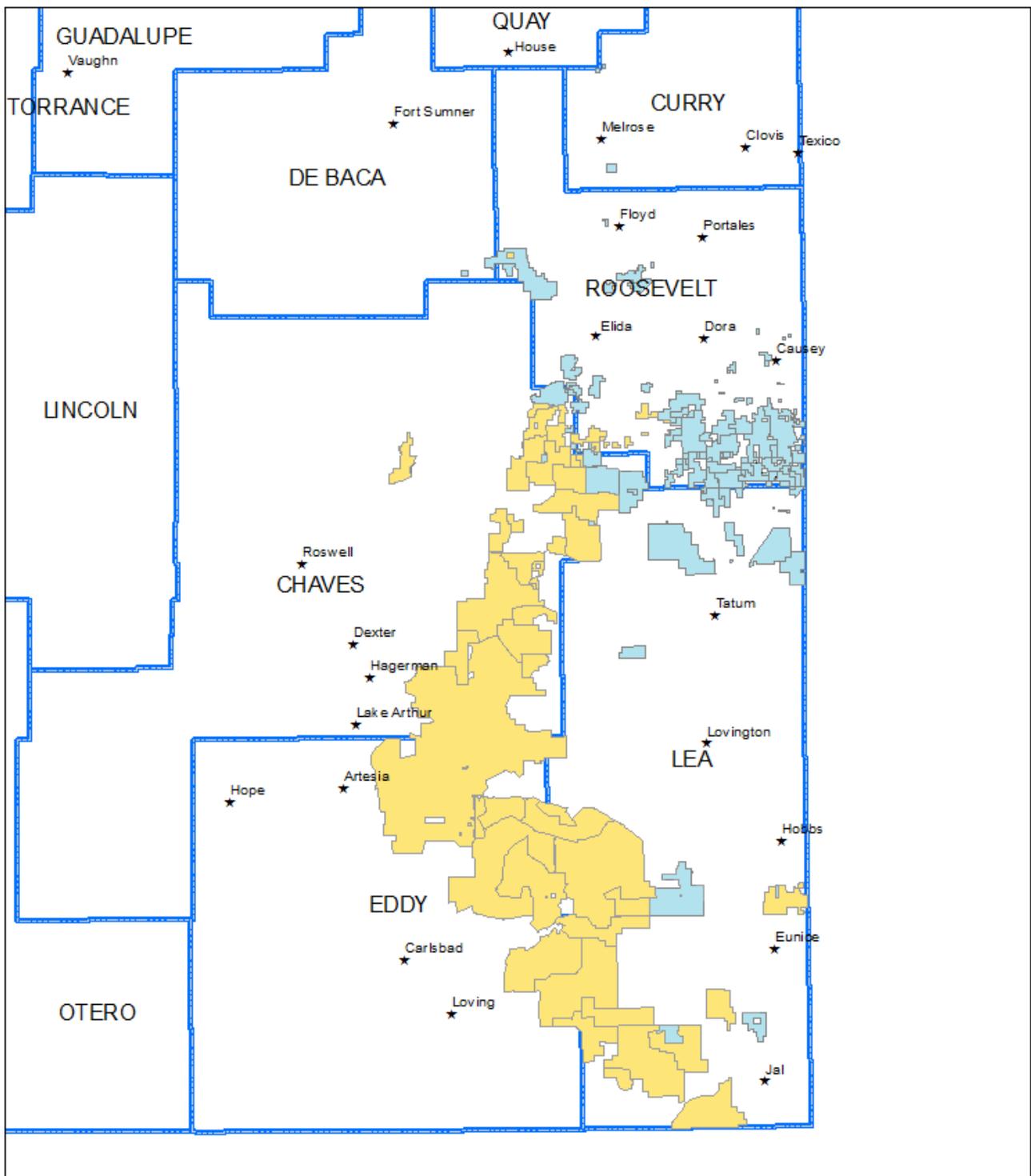
#### PARTICIPATING COOPERATOR'S NEED FOR THE CCA/CCAA

Throughout LPC and DSL habitat, two major uses of the landscape are ranching and oil and gas development. A listing of either species would authorize the FWS to prohibit activities on lands that may harm the LPC or DSL under the ESA. 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

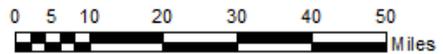


Figure 3: CCA/CCA Ranch Enrollments

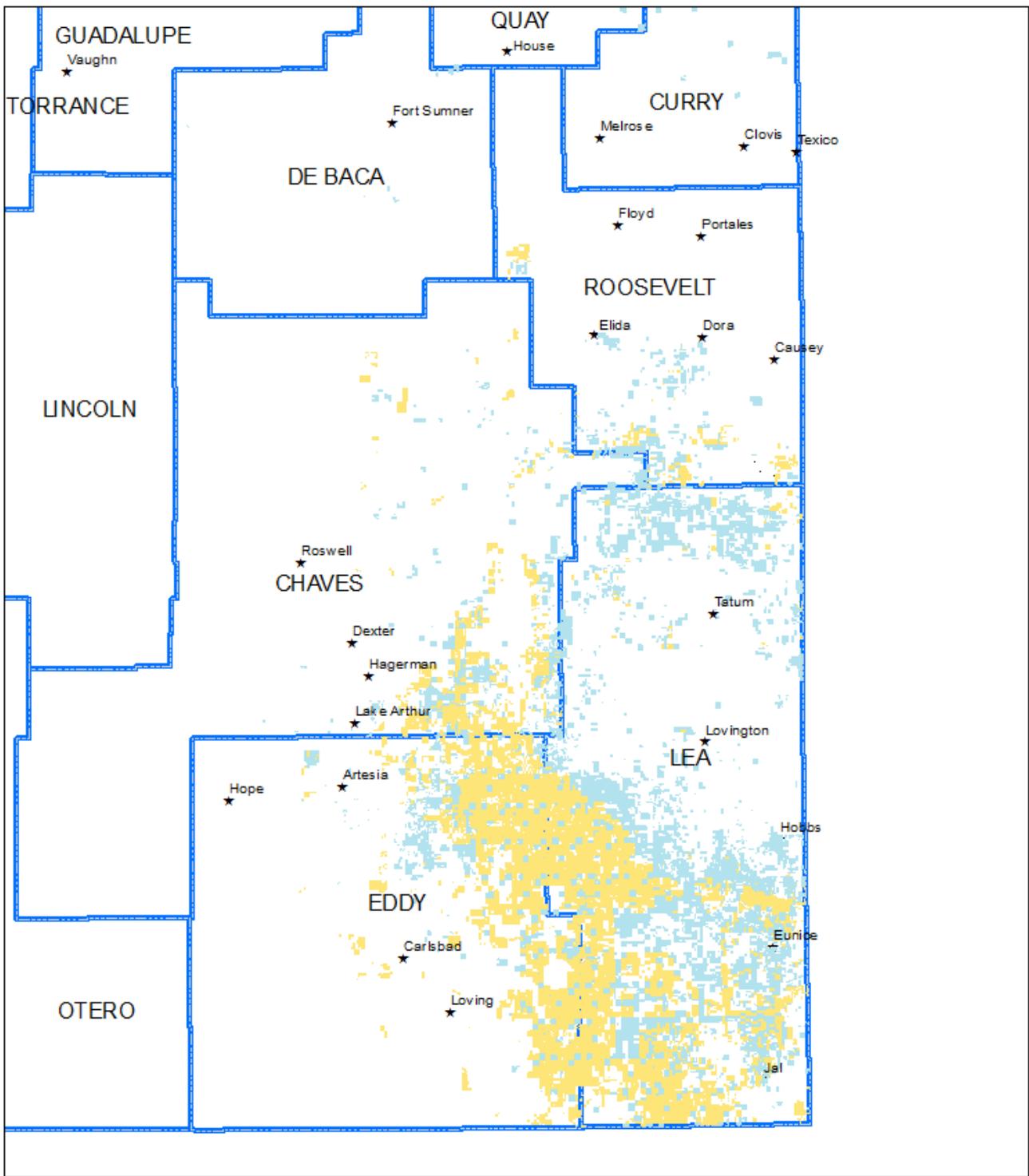


Figure 4: CCA/CCAA Industry Enrollments

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 (NRCS sand hills 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 to ensure success of the treatment may be required.
  - g. Experimental treatments outside these guidelines may occur with the approval of 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 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 sand hills 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 powerlines 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 powerlines 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 H<sub>2</sub>S and/or the accumulation of sulfates in the soil related to production of gas containing H<sub>2</sub>S 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 H<sub>2</sub>S 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 service 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, BLM, CEHMM, and/or 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 1,871,773 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 1,011,252 acres of mineral enrollments in the CCA and 1,192,835 acres of mineral enrollments in the CCAA. Total mineral enrollments by oil and gas companies and the New Mexico State Land Office is 2,204,087.

## FUNDING

A Habitat Conservation Fund (HCF) is established by CEHMM 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 keeping track of balances and debiting them when appropriate.

Ten percent of the funds received through industry participation goes to overhead such as building rentals, utilities, and insurance. The 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

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), consists of biologists from CEHMM, FWS, BLM, NMSLO, NRCS, and NMDGF. The ranking team meets quarterly, via phone or in person, and votes on proposed projects at least once annually. The annual meeting during which 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 are those that improve habitat for the species, including but not limited to: 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 habitat. Education projects must promote the ecology of the southern shortgrass prairie and the flora and fauna of 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 that are funded by the CCA/CCAA Program. Table 1 illustrates the projects that were funded in 2018, Table 2 illustrates the projects that were completed in 2018, and Appendix F illustrates all projects completed through the CCA/CCAA Program.

### *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 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 and led to a transition of these grassland landscapes into shrub lands or shrub/grasslands which are less suitable for LPC. Chemically treating mesquite through hand and aerial applications are the primary methods 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 and Gregory 2008), providing suitable habitat for nesting, brooding, forage, and cover for 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 include:



**Figure 5: Hand Treatment of Mesquite**

- The ability to be performed year-round. This provides land managers the ability to respond to requests any time of year and is not constrained by seasonal leaf emergence as required with aerial applications.

- No negative impacts on non-target plants within a defined area and alleviates any inadvertent harmful effects on non-target species from direct application or spray drift. Figure 5 is an individual mesquite tree that was sprayed by hand. The blue color is a dye used to ensure that the chemical was applied properly and only to the desired plant.

- Effective use in close proximity to other sensitive areas such as agricultural crops or near resident livestock.

- Precision such that mesquite occupied by resident wildlife including occupied (protected) bird nests can be protected by way of avoidance.

This also applies to any sensitive insects, reptiles, mammals, or protected plants in the near proximity.

- Effectiveness—Initial observations indicate that hand sprays are over 95 percent effective. This is evidenced by chlorosis (yellowing) in leaves and other visible signs of stress within only days of prescribed treatments and when applied during the winter, a higher percentage of stressed and/or dying mesquite.
- Chemicals and carriers continually being improved; therefore, working with the applicator and chemical companies to determine proper mix and timing is essential.

Benefits of aerial applications (Figure 6) include:

- Are less expensive than hand treatments. Costs typically range from \$20-\$40 per acre for electrostatic and conventional application. 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, encompass 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, working with the applicator and the chemical companies to determine proper mix and timing is essential.

To date, 79,297 acres (Appendix G) of mesquite have been treated. A future treatment consisting of 10,610.3 acres is currently funded and will be sprayed when conditions to spray are conducive for an effective treatment. Mesquite control of this nature improves habitat for LPC and mitigates mesquite encroachment into dunal areas that are suitable for DSL (Appendix H). Three aerial mesquite treatments were completed in 2018 (Table 2).



Figure 6: Aerial Treatment of Mesquite

*Funded and/or Completed Mesquite Projects in 2018 (\*indicates completed in 2018):*

**Running N Mesquite #2** — This aerial treatment was approved and funded in 2018 for \$173,089.20 for approximately 4,402 acres (Table 1, Figures 25, 26). A proposal to remove the dead standing mesquite (DSM) will be presented in the future. A nesting bird survey will be completed prior to the aerial treatment to avoid nesting birds. Ponds will also be avoided. The majority of this enrolled acreage is in CHAT 1. In 2018 there were two LPC leks observed on this ranch. With the close proximity of detected leks on neighboring properties, there is a high probability that more LPC are occupying this enrolled acreage throughout different times of the year; therefore, this project can help improve habitat connectivity for LPC. Lek surveys, along with vegetation and forage utilization monitoring, will be conducted in 2019. The southern portion of this enrolled acreage also falls within the DSL polygon (Laurencio and Fitzgerald 2010). DSL were detected in 2011 on this enrolled acreage and other DSL were detected to the south on neighboring properties in 2011 and 2013.

**\*Medlin Mesquite**—This aerial treatment (Tables 1, 2, Figures 7, 8, 25, 27), which was approved and funded in June 2018 for \$46,235.46 was completed in July 2018. The original project proposal called for the treatment of 1,108 acres, but following nesting bird surveys, the final treated area was 993 acres. This project was in suitable LPC habitat that was being encroached upon by mesquite. A proposal to remove the DSM will be presented in the future. In 2018 there were three LPC leks observed on this ranch, which is in CHAT 1. The Medlin ranch has exceeded the vegetation and forage utilization goals of the CCA/CCAA. With proper management following this treatment, it can continue to achieve conservation measures and increase LPC habitat suitability. Lek surveys, vegetation, and forage utilization monitoring will be conducted in 2019.

**\*Mesquite Hand Treatment of Active Leks #1** – This project was funded in March 2017 for \$897,876.85, and was completed in December 2018. Seven 502-acre plots were hand treated for honey mesquite to total 3,514 acres (Table 2, Figures 7, 8, 27). Many of these areas fall within the BLM Area of Critical Environmental Concern (ACEC) and The Nature Conservancy (TNC)/Milnesand Prairie Preserve (MPP), which are managed to benefit LPC habitat. This project was proposed to eliminate the encroachment of mesquite on active leks to better enhance habitat. A proposal to remove the DSM will be presented in the future.

**\*Weinheimer Mesquite** — This aerial treatment was approved and funded in June 2018 for \$153,792.89, and was completed in July 2018. The original project proposal was for the treatment of 3,900 acres, but following nesting bird surveys the final treatment was 3,727 acres. A large portion of the Weinheimer enrollment is experiencing encroachment of mesquite in high densities. Two areas were treated; one in the northern portion of the ranch consisting of approximately 1,514 acres, and one in the southern portion of the ranch, consisting of approximately 2,213 acres (Tables 1, 2, Figures 7, 8, 25, 27). Studies have shown that eradicating and removing mesquite opens up habitat for lekking, nesting, and brood rearing (Lautenbach et al. 2017). A proposal to remove the DSM will be presented in the future. Although there were no LPC 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, there is a high probability that LPC occupy this enrolled acreage throughout different times of the year; therefore, this project can help improve habitat connectivity for LPC. The completion of this project will help improve LPC habitat with proper management. Lek surveys will be conducted in 2019. About half of this enrolled acreage is in CHAT 1 and the other half in CHAT 3, with the northeast corner showing connectivity. Part of this ranch also falls within the DSL polygon (Laurencio and Fitzgerald 2010).

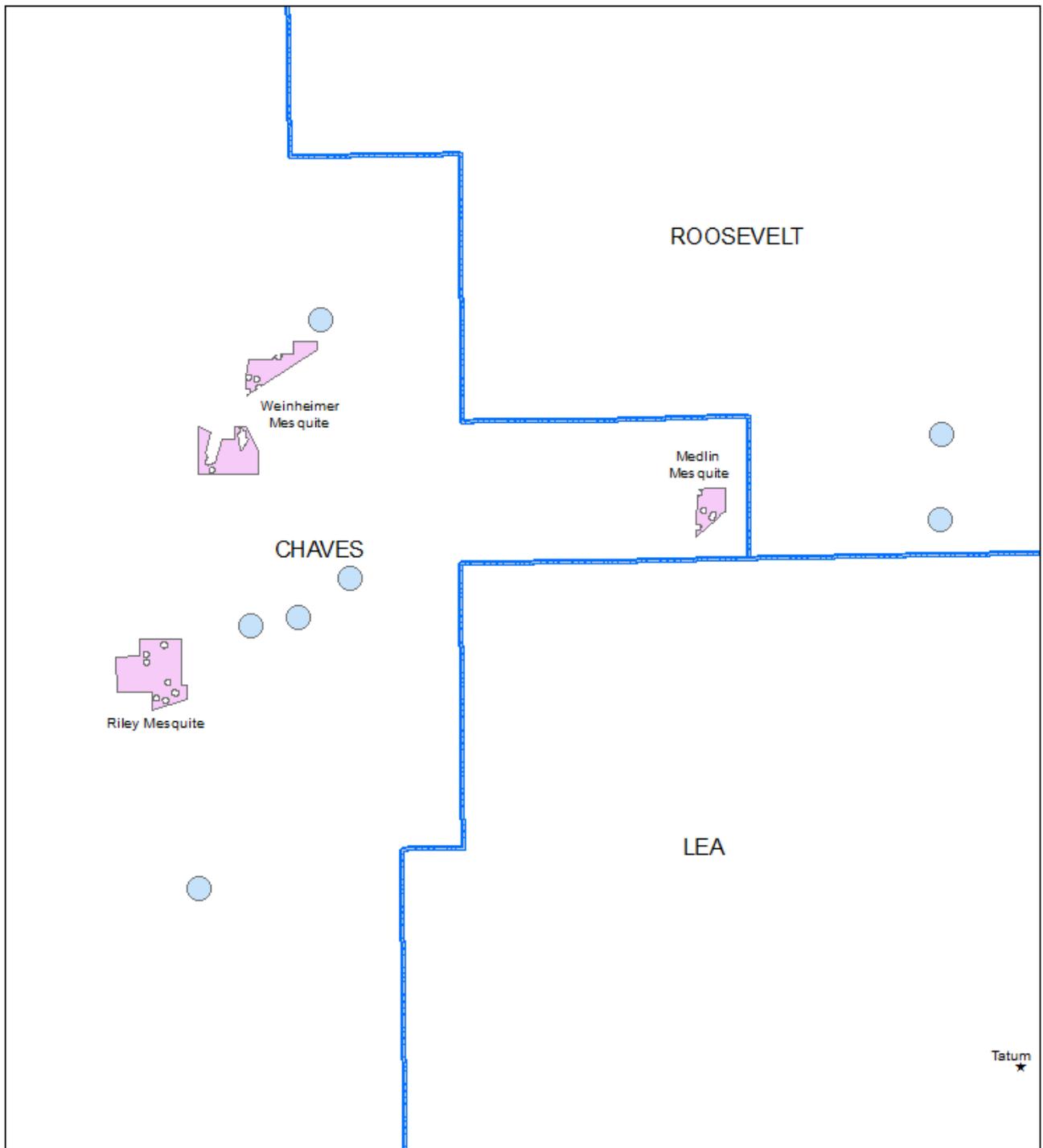
**\*Riley Mesquite**—This aerial treatment (Table 2, Figure 7, 8, 27) was approved and funded in February 2014 for \$149,350.08, and was completed in July 2018. The original project proposal was for the treatment of 4,028 acres, but following nesting bird surveys the final treatment area was 3,793 acres. The treatment was in suitable LPC habitat that was being encroached upon by mesquite. A proposal to remove the DSM will be presented in the future. Although there were no LPC detected during lekking season, it does border the BLM ACEC, an area managed for the benefit of LPC that contains numerous leks. With the close proximity of detected leks on neighboring properties, there is a high probability that LPC occupy this enrolled acreage throughout different times of the year; therefore, this project can help improve habitat connectivity for LPC. The property has exceeded the vegetation and forage utilization goals as of the last survey, and the completion of this project can help to further improve LPC habitat. Lek surveys, vegetation, and forage utilization monitoring, will be conducted in 2019. The majority of this enrolled acreage is in CHAT 3, with the eastern edge falling into CHAT 1. The eastern and southern portions of this enrolled acreage also fall within the DSL polygon (Laurencio and Fitzgerald 2010).

#### *Funded Mesquite Projects (prior to 2018) Awaiting Completion:*

**Mesquite Hand Treatment of Active Leks #2** – The ranking team has approved hand treatment of additional leks. This project was funded in August 2017 for \$745,470.00. CEHMM and the ranking team are in the process of identifying leks to be treated. CEHMM personnel are waiting to see the results of the Mesquite Hand Treatment of Active Leks #1 project prior to proceeding. This project was proposed to eliminate the encroachment of mesquite on active leks to better enhance habitat.

#### **REMOVAL OF DEAD STANDING MESQUITE**

Historical and current research (Boggie et. al. 2017) indicates that LPC avoid vertical structure, and additionally, LPC avoid mesquite whether or not the shrub is foliated. It is recommended that all mesquite be removed 2 km from historic and active leks. Erect skeletons have been a concern voiced by CEHMM, FWS, BLM, and NRCS, as sprayed mesquite cannot be effectively 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 9) to remove DSM on acreage that the ranking team deems ready for removal. The decision is based upon proximity to an active lek and an average of 80 percent 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 assure that the soil is not disturbed through the actions of the machinery. Currently, CEHMM has two machines in operation and has successfully removed 5,104.7 acres of DSM (Appendix G). Refer to attached “Conservation Benefit: Mesquite Removal” (Appendix H) for more information.



- Mesquite Hand Treatment of Active Leks #1
- Mesquite Spray
- NM Counties



**Figure 7: Mesquite Projects Completed in 2018**

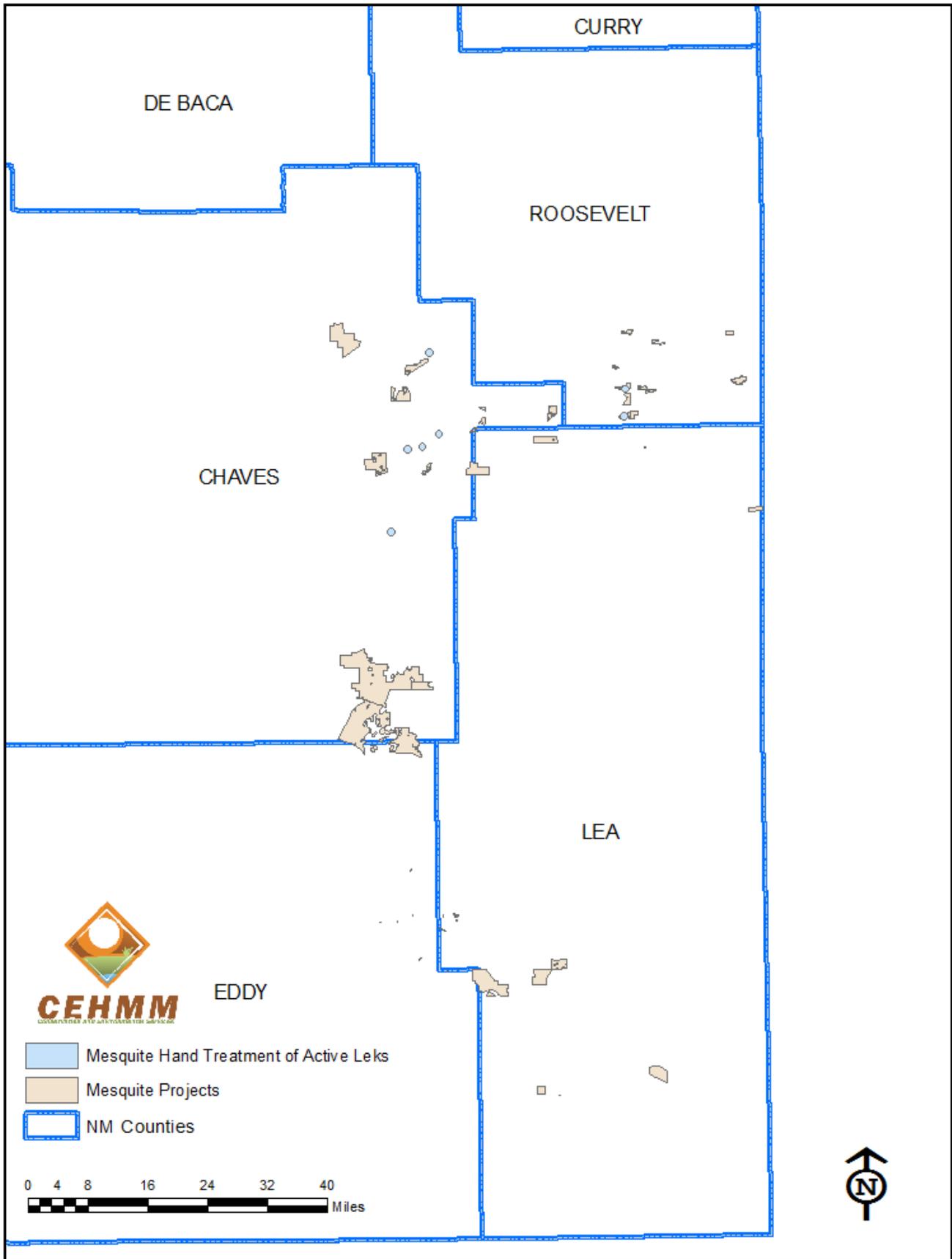


Figure 8: All Mesquite Projects Completed by the CCA/CCAA Program

*Funded and/or Completed DSM Removal Projects in 2018 (\*indicates completed in 2018):*

**\*M. Williamson DSM Removal** – This DSM project was originally funded in August 2017 for 482 acres. In 2018 the project was amended, and the NMSLO approved CHEMM’s Natural Resource Authorization (NRA) request for removal of DSM on an additional 450 acres of the Participating Cooperator’s leased state trust lands (Table 1,2, Figure 11,



**Figure 9: Track Steer with Rotary Cutter Attachment**

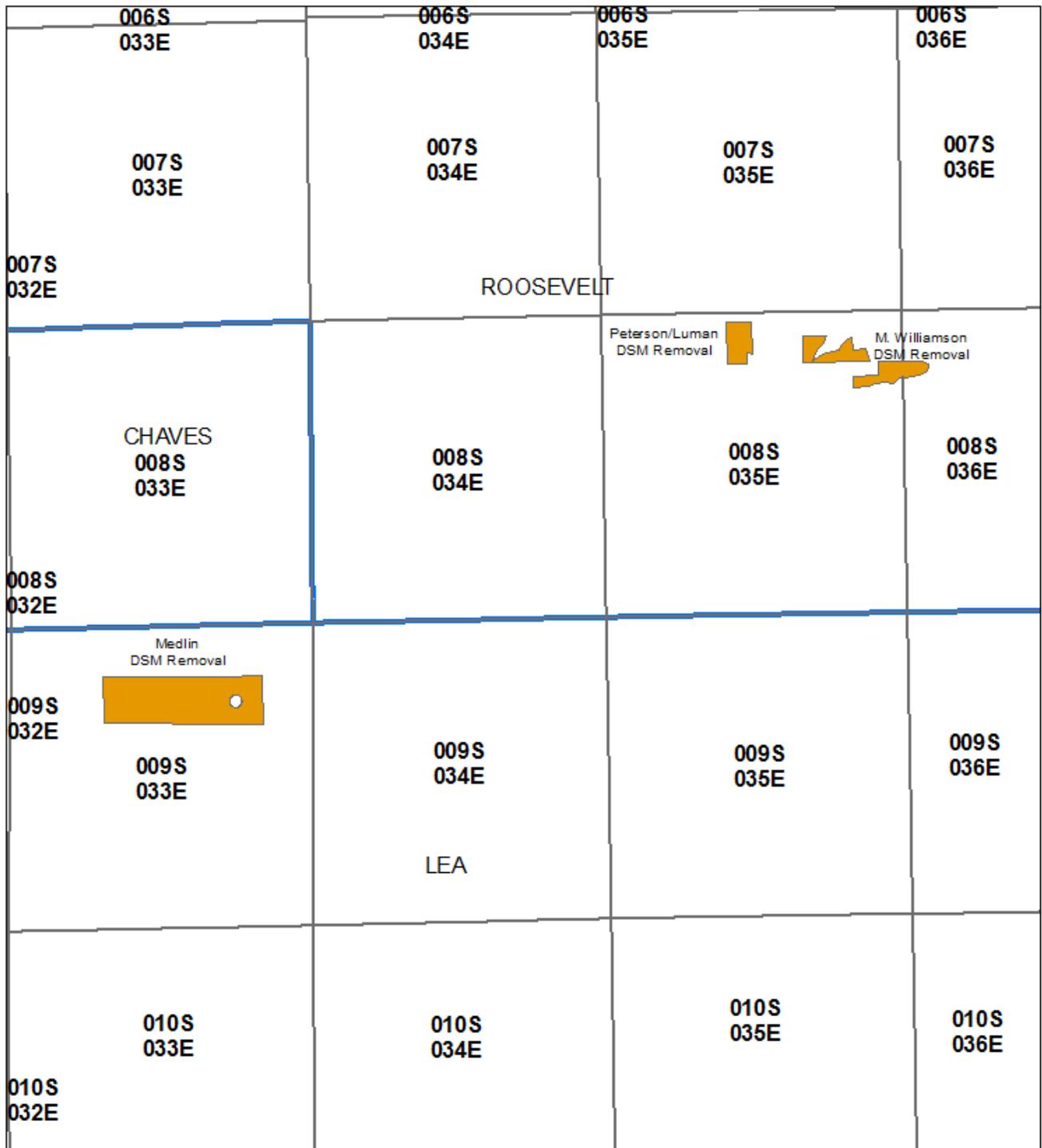
12, 25, 27). The budget was amended in 2018 for \$41,996.13, and the project was completed in August 2018. This enrolled acreage is in CHAT 1. In 2018 there were seven LPC leks observed on this ranch, with numerous others on neighboring properties. The Williamson ranch has exceeded the vegetation and forage utilization goals of the CCA/CCAAs, and with the completion of this project followed by proper management, can continue to do so. Lek surveys, along with vegetation and forage utilization monitoring, will be conducted in 2019. A small portion on the northern end of this enrolled acreage also falls within the DSL polygon (Laurencio and Fitzgerald 2010).

**\*Medlin DSM Removal** — In 2018 the NMSLO approved CHEMM’s NRA request for removal of 2,000 acres of DSM on the Participating Cooperator’s leased state trust lands (Tables 1,2, Figures, 11, 12, 25, 27). This project was funded for \$90,276.34, and was completed in September 2018. This enrolled acreage is in CHAT 1. In 2018 there were three LPC leks observed on this ranch. The Medlin ranch has exceeded the vegetation and forage utilization goals of the CCA/CCAAs and with the completion of this project followed by proper management, can continue to do so. Lek surveys, along with vegetation and forage utilization monitoring, will be conducted in 2019. The landscape before and after DSM removal can be seen in Figure 10.



**Figure 10: Comparison Photos; Before DSM Removal on Left and After DSM Removal on Right**

**\*Peterson/Luman DSM Removal** – CEHMM personnel have removed 250 acres of DSM (Table 2, Figure 11, 12, 27). This project was funded in August 2017 for \$26,562.00, and was completed in October 2018. Although there were no LPC detected during lekking season, this property borders TNC-MPP and a NMDGF Prairie Chicken Area (PCA), both with documented leks. With the close proximity of detected leks on neighboring properties, there is a high probability that LPC occupy this enrolled acreage throughout different times of the year; therefore, this project can help improve habitat connectivity for LPC. Management of this property has exceeded vegetation and forage utilization goals. This enrolled acreage is in CHAT 1. Lek surveys, along with vegetation and forage utilization monitoring, will be conducted in 2019.



 DSM Treatments  
 NM Counties



Figure 11: DSM Removal Completed in 2018

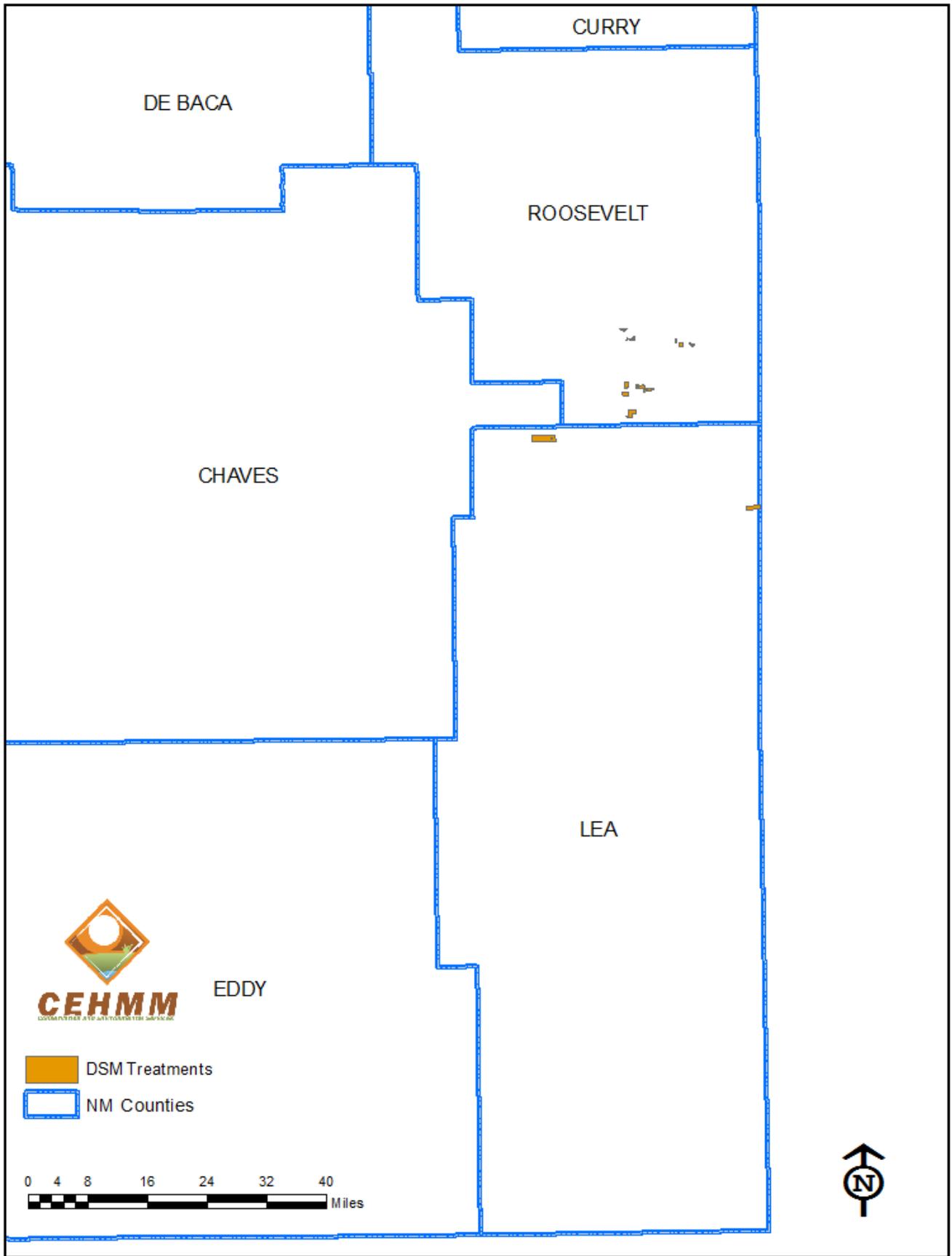


Figure 12: All DSM Removal Completed by the CCA/CAA Program

## ESCAPE RAMPS

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, but

also includes insects and small mammals, such as bats. Once an animal falls into a livestock tank while attempting to access water, they inherently struggle 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 animals' escape (Figure 13). The necessity for escape ramps can be seen in Figure 14 where LPC are drinking from a livestock water tank. CEHMM escape ramps are modeled after proven BLM standard ramp design. In order to increase traction for an entrapped animal and extend the ramp longevity, they are coated with a stable, non-toxic polymer textured material (similar to that sprayed on truck beds as liners) prior to installation. In

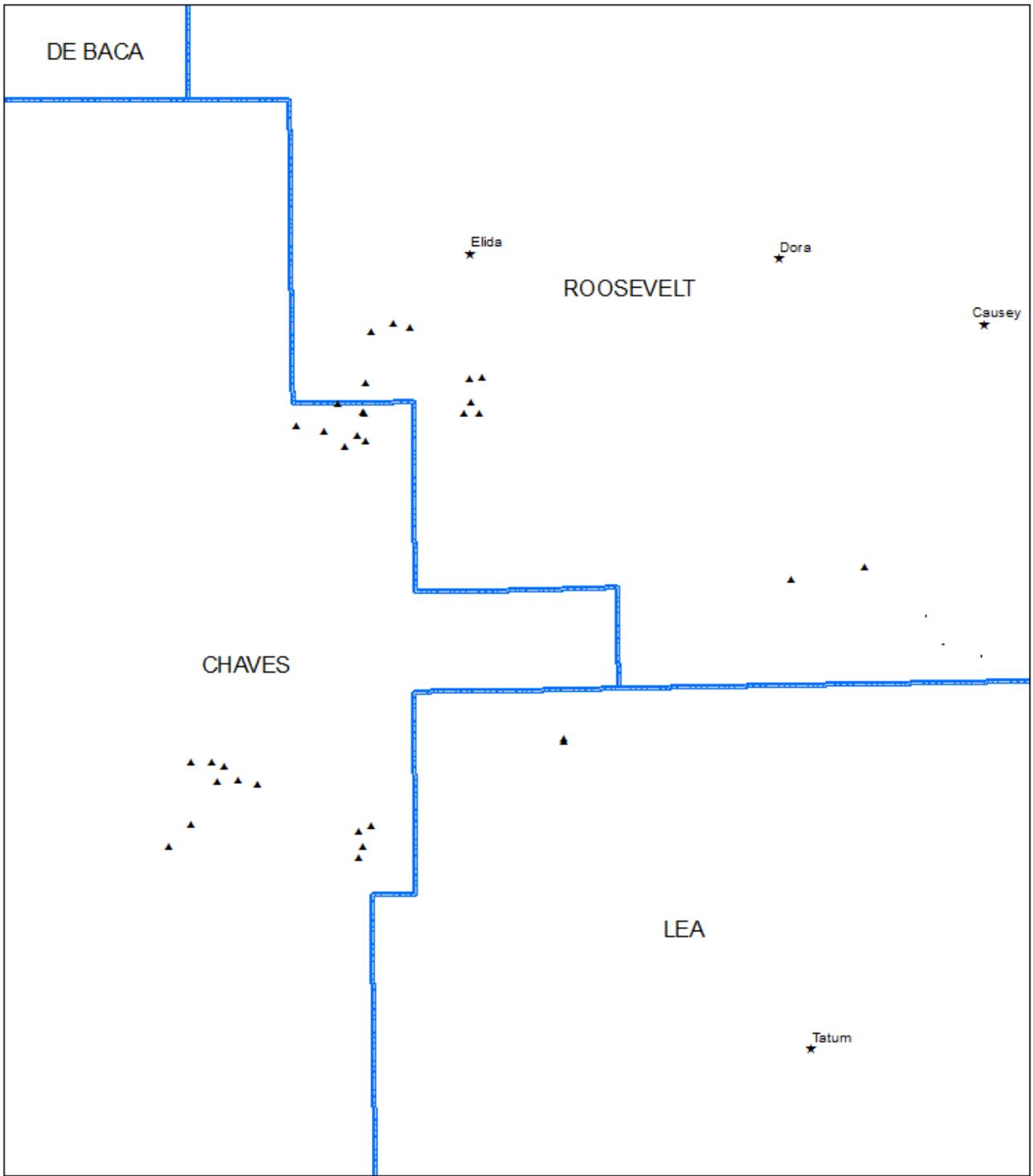


**Figure 13: Escape Ramp Installed in Water Tank**

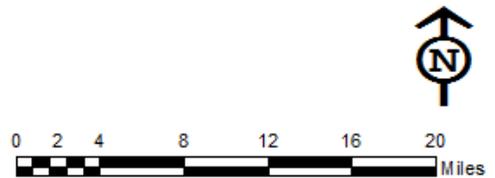
2018, CEHMM installed 34 escape ramps on three ranches (Figure 15). To date, 671 escape ramps have been installed in water troughs on ranches that have signed CIs (CCAA) and CPs (CCA) (Figure 16). CEHMM changed the design of the escape ramps in 2014, adding a rubber hose around the perimeter of the ramp to keep the metal ramp from rubbing on the side and bottom of the tanks. All previously installed ramps with the old design have been retrofitted or replaced to prevent the rubbing. CEHMM will continue to install escape ramps on enrolled ranches within LPC and DSL habitat.



**Figure 14: LPC Drinking From a Water Tank with an Escape Ramp Installed**



- ▲ Escape Ramps 2018
- ▭ NM Counties



**Figure 15: Escape Ramp Installation Locations in 2018**

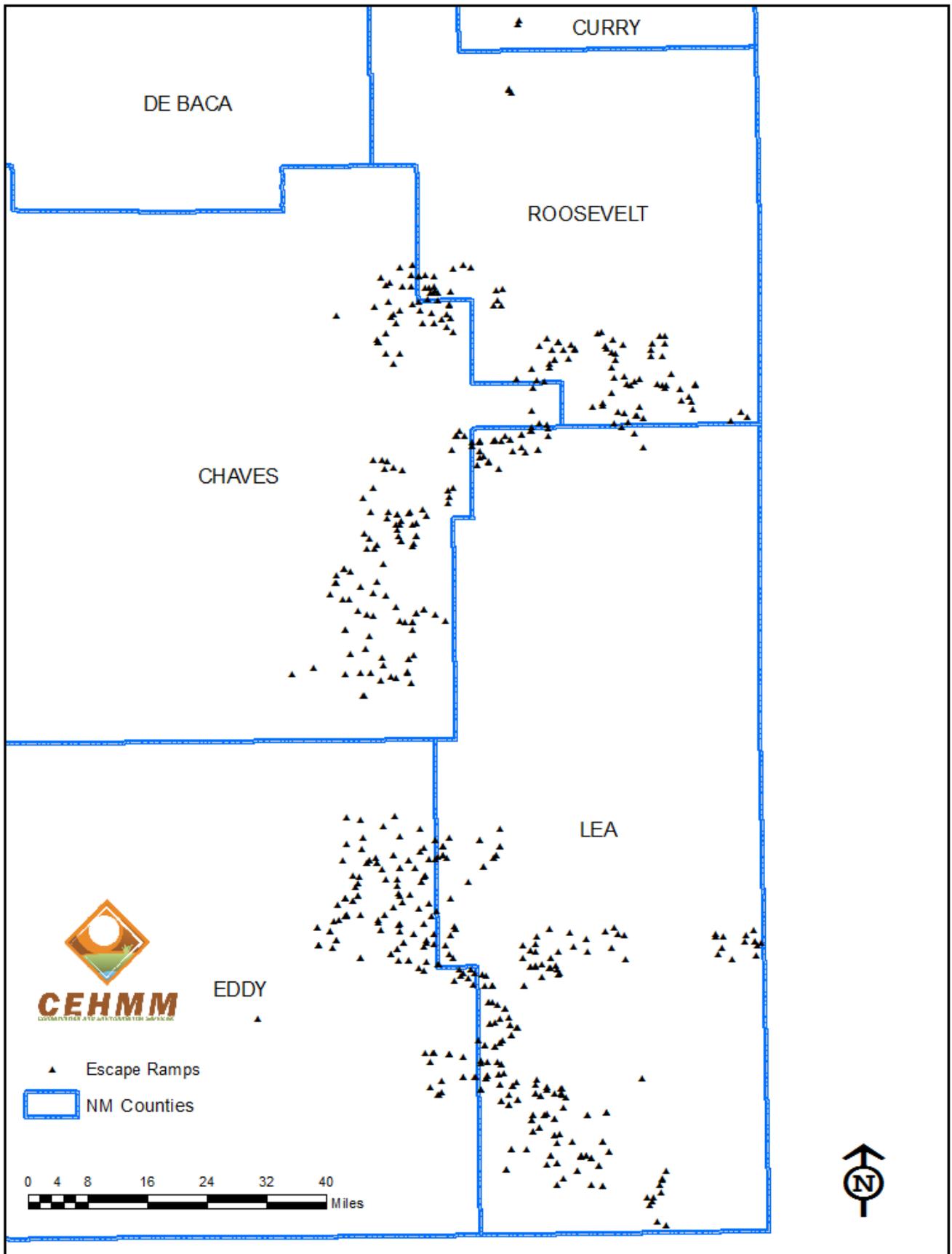


Figure 16: All Escape Ramp Installation Locations Completed by the CCA/CAA Program

## SOLAR CONVERSION AND TROUGH REPLACEMENT

In 2013, CEHMM held a strategic meeting where researchers identified grazing as the primary concern for LPC. In order for producers to effectively graze to benefit LPC, 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 water and fence 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.

One of the key issues facing native grasslands in eastern New Mexico is the availability of water. Concerns pertaining to livestock grazing are discussed in the CCA and the 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 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/CCAA requirements, to eliminate risks of LPC and other wildlife from drowning when utilizing these troughs.

Water wells outfitted with windmills have been found to be an undependable water source due to age of the windmill and expenses in repair. 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 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 structure) to 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 due to the small amount of direct sunlight needed to power them. In a three-year study, Grisham et al. (2014) documented 1,245 visits of LPC at open water sources. This study illustrates the necessity to provide water sources for LPC, especially in times of drought.

Over time, water troughs become degraded, fall into disrepair, and become unable to hold water (Figure 17), which eliminates a water source from the landscape that LPC and other wildlife have become dependent upon. Troughs of this nature are replaced with new fiberglass troughs (Figure 18) that are outfitted with escape ramps.



Figure 17: Before; dilapidated windmill and water trough .



Figure 18: After; Fiberglass Water Trough with Solar Pump.

With adequate and reliable watering facilities, Participating Cooperators are able to manage their grazing operations in a fashion that leaves residual grasses and cover upon which the LPC depends for nesting and brood rearing. Putting in a water source with adequate capacity allows ranchers to combine herds, which in turn gives ranchers the ability to rest pastures.

To date, CEHMM has converted eight windmills to solar and replaced seven water troughs (Figure 19). There were no converted windmills and no water troughs completed in 2018; however, six projects were funded this year.

#### *Funded Water Projects in 2018:*

**K. James Wildlife Water Amendment**—This project was funded in June 2018, and consists of CEHMM contracting the installation of approximately 1.25 miles of water line and installing a solar-powered submersible pump, a solar-powered booster pump, and a 200-300 gallon tire trough with a satellite water (Table 1, Figure 25, 26). The Participating Cooperator is providing in-kind services consisting of plumbing the trough, removing a windmill, and providing a storage tank. The project was funded for \$39,451.89. This will provide water for LPC in times of drought and allow an area to be grazed that is not currently being utilized due to the distance from existing livestock water sources. By allowing this area to be utilized, other areas will not be grazed as heavily, leaving more residual vegetation for LPC nesting and brood rearing. CEHMM received the signed project agreement from the Participating Cooperator. The BLM has been contacted to proceed with the National Environmental Policy Act (NEPA) process. An onsite with BLM wildlife staff, archaeologists, range staff, and CEHMM was completed in November 2018 to determine a suitable route and stake the line for archaeological clearance. The route is currently under review.

**TNC Water** — This project was approved and funded in 2018 for \$52,830.44 to remove seven small, worn out stock tanks and replace them with seven 20' fiberglass stock tanks which include built-in escape ramps (Table 1, Figures 25, 26). This property is managed specifically to benefit LPC habitat, and therefore provides a large area of suitable and occupied LPC habitat by exceeding vegetation and forage utilization goals. The implementation of these water projects will only help to further benefit the growing number of LPC on the property through proper management. This enrolled acreage is in CHAT 1. In 2018, 29 LPC leks were observed. Lek surveys will be conducted in 2019. A portion of this enrolled acreage also falls within the DSL polygon (Laurencio and Fitzgerald 2010). DSL were detected in four locations on this enrolled acreage in 2012 as well as other DSL detected to the east on neighboring properties.

**Mohon Water Tanks** — This project was approved and funded in 2018 for \$19,369.24 to remove an old stock tank that no longer holds water, improve the old pad, and replace the old tank with a new 20' fiberglass stock tank with a wildlife-friendly escape ramp. There will also be another 20' fiberglass tank with a wildlife-friendly escape ramp installed in another area of the ranch that is coming out of the Conservation Reserve Program (CRP) (Table 1, Figures 25, 26). 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 over-utilized 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 for better implementation of rest/rotation pattern, which can improve previously over-utilized areas through longer periods of rest. Although there were no LPC detected during lekking season, this property borders other enrolled properties and a PCA with documented leks. With the close proximity of detected leks on neighboring properties, there is a high probability that LPC occupy this enrolled acreage throughout different times of the year; therefore, this project can help improve habitat connectivity for LPC. The completion of this project will also help to improve LPC habitat through proper management. This enrolled acreage is in CHAT 1. Lek surveys, along with vegetation and forage utilization monitoring, will be conducted in 2019.

**M. Coombes Water #1 North** — This project was approved and funded in 2018 for \$141,205.21. Three unreliable windmills will be removed and replaced with three solar pumps; eight small, leaky stock tanks will be replaced with eight 20' fiberglass tanks with wildlife escape ramps; a new water point with a 20' fiberglass stock tank and one 12' x 20' storage tank will be added; and 3,900 feet of pipeline will be added to connect with an existing pipeline (Table 1, Figures 25, 26). This property was damaged by the recent wildfires in the area. Prior to the fires, the Coombes property was exceeding vegetation and forage utilization goals. Although there were no LPC detected during lekking season, with the close proximity of detected leks on neighboring properties to the immediate east and west, there is a high probability that LPC occupy this enrolled acreage throughout different times of the year; therefore, this project can help improve habitat connectivity for LPC. This enrolled acreage is in CHAT 1. Lek surveys will be conducted in 2019.

**M. Coombes Water #2 North** — This project was approved and funded in 2018 for \$59,911.47 to remove two unreliable windmills and add two solar pumps, install one 20' fiberglass stock tank with wildlife escape ramp, and add one 12' x 20' storage tank (Table 1, Figures 25, 26). Prior to the wildfires that damaged the property this year, the Coombes property was exceeding vegetation and forage utilization goals. The implementation of this project will allow continued benefits to LPC habitat through proper management. Although there were no LPC detected during lekking season, with the close proximity of detected leks on neighboring properties to the immediate east and west, there is a high probability that LPC occupy this enrolled acreage throughout different times of the year; therefore, this project can help improve habitat connectivity for LPC. This enrolled acreage is in CHAT 1. Lek surveys will be conducted in 2019.

**Weinheimer Fence & Water** — This project was approved and funded in 2018 for \$89,395.41 to install 3.25 miles of new, wildlife-friendly interior fencing; install two 20' fiberglass stock tanks with wildlife-friendly escape ramps; remove and replace an old, inadequate windmill with a solar pump; and install a storage tank with 2,720 feet of pipeline running to one stock tank (Table 1, Figure 25, 26). The Weinheimer ranch has met the vegetation and forage utilization goals of the CCA/CCAA, but was approaching the utilization limit. This was largely due to inadequate infrastructure throughout the ranch and heavy mesquite encroachment, leading to over-utilization 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 there were no LPC 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, there is a high probability that LPC occupy this enrolled acreage throughout different times of the year; therefore, this project can help improve habitat connectivity for LPC. The completion of this project will also improve LPC habitat for lekking, nesting and brood-rearing on the property, given proper management. Lek surveys will be conducted in 2019. About half of this enrolled acreage is in CHAT 1 and the other half in CHAT 3, with the northeast corner showing connectivity. Part of this ranch also falls within the DSL polygon.

#### *Funded Water Projects (prior to 2018) Awaiting Completion:*

**Pearce Water** – This project was funded in August 2014 for \$200,000 to allow the Participating Cooperator to improve their grazing management strategy (Figure 26). The strategy implemented includes short durations of grazing followed by long periods of relief from grazing pressure. A different pasture is getting at least 12 consecutive months of rest each year, and all others include long rest periods during the growing season. By implementing this type of strategy, nesting and brood rearing substrate for LPC is less susceptible to drought and is more productive due to the long periods of rest. In order to continue to implement these practices, a more productive water system is 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 was conducted, with the well maintaining 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 paperwork necessary to award the contract was received, and an award letter and a contract will be drafted to begin work.

**Smith Ranch Water** – This project was funded in July 2016 for \$19,657.63 (Figure 26). 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. This will increase the productivity of vegetation that the LPC relies on for nesting and brood rearing. CEHMM will develop a bid proposal for contractors. NEPA was completed in August 2017. The project was put on hold pending further discussions with the Participating Cooperator.

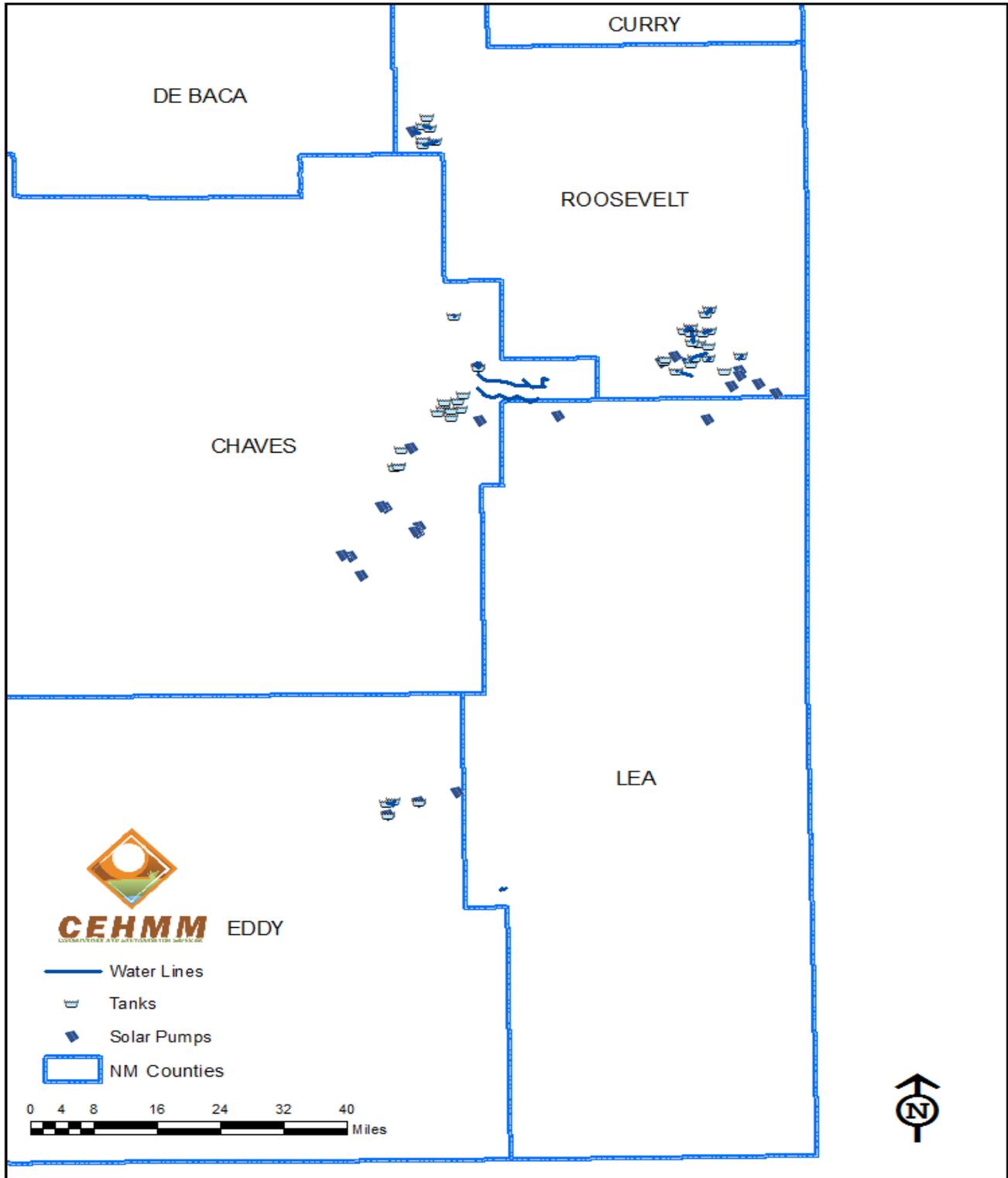


Figure 19: All Water Projects Completed by the CCA/CCA Program

## FENCE REMOVAL AND REPLACEMENT

In 2013, CEHMM held a strategic meeting where researchers identified grazing management as the primary concern for LPC. In order for producers to effectively graze to benefit LPC, 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 water and fence projects as a priority for the species. In 2018, a similar meeting was held, and researchers again determined that grazing management/rangeland health was a primary concern.

Fencing, along with implementation of a grazing management plan, will benefit all grassland species, including the LPC. Installing wildlife-friendly fences allows enrollees to graze more efficiently, allowing other pastures to rest. Adequate rest provides native grasses and forbs time to recover while also providing suitable habitat for nesting, brood-rearing, foraging, and cover for the LPC. Removing old, dilapidated fencing (5-strand barbed and sheep fence) and replacing with new wildlife-friendly fencing (Figure 20) will also decrease the risk of trespass cattle grazing the enrolled property, giving enrollees better control of their management practices. In addition to the benefits to the LPC 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 2018, 1.72 miles of wildlife-friendly fence have been completed on one enrolled ranch (Figures 23, 24, 27, 28).



**Figure 20: New wildlife-friendly interior fence where there was none prior.**

*Funded and/or Completed Fence Projects in 2018 (\*indicates completed in 2018):*

**Weinheimer Interior Fence**—This project was approved and funded in 2018 for \$110,486.94 to install approximately 7.5 miles of new wildlife-friendly fencing and to remove approximately 1.25 miles of old, dilapidated fence (Table 1, Figure 25, 26). The Weinheimer ranch has met the vegetation and forage utilization goals of the CCA/CCAA, but was approaching the utilization limit. This was largely due to inadequate infrastructure throughout the ranch and heavy mesquite encroachment, leading to over-utilization 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 there were no LPC 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, there is a high probability that LPC occupy this enrolled acreage throughout different times of the year; therefore, this project can help improve habitat connectivity for LPC. With proper management, the completion of this project will improve LPC habitat on the property. Lek surveys will be conducted in 2019. About half of this enrolled acreage is in CHAT 1 and the other half in CHAT 3, with the northeast corner showing connectivity. Part of this ranch also falls within the DSL polygon.

**Peterson-Buffington Fence Repair** — This project was approved and funded in 2018 for \$26,945.01 to replace 1.25 miles of boundary fence between two enrolled ranches. The fence was destroyed in a wildfire in 2018. The team also approved repair of a recently installed fence, also damaged in the wildfire, that needed new posts, H-braces, and corners (Table 1, Figures 21, 25, 26). Three miles of fence will be repaired and 1.25 miles will be removed and replaced. Although both the Buffington and Bilbrey properties have exceeded vegetation and forage utilization goals in the past, the recent wildfire has caused severe damage to both properties. The implementation of this project will help them continue to meet or exceed goals through proper management. This enrolled acreage is in CHAT 1. While there has been only one LPC lek observed in 2016 on the Buffington property, multiple active leks are present on the Bilbrey property, and the property borders two large PCA's with documented leks. With the close proximity of detected leks on neighboring properties, there is a high probability that LPC occupy this enrolled acreage throughout different times of the year; therefore, this project can help improve habitat connectivity for LPC. Lek surveys will be conducted in 2019.



**Figure 21: After fire went through and before repairs were made.**

**M. Coombes Boundary Fence-Removal North** — This project was approved and funded in 2018 for \$281,631.81 to remove and replace 14 miles of old, ineffective boundary fence, and remove 6.5 miles of ineffective and dangerous interior fence (Table 1, Figure 25, 26). Replacement fence will be wildlife-friendly. This fence borders five other properties enrolled in the CCA/CCAA and three NMDGF properties that have active or recent leks present. This property was damaged by wildfires in the area. Prior to the fires, the Coombes property was exceeding vegetation and forage utilization goals. Although there were no LPC detected during lekking season, with the close proximity of detected leks on neighboring properties to the immediate east and west, there is a high probability that LPC occupy this enrolled acreage throughout different times of the year; therefore, this project can help improve habitat connectivity for LPC. This enrolled acreage is in CHAT 1. Lek surveys will be conducted in 2019.

**\*Running N Interior Fence**—This project was funded in July 2016 for \$26,716.00 to install 1.72 miles of wildlife-friendly fence, and was completed in January 2018. Running N Ranch follows a rest/rotation grazing management plan (Table 2, Figure 22, 23, 24, 27). Middle Sand Pasture is composed of approximately 5,800 acres of occupied LPC habitat. The construction of this fence divided this pasture in half to better implement a management plan that will promote suitable LPC habitat. The majority of this enrolled acreage is in CHAT 1, and has been shown to exceed vegetation and forage utilization goals as of the last survey in 2016. In 2018 there were two LPC leks observed; however, this property borders other enrolled properties, including the BLM ACEC, with documented leks and occupied habitat. With the close proximity of detected leks on neighboring properties, there is a high probability that LPC are occupying this enrolled acreage throughout different times of the year; therefore, this project can help improve habitat connectivity for LPC, while helping to improve LPC habitat on the property itself through proper management. Lek surveys, along with vegetation and forage utilization monitoring, will be conducted in 2019. The southern portion of this enrolled acreage also falls within the DSL polygon. DSL were detected in 2011 on this enrolled acreage as well as to the south on neighboring properties in 2011 and 2013.

Middle Sand Pasture is composed of approximately 5,800 acres of occupied LPC habitat. The construction of this fence divided this pasture in half to better implement a management plan that will promote suitable LPC habitat. The majority of this enrolled acreage is in CHAT 1, and has been shown to exceed vegetation and forage utilization goals as of the last survey in 2016. In 2018 there were two LPC leks observed; however, this property borders other enrolled properties, including the BLM ACEC, with documented leks and occupied habitat. With the close proximity of detected leks on neighboring properties, there is a high probability that LPC are occupying this enrolled acreage throughout different times of the year; therefore, this project can help improve habitat connectivity for LPC, while helping to improve LPC habitat on the property itself through proper management. Lek surveys, along with vegetation and forage utilization monitoring, will be conducted in 2019. The southern portion of this enrolled acreage also falls within the DSL polygon. DSL were detected in 2011 on this enrolled acreage as well as to the south on neighboring properties in 2011 and 2013.



**Figure 22: Completed Wildlife-friendly Interior Fence**

Lek surveys, along with vegetation and forage utilization monitoring, will be conducted in 2019. The southern portion of this enrolled acreage also falls within the DSL polygon. DSL were detected in 2011 on this enrolled acreage as well as to the south on neighboring properties in 2011 and 2013.

**Weinheimer Fence & Water** — This project was approved and funded in 2018 for \$89,395.41 to install 3.25 miles of new, wildlife-friendly interior fencing; install two 20' fiberglass stock tanks with wildlife-friendly escape ramps; remove and replace an old, inadequate windmill with a solar pump; and install a storage tank with 2,720 feet of pipeline running to one stock tank (Table 1, Figures 25, 26). The Weinheimer ranch has met the vegetation and forage utilization goals of the CCA/CCAA, but was approaching the utilization limit. This was largely due to inadequate infrastructure throughout the ranch and heavy mesquite encroachment, leading to over-utilization 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 there were no LPC 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, there is a high probability that LPC occupy this enrolled acreage throughout different times of the year; therefore, this project can help improve habitat connectivity for LPC. The completion of this project will also improve LPC habitat for lekking, nesting and brood-rearing on the property itself, given proper management. Lek surveys will be conducted in 2019. About half of this enrolled acreage is in CHAT 1 and the other half in CHAT 3, with the Northeast corner showing connectivity. Part of this ranch also falls within the DSL polygon (Laurencio and Fitzgerald 2010).



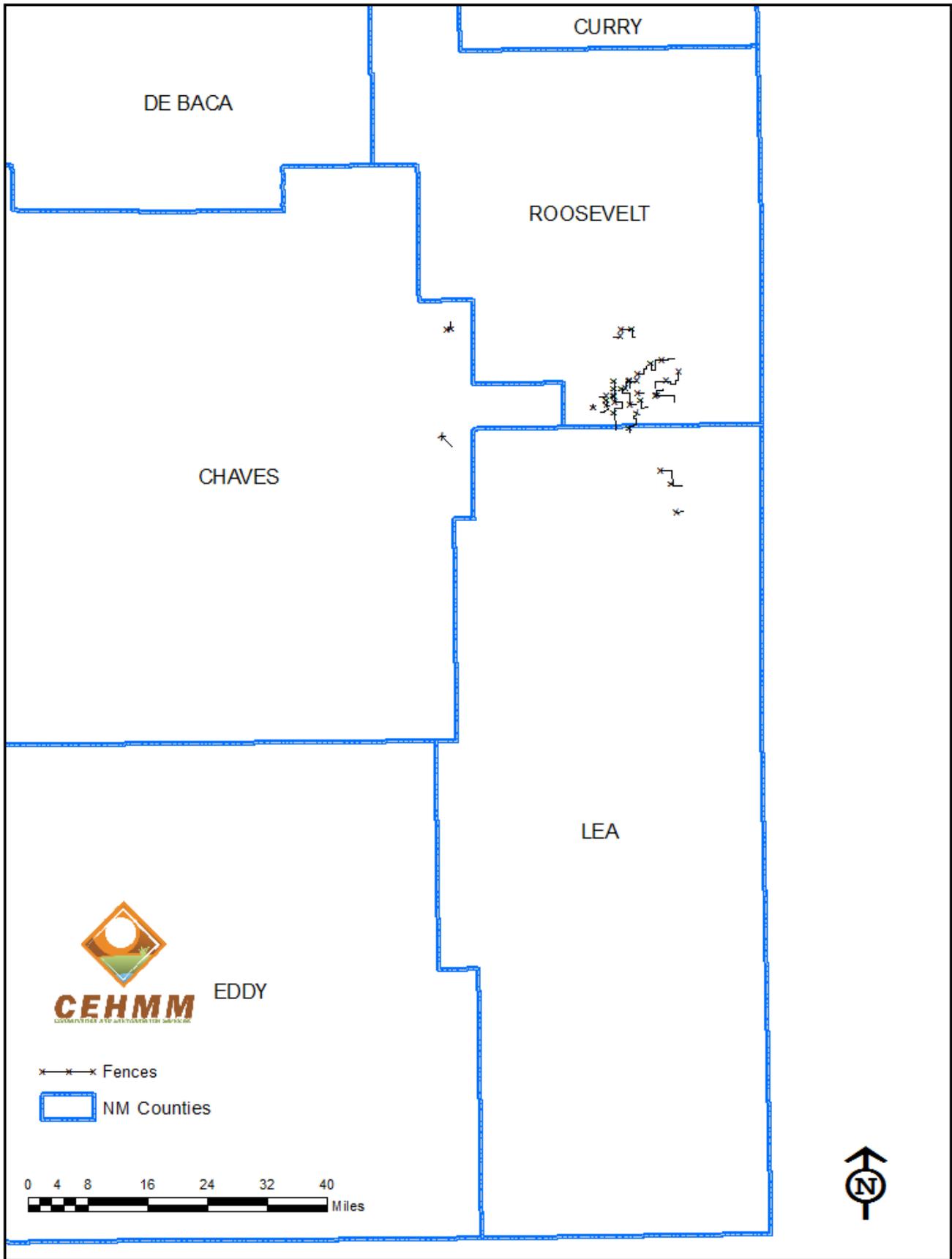


Figure 24: All Fence Projects Completed by the CCA/CAA Program

RESEARCH, EDUCATION, AND OTHER PROJECTS (\*indicates completed in 2018):

**\*Grazing Workshop**—Two workshops promoting adaptive grazing management, focused on managing through drought and utilizing adaptive grazing management strategies, were funded in June 2018 for \$12,712.81 (Table 1, 2). The workshops were made available to all Participating Cooperators. CEHMM held these workshops in October 2018.

**Leavitt and Hill Monitoring Proposal Plan**— This project was approved and funded in 2018 for \$60,343.01 (Table 1). The 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 detection probabilities, activity budgets, and field biologist influence will be examined. 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.

**Grisham-Fire and Grazing**— This was approved and funded in 2018 for \$289,773.00 (Table 1). The proposed study will assess the impact of prescribed fire and grazing on LPC habitat on three separate plots of land on the BLM ACEC.

**Natural Heritage LPC Data Management Amendment**— This project was funded in 2014 for \$43,572.00 (Table 2). 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 (Table 1) for two additional years of data collection and maintenance of LPC database.

**\*Milnesand Office**—The purchase of 290 acres of LPC habitat, which included the District 2 office, was funded in July 2017 for \$319,075.00 (Table 2). Purchasing this acreage and office allows on-the-ground support to enrollees in the area and the core of LPC habitat. The purchase was completed in May 2018

**Table 1. Funded Projects 2018.**

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Units</i>	<i>Description</i>
Running N Mesquite #2	June 2018	\$173,089.20	4,402 acres	Aerial treatment of mesquite. Eradicating and removing mesquite opens up habitat for lekking, nesting, and brood rearing.
Medlin Mesquite	June 2018	\$46,235.46	Budgeted 1,108 acres/actual treatment 993 acres	Aerial treatment of mesquite. Eradication and removal of mesquite opens up habitat for lekking, nesting, and brood rearing. After nesting bird surveys were conducted, the treatment area was 993 acres.
Weinheimer Mesquite	June 2018	\$153,792.89	Budgeted 3,900 acres/actual treatment 3,727 acres	Aerial treatment of mesquite. Eradication and removal of mesquite opens up habitat for lekking, nesting, and brood rearing. After nesting bird surveys were conducted, the treatment area was 3,727 acres.

<i>Project</i>	<i>Date Funded</i>	<i>Amount Funded</i>	<i>Units</i>	<i>Description</i>
M. Williamson DSM Removal	Funded August 2017/Amended May 2018	\$41,996.13	2017 Proposal—482 acres 2018 Amendment—Added 450 acres	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.
Medlin DSM Removal	May 2018	\$90,276.34	2,000 acres	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.
K. James Wildlife Water Amendment	June 2018	\$39,451.89	1.25 miles pipeline	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.
TNC Water	June 2018	\$52,830.44	N/A	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	N/A	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>Units</i>	<i>Description</i>
M Coombes Water #1 North	June 2018	\$141,205.21	3,900' pipeline	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 #2 North	June 2018	\$59,911.47	N/A	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 & Water	June 2018	\$89,395.41	3.25 miles fence/2,720' pipeline	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	Remove 1.25 miles of fence. Install 7.5 miles of fence	Fencing improves grazing rotation which allows for the maintenance or improvement of LPC habitat.
Peterson-Buffington Fence Repair	June 2018	\$26,945.01	1.25 miles remove and replace/3 miles repair	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 indirectly 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>Units</i>	<i>Description</i>
M Coombes Boundary Fence-Removal North	June 2018	\$281,631.81	14 miles remove and replace/6.5 miles remove, not replaced	Fencing improves grazing rotation which allows for the maintaining of or the improvement of LPC habitat and stops trespass cattle. Old fence needs to be removed as it is a hazard to wildlife. This fence also shares a boundary with other enrollees.
Grazing Workshop	June 2018	\$12,712.81	N/A	Two workshops promoting adaptive grazing management, focused on managing through drought and utilizing adaptive grazing management strategies, were funded in June 2018.
Leavitt and Hill Monitoring Proposal Plan	June 2018	\$60,343.01	N/A	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.
Grisham—Fire and Grazing	June 2018	\$289,773.00	N/A	The study will assess the impact of prescribed fire and grazing on LPC habitat on three separate plots of land on the BLM ACEC.
Natural Heritage LPC Data Management Amendment	December 2018	\$19,051.00	N/A	Two years of LPC data collection and maintenance of LP database.
<b>2018 Funded Projects Total</b>		<b>\$1,708,497.26</b>		

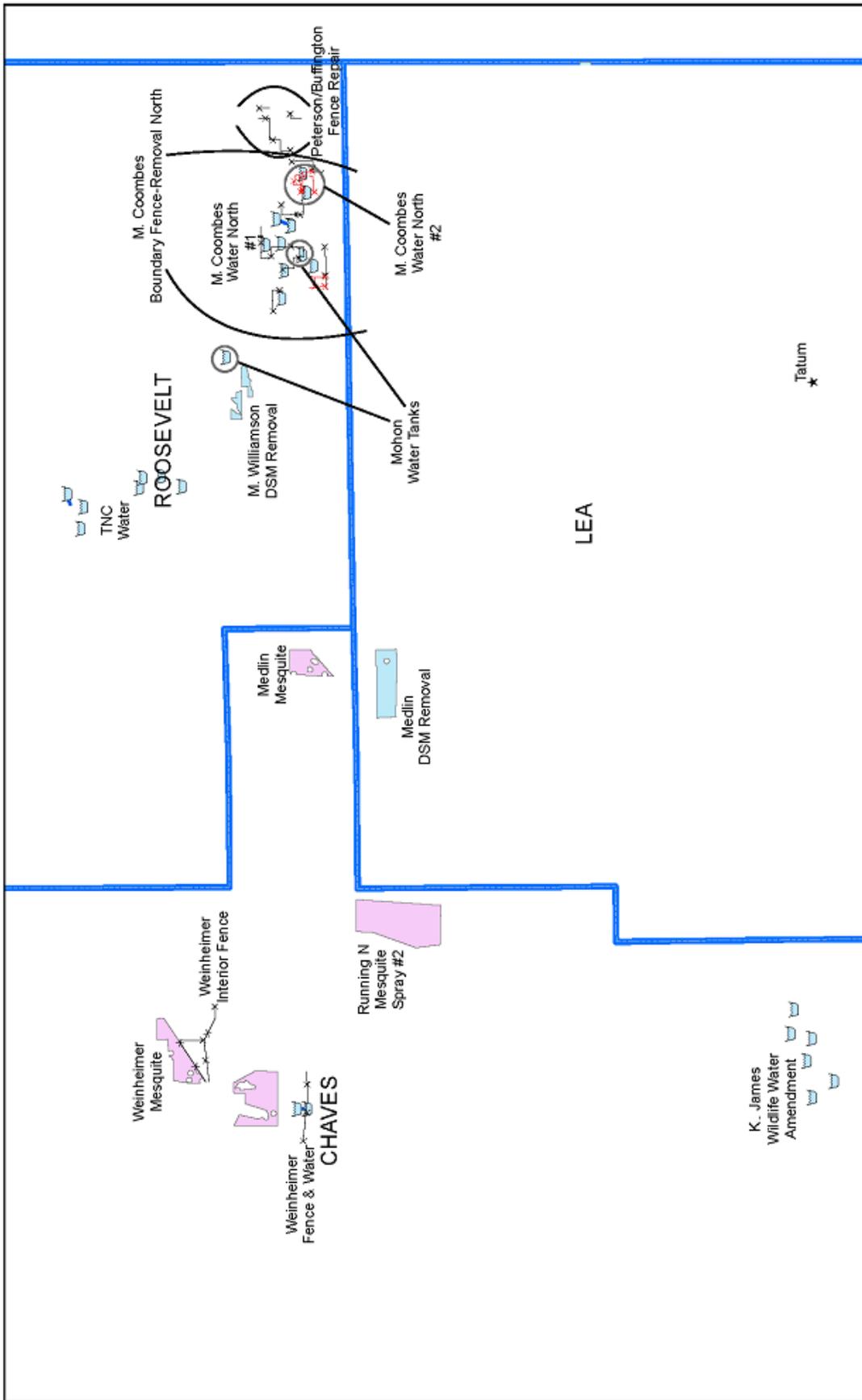


Figure 25: 2018 Funded Projects

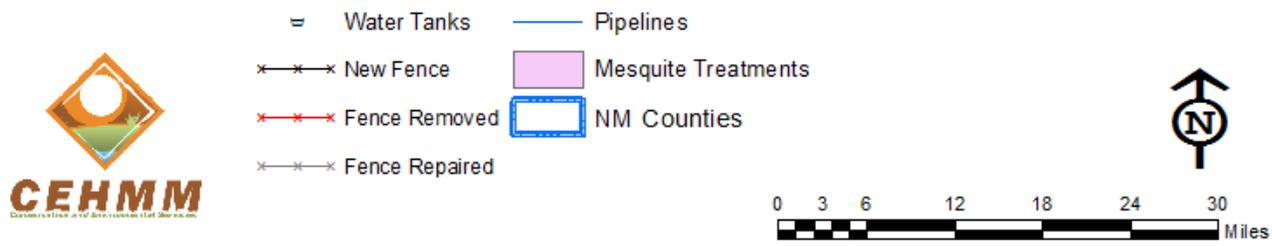
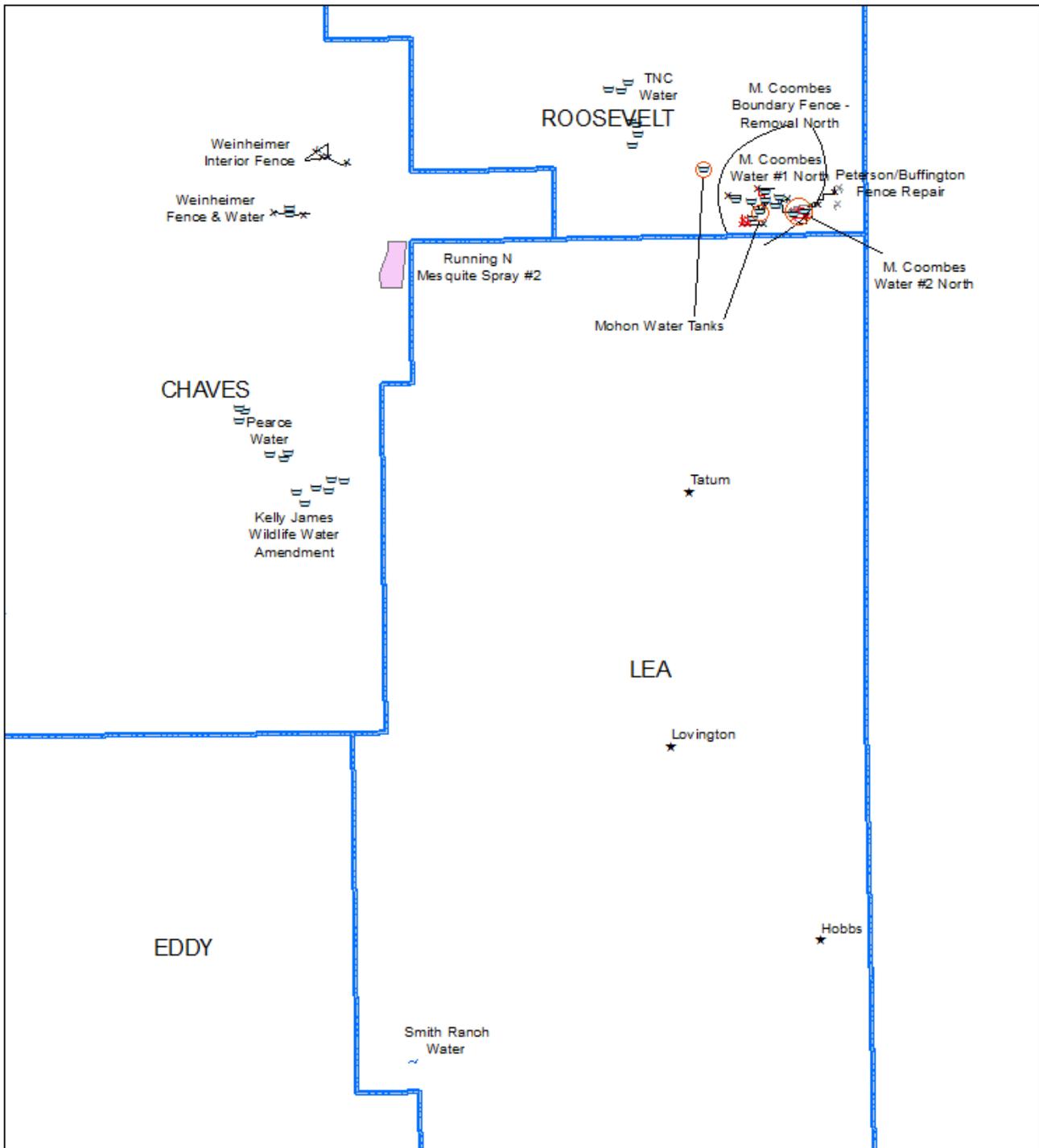


Figure 26: Funded Projects Awaiting Completion

**Table 2. Completed Projects 2018.**

<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>
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.
Mesquite Hand Treatment of Active Leks #1	March 2017	\$897,876.85	\$692,958.64 + pending charges	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.
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.
Riley Mesquite	February 2014	\$149,350.08	\$144,741.91	Budgeted 4,028 acres/ actual treatment 3,793 acres	July 2018	Aerial treatment of mesquite. This project is desirable LPC habitat that was being encroached upon by mesquite. Eradication and removal of mesquite 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.
M Williamson DSM Removal	Funded August 2017/ Amended May 2018	\$41,996.13	\$8,444.04	2017 Proposal— 482 acres  2018 Amendment— Added 450 acres	August 2018	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>
Medlin DSM Removal	May 2018	\$90,276.34	\$14,238.24	2,000 acres	September 2018	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.
Peterson/Luman DSM Removal	August 2017	\$26,562.00	\$1,255.08	250 acres	October 2018	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 Interior Fence	July 2016	\$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.
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.
Natural Heritage LPC Data Management Amendment	February 2014	\$43,572.00	\$37,148.29 + pending charges	N/A	December 2018	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, which will be utilized by various agencies for future monitoring and management efforts.
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.
<b>2018 Completed Projects Total</b>		<b>\$1,808,165.56</b>	<b>\$1,436,936.24 + pending charges</b>			

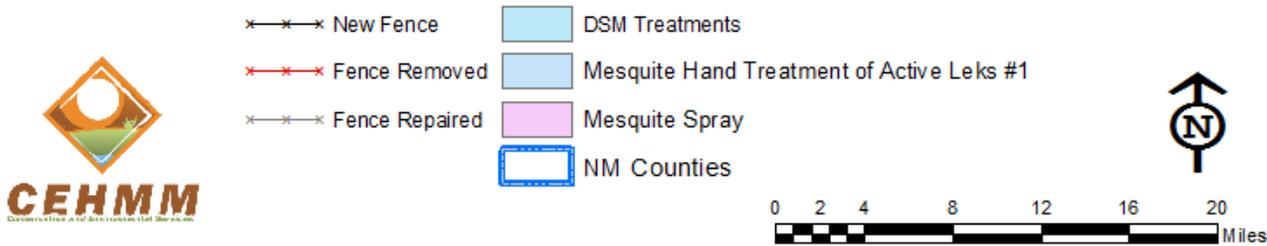
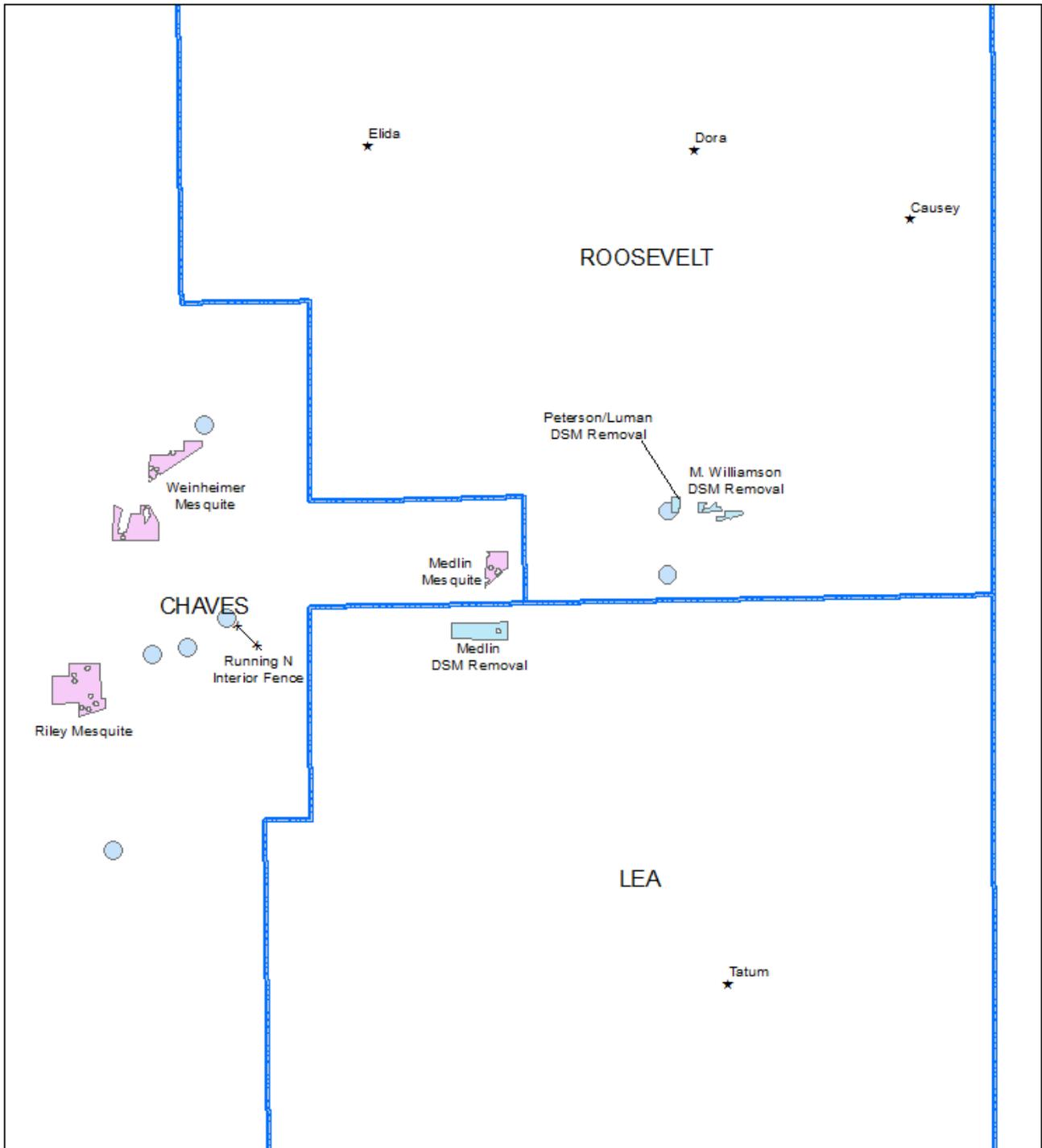


Figure 27: Completed Projects 2018

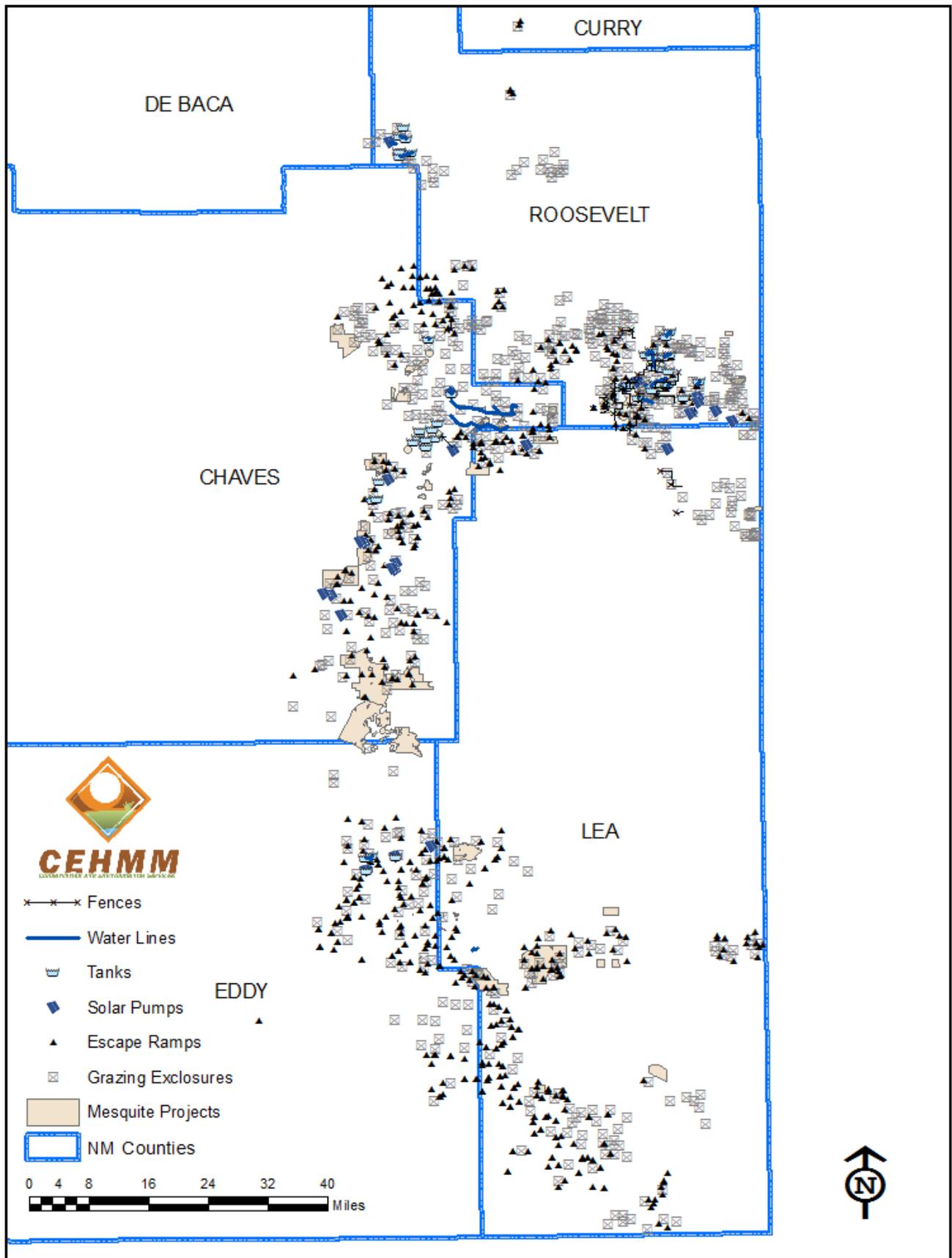


Figure 28: All Projects Completed by the CCA/CAA Program

## MONITORING

### *MONITORING OF COMPLETED PROJECTS*

Part of CEHMM’s role in the CCA/CCAA is to monitor projects and vegetative attributes in areas where those projects were completed to determine if the goals described in proposals were achieved. Projects monitored 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 treatments in 2018. Appendix I describes CEHMM’s monitoring efforts, including the mesquite projects that data was collected on in 2018. 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 from the first year that data was collected and 2018.

**Table 3. Mesquite canopy values (%) collected in 2018 on completed projects.**

Project Name	Spray Method	Date Completed	Post-Treatment Canopy	Post-Treatment Canopy
Sims Mesquite	Aerial	6/30/2011	4.09 % (2016)	7.58% (2018)
Berry Mesquite	Aerial	6/30/2011	5.79 % (2016)	3.16% (2018)
Bogle Mesquite	Aerial	6/30/2011	5.39 % (2016)	1.32% (2018)
BLM Caviness Mesquite	Aerial	6/30/2014	3.68 % (2016)	1.76% (2018)
Meyers Mesquite	Aerial	6/30/2011	3.20 % (2016)	1.76% (2018)
Field Mesquite	Hand followed by mechanical removal	1/15/2018	10.08 % (2016)	0.75% (2018)

**Table 4. Change in grass and forb canopy percentages on previously completed mesquite treatments. Change is from the first year data was collected to 2018.**

Percent Change in Canopy		
Project Name and Years Data was Collected	Grasses	Forbs
Sims Mesquite (2016, 2018)	21.2%	-7.1%
Berry Mesquite (2016, 2018)	26.0%	-0.2%
Bogle Mesquite (2016, 2018)	-7.7%	8.0%
BLM Caviness Mesquite (2016,2018)	1.1%	-0.6%
Meyers Mesquite (2016, 2018)	1.4%	-6.6%
Field Mesquite (2016, 2018)	-23.0%	31.0%

Some mesquite treatments have shown slight increases in mesquite canopy cover, although this can be attributed to various environmental factors that can affect these treatments. All mesquite treatments have shown increases in canopy cover of bunchgrasses, forbs, or both. An increase in bunchgrasses (e.g., Little Bluestem, Big Bluestem, etc.) allows the LPC greater opportunity for selecting nesting sites, while the increase in forbs can provide a valuable food source in spring and summer (Davis et al. 1979).



**Figure 29: Oil and gas pad one year following reclamation efforts.**

Range improvement projects (e.g., fence and livestock water) are monitored for functionality on a quarterly basis. All range improvements were found to be functional in 2018. These types of projects are related to implementing adaptive grazing management practices geared toward helping Participating Co-operators achieve the conservation measures described in their respective CP and/or CI. Vegetation and forage utilization records show that all properties

with fence and water improvements are fulfilling their conservation commitment 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, one reclamation project was also monitored for vegetative response. Reclamation projects previously completed have historically included the removal of caliche and re-introduction of native vegetation through seeding. Photographs documenting reclamation success are taken at each site. Figures 29 and 30 show an old oil and gas pad one and three years following reclamation efforts, respectively.



**Figure 30: Oil and gas pad three years following reclamation efforts.**

## SPECIES MONITORING

In 2018, herpetologist Mike Hill conducted nine days of DSL walking surveys in areas where well pads had been relocated after onsite evaluations with enrolled operators to avoid suitable DSL habitat and achieve conservation measures in the CCA/CCAA. Walking surveys were conducted by traversing suitable DSL habitat on foot in an effort to detect and capture DSL using 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. Once the specimen was noosed, Mr. Hill confirmed the species, and voucher photos were taken. Voucher photos were taken as evidence that the specimen captured was a DSL (Figure 31), and ventral, dorsal, and lateral pictures were taken for confirmation. Once the voucher photos were taken, the specimen was released into the shade. Two DSL were captured and photo vouchers were taken at these sites. Two other DSL were also observed and photographed, but voucher photos were not able to be obtained because Mr. Hill and CEHMM wildlife biologists were unable to capture them. Mike Hill also observed 37 lizards of three other species while performing the walking surveys: 27 Common Side-blotched Lizards (*Uta stansburiana*), seven Marbled Whiptails (*Aspidoscelis marmorata*), one Lesser Earless Lizard (*Holbrookia maculata*), one Six-Lined Racerunner (*Aspidoscelis sexlineata*), and one unknown lizard.



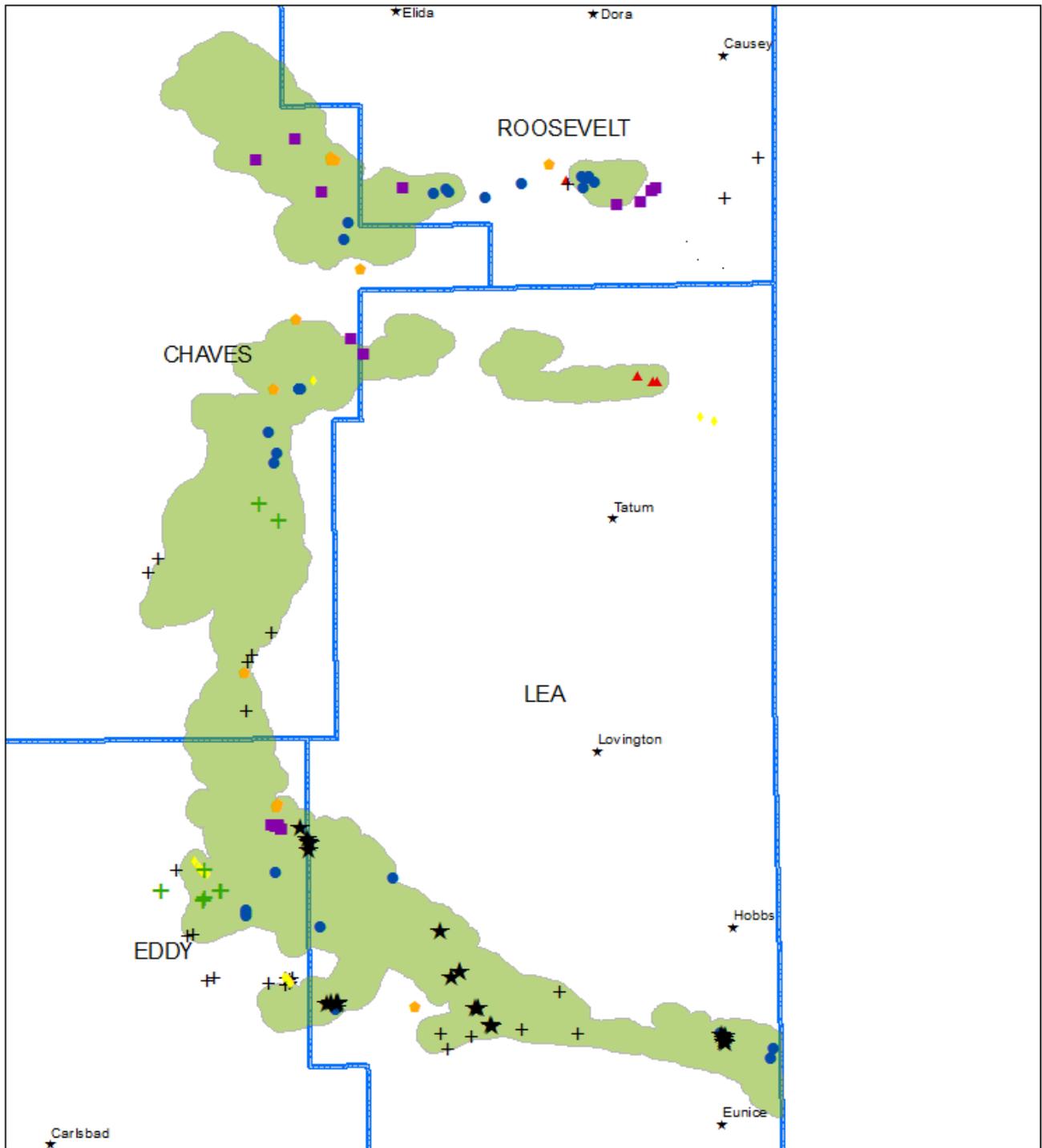
**Figure 31: Dunes Sagebrush Lizard**  
Courtesy of Mike Hill

CEHMM conducted 45 days of LPC road surveys on 45 CCA/CCAA ranches in March, April, May, and June 2018. Road surveys are also known as listening surveys. The surveyors shut off their vehicles and stood outside of their vehicles listening for ten minutes at each stop. The surveyors collected the following data at each stop: survey area (ranch name), presence of LPC, direction LPC were located, time, temperature, wind speed, cloud cover, noise sources, noise levels, and other wildlife observed or heard.



**Figure 32: Lesser Prairie-Chickens on a Lek**

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 concluded the following day. Winds at those speeds inhibit the surveyor from hearing the LPC and thus may produce false negatives for the area. In 2018, there were 646 stops made on 45 ranches. LPC were heard on 133 stops on 23 of the 45 ranches, and 911 LPC were observed on 80 leks (Figure 32). Figures 33 and 34 depict survey locations for 2018.



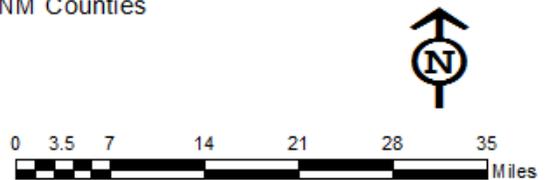
**DSL Survey Pts**

**Year**

- + 2011
- 2012
- 2013

- ▲ 2014
- ◆ 2015
- ◇ 2016
- ⊕ 2017
- ★ 2018

- DSL Range
- NM Counties



**Figure 33: DSL Surveys 2011-2018**

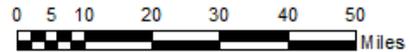
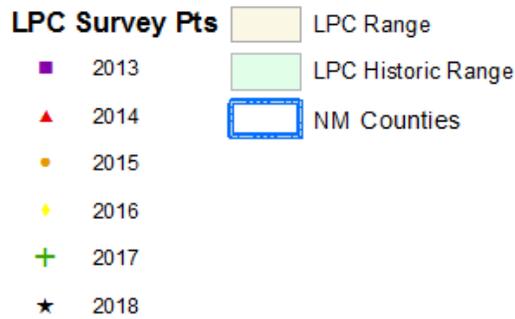
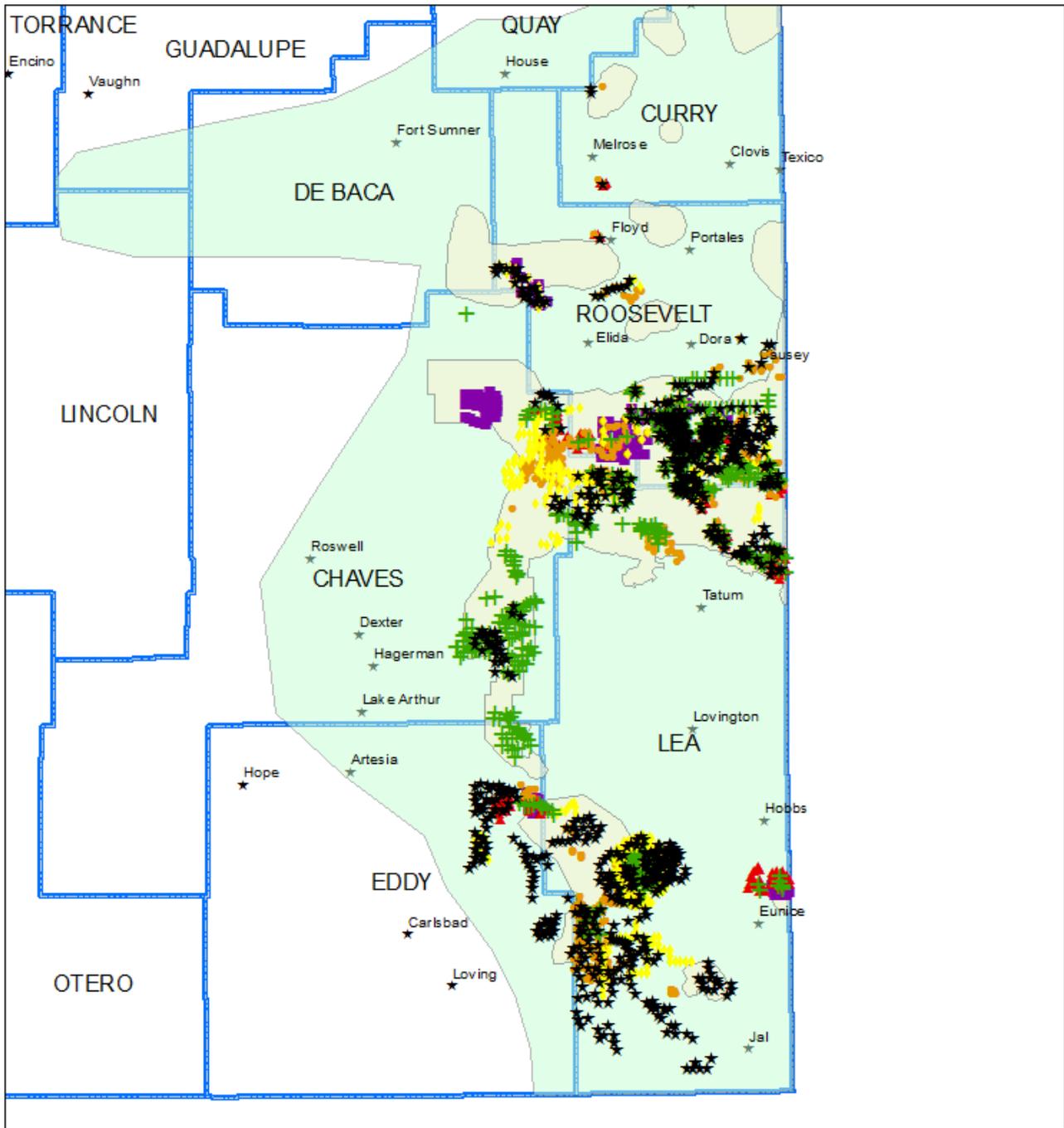


Figure 34: LPC Surveys 2013-2018

## GRAZING MONITORING

Baseline data for livestock grazing operations with acreage identified in a CI or CP were monitored (Figure 35) for 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 apply directly to available nesting and brood rearing habitat for LPC. DSL habitat related to grazing and rangeland management is also considered by ensuring that conservation measures in relation to treatment of shinnery oak in dune complexes and their corridors are achieved. In addition to monitoring vegetative attributes on the landscape, 15 new monitoring sites were established on two enrolled properties, meetings with Participating Cooperators to discuss results of forage utilization data collected in 2017 were held, sites were prepared to collect forage utilization data in winter 2018-2019, educational events were attended, and a grazing management plan questionnaire for each enrollee was developed to document plans for grazing in 2018.



**Figure 35: Vegetation Monitoring Transect**

for these same attributes will be collected within the next three years in the same two-week window with the purpose of determining 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, consideration of events that have occurred on the landscape, including, but not limited to rangeland management, natural disasters, energy development, and other uses of the landscape are taken into account when determining if a Participating Cooperator is achieving the conservation measures identified in their respective CIs and CPs.

In addition to collecting the above-mentioned data, CEHMM also prepared 120 sites to monitor forage utilization on grazing operations identified in 16 CI’s and/or CP’s. Fifteen new monitoring sites were identified on two operations as well. Participating Cooperators and landowners agree to a 45% utilization rate of forage by livestock as a conservation measure to help assure that LPC have adequate cover remaining for the upcoming nesting season. In the event that overutilization has deemed the habitat unsuitable, CEHMM range conservation staff will work with the operator to apply adaptive management practices and continue to monitor to determine if these practices work, or if other avenues should be taken to improve habitat conditions. Identifying upcoming grazing plans in the questionnaire that was developed and comparing those plans to actions on the ground will help in application of adaptive management if necessary (Appendix J).

All ranches that were monitored were found to provide suitable habitat for LPC and DSL within their respective ranges. Recent years of average and above average precipitation have allowed vegetative habitat components for LPC to recover from past drought periods. Grass species that LPC prefer for nesting are 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 LPC and DSL.

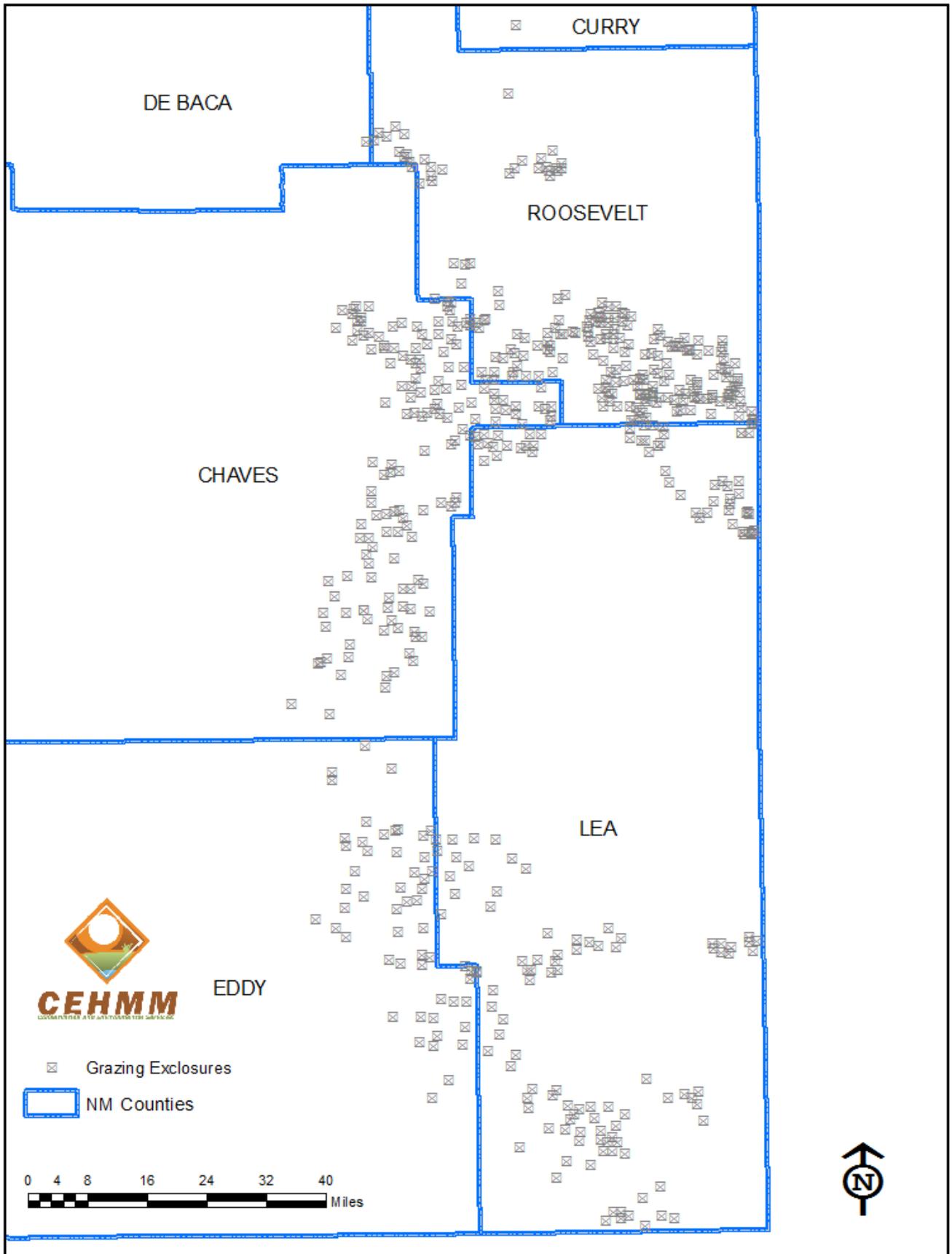
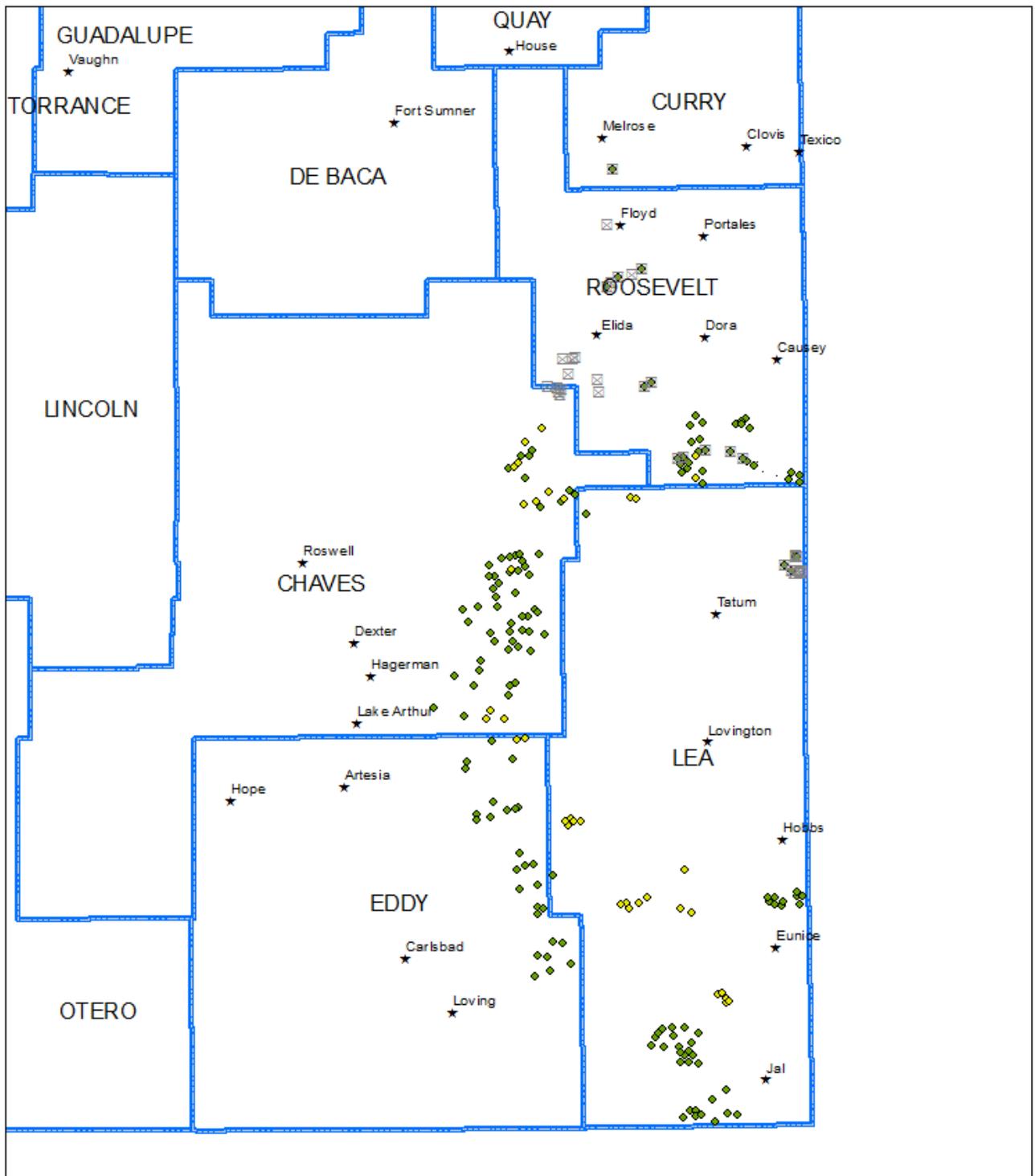


Figure 36: Exclosure Locations



- ☒ Exclosures 2018
- ◆ Mesquite Cover Transects
- ◆ Grazing Transect 2018
- ▭ NM Counties



**Figure 37: Grazing Monitoring and Transect Locations**

## MITIGATION OF IMPACTS TO HABITAT

CEHMM collaborated with four enrolled operators and the BLM to perform onsites 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), and avoiding suitable LPC and/or DSL habitat. Three onsites 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 development of facilities associated with the development of a well. Two wells were relocated on federal lands to avoid suitable DSL habitat. No wells were relocated on non-federal lands to avoid suitable LPC or DSL habitat. Table 5 describes the onsites that were completed in 2018. Since the inception of the CCA/CCAA, 624 wells have been relocated to avoid LPC and/or DSL habitat through the cooperation of the parties involved in the CCA/CCAA.

In 2018, 657 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 129.76 acres. Eight Participating Cooperators reported reclamation activities. Table 6 illustrates all activities that were reported by Participating Cooperators in 2018.

**Table 5. Onsites Completed 2018.**

<i>Federal onsites</i>	<i>Federal well locations moved for CCA</i>	<i>Non-Federal onsites complet-</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 formal notification to Participating Cooperators if it is discovered that any of the conservation measures listed in their CIs and CPs are not being implemented. A Conservation Measure Violation (CMV) is a formal notification to Participating Cooperators of the failure to implement conservation measure(s). It is similar to an Incident of Non-Compliance (INC) that the BLM issues to operators that do not meet the conditions of use on their respective operations. When a CMV is issued, CEHMM will work with Participating Cooperators to remedy the matter at hand in relation to the specific conservation measure that is not being applied. There is no fine or penalty involved with a CMV; however, if three CMV’s are issued in a 12-month period, Participating Cooperators risk termination of their CP and/or CI and the benefits of the CCA/CCAA in the event that the LPC or DSL were to be added to the threatened or endangered species list. Due to diligent planning, consultation with CEHMM, and an understanding of the purpose of the CCA/CCAA, no CMV’s were issued in 2018. A blank CMV can be reviewed in Appendix K.

**Table 6. Company Involvement 2018.**

<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>
Apache	5	1	0	0	17	0	0.48
Armstrong	0	0	0	0	0	0	0
BOPCO	0	0	0	0	0	0	0
BTA*	*	*	*	*	*	*	*
Burnett*	4	0	0	0	0	0	4.19
Chevron	0	0	0	0	1	0	3.17
Cimarex*	*	*	*	*	*	*	*
COG*	*	*	*	*	*	*	*
Conoco Phillips	7	0	0	0	5	0	10.75
Cross Timbers	0	0	0	0	0	0	0
Devon	20	33	0	0	0	24	0
Enervest*	*	*	*	*	*	*	*
EOG*	*	*	*	*	*	*	27
Fair oil	0	0	0	0	0	0	0
Fasken	0	0	0	0	0	0	0
Hanley Petroleum*	*	*	*	*	*	*	*
Hudson	0	0	0	0	0	0	0.03
Kaiser-Francis*	*	*	*	*	*	*	*
Legacy*	*	*	*	*	*	*	*
Linn	*	*	*	*	*	*	*

\* 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>
Mack	7	2	0	0	9	0	27
Marathon	0	0	0	0	0	0	0
McElvain	5	0	0	0	2	0	0
Marshall & Winston*	*	*	*	*	*	*	*
Matador*	*	*	*	*	*	*	*
Mewbourne	7	0	0	0	2	0	0
Nemo Fund*	*	*	*	*	*	*	*
OGX Production*	*	*	*	*	*	*	*
OXY	82	19	0	0	18	0	57.14
Paladin*	*	*	*	*	*	*	*
Primero*	*	*	*	*	*	*	*
Read & Stevens*	*	*	*	*	*	*	*
Regeneration	0	0	0	0	0	0	0
RG Exploration	0	0	0	0	0	0	0
RKI	0	0	0	0	0	0	0
Shackelford*	*	*	*	*	*	*	*
Stanolind	0	0	0	0	0	0	0
Strata	*	*	*	*	*	*	*
Tierra	0	1	0	0	0	0	0
V-F Petroleum	0	0	0	0	0	0	0
XTO*	*	*	*	*	*	*	*
<b>TOTAL</b>	<b>137</b>	<b>56</b>	<b>0</b>	<b>0</b>	<b>54</b>	<b>3</b>	<b>129.76</b>

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

## SUMMARY

To date, a total of 1,871,773 acres of rangeland have been enrolled in the CCA/CCAA. A total of 1,922,887 acres of land within the historical range of the LPC and DSL have been enrolled by oil and gas enrolled in the CCA/CCAA since the original agreements were executed.

Eleven projects were completed in 2018 and included:

- Construction of 1.72 miles of wildlife-friendly barbed wire fence;
- Acquisition of 290 acres of suitable, occupied LPC habitat along with facilities to conduct operations in District 2;
- 8,513 acres of aerial mesquite treatments;
- 3,514 acres of hand mesquite treatments;
- 3,182 acres of mechanical mesquite removal;
- One outreach and education project to promote sustainable grazing management strategies in LPC and DSL habitat with 30 attendees; and,
- One project to manage data for LPC and DSL.

The continued participation of the ranching community, oil and gas industry, and state and federal agencies in the CCA/CCAA has allowed CEHMM to successfully initiate and complete these projects as well as those in previous years. Through the cooperative conservation of Participating Cooperators, their operations remain in effect while still managing the landscapes with the vision of maintaining suitable habitat and creating suitable habitat 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 (USFWS) and Bureau of Land Management (BLM) developed the Candidate Conservation Agreement (CCA) and Candidate Conservation Agreement with Assurances (CCAA) is to address concerns by land owners and federal lease holders 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 USFWS 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 factored 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 USFWS, BLM, and Center of Excellence (CEHMM) for actions (such as oil and gas development and livestock grazing) occurring on lands or minerals administered by 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 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 that 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 that they will not be subject to additional restrictions if LPC and/or 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 that 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 conservation measures across the landscape in a consistent manner that improves the status 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 staffs 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 gets 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 set by a team of biologists from CEHMM, the USFWS, NM Game & Fish Department, NM State Land Office, and BLM. CEHMM is responsible for implementing (contracting), monitoring and reporting on projects.

### **What are the advantages of a participant?**

If listing were to occur, Participating Cooperators would only be delayed about one to two months while the USFWS consultation on the Agreement (CCA/CCAA) is adopted as their final “opinion.” At that period, the companies could continue their operations. For those who have not participated, a delay up to three years would be anticipated on their permits since they will require analysis for impacts to the species. There could even be a situation where a permit would not be approved. An additional advantage to participating is that once the USFWS 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 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 new activities beginning.

**How long do I contribute funds?**

The Participating Cooperator will provide funds over a three-year period that begins 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 for 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 that 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 USFWS to address potential take issues from the operation through the Section 10 process before the 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 Candidate Conservation Agreement with Assurances 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 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 LPC, projects would include invasive brush control, removal of abandoned structures, installing wildlife escape ramps in water troughs, and removing caliche 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 would impact the species would require consultation with USFWS.

## **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 signed up

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 signing up, 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 conservation for LPC/DSL across all ownerships in the same manner since the primary goal of the agreements is to guide conservation measures and efforts that will 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 BLM and USFWS is required. Due to limited staffs 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 based on the agreement.

**If I participate, can I locate wells on my lease where I want to?**

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 for Hazardous Materials Management (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 the 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 USFWS, 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 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 Fees<sup>1</sup>**

<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 <sup>2</sup>	\$ 3,000/location

<sup>1</sup>. Includes well pad and associated access road

<sup>2</sup>. 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 pad<sup>3</sup> 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 <sup>4</sup>	\$1,000/acre

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

<sup>4</sup>. 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 acreage disturbed.

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. 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 <sup>5</sup>	\$ <u>1.50</u> /acre	\$ <u>25.00</u> /linear mile*

\* or any fraction thereof

<sup>5</sup> 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 RMP Zones.

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

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

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

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

Is project within the BLM DSL polygon? Provide map of project in relation to DSL habitat.

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

Will project restore or create shinnery oak dunes? Explain.

Explain how 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., an 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 map of 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 to the proximity of the project to known locations of either species.

Does the project include re-introducing 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**

<b>Participant Name:</b>	<b>Enrolled in CCAA/CCA? (YES) (NO)</b>	
<b>Project Name:</b>	<b>Number of acres to be treated?</b>	
<b>Address:</b>	<b>Evaluator Name:</b>	
<b>Criteria</b>	<b>Max. Points</b>	<b>Score</b>
<b>1.</b> Does project benefit Dunes Sagebrush Lizard?*	10	
<b>2.</b> Does project benefit Lesser Prairie Chicken?*	10	
<b>3.</b> Will the project restore missing habitat components for feeding, breeding, shelter or water for the species?*	10	
<b>4.</b> Is project a component of an overall restoration plan or objective?*	10	
<b>5.</b> Are lizard surveys included in the project plans?	5	
<b>6.</b> Are prairie chicken surveys included in the project plan/ area?	5	
<b>7.</b> Is the project in the CMA or PPA?	10	
<b>8.</b> Is the project in an HEA?	5	
<b>9.</b> Is the project within the CHAT Focal Habitat Zone?	10	
<b>10.</b> Is the project within the CHAT connectivity zone habitat area?	5	
<b>11.</b> Is project within three miles of an unoccupied historic lek?	5	
<b>12.</b> Is project within three miles of an active lek?	10	
<b>13.</b> Is the project within the BLM DSL Polygon?	10	
<b>14.</b> Will project remove infrastructure from suitable or occupied dune complexes?	10	
<b>15.</b> Will project restore or create shinnery oak dunes	10	
<b>16.</b> Will project remove invasive weeds or brush to increase beneficial plant species?	5	
<b>17.</b> 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"> <li>• &gt; 640 acres deferred in one year</li> <li>• 160 – 640 acres deferred in one year</li> </ul>	(10 point max) 10 5	
<b>18.</b> 20 Point CCA/CCAA Enrollment Bonus if project is entirely on enrolled lands.	20	
<b>19.</b> There is a Private, Federal or State cost share or will be used to match an NRCS grant?	5	

<b>20.</b> Number of years project will be maintained (1 point/year)	10 points max	
<b>21.</b> Is the project within five miles of another restoration project for either species?	5	
<b>22.</b> Will the project provide connectivity between two habitat patches?	10	
<b>23.</b> Will the project remove power lines, poles, or other vertical structures (> 15ft. tall) within three miles of an active lek?	5	
<b>24.</b> Will the project remove fences, roads and pads and reduce habitat fragmentation?*	5	
<b>25.</b> Does the project include re-introducing the species to the project area?*	5	
<b>26.</b> Does the project provide a map showing known locations of either species?	5	
<b>Total</b>	<b>210</b>	

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

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\*Additional clarification for the following criteria:

1. In order to have a benefit for Dunes Sagebrush Lizards, 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 (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.
  - 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. Project must create a corridor between two habitat patches that have been disconnected by infrastructure or unsuitable habitat.
25. Must be part of a 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 habitat, 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: YES \_\_\_\_\_ NO \_\_\_\_\_ How?

Lesser Prairie Chicken: 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 CHAT Focal Habitat zone habitat area? Provide map of project in relation to CHAT Zones.

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

Is project within the BLM DSL polygon? Provide map of 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 re-introduction 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**

<b>Participant Name:</b>	<b>Address:</b>	
<b>Project Name:</b>		
<b>Evaluator Name:</b>	<b>Total Score:</b>	
<b>Criteria</b>	<b>Max. Points</b>	<b>Score</b>
1. Does project benefit Dunes Sagebrush Lizard?*	10	
2. Does project benefit Lesser Prairie Chicken?*	10	
3. Is the project within the CHAT Focal habitat area?	10	
4. Is the project within the CHAT connectivity zone habitat area?	5	
5. Is the project within the BLM DSL polygon?	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. Is there a cost share provided?	10	
15. Does the proposal include partnership and coordination with agencies and NGO's?	15	
16. Is there a detailed budget included?	10	
<b>Total</b>	<b>160</b>	

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


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\*Additional clarification for the following criteria:

1. In order to have a benefit for Dunes Sagebrush Lizards, 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.
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.

<b>Project</b>	<b>Date Funded</b>	<b>Amount Funded</b>	<b>Project Cost</b>	<b>Units</b>	<b>Date Completed</b>	<b>Description</b>
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 predator perches 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 predator perches 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 was identified as a potential threat to LPC because of perching by raptors.
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	\$43,572.00	\$37,148.29 + pending charges	N/A	December 2018	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	\$144,741.91	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	\$47,187.02 + pending charges	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.

<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>
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	\$105,528.50 + pending charges	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 has 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	June 2016	\$19,657.63	Pending	1.1 miles of pipe-line	In Progress	Awaiting info from Participating Cooperator on changes that need to be made due to development in the area.
K. James Wildlife Water Amendment	June 2016/ Amended 2018	\$39,451.89	\$280.63 + pending charges	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	\$95,090.51	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	\$692,958.64 + pending charges	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	August 2017	\$745,470.00	Pending	5,020 acres	Pending	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	\$1,255.08	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	\$8,444.04	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	Eradicating and removing mesquite opens up habitat for 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	\$14,238.24	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	Pending	N/A	Pending	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	Pending	N/A	Pending	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	Pending	3,900' pipeline	Pending	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	Pending	N/A	Pending	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' pipe-line	Fence complete, water pending	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 charges	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	\$682.73 + pending charges	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	\$3,005.53 + pending charges	14 miles remove and re-place/6.5 miles remove, not re-placed	Pending	Fencing improves grazing rotation which allows for the maintaining of or the improvement of LPC habitat and stops trespass cattle. Old fence needs to be removed as it is a hazard to wildlife. This fence also shares a boundary with other enrollees.
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	Pending	N/A	Pending	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.

Grisham—Fire and Grazing	June 2018	\$289,773.00	Pending	N/A	Pending	The study will assess the impact of prescribed fire and grazing on LPC habitat on three separate plots of land on the BLM ACEC.
Natural Heritage LPC Data Management Amendment	December 2018	\$19,051.00	Pending	N/A	Pending	Two years of data collection and maintenance of LPC database.
<b>Project Totals</b>		<b>\$10,766,058.82</b>	<b>\$7,352,510.15 + pending charges</b>			

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

<b>Total Treated for Entire Project</b>	
Roads and Pads Caliche Removal and Reseeding (Acres)	159.20
Mesquite (Acres)	79,297.00
Dead Standing Mesquite Eradication (Acres)	5,104.70
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.

**H**oney 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:

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Conservation Benefits: Mesquite Removal

**APPENDIX I:  
Monitoring Report**



**CEHMM**

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

**Monitoring Report**



**August 2018**

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## 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 aeri ally 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 aeri ally 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<sup>®</sup> was introduced and increased the average kill of mesquite by 10%, and in 2014 adding eight ounces of Remedy<sup>®</sup> to Sendero<sup>®</sup> 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<sup>®</sup> 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 <sup>1</sup>	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 <sup>1</sup>	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

<sup>1</sup>: 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](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.**

<b>Fence Projects</b>		
<b>Project Name</b>	<b>Date Completed</b>	<b>Forage Utilization (Post Project Completion)</b>
McCloy Fence	9/25/2015	27%
Running N Fence	9/25/2015	0.11%
<b>Water Projects</b>		
<b>Project Name</b>	<b>Date Completed</b>	<b>Forage Utilization (Post Project Completion)</b>
Billbrey 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.

# 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 – 575-675-2324

Visit us at [www.cehmm.org](http://www.cehmm.org)

Conservation Benefits: Grazing Management

**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* \_\_\_\_\_